



Oregon

Theodore R. Kulongoski, Governor

Department of Land Conservation and Development

635 Capitol Street, Suite 150

Salem, OR 97301-2540

(503) 373-0050

Fax (503) 378-5518

www.lcd.state.or.us



NOTICE OF ADOPTED AMENDMENT

09/16/2013

TO: Subscribers to Notice of Adopted Plan
or Land Use Regulation Amendments

FROM: Plan Amendment Program Specialist

SUBJECT: City of Florence Plan Amendment
DLCD File Number 001-13

The Department of Land Conservation and Development (DLCD) received the attached notice of adoption. Due to the size of amended material submitted, a complete copy has not been attached. A Copy of the adopted plan amendment is available for review at the DLCD office in Salem and the local government office.

Appeal Procedures*

DLCD ACKNOWLEDGMENT or DEADLINE TO APPEAL: Friday, September 27, 2013

This amendment was submitted to DLCD for review prior to adoption pursuant to ORS 197.830(2)(b) only persons who participated in the local government proceedings leading to adoption of the amendment are eligible to appeal this decision to the Land Use Board of Appeals (LUBA).

If you wish to appeal, you must file a notice of intent to appeal with the Land Use Board of Appeals (LUBA) no later than 21 days from the date the decision was mailed to you by the local government. If you have questions, check with the local government to determine the appeal deadline. Copies of the notice of intent to appeal must be served upon the local government and others who received written notice of the final decision from the local government. The notice of intent to appeal must be served and filed in the form and manner prescribed by LUBA, (OAR Chapter 661, Division 10). Please call LUBA at 503-373-1265, if you have questions about appeal procedures.

***NOTE:** The Acknowledgment or Appeal Deadline is based upon the date the decision was mailed by local government. A decision may have been mailed to you on a different date than it was mailed to DLCD. As a result, your appeal deadline may be earlier than the above date specified. **NO LUBA Notification to the jurisdiction of an appeal by the deadline, this Plan Amendment is acknowledged.**

Cc: Carol Heinkel, City of Florence
Gordon Howard, DLCD Urban Planning Specialist
Dave Perry, DLCD Regional Representative
Amanda Punton, DLCD Natural Resources Specialist

<paa> YA



FORM 2

DLCD

Notice of Adoption

This Form 2 must be mailed to DLCD within **20-Working Days after the Final Ordinance is signed** by the public Official Designated by the jurisdiction and all other requirements of ORS 197.615 and OAR 660-018-000

☐ In person ☐ electronic ☐ mailed

DATE
STAMP

DEPT OF

SEP 09 2013

LAND CONSERVATION
AND DEVELOPMENT

For Office Use Only

Jurisdiction: **City of Florence**
PC1304TA01,

Local file number: **PC1303CPA01,**

Date of Adoption: **9/3/2013**

Date Mailed: **9/6/2013**

Was a Notice of Proposed Amendment (Form 1) mailed to DLCD? ☒ Yes ☐ No Date: 3/21/2013

☒ Comprehensive Plan Text Amendment

☐ Comprehensive Plan Map Amendment

☒ Land Use Regulation Amendment

☒ Zoning Map Amendment

☒ New Land Use Regulation

☐ Other:

Summarize the adopted amendment. Do not use technical terms. Do not write "See Attached".

The City of Florence amended the Florence Realization 2020 Comprehensive Plan to adopt the Aquifer Protection Plan, Local Wetlands and Riparian Inventory, Significant Wetlands and Riparian Corridors Plan, plan policies, & consistency and housekeeping amendments. In addition, the City adopted a Drinking Water Protection Overlay Zone; protection measures for locally significant wetlands and riparian corridors; & Code amendments for consistency & housekeeping.

Does the Adoption differ from proposal? Yes, Please explain below:

Please see the attached letter and Summary of the Decision.

Plan Map Changed from: **NA** to:

Zone Map Changed from: **new DWP Overlay Zone** to:

Location: **see attached Summary of Decision**

Acres Involved: **0**

Specify Density: Previous: **NA**

New: **NA**

Applicable statewide planning goals:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Was an Exception Adopted? ☐ YES ☒ NO

Did DLCD receive a Notice of Proposed Amendment...

35-days prior to first evidentiary hearing?

☒ Yes ☐ No

If no, do the statewide planning goals apply?

☐ Yes ☐ No

DLCD File No. 001-13 (19756) [17599]

If no, did Emergency Circumstances require immediate adoption?

☐ Yes ☐ No

DLCD file No. _____

Please list all affected State or Federal Agencies, Local Governments or Special Districts:

DEQ, OHA, DLCD, DSL, ACE, Lane County, Heceta Water District, NMFS, ODFW, Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians, Siuslaw Soil and Water Conservation District, Siuslaw Watershed Council

Local Contact: **Kelli Weese**

Phone: **(541) 997-8237** Extension:

Address: **250 Hwy 101**

Fax Number: **541-997-4109**

City: **Florence**

Zip: **97439-**

E-mail Address: **kelli.weese@ci.florence.or.us**

ADOPTION SUBMITTAL REQUIREMENTS

This Form 2 must be received by DLCD no later than 20 working days after the ordinance has been signed by the public official designated by the jurisdiction to sign the approved ordinance(s)
per ORS 197.615 and OAR Chapter 660, Division 18

1. This Form 2 must be submitted by local jurisdictions only (not by applicant).
2. When submitting the adopted amendment, please print a completed copy of Form 2 on light **green paper if available**.
3. Send this Form 2 and **one complete paper copy** (documents and maps) of the adopted amendment to the address below.
4. Submittal of this Notice of Adoption must include the final signed ordinance(s), all supporting finding(s), exhibit(s) and any other supplementary information (ORS 197.615).
5. Deadline to appeals to LUBA is calculated **twenty-one (21) days** from the receipt (postmark date) by DLCD of the adoption (ORS 197.830 to 197.845).
6. In addition to sending the Form 2 - Notice of Adoption to DLCD, please also remember to notify persons who participated in the local hearing and requested notice of the final decision. (ORS 197.615).
7. Submit **one complete paper copy** via United States Postal Service, Common Carrier or Hand Carried to the DLCD Salem Office and stamped with the incoming date stamp.
8. Please mail the adopted amendment packet to:

**ATTENTION: PLAN AMENDMENT SPECIALIST
DEPARTMENT OF LAND CONSERVATION AND DEVELOPMENT
635 CAPITOL STREET NE, SUITE 150
SALEM, OREGON 97301-2540**

9. **Need More Copies?** Please print forms on **8½ -1/2x11 green paper only if available**. If you have any questions or would like assistance, please contact your DLCD regional representative or contact the DLCD Salem Office at (503) 373-0050 x238 or e-mail plan.amendments@state.or.us.



City of Florence

250 Hwy 101, Florence, OR 97439

www.ci.florence.or.us

September 6, 2013

Plan Amendment Specialist
Oregon Department of Land Conservation and Development
635 Capitol Street NE
Suite 150
Salem, OR 97301-2540

Subject: City of Florence File: PC1303CPA01, PC1304TA01, PC1305ZC0 (City)
Lane County File: PA13-0582 (LC)

Dear Specialist:

On September 3, 2013, the Florence City Council adopted the attached Ordinance No. 2, Series 2013: "An Ordinance For The Adoption Of Amendments To The Florence Realization 2020 Comprehensive Plan ("Comprehensive Plan") And Florence City Code (Fcc) For Aquifer Protection And Wetlands And Riparian Corridors; And For Housekeeping And Internal Consistency; And Adopting A Severability Clause."

The Mayor of Florence signed the Ordinance on September 5, 2013. This letter is submitted on the above date with the attached Post Adoption Notice to DLCD, the Ordinance, and Exhibits, along with the attached Summary of the Decision, which includes substantive differences from the proposed change submitted under ORS 197.610.

No one who submitted comments, testified, or otherwise participated in the local adoption process requested, in writing, notice of the decision by the City.

Please note that the Comprehensive Plan amendments in Exhibit B to Ordinance No. 2, Series 2003 were subject to a joint public hearing and co-adoption by Lane County. The file number for the Lane County action is shown in the subject line above. The Lane County Board is scheduled to take action on the amendments (via Lane County Ordinance No. PA 1299) on September 10, 2013.

If you have questions or want to discuss this submittal, please feel free to contact me at 541-997-4109.

Sincerely,

Kelli Weese, Florence Interim Planning Director / City Recorder

Cc: Dave Perry, DLCD
Carol Heinkel, Planning Consultant and Project Coordinator
Mike Miller, Florence Public Works Director

Public Works
989 Spruce St.
(541) 997-4106

**City Manager/
City Recorder**
(541) 997-3437

**Community Development:
Planning & Building**
(541) 997-8237

**Finance/
Utility Billing**
(541) 997-3436

Justice Center
900 Greenwood St
(541) 997-3515

Florence Events Center
715 Quince St
(541) 997-1994



Attachments:

- Submittal Letter and Summary of Decision
- September 3, 2013 Florence City Council Agenda Item Summary, including Staff Responses And Written Comments Submitted By Lea Patten Sent Via Email Directly To County Commissioners and August 13, 2013 Letter to Mr. Jaeger
- City of Florence Ordinance No. 2, Series 2013
- Exhibit A: Findings of Fact City for City of Florence Ordinance No. 2, Series 2013 and Lane County Ordinance No. PA 1299, August 6, 2013
- Exhibit B: To City Of Florence Ordinance No. 2 Series 2013 and Lane County Ordinance No. Pa 1299: Proposed Amendments to the Florence Realization 2020 Comprehensive Plan for Aquifer Protection and Wetlands and Riparian Corridors, August 6, 2013
- April 15, 2013 Aquifer Protection Plan for the North Florence Sole Source Dunal Aquifer and Appendices
- June 2013 Florence Area Wetlands and Riparian Inventory and Appendices
- June 2013 City of Florence Significant Wetlands and Riparian Corridors Plan and Appendices
- EXHIBIT C: To City Of Florence Ordinance No. 2 Series 2013: Proposed Amendments to the Florence City Code for Aquifer Protection and Wetlands and Riparian Corridors, August 6, 2013
- Exhibit D: Planning Commission Resolution PC 11 06 CPA 01 & PC 11 07 ZC 01 (note: Exhibits same as above and not duplicated).
- Exhibit E: Minutes from May 7, 2013 Planning Commissions meeting and public hearing.
- Replacement Pages for Revisions to: City of Florence Significant Wetlands and Riparian Corridors Plan and Florence Area Local Wetlands and Riparian Inventory, August 6, 2013

This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement WC-00J04801-0 to City of Florence. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

SUMMARY OF DECISION

Ordinance No. 2, Series 2013

This Summary describes the decision made by the Florence City Council in adopting Ordinance No. 2, Series 2013 and substantive differences from the proposed change submitted under ORS 197.610.

Ordinance No. 2, Series 2013

The Ordinance adopts the findings of fact in Exhibit A and the amendments in Exhibits B and C, described below. The Comprehensive Plan amendments in Exhibit B are subject to co-adoption by the Lane County Board of Commissioners, scheduled to take place on September 10, 2013 via adoption of Lane County Ordinance No. PA 1299.

EXHIBIT B:

Proposed Legislative Amendments to the Florence Realization 2020 Comprehensive Plan for Aquifer Protection and Wetlands and Riparian Corridors, August 6, 2013

1. Aquifer Protection

- a. Amend Florence Comprehensive Plan Chapter 5 to protect groundwater resources for consistency with state law and to adopt the Aquifer Protection Plan.
- b. Consistency Amendments: Amend Comprehensive Plan Chapter 11, Utilities, Facilities, and Services for consistency with the proposed amendments.

2. Wetlands and Riparian Corridors

- a. Amend Florence Comprehensive Plan Chapter 5: Open Spaces and Scenic, Historic, and Natural Resources for consistency with Statewide Planning Goal 5, including adoption of the 2013 Florence Area Wetlands and Riparian Inventory (2013 Inventory) and 2013 City of Florence Significant Wetlands and Riparian Corridors Plan (2013 Plan).
- b. Consistency Amendments: Amend Florence Comprehensive Plan Chapter 1, Definitions and Chapter 11, Utilities, Facilities, and Services for consistency with the proposed amendments.

3. Housekeeping Amendment

- a. Amend Comprehensive Plan Chapter 1, Introduction, to make the Comprehensive Plan consistent with state law which changed the DLCD notice requirement from 45 to 35 days.

EXHIBIT C:

Proposed Amendments to the Florence City Code for Aquifer Protection and Wetlands and Riparian Corridors, August 6, 2013

1. Aquifer Protection (Quasi-judicial Amendments)

- a. Adopt a new Drinking Water Protection Overlay Zone (Overlay Zone) Map, attached to Exhibit C.

- b. Amend Florence City Code Title 10: Zoning Regulations to insert a new Chapter 32: Chapter 32 Drinking Water Protection Overlay District

2. Wetlands and Riparian Corridors (Legislative Amendments)

- a. Amend Florence City Code Title 10 Chapter 7: Special Development Standards to add a new section 10-7-4: Development Standards for Wetlands and Riparian Areas, and renumber sections sequentially.
- b. Consistency Amendments: Amend FCC Title 9 Chapter 5 stormwater management definitions and buffer zone provisions; Title 10 Chapter 1 Definitions, and Title 10 Chapter 19, Prime Wildlife District, for internal Code consistency and for consistency with state law.

3. Housekeeping Amendment (Legislative Amendment)

- a. Adopt an amendment to FCC Title 10 Chapter 19 to make the Code consistent with Statewide Planning Goal 16.

As stated in the cover letter for the pre-adoption notice to DLCD, the tax lots affected by the Overlay Zone are as follows:

Map & Taxlot Number	Address
1812142001102	4701 HWY 101
1812142001500	5055 HWY 101
1812142001600	5071 HWY 101
1812142001700	N/A Munsel Lake LLC
1812142001900	5231 HWY 101
1812142001204	N/A
1812142001205	Confederate Tribes of the Coos
1812142001206	Confederate Tribes of the Coos
1812142002000	
1812142002100	5351 HWY 101
1812142001400	5045 HWY 101
1812142001301	
1812142001303	4981 HWY 101
1812142001302	
1812142001203	Confederate Tribes of the Coos
1812113301700	5491 HWY 101
1812113301603	
1812142002200	5371 HWY 101
1812113301602	5405 HWY 101
1812113301600	
1812113302000	
1812142000500	
1812142000400	
1812142000999	
1812142000300	5240 HWY 101

Substantive Differences from the Proposed Changes Submitted Under ORS 197.610:

The following changes were made in the final versions of these documents from the drafts submitted with the Notice of Adoption to DLCD on March 21, 2013:

Florence Area Wetlands and Riparian Inventory:

- The Inventory was approved by the Department of State Lands (DSL). The letter of approval was inserted into the front of the Inventory report.
- The Inventory was modified to change the boundaries of wetland #1 in response to citizen comments and based on a site visit by DSL staff. The Inventory report changed to show the difference in the acres of that wetland and thus total wetland acres, and associated changes to the wetland and riparian plan.

City of Florence Significant Wetlands and Riparian Corridors Plan:

- The Plan changed to reflect the changes to acreage in wetland #1, above.
- The Plan changed to reflect changes to Exhibit C to correct the typo and to address citizen comments described below.

Exhibit C:

- The following change to section J (highlighted) of the proposed Code 10-7-4 was made to correct a typo, and for internal consistency. This change was made to the April 15, 2013 Exhibit that was initiated by Council on that date and subject to the public hearings before the Planning Commission and Council:

J. Special provisions for the Munsel Creek Side Channel: The following special provisions apply to properties in the significant riparian corridor of the Munsel Creek side channel (Reach RMC-Cs in Table 2.2 of the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan). These provisions are in addition to, or provide relief from, the other standards in this subsection, and, where conflicts exist, this section shall prevail.

1. In addition to the other setback adjustments and Variances allowed by this subsection, a 50% setback adjustment to the required 50-foot significant riparian width for properties along the Munsel Creek side channel will be permitted in order to allow new or expanded development to build up to 25 feet from the top of bank of the creek, as long as any native plants disturbed by the development are replaced elsewhere in the buffer zone, subject to the following exceptions and procedures:
- On May 7, 2013, the Florence Planning Commission unanimously recommended adoption of Exhibit C with the changes outlined below which have been incorporated into the August 6, 2013 version of Exhibit C. Staff recommended the changes regarding the process for removal of native plants from buffer zones in response to

comments made by Florence citizen, Bill Blackwell. Staff further researched the proposed Code and found that additional provisions are necessary for clarification and consistency regarding the removal of native plants within the required buffer zones. The Planning Commission also agreed to request that the Council consider not adopting a separate fee for administration of the Drinking Water Protection Overlay Zone at this time.

Changes to April 15, 2013 version of Exhibit C, recommended by Planning Commission and incorporated into Exhibit C, August 6, 2013:

Change proposed Code Section FCC 10-7-4 as follows to respond to public comments:

F. General Development Standards and Requirements: When development is proposed that is subject to these standards, the property owner is responsible for the following. Figure 1 below is a cross section illustrating terms used in the discussion of wetland and riparian setbacks as defined by Oregon Statewide Planning Goal 5....

2. Preparation and submission of a site plan (vegetation clearing permits are also subject to the submission requirements in FCC Title 4 Chapter 6) that shows:

I. Removal of native vegetation: In accordance with Goal 5, removal of vegetation from a significant riparian corridor is prohibited, except as otherwise provided in these Wetland and Riparian Standards and in FCC 4-6-3 and for the following:

Change existing Code as follows to respond to public comments and for consistency:

FCC 4-6-3: VEGETATION CLEARING PERMIT REQUIRED:

A. A vegetation clearing permit shall be required in any of the following circumstances:...

1. Clearing native vegetation from... areas which have been designated by the City as a significant riparian corridor, significant wetland buffer zone, greenbelt, or view corridor.

FCC 4-6-4: PROCEDURE FOR OBTAINING A VEGETATION CLEARING PERMIT:

A. A vegetation clearing permit application is required unless the application includes a concurrent application for a building permit or Conditional Use Permit, except that the criteria in FCC 4-6-4 C shall also apply to any removal of native vegetation from a significant riparian or wetland buffer zone requested as part of a setback adjustment granted under FCC 10-7-4..

B. All requests for a Vegetation Clearing Permit shall be submitted to the Planning Department on a form available from that department, and containing the following

minimum information. (See FCC 10-7-4 for additional submission requirements for areas within significant wetland or riparian buffer zones):...

- C. The Planning Department shall process the Vegetation Removal Permit application through the Administrative Review procedures in FCC Title 10 Chapter 1 within thirty (30) days of filing a complete application. Review and approval shall be based on the following criteria, as applicable to the request:
1. The necessity to remove native vegetation in order to construct proposed improvements or otherwise utilize the property in a reasonable manner consistent with the City Code and policies;
 2. The environmental and physical impacts such clearing may have, including visual drainage, wind erosion, protection of adjoining property and structures, and impacts on significant riparian corridors or wetland buffer zones. Impacts on any affected significant wetland or riparian buffer zones shall be supported by a qualified professional or through consultation with staff from the Soil and Water Conservation District, Siuslaw Watershed Council, ODFW, OSU, or another person or agency with knowledge or experience with the affected resource;
 3. The adequacy of the applicant's proposed landscaping or revegetation plan, including plant selection, staking, irrigation, and other maintenance provisions.

CITY OF FLORENCE
Ordinance No. 2, Series 2013

AN ORDINANCE FOR THE ADOPTION OF AMENDMENTS TO THE FLORENCE REALIZATION 2020 COMPREHENSIVE PLAN ("COMPREHENSIVE PLAN") AND FLORENCE CITY CODE (FCC) FOR AQUIFER PROTECTION AND WETLANDS AND RIPARIAN CORRIDORS; AND FOR HOUSEKEEPING AND INTERNAL CONSISTENCY; AND ADOPTING A SEVERABILITY CLAUSE.

WHEREAS, Florence City Code (FCC) Title 10, Chapter 1, Section 1-3-B provides that a quasi-judicial zoning change and related Comprehensive Plan changes may be initiated by motion of the City Council; and FCC 10-1-3-C provides that legislative changes to the Code or Comprehensive Plan may be initiated by a request of the Council to the Planning Commission that proposed changes be considered by the Commission and its recommendation returned to the Council;

WHEREAS, the City of Florence was awarded an EPA grant for the Siuslaw Estuary Partnership (EPA Cooperative Agreement #WC-00J04801-0) in 2009 and the EPA amended the work plan for the grant in September 2012; and the work plan, as amended includes an adoption process for comprehensive plan and code amendments for aquifer protection and wetlands and riparian corridors;

WHEREAS, the City Council and Planning Commission held a joint Work Session on April 15, 2013 and the City Council initiated amendments to the Florence Realization 2020 Comprehensive Plan and Florence City Code for aquifer protection and wetlands and riparian corridors and for housekeeping and internal consistency;

WHEREAS, on September 10, 2012, the City Council approved the public outreach and adoption process for the Partnership grant products, including the use of a joint City-Lane County adoption process for comprehensive plan amendments; the Lane County Board of Commissioners approved the use of the joint adoption process on October 17, 2012;

WHEREAS, the City Council provided policy direction on protection measures for wetlands and riparian on July 16 and September 10, 2012; and the City Council conceptually approved the Aquifer Protection Plan (Plan) for the North Florence Sole Source Aquifer on July 16, 2012; and the Lane County Board of Commissioners approved the Aquifer Protection Plan on July 25, 2012 via Board Order 12-07-25-07;

WHEREAS, the Plan has been amended to address public comments and changes are needed to the Comprehensive Plan and City Code to implement and adopt the Plan and protection measures, as amended, and make these documents mutually consistent and compliant with State Administrative Rules and Statewide Planning Goals;

WHEREAS, additional changes are needed to the Comprehensive Plan and Florence City Code in order to achieve the following objectives:

1. Protect the North Florence Sole Source Dunal Aquifer, the city's sole drinking water source, by
 - adopting and implementing an Aquifer Protection Plan, with source water components certified by the Oregon Department of Environmental Quality (DEQ);
 - basing management strategies on potential sources of contamination; and
 - using updated wellhead delineations and drinking water protection areas.
2. Protect significant wetlands and riparian areas for their functions and values in controlling floods and protecting water quality in the aquifer and surface waters, and in protecting fish and wildlife habitat, consistent with the requirements of Statewide Planning Goal 5.

WHEREAS, on May 7, 2013, the Florence and Lane County Planning Commissions held a joint public hearing on the proposed Comprehensive Plan amendments and the Florence Planning Commission held a public hearing on the proposed Code amendments; deliberated; and recommended adoption of the proposed Comprehensive Plan and Code amendments; and all property owners directly affected by the proposals were mailed notice of the hearing and the hearing was posted to the City web site and advertised in the Siuslaw News;

WHEREAS, on August 6, 2013, the City Council and Lane County Board of Commissioners held a joint public hearing on the proposed Comprehensive Plan amendments; and the Florence Planning Commission held a public hearing on the proposed Code amendments; and all those providing testimony were mailed notice of the hearing and the hearing was posted to the City web site and advertised in the Siuslaw News;

WHEREAS, on September 3, 2013, the City Council deliberated at their meeting and found the proposed Comprehensive Plan and Code amendments consistent with applicable criteria in the Florence Realization 2020 Comprehensive Plan, Florence City Code, Oregon Revised Statutes, Oregon Administrative Rules, and Oregon Statewide Planning Goals.

THE CITY OF FLORENCE ORDAINS AS FOLLOWS:

Section 1. Adoption of Findings of Fact in Exhibit A;

Section 2. Adoption of the following **Florence Realization 2020 Comprehensive Plan** amendments in **Exhibit B** for:

I. Aquifer Protection:

1. Aquifer Protection Plan for the North Florence Sole Source Dunal Aquifer, April 15, 2013, as amended, except for the Contingency Plan (Aquifer Protection Plan) and Appendices;

2. "Certified Wellhead Delineations Report," (Delineations Report) February 2012, GSI Water Solutions, Inc., including Drinking Water Protection Area (DWPA) maps and all Time of Travel Zones for the existing wellfield and the proposed wellfield; and
3. Comprehensive Plan text amendments to protect the aquifer and for internal consistency.

II. Wetlands and Riparian Corridors:

1. 2013 Florence Area Local Wetland and Riparian Area Inventory, Pacific Habitat Services (2013 Inventory) and Appendices
2. 2013 City of Florence Significant Wetlands and Riparian Corridors Plan, and Appendices, and including:
 - a. 2013 Significant Wetlands Map and List of Goal 5 Locally Significant Wetlands, as amended
 - b. 2013 Significant Riparian Reaches Map and List of Goal 5 Locally Significant Riparian Corridors and Widths, as amended
 - c. ESEE Analysis for Public Facilities and Munsel Creek Side Channel
 - d. Limited Protection Program
3. Comprehensive Plan text amendments for internal consistency and housekeeping

Section 3. Adoption of the following **Florence City Code** amendments in **Exhibit C** for:

I. Aquifer Protection:

- a. A new FCC Title 10 Chapter 32: Drinking Water Protection Overlay District; and
- b. City of Florence Drinking Water Protection Overlay Zoning Map

II. Wetlands and Riparian Corridors:

- a. Amendments to Title 10 Chapter 7 to add a new code section FCC 10-7-4 Development Standards for Wetlands and Riparian Areas and related amendments to FCC 10-7; and
- b. Code amendments for consistency and housekeeping

Section 4. If any section, subsection, sentence, clause, phrase or portion of this Ordinance is for any reason held invalid or unconstitutional by any court of competent jurisdiction, such portion shall be deemed a separate, distinct and independent provision and such holding shall not affect the validity of the remaining portions hereof.

FURTHER, although not part of this Ordinance except as described above, the Florence City Council adopts the Contingency Plan in Chapter 5 of the Aquifer Protection Plan.

Adopted by the Florence City Council this 3rd day of September, 2013.

AYES: 5 – Councilors Henry, Jagoe, Roberts, Greene, and Mayor Xavier

NAYS: 0

ABSTAIN: 0

ABSENT: 0

APPROVED BY THE MAYOR, this 5th day of September, 2013.


Nola Xavier, MAYOR

ATTEST:


Kelli Weese, City Recorder

EXHIBIT A:
FINDINGS OF FACT FOR CITY OF FLORENCE ORDINANCE NO. 2, SERIES 2013
LANE COUNTY ORDINANCE NO. PA 1299

Public Hearing Date: August 6, 2013
Date of Report: July 18, 2013

City Planning Consultant: Carol Heinkel
City: Mike Miller, Public Works Director
Kelli Weese, Interim Planning Director
Lane County: Keir Miller, Senior Planner

Application: PC 13 03 CPA 01, PC 13 04 TA 01, PC 13 05 ZC 01 (City)
PA13-0582 (LC)

I. PROPOSAL DESCRIPTION

PROPOSALS:

EXHIBIT B:

Proposed Legislative Amendments to the Florence Realization 2020 Comprehensive Plan for Aquifer Protection and Wetlands and Riparian Corridors, August 6, 2013

1. Aquifer Protection

- a. Amend Florence Comprehensive Plan Chapter 5 to protect groundwater resources for consistency with state law and to adopt the Aquifer Protection Plan.
- b. Consistency Amendments: Amend Comprehensive Plan Chapter 11, Utilities, Facilities, and Services for consistency with the proposed amendments.

2. Wetlands and Riparian Corridors

- a. Amend Florence Comprehensive Plan Chapter 5: Open Spaces and Scenic, Historic, and Natural Resources for consistency with Statewide Planning Goal 5, including adoption of the 2013 Florence Area Wetlands and Riparian Inventory (2013 Inventory) and 2013 City of Florence Significant Wetlands and Riparian Corridors Plan (2013 Plan).
- b. Consistency Amendments: Amend Florence Comprehensive Plan Chapter 1, Definitions and Chapter 11, Utilities, Facilities, and Services for consistency with the proposed amendments.

3. Housekeeping Amendment

- a. Amend Comprehensive Plan Chapter 1, Introduction, to make the Comprehensive Plan consistent with state law which changed the DLCD notice requirement from 45 to 35 days.

EXHIBIT C:

Proposed Amendments to the Florence City Code for Aquifer Protection and Wetlands and Riparian Corridors, August 6, 2013

1. Aquifer Protection (Quasi-judicial Amendments)

- a. Adopt a new Drinking Water Protection Overlay Zone (Overlay Zone) Map, attached to Exhibit C.
- b. Amend Florence City Code Title 10: Zoning Regulations to insert a new Chapter 32: Drinking Water Protection Overlay District

2. Wetlands and Riparian Corridors (Legislative Amendments)

- a. Amend Florence City Code Title 10 Chapter 7: Special Development Standards to add a new section 10-7-4: Development Standards for Wetlands and Riparian Areas, and renumber sections sequentially.
- b. Consistency Amendments: Amend FCC Title 9 Chapter 5 stormwater management definitions and buffer zone provisions; Title 10 Chapter 1 Definitions, and Title 10 Chapter 19, Prime Wildlife District, for internal Code consistency and for consistency with state law.

3. Housekeeping Amendment (Legislative Amendment)

- a. Adopt an amendment to FCC Title 10 Chapter 19 to make the Code consistent with Statewide Planning Goal 16.

APPLICANT: City of Florence: Mike Miller, Public Works Director, Project Manager;
Planning Consultant: Carol Heinkel

PROPERTY OWNERS: See table below.

LOCATION:

Legislative amendments to Comprehensive Plan (Exhibit B): Florence urban growth boundary (UGB)

Legislative amendments to City Code (Exhibit C): Florence city limits

Quasi-judicial Code amendments (Overlay Zone): At north end of city limits, east and west of Highway 101; specific properties listed below and shown in Overlay Zone Map (Exhibit C)

Quasi-judicial Code amendments (Overlay Zone):

Map & Taxlot Number:	Address:	Owners:
1812142001102	4701 HWY 101	Fred Meyer Stores
1812142001500	5055 HWY 101	Marvin and Neal Ryall
1812142001600	5071 HWY 101	Marvin and Neal Ryall
1812142001700	N/A Munsel Lake LLC	Munsel Lake LLC
1812142001900	5231 HWY 101	Johanna Pratte
1812142001201	4969 Hwy 101	James & Susan Genereaux
1812142001204	N/A	James & Susan Genereaux
1812142001205	N/A	Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians

Quasi-judicial Code amendments (Overlay Zone):

Map & Taxlot Number:	Address:	Owners:
1812142001206	N/A	Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians
1812142002000	N/A	John Sherman
1812142002100	5351 HWY 101	Dell Matthews
1812142001400	5045 HWY 101	Ocean Pacific Co. Inc
1812142001301	N/A	Sand Ranch Prop. LLC
1812142001303	4981 HWY 101	Dennis Fleming
1812142001302	N/A	Dennis Fleming
1812142001203	N/A	Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians
1812113301700	5491 HWY 101	Terrace Investments LLC II
1812113301603	N/A	Terrace Investments LLC II
1812142002200	5371 HWY 101	Erin Trebolo
1812113301602	5405 HWY 101	Twombly Investments LLC
1812113301600	N/A	Terrace Investments LLC II
1812113302000	N/A	Terrace Investments LLC II
1812142000500	N/A	Ohran Joint Revocable Trust
1812142000400	N/A	Ohran Joint Revocable Trust
1812142000600	N/A	Sunnyside McGill LLC
1812142000300	5240 HWY 101	Glen & Ellona Seifert
1812142000201	N/A	Luis Hector Morales Decedents Trust
1812142001800	N/A	Johanna Pratte

COMPREHENSIVE PLAN MAP DESIGNATIONS:

Legislative amendments to Comprehensive Plan (Exhibit B): All Plan designations

Legislative amendments to City Code (Exhibit C): All Plan designations

Quasi-judicial Code amendments (Overlay Zone) (Exhibit C): North Commercial Node, Service Industrial

ZONE MAP CLASSIFICATIONS:

Legislative amendments to Comprehensive Plan (Exhibit B): City: All Zoning Classifications in City; **Lane County:** Natural Resource (NR), Impacted Forest (F2); and Suburban Residential (RA)

Legislative amendments to City Code (Exhibit C): All Zoning Classifications in City

Quasi-judicial Code amendments (Overlay Zone) (Exhibit C): North Commercial; Service Industrial

SURROUNDING LAND USE/ZONING:

Legislative amendments to Comprehensive Plan (Exhibit B): N/A

Legislative amendments to City Code (Exhibit C): N/A

Quasi-judicial Code amendments (Overlay Zone) (Exhibit C): north: mixed residential, industrial, vacant; west: vacant; east: vacant/residential; south: commercial.

II. NARRATIVE

Purpose and Objectives:

The purpose of this proposal is to protect and improve water quality and fish and wildlife habitat in the lower Siuslaw Watershed. Specific objectives are as follows:

1. Meet the requirements of EPA Cooperative Agreement #WC-00J04801-0 to submit for local adoption plans and Comprehensive Plan and Code amendments for Aquifer Protection and Wetlands and Riparian Corridors;
2. Bring the Florence Comprehensive Plan into compliance with Statewide Planning Goals for wetlands, riparian corridors, and groundwater resources;
3. Bring the Florence City Code into compliance with Statewide Planning Goals for wetlands, riparian corridors, and groundwater resources;
4. Make additional Comprehensive Plan and Code amendments for internal consistency and housekeeping.

Background

These Exhibits are products of the Siuslaw Estuary Partnership, funded by the US Environmental Protection Agency (EPA Cooperative Agreement #WC-00J04801-0), a grant awarded to the City of Florence by EPA on October 1, 2009. The mission of the Partnership is to protect and improve water quality and fish and wildlife habitat in the lower Siuslaw watershed. Submission to the City and County for adoption of Comprehensive Plan amendments, and to the City for adoption of Code amendments, to protect the North Florence Sole Source Dunal Aquifer and for Wetlands and Riparian Corridors satisfies the City's commitment to the EPA for these grant products.

Community concern for the Siuslaw estuary, the North Florence Sole Source Dunal Aquifer and the area's streams, lakes, and wetlands is well-documented in Comprehensive Plan policies and Code provisions. In response to this concern, in October, 2009, the City and its partners from 19 federal, state, tribal, and local agencies embarked on the multi-year Siuslaw Estuary Partnership project. This project is funded by project partners and the US Environmental Protection Agency (EPA). The Siuslaw Estuary Partnership Guiding Principles, endorsed by the City and its partners, provided guidance for these products. For more information about the Partnership, visit the web site at: www.SiuslawWaters.org.

Over the past three and a half years, there has been extensive public involvement in the project, including public open houses, stakeholder group meetings, study area-wide distribution of newsletters, newspaper articles, and targeted outreach to interest groups, property owners, and businesses. The public outreach process is documented in detail

in in Section V of this report (Findings for attached City Planning Commission Resolution PC 13 03 CPA 01, PC 13 04 TA 01, PC 13 05 ZC 01 and Lane County Ordinance No. PA 1299).

III. NOTICE AND REFERRALS

1. **NOTICE:** Notice of the proposed Comprehensive Plan Amendments was sent to DLCD on March 21, not less than 45 days prior to the first (Planning Commission) evidentiary hearing as required by the Comprehensive Plan and not less than 35 days prior to the hearing as required by state law.

The August 6 public hearing was noticed in the Siuslaw News on July 27 and 31, 2013 and in the Eugene Register-Guard on July 16, 2013, as required by state law, and Florence and/or Lane County Codes. All those who submitted written or oral testimony at the Planning Commission hearing were sent notice of the August 6th hearing on May 20, 2013 in accordance with Florence City Code.

In accordance with Florence City Code, on July 17, 2013, property owners within the proposed Drinking Water Protection Overlay Zone and within 300 feet of the zone were also sent notice and notice was posted on properties within the proposed overlay zone.

2. **REFERRALS:** Referrals were sent to the Oregon Department of Transportation, Florence Police Department, Central Lincoln Public Utility District, Qwest, Charter Communications, Florence Public Works Department, Florence U.S. Postal Service, the Siuslaw Valley Fire and Rescue District, the Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians, Lane County Land Management, Lane County Transportation, Heceta Water District, Land Watch, and the staff representatives of the federal, state, and local agencies serving on the Siuslaw Estuary Partnership Inter-disciplinary Team. Notice was also sent to William Sherlock, who requested notice on behalf of this client.

IV. APPLICABLE CRITERIA

1. **Florence Realization 2020 Comprehensive Plan**
2. **Florence City Code (FCC) Title 10: Zoning Regulations**
Chapter 1: Zoning Administration, Sections: 10-1-1-5 Land Use Hearings;
Section 10-1-2-2, Change of Boundaries on Zoning Map; 10-1-3 Amendments and Changes
3. **Oregon Revised Statutes:** ORS: 196.674; 197.175; 197.250; 197.251; 197.279(3)(b); 197.253; 197.610; 197.615; 215.418; 227.175; 227.186; 227.350

4. **Statewide Land Use Planning Goals and Associated Administrative Rules:**
Statewide Goals: 1: Citizen Involvement; 2: Land Use; 5: Natural Resources, Scenic and. Historic Areas, and Open Spaces; 6: Air, Water and Land Resources Quality; 7: Areas Subject to Natural Hazards; 9: Economic Development; 10: Housing; 11: Public Facilities and Services; 12: Transportation; 16: Estuarine Resources; 17: Coastal Shorelands
Administrative Rules: OAR Chapter 660: Division 23 pertaining to wetlands, riparian, and groundwater resources and related provisions; Division 12; Division 15; Division 16; OAR Chapter 141 Division 86; OAR Chapter 333 Division 61; OAR Chapter 340 Division 40 and 71
5. **Lane County Rural Comprehensive Plan Policies** – Part 1, Section D; and **Lane Code:** 12.005, 12.050, 14.300, 16.400

V. FINDINGS

Applicable criteria are shown in bold and findings are in plain text below.

FLORENCE REALIZATION 2020 COMPREHENSIVE PLAN

Introduction:

Plan Adoption, Amendments, Review and Implementation

Amendments to the Plan may be initiated by citizens, citizen groups, the Citizen Advisory Committee, the Planning Commission or the City Council. In any amendment proceedings, the City Council shall obtain the recommendation of the Planning Commission and the Citizen Advisory Committee before taking action on a proposed major amendment. Minor changes which do not have significant effects beyond the immediate area of the change require the recommendation of the Planning Commission. Minor changes may be initiated at any time. Notice of a public hearing for a proposed plan amendment shall be required at least 45 days prior to the first Planning Commission hearing.

The proposal is consistent with this Comprehensive Plan text because:

The proposal was initiated by City Council Resolution 3 Series 2013 on April 15, 2013;

The Planning Commission made a recommendation to the City Council; and
Notice of the public hearing was sent to DLCD at least 45 days prior to the date of the first Planning Commission hearing.

FLORENCE CITY CODE (FCC) TITLE 10: ZONING REGULATIONS

CHAPTER 1: ZONING ADMINISTRATION

SECTION 3: AMENDMENTS AND CHANGES

FCC 10-1-3-C: LEGISLATIVE CHANGES

- 1. Initiation: A legislative change in zoning district boundaries, in the text of this Title, Title 11 or in the Comprehensive Plan may be initiated by resolution of the Planning Commission or by a request of the Council to the Planning Commission that proposes changes be considered by the Commission and its recommendation returned to the Council.**
- 2. Notice and Public Hearing: Such notice and hearing as prescribed by state law and the Comprehensive Plan then in effect. (Amd. by Ord. 30, Series 1990).**

The proposal is consistent with the criteria in FCC 10-3-C because:

Exhibits B and C, except for the Drinking Water Protection Overlay Zone Map and Text, are legislative changes to the Comprehensive Plan and Code, affecting a large number of properties with broad policy application;
The City Council initiated the process by Resolution and set a date of May 7 for Planning Commission public hearing and recommendation;
Notice of the public hearing was sent to DLCD at least 45 days prior to the first Planning Commission hearing; Ballot Measure 56 notice was sent, consistent with the Comprehensive Plan and state law.

FCC 10-1-3-B: QUASI-JUDICIAL CHANGES

- 1. Initiation: A quasi-judicial zoning change and related Comprehensive Plan changes may be initiated by application of a property owner within the affected area, by a person having substantial ownership interest in the property, by resolution of the Planning Commission or motion of the City Council, and also by individual citizens or citizen groups during Plan update as provided in The Comprehensive Plan.**
- 3. Notice and Public Hearing: Notice and public hearing for quasi-judicial changes to this Code and the Comprehensive Plan shall be in accordance with Code Section 10-1-1-5.**

The proposal is consistent with the criteria in FCC 10-3-B, subsections #1 and #3 because:

The Drinking Water Protection Overlay Zone is a quasi-judicial zone change initiated by the City Council;
Notice of the proposed change was provided in accordance with Code Section 10-1-1-5:

FCC 10-1-1-5: LAND USE HEARINGS:

A. Hearings are required for quasi-judicial land use matters requiring Planning Commission review.

B. Notification of Hearing:

- 1. At least twenty (20) days prior to a quasi-judicial hearing, notice of hearing shall be posted on the subject property and shall be provided to the applicant and to all owners of record of property within 100 feet of the subject property, except in the case of hearings for Conditional Use Permits, Variance, Planned Unit Development and Zone Change, which notice shall be sent to all owners of record of property within 300 feet of the subject property.**
 - a. Notice shall also be provided to the airport as required by ORS 227.175 and FCC 10-21-2-4 and any governmental agency that is entitled to notice under an intergovernmental agreement with the City or that is potentially affected by the proposal. For proposals located adjacent to a state roadway or where proposals are expected to have an impact on a state transportation facility, notice of the hearing shall be sent to the Oregon Department of Transportation.**
 - b. For a zone change application with two or more evidentiary hearings, notice of hearing shall be mailed no less than ten (10) days prior to the date of the Planning Commission hearing and no less than ten (10) days prior to the date of the City Council hearing.**
 - c. For an ordinance that proposes to rezone property, a notice shall be prepared in conformance with ORS 227.186 and ORS 227.175(8).**
- 2. Prior to a quasi-judicial hearing, notice shall be published one (1) time in a newspaper of general circulation.**

C. Notice Mailed to Surrounding Property Owners - Information provided:

- 1. The notice shall:**
 - a. Explain the nature of the application and the proposed use or uses which could be authorized;**
 - b. List the applicable criteria from the ordinance and the plan that apply to the application at issue;**
 - c. Set forth the street address or other easily understood geographical reference to the subject property;**
 - d. State the date, time and location of the hearing;**
 - e. State that failure of an issue to be raised in a hearing, in person or by letter, or failure to provide sufficient specificity to afford the decision maker an opportunity to respond to the issue precludes further appeal based on that issue;**
 - f. State that application and applicable criteria are available for inspection at no cost and will be provided at reasonable cost;**

- g. State that a copy of the staff report will be available for inspection at no cost at least 7 days prior to the hearing and will be provided at reasonable cost;
 - h. Include a general explanation of the requirements for submission of testimony and the procedure for conduct of hearings.
 - i. Include the name of a local government representative to contact and the telephone number where additional information may be obtained.
- F. Notice of Decision by the Planning Commission:** A notice of the action or decision of the Planning Commission, and right of appeal shall be given in writing to the applicant. Any party who testified either in writing or verbally at the hearing must provide a mailing address in order to be noticed. The notice may be served personally, or sent by mail. The notice shall be deemed served at the time it is deposited in the United States mail.

The proposal is consistent with these criteria because:

the Planning Commission and City Council and Lane County Board held a public hearing on the request;

notice was posted on the subject property (Drinking Water Protection Overlay Zone) and sent to all owners of record of property within 300 feet of the subject property on April 11, more than 20 days before the public hearing on May 7; and on July 17, more than 20 days before the public hearing on August 6.

on April 27 and May 1, notice of the Planning Commission hearing was published and on July 27 and 31 notice of the elected officials hearing was published in the Siuslaw News, a newspaper of general circulation, the last not more than ten (10) days prior to the date of the hearing;

On May 20, 2013, notice of the Planning Commission's decision and the date of the Joint Elected Officials' public hearing was mailed to all those who provided comment, either orally or in writing, for the public hearing before the Planning Commissions.

The notices met all of the above requirements for content and timing; and

Notice consistent with ORS 227.186 was sent to the owners of property with a wetland or riparian area or within a Drinking Water Protection Overlay Zone, as follows:

ORS 227.186 NOTICE TO PROPERTY OWNERS OF HEARING ON CERTAIN ZONE CHANGE; FORM OF NOTICE; EXCEPTIONS; REIMBURSEMENT OF COST.

(2) All legislative acts relating to comprehensive plans, land use planning or zoning adopted by a city shall be by ordinance.

(3) Except as provided in subsection (6) of this section, at least 20 days but not more than 40 days before the date of the first hearing on an ordinance that proposes to amend an existing comprehensive plan or any element thereof, or to adopt a new comprehensive plan, a city shall cause a written individual notice of a land use change to be mailed to each owner whose property would have to be rezoned in order to comply with the amended or new comprehensive plan if the ordinance becomes effective.

(4) At least 20 days but not more than 40 days before the date of the first hearing

on an ordinance that proposes to rezone property, a city shall cause a written individual notice of a land use change to be mailed to the owner of each lot or parcel of property that the ordinance proposes to rezone.

(5) An additional individual notice of land use change required by subsection (3) or (4) of this section shall be approved by the city and shall describe in detail how the proposed ordinance would affect the use of the property. The notice shall:...

The proposal is consistent with ORS 227.186 because:

The Comprehensive Plan and Zoning Code amendments were adopted by Ordinance.

On April 11, at least 20 days but not more than 40 days before the date of the Planning Commission hearing (first hearing) on the adopting ordinance to amend the Comprehensive Plan and Code, the City mailed a written individual notice to the owners of each of the properties potentially affected by the proposal;

the notice described in detail how the proposed ordinance would affect the use of the properties;

the notice contained the text required in ORS 227.186; and

the proposal is to adopt an ordinance that will limit or prohibit land uses previously allowed in the affected zone.

FCC 10-1-2-2: CHANGE OF BOUNDARIES ON ZONING MAP: ...Amendments to the map (zone boundary changes) shall be indicated on subsequent maps, dated and filed with the map originally adopted. Each map shall bear the signature of the Planning Commission chairman who shall testify to their authenticity. (Amd. by Ord. 30, 1990).

The proposal is consistent with this provision because the Drinking Water Protection Overlay Zone map will be dated, filed with the City Zoning Map, and signed by the Planning Commission chairman.

OREGON REVISED STATUTES

ORS 197.610: LOCAL GOVERNMENT NOTICE OF PROPOSED AMENDMENT OR NEW REGULATION; EXCEPTIONS; REPORT TO COMMISSION.

(1) A proposal to amend a local government acknowledged comprehensive plan or land use regulation or to adopt a new land use regulation shall be forwarded to the Director of the Department of Land Conservation and Development at least 35 days before the first evidentiary hearing on adoption. The proposal forwarded shall contain the text and any supplemental information that the local government believes is necessary to inform the director as to the effect of the proposal. The notice shall include the date set for the first evidentiary hearing.

The proposal is consistent with ORS 197.610 because notice to DLCD was sent on March 21, 2013, at least 35 days prior to the March 7, 2013 (first) Planning Commission

public hearing and the notice contained the information required in this statute.

ORS 197.175: CITIES' AND COUNTIES' PLANNING RESPONSIBILITIES; RULES ON INCORPORATIONS; COMPLIANCE WITH GOALS.

(2) Pursuant to ORS Chapters 195, 196 and 197, each city and county in this state shall: (a) Prepare, adopt, amend and revise comprehensive plans in compliance with goals approved by the commission;

The proposal is consistent with ORS 197.175 because this staff report contains findings to conclude that the proposed comprehensive plan revisions are in compliance with the goals approved by the commission. A finding of "Not Applicable to this Proposal" is incorporated into these findings for all Statewide Planning Goals not specifically cited below.

ORS 197.615: SUBMISSION OF ADOPTED COMPREHENSIVE PLAN OR LAND USE REGULATION CHANGES TO DEPARTMENT OF LAND CONSERVATION AND DEVELOPMENT

(1) When a local government adopts a proposed change to an acknowledged comprehensive plan or a land use regulation, the local government shall submit the decision to the Director of the Department of Land Conservation and Development within 20 days after making the decision.

(2) The submission must contain the following materials:

(a) A copy of the signed decision, the findings and the text of the change to the comprehensive plan or land use regulation;

(b) If a comprehensive plan map or zoning map is created or altered by the proposed change, a copy of the map that is created or altered;

(c) A brief narrative summary of the decision, including a summary of substantive differences from the proposed change submitted under ORS 197.610 (Submission of proposed comprehensive plan or land use regulation changes to Department of Land Conservation and Development) and any supplemental information that the local government believes may be useful to inform the director or members of the public of the effect of the actual change; and

(d) A statement by the individual transmitting the submission, identifying the date of the decision and the date of the submission.

The proposal is consistent with ORS 197.615 because when the city and county adopt the proposed change to an acknowledged comprehensive plan and the city adopts the proposed change to the FCC, the local governments shall submit the decision to the Director of the Department of Land Conservation and Development within 20 days after making the decision; and the submission shall contain the required materials.

ORS 197.253: PARTICIPATION IN LOCAL PROCEEDINGS REQUIRED FOR SUBMITTING COMMENTS AND OBJECTIONS

Notwithstanding the provisions of ORS 197.251 (Compliance acknowledgment)

(2)(a), a person may not submit written comments and objections to the acknowl-

edgment request of any city or county that submits its plan or regulations to the Land Conservation and Development Commission for acknowledgment for the first time after August 9, 1983, unless the person participated either orally or in writing in the local government proceedings leading to the adoption of the plan and regulations.

The proposal is consistent with ORS 197.253 because only persons participating either orally or in writing in the city and county proceedings leading to the adoption of the plan and regulations shall be eligible to submit written comments and objections to the approval of the amendments by the Department of Land Conservation and Development.

ORS 197.250 COMPLIANCE WITH GOALS REQUIRED

Except as otherwise provided in ORS 197.245 (Commission amendment of initial goals), all comprehensive plans and land use regulations adopted by a local government to carry out those comprehensive plans and all plans, programs, rules or regulations affecting land use adopted by a state agency or special district shall be in compliance with the goals within one year after the date those goals are approved by the Land Conservation and Development Commission.

The proposal is consistent with ORS 197.250 because it is consistent with applicable statewide planning goals, as demonstrated in the findings below.

STATEWIDE PLANNING GOALS AND ADMINISTRATIVE RULES

GOAL 1: CITIZEN INVOLVEMENT

- 3. Citizen Influence -- To provide the opportunity for citizens to be involved in all phases of the planning process.**

Citizens shall have the opportunity to be involved in the phases of the planning process as set forth and defined in the goals and guidelines for Land Use Planning, including Preparation of Plans and Implementation Measures, Plan Content, Plan Adoption, Minor Changes and Major Revisions in the Plan, and Implementation Measures.

The proposals are consistent with this Goal because citizens were provided the opportunity to be involved in all phases of the planning process as set out below.

The Public Involvement Plan (PIP) for the Siuslaw Estuary Partnership was approved by the Florence Planning Commission on January 12, 2010 and is included as Appendix B of the Aquifer Protection Plan. Public involvement involved Technical Advisory Committees, Stakeholder Groups, and Public Education and Outreach. Technical Advisory Committees: The Siuslaw Estuary Partnership Inter-disciplinary Team served as the Technical Advisory Committee (TAC) for the plans and Trail Vision with additional agency staff added for specific products. These staff commit-

tees met regularly throughout the course of the project and recommended draft products to the Stakeholder Groups.

Stakeholder Groups: The Florence City Council approved the use of two Stakeholder Groups for the Partnership: a Community Stakeholder Group and an Elected Official Stakeholder Group. The Community Stakeholder Group was expanded in order to include representative interests in the Drinking Water Protection Areas on the Group. Specifically, these interests were: Ocean Dunes Golf Links, Coast Village, Sand Ranch, Florentine Estates, Koning and Cooper business owners, and Recycling and Garbage. The Community Stakeholder Group met most recently on February 28, 2013 to review and comment on the draft products. The Elected Official Stakeholder Group met on March 14 and agreed by consensus with the products, as revised.

Public Education and Outreach: In the fall of 2012, a targeted public outreach effort commenced on the draft Comprehensive Plan and Code amendments. This outreach included presentations, response to questions, and submission of comments on the draft proposals with the following groups:

Coast Village Homeowners Association: 10/29/12

Central Oregon Coast Board of Realtors: 11/29/12

Florence Area Chamber of Commerce: 2/21/13

Golf Course Owners/Managers: 2/25/13

Property owners within Drinking Water Protection Areas (DWPAs): 2/25/13

Property owners with wetlands or riparian areas: 2/27/13

Letters were sent to the owners in DWPAs and with wetlands or riparian areas on February 8th inviting them to the meeting, informing them of the draft products, and instructing them on ways they can be involved. Revisions to the draft were made based on feedback from meetings with property owners and Stakeholders in February and March 2013 and further changes may be made as needed to respond to comments raised during the public adoption process.

Public Education and Outreach also involved three Open Houses and three newsletters, "Waters in Common," which were distributed throughout the UGB to residents, property owners, or both. Each of these newsletters provided information about the aquifer, wetlands and riparian areas, and the trail vision and the need to protect water quality. The third newsletter, distributed in April 2012, provided information about the draft plans and inventories and ways to provide comment. That newsletter was included in water bills and mailed directly to all owners of property in the DWPAs. At the third Open House, the elements of the plans were presented in detail in the power point presentation and in hard copies available for the public. Comment forms were available, although no one submitted a completed form. Over 50 members of the public attended the April 30, 2012 Open House and heard the presentation.

In addition, public involvement efforts were conducted specifically for wetlands and riparian areas. Prior to beginning the inventory field work, selected landowners (i.e. those suspected of having wetlands or waters of the state on their property) were mailed notices describing the project and asking permission to enter their property. Right of access was granted by landowner permission only. The properties of those not responding were not accessed. Access information was collected in a database

and then transferred to a base map for use in the field. At the May 5, 2010 Open House, the public was informed about the wetland inventory process and staff answered questions from property owners deciding whether or not to grant access to their property. Following completion of initial fieldwork, a public meeting was held on September 22, 2010 to allow citizens to observe the location of mapped wetlands and comment as appropriate.

On March 6, 2012, the Wetlands and Riparian Area Team concurred with criteria and application of the criteria for determining the significance of, and measures to protect, wetlands and riparian corridors in the Florence urban growth boundary (UGB). On January 31, 2013, the Wetland and Riparian Team reviewed and commented on the revised 2013 Plan and forwarded it for public review and adoption. At their meetings in March and April, the Stakeholder Groups forwarded this proposal to the public for comment. Then, the proposal was presented to the public at the April 30, 2012 Open House.

All products and Stakeholder meeting packets have been posted to the project web site: www.SiuslawWaters.org and the public has been encouraged to review and comment.

GOAL 2: LAND USE

City, county, state and federal agency and special district plans and actions related to land use shall be consistent with the comprehensive plans of cities and counties and regional plans adopted under ORS Chapter 268.

All land use plans shall include identification of issues and problems, inventories and other factual information for each applicable statewide planning goal, evaluation of alternative courses of action and ultimate policy choices, taking into consideration social, economic, energy and environmental needs. The required information shall be contained in the plan document or in supporting documents. The plans, supporting documents and implementation ordinances shall be filed in a public office or other place easily accessible to the public. The plans shall be the basis for specific implementation measures. These measures shall be consistent with and adequate to carry out the plans. Each plan and related implementation measure shall be coordinated with the plans of affected governmental units.

All land-use plans and implementation ordinances shall be adopted by the governing body after public hearing and shall be reviewed and, as needed, revised on a periodic cycle to take into account changing public policies and circumstances, in accord with a schedule set forth in the plan. Opportunities shall be provided for review and comment by citizens and affected governmental units during preparation, review and revision of plans and implementation ordinances.

The proposals are consistent with Goal 2 because:

The amendments to the Florence City Code for aquifer protection and wetlands and riparian areas, and the Drinking Water Protection Overlay Zone to protect the City's

proposed wellfield, are consistent with the Comprehensive Plan for the City of Florence, as amended in this proposal;

The proposed Comprehensive Plan amendments include identification of issues and problems related to aquifer protection and wetlands and riparian areas, inventories and other factual information for each applicable statewide planning goal, and evaluation of alternative courses of action and ultimate policy choices, taking into consideration social, economic, energy and environmental needs;

The proposal amends the Comprehensive Plan to include the Aquifer Protection Plan, Florence Area Wetlands and Riparian Inventory, City of Florence Significant Wetlands and Riparian Corridors Plan in the plan document or in supporting documents. The plans, supporting documents and implementation ordinances shall be filed in the City of Florence Planning Office easily accessible to the public;

These plans are the basis for the proposed City Code amendments, which are consistent with and adequate to carry out the plans, including the Drinking Water Protection Overlay Zone, which is consistent with the Drinking Water Protection Area for the proposed wellfield which is incorporated as part of the Comprehensive Plan through these amendments;

The amendments to the Comprehensive Plan have been coordinated with and co-adopted by Lane County, the affected governmental unit; and

The Comprehensive Plan amendments were adopted by the City and County and the Code amendments by the City after public hearings; after a review and with revisions that take into account changing public policies and circumstances; opportunities were provided for review and comment by citizens and affected governmental units during preparation, review and revision of the plans and implementation ordinances.

The Consistency Code amendment to FCC 10-19-9 Prime Wildlife District make the Code consistent with the proposed Comprehensive Plan and Code amendments as well as Statewide Planning Goal 2 (Land Use) by relying on the most recent inventory and assessment data for determining the boundaries and assessment of the management unit.

GOAL 5: NATURAL RESOURCES, SCENIC AND HISTORIC AREAS, AND OPEN SPACES

To protect natural resources and conserve scenic and historic areas and open spaces. Local governments shall adopt programs that will protect natural resources and conserve scenic, historic, and open space resources for present and future generations. These resources promote a healthy environment and natural landscape that contributes to Oregon's livability. The following resources shall be inventoried: a. Riparian corridors, including water and riparian areas and fish habitat; b. Wetlands;... f. Groundwater Resources;...

The proposal is consistent with Goal 5 requirements for wetlands, riparian corridors, and groundwater resources as demonstrated in the following findings of consistency with the Goal 5 Administrative Rule (OAR Chapter 60 Division 23).

OAR 660-023-0250: APPLICABILITY

(2) The requirements of this division are applicable to PAPAs initiated on or after September 1, 1996. OAR 660, Division 16 applies to PAPAs initiated prior to September 1, 1996. For purposes of this section "initiated" means that the local government has deemed the PAPA application to be complete.

(3) Local governments are not required to apply Goal 5 in consideration of a PAPA unless the PAPA affects a Goal 5 resource. For purposes of this section, a PAPA would affect a Goal 5 resource only if: (a) The PAPA creates or amends a resource list or a portion of an acknowledged plan or land use regulation adopted in order to protect a significant Goal 5 resource or to address specific requirements of Goal 5;...

The proposals are consistent with this Rule, as follows:

The Goal 5 Rule applies to this PAPA (Post Acknowledgment Plan Amendment) because the City and County have updated inventories for wetlands, riparian, and groundwater resources.

The proposed Comprehensive Plan amendments bring the Comprehensive Plan into compliance with Goal 5 for the updated inventories that the City and County have updated and adopted.

The proposed Comprehensive Plan amendments bring the City and the County into compliance with Goal 5 for significant groundwater resources.

The proposed City Code amendments bring the City Code into compliance with Goal 5 for significant wetlands, riparian, and groundwater resources in order to protect these significant Goal 5 resources and address specific requirements of Goal 5.

The City of Florence Significant Wetlands and Riparian Corridors Plan adopted in this proposal as part of the Comprehensive Plan will be implemented in stages. This initial proposal includes adoption of the wetland and riparian inventory for the entire UGB and adoption of Code provisions by the City to protect riparian and wetland areas, pursuant to Statewide Goal 5. Ultimately, the County is required to adopt measures to protect wetland and riparian areas, comparable to the Goal 5 Rule requirements for safe harbor, and that will be accomplished in a separate future action.

In the interim, there is not an imminent threat to significant wetlands and riparian areas in the Florence UGB. Current regulations prohibit new subdivisions and land partitioning prior to annexation, so that major development within the UGB in the future will occur under the City's Code; and the County's Beaches and Dunes Overlay, which covers all the County lands in the UGB through the /U Combining District in Lane Code Chapter 10, requires a case-by-case Preliminary Investigation (LC 10.270-45) to identify, among other issues, "critical fish or wildlife habitat." As an interim measure, this development review process is available to the County to protect wetlands and riparian areas. The existing Lane County Code Chapter 10 requirements that prohibit land divisions prior to annexation and apply the Lane County Beaches and Dunes Overlay which applies specific protections for "critical fish and wildlife habitat is as follows:"

Lane Code Chapter 10: Florence Urban Growth Boundary

10.122-25 Location.

The /U Combining District is for the purpose of reviewing land within those areas that are considered transitional and/or marginal; conditions which could either restrict and/or limit urban and semi-urban uses.

10.122-30 Lot Area. (1) For land within the Florence UGB that is within the North Florence Dunal Aquifer boundary, as designated by the US Environmental Protection Agency in September 1987, no land divisions shall be allowed prior to annexation to the City.

OAR 660-023-0020

STANDARD AND SPECIFIC RULES AND SAFE HARBORS

- (2) A "safe harbor" consists of an optional course of action that satisfies certain requirements under the standard process. Local governments may follow safe harbor requirements rather than addressing certain requirements in the standard Goal 5 process. For example, a jurisdiction may choose to identify "significant" riparian corridors using the safe harbor criteria under OAR 660-023-0090(5) rather than follow the general requirements for determining "significance" in the standard Goal 5 process under OAR 660-023-0030(4). Similarly, a jurisdiction may adopt a wetlands ordinance that meets the requirements of OAR 660-023-0100(4)(b) in lieu of following the ESEE decision process in OAR 660-023-0040.**

The City Code amendments for wetlands and riparian areas are consistent with this Rule because the Limited Protection Program adopted by the City:

uses the safe harbor process for the riparian inventory for Munsel Creek, the only fish-bearing stream in the inventory, and the standard Goal 5 process under OAR 660-023-0030(4) for determining other significant riparian reaches;
applies the safe harbor protections in Goal 5 to all significant riparian reaches in the city except the Munsel Creek side channel;
applies the safe harbor protections to all significant wetlands in the City except where protection of the wetland conflicts with provision of public infrastructure in accordance with the City's adopted Public Facilities Plan;
uses the ESEE decision process in OAR 660-023-0040 to address conflicts between significant wetlands and public infrastructure and between the significant riparian corridor and existing development along the Munsel Creek side channel

DEPARTMENT OF LAND CONSERVATION AND DEVELOPMENT (DLCD) STATEWIDE PLANNING GOAL 5 AND DEPARTMENT OF STATE LANDS (DSL) ADMINISTRATIVE RULES: WETLANDS

DLCD: OAR 660-023-0100

(2)The standard inventory process requirements in OAR 660-023-0030 do not apply to wetlands. Instead, local governments shall follow the requirements of section (3) of this rule in order to inventory and determine significant wetlands.

(3) For areas inside urban growth boundaries (UGBs) and urban unincorporated communities (UUCs), local governments shall:

- (a) Conduct a local wetlands inventory (LWI) using the standards and procedures of OAR 141-086-0110 through 141-086-0240 and adopt the LWI as part of the comprehensive plan or as a land use regulation; and
- (b) Determine which wetlands on the LWI are "significant wetlands" using the criteria adopted by the Division of State Lands (DSL) pursuant to ORS 197.279(3)(b) and adopt the list of significant wetlands as part of the comprehensive plan or as a land use regulation.

ORS 197.279

Approved wetland conservation plans comply with goals; exception; rules. (1) Wetland conservation plans approved by the Director of the Department of State Lands pursuant to ORS chapter 196 shall be deemed to comply with the requirements of statewide planning goals relating to other than estuarine wetlands for those areas, uses and activities which are regulated by the wetland conservation plans.

(3) The department shall adopt by rule:

(b) Criteria for cities and counties to use to determine when a wetland is a significant wetland. [1989 c.837 §25; 1995 c.472 §2]
DSL:

OAR 141-086-0180: PURPOSE

Pursuant to ORS 196.674 pertaining to the Statewide Wetlands Inventory (SWI), these rules establish a system for uniform wetland identification and comprehensive mapping. These rules also establish wetlands inventory standards for cities or counties developing a wetland conservation plan (WCP) pursuant to ORS 196.678. A Local Wetlands Inventory (LWI) is developed for all or a portion of a city or county according to the standards and guidelines contained in these rules (OAR 141-086-0180 through 141-086-0240).

OAR 141-086-0185: APPLICABILITY

(1) Once approved by the Department of State Lands (Department), the LWI must be used in place of the National Wetlands Inventory (NWI) and is incorporated into the SWI.

(2) The approved LWI must be used by cities and counties in lieu of the NWI for notifying the Department of land use applications affecting mapped wetlands and other waters (ORS 215.418 and 227.350).

(3) An LWI fulfills the wetlands inventory requirements for Goal 5 and Goal 17 (OAR 660-015 and 660-023). An LWI that meets the additional WCP require-

ments specified in these rules must be used as the wetlands inventory basis for a WCP.

(4) A wetland function and condition assessment of mapped wetlands must be conducted as part of the LWI using the Oregon Freshwater Wetland Assessment Methodology (OFWAM) published by the Department in 1996. An equivalent functional assessment methodology may be used or adjustments may be made to OFWAM upon written approval by the Director. The assessment results are used to determine the relative quality (functions, values, and condition) of the mapped wetlands and to designate significant wetlands (OAR 141-086-0300 through 141-086-0350) as required for Goal 5, or to assess wetland functions and values for a WCP.

(5) An LWI is used by the Department, other agencies and the public to help determine if wetlands or other waters are present on particular land parcels.

(6) An LWI provides information for planning purposes on the location of potentially regulated wetlands and other waters such as lakes and streams, but is not of sufficient detail for permitting purposes under the state Removal-Fill Law (ORS 196.800 through 196.990)....

(7) All wetlands inventory procedures and products are subject to review and approval by the Department before the products:

- (a) Are incorporated into the SWI;
- (b) Can be used in lieu of the NWI for Wetland Land Use Notification purposes; or
- (c) Can be used by a city or county for Goal 5, Goal 17 or WCP purposes.

OAR 141-086-0350: LOCALLY SIGNIFICANT WETLAND CRITERIA

2) Mandatory LSW Criteria. A local government shall identify a wetland as locally significant if it meets one or more of the following criteria:

(a) The wetland performs any of the following functions at the levels indicated below using the Oregon Freshwater Wetland Assessment Methodology:

- (A) "Diverse" wildlife habitat; or
- (B) "Intact" fish habitat; or
- (C) "Intact" water quality function; or
- (D) "Intact" hydrologic control function.

(b) The wetland or a portion of the wetland occurs within a horizontal distance less than one-fourth mile from a water body listed by the Department of Environmental Quality as a water quality limited water body (303 (d) list), and the wetland's water quality function is described as "intact" or "impacted or degraded" using OFWAM. The 303(d) list specifies which parameters (e.g., temperature, pH) do not meet state water quality standards for each water body. A local government may determine that a wetland is not significant under this subsection upon documentation that the wetland does not provide water quality improvements for the specified parameter(s).

(c) The wetland contains one or more rare plant communities, as defined in this rule.

(d) The wetland is inhabited by any species listed by the federal government as threatened or endangered, or listed by the state as sensitive, threatened or endangered, unless the appropriate state or federal agency indicates that the wetland is not important for the maintenance of the species.

(A) The use of the site by listed species must be documented, not anecdotal. Acceptable sources of documentation may include but are not limited to: field observations at the wetland sites during the local wetlands inventory and functional assessments, and existing information on rare species occurrences at agencies such as the Oregon Natural Heritage Program, Oregon Department of Fish and Wildlife, Oregon Department of Agriculture and the U.S. Fish and Wildlife Service.

(B) Input originating from other locally knowledgeable sources constitutes "documentation" if verified by one of the above agencies or a university or college reference collection.

(e) The wetland has a direct surface water connection to a stream segment mapped by the Oregon Department of Fish and Wildlife as habitat for indigenous anadromous salmonids, and the wetland is determined to have "intact" or "impacted or degraded" fish habitat function using OFWAM.

(3) Optional LSW Criteria. At the discretion of the local government, wetlands that meet one or more of the following criteria may be identified as locally significant wetlands:

(a) The wetland represents a locally unique native plant community: wetland is or contains the only representative of a particular native wetland plant community in the UGB/UUC, which is only applicable if the entire UGB/UUC is inventoried. To be identified as a LSW, such a wetland must also have been assessed to perform at least one of the following functions at the levels indicated below using OFWAM:

(A) Its wildlife habitat descriptor is either "provides diverse habitat", or "provides habitat for some wildlife species"; or

(B) Its fish habitat descriptor is either "intact", or "impacted or degraded"; or

(C) Its water quality function descriptor is either "intact", or "impacted or degraded"; or

(D) Its hydrologic control function descriptor is either "intact", or "impacted or degraded".

(b) The wetland is publicly owned and determined to "have educational uses" using OFWAM, and such use by a school or organization is documented for that site.

The proposed Comprehensive Plan amendments for wetlands are consistent with Administrative Rules for DLCD and DSL because the amendments and the process:

Amended the acknowledged plan for the area inside the Florence UGB to address the requirements of the OAR following the requirements of section (3) of the rule in order to inventory and determine significant wetlands:

Conducted a local wetlands inventory (LWI) using the standards and procedures of OAR 141-086-0110 through 141-086-0240 pursuant to ORS 197.279(3)(b);
 Used the Oregon Rapid Wetlands Assessment Protocol (ORWAP), an equivalent functional assessment methodology, in accordance with written approval by the Director of DSL;
 Used the assessment results to determine the relative quality (functions, values, and condition) of the mapped wetlands and to designate significant wetlands (OAR 141-086-0300 through 141-086-0350) as required for Goal 5;
 Will use the DSL-approved LWI for Goal 5 and Goal 17 purposes;
 Adopted the LWI as part of the Comprehensive Plan;
 Determined which wetlands on the LWI are "significant wetlands" using the criteria approved by the Department of State Lands;
 Through adoption of proposed Plan policy, the City and County will use the DSL-approved LWI in lieu of the NWI for notifying the Department of land use applications affecting mapped wetlands and other waters in accordance with ORS 215.418 and 227.350; and
 Through adoption of Code amendments, including consistency Code amendments, the LWI will fulfill the wetlands inventory requirements for Goal 5 and Goal 17, consistent with OAR 660-015 and 660-023.

DLCD: OAR 660-023-0100

- (4) For significant wetlands inside UGBs and UUCs, a local government shall:**
- (a) Complete the Goal 5 process and adopt a program to achieve the goal following the requirements of OAR 660-023-0040 and 660-023-0050; or**
 - (b) Adopt a safe harbor ordinance to protect significant wetlands consistent with this subsection, as follows:**
 - (A) The protection ordinance shall place restrictions on grading, excavation, placement of fill, and vegetation removal other than perimeter mowing and other cutting necessary for hazard prevention; and**
 - (B) The ordinance shall include a variance procedure to consider hardship variances, claims of map error verified by DSL, and reduction or removal of the restrictions under paragraph (A) of this subsection for any lands demonstrated to have been rendered not buildable by application of the ordinance.**

The proposed City Code amendments for significant wetlands are consistent with this Goal 5 requirement because the City completed the Goal 5 process and adopted a program to achieve the Goal following both the safe harbor requirements and the requirements of OAR 660-023-0040 and 660-023-0050 (see finding of consistency with these OAR below), by:

adopting a Limited Protection Program that applies the safe harbor Goal 5 provisions except where there are conflicts with public infrastructure, and, consistent with OAR 660-023-0040 and 660-023-0050 addresses conflicts, through an ESEE analysis, between public infrastructure and full protection of significant wetlands;

including standards that place restrictions on grading, excavation, placement of fill, and vegetation removal other than perimeter mowing and other cutting necessary for hazard prevention; and

including variance procedures to consider hardship variances, claims of map error verified by DSL, and reduction or removal of the restrictions for any lands demonstrated to have been rendered not buildable by application of the standards.

(7) All local governments shall adopt land use regulations that require notification of DSL concerning applications for development permits or other land use decisions affecting wetlands on the inventory, as per ORS 227 .350 and 215.418, or on the SWI as provided in section (5) of this rule.

The proposed Comprehensive Plan amendments are consistent with this administrative rule because the City and County will adopt plan policy to require notification of DSL concerning applications for development permits or other land use decisions affecting wetlands on the inventory.

Goal 5 Administrative Rule for Riparian Areas

OAR 660-023-0090 Riparian Corridors

(3) Local governments shall inventory and determine significant riparian corridors by following either the safe harbor methodology described in section (5) of this rule or the standard inventory process described in OAR 660-023-0030 as modified by the requirements in section (4) of this rule. The local government may divide the riparian corridor into a series of stream sections (or reaches) and regard these as individual resource sites.

(4) When following the standard inventory process in OAR 660-023-0030, local governments shall collect information regarding all water areas, fish habitat, riparian areas, and wetlands within riparian corridors. .. Local governments are encouraged, but not required, to conduct field investigations to verify the location, quality, and quantity of resources within the riparian corridor. At a minimum, local governments shall consult the following sources, where available, in order to inventory riparian corridors along rivers, lakes, and streams within the jurisdiction:

- (a) Oregon Department of Forestry stream classification maps;**
- (b) United States Geological Service (USGS) 7.5-minute quadrangle maps;**
- (c) National Wetlands Inventory maps;**
- (d) Oregon Department of Fish and Wildlife (ODFW) maps indicating fish habitat;**
- (e) Federal Emergency Management Agency (FEMA) flood maps; and**
- (f) Aerial photographs.**

The Comprehensive Plan and Code amendments are consistent with this Rule because:

The City and County have inventoried and determined significant riparian corridors by following a combined safe harbor methodology and the standard inventory process described in the Rule, divided the riparian corridor into a series of stream sections (or reaches), and regarded these as individual resource sites.

In using the standard inventory process in OAR 660-023-0030, the local governments collected information regarding all water areas, fish habitat, riparian areas, and wetlands within riparian corridors; conducted field investigations to verify the location, quality, and quantity of resources within the riparian corridor; and consulted the sources listed in the Rule as well as information provided by ODFW and the US National Marine Fisheries Service.

- (5) As a safe harbor in order to address the requirements under OAR 660-023-0030, a local government may determine the boundaries of significant riparian corridors within its jurisdiction using a standard setback distance from all fish-bearing lakes and streams shown on the documents listed in subsections (a) through (f) of section (4) of this rule, as follows:..**
- (b) Along all lakes, and fish-bearing streams with average annual stream flow less than 1,000 cfs, the riparian corridor boundary shall be 50 feet from the top of bank.**
- (c) Where the riparian corridor includes all or portions of a significant wetland as set out in OAR 660-023-0100, the standard distance to the riparian corridor boundary shall be measured from, and include, the upland edge of the wetland.**

As a safe harbor in order to address the requirements under OAR 660-023-0030, the City and County determined the boundaries of significant riparian corridors within its jurisdiction using a standard setback distance of 50 foot from top of bank from Munsel Creek, the only fish-bearing stream in the inventory which has an average annual stream flow less than 1,000 cfs;

where the Munsel Creek riparian corridor includes portions of a significant wetland as set out in OAR 660-023-0100, the standard distance to the riparian corridor boundary shall be measured from, and include, the upland edge of the wetland.

- (6) Local governments shall develop a program to achieve Goal 5 using either the safe harbor described in section (8) of this rule or the standard Goal 5 ESEE process in OAR 660-023-0040 and 660-023-0050 as modified by section (7) of this rule.**
- (7) When following the standard ESEE process in OAR 660-023-0040 and 660-023-0050, a local government shall comply with Goal 5 if it identifies at least the following activities as conflicting uses in riparian corridors:**
- (a) The permanent alteration of the riparian corridor by placement of structures or impervious surfaces, except for:**
- (A) Water-dependent or water-related uses; and**

- (B) Replacement of existing structures with structures in the same location that do not disturb additional riparian surface area; and
- (b) Removal of vegetation in the riparian area, except:
 - (A) As necessary for restoration activities, such as replacement of vegetation with native riparian species;
 - (B) As necessary for the development of water-related or water-dependent uses;...

The Code amendments are consistent with this Rule because the City developed a program to achieve Goal 5 using both the safe harbor and the standard Goal 5 ESEE process that includes the provisions related to the permanent alteration of the riparian corridor by placement of structures or impervious surfaces, except for the uses specified in the Rule.

- (8) As a safe harbor in lieu of following the ESEE process requirements of OAR 660-023-0040 and 660-023-0050, a local government may adopt an ordinance to protect a significant riparian corridor as follows:
 - (a) The ordinance shall prevent permanent alteration of the riparian area by grading or by the placement of structures or impervious surfaces, except for the following uses, provided they are designed and constructed to minimize intrusion into the riparian area:
 - (A) Streets, roads, and paths;
 - (B) Drainage facilities, utilities, and irrigation pumps;
 - (C) Water-related and water-dependent uses; and
 - (D) Replacement of existing structures with structures in the same location that do not disturb additional riparian surface area.
 - (b) The ordinance shall contain provisions to control the removal of riparian vegetation, except that the ordinance shall allow:
 - (A) Removal of non-native vegetation and replacement with native plant species; and
 - (B) Removal of vegetation necessary for the development of water-related or water-dependent uses;
 - (d) The ordinance shall include a procedure to consider hardship variances, claims of map error, and reduction or removal of the restrictions under subsections (a) and (b) of this section for any existing lot or parcel demonstrated to have been rendered not buildable by application of the ordinance; ...

The Code amendments and Limited Protection Program comply with this Rule because the Code standards contain all of the required provisions.

Goal 5 Administrative Rules: ESEE Analysis

660-023-0040 ESEE DECISION PROCESS

(1) Local governments shall develop a program to achieve Goal 5 for all significant resource sites based on an analysis of the economic, social, environmental, and energy (ESEE) consequences that could result from a decision to allow, limit, or prohibit a conflicting use. This rule describes four steps to be followed in conducting an ESEE analysis, as set out in detail in sections (2) through (5) of this rule. Local governments are not required to follow these steps sequentially, and some steps anticipate a return to a previous step. However, findings shall demonstrate that requirements under each of the steps have been met, regardless of the sequence followed by the local government. The ESEE analysis need not be lengthy or complex, but should enable reviewers to gain a clear understanding of the conflicts and the consequences to be expected. The steps in the standard ESEE process are as follows:

- (a) Identify conflicting uses;**
- (b) Determine the impact area;**
- (c) Analyze the ESEE consequences; and**
- (d) Develop a program to achieve Goal 5.**

(2) Identify conflicting uses. Local governments shall identify conflicting uses that exist, or could occur, with regard to significant Goal 5 resource sites. To identify these uses, local governments shall examine land uses allowed outright or conditionally within the zones applied to the resource site and in its impact area. Local governments are not required to consider allowed uses that would be unlikely to occur in the impact area because existing permanent uses occupy the site. The following shall also apply in the identification of conflicting uses:

- (a) If no uses conflict with a significant resource site, acknowledged policies and land use regulations may be considered sufficient to protect the resource site. The determination that there are no conflicting uses must be based on the applicable zoning rather than ownership of the site. (Therefore, public ownership of a site does not by itself support a conclusion that there are no conflicting uses.)**
- (b) A local government may determine that one or more significant Goal 5 resource sites are conflicting uses with another significant resource site. The local government shall determine the level of protection for each significant site using the ESEE process and/or the requirements in OAR 660-023-0090 through 660-023-0230 (see OAR 660-023-0020(1)).**

(3) Determine the impact area. Local governments shall determine an impact area for each significant resource site. The impact area shall be drawn to include only the area in which allowed uses could adversely affect the identified resource. The impact area defines the geographic limits within which to conduct an ESEE analysis for the identified significant resource site.

(4) Analyze the ESEE consequences. Local governments shall analyze the ESEE consequences that could result from decisions to allow, limit, or prohibit a conflicting use. The analysis may address each of the identified conflicting uses, or it may address a group of similar conflicting uses. A local government may conduct

a single analysis for two or more resource sites that are within the same area or that are similarly situated and subject to the same zoning. The local government may establish a matrix of commonly occurring conflicting uses and apply the matrix to particular resource sites in order to facilitate the analysis. A local government may conduct a single analysis for a site containing more than one significant Goal 5 resource. The ESEE analysis must consider any applicable statewide goal or acknowledged plan requirements, including the requirements of Goal 5. The analyses of the ESEE consequences shall be adopted either as part of the plan or as a land use regulation.

(5) Develop a program to achieve Goal 5. Local governments shall determine whether to allow, limit, or prohibit identified conflicting uses for significant resource sites. This decision shall be based upon and supported by the ESEE analysis. A decision to prohibit or limit conflicting uses protects a resource site. A decision to allow some or all conflicting uses for a particular site may also be consistent with Goal 5, provided it is supported by the ESEE analysis. One of the following determinations shall be reached with regard to conflicting uses for a significant resource site:

- (a) A local government may decide that a significant resource site is of such importance compared to the conflicting uses, and the ESEE consequences of allowing the conflicting uses are so detrimental to the resource, that the conflicting uses should be prohibited.
- (b) A local government may decide that both the resource site and the conflicting uses are important compared to each other, and, based on the ESEE analysis, the conflicting uses should be allowed in a limited way that protects the resource site to a desired extent.
- (c) A local government may decide that the conflicting use should be allowed fully, notwithstanding the possible impacts on the resource site. The ESEE analysis must demonstrate that the conflicting use is of sufficient importance relative to the resource site, and must indicate why measures to protect the resource to some extent should not be provided, as per subsection (b) of this section.

The City Code Amendments, ESEE Analysis, and Limited Protection Program in the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan (2013 Plan) are consistent with this Rule because:

The 2013 Plan documents the procedures used to complete the Goal 5 process and the 2013 Plan is adopted as part of the Comprehensive Plan.

The City Code amendments, ESEE, and Limited Protection Program described in the 2013 Plan followed the steps in the Rule, i.e., identified conflicting uses; determined the impact area; analyzed the ESEE consequences; and developed a program to achieve Goal 5.

The City developed a program to achieve Goal 5 by limiting conflicting uses for significant resource sites; and this decision is based upon and supported by the ESEE analysis in Chapter 3 of the 2013 Plan: ESEE Analysis for Public Facilities and the Munsel Creek Side Channel.

The decision to limit conflicting uses protects significant wetlands and riparian corridors and is supported by the ESEE analysis.

The determination was reached that both the resource site and the conflicting uses are important compared to each other, and, based on the ESEE analysis, the conflicting uses should be allowed in a limited way that protects the resource site to a desired extent.

OAR 660-023-0050: PROGRAMS TO ACHIEVE GOAL 5

(1) For each resource site, local governments shall adopt comprehensive plan provisions and land use regulations to implement the decisions made pursuant to OAR 660-023-0040(5). The plan shall describe the degree of protection intended for each significant resource site. The plan and implementing ordinances shall clearly identify those conflicting uses that are allowed and the specific standards or limitations that apply to the allowed uses. A program to achieve Goal 5 may include zoning measures that partially or fully allow conflicting uses (see OAR 660-023-0040(5)(b) and (c)).

(2) When a local government has decided to protect a resource site under OAR 660-023-0040(5)(b), implementing measures applied to conflicting uses on the resource site and within its impact area shall contain clear and objective standards. For purposes of this division, a standard shall be considered clear and objective if it meets any one of the following criteria:

- (a) It is a fixed numerical standard, such as a height limitation of 35 feet or a setback of 50 feet;**
- (b) It is a nondiscretionary requirement, such as a requirement that grading not occur beneath the dripline of a protected tree; or**
- (c) It is a performance standard that describes the outcome to be achieved by the design, siting, construction, or operation of the conflicting use, and specifies the objective criteria to be used in evaluating outcome or performance. Different performance standards may be needed for different resource sites. If performance standards are adopted, the local government shall at the same time adopt a process for their application (such as a conditional use, or design review ordinance provision).**

(3) In addition to the clear and objective regulations required by section (2) of this rule, except for aggregate resources, local governments may adopt an alternative approval process that includes land use regulations that are not clear and objective (such as a planned unit development ordinance with discretionary performance standards), provided such regulations:

- (a) Specify that landowners have the choice of proceeding under either the clear and objective approval process or the alternative regulations; and**
- (b) Require a level of protection for the resource that meets or exceeds the intended level determined under OAR 660-023-0040 (5) and 660-023-0050(1).**

The proposals are in compliance with this Rule because the City will adopt City Code amendments that:

- implement the Limited Protection Program in the 2013 Plan;
- describe the degree of protection intended for each significant resource site;
- clearly identify those conflicting uses that are allowed (public infrastructure in the adopted Public Facilities Plan in significant wetlands and a 50% setback reduction along the Munsel Creek side channel) and the specific standards or limitations that apply to the allowed uses; and the standards are included in zoning measures that allow the conflicting uses. In the case of the side channel, specific criteria for replanting displaced native plants apply.
- contain clear and objective standards (i.e., a 50% setback reduction for the side channel; and to allow public infrastructure in significant wetlands)
- include incentives to encourage preservation, maintenance and restoration of significant wetlands and riparian areas.
- allow for landowners to choose proceeding under either the clear and objective approval process through Administrative Review; or through a Plan Amendment Option or Variance process with a required level of protection for the resource that meets or exceeds the intended level determined under OAR 660-023-0040 (5) and 660-023-0050(1).

OAR 660-023-0140: GROUNDWATER RESOURCES

(2) Local governments shall amend acknowledged plans prior to or at each periodic review in order to inventory and protect significant groundwater resources under Goal 5 only as provided in sections (3) through (5) of this rule. Goal 5 does not apply to other groundwater areas, although other statewide Goals, especially Goals 2, 6, and 11, apply to land use decisions concerning such groundwater areas. Significant groundwater resources are limited to:

(b) Wellhead protection areas, subject to the requirements in sections (4) and (5) of this rule instead of the requirements in OAR 660-023-0030 through 660-023-0050.

The adoption of the 2013 Aquifer Protection Plan and Comprehensive Plan amendments by the City and the County bring these local governments into compliance with Goal 5 for groundwater resources because:

- The local governments will amend the acknowledged plan to inventory and protect the Wellhead Protection Area, aka Drinking Water Protection Area (DWPA), for the existing wellfield, which is a significant groundwater resource under Goal 5;
- The DWPA for the proposed wellfield is protected under Goals 2, 6, and 11, as demonstrated in these Findings;
- The DWPA for the existing wellfield is a significant groundwater resource subject to the requirements in sections (4) and (5) of this rule instead of the requirements in OAR 660-023-0030 through 660-023-0050.

(4) A local government or water provider may delineate a wellhead protection area for wells or wellfields that serve lands within its jurisdiction. For the delineation of wellhead protection areas, the standards and procedures in OAR chapter 333, division 61 (Oregon Health Division rules) shall apply rather than the standards and procedures of OAR 660-023-0030.

(5) A wellhead protection area is a significant groundwater resource only if the area has been so delineated and either:

(a) The public water system served by the wellhead area has a service population greater than 10,000 or has more than 3,000 service connections and relies on groundwater from the wellhead area as the primary or secondary source of drinking water; or...

(6) Local governments shall develop programs to resolve conflicts with wellhead protection areas described under section (5) of this rule. In order to resolve conflicts with wellhead protection areas, local governments shall adopt comprehensive plan provisions and land use regulations, consistent with all applicable statewide goals, that:

(a) Reduce the risk of contamination of groundwater, following the standards and requirements of OAR Chapter 340, Division 40; and

(b) Implement wellhead protection plans certified by the Oregon Department of Environmental Quality (DEQ) under OAR 340-040-0180.

DEQ WELLHEAD PROTECTION ADMINISTRATIVE RULES

OAR 340-040-0170

Required Elements of A Wellhead Protection Plan

(1) A Wellhead Protection Plan shall contain and address the following seven elements:

(a) Specification of Duties:

(A) The Plan shall identify all the Responsible Management Authorities within a Wellhead Protection Area. The jurisdictional boundaries of each Responsible Management Authority shall be shown on a map;

(B) For each Responsible Management Authority identified, the expectations, their respective responsibilities, and the duties they will perform with regards to implementing the Plan must be identified;

(C) The Plan shall either:

(i) Have all Responsible Management Authorities in the Wellhead Protection Area sign the Wellhead Protection Plan indicating that they will implement the actions outlined for their jurisdiction in the Plan; or

(ii) Describe the procedure used to notify and attempt to involve those Responsible Management Authorities not willing to sign the Plan.

- (b) Delineation of Wellhead Protection Areas:** Delineation of Wellhead Protection Areas shall occur as described under Health Division's rules under OAR 333-061-0057(1)(i).
- (c) Inventory of Potential Contaminant Sources:** After delineation of the Wellhead Protection Area, an inventory identifying the potential sources of contamination within the Wellhead Protection Area shall be completed. The inventory shall be designed to identify:
 - (A)** Past practices which may have resulted in a potential threat to the groundwater;
 - (B)** Those potential sources of contamination presently existing; and
 - (C)** Those potential sources which may exist in the future.
- (d) Management of Potential Sources of Contamination:**
 - (A)** For those potential sources of contamination identified under the inventory element of paragraphs (1)(A)(B)(C) of this rule, the Plan shall identify the management action to be employed to reduce the risk of contamination to the groundwater from those source(s) and justification for the proposed management actions and level of protection provided;
 - (B)** The Plan must identify the process used to address unanticipated potential sources of contamination that may locate within the Wellhead Protection Area, how the source will be evaluated for acceptability within the area, and how the management actions identified in the Plan for reducing the risk of contamination will be implemented;
 - (C)** Any management plans that directly regulate farming practices for the purpose of protecting water quality on agricultural lands within a Wellhead Protection Area shall be developed and implemented by the Oregon Department of Agriculture in accordance with Oregon Department of Agriculture authorities.
- (e) Contingency Plan:** Development of contingency plans for Wellhead Protection Areas shall be in accordance with Health Division rules under OAR 333-061-0057(3);
- (f) Siting of New Public Water System Wells or Springs:** Siting of new public water system wells or springs shall be in accordance with Health Division rules under OAR 333-061-0057(2);
- (g) Public Participation:** A description of the public participation efforts shall be included in the Plan, including:
 - (A)** Documentation that property owners and residents within the Wellhead Protection Area were notified of the development of a Wellhead Protection Plan. Notification at a minimum shall include publication of the intent to develop a Wellhead Protection Plan in a local newspaper, and a description of the process for developing and participating in the development of the Wellhead Protection Plan;
 - (B)** Formation of a Team to develop the Plan. The Team can either be a new group formed for the specific purpose of developing a Plan or it can be an existing group that is assigned the additional duty of developing a Plan;

- (C) Description of steps taken to provide opportunity for various interests within the affected area to participate;**
- (D) Documentation that all local public hearing procedures were followed in developing and adopting the Plan.**

340-040-0180: CERTIFICATION PROCEDURE

- (1) For a Wellhead Protection Plan to be certified by the Department, the Plan must meet requirements specified in OAR 340-040-0170.**
- (2) The Department shall act as the contact point for development and approval of Wellhead Protection Plans. The Department shall coordinate with other governmental entities so that the Plan is consistent with the requirements of those governmental entities before Department certification of the Plan is granted.**
- (3) The Health Division shall be responsible for certifying the delineation, and reviewing contingency plans and the new wells elements of the Plan as provided for under OAR 333-061-0020 through OAR 333-061-0065. The Department shall accept the Health Division's recommendations and certification.**
- (4) After consultation with the Department of Agriculture on agricultural issues, the Department of Land Conservation and Development on land use issues, the Health Division, and other governmental entities as appropriate, the Department shall be responsible for reviewing the remaining elements and giving the overall certification for each local Wellhead Protection Plan if each element is found to be adequately addressed.**
- (5) Within 60 days of the receipt of a request for certification of a Wellhead Protection Plan, the Department will send a written acknowledgment of receipt of the request and an estimated date for Department review and certification of the Plan.**
- (6) After certification of the plan, the Department will provide a written certification of completion to all signatories to the Plan.**

The proposal is consistent with these rules as demonstrated in the findings below and the text of the proposed Aquifer Protection Plan for the North Florence Sole Source Dual Aquifer (incorporated into these findings) because:

The proposal amends the acknowledged plan in order to inventory and protect the Drinking Water Protection Area (DWPA) for the City's existing wellfield, which is a significant groundwater resource under Statewide Planning Goal 5.

The City delineated the wellhead protection area for the wellfields that serve lands within its jurisdiction in accordance with the standards and procedures in OAR Chapter 333, Division 61; and the Oregon Health Authority certified the delineations as follows:

"The delineation of the capture zones for the current City of Florence wellfield meets the above requirements and is therefore certified collectively as Oregon Health Authority Drinking Water Program (OHA DWP) Delineation Certificate #0016. The delineation of capture zones for the proposed wellfield by OHA definition is a provisional delineations and cannot be included as part of this certifica-

tion. Instead, OHA approves of the use of the provisional delineation for protection of possible future drinking water resources."

The DWPA for the proposed wellfield is protected under Goals 2, 6, and 11, in accordance with Goal 5.

The DWPA for the existing wellfield is a significant groundwater resources because:
the DWPA was certified by the Oregon Health Authority consistent with the requirements in sections (4) and (5) of this rule;
the City's water system served by the wellhead area has more than 3,000 service connections, and relies on groundwater from the wellhead area as the primary (sole) source of drinking water.

The City and County have jointly adopted the Aquifer Protection Plan for the North Florence Sole Source Dunal Aquifer and Comprehensive Plan policies and the City has adopted a Drinking Water Protection Overlay Zone, consistent with all applicable statewide goals, that reduce the risk of contamination of groundwater, following the standards and requirements of OAR chapter 340, division 40; and implement wellhead protection plans certified by the Oregon Department of Environmental Quality (DEQ) under OAR 340-040-0180.

GOAL 6: AIR, WATER, AND LAND RESOURCES QUALITY

To maintain and improve the quality of the air, water and land resources of the state.

All waste and process discharges from future development, when combined with such discharges from existing developments shall not threaten to violate, or violate applicable state or federal environmental quality statutes, rules and standards. With respect to the air, water and land resources of the applicable air sheds and river basins described or included in state environmental quality statutes, rules, standards and implementation plans, such discharges shall not (1) exceed the carrying capacity of such resources, considering long range needs; (2) degrade such resources; or (3) threaten the availability of such resources.

Waste and Process Discharges -- refers to solid waste, thermal, noise, atmospheric or water pollutants, contaminants, or products therefrom. Included here also are indirect sources of air pollution which result in emissions of air contaminants for which the state has established standards.

The proposed Aquifer Protection Plan (Plan), Comprehensive Plan policies, and City Drinking Water Protection Overlay Zone (Overlay) are consistent with and implement this Goal because they maintain and improve the quality of the groundwater resources in the North Florence Sole Source Dunal Aquifer, the sole source of drinking water in Florence, as follows:

The North Florence Dunal Aquifer was designated a sole source aquifer by the EPA in September 1987. In designating the aquifer sole source, the September 1987 EPA Resource Document states:

"Potential for Contamination: Rapid infiltration rates into the sand cover combined with a shallow water table make the North Florence Dunal Aquifer highly susceptible to contamination from surface activity. Despite the relatively rapid flow of groundwater through the aquifer, water soluble contaminants introduced near the surface may remain in the ground water system for nearly 60 years.¹ Immiscible contaminants, such as petroleum distillates, would spread rapidly if spilled onto the permeable sand cover but would resist flushing by natural ground water flow.

Possible sources of aquifer contamination include fuel storage tank failure, accidental spills of hazardous material transported across the aquifer, septic tank effluent, storm runoff, pesticides, and chemical fertilizers. The lakes located along the eastern margin of the dunal area would suffer from any contaminants introduced into that portion of the aquifer which recharges the lakes. Direct leaching from septic tanks located in sand-covered areas adjacent to the lakes could seriously downgrade the quality of Clear Lake – the only surface source of drinking water presently used in the area.² Localized over-pumping of the aquifer near the ocean could result in saltwater intrusion. However, population projects by the Lane County Planning Staff suggest that such overdrafts are unlikely."

The Aquifer Protection Plan contains management strategies such as public education, technical assistance, Comprehensive Plan and City Code amendments, and other management strategies that represent community-based approaches to protect the aquifer from identified existing and future Potential Contaminant Sources, consistent with the Oregon Department of Environmental Quality (DEQ) and Oregon Health Authority Rules for Source Water Protection Plans.

Proposed Comprehensive Plan policies 6 and 7 address contamination threats from on site septic systems by specifically implementing OAR 340-071-0160 requirements for municipal wastewater systems to serve development within a UGB when the service is physically and legally available as those terms are defined in the OAR:

**"DEPARTMENT OF ENVIRONMENTAL QUALITY, DIVISION 71
ONSITE WASTEWATER TREATMENT SYSTEMS**

OAR 340-071-0160: Permit Application Procedures -- Construction, Installation, Alteration, and Repair Permits

(2) Application. A completed application for a (septic) construction, installation, alteration, or repair permit must be submitted to the appropriate agent on approved forms with all required exhibits the applicable permit application fee in OAR 340-071-0140(3). Applications that are not completed

¹ Christensen, R. and Rosenthal, G., 1982, North Florence Dunal Aquifer Study: Lane Council of Governments, Eugene, Oregon, 174 p.

² Christensen, R., 1985, Phosphorous Accumulation in the Clear Lake Watershed: Lane County Land Management Division of the Department of Public Works, 81 p.

in accordance with this section will not be accepted for filing. Except as otherwise allowed in this division, the exhibits must include:...

(b) A land use compatibility statement from the appropriate land use authority signifying that the proposed land use is compatible with the Land Conservation and Development Commission-acknowledged comprehensive plan or complies with the statewide planning goals....

(4) Permit denial. The agent must deny a (septic) permit if any of the following occurs.

(f) A sewerage system that can serve the proposed sewage flow is both legally and physically available, as described in paragraphs (A) and (B) of this subsection.

(A) Physical availability.

(i) A sewerage system is considered available if topographic or man-made features do not make connection physically impractical and one of the following applies.

(I) For a single family dwelling or other establishment with a maximum projected daily sewage flow not exceeding 899 gallons, the nearest sewerage connection point from the property to be served is within 300 feet.

(II) For a proposed subdivision or group of two to five single family dwellings or other establishment with the equivalent projected daily sewage flow, the nearest sewerage connection point from the property to be served is not further than 200 feet multiplied by the number of dwellings or dwelling equivalents.

(III) For proposed subdivisions or other developments with more than five single family dwellings or equivalent flows the agent will determine sewerage availability.

(B) Legal availability. A sewerage system is deemed legally available if the system is not under a department connection permit moratorium and the sewerage system owner is willing or obligated to provide sewer service."

The Drinking Water Protection Overlay Zone protects the City's proposed wellfield from hazardous materials that could degrade the resource and threaten the availability of the resource to meet the drinking water needs of the City in the future.

Comprehensive Plan policy 8 provides a process for the City and County to coordinate to help prevent contamination of the proposed wellfield from Dense Non-aqueous Phase Liquids (DNPLs) which can cause the City to abandon the wellfield.

GOAL 7: AREAS SUBJECT TO NATURAL HAZARDS

To protect people and property from natural hazards.

A. NATURAL HAZARD PLANNING

- 1. Local governments shall adopt comprehensive plans (inventories, policies and implementing measures) to reduce risk to people and property from natural hazards.**
- 2. Natural hazards for purposes of this goal are: floods (coastal and riverine), landslides, earthquakes and related hazards, tsunamis, coastal erosion, and wildfires. Local governments may identify and plan for other natural hazards.**

The Code amendments for wetlands and riparian areas amend portions of Chapter 7 of the Code – Special Development Standards – that implement the requirements of Goal 7. The amendments are consistent with this Goal because they protect the flood control functions and values of significant wetlands and riparian areas and they do not affect provisions for other natural hazards.

GOAL 9: ECONOMIC DEVELOPMENT

To provide adequate opportunities throughout the state for a variety of economic activities vital to the health, welfare, and prosperity of Oregon's citizens.

Comprehensive plans for urban areas shall:

- 1. Include an analysis of the community's economic patterns, potentialities, strengths, and deficiencies as they relate to state and national trends;**
- 2. Contain policies concerning the economic development opportunities in the community;**
- 3. Provide for at least an adequate supply of sites of suitable sizes, types, locations, and service levels for a variety of industrial and commercial uses consistent with plan policies;**
- 4. Limit uses on or near sites zoned for specific industrial and commercial uses to those which are compatible with proposed uses.**

The proposals are consistent with this Goal because they do not affect the supply of industrial or commercial sites in the UGB as specifically stated below.

The proposed City Code amendments for wetlands and riparian areas are consistent with Goal 9 because they enhance the economic development potential of employment lands by applying the City's existing Stormwater Buffer Zone to significant wetlands over ½ acre (instead of all wetlands) and to significant riparian areas (instead of all riparian areas); by providing for setback adjustments and Variances when properties are rendered unbuildable; and providing a Plan Amendment Option to address conflicts with the economic development potential of properties.

The proposed Aquifer Protection Plan is consistent with this Goal because it provides for public education and technical assistance to businesses to help them protect the aquifer; and protection of the aquifer, the City's sole drinking water source, is essential for

all economic activity in the city. The Overlay Zone does not prohibit specific economic activity; it regulates the use and storage of hazardous materials through future land use permit application processes. No land uses are prohibited by the Overlay and the City's business assistance program (in the Aquifer Protection Plan) is designed so that the City will assist businesses in complying with the requirements of the Overlay.

GOAL 10: HOUSING

To provide for the housing needs of citizens of the state.

Buildable lands for residential use shall be inventoried and plans shall encourage the availability of adequate numbers of needed housing units at price ranges and rent levels which are commensurate with the financial capabilities of Oregon households and allow for flexibility of housing location, type and density.

The proposal is also consistent with Goal 10 because it does not affect the supply of buildable residential lands: the 2013 Wetland and Riparian Inventory replaces the existing adopted 1997 Inventory and the two are nearly identical in the area covered by the regulations; and the Overlay Zone does not apply to residential land uses.

The proposed City Code amendments for wetlands and riparian areas are consistent with Goal 10 because they enhance development potential of residential lands by applying the City's existing Stormwater Buffer Zone to significant wetlands over ½ acre (instead of all wetlands) and to significant riparian areas (instead of all riparian areas); by providing for setback adjustments and Variances when properties are rendered unbuildable; and providing a Plan Amendment Option to address conflicts with the residential development potential of properties.

GOAL 11: PUBLIC FACILITIES AND SERVICES

To plan and develop a timely, orderly and efficient arrangement of public facilities and services to serve as a framework for urban and rural development.

The proposals are consistent with Goal 11 because they result in a timely, orderly, and efficient arrangement of public facilities and services for urban development as follows:

The Limited Protection Program results in an allowance for public facilities that are part of the adopted Public Facilities Plan to be constructed in significant wetlands. Public and private facilities are allowed by Goal 5 in significant riparian areas and this is reflected in the proposed Code.

The proposed wellfield is adopted as part of the Public Facility Plan and the Comprehensive Plan policies, Aquifer Protection Plan, and Overlay Zone protect the proposed wellfield for use by future residents and businesses of Florence.

Goal 12: Transportation

To provide and encourage a safe, convenient and economic transportation system.

OAR 660-012-0060

Plan and Land Use Regulation Amendments

(1) Where an amendment to a functional plan, an acknowledged comprehensive plan, or a land use regulation would significantly affect an existing or planned transportation facility, the local government shall put in place measures as provided in section (2) of this rule to assure that allowed land uses are consistent with the identified function, capacity, and performance standards (e.g. level of service, volume to capacity ratio, etc.) of the facility. A plan or land use regulation amendment significantly affects a transportation facility if it would:

- (a) Change the functional classification of an existing or planned transportation facility (exclusive of correction of map errors in an adopted plan);**
- (b) Change standards implementing a functional classification system; or**
- (c) As measured at the end of the planning period identified in the adopted transportation system plan:**
 - (A) Allow land uses or levels of development that would result in types or levels of travel or access that are inconsistent with the functional classification of an existing or planned transportation facility;**
 - (B) Reduce the performance of an existing or planned transportation facility below the minimum acceptable performance standard identified in the TSP or comprehensive plan; or**
 - (C) Worsen the performance of an existing or planned transportation facility that is otherwise projected to perform below the minimum acceptable performance standard identified in the TSP or comprehensive plan.**

The proposals are consistent with Goal 12 and these provisions in the Transportation Planning Rule because the proposals do not significantly affect a transportation facility, as follows:

- (a) They will not cause a change in the functional classification of an existing or planned transportation facility;**
- (b) they do not change standards implementing a functional classification system; or**
- (c) as measured at the end of the planning period identified in the adopted transportation system plan:**
 - (A) they do not allow land uses or levels of development that would result in types or levels of travel or access that are inconsistent with the functional classification of an existing or planned transportation facility;**
 - (B) they do not reduce the performance of an existing or planned transportation facility below the minimum acceptable performance standard identified in the TSP or comprehensive plan; or**

(C) they do not worsen the performance of an existing or planned transportation facility that is otherwise projected to perform below the minimum acceptable performance standard identified in the TSP or comprehensive plan.

GOAL 16: ESTUARINE RESOURCES

To recognize and protect the unique environmental, economic, and social values of each estuary and associated wetlands; and To protect, maintain, where appropriate develop, and where appropriate restore the long-term environmental, economic, and social values, diversity and benefits of Oregon's estuaries.

The housekeeping amendment to FCC Title 10 Chapter 19 makes the Code consistent with Statewide Planning Goal 16 by replacing the phrase "and it is not possible to locate the use on an upland site" with "In approving these uses, the City shall consider the potential for using upland sites to reduce or limit the commitment of the estuarine surface area for surface uses." The amendment is consistent with the direction in Goal 16:

"Oregon's Statewide Planning Goals & Guidelines, GOAL 16: ESTUARINE RESOURCES, OAR 660-015-0010(1) Management Units As a minimum, the following kinds of management units shall be established:... 3. Development: ... As appropriate the following uses shall also be permissible in development management units: ... Where consistent with the purposes of this management unit and adjacent shorelands designated especially suited for water-dependent uses or designated for waterfront redevelopment, water-related and nondependent, nonrelated uses not requiring dredge or fill; mining and mineral extraction; and activities identified in (1) and (2) above shall also be appropriate. In designating areas for these uses, local governments shall consider the potential for using upland sites to reduce or limit the commitment of the estuarine surface area for surface uses."

GOAL 17: COASTAL SHORELANDS

To conserve, protect, where appropriate, develop and where appropriate restore the resources and benefits of all coastal shorelands, recognizing their value for protection and maintenance of water quality, fish and wildlife habitat, water-dependent uses, economic resources and recreation and aesthetics. The management of these shoreland areas shall be compatible with the characteristics of the adjacent coastal waters; and To reduce the hazard to human life and property, and the adverse effects upon water quality and fish and wildlife habitat, resulting from the use and enjoyment of Oregon's coastal shorelands.

The proposals are consistent with Goal 17 as follows:

The proposals do not affect Goal 17 management units, except that the consistency Code amendment to FCC 10-19-9 Prime Wildlife District makes the Code consistent with the proposed Comprehensive Plan and Code amendments as well as Statewide

Planning Goal 2 (Land Use) and Goal 17 (Coastal Shorelands) by relying on the most recent inventory and assessment data for determining the boundaries and assessment of the management unit.

The 2013 Plan addresses the significance of wetlands and riparian areas under Statewide Planning Goal 5. Wetlands that are regulated under Statewide Planning Goal 17, Coastal Shorelands, are not subject to Goal 5 significance or protection. In the Florence UGB, Goal 17 resources are identified in the Lane County Coastal Resources Inventory, the Management Unit descriptions in the Florence Comprehensive Plan, and in the Coastal Shorelands standards in Florence City Code Title 10 Chapter 19.

As provided in Goal 5, the local wetland inventory and assessment (2013 LWI) will be used to update the general location and assessment of the South Heceta Junction Seasonal Lakes Goal 17 wetlands. This is necessary because the 2013 LWI is more current and precise and the general location of these wetlands in the 1978 Management Unit does not align with the general wetland location in the 2013 LWI, as described in detail in the "Statewide Planning Goals 5 and 17" section of Chapter 2 and "Consistency Code Amendments" in Chapter 4 of the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan, proposed for adoption as part of the Comprehensive Plan.

LANE COUNTY RURAL COMPREHENSIVE PLAN – PART 1, SECTION D

D. CITIES, COMMUNITIES AND RURAL LANDS

While the Policies in this document are directed at Lane County government, it is clearly recognized that the County has a responsibility to, and must coordinate efforts closely with, the incorporated cities within its boundaries. Statewide planning law requires that each incorporated city develop and adopt its own land use plan which must itself comply with LCDG Goals. The plan must contain essentially the same elements as the County General Plan, with an additional element of an identified Urban Growth Boundary (required by Goal 14). Future urban growth for each city is to take place within that Boundary. In the case of the Eugene-Springfield Metropolitan Area Plan, a mutual Boundary is adopted by both cities and the County. For all other cities, the County must ratify the cities UGBs by independent evaluation of, and adoption of, appropriate city plan provisions.

Through this method, the County becomes responsible for administering the provisions of city plans within the city UGBs but outside of the corporate city limits. "Joint Agreements for Planning Coordination" drawn up between the County and each city lay the framework for cooperative action in the effort. Policies concerning Goal 14 in this document further indicate County" posture toward city plans. County adoption of city plans--or amendments thereto--ensures that conflicts between city plans and County Plan do not readily occur.

The proposal is consistent with the Lane County Rural Comprehensive Plan because Lane County will co-adopt the Comprehensive Plan amendments in Exhibit B.

LANE CODE

Comprehensive Plan

12.050 Method of Adoption and Amendment.

- (1) The adoption of the comprehensive plan or an amendment to such plan shall be by an ordinance. (2) The Board may amend or supplement the comprehensive plan upon a finding of:**
- (a) an error in the plan; or**
 - (b) changed circumstances affecting or pertaining to the plan; or**
 - (c) a change in public policy; or**
 - (d) a change in public need based on a reevaluation of factors affecting the plan; provided, the amendment or supplement does not impair the purpose of the plan as established by LC 12.005 above.**

The proposal is consistent with this Lane Code section because the adoption of the amendments to the Florence Comprehensive Plan are by ordinance based on findings of changed circumstances, change in public policy, change in public need related to aquifer protection and wetlands and riparian resources, and housekeeping and consistency amendments.

14.300 De Novo Hearing Procedure.

All applications or appeals, unless otherwise specified, subject to this Section shall be reviewed as follows:

(1) Hearing Deadlines.

- (c) An application for review by the Planning Commission and a subsequent action by the Board, if accepted by the Director, shall be scheduled as follows:**
- (i) The Planning Commission hearing shall be no sooner than 45 days from the date of application acceptance and no later than 60 days from the date of application acceptance.**
 - (ii) The Board hearing shall be no sooner than 60 days from the date of application acceptance and no later than 75 days from the date of application acceptance.**

(2) Publication of Notice. For a zone change application and/or plan amendment application, the Department shall cause to be published in a newspaper of general circulation, at least 21 days in advance of the hearing, a notice of the hearing which contains the information required by LC 14.070(2) above.

The proposal is consistent with this Lane Code section because the adoption of the amendments to the Florence Comprehensive Plan were subject to public hearings before the Planning Commission and Board in accordance with the above schedule; and notice of the plan amendment was published in the Siuslaw News and Eugene Register-Guard at least 21 days in advance of the hearings, as stated in these findings. The proposed Comprehensive Plan amendments are legislative and therefore not subject to the quasi-judicial notice requirements of state law otherwise referenced in this Code.

(7) Order of Procedure. In the conduct of a public hearing, and unless otherwise specified by the Approval Authority, the Approval Authority shall:...

The proposal is consistent with this Lane Code section because the adoption of the amendments to the Florence Comprehensive Plan followed the procedures in this section.

(8) Decision and Findings Mailing. Within two days of the date that the written decision adopting findings is signed by the Approval Authority, the Director shall mail to the applicant, and all parties of record, a copy of the decision and findings; or if the decision and findings exceed five pages, the Director shall mail notice of the decision.

The proposal is consistent with this Lane Code section because the adoption of the amendments to the Florence Comprehensive Plan will include notice to the applicant, the City of Florence.

RURAL COMPREHENSIVE PLAN AMENDMENTS RURAL COMPREHENSIVE PLAN

(6) Plan Adoption or Amendment - General Procedures. The Rural Comprehensive Plan, or any component of such Plan, shall be adopted or amended in accordance with the following procedures:

(a) Referral to Planning Commission. Before the Board takes any action on a Rural Comprehensive Plan component, or an amendment to such Plan component, a report and recommendation thereon shall be requested from the County Planning Commission and a reasonable time allowed for the submission of such report and recommendation. In the event the Rural Comprehensive Plan component, or amendment applies to a limited geographic area, only the Planning Commission having jurisdiction of that area need receive such referral.

The proposal is consistent with this Lane Code section because the adoption of the amendments was referred to the Planning Commission for public hearing.

(b) Planning Commission - Hearing and Notice.

(i) The Planning Commission shall hold at least one public hearing before making a recommendation to the Board on a Rural Comprehensive Plan component, or an amendment to such Plan component, and the hearing shall be conducted pursuant to LC 14.300.

The proposal is consistent with this Lane Code section because the Planning Commission held at least one hearing on adoption of the amendments to the Florence Comprehensive Plan before making a recommendation to the Board and the hearing was conducted pursuant to LC 14.300.

(ii) Notice of the time and place of hearing shall be given, pursuant to LC 14.300.

(iv) The proposed Rural Comprehensive Plan component, or an amendment to such Plan component, shall be on file with the Director and available for public examination for at least 10 days prior to the time set for hearing thereon.

(c) Planning Commission - Consideration With Other Agencies.

(i) In considering a Rural Comprehensive Plan component, or an amendment to such Plan component, the Planning Commission shall take account of and seek to harmonize, within the framework of the needs of the County, the Plans of cities, and the Plans and planning activities of local, state, federal and other public agencies, organizations and bodies within the County and adjacent to it.

(ii) The Planning Commission, during consideration of a Rural Comprehensive Plan component or an amendment to such Plan component, shall consult and advise with public officials and agencies, public utility companies, civic, educational, professional and other organizations, and citizens generally to the end that maximum coordination of Plans may be secured.

(iii) Whenever the Planning Commission is considering a Rural Comprehensive Plan component, or an amendment to such Plan component, it shall be referred to the planning agency of every city and county affected to inform them and solicit their comments.

(iv) The provisions of this subsection are directory, not mandatory, and the failure to refer such Plan, or an amendment to such Plan, shall not in any manner affect its validity.

The proposal is consistent with this Lane Code section because the notice and referrals for adoption of the amendments to the Florence Comprehensive Plan were conducted in accordance with this section.

(d) Planning Commission - Recommendation and Record.

(i) Recommendation of the Planning Commission on a Rural Comprehensive Plan component, or an amendment to a Plan component, shall be by resolution of the Commission and carried by the affirmative vote of not less than a majority of its total voting members.

(ii) The record made at the Planning Commission hearings on a Rural Comprehensive Plan component, or an amendment to such Plan component and all materials submitted to or gathered by the Planning Commission for its consideration, shall be forwarded to the Board along with the recommendation.

(e) Board Action - Hearing and Notice.

(i) After a recommendation has been submitted to the Board by the Planning Commission on the Rural Comprehensive Plan component, or an amendment to such Plan component, all interested persons shall have an opportunity to be heard thereon at a public hearing before the Board conducted pursuant to LC 14.300.

- (ii) Notice of the time and place of the hearing shall be given pursuant to LC 14.300.
- (h) **Method of Adoption and Amendment.**
 - (i) The adoption or amendment of a Rural Comprehensive Plan component shall be by Ordinance.
 - (iii) The Board may amend or supplement the Rural Comprehensive Plan upon making the following findings:
 - (aa) For Major and Minor Amendments as defined in LC 16.400(8)(a) below, the Plan component or amendment meets all applicable requirements of local and state law, including Statewide Planning Goals and Oregon Administrative Rules.
 - (bb) For Major and Minor Amendments as defined in LC 16.400(8)(a) below, the Plan amendment or component is:
 - (i-i) necessary to correct an identified error in the application of the Plan; or
 - (ii-ii) necessary to fulfill an identified public or community need for the intended result of the component or amendment; or
 - (iii-iii) necessary to comply with the mandate of local, state or federal policy or law; or
 - (iv-iv) necessary to provide for the implementation of adopted Plan policy or elements; or
 - (v-v) otherwise deemed by the Board, for reasons briefly set forth in its decision, to be desirable, appropriate or proper.

(8) Additional Amendment Provisions. In addition to the general procedures set forth in LC 16.400(6) above, the following provisions shall apply to any amendment of Rural Comprehensive Plan components.

- (b) Amendment proposals, either minor or major, may be initiated by the County or by individual application. Individual applications shall be subject to a fee established by the Board and submitted pursuant to LC 14.050.

The proposal is consistent with this Lane Code section because adoption of the amendments to the Florence Comprehensive Plan was supported by a majority of the Lane County Planning Commission. Further, the proposal was adopted by ordinance by the Lane County Board of Commissioners based on findings of changed circumstances, change in public policy, change in public need related to aquifer protection and wetlands and riparian resources, and housekeeping and consistency amendments.

VI. CONCLUSIONS

City of Florence Ordinance No, 2, Series 2013 and Lane County Ordinance No. PA 1299 and the proposed legislative amendments to the Comprehensive Plan in **Exhibit B** are consistent with the Florence Realization 2020 Comprehensive Plan, Florence City Code, Lane County Rural Comprehensive Plan, Lane Code, Oregon Revised Statutes, and Statewide Planning Goals and associated Administrative Rules.

City of Florence Ordinance No. 2, Series 2013 and Lane County Ordinance No. PA 1299 and the proposed legislative and quasi-judicial amendments to the City Code in **Exhibit C** are consistent with the Florence Realization 2020 Comprehensive Plan, Florence City Code, Oregon Revised Statutes, and Statewide Planning Goals and associated Administrative Rules.

EXHIBIT B
TO CITY OF FLORENCE ORDINANCE NO. 2 SERIES 2013
AND LANE COUNTY ORDINANCE NO. PA 1299
Proposed Amendments to the Florence Realization 2020 Comprehensive Plan for
Aquifer Protection and Wetlands and Riparian Corridors
August 6, 2013

Unless noted otherwise, proposed additions are shown in double underline and deletions in strike-out.

1. AQUIFER PROTECTION

- a. Amend Florence Comprehensive Plan Chapter 5 to protect groundwater resources for consistency with state law and to adopt the Aquifer Protection Plan.**

Florence Comprehensive Plan
Chapter 5: Open Spaces and Scenic, Historic, and Natural Resources

Groundwater Resources

Goal

To protect the quality and quantity of the North Florence Dunal Aquifer, which has been designated a sole source aquifer by the Federal Environmental Protection Agency and which serves as a drinking water source for the City of Florence.

Objectives

1. To maintain recharge of the aquifer.
2. To protect the quality of water that recharges the aquifer.
3. To provide watershed/wellhead protection measures to protect water quality in the aquifer.
4. To protect the drinking water of the City of Florence.

Policies

1. The City shall implement the recommendations of the Stormwater management Plan regarding protection of the aquifer for the City's wellfield(s).

~~The City shall prepare and adopt a Wellhead Protection Program to protect the aquifers for the existing and potential wellfields, that supply drinking water for the residents of the City.~~

2. The City shall implement the 2013 *Aquifer Protection Plan for the North Florence Sole Source Dunal Aquifer (Aquifer Protection Plan)*, as amended and certified by the Oregon Department of Environmental Quality (DEQ) and the Oregon Health Authority (OHA). The Aquifer Protection Plan shall be implemented by: the policies in this Comprehensive Plan; Florence City Code provisions, including a Drinking Water Protection Overlay Zone; and City programs, as resources allow.
3. All portions of the *Aquifer Protection Plan*, except the Contingency Plan, are adopted as a supporting document to this Comprehensive Plan; and the Plan will be located in Appendix 5 of the Comprehensive Plan.
4. The "Certified Wellhead Delineations Report," (Delineations Report) February 2012, prepared by GSI Water Solutions, Inc. and certified by the Oregon Health Authority, is adopted into this Comprehensive Plan and is physically located in Appendix 5. The Delineations, including all Time of Travel Zones (TOTZ), shall serve as the drinking water source inventory for the City of Florence. The maps in the Delineations Report of Drinking Water Protection Areas (DWPAs) for the existing and proposed wellfield are adopted as part of this Comprehensive Plan. The City shall use the map of the delineated DWPA for the proposed wellfield as the reference map for the Drinking Water Protection Overlay Zone.
5. The DWPA, including all delineated TOTZ, for the existing wellfield is a significant groundwater resource as that term is defined by Statewide Planning Goal 5. The DWPA, including all delineated TOTZ, for the proposed wellfield shall be protected through application of Statewide Planning Goal 2, Land Use; Goal 6, Air, Water and Land Resources Quality; and Goal 11, Public Facilities and Services.
6. Prior to issuing new or replacement septic permits, Lane County shall request the City to inform the County in writing whether municipal wastewater service is "physically and legally available," as those terms are defined in OAR 340-071-0160.
7. Consistent with policies in this Comprehensive Plan, the City shall implement state law that requires the City to provide municipal wastewater services at the time a new or replacement septic system permit is applied for, if the municipal service is physically and legally available, as prescribed in Comprehensive Plan policies and OAR 340-071-0160.
8. As part of the land use referral process under the existing Joint Agreement for Planning Coordination between the City of Florence and Lane County, the County and the City will work cooperatively to discourage the use of Dense Non-aqueous Phase Liquids (DNAPLs) by commercial and industrial busi-

nesses in the 20 year Time of Travel Zone for the proposed wellfield. The City will respond to the referral response for permits in this area by providing information on the effects of DNAPLs in wellfields and on alternative chemicals that may be appropriate for the proposed land use.

Recommendations

~~The City should explore funding sources for delineation of the aquifer for the current wellfield, as well as a more precise estimation of the extent of the aquifers for the potential wellfields identified by Brown and Caldwell.~~

- 2.1. The City should continue to support attempts by Heceta Water District and Lane County to protect the water quality of Clear and Collard Lakes.

~~The City should identify possible contaminants in the areas of the aquifers, and identify alternative sites for those businesses, if possible, and/or work with the County and those businesses to reduce the use of and to provide for safe disposal of potential contaminants.~~

2. The City should continue to work with the Lane County and the Oregon Department of Environmental Quality Health to identify areas of failing onsite sewage disposal systems in the UGB, and pursue annexation and provision of municipal sewer to those areas, with the areas having the potential for contamination of the aquifer having the highest priority.

3. The City and Lane County should consider amending their Joint Agreement for Planning Services to provide a process for ensuring that DNAPLs are not used in the DWPA for the proposed wellfield.

- 5.4. The City should investigate the issue of dry wells and sumps for stormwater disposal relative to its potential for contamination of groundwater and attempt to reconcile the State Plumbing Code requirements with Federal prohibitions on discharge of stormwater to surface waters.

5. The City should investigate whether Transfer of Development Rights is a feasible tool for Florence; and, if feasible, work with Lane County to determine applicability in area outside city within UGB.

Background

Florence's groundwater resource has been designated by the Federal Environmental Protection Agency as a sole-source aquifer, the only sole source aquifer in Oregon, one of the few in the State. Protecting the aquifer's present quality and quantity is are critical to Florence's future, and sound management is essential to avoidance of irreparable harm to that important natural resource. To this end, in 2013, the City and Lane County jointly adopted the 2013 Aquifer Protection Plan

for the North Florence Sole Source Dunal Aquifer (Aquifer Protection Plan), in Appendix 5 of this Comprehensive Plan. The source water components of the Aquifer Protection Plan have been certified by the Oregon Department of Environmental Quality (DEQ) and the Oregon Health Authority (OHA) and are adopted as part of this Comprehensive Plan.. In addition, tThe documents titled North Florence Dunal Aquifer – Modeling and Analysis by Ott Water Engineers, 1982 and the August 1987 EPA Resource Document for Consideration of the North Florence Dunal Aquifer as a Sole Source Aquifer, are included in Appendix 5-G as supporting documentation for the North Florence Dunal Aquifer and the "Certified Well-head Delineations Report," (Delineations Report) February 2012, prepared by GSI Water Solutions, Inc. and certified by the Oregon Health Authority, is adopted into this Comprehensive Plan and is physically located in Appendix 5.

The DWPA for the existing wellfield is a "significant groundwater resource," as that term is defined in Oregon Administrative Rules for Goal 5 (Chapter 660 Division 23). The DWPA for the proposed wellfield is adopted as part of this Comprehensive Plan and protected by Plan policies and Code in order to protect this resource to meet the City's future needs for drinking water, consistent with Statewide Planning Goal 11; in order to protect water quality, consistent with Goal 6; and the delineation is based on the best available data, consistent with Goal 2.

The Aquifer Protection Plan was one of the products of the multi-year Siuslaw Estuary Partnership project funded by the Environmental Protection Agency to protect water quality and fish and wildlife habitat in the lower Siuslaw Watershed. The Comprehensive Plan and Florence City Code were amended to implement the Aquifer Protection Plan, including adoption of Comprehensive Plan policies and a new City Code Section 10-32: Drinking Water Protection Overlay District. This District regulates, within city limits, the use and storage of hazardous materials within the Drinking Water Protection Areas (DWPAs) of the City's proposed wellfield. Prohibition on the use of DNPLs is a key requirement of this overlay zone and the applicable Comprehensive Plan policy, above. DNAPLs do not break down in water as other contaminants do; and they are therefore extremely detrimental to a water source. Remediation of DNAPLs, if feasible, comes at a very high price and can be cause for abandoning a source. For this reason, prevention is the best and most effective protection strategy from this type of contaminant.

The Aquifer Protection Plan also contains Management Strategies such as inter-governmental coordination and education. These Management Strategies are prioritized in the Aquifer Protection Plan and high priority strategies are already being implemented or will be implemented in the immediate future. Other strategies will be implemented over time as resources allow. Through these efforts, Florence and its partners will ensure that the sole source aquifer is protected for current and future inhabitants of the Florence city limits and UGB.

- ~~• The City's municipal wellfield is located on 80 acres adjacent to the Ocean Dunes golf course. The wellfield consists of seven production wells for which~~

~~the water source is the North Florence Dunal Aquifer. These wells were constructed beginning in the mid-60's with the last four wells constructed in 1994, and range in depth from 120 feet to 182 feet. The untreated water has high levels of iron and some manganese, and is treated to reduce these levels to acceptable concentrations to meet drinking water standards.~~

- ~~• Clear Lake is one of a series of fresh water lakes located north of Florence which may serve as future water sources. The City has received water from Clear Lake through an agreement with the Heceta Water District. The City, Lane County and the Water District have, until recently, been negotiating on the construction of a filtration plant on Clear Lake. This is necessary to meet federal drinking water standards for surface water sources. However, homeowners on Clear Lake challenged this effort, and the City has decided not to pursue this effort at this time. An agreement between the District, Lane County and a Clear Lake landowner limits withdrawals from Clear Lake to 1 mgd after March 2002.~~

- ~~• In the absence of an agreement for future water supply from Clear Lake, the City's Water Facilities Plan, (Brown & Caldwell, September 1998) was updated (see Chapter 11, and Appendix 11) to provide for up to five new wells near the existing wellfield, with future well locations identified north and south of Heceta Beach Road. The City may work with Heceta Water District to obtain future withdrawals from Clear Lake up to sustainable levels.~~

- ~~• The Water Facilities Plan recommends that, "to preserve groundwater quality, the potential wellfield capture zones should be protected from industrial development or other activities that may release contaminants to the subsurface." In another section of the City's Water Facilities Plan, Brown and Caldwell recommends that, "given the potentially rapid recharge and the highly transmissive sands in the study area, a wellhead protection program is recommended for Florence's existing wellfield and any future wellfields."~~

- ~~• Protection of Oregon's groundwater resources is the primary goal of the Oregon Wellhead Protection Program. This is a voluntary program administered jointly by the Department of Environmental Quality and the Health Division. Under this program, a community:~~

- ~~• identifies the recharge area for its groundwater supplies,~~
- ~~• determines the potential sources of contamination,~~
- ~~• makes decisions about how the groundwater resource will be managed.~~

- ~~• DEQ is responsible for:~~

- ~~• certifying a community's Wellhead Protection Plan,~~
- ~~• assisting in the inventory of possible contaminant sources,~~

- ~~assisting in development of management strategies.~~
- ~~The Health Division is responsible for:~~
- ~~certifying the delineation of Wellhead Protections Areas,~~
- ~~providing assistance in developing a Water Contingency Plan,~~
- ~~planning for new groundwater sources.~~
- ~~Oregon's voluntary Wellhead Protection Program was approved in 1996, following defeat in the Legislature in 1993 of a proposal for a mandatory Wellhead Protection Program. Since it is a relatively new program, only a few communities have certified wellhead protection programs. Among them are Junction City and Coburg, both small cities, and the City of Springfield.~~
- ~~Applicable rules and regulations include:~~
- ~~(Wellhead Protection Plans) ORS 468.035, 468B.015(2), 468B.150-180 and implementing OAR Sections 340-40-140-340-40-210,~~
- ~~(Voluntary Wellhead Protection Program, delineation of Wellhead Protection Areas) ORS 448.123(1)(a), 448.131(2)(a)(b), 448.160, 672.525 and implementing OAR Sections 333-61-020, 333-61-050, 333-61-057, 333-61-065.~~

b. Consistency Amendments: Amend Comprehensive Plan Chapter 11, Utilities, Facilities, and Services for consistency with the proposed amendments.

Comprehensive Plan Chapter 11: Utilities, Facilities, and Services

Water System Supplies and Needs

Policies

2. The City shall develop ~~identify~~ new sources of water identified in the 2013 Aquifer Protection Plan to meet anticipated demands during the 2010-2030 period, and will provide treatment as appropriate for those sources.
3. The City will pursue strategies in the 2013 Aquifer Protection Plan to protect domestic water sources.

Recommendations

1. The City should implement the management strategies in the 2013 Aquifer Protection Plan, including adoption of a Drinking Water Protection Overlay Zone.

4. ~~The City should pursue ownership of private lands containing the proposed future wellfields.~~
5. ~~The City should initiate development of a wellhead/aquifer protection plan in order to assure that the aquifer, and the area around the wellheads is managed with a goal of maintaining the aquifer as a source of domestic water meeting state and federal standards for potability.~~

2. WETLANDS AND RIPARIAN CORRIDORS

- a. **Amend Florence Comprehensive Plan Chapter 5: Open Spaces and Scenic, Historic, and Natural Resources for consistency with Statewide Planning Goal 5.**

Florence Comprehensive Plan

Chapter 5: Open Spaces and Scenic, Historic, and Natural Resources

Florence's 20-year plan focuses on existing natural resources and their protection, which Oregon law now requires. This plan presents inventories of those selected resources, an understanding of each resource's environmental role in defining Florence's future, the identification of ways in which to protect those resources and to develop a local implementation program.

This chapter provides policy direction for the following specific resources:

- Wetlands and Riparian Areas
- Groundwater Resources
- Rare, Threatened, Endangered, and Sensitive Species
- Native Vegetation
- Mineral and Aggregate Resources
- Scenic Resources and Visual Quality
- Historic Resources

Goal

To conserve natural resources such as wetlands, riparian areas, groundwater supplies, air and water, and fish and wildlife habitat in recognition of their important environmental, social, cultural, historic and economic value to the Florence area and the central Oregon Coast.

Wetlands and Riparian Areas

Objectives

(Note: the following combine the objectives in the adopted Comprehensive Plan for wetlands and riparian areas and propose no changes.)

1. To maintain an accurate inventory of significant wetlands and riparian areas for use in land use planning and development review.
2. To protect significant wetlands and riparian areas for their critical functions and values in protecting surface and groundwater quality, flood control, habitat for fish, and terrestrial creatures, and for enhancing the visual character of the Florence community.

Policies

(Note: the following edits combine redundant policies in the adopted Comprehensive Plan for wetlands and riparian areas and propose amendments.)

1. For the purpose of land planning and initial wetland and riparian identification within the Florence Urban Growth Boundary (UGB), the City and Lane County shall rely on the 2013 ~~1997~~ Florence Area Local Wetland and Riparian Area Inventory (2013 Inventory), approved by the Oregon Department of State Lands, and as amended hereafter. The 2013 Inventory within the Florence UGB, as amended, is adopted as part of this Comprehensive Plan and is physically located in Appendix 5.
2. Disturbance of significant¹ wetlands for land development activities shall be permitted within the Florence UGB only as determined by the permitted provisions of permits issued by the Department ~~Division~~ of State Lands (DSL) and/or the Army Corps of Engineers.
3. In accordance with ORS 215.418, the City and County shall notify DSL when wetlands are present on a property that is subject to a local land use or building permit approval. The City shall notify DSL when riparian areas are present on a property that is subject to a local land use or building permit approval.
4. The City and County shall consider formal wetland delineation reports approved by the Oregon ~~Division~~ Department of State Lands as a valid source of wetland information specific to a land use action or limited land use action. Such reports, if approved by DSL, will be incorporated by reference into the City's ~~1997~~ 2013 Florence Area Local Wetlands and Riparian Area Inventory.
5. No significant wetland or riparian corridor as defined by the ~~2013~~ 1997 Florence Area Local Wetlands and Riparian Inventory shall be drained by re-routing of natural drainage ways.
6. The City shall protect the functions and values of significant² Goal 5 riparian

¹ Significant wetlands and riparian corridors as identified by the ~~1997~~ 2013 Florence Area Local Wetlands and Riparian Area Inventory, Pacific Habitat Service, Inc. Comprehensive Plan Appendix 5.

² "Significant" means wetlands that meet the definition of significant in Statewide Planning Goal 5.

corridors and wetlands for flood control, water quality, and fish and wildlife habitat through Code provisions that protect these resources from development in accordance with Statewide Planning Goal 5 administrative rules (OAR 660 Division 23) and the Economic, Social, Environmental, and Energy (ESEE) Analysis and Limited Protection Program.

The ESEE Analysis is included, and significant wetlands and riparian corridors are listed and mapped, in the ³ "2013 City of Florence Significant Wetlands and Riparian Corridors Plan" adopted by reference into this Comprehensive Plan. The Program exempts public infrastructure, as defined in the ESEE Analysis, from local wetland protection measures, and allows special setback reductions and other allowances for development along the Munsel Creek Side Channel (Reach RMC-Cs in the 2013 Riparian Inventory).

- ~~2. ⁵ Riparian areas shall be prevented from permanent alteration by grading or the placement of structures or impervious surfaces, except for the following uses provided they are designed to minimize intrusion into the riparian area:~~

~~streets, roads and paths;
drainage facilities;
utilities and irrigation pumps;
water-related (outside of coastal shoreland areas) and water-dependent uses;
replacement of existing structures in the same location that do not disturb additional riparian surface area.~~

- ~~7. The City shall include a procedure in the Code to consider hardship variances, claims of map error, and reduction or removal of the restrictions for any existing lot or parcel demonstrated to have been rendered unbuildable⁴ by application of the significant wetlands and riparian areas standards in the Code.~~

- ~~8. The City shall encourage restoration and protection of privately-owned wetlands and riparian areas through Code incentives, and, as resources allow, through education in partnership with the Siuslaw Watershed Council and the Siuslaw Soil and Water Conservation District.~~

~~3. While not required to adopt safe harbor policies and ordinances under the requirement of this periodic review, the City has chosen to modify the riparian setback on Munsel Creek to require a 50 foot minimum setback from the thread of the creek, which must include at least 15 feet from the top of the bank. The minimum must be increased as necessary to meet the 15 foot requirement.~~

³ The ESEE and Limited Protection Program are contained in the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan in Appendix 5 of the Comprehensive Plan.

⁴ The term "unbuildable" is defined in the definitions section of Chapter 1 of the Comprehensive Plan and in FCC 10-1. See Consistency Amendments, below.

4. The riparian setback from the Siuslaw River shall be 50 feet from the top of the cut bank.
5. ~~The retention of native vegetation in riparian areas is critical to their function. Therefore, the City shall adopt effective regulations ensuring the retention, or if necessary, the replanting of native species in riparian areas and may include conditions regarding fertilizer and pesticide runoff. The regulations will address the following:~~
 - A. ~~Control the removal of riparian vegetation, except for:~~
 - (1) ~~removal of non-native vegetation and replacement with native plant species; and~~
 - (2) ~~removal of vegetation necessary for the development of water-related or water-dependent uses;~~

9. Plan Amendment Option: Any owner of property affected by the Significant Wetlands and Riparian Areas Standards in City Code may apply for a quasi-judicial comprehensive plan amendment. This amendment must be based on a specific development proposal. The effect of the amendment would be to remove the requirement to comply with these standards from all or a portion of the property. The applicant shall demonstrate that such an amendment is justified by completing an Environmental, Social, Economic and Energy (ESEE) consequences analysis prepared in accordance with OAR 660-23-040. If the application is approved, then the ESEE analysis shall be incorporated by reference into the Florence Comprehensive Plan, and the Florence Significant Goal 5 Wetlands and Riparian Areas Maps shall be amended to remove the wetland or riparian area from the inventory.

The ESEE analysis shall adhere to the following requirements:

- A. The ESEE analysis must demonstrate to the ultimate satisfaction of the Florence City Council that the adverse economic consequences of not allowing the conflicting use are sufficient to justify the loss, or partial loss, of the resource. The City will confer with the Department of Land Conservation and Development (DLCD) prior to making their ultimate decision.
- B. The ESEE analysis must demonstrate why the use cannot be located on buildable land outside of the significant wetland or riparian area and that there are no other sites within the City that can meet the specific needs of the proposed use.
- C. The ESEE analysis shall be prepared by a qualified professional experienced in the preparation of Goal 5 ESEE analyses, with review by DLCD.

Recommendations

~~As the City's buildable lands begin to fill in and prior to moving the UGB limit outward, the City should consider conducting an analysis of the economic, social, environmental, and energy (ESEE) consequences that could result from a decision to allow, limit, or prohibit a conflicting use for each of the locally identified significant wetlands. From this analysis, lesser quality wetlands may be found eligible for partial or full development.~~

~~The City should coordinate with the Oregon Division of State Lands (DSL), the U.S. Army Corps of Engineers (ACE), and other appropriate state and federal agencies in the identification, protection and, where appropriate, mitigation of impacts to local wetland resources.~~

1. The City should consider restoring and protecting City-owned wetlands and riparian areas, using the preliminary assessment in the 2013 *City of Florence Significant Wetlands and Riparian Corridors Plan* in Comprehensive Plan Appendix 5.

Background

Note: Replace the separate Background sections for wetlands and riparian areas in the adopted Comprehensive Plan (shown in strike out below) with the following Background section:

The Wetland and Riparian Areas section of Chapter 5 of the Comprehensive Plan is based on the inventories, assessments, significance, and protection measures set out in the 2013 Florence Area Local Wetlands and Riparian Inventory (2013 Inventory) and the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan (2013 Plan), both located in Appendix 5 of the Comprehensive Plan. The 2013 Inventory and the 2013 Plan and ESEE Analysis and Limited Protection Program are adopted as part of this Comprehensive Plan.

Community concern for the Siuslaw estuary, the North Florence Sole Source Dunal Aquifer, and the area's streams, lakes, and wetlands is well-documented in Comprehensive Plan policies and Code provisions. In response to this concern, in October, 2009, the City and its partners from 19 federal, state, tribal, and local agencies embarked on a multi-year project called the Siuslaw Estuary Partnership (EPA Cooperative Agreement #WC-00J04801-0). The mission of the Partnership is to protect and improve water quality and fish and wildlife habitat in the lower Siuslaw watershed. This project is funded by project partners and the US Environmental Protection Agency (EPA). The Siuslaw Estuary Partnership Guiding Principles, endorsed by the City and its partners, provided guidance for the policies in this chapter of the Comprehensive Plan.

The 2013 Local Wetlands and Riparian Inventory updated the "City of Florence Local Wetlands and Riparian Area Inventory," prepared on December 30, 1996 by

Pacific Habitat Services, Inc. and approved by DSL in 1997 (1997 Inventory). That inventory used the Oregon Freshwater Wetland Assessment Methodology (OF-WAM). For the 2013 Inventory, an alternative wetland assessment, the Oregon Rapid Wetland Assessment Protocol (ORWAP; 2009), was used. The ORWAP provides much more detailed data on wetland functions, values and condition. The 1997 Inventory identified 270 wetlands, totaling 572 acres, and about 315 acres of riparian area. In the 2013 Plan, all of the 16 wetlands that are not subject to Goal 17 within the UGB were considered "significant" under Goal 5.

The improved inventories and assessment information in the 2013 Inventory assist the City in complying with Statewide Land Use Planning Goal 5 and will help the City and the County to make more informed land use decisions within the city and unincorporated lands within the study area.

On September 1, 1996, the Land Conservation and Development Commission adopted a revised Statewide Planning Goal 5. The Goal requires local jurisdictions to inventory the natural resources covered under the Goal, determine the significance of these resources, and develop plans to achieve the Goal. In other words, local jurisdictions must adopt land use ordinances regulating development in and around significant resource areas.

The purpose of the 2013 Inventory and Plan was to update the 1997 Inventory and to adopt protection measures, as required by state law. This inventory involves only freshwater wetland and riparian areas; it does not include the estuary or estuarine wetlands. Specific objectives were to:

- update the 1997 biological and functional assessment;
- assess omitted wetlands;
- include delineations made since 1997;
- adopt policies and measures to protect the unique functions and values of the resources; and
- conduct preliminary work to assess the potential for restoration of riparian areas and wetlands on City-owned property. This preliminary work is set out in Chapter 5 of the 2013 Plan in Appendix 5.

The 2013 Inventory provides a comprehensive functional assessment of wetlands and riparian areas. This is especially important in this watershed because this 2013 Plan, once adopted, will ensure: retention of the capacity of existing natural wetlands and riparian areas to store and slow the velocity of stormwater prior to discharge to area creeks and the estuary; critical water quality benefits for the North Florence Sole Source Dunal Aquifer, the source of the City's drinking water; and protection of the quality of area surface waters, habitat to numerous fish and wildlife. The protection measures in this 2013 Plan will enhance the carrying capacity of the land to fully address the anticipated impacts from planned urbanization. The functional assessment thus provides critical information to help guide future urbanization policy and stormwater management policy and capital programs.

Public involvement for the Wetlands and Riparian Areas project consisted of three annual open houses; three annual newsletters distributed to all residents and/or property owners in the study area; targeted outreach; a Stakeholder process; media outreach; and public hearings before the Planning Commission and City Council. In addition, public involvement efforts were conducted specifically for wetlands and riparian areas. Prior to beginning the inventory field work, selected landowners (i.e. those suspected of having wetlands or waters of the state on their property) were mailed notices describing the project and asking permission to enter their property. Right of access was granted by landowner permission only. The properties of those not responding were not accessed. Access information was collected in a database and then transferred to a base map for use in the field.

The City of Florence held an open house meeting May 5, 2010 to inform the public and property owners about the wetland inventory process and answer questions from property owners deciding whether or not to grant access to their property. Following completion of initial fieldwork, a second public meeting was held on September 22, 2010 to allow property owners to observe the location of mapped wetlands and comment as appropriate. A third meeting with property owners was held on February 27, 2013 to present the draft Comprehensive Plan and Code amendments and to address comments and concerns.

The Wetlands and Riparian Area Team met from 2010 through January 2013 and concurred with the proposal for determining the significance of, and measures to protect, wetlands and riparian areas in the Florence urban growth boundary (UGB). At their meetings in March, April, and July 2012 and February and March 2013, the Stakeholder Groups reviewed and commented on the draft products and amendments. The draft products were also presented to the public at Open Houses in 2011 and 2012 and summarized in newsletters distributed throughout the study area in 2011 and 2012. The proposal, and all updates to the proposal, have been consistently posted to the project web site at www.SiuslawWaters.org with an invitation for public comment on the home page.

Background

~~In 1996, Florence's local wetland inventory was conducted and included all UGB land and some land outside where UGB expansion was anticipated. In January 1997, the Division of State Lands officially accepted the Florence Local Wetland Inventory (LWI), replacing the National Wetlands Inventory (NWI) prepared many years ago for identifying such resources in the Florence area. The Florence inventory is helpful for at least two reasons:~~

~~It helps determine for planning purposes what land is "buildable" and what was not due to the anticipated presence of wetlands.~~

~~It will help the City and County review development proposals and identify when a wetland might possibly be impacted as a result of such development.~~

The LWI will also help the City's and County's required DSL notification when a land use action is proposed near an identified wetland.

After the City's Periodic Review work program was approved in November 1995, the State adopted amendments to Statewide Planning Goal 5. Goal 5 requires conservation of a variety of natural resources, including wetlands and riparian areas. The amendments included the LWI requirement, a requirement for the City to make determinations of local significance for identified wetland resources, and a requirement that the City and County protect those significant wetland resources.

The analysis and results of the City's determination of local significance for Florence's wetlands are included in Appendix 5, City of Florence Local Wetlands and Riparian Area Inventory, 1997.

Once local wetlands are identified and evaluated as to their significance, the Statewide Planning Goal 5 provides local jurisdictions with two planning options for mandated protection of wetlands. This protection must occur in addition to that protection provided by current State and federal regulations.

Under option one, Florence can use the "safe harbors" provisions of Oregon law. By adopting a safe harbors ordinance, restrictions are placed on grading, excavation, placement of fill and removal of vegetation within all locally significant wetlands within the Florence UGB.

Or, under option two, by conducting an economic, social, environmental and energy (ESEE) analysis, Florence may further refine its wetland protection program by allowing, limiting, or prohibiting conflicting uses of wetland resources depending on that analysis. The ESEE process is relatively intensive, especially in Florence's case, where 270 wetlands totaling 572.25 acres are identified by the LWI.

While it may be desirable for Florence to conduct an ESEE analysis for its significant wetland resources in the future, staff has identified sufficient "buildable lands" within the existing UGB to meet the City's residential, commercial, and industrial land needs. As such, the most expedient and effective path at this point to comply with Goal 5 and protect significant wetlands is adoption of a safe harbor ordinance by the City and Lane County.

However, since adoption of a safe harbor ordinance is not required of this periodic review, the City has chosen not to adopt such an ordinance at this time, but to continue to rely on DSL/ACE permits for wetland protection.

Background

The City's LWI also included a riparian area inventory. A riparian area can be best defined as a buffer of variable width between an aquatic resource and an upland area. The

buffer is typically vegetated, and provides several beneficial functions to the lake or stream.

These functions are:

~~Acts as a natural filter of stormwater, limiting pollution of streams and waterways.~~
~~Cools stream temperatures in summer and traps heat in winter when canopy is sufficient to screen all or part of the stream channel.~~

~~Holds the stream bank in place and therefore reduces erosion.~~

~~Adds controls to flood velocities of streams and drainage ways.~~

~~Provides valuable wildlife habitat.~~

~~When properly integrated into a development design or recreational greenway, riparian buffers yield aesthetic benefits as well.~~

~~To some extent, Florence has been protecting its riparian areas within City limits prior to 1988, through the Munsel Creek and drainage way setback restrictions found in Florence City Code, Title 10, Chapter 7, Special Development Standards.~~

~~While not required by periodic review, the City realizes the importance of riparian buffers and has chosen to increase the protection of the riparian area on Munsel Creek which has been classified as a salmon stream and which is a teaching/management area for the Salmon and Trout Enhancement Program (STEP).~~

~~On the Siuslaw River, the riparian setback will remain at 50 feet from the top of the bank. Existing development is grandfathered. Expansions of existing development and new development must provide for the required setback, or request a variance and include provisions to mitigate the proposed intrusion into the setback.~~

- b. Consistency Amendments: Amend Florence Comprehensive Plan Chapter 1, Definitions and Chapter 11, Utilities, Facilities, and Services for consistency with the proposed amendments.**

Definitions

Note: Delete the following definition from the Comprehensive Plan because this term is not used in the Comprehensive Plan.

~~SENSITIVE AREA.~~ ~~Natural streams (perennial or intermittent), rivers (including the estuary portion of the river), lakes, or wetlands hydraulically connected by surface water to streams, rivers, or lakes and areas defined by the City of Florence's Local Wetlands and Riparian Inventory. Also, includes all areas that are protected for species as per areas designated by Oregon Department of Fish and Wildlife, Oregon Division of State Lands, National Marine Fisheries Service, United States Fish and Wildlife Service and Oregon Department of Transportation.~~

Note: Add this definition of unbuildable to the Comprehensive Plan definitions:

UNBUILDABLE. Lots that are rendered "unbuildable" by the required setback for significant wetlands and riparian areas.

- a) For single family housing, lots are considered unbuildable if the required setback for the significant wetland or riparian area is such that no contiguous space exists outside the setback that allows for a dwelling unit at least 50 feet by 27 feet.⁵
- b) For all affected properties, lots are deemed unbuildable if strict adherence to the applicable setback standards and conditions would effectively preclude a use of the parcel that could be reasonably expected to occur in the zone and that the property owner would be precluded a substantial property right enjoyed by the majority of landowners in the vicinity.
- c) For the Munsel Creek side channel (Reach RMC-Cs in the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan in Appendix 5 of the Comprehensive Plan), the "required setback" for the purpose of the unbuildable definition, is the reduced setback allowed through the ESEE Analysis adopted into this Comprehensive Plan Appendix 5.

Florence Comprehensive Plan

Chapter 11: Utilities, Facilities, and Services

Note: The following amendment makes this policy consistent with the Limited Protection Program.

Stormwater Management

Policies

Water Quality

2. Protect the quality of water in surface waters, i.e., the estuary, significant wetlands and riparian corridors, ~~creeks, lakes, wetlands,~~ and ocean/beach, from contamination threats that could impair the quality of the water for fish and wildlife habitat and human recreation.

3. **Housekeeping Amendment: Amend Comprehensive Plan Chapter 1, Introduction, to make the Comprehensive Plan consistent with state law which changed the DLCD notice requirement from 45 to 35 days.**

Note: The following amendment makes the Comprehensive Plan consistent with state law which changed from 45 to 35 days.

⁵ Note: A 50 foot by 27 foot area allows the siting of a typical double-wide manufactured home, a form of affordable housing.

Florence Comprehensive Plan

Chapter 1: Introduction

Amendments to the Plan may be initiated by citizens, citizen groups, the Citizen Advisory Committee, the Planning Commission or the City Council. In any amendment proceedings, the City Council shall obtain the recommendation of the Planning Commission and the Citizen Advisory Committee before taking action on a proposed major amendment. Minor changes which do not have significant effects beyond the immediate area of the change require the recommendation of the Planning Commission. Minor changes may be initiated at any time. Notice to the Oregon Department of Land Conservation and Development (DLCD) of a public hearing for a proposed plan amendment shall be required at least ~~45~~35 days prior to the first Planning Commission hearing.

EXHIBIT C
TO CITY OF FLORENCE ORDINANCE NO. 2, SERIES 2003
Proposed Amendments to the Florence City Code for
Aquifer Protection and Wetlands and Riparian Corridors
August 6, 2013

1. AQUIFER PROTECTION

- a. Adopt a new Drinking Water Protection Overlay Zone Map, attached.**
- b. Amend Florence City Code Title 10: Zoning Regulations to insert a new Chapter 32:**

Chapter 32 Drinking Water Protection Overlay District

SECTION

- 10-32-1 Purpose
- 10-32-2 Applicability
- 10-32-3 Warning and Waiver of Liability
- 10-32-4 Time of Travel Zones (TOTZ)
- 10-32-5 Review
- 10-32-6 Exemptions
- 10-32-7 Standards for Hazardous Materials within TOTZ
- 10-32-8 Conditions
- 10-32-9 Appeals

10-32-1: PURPOSE:

- A. The Drinking Water Protection (DWP) Overlay District is established to protect from contamination the North Florence Sole Source Dunal Aquifer, used as the sole potable water supply source by the City. This Section establishes procedures and standards for the physical use of hazardous or other materials harmful to groundwater within TOTZ by new and existing land uses requiring development approval. The provisions of this Section are designed to:
 1. Protect the City's drinking water supply, which is obtained from groundwater resources, from impacts by facilities that store, handle, treat, use, produce, or otherwise have on premises substances that pose a hazard to groundwater quality; and
 2. Provide standards for hazardous or other materials that pose a risk to groundwater within the TOTZ.

- B. In order to accomplish this purpose, the DWP Overlay District includes methods and provisions to:
1. Restrict or prohibit the use of hazardous or other materials which are potential groundwater contaminants;
 2. Set standards for the storage, use, handling, treatment, and production of hazardous or other materials that pose a risk to groundwater within TOTZ; and
 3. Review new or expanded uses of hazardous or other materials that pose a risk to groundwater.

10-32-2: APPLICABILITY:

This DWP Overlay District applies to industrial and commercial land uses within the Drinking Water Protection Area (DWPA) for the proposed wellfield. As of (DATE OF ORDINANCE ADOPTION), 2013, all areas in an industrial or commercial zoning district within the specified wellhead TOTZ are automatically are re-zoned to add the DWP Overlay District to the underlying zoning district. The areas to which the DWP Overlay District is applied are shown on the Drinking Water Protection Overlay Map, on file in the Community Development Department and incorporated in this Section by reference.

10-32-3: WARNING AND WAIVER OF LIABILITY:

The degree of aquifer protection required by this Section in the areas designated in Section 10-32-2 is based on scientific and engineering considerations. The nature of these considerations is that the exact boundaries of Time of Travel Zones (TOTZ) have an associated uncertainty that renders conclusions based on them to be estimates. Under no conditions should this Section be construed to guarantee the purity of the ambient ground water or guarantee the prevention of ground water contamination. Therefore, this Section shall not create liability on the part of the City, or any City personnel, for any contamination that may result from reliance on this Section or any administrative decision made under this Section.

10-32-4: TIME OF TRAVEL ZONES (TOTZ):

- A. The DWP Overlay District includes 3 TOTZ for the proposed wellfield: 5-10 years; 10-20 years; and 20-30 years. The Overlay District does not include the 0-5 year TOTZ because there are no industrial or commercial properties or zones in that TOTZ. The locations of the TOTZ for the proposed wellfield are shown on the Drinking Water Protection Area Map for the Proposed Wellfield on file with the City's Planning Department; Public Works Department; the Siuslaw Valley Fire and Rescue Agency; and Heceta Water District (HWD).

- B. The areas within specified wellhead TOTZ are those drinking water protection areas for which the Oregon Health Authority issued a “provisional delineation,” stating, “OHA approves the use of this delineation for protection of possible future drinking water sources,” under the Oregon Administrative Rules that apply to Oregon’s EPA-approved Drinking Water Protection Program, in Oregon Health Authority Delineation Certification #0016, March 16, 2012.
- C. In determining the location of a property within a TOTZ, the following criteria apply:
 - 1. The Lane County Department of Assessment and Taxation maps shall be used as a base map with the addition of TOTZ boundaries.
 - 2. That portion of a tax lot that lies within a TOTZ is governed by the restrictions applicable to that TOTZ.
 - 3. Tax lots having parts lying within more than one TOTZ are governed by the standards of the more restrictive TOTZ.
 - 4. EXCEPTION: The Public Works Director (Director) may waive the requirement that the more restrictive standards apply when all of the following apply:
 - a. Storage, use, handling, treatment, and/or production of hazardous or other materials that pose a risk to groundwater will not take place within the portion of the tax lot having the more restrictive TOTZ standards; and
 - b. Storage, use, handling, treatment, and/or production of hazardous or other materials that pose a risk to groundwater will not take place within 50 feet of the portion of the tax lot having more restrictive TOTZ standards; and
 - c. The tax lot is 20,000 square feet or larger.
 - 5. A property owner may request the TOTZ be modified by submitting a Zone Change application to the City. Any request for modification of the TOTZ shall be accompanied by certification of the TOTZ as proposed to be modified by the Oregon Health Authority, under the Administrative Rules that apply to Oregon’s EPA-approved Drinking Water Protection Program.

10-32-5: REVIEW:

- A. A DWP Overlay District Development Application is required when all of the following criteria are met:

1. Industrial and commercial land uses that are affected by one or more of the following: a land use permit application or building permit application;
 2. The action in Subsection A.1., above will:
 - a. Affect the storage, use, and/or production of hazardous or other materials that pose a risk to groundwater; or
 - b. Increase the quantity of hazardous or other materials that pose a risk to groundwater that are stored, used and/or produced.
- B. Prior to the submittal of a DWP Overlay District Development Application, an exemption request may be submitted to the Director as specified in Section 10-32-6-B-1.
- C. DWP Overlay District applications shall be reviewed under Administrative Review procedures in 10-1-1-6.
- D. Prior to undertaking an activity covered by Section 10-32-5-A, the owner or tenant shall submit a DWP Overlay District Application to the City for review and approval. Applications shall include the following information:
1. A Hazardous Material Inventory Statement and a Material Safety Data Sheet for any or all materials entered in the Statement unless exempted under Section 10-32-6. Hazardous material weights shall be converted to volume measurement for purposes of determining amounts; 10 pounds shall be considered equal to one gallon as specified in Florence Fire Code;
 2. A list of the chemicals to be monitored through the analysis of groundwater samples and a monitoring schedule if ground water monitoring is anticipated to be required;
 3. A detailed description of the activities conducted at the facility that involve the storage, handling, treatment, use or production of hazardous materials in quantities greater than the maximum allowable amounts as stated in Section 10-32-7-A;
 4. A description of the primary and any secondary containment devices proposed, and, if applicable, clearly identified as to whether the devices will drain to the storm or sanitary sewer;
 5. A proposed Hazardous Material Management Plan for the facility that indicates procedures to be followed to prevent, control, collect and dispose of any unauthorized release of a hazardous material;

6. A description of the procedures for inspection and maintenance of containment devices and emergency equipment;
 7. A description of the plan for disposition of unused hazardous materials or hazardous material waste products over the maximum allowable amounts including the type of transportation, and proposed routes.
- E. The Director shall review the application and make a decision based on the standards contained in Section 10-32-7, after consulting with the Building Official, Fire Marshall, Planning Director, and the manager of HWD, as appropriate.

10-32-6: EXEMPTIONS:

This Section does not exempt any material or use from Fire Code regulations adopted by the City.

- A. Exemptions are as specified in this Section unless the Director, in consultation with the Fire Marshall, determines that a hazardous material, activity, and/or facility that is exempt pursuant to this Section has a significant or substantial potential to degrade groundwater quality. Then the Director may require compliance with the requirements of this Section related to that hazardous material, activity or facility. This determination will be based upon site and/or chemical-specific data and are eligible for appeal to the Planning Commission, as specified in Section 10-32-9.
- B. Unless otherwise provided herein, the following materials are exempt from regulation hereunder:
1. Use, storage and handling of specific hazardous materials that do not present a risk to the aquifer, as determined and listed by the Director, are exempt from all regulation under this Section with the exception of the potential requirement to list these hazardous materials on the Hazardous Material Inventory Statement as found in the most recent Fire Code regulations adopted by the City. A Hazardous Materials Exemption Request may be submitted to the Director for Hazardous Materials that can be demonstrated to pose no threat to the aquifer. These materials may be exempted from regulation and added to the list. The demonstration of no threat is the responsibility of the applicant seeking the exemption and will be subject to review by technical experts.
 2. Hazardous materials offered for sale in their original sealed containers of 5 gallons or less are exempt from the 500-gallon storage limit specified in Section 10-32-7-A-1.

3. Hazardous materials in fuel tanks and fluid reservoirs attached to a private or commercial motor vehicle and used directly in the motoring operation of that vehicle, or machinery, including, but not limited to: fuel, engine oil and coolant.
4. Fuel oil used in existing heating systems.
5. Emergency use, storage, and handling of hazardous materials by governmental organizations in the public interest.
6. Hazardous materials used and stored specifically for water treatment processes of public water systems and private systems for the same purposes when approved by the Director.
7. Hazardous materials contained in properly operating sealed units (including, but not limited to: transformers, refrigeration units) that are not opened as part of routine use.
8. Local natural gas distribution lines, when available.
9. Fuel for emergency generators located at facilities that provide essential community services (including, but not limited to: hospitals, fire/life safety, police, public shelters, and telephone systems).
10. Any commonly used office supply—including, but not limited to: correcting fluid for typewriters, toner for computer printers or cleaners for windows and bathrooms—where the supplies are purchased off-site for use on-site.
11. Aggregate quantities equal to or less than 20 gallons of hazardous materials that do not contain DNAPLs.¹

10-32-7: STANDARDS FOR HAZARDOUS MATERIALS WITHIN TOTZ

Applications shall comply with the following standards. Where the following standards are more restrictive than the standards of the Florence Fire Code, the following standards shall apply:

A. Five to Ten Year TOTZ Standards.

1. The storage, handling, treatment, use, application, or production or otherwise keeping on premises of more than 20 gallons of hazardous materials

¹ DNPLs are organic substances that are relatively insoluble in water and more dense than water. DNAPLs tend to sink vertically through sand and gravel aquifers to the underlying layer. The most common are chlorinated solvents. Significant amounts of DNAPLs are present at chlorinated solvent-contaminated sites, such as manufacturing and degreasing facilities, dry cleaners, wood treaters, and former manufacturing gas plants.

that pose a risk to groundwater in aggregate quantities not containing DNAPLs are allowed only upon compliance with containment and safety standards specified by the most recent applicable Fire Code.

2. Unless exempted, all hazardous or other materials that pose a risk to groundwater shall be stored in areas with approved secondary containment in place (Fire Code).
3. All new use of DNAPLs are prohibited.
4. Any change in the type of use or an increase in maximum daily inventory quantity of any DNAPL is considered a new use and is prohibited.
5. The following certain types of facilities or changes in chemical use and/or storage of hazardous or other materials that pose a risk to groundwater are prohibited:
 - a. Hazardous material product pipelines used to transport the hazardous material off of the tax lot where it is produced or used;
 - b. Injection wells, except for dry wells for roof drainage;
 - c. Solid waste landfills and transfer stations;
 - d. Fill materials containing hazardous materials;
 - e. Land uses and new facilities that will use, store, treat handle, and/or produce DNAPLs.
6. Requirements found in the Fire Code for a monitoring program and monitoring methods to detect hazardous or other materials in the secondary containment system shall be met for all amounts of hazardous materials that pose a risk to groundwater unless exempted.
7. The following requirements for inspection and record keeping procedures for monthly in-house inspection and maintenance of containment and emergency equipment for all amounts of hazardous or other materials that pose a risk to groundwater shall be met unless exempted: Schedules and procedures for inspecting safety and monitoring and emergency equipment. The applicant shall develop and follow a written inspection procedure acceptable to the Director for inspecting the facility for events or practices which could lead to unauthorized discharges or hazardous materials. An inspection check sheet shall be developed to be used in conjunction with routine inspections. The check sheet shall provide for the date, time, and location of inspection; note problems and dates and times of corrective ac-

tions taken; and include the name of the inspector and the countersignature of the designated safety manager for the facility.

B. Ten to Twenty Year TOTZ Standards.

1. The storage, handling, treatment, use, production or otherwise keeping on premises of more than 20 gallons of hazardous materials that pose a risk to groundwater in aggregate quantities not containing DNAPLs is allowed upon compliance with containment and safety standards specified by the most recent Fire Code adopted by the City
2. All hazardous or other materials that pose a risk to groundwater shall be stored in areas with approved secondary containment in place (Fire Code).
3. All new use of DNAPLs are prohibited.
4. Any change in type of use or an increase in the maximum daily inventory quantity of any DNAPL is considered a new use and is prohibited.
5. The following requirements for inspection and record keeping procedures for monthly in-house inspection and maintenance of containment and emergency equipment for all amounts of hazardous or other materials that pose a risk to groundwater shall be met unless exempted: Schedules and procedures for inspecting safety and monitoring and emergency equipment. The applicant shall develop and follow a written inspection procedure acceptable to the Director for inspecting the facility for events or practices which could lead to unauthorized discharges or hazardous materials. An inspection check sheet shall be developed to be used in conjunction with routine inspections. The check sheet shall provide for the date, time, and location of inspection; note problems and dates and times of corrective actions taken; and include the name of the inspector and the countersignature of the designated safety manager for the facility.

C. Twenty to Thirty Year TOTZ Standards. The storage, handling, treatment, use, production or keeping on premises of more than 20 gallons of hazardous materials that pose a risk to groundwater in aggregate quantities is allowed only upon compliance with containment and safety standards specified by the most recent Fire Code adopted by the City.

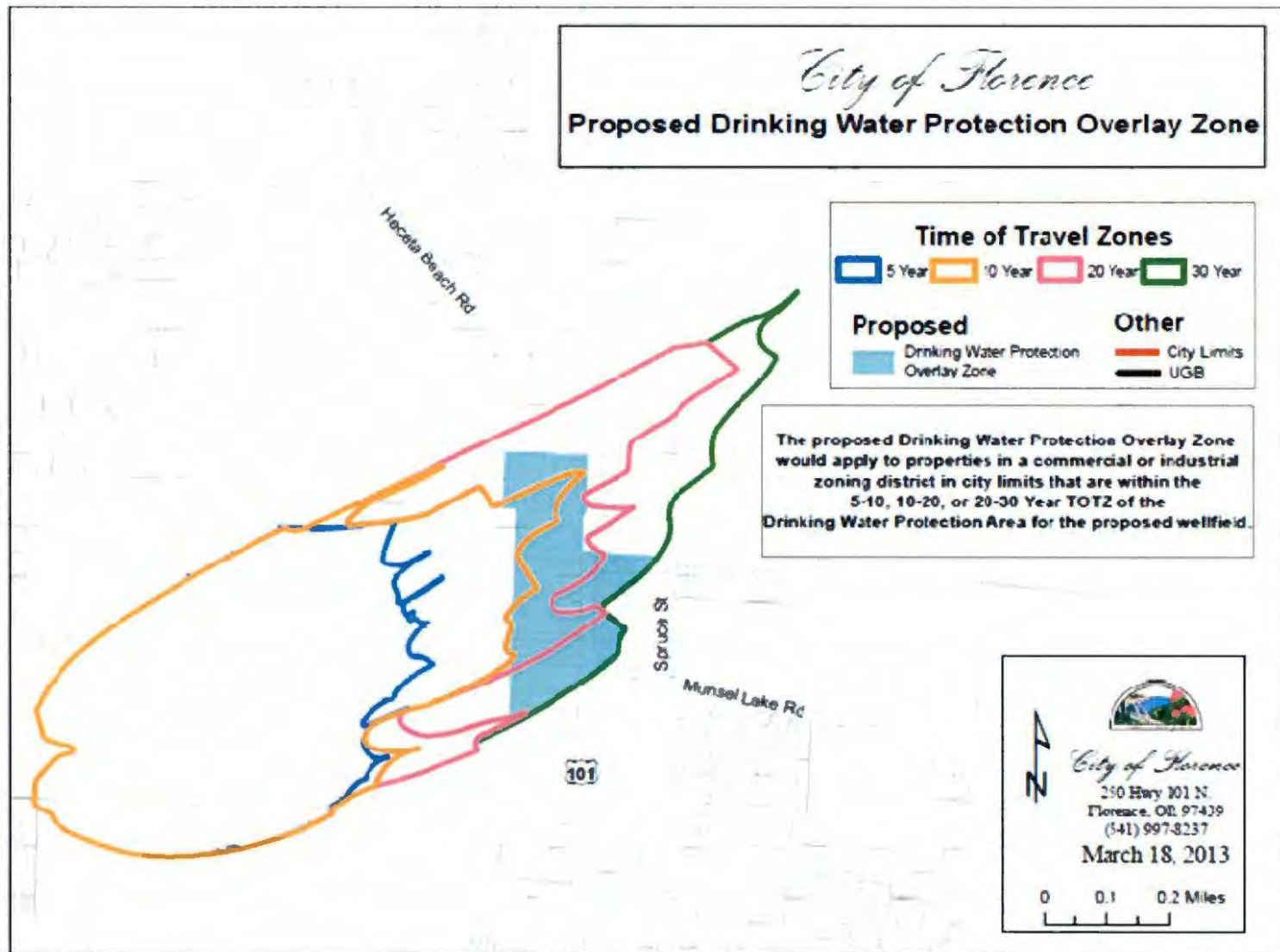
10-32-8: CONDITIONS:

The Director may attach conditions of approval that will minimize negative impacts of regulated substances on groundwater and ensure that the facility or the proposed development can fully meet the standards specified in Section 10-32-7. These conditions may include, but are not limited to: on-site monitoring wells,

Wellhead Protection Area signs, special storm water facilities or other conditions to address specific risks associated with the proposed development.

10-32-9: APPEALS:

The only portions of this Section that are subject to appeal are: Section 10-32-5-E, the Director's decision on a DWP application, Section 10-32-6, Exemptions, and Section 10-32-7-A-1, Waiver. The decision of the Director may be appealed as specified in Section 10-1-1-7.



2. WETLANDS AND RIPARIAN CORRIDORS

- a. Amend Florence City Code Title 10 Chapter 7: Special Development Standards to add a new section 10-7-4: Development Standards for Wetlands and Riparian Areas, and renumber sections sequentially. Unless noted otherwise, additions are shown in double underline and deletions in strike-out.

SECTION:

10-7-1: Purpose

10-7-2: Identification of Wetlands and Riparian Areas and Potential Problem Areas

10-7-3: Development Standards for Potential Problem Areas

10-7-4: Development Standards for Wetlands and Riparian Areas

10-7-45 Site Investigation

10-7-56: Review and Use of Site Investigation Reports (Amended Ord. 10, Series 2009)

10-7-1: PURPOSE: The purpose of this Chapter is to apply additional development standards to areas with wetlands or riparian areas and potential problem areas, such as natural hazards or soils which are particularly subject to erosion, landslide or seasonal surface water. Compliance with these standards is required in order to obtain a Special Use Permit. The standards are intended to: eliminate the danger to the health, safety or property of those who would live in potential problem areas and the general public; and to protect areas of critical environmental concern; areas having scenic, scientific, cultural, or biological importance; and significant fish and wildlife habitat as identified through Goal 5: Open Spaces and Scenic, Historic, and Natural Resources, and Goal 17: Coastal Shorelands. (Amended Ord. No. 10, Series 2009).

10-7-2: IDENTIFICATION OF WETLANDS AND RIPARIAN AREAS AND POTENTIAL PROBLEM AREAS: At minimum, the following maps shall be used to identify wetlands and riparian areas and potential problem areas:

A. "Hazards Map", Florence Comprehensive Plan Appendix 7.

B. "Soils Map", Florence Comprehensive Plan Appendix 7. (Ord. 625, 6-30-80)

C. "Beaches and Dunes Overlay Zone." See Chapter 19 for overlay zone requirements. Where conflicts exist between that chapter and this one, the more restrictive requirements shall apply.

D. 2013 City of Florence Significant Wetlands Map and 2013 City of Florence Significant Riparian Reaches Map in Appendix A of the 2013 Florence Area Local Wetlands and Riparian Inventory (2013 Inventory) and in the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan (2013 Plan), in Comprehensive Plan Appendix 5.

~~D. E.~~ Other information contained in the plan or adopted by reference into the plan, or more detailed inventory data made available after adoption of the plan

may also be used to identify potential problem areas. (Amended Ord. No. 10, Series 2009)

NOTE: Delete 10-7-3 B, below, and renumber sequentially; and amend section H, as shown.

10-7-3: DEVELOPMENT STANDARDS FOR POTENTIAL PROBLEM AREAS:

The following standards shall be applied to development in potential problem areas unless an approved Phase I Site Investigation Report or an on-site examination shows that the condition which was identified in the Comprehensive Plan or Overlay Zoning Map does not in fact exist on the subject property. These standards shall be applied in addition to any standards required in the Zoning Districts, Comprehensive Plan, and to any requirements shown to be necessary as a result of site investigation. Where conflicts or inconsistencies exist between these Development Standards, City Code, and the Comprehensive Plan, the strictest provisions shall apply unless stated otherwise.

A. Special Flood Hazard Area: All uses proposed in the flood area shall conform to the provisions of the National Flood Insurance Programs.

~~B. Munsel Creek and Other Drainageways: A fifty foot (50') setback shall be required for all buildings from the creek channel, except by Planning Commission approval where it can be shown by accepted engineering practices or treatment that no erosion hazards, slide potential, or possible flood damage are likely to occur, and that riparian vegetation will be protected.~~

H. Yaquina Soils and Wet Areas(except significant wetlands and riparian areas identified in the 2013 Wetland and Riparian Inventory, as amended): In areas with seasonal standing water, construction of a drainage system and/or placement of fill material shall be required according to plans prepared by a registered engineer and approved by the City. (Ord. 625, 6-30-80; amd. Ord. 669, 5-17-82) (Amended Ord. 10, Series 2009)

NOTE: Insert new code section 10-7-4:

10-7-4: DEVELOPMENT STANDARDS FOR WETLANDS AND RIPARIAN AREAS

A. Purpose: Significant wetlands, and their related wetland buffer zones, and significant riparian corridors provide hydrologic control of floodwaters; protect groundwater and surface water quality; provide valuable fish and wildlife habitat, including habitat for anadromous salmonids; improve water quality by regulating stream temperatures, trapping sediment, and stabilizing streambanks and shorelines; and provide educational and recreational opportunities. It is recognized that not all resources will exhibit all of these functions and conditions.

The purpose of this Subsection (FCC 10-7-4) is to protect significant wetlands, wetland buffer zones, and significant riparian corridors in order to:

1. Implement the goals and policies of the Comprehensive Plan;
2. Satisfy the requirements of Statewide Planning Goal 5 and ensure consistency with adopted City Stormwater requirements in Florence City Code Title 9 Chapter 5;
3. Safeguard the City's locally significant wetland and riparian areas, especially the flood control and water quality functions these areas provide for the community;
4. Safeguard fish and wildlife habitat;
5. Safeguard water quality and natural hydrology, to control erosion and sedimentation, and to reduce the adverse effects of flooding;
6. Safeguard the amenity values and educational opportunities for City's wetlands and riparian areas for the community; and
7. Improve and promote coordination among Federal, State, and local agencies regarding development activities near wetlands and riparian areas.

B. Applicability.

1. Affected Property: The procedures and requirements of the Significant Wetland and Riparian Area Standards:
 - a. Apply to any parcel designated as having a Significant Goal 5 Wetland or Significant Goal 5 Riparian Corridor, and Significant Wetland Buffer Zones, as defined in FCC Title 9 Chapter 5 and FCC Title 10 Chapter 1. Significant Goal 5 wetlands and significant riparian corridors are mapped in Appendix A of the 2013 Inventory and Tables 2.1 and 2.2 and the Significant Wetland and Riparian Reaches Maps in the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan (2013 Plan), as amended, in Comprehensive Plan Appendix 5, which is adopted into this Code by reference.
 - b. Apply in addition to the stormwater standards in FCC 9-5-3-3-F (incorporated herein) and the standards of the property's zoning district, except that the required setbacks in this subsection are not in addition to the required setbacks in the underlying zone. Where conflicts exist between this subsection and the underlying zoning district, this subsection shall apply.
2. Applicability to properties adjacent to the side channel of Munsel Creek (Reach RMC-Cs in the 2013 Inventory). These properties are subject to special setback reductions and provisions, as set out below, due to the unique development patterns and history of the area. These special provisions are supported by, and explained in, the Economic, Social, Environmental, and Energy (ESEE) Analysis and Limited Protection Program (ESEE Analysis) in Chapter 3 of the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan in Appendix 5 of the Comprehensive

Plan. The ESEE Analysis is adopted as part of the Comprehensive Plan and is incorporated herein by reference.

3. Applicability to public facilities in significant wetlands. Public facilities (transportation, water, wastewater, and stormwater) that are included in the City's Public Facility Plan, as amended, are exempt from the requirements of this subsection provided that permitted uses are designed and constructed to minimize intrusion into the riparian area; disturbed areas are replanted with native vegetation; and all required federal and state permits are obtained. This exemption is authorized by the ESEE Analysis in Appendix 5 of the Comprehensive Plan. See Section, "Exemptions," below.

C. Activities Subject to Standards and Requirements: Activities subject to the Special Development Standards in this subsection shall include the following, unless specifically exempted by Code:

1. Partitioning and subdividing of land;
2. New structural development;
3. Exterior expansion of any building or structure, or increase in impervious surfaces or storage areas;
4. Site modifications including grading, excavation or fill (as regulated by the Oregon Department of State Lands and the Army Corps of Engineers), installation of new above or below ground utilities, construction of roads, driveways, or paths, except as specifically exempted in the section "exemptions" below;
5. The cutting of trees and the clearing of any native vegetation within a Significant Wetland, Wetland Buffer Zone, or Riparian Corridor beyond that required to maintain landscaping on individual lots existing on the effective date of this title.

D. Exemptions:

1. Only the following uses and activities in significant riparian corridors or wetland buffer zones are exempt from these Significant Wetland and Riparian Area Standards, provided: the uses and activities are designed and constructed to minimize intrusion into the buffer zone; disturbed areas are replanted with native vegetation; and all required federal and state permits are obtained:
 - a) Replacement of lawfully created existing structures with structures in the same location that do not disturb additional wetland buffer zone or significant riparian surface area. All Coast Village structures existing on (insert date ordinance is adopted) are grandfathered and qualify as "lawfully created existing structures" for purposes of this subsection. This provision supersedes the provisions for non-conforming structures in FCC 10-8.

- b) Installation or maintenance of public and private facilities and utilities (such as transportation, water, wastewater, and stormwater, electric, gas, etc.) in riparian areas.
- c) The sale of property.
- d) Temporary emergency procedures necessary for the safety or protection of property.
- e) All water-related and water-dependent uses as defined in the Definitions in the Florence Code Title 10.
- f) Removal of non-native vegetation and replacement with native plant species.
- g) Removal of vegetation necessary for the development of water-related or water-dependent uses.
- h) Public facilities identified in the City's Public Facility Plan, in Appendix 11 of the Comprehensive Plan, as amended, that are installed in significant wetlands, provided that the facilities are designed and constructed to minimize intrusion into the wetland; disturbed areas are replanted with native vegetation; and all required federal and state permits are obtained.

E. Agency Review: Decisions made by the City of Florence under this title do not supersede the authority of the state or federal agencies which may regulate or have an interest in the activity in question. It is the responsibility of the land-owner to ensure that any other necessary state or federal permits or clearances are obtained. In particular, state and federal mitigation requirements for impacts associated with approved water-related or water-dependent uses may still be required.

F. General Development Standards and Requirements: When development is proposed that is subject to these standards, the property owner is responsible for the following. Figure 1 below is a cross section illustrating terms used in the discussion of wetland and riparian setbacks as defined by Oregon Statewide Planning Goal 5.

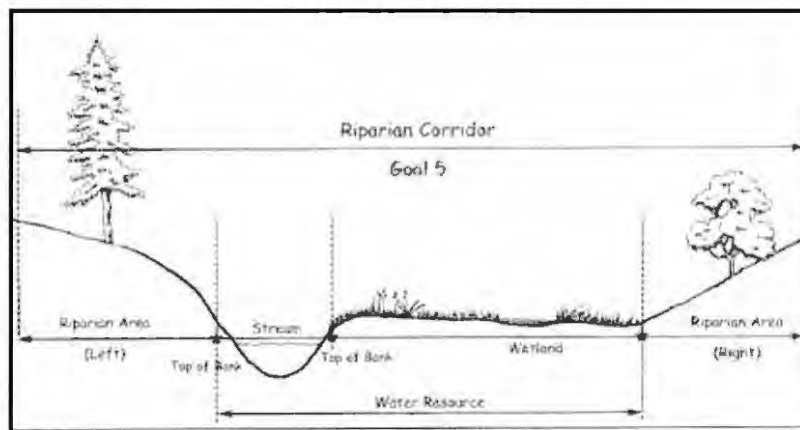


Figure 1: Downstream cross section illustrating terms used in Statewide Planning Goal 5. Source: *Urban Riparian Inventory and Assessment Guide*, Oregon Department of State Lands, 1998.

1. Determination of Significant Wetland and Riparian Area Boundaries.
 - a. For the purpose of showing the boundary of a significant wetland on a site plan, property owners may choose one of the following options:
 - 1) hire a Qualified Professional to do the delineation and have the delineation approved by the Oregon Department of State Lands (DSL); or
 - 2) hire a Qualified Professional to do the delineation but do not request DSL approval of the delineation. The Qualified Professional must have performed prior wetland delineations that were approved by DSL; or
 - 3) If the site plan shows the proposed development is outside the 50 foot Stormwater Buffer Zone, the wetland boundaries shown on the adopted Local Wetland Inventory (LWI) Map can be used to determine the wetland boundary for this purpose.
 - b. For significant riparian corridors, the width of the corridor boundary is the "significant riparian width" in Table 2.2 of the 2013 City of Florence Significant Wetlands and Riparian Corridor Plan in Comprehensive Appendix 5.
 - c. For significant riparian corridors, the boundaries of the riparian corridor will be measured and shown on an approved site plan. The City shall maintain maps of regulated riparian areas, and make them available to the public. These maps will be used to identify the extent of the riparian area unless the applicant can demonstrate through detailed inventory information (including maps, photos, and Lane County aerial photos showing the location and species of vegetation growing in the disputed area) that the city's maps are in error. For purposes of making these measurements, the following shall apply:
 - 1) Riparian buffer zones are measured horizontally from the top of bank. The top of the bank is the highest point at which the bank meets the grade of the surrounding topography, characterized by an abrupt or noticeable change from a steeper grade to a less steep grade, and, where natural conditions prevail, by a noticeable change from topography or vegetation primarily shaped by the presence and/or movement of the water to topography not primarily shaped by the presence of water. Where there is more than one such break in the grade, the uppermost shall be considered the top of bank.
 - 2) If the top of the bank is not identifiable, the riparian buffer zones are measured horizontally from the line of ordinary high water. In a given stream, the line of ordinary high water is the line on the bank or shore to which seasonal high water rises annually and identified in the field by physical characteristics that include one or more of the following:
 1. A clear, natural line impressed on the bank
 2. Changes in the characteristics of soils
 3. The presence of water-borne litter and debris

4. Destruction of terrestrial vegetation

If reliable water level data are available for 3 or more consecutive previous years, the line of ordinary high water can be considered the mean of the highest water level for all years for which data are available.

2. Preparation and submission of a site plan (vegetation clearing permits are also subject to the submission requirements in FCC Title 4 Chapter 6) that shows:
 - a. the wetland boundary or the top of bank of the riparian corridor,
 - b. the significant riparian corridor width or the wetland buffer zone,
 - c. the footprint of the proposed structure measured from the riparian corridor boundary or wetland buffer zone edges,
 - d. any requested setback adjustments as measured from the edge of the wetland or riparian corridor boundary,
 - e. the type and location of dominant existing native plants that would be displaced, and
 - f. the type of native plants to be planted and the location where they will be replanted.
3. It is prohibited to permanently alter a significant wetland by: the placement of structures or impervious surfaces; or by the removal of native vegetation; or by grading, excavation, placement of fill, or vegetation removal (other than perimeter mowing and other cutting necessary for hazard prevention), except as follows:
 - a) where full protection of the Significant Wetland renders a property unbuildable, as defined in the definitions in Title 10 Chapter 1 of this Code; or
 - b) public facilities identified in the City's Public Facility Plan, Appendix 11 of the Comprehensive Plan, as amended, may be installed in significant wetlands or riparian areas, provided that the facilities are designed and constructed to minimize intrusion into the wetland or riparian area; disturbed areas are replanted with native vegetation; and all required federal and state permits are obtained.

G. Stormwater Quality: As provided in FCC 9-5-5-3-F and the Code Definitions in FCC-10-1, significant wetlands over ½ acre and significant streams are "sensitive areas" that shall be protected by a buffer zone of native, undisturbed vegetation. The outer boundary of the buffer shall be determined by a minimum 50-foot setback from the edge of the significant wetland; for significant riparian areas, the buffer zone shall be the significant riparian width identified in the 2013 Inventory and 2013 City of Florence Significant Wetlands and Riparian Corridors Plan. The width and nature of protection required within the buffer may change as the Endangered Species Act and other state and federal regu-

lations are promulgated. The City requires that the buffer width meet all state and federal requirements.

No land disturbing activities, structures, development and construction activities, gardens, lawns, application of chemicals, pet wastes, dumping of any kind of materials shall be permitted within the buffer zone, except as noted below:

1. Roads, pedestrian, or bike paths crossing the buffer from one side to the other in order to provide access to or across the sensitive area.
2. A pedestrian or bike path constructed within a buffer and parallel to a sensitive area shall have the buffer widened by the width of the path if the path is constructed of impervious material.
3. Pedestrian or bike paths shall not exceed 10-feet in width.
4. Utility/service infrastructure construction (i.e., storm, sanitary sewer, water, phone, gas, cable, etc.) If approved by the City Manager or his/her designee.
5. Measures to remove or abate hazards, nuisance, or fire and life safety violations as approved by the City.
6. Enhancement of the riparian corridor for water quality or quantity benefits, fish, or wildlife habitat as approved by the City and other appropriate regulatory authorities.
7. Water quality facilities planted with appropriate native vegetation may encroach into the buffer area as approved by the City and other appropriate authorities.

H. Additional Statewide Planning Goal 5 exceptions: The following exceptions are in addition to the exceptions in G, above. Consistent with Statewide Planning Goal 5 [OAR 660-023-0090 (8) (a)], the permanent alteration of significant riparian areas by grading or the placement of structures or impervious surfaces is prohibited, except for the following uses, provided they are designed and constructed to minimize intrusion into the riparian area:

1. Water-related and water-dependent uses and removal of vegetation necessary for the development of water-related or water-dependent uses;
2. Replacement of existing structures with structures in the same location that do not disturb additional riparian surface area; and
3. Removal of non-native vegetation and replacement with native plant species.

I. Removal of native vegetation: In accordance with Goal 5, removal of vegetation from a significant riparian corridor is prohibited, except as otherwise provided in these Wetland and Riparian Standards and in FCC 4-6-3 and for the following:

1. Removal of non-native vegetation and replacement with native plant species. The replacement vegetation shall cover, at a minimum, the area from which vegetation was removed. shall maintain or exceed the density of the

removed vegetation, and shall maintain or improve the shade provided by the vegetation.

2. Removal of vegetation necessary for the development of approved water-related or water-dependent uses or for the continued maintenance of dikes, drainage ditches, or other stormwater or flood control facilities. Vegetation removal shall be kept to the minimum necessary.
3. Trees in danger of falling and thereby posing a hazard to life or property may be removed, following consultation and approval from the Planning Director. If no hazard will be created, the Planning Department may require these trees, once felled, to be left in place in the Significant Wetland or Riparian Area.
4. The control or removal of nuisance plants should primarily be by mechanical means (e.g. hand-pulling). If mechanical means fail to adequately control nuisance plant populations, a federally approved herbicide technology for use in or near open water is the only type of herbicide that can be used in a Significant Riparian Corridor. Pre-emergent herbicides or auxin herbicides that pose a risk of contaminating water shall not be used. Herbicide applications are preferred to be made early in the morning or during windless periods at least 4 hours before probable rainfall. Any herbicide use must follow the label restrictions, especially the cautions against use in or near open water.

J. Special provisions for the Munsel Creek Side Channel: The following special provisions apply to properties in the significant riparian corridor of the Munsel Creek side channel (Reach RMC-Cs in Table 2.2 of the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan). These provisions are in addition to, or provide relief from, the other standards in this subsection, and, where conflicts exist, this section shall prevail.

1. In addition to the other setback adjustments and Variances allowed by this subsection, a 50% setback adjustment to the required 50-foot significant riparian width for properties along the Munsel Creek side channel will be permitted in order to allow new or expanded development to build up to 25 feet from the top of bank of the creek, as long as any native plants disturbed by the development are replaced elsewhere in the buffer zone, subject to the following exceptions and procedures:
 - a. Properties in Florentine Estates PUD that were granted a reduced setback by the Planning Commission prior to the (inset date of this ordinance) are deemed to comply with the standards in this subsection and do not need to apply for this setback adjustment.
 - b. The setback adjustment for other affected properties shall be granted through the Administrative Review process in 10-1-1-6.
 - c. The applicant shall be granted the setback reduction upon demonstration that any native vegetation displaced by the development shall be replanted in the remaining buffer zone (shrub for shrub, tree for tree, etc.).

- d. The applicant is not required to retain a professional for this application but a qualified professional may help a property owner identify displaced native plants and show how they will be replanted. To provide technical assistance, the City will provide the applicant with a native plant guide. Staff from the Siuslaw Watershed Council and Soil and Water Conservation District are available to provide property owners with technical assistance with native plant identification and guidance on replanting.

K. Setback Adjustments: The following reductions in setbacks shall be allowed for properties affected by the significant wetland and riparian area standards as set out below.

1. Eligibility for setback adjustment. Property owners affected by these significant wetland and riparian corridor standards shall be eligible for setback adjustments as follows:
 - a. Single family dwellings: when the significant wetland or significant riparian corridor standard or requirement is such that no contiguous space exists outside the setback that allows for a dwelling unit at least 50 feet by 27 feet.
 - b. For the Munsel Creek side channel: the "required setback" for the purpose of eligibility for the setback adjustment is the reduced setback allowed in subsection "J" above.
2. If the required setback or standard for the significant wetland or riparian corridor is such that no contiguous space exists outside the setback that allows for a dwelling unit at least 50 feet by 27 feet, then a primary dwelling, this size or less, shall be permitted to intrude into the setback area in accordance with the standards of this subsection. Any Code requirements of the applicable zoning district (such as required garages) that would necessitate intrusion into additional riparian area shall not apply.
3. If the proposed primary dwelling will be more than 20 feet from a significant or wetland or stream, the adjustment application shall use the Administrative Review process in FCC 10-1-1-6.
4. If a proposed primary dwelling will be built within 20 feet of a significant wetland or stream, a Hardship Variance from the Planning Commission shall be required in accordance with Florence City Code Title 10 Chapter 4.

L. Hardship Variances: A variance to the provisions of this subsection shall be granted by the Planning Commission in accordance with the procedures in Florence City Code Title 10 Chapter 4 only as a last resort and is only considered necessary to allow reasonable economic use of the subject property. The property must be owned by the applicant and not created after the effective date of this title.

1. Eligibility. An application for a hardship variance from the provisions of this subsection shall be available upon demonstration of the following conditions:

- a. Siting of a primary dwelling 50 feet by 27 feet or less requires intrusion into the significant wetland buffer zone or significant riparian corridor within 20 feet of a significant wetland or stream; or
 - b. Strict adherence to the applicable standards or requirements of this subsection would effectively preclude a use of the parcel that could be reasonably expected to occur in the zone and that the property owner would be precluded a substantial property right enjoyed by the majority of landowners in the vicinity.
 - c. Due to unique circumstances and historic development patterns outside the control of the property owners, the Variance fee for this application shall be waived for affected Coast Village properties.
2. The following additional standards shall apply:
- a. Demonstration that the intrusion into the setback must be the minimum necessary;
 - b. Demonstration that any native vegetation displaced by the development will be replanted in the remaining significant wetland buffer zone or riparian corridor. The applicant is not required to retain a professional for this application but a qualified professional may help a property owner identify displaced native plants and show how they will be replanted. To provide technical assistance, the City will provide the applicant with a native plant guide; staff from the Siuslaw Watershed Council and Soil and Water Conservation Service are available to provide property owners with technical assistance with native plant identification and guidance on replanting.
 - c. Permanent alteration of the Significant Wetland or Riparian Area by an action requiring a variance is subject any mitigation requirements imposed by federal and state permitting authorities.
 - d. In granting a Variance, the Planning Commission shall impose conditions of approval that address all of the following criteria:
 - 1) The site plan and application shall document the location of the impact, the existing conditions of the resource prior to the impact, a detailed planting plan for the approved setback area with dominant native plant species and density, and a narrative describing how the impacted resource will be replaced and approved setback area restored.
 - 2) Invasive vegetation shall be removed from, and native vegetation planted in, the approved setback area, with a minimum replacement ratio of 1:1 for the impacted area.
 - 3) Herbicides and pesticides not approved for use in buffer zones or riparian areas is prohibited in the approved setback area.
 - 4) All vegetation planted within the approved setback area shall be native to the region. In general, species to be planted shall replace those impacted by the development activity, i.e., trees must replace trees, brush must replace brush, and, within reason, like plants must replace like plants (i.e., dominant plant species).

- 5) Trees shall be planted at a density not less than the density in place prior to development.
- 6) The property owners will work with available federal, state, and local agencies, such as the Siuslaw Watershed Council, the Siuslaw Soil and Water Conservation District, ODFW, DSL, STEP to implement practices and programs to restore and protect the riparian area.

M. Significant wetland and riparian corridor enhancement incentives:

1. Enhancement of Significant Wetland Buffer Zones or Riparian Corridors is encouraged, including: riparian or in-channel habitat improvements, non-native plant control, and similar projects which propose to improve or maintain the quality of a Significant Wetland or Riparian Area; however, no enhancement activity requiring the excavation or filling of material in a wetland or jurisdictional stream shall be allowed unless all applicable State and Federal permits have been granted.
2. Incentives shall be provided to improve the continuity of Significant Riparian Corridors in situations where lots would be rendered unbuildable by the setback, as defined in the Definitions in FCC Title 10 Chapter 1. Such incentives may include: reducing the required front yard setback, alternative access, vacating right-of-way, property line adjustments, re-orientation of lots, transfer of development rights (if feasible), and density bonuses, among others. The resulting development will conform, to the maximum extent practical, to the general development patterns in the vicinity of the affected lot.
3. These incentives may also be provided to properties that are severely impacted by the setback when doing so will result in enhancement of the significant wetland, wetland buffer zone, or significant riparian corridor.

L. Inventory map corrections: The Planning Director may correct the location of a wetland or riparian boundary shown on the Local Wetland and Riparian Areas Inventory Maps when it has been demonstrated by a property owner or applicant that a mapping error has occurred and the error has been verified by DSL. Wetland delineations verified by DSL shall be used to automatically update and replace the City's Local Wetland Inventory mapping. No variance application shall be required for map corrections where approved delineations are provided.

b. Consistency Amendments: Amend FCC Title 9 Chapter 5 stormwater management definitions and buffer zone provisions; Title 10 Chapter 1 Definitions, and Title 10 Chapter 19, Prime Wildlife District; and Title 4 Chapter 6 Vegetation Clearing Permit requirements, for internal Code consistency.

The following Code amendments are proposed for consistency with the proposed Comprehensive Plan and Code amendments or are otherwise for consistency with state law. Unless noted otherwise, deletions are in strike out and additions in double underline.

FCC TITLE 9, CHAPTER 5

STORMWATER MANAGEMENT UTILITY, USER FEE SYSTEM AND STORM-WATER MANAGEMENT REQUIREMENTS

9-5-1-2: DEFINITIONS

SENSITIVE AREAS Significant wetlands greater than ½ acre and significant streams identified in the 2013 Florence Area Local Wetlands and Riparian Inventory, as amended, Natural streams (perennial or intermittent), rivers, including the estuary, and lakes, or wetlands hydraulically connected by surface water to streams, rivers, or lakes and areas defined by the City of Florence's Local Wetlands and Riparian Inventory. Also, includes all areas that are protected for species as per areas designated by Oregon Department of Fish and Wildlife, Oregon ~~Division~~Department of State Lands, National Marine Fisheries Service, United States Fish and Wildlife Service and Oregon Department of Transportation.

9-5-3-3: STORM WATER QUALITY

- F. Sensitive areas shall be protected by a buffer zone of native, undisturbed vegetation. The outer boundary of the buffer shall be determined by a minimum 50-foot setback from the edge of the sensitive area, or as wider if required by other City Code provisions requirements. (See additional standards and requirements for significant wetlands and significant riparian corridors in Florence City Code Title 10, Chapter 7; and for the Estuary, Coastal Shorelands, and Beaches and Dunes in Title 10 Chapter 19-) The width and nature of protection required within the buffer may change as the Endangered Species Act and other state and federal regulations are promulgated. The City requires that the buffer width meet all state and federal requirements. No land disturbing activities, structures, development and construction activities, gardens, lawns, application of chemicals, pet wastes, dumping of any kind of materials shall be permitted within the buffer zone, except as noted below:
1. Roads, pedestrian, or bike paths crossing the buffer from one side to the other in order to provide access to or across the sensitive area.
 2. A pedestrian or bike path constructed within a buffer and parallel to a sensitive area shall have the buffer widened by the width of the path if the path is constructed of impervious material.
 3. Pedestrian or bike paths shall not exceed 10-feet in width.
 4. Utility/service infrastructure construction (i.e., storm, sanitary sewer, water, phone, gas, cable, etc.) If approved by the City Manager or his/her designee.
 5. Measures to remove or abate hazards, nuisance, or fire and life safety violations as approved by the City.

6. Enhancement of the riparian corridor for water quality or quantity benefits, fish, or wildlife habitat as approved by the City and other appropriate regulatory authorities.
7. Water quality facilities planted with appropriate native vegetation may encroach into the buffer area as approved by the City and other appropriate authorities.

FCC Title 10, Chapter 1: Zoning Administration

FCC 10-1-4: DEFINITIONS

Insert the following definitions in alphabetical order into FCC 10-1-4. Where an existing definition is proposed to be modified, additions are shown in double underline and deletions in strike-out.

BANKFULL STAGE	Means the elevation at which water overflows the natural banks of the stream.
BIOENGINEERING	Means a method of erosion control and landscape restoration using live plants, such as willows.
BUFFER ZONE	A physical setback from a sensitive area used to protect the <u>flood storage capacity</u> , water quality, the aquatic and riparian wildlife communities, and the habitat value within the sensitive area. The start of the buffer starts at the edge of the defined channel (bank full stage) for streams/rivers, delineated wetland boundary, delineated spring boundary, or average high water for lakes.
BUILDING	Any temporary or permanent structure constructed and maintained for the support, shelter, or enclosure of people, motor vehicles, animals, chattels or personal or real property of any kind. The words "building" and "structure" shall be synonymous.
DELINEATION	Means a wetland delineation report that contains the methods, data, conclusions and maps used to determine if wetlands and/or other waters of the state are present on a land parcel and, if so, describes and maps their location and geographic extent. A wetland determination report documenting wetland presence or absence is included within this definition.
ENHANCEMENT	An action which results in a long-term improvement of existing functional characteristics and processes that is not the result of a creation or restoration action. <u>Enhancement is a modification of a wetland or riparian area to improve its condition. Enhancement is</u>

	<u>conducted only on degraded features, results in a net gain in functions and values, and does not replace or diminish existing functions and values with different ones unless justified as ecologically preferable.</u>
EXCAVATION	Means removal of organic or inorganic material (e.g. soil, sand, sediment, muck) by human action.
IMPERVIOUS SURFACE	Means any material (e.g. rooftops, asphalt, concrete) which reduces or prevents absorption of water into soil.
INVASIVE VEGETATION	Includes plants that appear on the current Oregon Department of Agriculture Noxious Weed List, plus known problem species including <i>Phalaris arundinacea</i> , <i>Holcus lanatus</i> , and <i>Anthoxanthum odoratum</i> . In addition, any non-native plant species may be considered invasive if it comprises more than 15% of the total plant cover and appears to be increasing in cover or frequency over time.
LAWN	Means grass or similar materials usually maintained as a ground cover of less than 6 inches in height. For purposes of this title, lawn is not considered native vegetation regardless of the species used.
MITIGATION	The creation, restoration, or enhancement of an estuarine area to maintain the functional characteristics and processes of the estuary, such as its natural biological productivity, habitats, and species diversity, unique features and water quality. <u>For wetlands and riparian areas, "mitigation" is a means of compensating for impacts to a Wetland or and Riparian Area or its buffer including: restoration, creation, or enhancement. Some examples of mitigation actions are construction of new wetlands to replace an existing wetland that has been filled, replanting trees, removal of nuisance plants, and restoring streamside vegetation where it is disturbed.</u>
NATIVE VEGETATION	Means plants identified as naturally occurring and historically found within the City of Florence.
QUALIFIED PROFESSIONAL	Means an individual who has proven expertise and vocational experience in a given natural resource field. A qualified professional conducting a wetland delineation must have had a delineation approved by the Oregon Department of State Lands.
REVIEW AUTHORITY	Means the City of Florence.
RIPARIAN AREA	Means the area adjacent to a river, lake, or stream, consisting of the area of transition from an aquatic ecosystem to a terrestrial ecosystem. For purposes of this title, riparian areas are identified on the Significant

RIPARIAN CORRIDOR	Wetlands and Riparian Areas Map in the Comprehensive Plan. Means a Goal 5 Resource that includes the water areas, adjacent riparian areas, and wetlands within the riparian area boundary. For purposes of this title, riparian corridors are identified on the Significant Wetlands and Riparian Areas Map in the Comprehensive Plan.
SENSITIVE AREA	<u>Significant wetlands greater than ½ acre and significant streams identified in the 2013 Florence Area Local Wetlands and Riparian Inventory, as amended.</u> Natural streams (perennial or intermittent), rivers, including the estuary, and lakes, or wetlands hydraulically connected by surface water to streams, rivers, or lakes and areas defined by the City of Florence's Local Wetlands and Riparian Inventory. Also, includes all areas that are protected for species as per areas designated by Oregon Department of Fish and Wildlife, Oregon Division <u>Department</u> of State Lands, National Marine Fisheries Service, United States Fish and Wildlife Service and Oregon Department of Transportation.
SHRUBS	Consists of woody plants less than 3 inches in diameter at breast height, regardless of height.
SIGNIFICANT WETLANDS AND RIPARIAN AREAS	Wetlands and riparian corridors identified as significant by the 2013 Florence Area Local Wetlands and Riparian Inventory and the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan, as amended, and designated significant by the local government.
SIGNIFICANT WETLAND BUFFER ZONE	The 50 foot buffer zone required by the stormwater management requirements of FCC 9-5-3-3-F, measured on accordance with the boundary determinations in FCC 10-7 standards and requirements for wetlands and riparian corridors.
STATE AND FEDERAL NATURAL RESOURCE AGENCY	The Oregon Department of State Lands, Oregon Department of Fish and Wildlife, U.S. Army Corps of Engineers, U.S. Department of Agriculture Natural Resources Conservation Service, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, and Department of Environmental Quality.
STREAM	A channel such as a river or creek that carries flowing surface water, including perennial streams and inter-

mittent streams with defined channels, and excluding man-made irrigation and drainage channels. A perennial stream is one that flows continuously. An intermittent or seasonal stream is one that flows only at certain times of the year.²

STRUCTURE	See "Building." For the purposes of administering Code Chapters 7, 18, 19, and 24, the definition shall also mean Anything constructed, installed, or portable, and the use of which requires a location on <u>a parcel of land or on the ground, either above or below water.</u>
SUBSTANTIAL IMPROVEMENT	<p>Any repair, reconstruction, or improvement of a structure, the cost of which equals or exceed 50 percent of the market value of the structure either:</p> <ul style="list-style-type: none">(a) Before the improvement or repair is started, or(b) If the structure has been damaged and is being restored, before the damage occurred. For the purposes of this definition "substantial improvement" is considered to occur when the first alteration of any wall, ceiling, floor, or other structural part of the building commences, whether or not that alteration affects the external dimensions of the structure. The term does not, however, include either:<ul style="list-style-type: none">(1) Any project for improvement of a structure to comply with existing state or local health, sanitary, or safety code specifications which are solely necessary to assure safe living conditions, or(2) Any alteration of a structure listed on the National Register of Historic Places or a State Inventory of Historic Places.
TREE	Consists of woody plants 3 inches or more in diameter at breast height, regardless of height.
TOP OF BANK	Refers to the location where the rising ground bordering a stream intersects the side of the stream channel. The stream channel is typically non-vegetated, and the top of bank normally corresponds with the bankfull stage. In the absence of physical evidence, the two-year recurrence interval flood elevation may be used to delineate the top of bank.
UNBUILDABLE.	<p>Lots that are rendered "unbuildable" by the required setback for significant wetlands and riparian areas.</p> <ul style="list-style-type: none">a) For single family housing, lots are considered unbuildable if the required setback for the significant wetland or riparian area is such that no contiguous space exists outside

² Department of State Lands (DSL) and U.S. Geological Survey (USGS) definitions.

the setback that allows for a dwelling unit at least 50 feet by 27 feet.³

- b) For all properties, lots are deemed unbuildable if strict adherence to the applicable setback standards and conditions would effectively preclude a use of the parcel that could be reasonably expected to occur in the zone and that the property owner would be precluded a substantial property right enjoyed by the majority of landowners in the vicinity.
- c) For the Munsel Creek side channel (Reach RMC-Cs in the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan in Appendix 5 of the Comprehensive Plan), the "required setback" for the purpose of the unbuildable definition, is the reduced setback allowed in FCC Title 10 Chapter 7.

WETLANDS

~~Land areas where water is the dominant factor determining the nature of soil development and the types of plant and animal communities living at the soil surface. Wetland soils retain sufficient moisture to support aquatic or semi-aquatic plant life. In marine and estuarine areas, wetlands are bounded at the lower extreme by extreme low water; in freshwater areas, by a depth of six feet. The areas below wetlands are submerged lands. Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Based on the above definition, three major factors characterize a wetland: hydrology, soils, and plants.~~

WETLAND BOUNDARY

The edges of a wetland as delineated by a qualified professional or as determined through the standards in FCC Title 10 Chapter 7.

FCC 10-19-9: PRIME WILDLIFE OVERLAY DISTRICT /PW

Note: The following Code amendments make the Code consistent with the proposed Comprehensive Plan and Code amendments as well as Statewide Planning Goal 2 (Land Use) and Goal 17 (Coastal Shorelands).

³ Note: A 50 foot by 27 foot area allows the siting of a typical double-wide manufactured home, a form of affordable housing.

A. Purpose and Application:

Purpose: The purpose of the /PW District is to protect areas in and adjacent to the North Jetty Lake and the South Heceta Junction Seasonal Lakes that have native vegetation and habitats of specific species of concern and to protect wildlife habitat, water quality, bank stability and provide flood control. The requirements imposed by the /PW District shall be in addition to those imposed by the base zoning district. Where the requirements of the /PW District conflict with the requirements of the base zoning district or the Comprehensive Plan, the more restrictive requirements shall apply.

Application: The Prime Wildlife Overlay District (/PW) is applied within the Florence city limits to Coastal Lake Shorelands identified in inventory information and designated in the Comprehensive Plan as possessing areas of unique biological assemblages, habitats of rare or endangered species, or a diversity of wildlife species. The /PW Overlay applies to the North Jetty Lake Shorelands as shown on the Florence Coastal Overlay Zoning Map. The extent of the /PW Overlay application for the South Heceta Junction Seasonal Lakes shall be determined through a Preliminary Investigation as specified below.

Preliminary Investigation: Any land use or building permit application within the /PW District as it applies to the South Heceta Junction Seasonal Lakes shall require a preliminary investigation by the Planning Director to determine the specific area to which the requirements of the district shall apply. The requirements of the district shall apply in an area generally identified on the Florence Coastal Overlay Zoning Map and the 2013 Local Wetland Inventory, as amended, and, specifically, in the site-specific information submitted by an applicant to determine whether the site possesses areas of unique biological assemblages, habitats of rare or endangered species, or a diversity of wildlife species ~~identified in the Coastal Resources Inventory,~~ or function to provide or affect water quality, bank stability or flood control, as identified in the Lane County Coastal Resources Inventory or the wetland functions and values in the 2013 Florence Area Local Wetlands and Riparian Inventory, as amended.

FCC 4-6-3: VEGETATION CLEARING PERMIT REQUIRED:

A. A vegetation clearing permit shall be required in any of the following circumstances:...

1. Clearing native vegetation from... areas which have been designated by the City as a significant riparian corridor, significant wetland buffer zone, greenbelt, or view corridor.

FCC 4-6-4: PROCEDURE FOR OBTAINING A VEGETATION CLEARING PERMIT:

- A. ~~A~~ No vegetation clearing permit application is required will be accepted unless the application also includes a concurrent application for a building permit or Conditional Use Permit, except that the criteria in FCC 4-6-4 C shall also apply to any removal of native vegetation from a significant riparian or wetland buffer zone requested as part of a setback adjustment granted under FCC 10-7-4..
- B. All requests for a Vegetation Clearing Permit shall be submitted to the ~~Community Development~~ Planning Department on a form available from that department, and containing the following minimum information: (See FCC 10-7-4 for additional submission requirements for areas within significant wetland or riparian buffer zones):...
- C. The ~~Planning~~ Community Development Department shall process the Vegetation Removal Permit application through the Administrative Review procedures in FCC Title 10 Chapter 1 and forward a report to the Design Review Board within thirty (30) days of filing a complete application. Review and approval by the Design Review Board shall be based on the following criteria, as applicable to the request:
 1. The necessity to remove native vegetation in order to construct proposed improvements or otherwise utilize the property in a reasonable manner consistent with the City Code and policies;
 2. The environmental and physical impacts such clearing may have, including visual drainage, wind erosion, protection of adjoining property and structures, and impacts on significant riparian corridors or wetland buffer zones, and impacts on any affected significant wetland or riparian buffer zones shall be supported by a qualified professional or through consultation with staff from the Soil and Water Conservation District, Siuslaw Watershed Council, ODFW, OSU, or another person or agency with knowledge or experience with the affected resource;
 3. The adequacy of the applicant's proposed landscaping or revegetation plan, including plant selection, staking, irrigation, and other maintenance provisions.

3. Housekeeping Amendment: Adopt an amendment to FCC Title 10 Chapter 19 to make the Code consistent with Statewide Planning Goal 16. See discussion, below, for rationale.

FCC 10-19-4: DEVELOPMENT ESTUARY DISTRICT (DE):

- F. Conditional Uses: Outside of Areas Managed for Water Dependent Activities, the following uses and activities are allowed in the estuary with a Conditional Use Permit, subject to the applicable criteria....
10. Water-related uses, non-water-dependent uses, and non-water-related uses, provided no dredge or fill is involved, and it is not possible to locate the use on an upland site. In approving these uses, the City shall consider the poten-

tial for using upland sites to reduce or limit the commitment of the estuarine surface area for surface uses. Nonwater-dependent and non-water-related uses that existed as of July 7, 2009 will retain their non-conforming status for five years from the date the use is abandoned or the structure is destroyed; and the existing structure for the same use may be replaced; the provisions of non-conforming uses in the Florence City Code not withstanding.

Discussion:

The amendment is consistent with the direction in Goal 16:

“Oregon’s Statewide Planning Goals & Guidelines, GOAL 16: ESTUARINE RESOURCES, OAR 660-015-0010(1) Management Units As a minimum, the following kinds of management units shall be established:... 3. Development: ... As appropriate the following uses shall also be permissible in development management units: ... Where consistent with the purposes of this management unit and adjacent shorelands designated especially suited for water-dependent uses or designated for waterfront redevelopment, water-related and nondependent, nonrelated uses not requiring dredge or fill; mining and mineral extraction; and activities identified in (1) and (2) above shall also be appropriate. In designating areas for these uses, local governments shall consider the potential for using upland sites to reduce or limit the commitment of the estuarine surface area for surface uses.”

EXHIBIT C
TO CITY OF FLORENCE ORDINANCE NO. 2, SERIES 2003
Proposed Amendments to the Florence City Code for
Aquifer Protection and Wetlands and Riparian Corridors
August 6, 2013

1. AQUIFER PROTECTION

- a. Adopt a new Drinking Water Protection Overlay Zone Map, attached.**
- b. Amend Florence City Code Title 10: Zoning Regulations to insert a new Chapter 32:**

Chapter 32 Drinking Water Protection Overlay District

SECTION

- 10-32-1 Purpose
- 10-32-2 Applicability
- 10-32-3 Warning and Waiver of Liability
- 10-32-4 Time of Travel Zones (TOTZ)
- 10-32-5 Review
- 10-32-6 Exemptions
- 10-32-7 Standards for Hazardous Materials within TOTZ
- 10-32-8 Conditions
- 10-32-9 Appeals

10-32-1: PURPOSE:

- A.** The Drinking Water Protection (DWP) Overlay District is established to protect from contamination the North Florence Sole Source Dunal Aquifer, used as the sole potable water supply source by the City. This Section establishes procedures and standards for the physical use of hazardous or other materials harmful to groundwater within TOTZ by new and existing land uses requiring development approval. The provisions of this Section are designed to:
 - 1. Protect the City's drinking water supply, which is obtained from groundwater resources, from impacts by facilities that store, handle, treat, use, produce, or otherwise have on premises substances that pose a hazard to groundwater quality; and
 - 2. Provide standards for hazardous or other materials that pose a risk to groundwater within the TOTZ.

- B. In order to accomplish this purpose, the DWP Overlay District includes methods and provisions to:
1. Restrict or prohibit the use of hazardous or other materials which are potential groundwater contaminants;
 2. Set standards for the storage, use, handling, treatment, and production of hazardous or other materials that pose a risk to groundwater within TOTZ; and
 3. Review new or expanded uses of hazardous or other materials that pose a risk to groundwater.

10-32-2: APPLICABILITY:

This DWP Overlay District applies to industrial and commercial land uses within the Drinking Water Protection Area (DWPA) for the proposed wellfield. As of (DATE OF ORDINANCE ADOPTION), 2013, all areas in an industrial or commercial zoning district within the specified wellhead TOTZ are automatically are re-zoned to add the DWP Overlay District to the underlying zoning district. The areas to which the DWP Overlay District is applied are shown on the Drinking Water Protection Overlay Map, on file in the Community Development Department and incorporated in this Section by reference.

10-32-3: WARNING AND WAIVER OF LIABILITY:

The degree of aquifer protection required by this Section in the areas designated in Section 10-32-2 is based on scientific and engineering considerations. The nature of these considerations is that the exact boundaries of Time of Travel Zones (TOTZ) have an associated uncertainty that renders conclusions based on them to be estimates. Under no conditions should this Section be construed to guarantee the purity of the ambient ground water or guarantee the prevention of ground water contamination. Therefore, this Section shall not create liability on the part of the City, or any City personnel, for any contamination that may result from reliance on this Section or any administrative decision made under this Section.

10-32-4: TIME OF TRAVEL ZONES (TOTZ):

- A. The DWP Overlay District includes 3 TOTZ for the proposed wellfield: 5-10 years; 10-20 years; and 20-30 years. The Overlay District does not include the 0-5 year TOTZ because there are no industrial or commercial properties or zones in that TOTZ. The locations of the TOTZ for the proposed wellfield are shown on the Drinking Water Protection Area Map for the Proposed Wellfield on file with the City's Planning Department; Public Works Department; the Siuslaw Valley Fire and Rescue Agency; and Heceta Water District (HWD).

- B. The areas within specified wellhead TOTZ are those drinking water protection areas for which the Oregon Health Authority issued a "provisional delineation," stating, "OHA approves the use of this delineation for protection of possible future drinking water sources," under the Oregon Administrative Rules that apply to Oregon's EPA-approved Drinking Water Protection Program, in Oregon Health Authority Delineation Certification #0016, March 16, 2012.
- C. In determining the location of a property within a TOTZ, the following criteria apply:
1. The Lane County Department of Assessment and Taxation maps shall be used as a base map with the addition of TOTZ boundaries.
 2. That portion of a tax lot that lies within a TOTZ is governed by the restrictions applicable to that TOTZ.
 3. Tax lots having parts lying within more than one TOTZ are governed by the standards of the more restrictive TOTZ.
 4. EXCEPTION: The Public Works Director (Director) may waive the requirement that the more restrictive standards apply when all of the following apply:
 - a. Storage, use, handling, treatment, and/or production of hazardous or other materials that pose a risk to groundwater will not take place within the portion of the tax lot having the more restrictive TOTZ standards; and
 - b. Storage, use, handling, treatment, and/or production of hazardous or other materials that pose a risk to groundwater will not take place within 50 feet of the portion of the tax lot having more restrictive TOTZ standards; and
 - c. The tax lot is 20,000 square feet or larger.
 5. A property owner may request the TOTZ be modified by submitting a Zone Change application to the City. Any request for modification of the TOTZ shall be accompanied by certification of the TOTZ as proposed to be modified by the Oregon Health Authority, under the Administrative Rules that apply to Oregon's EPA-approved Drinking Water Protection Program.

10-32-5: REVIEW:

- A. A DWP Overlay District Development Application is required when all of the following criteria are met:

1. Industrial and commercial land uses that are affected by one or more of the following: a land use permit application or building permit application;
 2. The action in Subsection A.1., above will:
 - a. Affect the storage, use, and/or production of hazardous or other materials that pose a risk to groundwater; or
 - b. Increase the quantity of hazardous or other materials that pose a risk to groundwater that are stored, used and/or produced.
- B. Prior to the submittal of a DWP Overlay District Development Application, an exemption request may be submitted to the Director as specified in Section 10-32-6-B-1.
- C. DWP Overlay District applications shall be reviewed under Administrative Review procedures in 10-1-1-6.
- D. Prior to undertaking an activity covered by Section 10-32-5-A, the owner or tenant shall submit a DWP Overlay District Application to the City for review and approval. Applications shall include the following information:
1. A Hazardous Material Inventory Statement and a Material Safety Data Sheet for any or all materials entered in the Statement unless exempted under Section 10-32-6. Hazardous material weights shall be converted to volume measurement for purposes of determining amounts; 10 pounds shall be considered equal to one gallon as specified in Florence Fire Code;
 2. A list of the chemicals to be monitored through the analysis of groundwater samples and a monitoring schedule if ground water monitoring is anticipated to be required;
 3. A detailed description of the activities conducted at the facility that involve the storage, handling, treatment, use or production of hazardous materials in quantities greater than the maximum allowable amounts as stated in Section 10-32-7-A;
 4. A description of the primary and any secondary containment devices proposed, and, if applicable, clearly identified as to whether the devices will drain to the storm or sanitary sewer;
 5. A proposed Hazardous Material Management Plan for the facility that indicates procedures to be followed to prevent, control, collect and dispose of any unauthorized release of a hazardous material;

6. A description of the procedures for inspection and maintenance of containment devices and emergency equipment;
 7. A description of the plan for disposition of unused hazardous materials or hazardous material waste products over the maximum allowable amounts including the type of transportation, and proposed routes.
- E. The Director shall review the application and make a decision based on the standards contained in Section 10-32-7, after consulting with the Building Official, Fire Marshall, Planning Director, and the manager of HWD, as appropriate.

10-32-6: EXEMPTIONS:

This Section does not exempt any material or use from Fire Code regulations adopted by the City.

- A. Exemptions are as specified in this Section unless the Director, in consultation with the Fire Marshall, determines that a hazardous material, activity, and/or facility that is exempt pursuant to this Section has a significant or substantial potential to degrade groundwater quality. Then the Director may require compliance with the requirements of this Section related to that hazardous material, activity or facility. This determination will be based upon site and/or chemical-specific data and are eligible for appeal to the Planning Commission, as specified in Section 10-32-9.
- B. Unless otherwise provided herein, the following materials are exempt from regulation hereunder:
1. Use, storage and handling of specific hazardous materials that do not present a risk to the aquifer, as determined and listed by the Director, are exempt from all regulation under this Section with the exception of the potential requirement to list these hazardous materials on the Hazardous Material Inventory Statement as found in the most recent Fire Code regulations adopted by the City. A Hazardous Materials Exemption Request may be submitted to the Director for Hazardous Materials that can be demonstrated to pose no threat to the aquifer. These materials may be exempted from regulation and added to the list. The demonstration of no threat is the responsibility of the applicant seeking the exemption and will be subject to review by technical experts.
 2. Hazardous materials offered for sale in their original sealed containers of 5 gallons or less are exempt from the 500-gallon storage limit specified in Section 10-32-7-A-1.

3. Hazardous materials in fuel tanks and fluid reservoirs attached to a private or commercial motor vehicle and used directly in the motoring operation of that vehicle, or machinery, including, but not limited to: fuel, engine oil and coolant.
4. Fuel oil used in existing heating systems.
5. Emergency use, storage, and handling of hazardous materials by governmental organizations in the public interest.
6. Hazardous materials used and stored specifically for water treatment processes of public water systems and private systems for the same purposes when approved by the Director.
7. Hazardous materials contained in properly operating sealed units (including, but not limited to: transformers, refrigeration units) that are not opened as part of routine use.
8. Local natural gas distribution lines, when available.
9. Fuel for emergency generators located at facilities that provide essential community services (including, but not limited to: hospitals, fire/life safety, police, public shelters, and telephone systems).
10. Any commonly used office supply—including, but not limited to: correcting fluid for typewriters, toner for computer printers or cleaners for windows and bathrooms—where the supplies are purchased off-site for use on-site.
11. Aggregate quantities equal to or less than 20 gallons of hazardous materials that do not contain DNAPLs.¹

10-32-7: STANDARDS FOR HAZARDOUS MATERIALS WITHIN TOTZ

Applications shall comply with the following standards. Where the following standards are more restrictive than the standards of the Florence Fire Code, the following standards shall apply:

A. Five to Ten Year TOTZ Standards.

1. The storage, handling, treatment, use, application, or production or otherwise keeping on premises of more than 20 gallons of hazardous materials

¹ DNAPLs are organic substances that are relatively insoluble in water and more dense than water. DNAPLs tend to sink vertically through sand and gravel aquifers to the underlying layer. The most common are chlorinated solvents. Significant amounts of DNAPLs are present at chlorinated solvent-contaminated sites, such as manufacturing and degreasing facilities, dry cleaners, wood treaters, and former manufacturing gas plants.

that pose a risk to groundwater in aggregate quantities not containing DNAPLs are allowed only upon compliance with containment and safety standards specified by the most recent applicable Fire Code.

2. Unless exempted, all hazardous or other materials that pose a risk to groundwater shall be stored in areas with approved secondary containment in place (Fire Code).
3. All new use of DNAPLs are prohibited.
4. Any change in the type of use or an increase in maximum daily inventory quantity of any DNAPL is considered a new use and is prohibited.
5. The following certain types of facilities or changes in chemical use and/or storage of hazardous or other materials that pose a risk to groundwater are prohibited:
 - a. Hazardous material product pipelines used to transport the hazardous material off of the tax lot where it is produced or used;
 - b. Injection wells, except for dry wells for roof drainage;
 - c. Solid waste landfills and transfer stations;
 - d. Fill materials containing hazardous materials;
 - e. Land uses and new facilities that will use, store, treat handle, and/or produce DNAPLs.
6. Requirements found in the Fire Code for a monitoring program and monitoring methods to detect hazardous or other materials in the secondary containment system shall be met for all amounts of hazardous materials that pose a risk to groundwater unless exempted.
7. The following requirements for inspection and record keeping procedures for monthly in-house inspection and maintenance of containment and emergency equipment for all amounts of hazardous or other materials that pose a risk to groundwater shall be met unless exempted: Schedules and procedures for inspecting safety and monitoring and emergency equipment. The applicant shall develop and follow a written inspection procedure acceptable to the Director for inspecting the facility for events or practices which could lead to unauthorized discharges or hazardous materials. An inspection check sheet shall be developed to be used in conjunction with routine inspections. The check sheet shall provide for the date, time, and location of inspection; note problems and dates and times of corrective ac-

tions taken; and include the name of the inspector and the countersignature of the designated safety manager for the facility.

B. Ten to Twenty Year TOTZ Standards.

1. The storage, handling, treatment, use, production or otherwise keeping on premises of more than 20 gallons of hazardous materials that pose a risk to groundwater in aggregate quantities not containing DNAPLs is allowed upon compliance with containment and safety standards specified by the most recent Fire Code adopted by the City
2. All hazardous or other materials that pose a risk to groundwater shall be stored in areas with approved secondary containment in place (Fire Code).
3. All new use of DNAPLs are prohibited.
4. Any change in type of use or an increase in the maximum daily inventory quantity of any DNAPL is considered a new use and is prohibited.
5. The following requirements for inspection and record keeping procedures for monthly in-house inspection and maintenance of containment and emergency equipment for all amounts of hazardous or other materials that pose a risk to groundwater shall be met unless exempted: Schedules and procedures for inspecting safety and monitoring and emergency equipment. The applicant shall develop and follow a written inspection procedure acceptable to the Director for inspecting the facility for events or practices which could lead to unauthorized discharges or hazardous materials. An inspection check sheet shall be developed to be used in conjunction with routine inspections. The check sheet shall provide for the date, time, and location of inspection; note problems and dates and times of corrective actions taken; and include the name of the inspector and the countersignature of the designated safety manager for the facility.

C. Twenty to Thirty Year TOTZ Standards. The storage, handling, treatment, use, production or keeping on premises of more than 20 gallons of hazardous materials that pose a risk to groundwater in aggregate quantities is allowed only upon compliance with containment and safety standards specified by the most recent Fire Code adopted by the City.

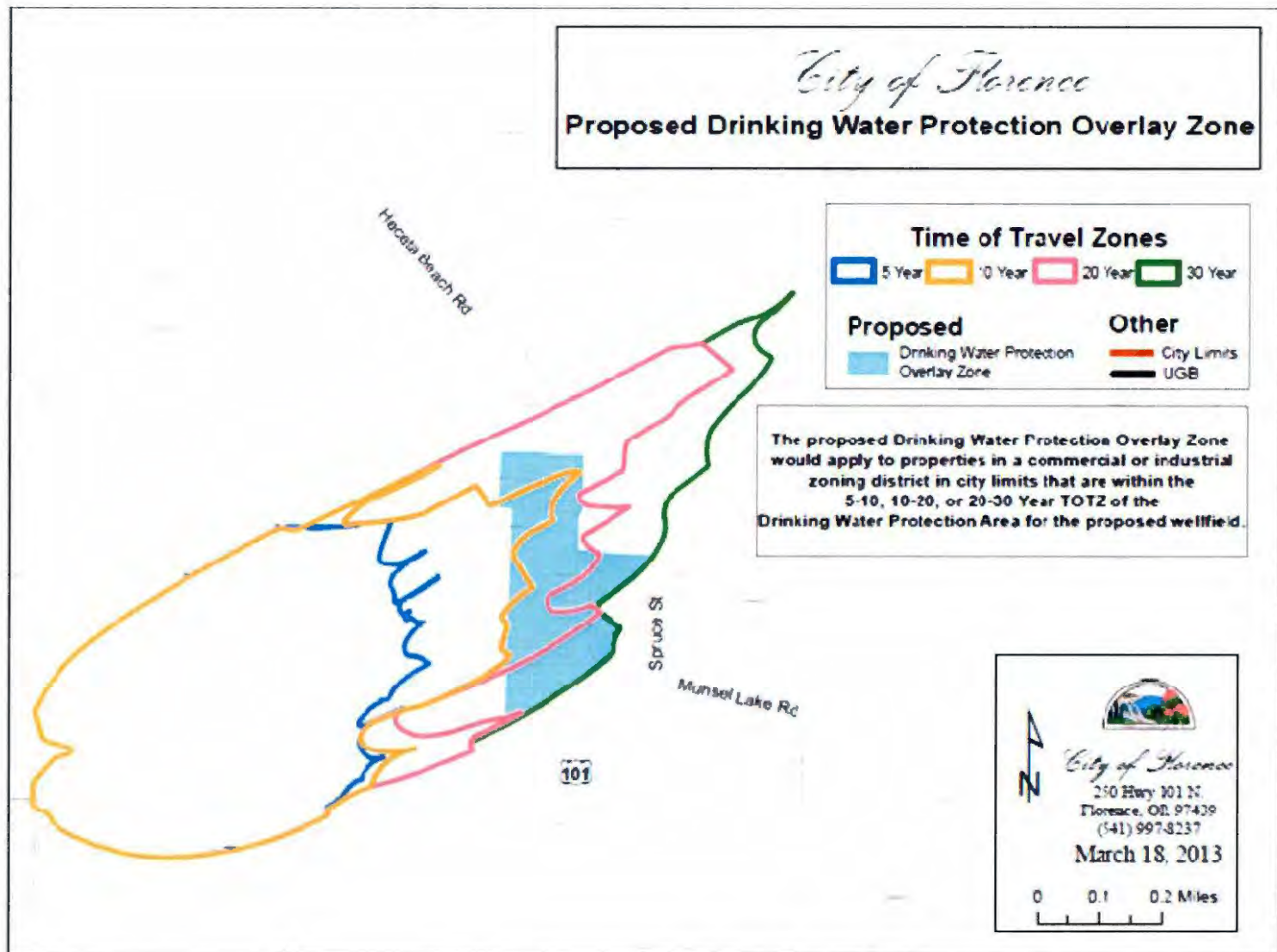
10-32-8: CONDITIONS:

The Director may attach conditions of approval that will minimize negative impacts of regulated substances on groundwater and ensure that the facility or the proposed development can fully meet the standards specified in Section 10-32-7. These conditions may include, but are not limited to: on-site monitoring wells,

Wellhead Protection Area signs, special storm water facilities or other conditions to address specific risks associated with the proposed development.

10-32-9: APPEALS:

The only portions of this Section that are subject to appeal are: Section 10-32-5-E, the Director's decision on a DWP application, Section 10-32-6, Exemptions, and Section 10-32-7-A-1, Waiver. The decision of the Director may be appealed as specified in Section 10-1-1-7.



2. WETLANDS AND RIPARIAN CORRIDORS

- a. Amend Florence City Code Title 10 Chapter 7: Special Development Standards to add a new section 10-7-4: Development Standards for Wetlands and Riparian Areas, and renumber sections sequentially. Unless noted otherwise, additions are shown in double underline and deletions in strike-out.

SECTION:

10-7-1: Purpose

10-7-2: Identification of Wetlands and Riparian Areas and Potential Problem Areas

10-7-3: Development Standards for Potential Problem Areas

10-7-4: Development Standards for Wetlands and Riparian Areas

10-7-45 Site Investigation

10-7-56: Review and Use of Site Investigation Reports (Amended Ord. 10, Series 2009)

10-7-1: PURPOSE: The purpose of this Chapter is to apply additional development standards to areas with wetlands or riparian areas and potential problem areas, such as natural hazards or soils which are particularly subject to erosion, landslide or seasonal surface water. Compliance with these standards is required in order to obtain a Special Use Permit. The standards are intended to: eliminate the danger to the health, safety or property of those who would live in potential problem areas and the general public; and to protect areas of critical environmental concern; areas having scenic, scientific, cultural, or biological importance; and significant fish and wildlife habitat as identified through Goal 5: Open Spaces and Scenic, Historic, and Natural Resources, and Goal 17: Coastal Shorelands. (Amended Ord. No. 10, Series 2009).

10-7-2: IDENTIFICATION OF WETLANDS AND RIPARIAN AREAS AND POTENTIAL PROBLEM AREAS: At minimum, the following maps shall be used to identify wetlands and riparian areas and potential problem areas:

A. "Hazards Map", Florence Comprehensive Plan Appendix 7.

B. "Soils Map", Florence Comprehensive Plan Appendix 7. (Ord. 625, 6-30-80)

C. "Beaches and Dunes Overlay Zone." See Chapter 19 for overlay zone requirements. Where conflicts exist between that chapter and this one, the more restrictive requirements shall apply.

D. 2013 City of Florence Significant Wetlands Map and 2013 City of Florence Significant Riparian Reaches Map in Appendix A of the 2013 Florence Area Local Wetlands and Riparian Inventory (2013 Inventory) and in the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan (2013 Plan), in Comprehensive Plan Appendix 5.

D. E. Other information contained in the plan or adopted by reference into the plan, or more detailed inventory data made available after adoption of the plan

may also be used to identify potential problem areas. (Amended Ord. No. 10, Series 2009)

NOTE: Delete 10-7-3 B, below, and renumber sequentially; and amend section H, as shown.

10-7-3: DEVELOPMENT STANDARDS FOR POTENTIAL PROBLEM AREAS:

The following standards shall be applied to development in potential problem areas unless an approved Phase I Site Investigation Report or an on-site examination shows that the condition which was identified in the Comprehensive Plan or Overlay Zoning Map does not in fact exist on the subject property. These standards shall be applied in addition to any standards required in the Zoning Districts, Comprehensive Plan, and to any requirements shown to be necessary as a result of site investigation. Where conflicts or inconsistencies exist between these Development Standards, City Code, and the Comprehensive Plan, the strictest provisions shall apply unless stated otherwise.

A. Special Flood Hazard Area: All uses proposed in the flood area shall conform to the provisions of the National Flood Insurance Programs.

~~B. Munsel Creek and Other Drainageways: A fifty foot (50') setback shall be required for all buildings from the creek channel, except by Planning Commission approval where it can be shown by accepted engineering practices or treatment that no erosion hazards, slide potential, or possible flood damage are likely to occur, and that riparian vegetation will be protected.~~

~~H.~~ IH. Yaquina Soils and Wet Areas(except significant wetlands and riparian areas identified in the 2013 Wetland and Riparian Inventory, as amended): In areas with seasonal standing water, construction of a drainage system and/or placement of fill material shall be required according to plans prepared by a registered engineer and approved by the City. (Ord. 625, 6-30-80; amd. Ord. 669, 5-17-82) (Amended Ord. 10, Series 2009)

NOTE: Insert new code section 10-7-4:

10-7-4: DEVELOPMENT STANDARDS FOR WETLANDS AND RIPARIAN AREAS

A. Purpose: Significant wetlands, and their related wetland buffer zones, and significant riparian corridors provide hydrologic control of floodwaters; protect groundwater and surface water quality; provide valuable fish and wildlife habitat, including habitat for anadromous salmonids; improve water quality by regulating stream temperatures, trapping sediment, and stabilizing streambanks and shorelines; and provide educational and recreational opportunities. It is recognized that not all resources will exhibit all of these functions and conditions.

The purpose of this Subsection (FCC 10-7-4) is to protect significant wetlands, wetland buffer zones, and significant riparian corridors in order to:

1. Implement the goals and policies of the Comprehensive Plan;
2. Satisfy the requirements of Statewide Planning Goal 5 and ensure consistency with adopted City Stormwater requirements in Florence City Code Title 9 Chapter 5;
3. Safeguard the City's locally significant wetland and riparian areas, especially the flood control and water quality functions these areas provide for the community;
4. Safeguard fish and wildlife habitat;
5. Safeguard water quality and natural hydrology, to control erosion and sedimentation, and to reduce the adverse effects of flooding;
6. Safeguard the amenity values and educational opportunities for City's wetlands and riparian areas for the community; and
7. Improve and promote coordination among Federal, State, and local agencies regarding development activities near wetlands and riparian areas.

B. Applicability.

1. **Affected Property:** The procedures and requirements of the Significant Wetland and Riparian Area Standards:
 - a. Apply to any parcel designated as having a Significant Goal 5 Wetland or Significant Goal 5 Riparian Corridor, and Significant Wetland Buffer Zones, as defined in FCC Title 9 Chapter 5 and FCC Title 10 Chapter 1. Significant Goal 5 wetlands and significant riparian corridors are mapped in Appendix A of the 2013 Inventory and Tables 2.1 and 2.2 and the Significant Wetland and Riparian Reaches Maps in the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan (2013 Plan), as amended, in Comprehensive Plan Appendix 5, which is adopted into this Code by reference.
 - b. Apply in addition to the stormwater standards in FCC 9-5-3-3-F (incorporated herein) and the standards of the property's zoning district, except that the required setbacks in this subsection are not in addition to the required setbacks in the underlying zone. Where conflicts exist between this subsection and the underlying zoning district, this subsection shall apply.
2. **Applicability to properties adjacent to the side channel of Munsel Creek (Reach RMC-Cs in the 2013 Inventory).** These properties are subject to special setback reductions and provisions, as set out below, due to the unique development patterns and history of the area. These special provisions are supported by, and explained in, the Economic, Social, Environmental, and Energy (ESEE) Analysis and Limited Protection Program (ESEE Analysis) in Chapter 3 of the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan in Appendix 5 of the Comprehensive

Plan. The ESEE Analysis is adopted as part of the Comprehensive Plan and is incorporated herein by reference.

3. Applicability to public facilities in significant wetlands. Public facilities (transportation, water, wastewater, and stormwater) that are included in the City's Public Facility Plan, as amended, are exempt from the requirements of this subsection provided that permitted uses are designed and constructed to minimize intrusion into the riparian area; disturbed areas are replanted with native vegetation; and all required federal and state permits are obtained. This exemption is authorized by the ESEE Analysis in Appendix 5 of the Comprehensive Plan. See Section, "Exemptions," below.

C. Activities Subject to Standards and Requirements: Activities subject to the Special Development Standards in this subsection shall include the following, unless specifically exempted by Code:

1. Partitioning and subdividing of land;
2. New structural development;
3. Exterior expansion of any building or structure, or increase in impervious surfaces or storage areas;
4. Site modifications including grading, excavation or fill (as regulated by the Oregon Department of State Lands and the Army Corps of Engineers), installation of new above or below ground utilities, construction of roads, driveways, or paths, except as specifically exempted in the section "exemptions" below;
5. The cutting of trees and the clearing of any native vegetation within a Significant Wetland, Wetland Buffer Zone, or Riparian Corridor beyond that required to maintain landscaping on individual lots existing on the effective date of this title.

D. Exemptions:

1. Only the following uses and activities in significant riparian corridors or wetland buffer zones are exempt from these Significant Wetland and Riparian Area Standards, provided: the uses and activities are designed and constructed to minimize intrusion into the buffer zone; disturbed areas are replanted with native vegetation; and all required federal and state permits are obtained:
 - a) Replacement of lawfully created existing structures with structures in the same location that do not disturb additional wetland buffer zone or significant riparian surface area. All Coast Village structures existing on (insert date ordinance is adopted) are grandfathered and qualify as "lawfully created existing structures" for purposes of this subsection. This provision supersedes the provisions for non-conforming structures in FCC 10-8.

- b) Installation or maintenance of public and private facilities and utilities (such as transportation, water, wastewater, and stormwater, electric, gas, etc.) in riparian areas.
- c) The sale of property.
- d) Temporary emergency procedures necessary for the safety or protection of property.
- e) All water-related and water-dependent uses as defined in the Definitions in the Florence Code Title 10.
- f) Removal of non-native vegetation and replacement with native plant species.
- g) Removal of vegetation necessary for the development of water-related or water-dependent uses.
- h) Public facilities identified in the City's Public Facility Plan, in Appendix 11 of the Comprehensive Plan, as amended, that are installed in significant wetlands, provided that the facilities are designed and constructed to minimize intrusion into the wetland; disturbed areas are replanted with native vegetation; and all required federal and state permits are obtained.

E. Agency Review: Decisions made by the City of Florence under this title do not supersede the authority of the state or federal agencies which may regulate or have an interest in the activity in question. It is the responsibility of the land-owner to ensure that any other necessary state or federal permits or clearances are obtained. In particular, state and federal mitigation requirements for impacts associated with approved water-related or water-dependent uses may still be required.

F. General Development Standards and Requirements: When development is proposed that is subject to these standards, the property owner is responsible for the following. Figure 1 below is a cross section illustrating terms used in the discussion of wetland and riparian setbacks as defined by Oregon Statewide Planning Goal 5.

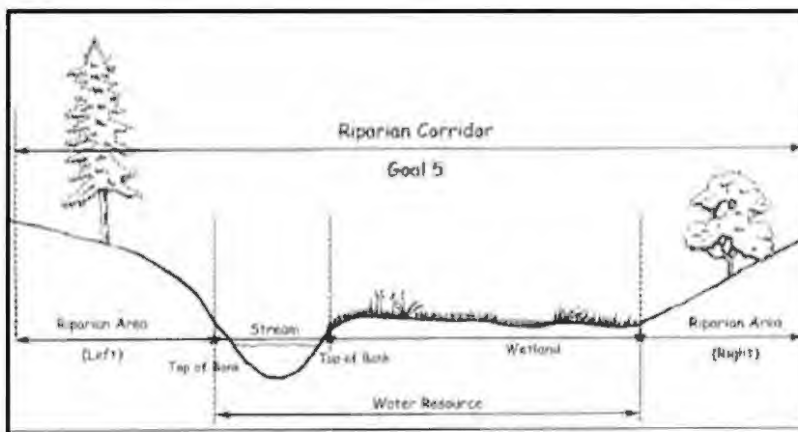


Figure 1: Downstream cross section illustrating terms used in Statewide Planning Goal 5. Source: *Urban Riparian Inventory and Assessment Guide*, Oregon Department of State Lands, 1998.

1. Determination of Significant Wetland and Riparian Area Boundaries.
 - a. For the purpose of showing the boundary of a significant wetland on a site plan, property owners may choose one of the following options:
 - 1) hire a Qualified Professional to do the delineation and have the delineation approved by the Oregon Department of State Lands (DSL); or
 - 2) hire a Qualified Professional to do the delineation but do not request DSL approval of the delineation. The Qualified Professional must have performed prior wetland delineations that were approved by DSL; or
 - 3) If the site plan shows the proposed development is outside the 50 foot Stormwater Buffer Zone, the wetland boundaries shown on the adopted Local Wetland Inventory (LWI) Map can be used to determine the wetland boundary for this purpose.
 - b. For significant riparian corridors, the width of the corridor boundary is the "significant riparian width" in Table 2.2 of the 2013 City of Florence Significant Wetlands and Riparian Corridor Plan in Comprehensive Appendix 5.
 - c. For significant riparian corridors, the boundaries of the riparian corridor will be measured and shown on an approved site plan. The City shall maintain maps of regulated riparian areas, and make them available to the public. These maps will be used to identify the extent of the riparian area unless the applicant can demonstrate through detailed inventory information (including maps, photos, and Lane County aerial photos showing the location and species of vegetation growing in the disputed area) that the city's maps are in error. For purposes of making these measurements, the following shall apply:
 - 1) Riparian buffer zones are measured horizontally from the top of bank. The top of the bank is the highest point at which the bank meets the grade of the surrounding topography, characterized by an abrupt or noticeable change from a steeper grade to a less steep grade, and, where natural conditions prevail, by a noticeable change from topography or vegetation primarily shaped by the presence and/or movement of the water to topography not primarily shaped by the presence of water. Where there is more than one such break in the grade, the uppermost shall be considered the top of bank.
 - 2) If the top of the bank is not identifiable, the riparian buffer zones are measured horizontally from the line of ordinary high water. In a given stream, the line of ordinary high water is the line on the bank or shore to which seasonal high water rises annually and identified in the field by physical characteristics that include one or more of the following:
 1. A clear, natural line impressed on the bank
 2. Changes in the characteristics of soils
 3. The presence of water-borne litter and debris

4. Destruction of terrestrial vegetation

If reliable water level data are available for 3 or more consecutive previous years, the line of ordinary high water can be considered the mean of the highest water level for all years for which data are available.

2. Preparation and submission of a site plan (vegetation clearing permits are also subject to the submission requirements in FCC Title 4 Chapter 6) that shows:
 - a. the wetland boundary or the top of bank of the riparian corridor,
 - b. the significant riparian corridor width or the wetland buffer zone,
 - c. the footprint of the proposed structure measured from the riparian corridor boundary or wetland buffer zone edges,
 - d. any requested setback adjustments as measured from the edge of the wetland or riparian corridor boundary,
 - e. the type and location of dominant existing native plants that would be displaced, and
 - f. the type of native plants to be planted and the location where they will be replanted.
3. It is prohibited to permanently alter a significant wetland by: the placement of structures or impervious surfaces; or by the removal of native vegetation; or by grading, excavation, placement of fill, or vegetation removal (other than perimeter mowing and other cutting necessary for hazard prevention), except as follows:
 - a) where full protection of the Significant Wetland renders a property unbuildable, as defined in the definitions in Title 10 Chapter 1 of this Code; or
 - b) public facilities identified in the City's Public Facility Plan, Appendix 11 of the Comprehensive Plan, as amended, may be installed in significant wetlands or riparian areas, provided that the facilities are designed and constructed to minimize intrusion into the wetland or riparian area; disturbed areas are replanted with native vegetation; and all required federal and state permits are obtained.

G. Stormwater Quality: As provided in FCC 9-5-5-3-F and the Code Definitions in FCC-10-1, significant wetlands over ½ acre and significant streams are "sensitive areas" that shall be protected by a buffer zone of native, undisturbed vegetation. The outer boundary of the buffer shall be determined by a minimum 50-foot setback from the edge of the significant wetland; for significant riparian areas, the buffer zone shall be the significant riparian width identified in the 2013 Inventory and 2013 City of Florence Significant Wetlands and Riparian Corridors Plan. The width and nature of protection required within the buffer may change as the Endangered Species Act and other state and federal regu-

lations are promulgated. The City requires that the buffer width meet all state and federal requirements.

No land disturbing activities, structures, development and construction activities, gardens, lawns, application of chemicals, pet wastes, dumping of any kind of materials shall be permitted within the buffer zone, except as noted below:

1. Roads, pedestrian, or bike paths crossing the buffer from one side to the other in order to provide access to or across the sensitive area.
2. A pedestrian or bike path constructed within a buffer and parallel to a sensitive area shall have the buffer widened by the width of the path if the path is constructed of impervious material.
3. Pedestrian or bike paths shall not exceed 10-feet in width.
4. Utility/service infrastructure construction (i.e., storm, sanitary sewer, water, phone, gas, cable, etc.) If approved by the City Manager or his/her designee.
5. Measures to remove or abate hazards, nuisance, or fire and life safety violations as approved by the City.
6. Enhancement of the riparian corridor for water quality or quantity benefits, fish, or wildlife habitat as approved by the City and other appropriate regulatory authorities.
7. Water quality facilities planted with appropriate native vegetation may encroach into the buffer area as approved by the City and other appropriate authorities.

H. Additional Statewide Planning Goal 5 exceptions: The following exceptions are in addition to the exceptions in G, above. Consistent with Statewide Planning Goal 5 [OAR 660-023-0090 (8) (a)], the permanent alteration of significant riparian areas by grading or the placement of structures or impervious surfaces is prohibited, except for the following uses, provided they are designed and constructed to minimize intrusion into the riparian area:

1. Water-related and water-dependent uses and removal of vegetation necessary for the development of water-related or water-dependent uses;
2. Replacement of existing structures with structures in the same location that do not disturb additional riparian surface area; and
3. Removal of non-native vegetation and replacement with native plant species.

I. Removal of native vegetation: In accordance with Goal 5, removal of vegetation from a significant riparian corridor is prohibited, except as otherwise provided in these Wetland and Riparian Standards and in FCC 4-6-3 and for the following:

1. Removal of non-native vegetation and replacement with native plant species. The replacement vegetation shall cover, at a minimum, the area from which vegetation was removed, shall maintain or exceed the density of the

- removed vegetation, and shall maintain or improve the shade provided by the vegetation.
2. Removal of vegetation necessary for the development of approved water-related or water-dependent uses or for the continued maintenance of dikes, drainage ditches, or other stormwater or flood control facilities. Vegetation removal shall be kept to the minimum necessary.
 3. Trees in danger of falling and thereby posing a hazard to life or property may be removed, following consultation and approval from the Planning Director. If no hazard will be created, the Planning Department may require these trees, once felled, to be left in place in the Significant Wetland or Riparian Area.
 4. The control or removal of nuisance plants should primarily be by mechanical means (e.g. hand-pulling). If mechanical means fail to adequately control nuisance plant populations, a federally approved herbicide technology for use in or near open water is the only type of herbicide that can be used in a Significant Riparian Corridor. Pre-emergent herbicides or auxin herbicides that pose a risk of contaminating water shall not be used. Herbicide applications are preferred to be made early in the morning or during windless periods at least 4 hours before probable rainfall. Any herbicide use must follow the label restrictions, especially the cautions against use in or near open water.

J. Special provisions for the Munsel Creek Side Channel: The following special provisions apply to properties in the significant riparian corridor of the Munsel Creek side channel (Reach RMC-Cs in Table 2.2 of the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan). These provisions are in addition to, or provide relief from, the other standards in this subsection, and, where conflicts exist, this section shall prevail.

1. In addition to the other setback adjustments and Variances allowed by this subsection, a 50% setback adjustment to the required 50-foot significant riparian width for properties along the Munsel Creek side channel will be permitted in order to allow new or expanded development to build up to 25 feet from the top of bank of the creek, as long as any native plants disturbed by the development are replaced elsewhere in the buffer zone, subject to the following exceptions and procedures:
 - a. Properties in Florentine Estates PUD that were granted a reduced setback by the Planning Commission prior to the (inset date of this ordinance) are deemed to comply with the standards in this subsection and do not need to apply for this setback adjustment.
 - b. The setback adjustment for other affected properties shall be granted through the Administrative Review process in 10-1-1-6.
 - c. The applicant shall be granted the setback reduction upon demonstration that any native vegetation displaced by the development shall be replanted in the remaining buffer zone (shrub for shrub, tree for tree, etc.).

- d. The applicant is not required to retain a professional for this application but a qualified professional may help a property owner identify displaced native plants and show how they will be replanted. To provide technical assistance, the City will provide the applicant with a native plant guide. Staff from the Siuslaw Watershed Council and Soil and Water Conservation District are available to provide property owners with technical assistance with native plant identification and guidance on replanting.

K. Setback Adjustments: The following reductions in setbacks shall be allowed for properties affected by the significant wetland and riparian area standards as set out below.

1. Eligibility for setback adjustment. Property owners affected by these significant wetland and riparian corridor standards shall be eligible for setback adjustments as follows:
 - a. Single family dwellings: when the significant wetland or significant riparian corridor standard or requirement is such that no contiguous space exists outside the setback that allows for a dwelling unit at least 50 feet by 27 feet.
 - b. For the Munsel Creek side channel: the "required setback" for the purpose of eligibility for the setback adjustment is the reduced setback allowed in subsection "J" above.
2. If the required setback or standard for the significant wetland or riparian corridor is such that no contiguous space exists outside the setback that allows for a dwelling unit at least 50 feet by 27 feet, then a primary dwelling, this size or less, shall be permitted to intrude into the setback area in accordance with the standards of this subsection. Any Code requirements of the applicable zoning district (such as required garages) that would necessitate intrusion into additional riparian area shall not apply.
3. If the proposed primary dwelling will be more than 20 feet from a significant or wetland or stream, the adjustment application shall use the Administrative Review process in FCC 10-1-1-6.
4. If a proposed primary dwelling will be built within 20 feet of a significant wetland or stream, a Hardship Variance from the Planning Commission shall be required in accordance with Florence City Code Title 10 Chapter 4.

L. Hardship Variances: A variance to the provisions of this subsection shall be granted by the Planning Commission in accordance with the procedures in Florence City Code Title 10 Chapter 4 only as a last resort and is only considered necessary to allow reasonable economic use of the subject property. The property must be owned by the applicant and not created after the effective date of this title.

1. Eligibility. An application for a hardship variance from the provisions of this subsection shall be available upon demonstration of the following conditions:

- a. Siting of a primary dwelling 50 feet by 27 feet or less requires intrusion into the significant wetland buffer zone or significant riparian corridor within 20 feet of a significant wetland or stream; or
 - b. Strict adherence to the applicable standards or requirements of this subsection would effectively preclude a use of the parcel that could be reasonably expected to occur in the zone and that the property owner would be precluded a substantial property right enjoyed by the majority of landowners in the vicinity.
 - c. Due to unique circumstances and historic development patterns outside the control of the property owners, the Variance fee for this application shall be waived for affected Coast Village properties.
2. The following additional standards shall apply:
- a. Demonstration that the intrusion into the setback must be the minimum necessary;
 - b. Demonstration that any native vegetation displaced by the development will be replanted in the remaining significant wetland buffer zone or riparian corridor. The applicant is not required to retain a professional for this application but a qualified professional may help a property owner identify displaced native plants and show how they will be replanted. To provide technical assistance, the City will provide the applicant with a native plant guide; staff from the Siuslaw Watershed Council and Soil and Water Conservation Service are available to provide property owners with technical assistance with native plant identification and guidance on replanting.
 - c. Permanent alteration of the Significant Wetland or Riparian Area by an action requiring a variance is subject any mitigation requirements imposed by federal and state permitting authorities.
 - d. In granting a Variance, the Planning Commission shall impose conditions of approval that address all of the following criteria:
 - 1) The site plan and application shall document the location of the impact, the existing conditions of the resource prior to the impact, a detailed planting plan for the approved setback area with dominant native plant species and density, and a narrative describing how the impacted resource will be replaced and approved setback area restored.
 - 2) Invasive vegetation shall be removed from, and native vegetation planted in, the approved setback area, with a minimum replacement ratio of 1:1 for the impacted area.
 - 3) Herbicides and pesticides not approved for use in buffer zones or riparian areas is prohibited in the approved setback area.
 - 4) All vegetation planted within the approved setback area shall be native to the region. In general, species to be planted shall replace those impacted by the development activity, i.e., trees must replace trees, brush must replace brush, and, within reason, like plants must replace like plants (i.e., dominant plant species).

- 5) Trees shall be planted at a density not less than the density in place prior to development.
- 6) The property owners will work with available federal, state, and local agencies, such as the Siuslaw Watershed Council, the Siuslaw Soil and Water Conservation District, ODFW, DSL, STEP to implement practices and programs to restore and protect the riparian area.

M. Significant wetland and riparian corridor enhancement incentives:

1. Enhancement of Significant Wetland Buffer Zones or Riparian Corridors is encouraged, including: riparian or in-channel habitat improvements, non-native plant control, and similar projects which propose to improve or maintain the quality of a Significant Wetland or Riparian Area; however, no enhancement activity requiring the excavation or filling of material in a wetland or jurisdictional stream shall be allowed unless all applicable State and Federal permits have been granted.
2. Incentives shall be provided to improve the continuity of Significant Riparian Corridors in situations where lots would be rendered unbuildable by the setback, as defined in the Definitions in FCC Title 10 Chapter 1. Such incentives may include: reducing the required front yard setback, alternative access, vacating right-of-way, property line adjustments, re-orientation of lots, transfer of development rights (if feasible), and density bonuses, among others. The resulting development will conform, to the maximum extent practical, to the general development patterns in the vicinity of the affected lot.
3. These incentives may also be provided to properties that are severely impacted by the setback when doing so will result in enhancement of the significant wetland, wetland buffer zone, or significant riparian corridor.

L. Inventory map corrections: The Planning Director may correct the location of a wetland or riparian boundary shown on the Local Wetland and Riparian Areas Inventory Maps when it has been demonstrated by a property owner or applicant that a mapping error has occurred and the error has been verified by DSL. Wetland delineations verified by DSL shall be used to automatically update and replace the City's Local Wetland Inventory mapping. No variance application shall be required for map corrections where approved delineations are provided.

b. Consistency Amendments: Amend FCC Title 9 Chapter 5 stormwater management definitions and buffer zone provisions; Title 10 Chapter 1 Definitions, and Title 10 Chapter 19, Prime Wildlife District; and Title 4 Chapter 6 Vegetation Clearing Permit requirements, for internal Code consistency.

The following Code amendments are proposed for consistency with the proposed Comprehensive Plan and Code amendments or are otherwise for consistency with state law. Unless noted otherwise, deletions are in strike out and additions in double underline.

FCC TITLE 9, CHAPTER 5

STORMWATER MANAGEMENT UTILITY, USER FEE SYSTEM AND STORMWATER MANAGEMENT REQUIREMENTS

9-5-1-2: DEFINITIONS

SENSITIVE AREAS Significant wetlands greater than ½ acre and significant streams identified in the 2013 Florence Area Local Wetlands and Riparian Inventory, as amended. Natural streams (perennial or intermittent), rivers, including the estuary, and lakes, or wetlands hydraulically connected by surface water to streams, rivers, or lakes and areas defined by the City of Florence's Local Wetlands and Riparian Inventory. Also, includes all areas that are protected for species as per areas designated by Oregon Department of Fish and Wildlife, Oregon ~~Division~~Department of State Lands, National Marine Fisheries Service, United States Fish and Wildlife Service and Oregon Department of Transportation.

9-5-3-3: STORM WATER QUALITY

F. Sensitive areas shall be protected by a buffer zone of native, undisturbed vegetation. The outer boundary of the buffer shall be determined by a minimum 50-foot setback from the edge of the sensitive area, or as wider if required by other City Code provisions requirements. (See additional standards and requirements for significant wetlands and significant riparian corridors in Florence City Code Title 10, Chapter 7; and for the Estuary, Coastal Shorelands, and Beaches and Dunes in Title 10 Chapter 19.) The width and nature of protection required within the buffer may change as the Endangered Species Act and other state and federal regulations are promulgated. The City requires that the buffer width meet all state and federal requirements. No land disturbing activities, structures, development and construction activities, gardens, lawns, application of chemicals, pet wastes, dumping of any kind of materials shall be permitted within the buffer zone, except as noted below:

1. Roads, pedestrian, or bike paths crossing the buffer from one side to the other in order to provide access to or across the sensitive area.
2. A pedestrian or bike path constructed within a buffer and parallel to a sensitive area shall have the buffer widened by the width of the path if the path is constructed of impervious material.
3. Pedestrian or bike paths shall not exceed 10-feet in width.
4. Utility/service infrastructure construction (i.e., storm, sanitary sewer, water, phone, gas, cable, etc.) If approved by the City Manager or his/her designee.
5. Measures to remove or abate hazards, nuisance, or fire and life safety violations as approved by the City.

6. Enhancement of the riparian corridor for water quality or quantity benefits, fish, or wildlife habitat as approved by the City and other appropriate regulatory authorities.
7. Water quality facilities planted with appropriate native vegetation may encroach into the buffer area as approved by the City and other appropriate authorities.

FCC Title 10, Chapter 1: Zoning Administration

FCC 10-1-4: DEFINITIONS

Insert the following definitions in alphabetical order into FCC 10-1-4. Where an existing definition is proposed to be modified, additions are shown in double underline and deletions in strike-out.

BANKFULL STAGE	Means the elevation at which water overflows the natural banks of the stream.
BIOENGINEERING	Means a method of erosion control and landscape restoration using live plants, such as willows.
BUFFER ZONE	A physical setback from a sensitive area used to protect the <u>flood storage capacity</u> , water quality, the aquatic and riparian wildlife communities, and the habitat value within the sensitive area. The start of the buffer starts at the edge of the defined channel (bank full stage) for streams/rivers, delineated wetland boundary, delineated spring boundary, or average high water for lakes.
BUILDING	Any temporary or permanent structure constructed and maintained for the support, shelter, or enclosure of people, motor vehicles, animals, chattels or personal or real property of any kind. The words "building" and "structure" shall be synonymous.
DELINEATION	Means a wetland delineation report that contains the methods, data, conclusions and maps used to determine if wetlands and/or other waters of the state are present on a land parcel and, if so, describes and maps their location and geographic extent. A wetland determination report documenting wetland presence or absence is included within this definition.
ENHANCEMENT	An action which results in a long-term improvement of existing functional characteristics and processes that is not the result of a creation or restoration action. <u>Enhancement is a modification of a wetland or riparian area to improve its condition. Enhancement is</u>

	<u>conducted only on degraded features, results in a net gain in functions and values, and does not replace or diminish existing functions and values with different ones unless justified as ecologically preferable.</u>
EXCAVATION	Means removal of organic or inorganic material (e.g. soil, sand, sediment, muck) by human action.
IMPERVIOUS SURFACE	Means any material (e.g. rooftops, asphalt, concrete) which reduces or prevents absorption of water into soil.
INVASIVE VEGETATION	Includes plants that appear on the current Oregon Department of Agriculture Noxious Weed List, plus known problem species including <i>Phalaris arundinacea</i> , <i>Holcus lanatus</i> , and <i>Anthoxanthum odoratum</i> . In addition, any non-native plant species may be considered invasive if it comprises more than 15% of the total plant cover and appears to be increasing in cover or frequency over time.
LAWN	Means grass or similar materials usually maintained as a ground cover of less than 6 inches in height. For purposes of this title, lawn is not considered native vegetation regardless of the species used.
MITIGATION	The creation, restoration, or enhancement of an estuarine area to maintain the functional characteristics and processes of the estuary, such as its natural biological productivity, habitats, and species diversity, unique features and water quality. <u>For wetlands and riparian areas, "mitigation" is a means of compensating for impacts to a Wetland or and Riparian Area or its buffer including: restoration, creation, or enhancement. Some examples of mitigation actions are construction of new wetlands to replace an existing wetland that has been filled, replanting trees, removal of nuisance plants, and restoring streamside vegetation where it is disturbed.</u>
NATIVE VEGETATION	Means plants identified as naturally occurring and historically found within the City of Florence.
QUALIFIED PROFESSIONAL	Means an individual who has proven expertise and vocational experience in a given natural resource field. A qualified professional conducting a wetland delineation must have had a delineation approved by the Oregon Department of State Lands.
REVIEW AUTHORITY	Means the City of Florence.
RIPARIAN AREA	Means the area adjacent to a river, lake, or stream, consisting of the area of transition from an aquatic ecosystem to a terrestrial ecosystem. For purposes of this title, riparian areas are identified on the Significant

RIPARIAN CORRIDOR	Wetlands and Riparian Areas Map in the Comprehensive Plan. Means a Goal 5 Resource that includes the water areas, adjacent riparian areas, and wetlands within the riparian area boundary. For purposes of this title, riparian corridors are identified on the Significant Wetlands and Riparian Areas Map in the Comprehensive Plan.
SENSITIVE AREA	<u>Significant wetlands greater than ½ acre and significant streams identified in the 2013 Florence Area Local Wetlands and Riparian Inventory, as amended.</u> Natural streams (perennial or intermittent), rivers, including the estuary, and lakes, or wetlands hydraulically connected by surface water to streams, rivers, or lakes and areas defined by the City of Florence's Local Wetlands and Riparian Inventory. Also, includes all areas that are protected for species as per areas designated by Oregon Department of Fish and Wildlife, Oregon Division Department of State Lands, National Marine Fisheries Service, United States Fish and Wildlife Service and Oregon Department of Transportation.
SHRUBS	Consists of woody plants less than 3 inches in diameter at breast height, regardless of height.
SIGNIFICANT WETLANDS AND RIPARIAN AREAS	Wetlands and riparian corridors identified as significant by the 2013 Florence Area Local Wetlands and Riparian Inventory and the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan, as amended, and designated significant by the local government.
SIGNIFICANT WETLAND BUFFER ZONE	The 50 foot buffer zone required by the stormwater management requirements of FCC 9-5-3-3-F, measured on accordance with the boundary determinations in FCC 10-7 standards and requirements for wetlands and riparian corridors.
STATE AND FEDERAL NATURAL RESOURCE AGENCY	The Oregon Department of State Lands, Oregon Department of Fish and Wildlife, U.S. Army Corps of Engineers, U.S. Department of Agriculture Natural Resources Conservation Service, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, and Department of Environmental Quality.
STREAM	A channel such as a river or creek that carries flowing surface water, including perennial streams and inter-

mittent streams with defined channels, and excluding man-made irrigation and drainage channels. A perennial stream is one that flows continuously. An intermittent or seasonal stream is one that flows only at certain times of the year.²

STRUCTURE	<p>See "Building." For the purposes of administering Code Chapters 7, 18, 19, and 24, the definition shall also mean Anything constructed, installed, or portable, and the use of which requires a location on <u>a parcel of land or on the ground</u>, either above or below water.</p>
SUBSTANTIAL IMPROVEMENT	<p>Any repair, reconstruction, or improvement of a structure, the cost of which equals or exceed 50 percent of the market value of the structure either:</p> <ul style="list-style-type: none">(a) Before the improvement or repair is started, or(b) If the structure has been damaged and is being restored, before the damage occurred. For the purposes of this definition "substantial improvement" is considered to occur when the first alteration of any wall, ceiling, floor, or other structural part of the building commences, whether or not that alteration affects the external dimensions of the structure. The term does not, however, include either:<ul style="list-style-type: none">(1) Any project for improvement of a structure to comply with existing state or local health, sanitary, or safety code specifications which are solely necessary to assure safe living conditions, or(2) Any alteration of a structure listed on the National Register of Historic Places or a State Inventory of Historic Places.
TREE	<p>Consists of woody plants 3 inches or more in diameter at breast height, regardless of height.</p>
TOP OF BANK	<p>Refers to the location where the rising ground bordering a stream intersects the side of the stream channel. The stream channel is typically non-vegetated, and the top of bank normally corresponds with the bankfull stage. In the absence of physical evidence, the two-year recurrence interval flood elevation may be used to delineate the top of bank.</p>
UNBUILDABLE.	<p>Lots that are rendered "unbuildable" by the required setback for significant wetlands and riparian areas.</p> <ul style="list-style-type: none">a) For single family housing, lots are considered unbuildable if the required setback for the significant wetland or riparian area is such that no contiguous space exists outside

² Department of State Lands (DSL) and U.S. Geological Survey (USGS) definitions.

the setback that allows for a dwelling unit at least 50 feet by 27 feet.³

- b) For all properties, lots are deemed unbuildable if strict adherence to the applicable setback standards and conditions would effectively preclude a use of the parcel that could be reasonably expected to occur in the zone and that the property owner would be precluded a substantial property right enjoyed by the majority of landowners in the vicinity.
- c) For the Munsel Creek side channel (Reach RMC-Cs in the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan in Appendix 5 of the Comprehensive Plan), the "required setback" for the purpose of the unbuildable definition, is the reduced setback allowed in FCC Title 10 Chapter 7.

WETLANDS

~~Land areas where water is the dominant factor determining the nature of soil development and the types of plant and animal communities living at the soil surface. Wetland soils retain sufficient moisture to support aquatic or semi-aquatic plant life. In marine and estuarine areas, wetlands are bounded at the lower extreme by extreme low water; in freshwater areas, by a depth of six feet. The areas below wetlands are submerged lands. Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Based on the above definition, three major factors characterize a wetland: hydrology, soils, and plants.~~

WETLAND BOUNDARY

The edges of a wetland as delineated by a qualified professional or as determined through the standards in FCC Title 10 Chapter 7.

FCC 10-19-9: PRIME WILDLIFE OVERLAY DISTRICT /PW

Note: The following Code amendments make the Code consistent with the proposed Comprehensive Plan and Code amendments as well as Statewide Planning Goal 2 (Land Use) and Goal 17 (Coastal Shorelands).

³ Note: A 50 foot by 27 foot area allows the siting of a typical double-wide manufactured home, a form of affordable housing.

A. Purpose and Application:

Purpose: The purpose of the /PW District is to protect areas in and adjacent to the North Jetty Lake and the South Heceta Junction Seasonal Lakes that have native vegetation and habitats of specific species of concern and to protect wildlife habitat, water quality, bank stability and provide flood control. The requirements imposed by the /PW District shall be in addition to those imposed by the base zoning district. Where the requirements of the /PW District conflict with the requirements of the base zoning district or the Comprehensive Plan, the more restrictive requirements shall apply.

Application: The Prime Wildlife Overlay District (/PW) is applied within the Florence city limits to Coastal Lake Shorelands identified in inventory information and designated in the Comprehensive Plan as possessing areas of unique biological assemblages, habitats of rare or endangered species, or a diversity of wildlife species. The /PW Overlay applies to the North Jetty Lake Shorelands as shown on the Florence Coastal Overlay Zoning Map. The extent of the /PW Overlay application for the South Heceta Junction Seasonal Lakes shall be determined through a Preliminary Investigation as specified below.

Preliminary Investigation: Any land use or building permit application within the /PW District as it applies to the South Heceta Junction Seasonal Lakes shall require a preliminary investigation by the Planning Director to determine the specific area to which the requirements of the district shall apply. The requirements of the district shall apply in an area generally identified on the Florence Coastal Overlay Zoning Map and the 2013 Local Wetland Inventory, as amended, and, specifically, in the site-specific information submitted by an applicant to determine whether the site possesses areas of unique biological assemblages, habitats of rare or endangered species, or a diversity of wildlife species ~~identified in the Coastal Resources Inventory,~~ or function to provide or affect water quality, bank stability or flood control, as identified in the Lane County Coastal Resources Inventory or the wetland functions and values in the 2013 Florence Area Local Wetlands and Riparian Inventory, as amended.

FCC 4-6-3: VEGETATION CLEARING PERMIT REQUIRED:

A. A vegetation clearing permit shall be required in any of the following circumstances:...

1. Clearing native vegetation from... areas which have been designated by the City as a significant riparian corridor, significant wetland buffer zone, greenbelt, or view corridor.

FCC 4-6-4: PROCEDURE FOR OBTAINING A VEGETATION CLEARING PERMIT:

- A. ~~A~~ No vegetation clearing permit application is required will be accepted unless the application also includes a concurrent application for a building permit or Conditional Use Permit, except that the criteria in FCC 4-6-4 C shall also apply to any removal of native vegetation from a significant riparian or wetland buffer zone requested as part of a setback adjustment granted under FCC 10-7-4..
- B. All requests for a Vegetation Clearing Permit shall be submitted to the ~~Community Development~~ Planning Department on a form available from that department, and containing the following minimum information: (See FCC 10-7-4 for additional submission requirements for areas within significant wetland or riparian buffer zones):...
- C. The ~~Planning~~ Community Development Department shall process the Vegetation Removal Permit application through the Administrative Review procedures in FCC Title 10 Chapter 1 and forward a report to the Design Review Board within thirty (30) days of filing a complete application. Review and approval ~~by the Design Review Board~~ shall be based on the following criteria, as applicable to the request:
 1. The necessity to remove native vegetation in order to construct proposed improvements or otherwise utilize the property in a reasonable manner consistent with the City Code and policies;
 2. The environmental and physical impacts such clearing may have, including visual drainage, wind erosion, protection of adjoining property and structures, and impacts on significant riparian corridors or wetland buffer zones, and impacts on any affected significant wetland or riparian buffer zones shall be supported by a qualified professional or through consultation with staff from the Soil and Water Conservation District, Siuslaw Watershed Council, ODFW, OSU, or another person or agency with knowledge or experience with the affected resource;
 3. The adequacy of the applicant's proposed landscaping or revegetation plan, including plant selection, staking, irrigation, and other maintenance provisions.

3. Housekeeping Amendment: Adopt an amendment to FCC Title 10 Chapter 19 to make the Code consistent with Statewide Planning Goal 16. See discussion, below, for rationale.

FCC 10-19-4: DEVELOPMENT ESTUARY DISTRICT (DE):

- F. Conditional Uses: Outside of Areas Managed for Water Dependent Activities, the following uses and activities are allowed in the estuary with a Conditional Use Permit, subject to the applicable criteria....
10. Water-related uses, non-water-dependent uses, and non-water-related uses, provided no dredge or fill is involved, ~~and it is not possible to locate the use on an upland site.~~ In approving these uses, the City shall consider the poten-

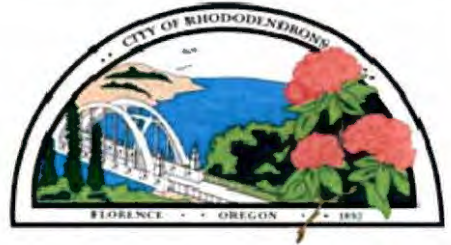
tial for using upland sites to reduce or limit the commitment of the estuarine surface area for surface uses. Nonwater-dependent and non-water-related uses that existed as of July 7, 2009 will retain their non-conforming status for five years from the date the use is abandoned or the structure is destroyed; and the existing structure for the same use may be replaced; the provisions of non-conforming uses in the Florence City Code not withstanding.

Discussion:

The amendment is consistent with the direction in Goal 16:

“Oregon’s Statewide Planning Goals & Guidelines, GOAL 16: ESTUARINE RESOURCES, OAR 660-015-0010(1) Management Units As a minimum, the following kinds of management units shall be established:... 3. Development: ... As appropriate the following uses shall also be permissible in development management units: ... Where consistent with the purposes of this management unit and adjacent shorelands designated especially suited for water-dependent uses or designated for waterfront redevelopment, water-related and nondependent, nonrelated uses not requiring dredge or fill; mining and mineral extraction; and activities identified in (1) and (2) above shall also be appropriate. In designating areas for these uses, local governments shall consider the potential for using upland sites to reduce or limit the commitment of the estuarine surface area for surface uses.”

Siuslaw Estuary Partnership
*An Integrated Multiple Objective Approach To
Watershed Protection and Restoration*



**Aquifer Protection Plan
For the North Florence Sole Source Dunal Aquifer**



April 15, 2013

Insert Ordinance numbers and dates from Florence City Council and Lane County Board, when adopted.

Insert certification letter from Oregon Department of Environmental Quality,
when provided.

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**Note: Portions of these sections of the plan apply aquifer-wide and are not intended for certification of a Source Water Protection Plan under OAR 340-040-0170.*

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E	Other Source Water Assessments: Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians, June 2007; and Heceta Water District, September 11, 2001
F	EPA-Approved Quality Assurance Project Plan
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Acknowledgements

The City of Florence gratefully acknowledges the following City staff and consultants, Stakeholders, and Aquifer Protection Plan Technical Advisory Committee for their contributions to this Aquifer Protection Plan.

City of Florence

Jacque Betz, City Manager
Mike Miller, Florence Public Works Director, Project Manager
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Kelli Weese, GIS Technician, City Recorder, Interim Planning Director
Michelle Pezley, Florence Assistant Planner

Stakeholders

Community Stakeholder Group

Audubon Society and Local Birdwatcher Group: Adele Dawson
Central Oregon Coast Board of Realtors: Rob Shepherd
Florence Chamber of Commerce: Lisa Walter-Sedlacek
Fisheries, Steelheader Group: David Hunnington
Florence Area Hospitality Association: Tiffany Rogato
Florence Planning Commissioners: Mark Tilton
Lane County Planning Commission: Nancy Nichols
Oregon Shores Conservation Coalition: Anne Caples and Sue Noble
Scuba Club/Divers: Clarence Lysdale
STEP (Salmon Trout Enhancement Program): Bill Hennig
Surfrider Foundation: Gus Gates
Volkswalkers: Jean White
Ocean Dunes Golf Links: Randy Curtola
Coast Village: Mary McGann
Sand Ranch: Deacon Mathews
Florentine Estates: Nola Xavier and Del Phelps
Koning and Cooper (business owners): Art Koning and Gary Cooper
Recycling and Solid Waste: Dave Twombly

Elected Official Stakeholder Group

Siuslaw Watershed Council Leadership Board: Jim Grano, Chair
Florence City Council: Phil Brubaker, Mayor; Sue Roberts, Councilor
Lane County Board of Commissioners: Jay Bozievich, Commissioner
Heceta Water District Board: Jerry Nordin, Board Member
Port of Siuslaw Board: Joshua Green, Board Member
Tribal Council of the Confederated Tribes of the Coos, Lower Umpqua, and
Siuslaw Indians: Bob Garcia, Tribal Chairman
Siuslaw Soil and Water Conservation District Board: Fuzzy Gates, Board Member

Aquifer Protection Plan Technical Advisory Committee

- Jacqueline Fern, David Waltz, Mike Kucinski, Randy Trox, Oregon Department of Environmental Quality (DEQ)
- Tom Pattee, Sean Stevenson, Oregon Health Authority, Drinking Water Program
- Dan Hurley and Kier Miller, Lane County
- Jason Kirchner, John Spangler, Bob Buckman, Oregon Department of Fish and Wildlife
- Dave Perry, Amanda Punton, Oregon Department of Land Conservation and Development
- Bart Bretherton, Oregon Department of Transportation
- Michael Mattick, Oregon Department of Water Resources
- Seth Mead, Siuslaw Soil and Water Conservation District
- Liz Vollmer-Buhl, Siuslaw Watershed Council
- Howard Crombie, Natural Resources Program Director, Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians
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Executive Summary

This Aquifer Protection Plan for the North Florence Sole Source Dunal Aquifer was prepared through the work of the Siuslaw Estuary Partnership, a collaborative effort by the City of Florence and its federal, state, local, and tribal partners to protect and improve water quality and fish and wildlife habitat in the lower Siuslaw River Watershed. As such, the plan incorporates the Partnership's Guiding Principles, endorsed by the City and its partners. Portions of this plan also serve as the Source Water Protection Plan for the City in accordance with the Oregon Department of Environmental Quality's (DEQ) administrative rules for groundwater quality protection.

This project was managed by the City's Public Works Director. The plan was developed over the course of three years by the City of Florence's Planning Consultant, together with the City's consulting Hydro-geologists, and the Interdisciplinary Team, particularly staff from the Oregon Department of Environmental Quality and the Oregon Health Authority. The plan benefitted from the input of two Stakeholder Groups: the Community Stakeholders and the Elected Official Stakeholders; and it was presented for public review and comment as part of an extensive public outreach program.

Purpose and Scope

The purpose of this Aquifer Protection Plan is to protect water quality within the City of Florence's urban growth boundary (UGB) in the North Florence Dunal Aquifer, the sole source of drinking water for the Florence community. The scope of this plan is aquifer-wide for three key reasons:

1. The aquifer, designated "sole source" by the US Environmental Protection Agency (EPA) in 1987, is the only source of drinking water available in this area.
2. Surface waters and groundwater are highly interconnected in the aquifer; they flow primarily to the Siuslaw Estuary; and the estuary, with its surrounding watershed, provides significant habitat to many threatened and endangered species.
3. The health of the natural environment is key to Florence's economic vitality. As good stewards of these resources, the City of Florence and its partners have determined that this plan should have an aquifer-wide focus.

Source Water and Drinking Water Protection Areas (DWPAs) (Chapter 2)

- Florence's drinking water is supplied by a single wellfield comprising 12 City-owned and operated wells, with one additional well to come on line in the near future. The City's municipal wellfield is located on 80 acres adjacent to the Ocean Dunes golf course on the eastern edge of Florence bordered by Willow Ridge Court to the south and 35th Street to the north. The wells produce water year round and serve as the City's sole water supply source.
- The City has four above-ground reservoirs: an elevated 250,000-gallon tank near the City shop (currently offline and not in use); a 500,000-gallon steel tank on the east hills; and two 2,000,000-gallon tanks near the Sand Pines Golf Course. Water diverted under all of the City's groundwater rights is treated at the City's water treatment plant. Currently, the plant has a capacity of 4.6 cubic feet per second (cfs) or 3 million gallons per day (mgd). This capacity is 1.24 cfs (0.8 mgd) less than the full

value of the City's existing groundwater rights. The City's distribution system consists of four pressure zones served by three water storage reservoirs and three booster pumping stations.

- Currently, the existing City wells do not have the capacity to produce the full amount of water authorized by the City's water rights. Furthermore, the City's population and demand for water are increasing and are projected to exceed the existing water supply within the 20-year planning period (2030) for the City's Water Management and Conservation Plan (WMCP). For these reasons, this plan contains a new well site analysis for a proposed wellfield to provide for water supply redundancy and expand water supply. The additional wellfield site is located northwest of the existing wellfield. It is likely that new water rights would be required for the additional wellfield.
- The Drinking Water Protection Areas (DWPAs) or "capture zones" for the existing and proposed wellfields, shown in Figures ES 1 and ES 2, outline the land surface that overlies that part of the aquifer that supplies groundwater to the well over a given time period. The DWPAs in this plan show the capture zones for the 1, 2, 5, 10, 20, and 30 year Time of Travel Zones (TOT). The TOT represents the length of time it takes for a molecule of water entering the groundwater at a specific location to reach the City's wells.
- The Oregon Health Authority (OHA) has certified the DWPAs delineation for the existing wellfield (see Appendix D). This certification assures that the delineations meet minimum requirements for the system size as outlined in OHA Oregon Administrative Rule (OAR) 333-61-0057 and that the delineation is a hydro-geologically reasonable representation of the capture zone of the well, wellfield, or spring.
- The delineation of capture zones for the proposed wellfield was not certified by OHA because the wells do not yet exist. OHA did approve the use of the delineation for the proposed wellfield for protection of possible future drinking water resources (Appendix D).
- In general, the closer a contaminant source is to a well, the greater the risk of contamination, although some contaminants, namely dense non-aqueous phase liquids, or DNAPLs, are a threat to the water supply regardless of distance traveled to the well. This is because DNAPLs, such as chlorinated solvents, are liquids that are both denser than water and do not dissolve in water. DNAPLs are extremely expensive and difficult to remediate.http://en.wikipedia.org/wiki/Dense_non-aqueous_phase_liquid - cite note 0#cite_note-0
- This Plan also contains information about the Source Water Assessments conducted for Heceta Water District and the Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians (see Appendices E-1 and E-2).

Water Monitoring Program and Potential Contaminant Sources (Chapter 3)

Surface and Groundwater Monitoring Program

- The Siuslaw Estuary Partnership includes a Surface- and Groundwater Monitoring Program to protect the North Florence Sole Source Dunal Aquifer and to protect and improve water quality in Munsel and Ackerley Creeks and the Siuslaw River.

- The Siuslaw River has been classified as Water Quality Limited under the Clean Water Act and on the state's 303(d) list of Impaired Water Bodies.
- Sixteen groundwater "test wells" are installed throughout the aquifer to monitor levels and quality; and stream gages, sondes, and grab sampling are used in Munsel and Ackerley Creeks to monitor stream flow and water quality. The Surface and Groundwater Monitoring Program is operating under an EPA-approved Quality Assurance Project Plan (QAPP) (Appendix F).
- Data on water levels, fluctuation, and flow collected and analyzed through the City's Surface and Groundwater Monitoring Program were used in the Groundwater Flow Model and all monitoring results have been reported in quarterly and annual reports prepared by GSI Water Solutions, Inc., the hydro-geologists retained as consultants to the Partnership. These reports are included in Appendix A of this plan along with reports from the Oregon Beach Monitoring Program.

Potential Contaminant Source (PCS) Inventories

- Potential Contaminant Source Inventories were developed for both existing and future land use for both the existing wellfield and the proposed wellfield.
- The inventory is a very valuable tool for the local community in that it:
 - Provides information on the locations of PCSs, especially those that present the greatest risks to the water supply,
 - Provides an effective means of educating the local public about potential problems, and
 - Provides a reliable basis for developing a local management plan to reduce the risks to the water supply.
- Chapter 4 of this plan contains management goals and strategies to address potential contaminant source inventories, as summarized in the section below, Management Goals and Strategies.

Management Goals and Strategies (Chapter 4)

Chapter 4 of this plan contains management goals and strategies for the following three areas:

1. Aquifer-wide
2. Existing Wellfield
3. Proposed Wellfield

Management strategies for the existing and proposed wellfield are tied to the Potential Contaminant Source Inventories for existing and planned land uses. The Goals and Strategies are presented in Tables 4.1, 4.2, and 4.3 for the three categories and the priorities shown reflect the following:

- H (High): Begin to implement immediately or continue to implement, if already being done
- M (Medium): Begin to implement in next two fiscal years

L (Low): Implement as time and financial resources are available

The priorities and implementing groups and their roles were determined through the team and stakeholder processes. For all strategies, the City will take the lead role in implementation, unless noted otherwise.

Management goals are broad vision statements describing desired conditions or activities for the future. They provide direction for the development of management strategies. The management strategies more specifically describe a course of action for protecting the aquifer and Drinking Water Protection Areas (DWPAs).

The implementation of management strategies is key to the ultimate success of the Plan. Following City and County approval of the plan and certification of the plan by the Oregon Department of Environmental Quality (DEQ), the City will initiate amendments to the Comprehensive Plan and Code and begin to implement management strategies. Amendments that apply within city limits will be submitted for adoption by the City Council; amendments that apply outside the City, within the UGB, will be submitted to the County Board for adoption as well.

1. Aquifer-Wide Management Goals and Strategies¹

Aquifer-wide management goals and strategies apply throughout the aquifer. They are presented in Table 4.1 with the implicated priority for implementation and implementing groups and their roles. Goals and strategies fall into four categories:

1. Surface and Groundwater Monitoring (H)
2. Public Education (H)
3. Coordination with Public and Non-profit Partners (H)
4. Integrated Pest Management (M)

2. Management Goals and Strategies for the Existing Wellfield

Three types of land uses have been identified in the DWPA for the existing wellfield:

1. Residential
2. Private Open Space
3. Public

Management goals and strategies and implementing priorities and groups/roles are linked to these existing and planned land use types and associated high- and moderate-risk potential contaminant sources in Table 4.2, starting with strategies that apply to all land use types in the DWPA.

Goals and strategies fall into the following categories:

1. Conduct targeted public education and outreach (M)
2. Continue to monitor potential contaminant sources (H)

¹ The aquifer-wide strategies in Chapter 4 apply aquifer-wide and are not intended for certification of a Source Water Protection Plan under OAR 340-040-0170, except as they are cross-referenced in the specific DWPA sections of this chapter.

3. Work with realtors (H)
4. Target integrated pest management efforts to DWPA (M)
5. Adopt comprehensive plan policies and code amendments (H)
6. Work with home owners associations (H)
7. Continue to work with golf course managers (H)
8. Continue to monitor sewer lines (H)

3. Management Goals and Strategies for the Proposed Wellfield

Four types of land use have been identified in the DWPA for the proposed well-field:

1. Residential
2. Commercial/Industrial
3. Private Open Space
4. Public

Management goals and strategies and implementing priorities and groups/roles are linked to these existing and planned land use types and associated high- and moderate-risk potential contaminant sources in Table 4.3, starting with strategies that apply to all land use types in the DWPA.

Goals and strategies are presented in Table 4.3 that fall into the following categories:

1. Conduct targeted public education and outreach (M)
2. Adopt comprehensive plan policies and code amendments (H)
3. Continue to monitor potential contaminant sources (H)
4. Work with realtors (H)
5. Target integrated pest management efforts to DWPA (M)
6. Adopt drinking water protection overlay zone (H)
7. Inventory and rank chemicals used in the DWPA and prepare related responses (H)
8. Provide business assistance (H)
9. Continue to work with golf course managers (H)
10. Continue to monitor sewer lines (H)

Implementation Plan

The City will take the following actions to implement the management strategies:

1. The City Council concurred by motion with the Plan on July 11, 2012; The Lane County Board concurred by Board Order on July 25, 2012.
2. An initial draft locally accepted plan was submitted to the Oregon Department of Environmental Quality (DEQ) and OHA for review in July 2012 and a revised draft was submitted in December 2012. The City will request certification prior to final adoption.
3. City will initiate amendments to the Comprehensive Plan and Code, including Drinking Water Protection Overlay Zone, and begin to implement management strategies: April 30, 2013 (target date).
4. City will submit to Lane County, for co-adoption, Comprehensive Plan amendments that apply outside the City, within the UGB: to be scheduled
5. City will set up internal procedures and assign staff to develop and implement annual work programs to implement the management strategies. City has ob-

tained the assistance of a RARE program participant to assist in the administration of the strategies.

Contingency Plan (Chapter 5)

In the event contamination or loss of the water source should occur, the City needs to be prepared to react to with a contingency plan. The Contingency Plan in Chapter 5 is a designed response to the contamination or disruption of Florence's current water supply. Procedures to deal with contamination threats are also outlined in Chapter 5.

The Contingency Plan focuses on:

- Identification of the primary potential threats to the aquifer and water supply;
- Developing procedures that will be followed should the threats materialize.

Florence's contingency plan addresses ten elements required by the Oregon Drinking Water Protection Program:

1. Potential threats to the drinking water supply
2. Protocols for incident response
3. Prioritization of water usage
4. Key personnel and development of a notification roster
5. Short-term and long-term replacement of water supplies
6. Short-term and long-term conservation measures
7. Plan testing, review, and update
8. Personnel training
9. Provisions for public education
10. Logistical and financial resources

Primary threats to Florence's drinking water system are related to an interruption of water delivery or contamination of the aquifer used for the drinking water supply. The following types of events could cause an interruption in delivery and/or contamination of the water supply, in order of most likely events:

1. Electrical/mechanical problems: power outage, broken pipeline, pump failure
 2. Spill in area surface waters, i.e., creeks, lakes, wetlands, beaches, stormwater systems that discharge to surface waters; stormwater contamination resulting in well water contamination; releases from a leaking underground fuel storage tank; chemical spill at a nearby business; or other hazardous materials spills (highway spills)
 3. Flooding
 4. Contamination at a wellhead
 5. Earthquakes or Tsunamis (see "City of Florence Multi-Jurisdictional Natural Hazards Mitigation Plan")
- The most likely threats to the drinking water supply are electrical/mechanical failure, contamination at or near a wellhead, a chemical release within the drinking water protection area (DWPA) or highway spills, a spill in area surface waters or in stormwater systems that discharge to surface waters. Of the identified risks, the one with the most potential for serious contamination is a spill from a transport vehicle traveling on Highway 101 adjacent to the DWPA. The likelihood of this happening is low, but the potential for contamination, should a spill occur is high. Should an incident like this occur, the Siuslaw Valley Incident Command Team would respond immediately and work to contain the spread of the hazardous material as detailed in their

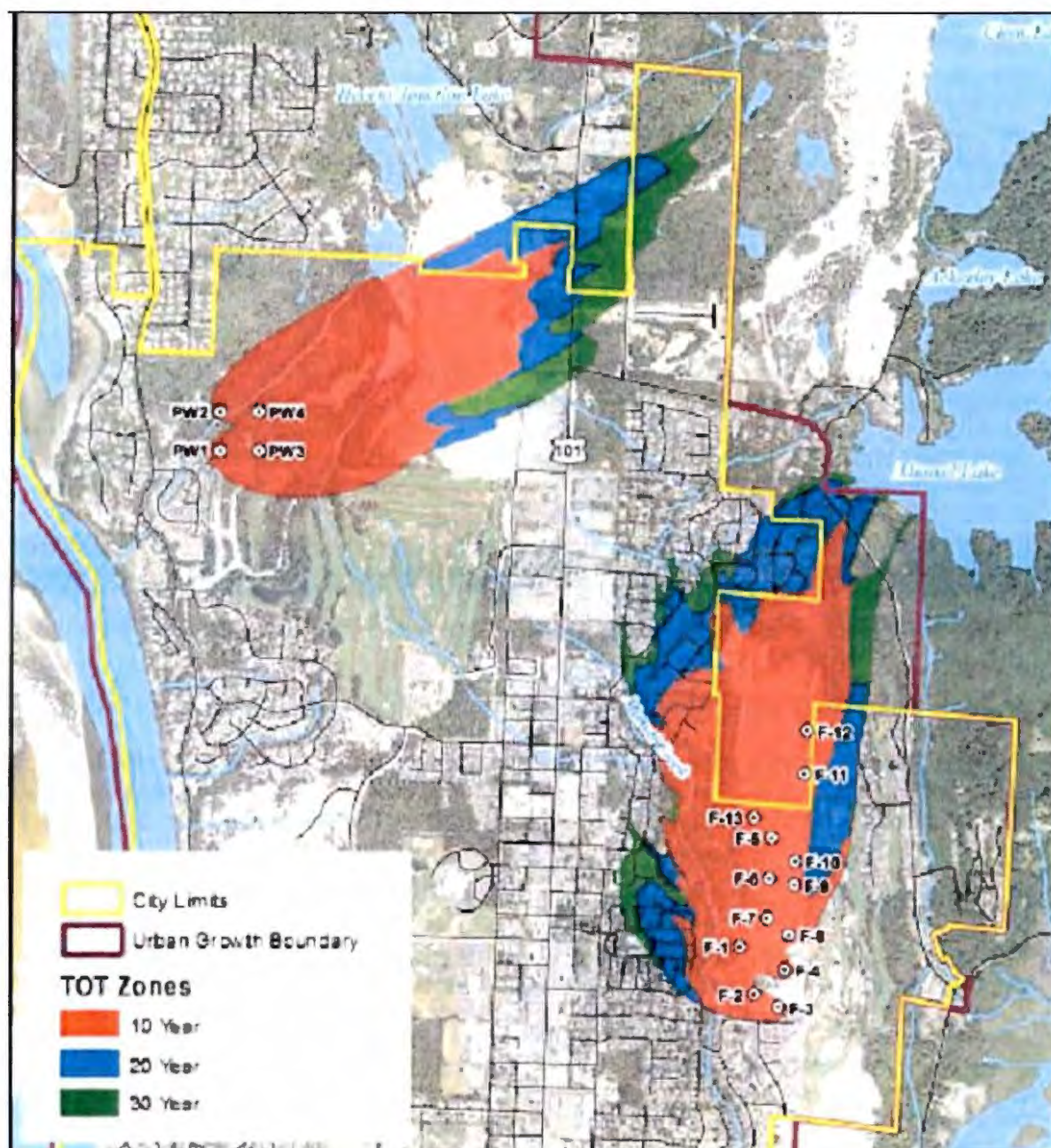
Emergency Response Plan.

- The City Water Treatment Plant has an operations manual that provides detailed procedures for containment of spills or other potential contaminant events. The pertinent portion of the Procedures Manual is located in Appendix K. Ocean Dunes Golf Course also has a spill containment plan, as part of the requirement for certification for application of agricultural chemicals.
- Breaks or leakage in city sewer lines are repaired by City staff or by a contractor under City direction. Breaks are repaired under an emergency operations plan (see Appendix K). Leaks are identified and repaired through the use of routine TV surveillance of all sewer lines and routine manhole cover surveillance.
- Prevention of contaminant incidents related to stormwater is the preferred option. The City's stormwater system is a combination of piped and infiltration facilities. The City requires oil and silt separator catch basins in all development, and has a stenciling program for all storm drains.
- In the event of a contaminant incident in an infiltration system, standard containment procedures would be utilized according to the Florence Water Management and Conservation Plan. In the event of a contaminant incident in a piped system, if identified soon enough, the contaminating substance would be isolated in the affected area of the piped system. If identified only at the time a contaminant was detected at the outfall, standard containment procedures would be utilized. If the outfall were in the Siuslaw River, the Emergency Response Plan would provide for containment of the contaminant to the smallest possible affected area.
- Lane County has established procedures for dealing with potential contaminant incidents at its facilities.

New Well Site Analysis (Chapter 6)

- The 2011 Florence Water Master Plan recommends that the City expand the existing groundwater supply system by adding up to 4 new wells in a new wellfield to increase capacity by approximately 350 gpm (0.5 mgd) in order to provide a total supply capacity of 3.2 mgd at the end of the 20-year planning horizon in 2030. The City's projected demand in 2020 will require all of the City's existing 2.7 mgd supply capacity, thus supply expansion is recommended between 2015 and 2020.
- The proposed new well field is located west of Highway 101 and immediately north of Sand Pines Golf Course (Figure ES 1 and ES 2). This site and its delineated drinking water protection area (DWPA) are shown in Figures 6.1 and 6.2. This DWPA has been given "provisional" certification by OHA, as explained in their letter in the delineation report in Appendix D. It should be noted that the actual well locations will most likely be farther to the south and west of where they are shown in these figures. The actual DWPA would also move accordingly to accurately reflect well locations.
- The proposed site for this report was analyzed from a groundwater risk perspective. Selecting a preferred site from a groundwater risk view involves an analysis of various land use components such as property ownership and contamination risks associated with various land uses within that well's delineated protection area.

Figure ES 1. Regional view showing the 30-year capture zones (DWPAs) of the existing wellfield (lower right) and the proposed wellfield (upper left). Shading indicates the TOT zones: red = 10-yr, blue = 20-yr, and green = 30-yr TOT. Existing wells one through 13 and proposed wells 1 through 4 are shown.



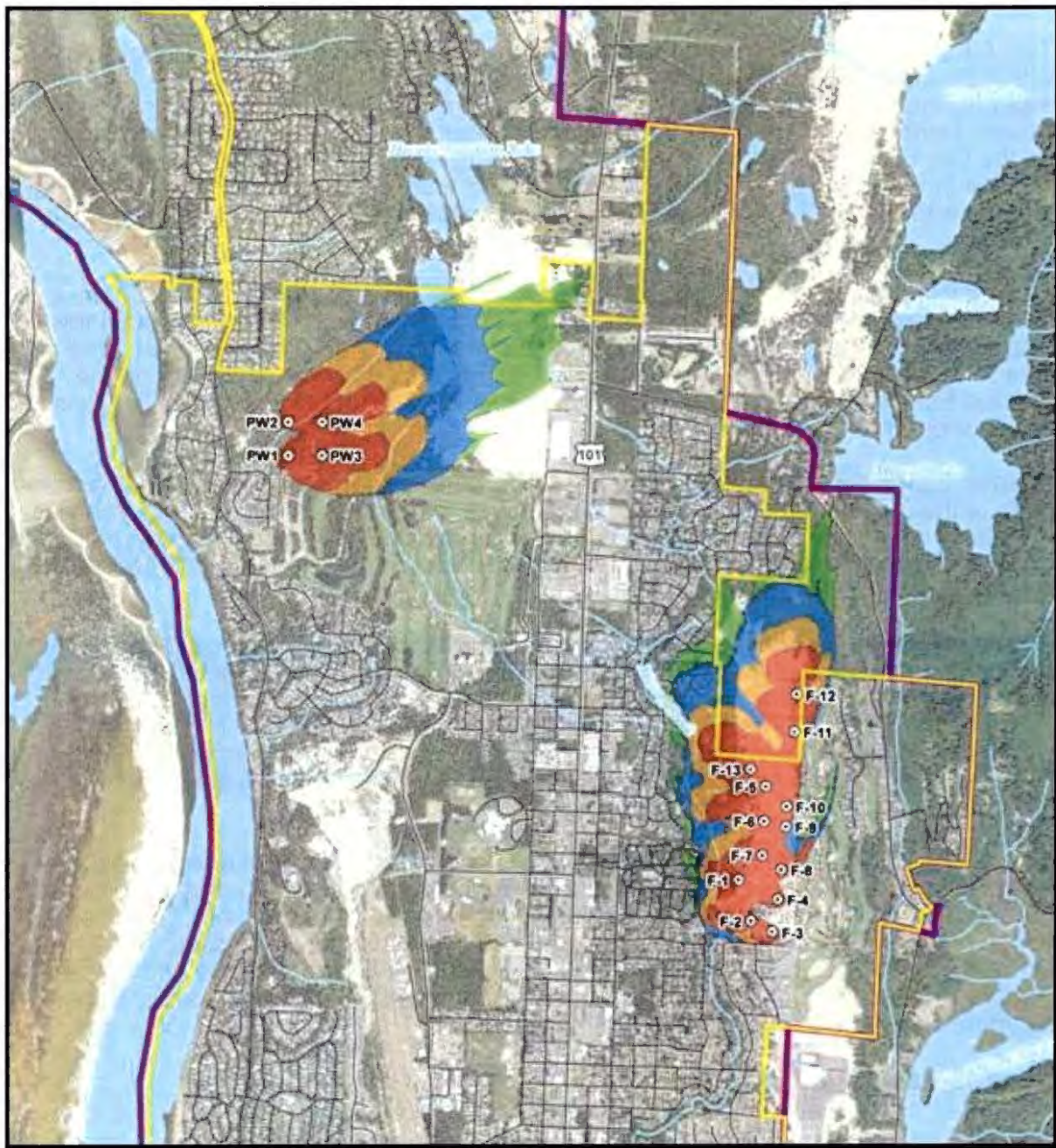


Figure ES 2. Ten-year capture zones for Florence's existing and proposed Wellfields. Different Time of Travel (TOT) zones indicated by shading: red = 1-year TOT, orange = 2-year TOT, blue = 5-year TOT, and green = 10-year TOT.

Chapter 1: Introduction

This Aquifer Protection Plan protects water quality in the North Florence Dunal Aquifer within the City of Florence's urban growth boundary (UGB), the sole source of drinking water for the Florence community. The scope of this plan is the North Florence Sole Source Dunal Aquifer. Portions of this plan serve as the Source Water Protection Plan for the City in accordance with OAR 340-040-170.² The state certified Source Water Protection Plan includes all sections of this document except portions of those sections marked with an asterisk in the Table of Contents and footnoted as such in the body of this plan.

This Plan is organized into six chapters. Chapter 1 outlines the plan's organization and provides the purpose and background of the Aquifer Protection Plan. In addition, this chapter provides an overview of the Florence community, natural environment, and sole source aquifer; the public involvement and Technical Advisory Committee; and the Siuslaw Estuary Partnership Guiding Principles and Measurable Outcomes that guided the development of this plan.

Chapter 2 provides information about the City's water system, the nature and characteristics of the aquifer, the Groundwater Flow Model, and Source Water Protection Areas. Chapter 3 describes the City's Surface and Groundwater Monitoring Program methodology and results, and the Potential Contaminant Source Inventories for the Delineated Source Water Protection Areas.

Chapters 4 through 6 focus on solutions. Chapter 4 includes the goals and specific management strategies for reducing contamination risks and for responding to contamination incidents within the drinking water protection areas and the aquifer. Chapter 5 identifies the primary threats leading to disruption and/or contamination of Florence's water system and details protocols to be used in the event of an emergency. Finally, Chapter 6 provides an analysis of new well sites based on criteria related to source water protection.

Chapters 4, 5, and 6 are not intended to be exclusive "solutions." Other solutions may be identified and reviewed for potential implementation through the ordinance process. Further, not all of the solutions presented may be ultimately adopted through the ordinance process. The solutions to be implemented by ordinance will be selected after further examination, dialogue, and review between the City and its partners and Stakeholders. During that process, factors such as enforcement responsibilities and apportionment of costs will be discussed.

Purpose and Background

Purpose

The purpose of this Aquifer Protection Plan is to update the December 2003 Florence Drinking Water Protection Plan and expand the scope to encompass the North Florence Sole Source Dunal Aquifer within the Florence Urban Growth Boundary (UGB).

The scope of this plan is aquifer-wide for several reasons. The aquifer is "sole source" meaning that there are no alternative drinking water sources available. In addition, sur-

² See certification approval letter from the Oregon Department of Environmental Quality (DEQ) in the front of this plan.

face waters and groundwater are highly interconnected in the aquifer; so, contamination of one can contaminate the other. Further, the Siuslaw estuary and surrounding watershed provide significant habitat to many threatened and endangered species; and the health of the natural environment is key to Florence's economic vitality. As good stewards of these resources, the City of Florence and its partners have determined that this plan should have an aquifer-wide focus.

Specific objectives are to:³

1. Protect the North Florence Sole Source Dunal Aquifer.
2. Incorporate the Guiding Principles of the Siuslaw Estuary Partnership into the Aquifer Protection Plan.*
3. Protect drinking water quality and quantity in the City's existing wells and new well sites.
4. Locate new sites for City production wells where they will not cause water levels in creeks and wetlands to go below threshold levels that would harm fish and wildlife habitat.
5. Update the delineation of the Drinking Water Protection Areas (DWPAs) for existing and future wells; expand the Zone of Contribution to the 30 Year Time of Travel Zone for certification of DWPAs.
6. Protect fish and wildlife habitat and align Aquifer Protection Plan with Goals and Strategies for protecting fish and wildlife habitat.*
7. Incorporate and address results from the Surface and Groundwater Monitoring Program.*
8. Identify and obtain agreement from stakeholders on Goals and Strategies for protecting water quality in the aquifer.
9. Engage the public in the process to improve awareness of threats to drinking water quality.
10. Update the list of potential contaminants and Potential Contaminant Source Inventory.
11. Integrate maps into GIS: Delineation Map; Potential Contaminant Map; Aquifer Sensitivity Map.
12. Adopt measures to protect the DWPAs, and the aquifer.*
13. Meet state DEQ requirement to update the Plan every 5 years.

Background

The aquifer was designated a "sole source" aquifer by the US Environmental Protection Agency (EPA) in 1987 (Figure 1.1).⁴ It was, and continues to be, the only "sole source" aquifer in the State of Oregon. Residents and businesses within the Florence urban growth boundary (UGB) rely entirely on water from the aquifer for their public water supply. In addition, all streams, creeks, lakes, and wetlands (surface waters) in the aquifer boundary are "hydrologically connected" with the groundwater system.

The aquifer lies within the lower Siuslaw River Watershed, a significant natural area that provides critical habitat for endangered and threatened animal species. In all, about 23

³ The objectives, or portions of objectives, shown with an asterisk (*) apply aquifer-wide and are not intended for certification of a Source Water Protection Plan under OAR 340-040-0170).

⁴ The Environmental Protection Agency (EPA) defines a sole source aquifer as "an underground water source that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. These areas have no alternative drinking water source(s) that could physically, legally, and economically supply all those who depend upon the aquifer for drinking water."

species of fish, almost 200 species of birds, and numerous species of marine mammals use the estuary and the surrounding wetlands, lakes, riparian and upland areas. The watershed supports spawning runs of fall Chinook, winter steelhead, coho, and sea-run cutthroat; and receives significant waterfowl use. Historically, the Siuslaw Basin was one of the most abundant anadromous fish producers in the Pacific Northwest. Once the Oregon Coast's largest Coho-producing system next to the Columbia, the Siuslaw River's salmon production is drastically diminished.

The lower Siuslaw River watershed health is degraded and a significant amount of restoration action is needed to improve watershed conditions (Oregon Watershed Enhancement Board, 2007). The watershed is limited by all factors in aquatic/instream areas, tideland, riparian, freshwater wetlands, and upland areas. The Siuslaw River is classified as Water Quality Limited under the Clean Water Act and is included on the state's 303(d) list of Impaired Waterbodies by the Oregon Department of Environmental Quality. The River is failing in all these parameters: Dissolved Oxygen, Fecal Coliform, Habitat Modification, and Temperature, and potentially Alkalinity. Beneficial Uses impaired by these listed parameters include resident fish and aquatic life; salmonid fish spawning and rearing; anadromous fish passage; trout rearing and migration; and shellfish growing.

Urbanization of the UGB, development of rural areas along stream corridors for housing, and environmental changes will exacerbate long-term watershed changes caused by established land use patterns, including altered sediment and detritus deposition patterns, changed peak flows, water circulation patterns, flooding regimes, and surface and groundwater contamination from septic systems and non-point source pollution. The presence and increased discharge of nitrates and other pollutants into the ecosystem through urban groundwater and surface water activities, and the loss of riparian and floodplain function, can be expected to further degrade the system. Another deleterious effect is increased erosion, which is already a problem in developed portions of the estuary and along Munsel Creek.

Community concern for the aquifer, the Siuslaw estuary, and the area's streams, lakes, and wetlands and is well-documented in City Comprehensive Plan policies and annual City Council Goals. In October, 2009, the City and its partners from 19 federal, state, tribal, and local agencies, embarked on a three-year, EPA-funded project called the Siuslaw Estuary Partnership (EPA Cooperative Agreement #WC-00J04801-0). The mission of the project is to protect and improve water quality and fish and wildlife habitat in the lower Siuslaw watershed. This three-year project is funded by project partners and the US Environmental Protection Agency (EPA). This Aquifer Protection Plan is one of the products included in the Partnership work plan and the Partnership grant helps fund the City's Surface and Groundwater Monitoring Program, described in detail in Chapter 3. The Siuslaw Estuary Partnership Guiding Principles, endorsed by the City and its partners, provide guidance for this plan (see below).

Community Sketch

Florence is an incorporated city in Lane County, Oregon, with a 2010 city limit population of 9,590 and a 2008 estimated urban growth boundary (UGB) population, including city limits, of 10,767 (Portland State University estimates). The UGB covers 5 square miles of land and 0.6 square miles of water along the Siuslaw River estuary and the Pacific Ocean. Florence is Lane County's major coastal city and the largest city in the Siuslaw watershed. The UGB population is projected to grow to 16,323 by 2030, almost double the UGB population in 2000. This growth is expected to occur primarily through

urbanization of “urbanizable” land within the UGB. Land cover includes urban development within city limits and developable rural lands and uses outside.

The Siuslaw River estuary, designated a Shallow Draft Development estuary under the Oregon Estuary Classification System, is managed for navigation and other public needs with jetties and a main channel maintained by dredging at 22 feet or less. The geomorphology of the area is that of a Drowned River Mouth estuary. The estuary’s broad floodplain, numerous wetlands, and tidal islands, lead to the dunes along the coastal plain at Florence. Here the land is characterized by barren sand dunes interspersed with pine woodlands and deflation plain lakes or wetlands.

The quality of the groundwater is critical to the physical health of the community. Water quality in both groundwater and surface waters is also critical for the economic well being of residents and businesses. The area is an important recreational area providing opportunities for fishing, boating, beach walking, shopping, dining, bird watching, and many other active and passive recreational activities.

Since the decline of the forest industry, most of the revenue generated in the area is from tourism, recreation, and commercial fishing. Local community members, both tribal and nontribal, engage in subsistence fishing for marine and stream resources. The Siuslaw River is Water Quality Limited; steps to improve its quality are imperative for both humans and animals residing in or using the watershed. Protecting the North Florence Sole Source Dunal Aquifer is key to ensuring all of these resources are available for future generations to enjoy.

North Florence Sole Source Dunal Aquifer

The North Florence Dunal Aquifer encompasses the entire continuous body of sand north of the Siuslaw River and east of the Pacific Ocean, the primary discharge points for the aquifer. About 85 percent of the rain percolates into the water table.⁵ Groundwater moves rapidly and almost uniformly toward a discharge point. Multiple seeps and springs occur along the coastline and riverbank, although the aquifer discharges mostly as underflow. Few streams cross the dunal area since most rainfall quickly infiltrates to the water table which is at the surface most of the year. Where streams flow across the sand, they are hydrologically connected with the groundwater system, as are Munsel Lake and Clear Lake. When the last comprehensive testing of the aquifer was done 23 years ago, the groundwater was of good quality “from a human health standpoint.”

The City is currently monitoring water levels, flow, and quality in the groundwater and in Munsel and Ackerley Creeks. The results of that testing program are summarized in Chapter 3 and the full reports are included in Appendix A. The 1987 EPA Sole Source Aquifer Resource Document states, “Possible sources of aquifer contamination include fuel storage tank failure, accidental spills of hazardous material, septic tank effluent, storm runoff, pesticides, and chemical fertilizers.” Discharge of pharmaceutical by-products is also an environmental threat. The Potential Contaminant Source Inventories in Chapter 3 provide a detailed list of potential threats to water quality in the City’s Drinking Water Protection Areas from existing and future land uses.

⁵ EPA Resource Document: *For Consideration of the North Florence Dunal Aquifer as a Sole Source Aquifer*, September 1987.

Public Involvement and Technical Advisory Committee

The Public Involvement Plan (PIP) for the Siuslaw Estuary Partnership was approved by the Florence Planning Commission on January 12, 2010 and is included as Appendix B of this plan. In accordance with the approved PIP, public involvement for the plan involved a Technical Advisory Committee, Stakeholder Groups, and Public Education and Outreach.

Technical Advisory Committee

The Siuslaw Estuary Partnership Inter-disciplinary Team served as the Technical Advisory Committee (TAC) for this plan (see Acknowledgments). The Water Quality and Quantity sub-Team was enhanced to include staff from the Department of Land Conservation and Development (DLCD) and the US Bureau of Land Management (BLM). The TAC met on October 5, 2011 and February 1, 2012. At their October meeting, the TAC reviewed and commented on the revised Scope of Work and the proposed well-head delineations. At their February meeting, the TAC reviewed and commented on the Potential Contaminant Source Inventory and proposed Potential Management Strategies to forward to the Stakeholder Groups for comment.

Stakeholder Groups

The Florence City Council approved the use of two Stakeholder Groups for the Partnership: a Community Stakeholder Group and an Elected Official Stakeholder Group (see PIP in Appendix B and Acknowledgments). The Community Stakeholder Group was expanded in order to include representative interests in the DWPAs on the Group. Specifically, these interests were: Ocean Dunes Golf Links, Coast Village, Sand Ranch, Florentine Estates, Koning and Cooper business owners, and Recycling and Garbage. Both Stakeholder Groups met in February and March, 2012 to review and comment on the components of the plan and they both forwarded the proposed Management Strategies to the Open House, on April 30, 2012, for public comment.

Public Education and Outreach

Public Education and Outreach involved three Open Houses and three newsletters, "Waters in Common," which were distributed throughout the UGB to residents, property owners, or both. Each of these newsletters provided information about the aquifer and the need to protect water quality. The third newsletter, distributed in April 2012, provided information about the Aquifer Protection Plan and ways to provide comment on the plan. That newsletter was included in water bills and mailed directly to all owners of property in the DWPAs. At the third Open House, the elements of the plan, including the DWPAs, the Potential Contaminant Source Inventories, and the Potential Management Strategies, were presented in detail in the power point presentation and in hard copies available for the public. Comment forms were available as well, although no one submitted a completed form. Over 50 members of the public attended the April 30, 2012 Open House and heard the presentation.

All products and Stakeholder meeting packets have been posted to the project web site: www.SiuslawWaters.org and the public has been encouraged to review and comment.

Siuslaw Estuary Partnership: Guiding Principles and Measurable Outcomes

Guiding Principles

The following Guiding Principles for Water Quality and Quantity were endorsed by Florence City Council, Siuslaw Watershed Council, Siuslaw Soil and Water Conservation District, Heceta Water District, Lane County Board of Commissioners, and Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians. These Guiding Principles are intended to guide the development of products from the Siuslaw Estuary Partnership, including this Aquifer Protection Plan.

1. Protect water quality for human consumption in the North Florence Sole Source Dunal Aquifer and Clear Lake from known contamination threats; and adopt plans and strategies to respond to potential threats.
2. Protect the quality of water in surface waters, i.e., the estuary, creeks, lakes, wetlands, and ocean/beach, from contamination threats that could impair the quality of the water for fish and wildlife habitat and human recreation.
3. Protect water quality in ground and surface waters from the effects of urbanization through land use and development policies and procedures.
4. Understand the natural state of water quantity and quality through the establishment of base line data and a surface and groundwater assessment and monitoring program and through research and monitoring of climate change.
5. Protect the water storage function of wetlands and water flow in creeks and the estuary through water management planning and practices that maintain groundwater levels and surface water flows so that they do not impair water quality or impact fish and wildlife habitat.
6. Prevent adverse flooding conditions through natural storage and slow release of surface water and runoff.
7. Locate, design, and operate production wells so that they do not reduce groundwater at levels below that necessary to support fish and wildlife habitat.
8. Foster and support the design and use of innovative stormwater management practices, including the incorporation of properly-designed constructed wetlands into public and private stormwater systems.
9. Tailor stormwater management plans and practices for new development and redevelopment to the Oregon coastal environment in a manner that can adapt to changes in temperature and precipitation, and other notable climate change impacts.
10. Promote water conservation through efficient landscape and irrigation, including water reuse and recycling, and other strategies to reduce water consumption, and to reduce the need for new drinking water sources and/or expanded water storage.

Measurable Outcomes

The following measurable outcomes are used by staff to evaluate how well this plan and the water monitoring program work toward serving the Guiding Principles. These are provided for illustrative purposes only. Endorsement of Outcomes was not requested or required.

Short Term Outcomes

Water Quantity

1. Existing conditions (base line data) are known for aquifer flow patterns (volume, direction, and speed) and water table levels and seasonal variability
2. Model and data capacity exist to evaluate how future production well sites might affect groundwater flow, wetlands, and overall aquifer production.
3. Storage capacity of aquifer and wetlands is known; information is used to inform City Stormwater System Plans and projects (*note: this needs to be combined with wetlands outcomes worksheet*).
4. Baseline data are better understood on the impact of groundwater flow (water quantity) into Munsel and Ackerley Creeks, the estuary, the ocean/beach, Clear Lake, and wetlands.
5. Existing hydrograph conditions (baseline data) for Munsel and Ackerley Creeks will be established.
6. Impacts of fluctuation in rainfall (short term) are known, to the extent a transient model or another measuring tool is available to the Project.
7. Impacts of land use on the water table are better understood.
8. Sites for new city production wells are identified.
9. Risk (e.g., overloading) to groundwater of artificial infiltration of stormwater is reduced through modeling results and analyses.
10. Flood storage is improved through the protection of natural areas with flood storage capacity, thus, preventing further impacts to the hydrograph of the aquifer and surface waters.

Water Quality

1. Existing conditions of water quality in aquifer (background levels for each constituent included in the Quality Assurance Project Plan) are established.
2. Impacts of land uses on surface water and groundwater quality are better understood.
3. Appropriate trigger levels are set for groundwater contaminant concentration.
4. Variability of contaminant concentrations in the area is established.
5. Variability of contaminant concentrations as a function of season is determined.
6. Existing aquifer contamination is identified, assessed, and corrected, as feasible.
7. Contamination threats are identified, assessed, and prioritized for strategies in the Source Water Protection Plan.
8. Potential threats to drinking water from contaminated storm runoff and surface contaminants being carried into the aquifer via percolation are better understood and addressed or prioritized for future actions.
9. Preliminary baseline data are established for existing conditions of water quality in Munsel and Ackerley Creek and estuary and marine as specified in the Quality Assurance Project Plan.
10. Impacts of Stormwater Demonstration Project on estuary water quality, as specified in the Quality Assurance Project Plan, are known and any modifications to BMPs that are indicated are made.

11. Goals and strategies for protecting water quality in the aquifer are agreed upon and submitted for local adoption and State approval.
12. Risk to groundwater quality of artificial infiltration of stormwater is reduced.
13. Impacts of stormwater runoff to water quality in estuary are evaluated and reduced as data become available.
14. The impacts from septic systems, if any, to the water quality of the aquifer are better understood, and if necessary management actions can be developed and implemented.

Fish and Wildlife Habitat

1. Human-induced and naturally occurring changes in water levels in wetlands and area lakes from water table fluctuations are understood, and the effects on fish and wildlife habitat are better understood, through the data collection, analysis, and modeling described in the Quality Assurance Project Plan.
2. Impacts of stormwater outfalls on the hydrograph of Munsel Creek are known, and the effects on fish habitat are better understood.
3. Preliminary threshold level, i.e., allowable drop in water table, is set that does not have a significant impact on lakes, streams and wetlands, as determined through data collection, analysis, and response.
4. Preliminary threshold level, above, is considered in location of new production wells.
5. If a transient model is available, recharge capacity can be gauged and different impervious surface scenarios can be evaluated. As a result, the potential threats to fish and wildlife from water quantity impacts of runoff and groundwater flowing into surface waters will be better understood and addressed or prioritized for future actions.
6. Effect of land uses on surface water quantity, and thus fish and wildlife habitat and human contact recreation, is better understood.
7. Runoff and groundwater contaminants flowing into Clear Lake, Munsel and Acklerley Creeks, wetlands, estuary, and ocean/beach are better understood. As a result, water quality data will provide a basis for better understanding the effects on fish and wildlife habitat.
8. Potential threats (e.g., pharmaceuticals) to fish and wildlife from runoff and groundwater contaminants flowing into surface waters are better understood and addressed or prioritized for future actions.
9. Effect of land uses on surface water quality, and thus fish and wildlife habitat, is better understood.
10. Source Water Protection Plan is aligned with Goals and Strategies for protecting fish and wildlife habitat.
11. Production well sites selected do not cause water levels in creeks and wetlands to go below threshold levels set above.
12. New stormwater practices reduce impacts to fish and wildlife habitat by reducing pollutants entering surface waters through groundwater seepage and by reducing stormwater discharge impacts to wetlands and the hydrograph of Munsel Creek.
13. Stormwater Demonstration showcases state-of-the-art Best Management Practices in established commercial area adjacent to an estuary with high habitat values.

Medium Term Outcomes

Water Quantity

1. Aquifer flow patterns (volume, direction, and speed), water table levels and seasonal variability are monitored and better understood.
2. Future production well sites are evaluated for their potential effect on groundwater flow, wetlands, and overall aquifer production.
3. City Stormwater System Plans and projects take into account the storage capacity of aquifer and wetlands.
4. The impact of groundwater flow (water quantity) into Munsel and Ackerley Creeks, the estuary, the ocean/beach, Clear Lake, and wetlands is monitored and better understood.
5. Hydrograph conditions for Munsel and Ackerley Creeks are better understood.
6. Stormwater policy and practices incorporate knowledge about the impacts of fluctuation in rainfall (short term) (requires transient model).
7. Known impacts of land use on the water table are addressed in modifications to land use and development policies and practices.
8. New city production wells are planned.
9. Risk (e.g., overloading) to groundwater of artificial infiltration of stormwater is reduced through modeling results and analyses.
10. Flood storage is improved through the protection of natural areas with flood storage capacity, reducing reliance on culverts for stormwater discharge and, thus, preventing further impacts to the hydrograph of the aquifer and surface waters.
11. Water quantity in Munsel Creek is monitored.

Water Quality

1. Water quality in aquifer is monitored.
2. Impacts of land uses on surface water and groundwater quality are monitored.
3. Groundwater contaminant concentration and variability are monitored and maintained below trigger levels in all seasons.
4. Aquifer contamination is identified, assessed, and corrected, as feasible.
5. Strategies in the Source Water Protection Plan are adopted and implemented to protect water quality.
6. Water quality in Munsel and Ackerley Creek, the estuary and marine is monitored.
7. Modifications to BMPs are made, as indicated by the impacts of Stormwater Demonstration Project on estuary water quality, as described in the Quality Assurance Project Plan.
8. Goals and strategies for protecting water quality in the aquifer are adopted by the City and approved by the appropriate State agencies.
9. Groundwater quality is protected from artificial infiltration of stormwater.
10. Impacts of stormwater runoff to water quality in estuary are monitored and continue to be reduced.
11. Water quality in Munsel Creek is monitored.

Fish and Wildlife Habitat

1. The threat to water levels in wetlands and area lakes from water table fluctuations, and the effects on fish habitat, are reduced.
2. Impacts of stormwater outfalls on the hydrograph of Munsel Creek, and the effects on fish habitat, are reduced.

3. Drop in water table is monitored and significant impact on lakes and wetlands, and thus fish and wildlife habitat, from drop is reduced.
4. New production wells are planned that will be designed and operated so as not to allow the water table to go below threshold levels. These levels are set to reduce significant impact on lakes and wetlands, and thus fish and wildlife habitat, from drop, as described in the Quality Assurance Project Plan.
5. Plans and strategies are in place to prevent threats to fish and wildlife and human contact recreation from runoff and groundwater seeping into surface waters (assumes transient model is available.)
6. Land use and development policies are pursued to reduce impacts to surface water quantity and quality, and thus fish and wildlife habitat.
7. Runoff and groundwater contaminants seeping into Clear Lake, Munsel and Ack-erley Creeks, wetlands, estuary, and ocean/beach are reduced, improving conditions for fish and wildlife habitat and human contact recreation.
8. Source Water Protection Plan and City Comprehensive Plan amendments are adopted, and contain strategies to protect drinking water and fish and wildlife habitat.
9. Production well sites are planned in a manner that will not negatively affect fish and wildlife habitat.
10. New stormwater practices are monitored for continued reduction of impacts to fish and wildlife habitat and human contact recreation by reducing pollutants entering surface waters through groundwater seepage and by reducing stormwater discharge impacts to wetlands and the hydrograph of Munsel Creek.
11. Stormwater Demonstration showcases state-of-the-art Best Management Practices in established commercial area adjacent to an estuary with high habitat values.

Long Term Outcomes

1. The quality of water for human consumption in the North Florence Sole Source Dunal Aquifer and Clear Lake is protected from known contamination threats; and plans and strategies are adopted to respond to any unforeseen threats.
2. The quality of water in surface waters, i.e., the estuary, creeks, lakes, wetlands, and ocean/beach is protected from contamination threats that could impair the quality of the water for fish and wildlife habitat or human contact recreation.
3. Water quality in ground and surface waters is protected from the effects of urbanization through adopted land use and development policies and procedures.
4. Groundwater levels and fluctuations, and runoff volumes and velocity, are maintained at levels and flow patterns that do not impair the function of wetlands, creeks, and the estuary for fish and wildlife habitat.
5. Stormwater management plans and practices for new development and re-development are tailored to the Oregon coastal environment; and can adapt to changes in temperature and precipitation, and other notable climate change impacts.

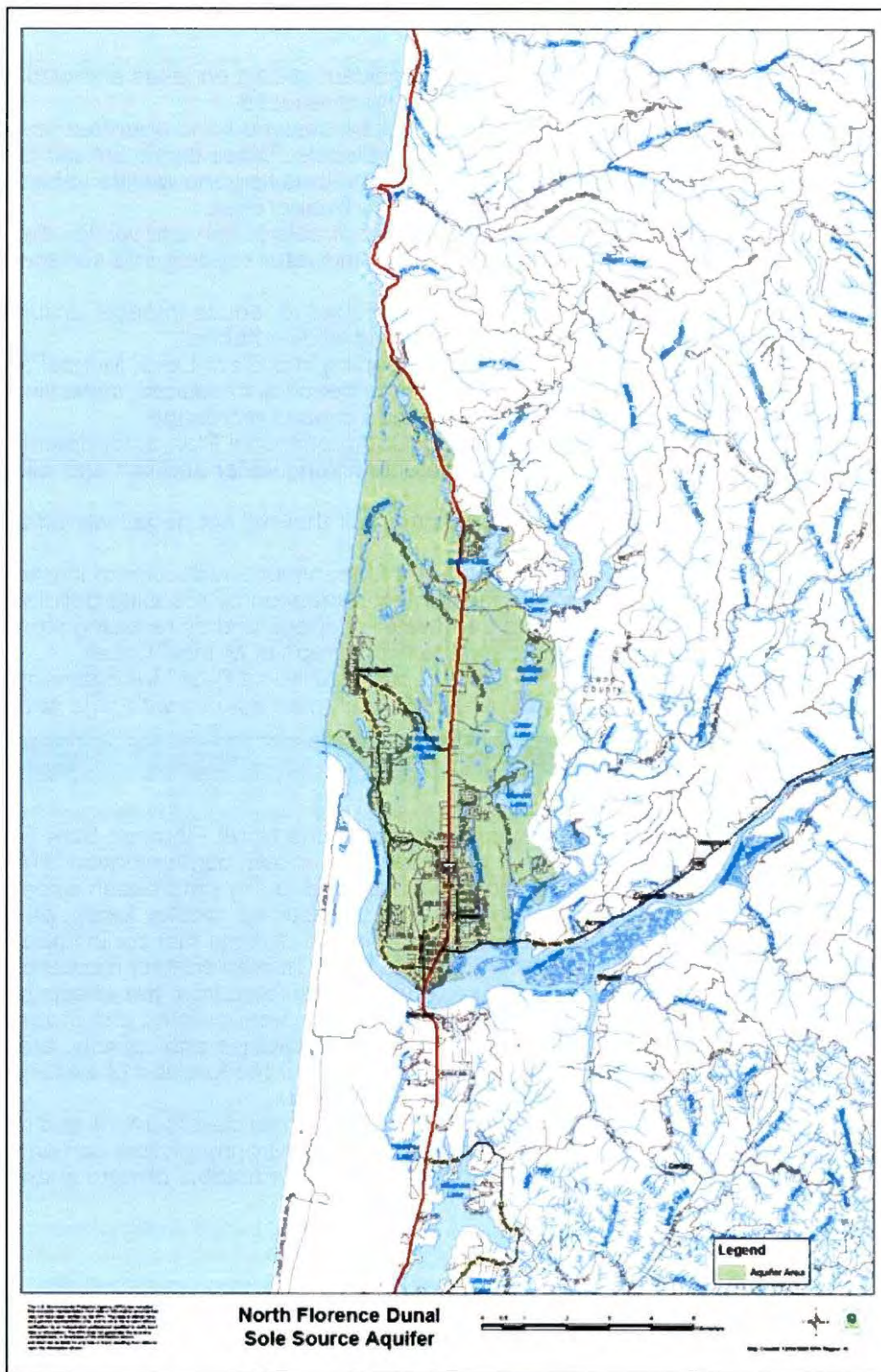


Figure 1.1 North Florence Sole Source Dunal Aquifer

Chapter 2: Source Water and Drinking Water Protection Areas

This chapter describes the City's current water source and the delineated Drinking Water Protection Areas for the existing and proposed wellfields. It also includes a discussion of other Source Water Assessments prepared for the Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians (CLUSI) and Heceta Water District.

City of Florence Water Source

This section describes Florence's source water, including the wellfield and wells, the location of the drinking water source, groundwater use, and source construction. Detailed information about the City of Florence's water system is shown in Figure 2.1 and contained in the *Florence Water Management and Conservation Plan*, March, 2010 and the *Florence Water System Master Plan Update*, January, 2011. Figure 2.1, "Water System Map," from the *Water System Master Plan Update* illustrates the City's Water System, including pressure zones, water system facilities and distribution mains.

Currently, Florence's drinking water is supplied by 13 wells owned and operated by the City. The City's municipal wellfield is located on 80 acres adjacent to the Ocean Dunes golf course on the eastern edge of Florence bordered by Willow Ridge Court to the south and 35th Street to the north (Figure 2.1). The wells produce water year round and serve as the City's sole water supply source.⁶

Currently the City holds three groundwater rights totaling 3.8 million gallons per day (mgd) [5.89 cubic feet per second (cfs)]. Based on the City's recently completed Water Management and Conservation Plan (WMCP), the 12 existing City wells produce approximately 2.7 mgd (4.2 cfs) from a dunal aquifer with high levels of iron and manganese present in the native groundwater. Groundwater from the wells is pumped to the approximately 3.0 mgd Water Treatment Plant located adjacent to the City's wellfield near the intersection of Willow Street and 24th Street. The treatment plant uses pressurized biological reactors and pressurized green sand filters for iron and manganese removal and sodium hydroxide for pH adjustment. Sodium fluoride is added to the treated groundwater before it enters the distribution system and storage reservoirs.

Existing Water System

The City's municipal water supply is from groundwater supplied by Wells 1 through 13 (well #13 is drilled but not in production – we anticipate well #13 to be online by Spring 2013), located along the eastern margin of the City, that appropriate water from a dunal aquifer (Figure 2.1). Currently, these wells do not have the capacity to produce the full amount of water authorized by the City's water rights. Furthermore, the City's population and demand for water are increasing and are projected to exceed the existing water supply within the 20-year planning period (2030) for the City's Water Management and Conservation Plan (WMCP). The City also holds a water right to divert water from Munsel Creek, tributary to the Siuslaw River, but this water right is not currently in use. Historically, the City purchased a portion of its water supply from Heceta Water District

⁶ . The City has an intertie with Heceta Water District (HWD) for emergency use only. HWD derives its water from the aquifer via Clear Lake and it does not have the capacity to supply all of Florence's water needs.

(HWD); however, the City stopped purchasing water from HWD in 2003 after the expansion of the water treatment plant (WTP) and wellfield that included Wells 8-12. The City has four aboveground reservoirs: an elevated 250,000-gallon tank near the City shop (currently offline and not in use); a 500,000-gallon steel tank on the east hills; and two 2,000,000-gallon tanks near the Sand Pines Golf Course. Water diverted under all of the City's groundwater rights is treated at the City's water treatment plant. Currently, the plant has a capacity of 4.6 cubic feet per second (cfs) or 3 million gallons per day (mgd). This capacity is 1.24 cfs (0.8 mgd) less than the full value of the City's existing groundwater rights. The City's distribution system consists of four pressure zones served by three water storage reservoirs and three booster pumping stations.

The City of Florence's existing water distribution system includes four service levels, or pressure zones. Pressure zones are generally defined by ground topography and designated by overflow elevations of water storage facilities or discharge hydraulic grades of pressure reducing or booster pumping facilities serving the zone. The Main Pressure Zone serves the majority of City of Florence water customers by gravity from storage facilities. The Main Zone covers the area from 35th Street south to the Siuslaw River. The North Pressure Zone serves areas north of 35th Street from the constant pressure Sand Pines Booster Pump Station. The East and Ocean Dunes Pressure Zones each serve a small group of customers in the City's east hills from constant pressure booster pump stations.

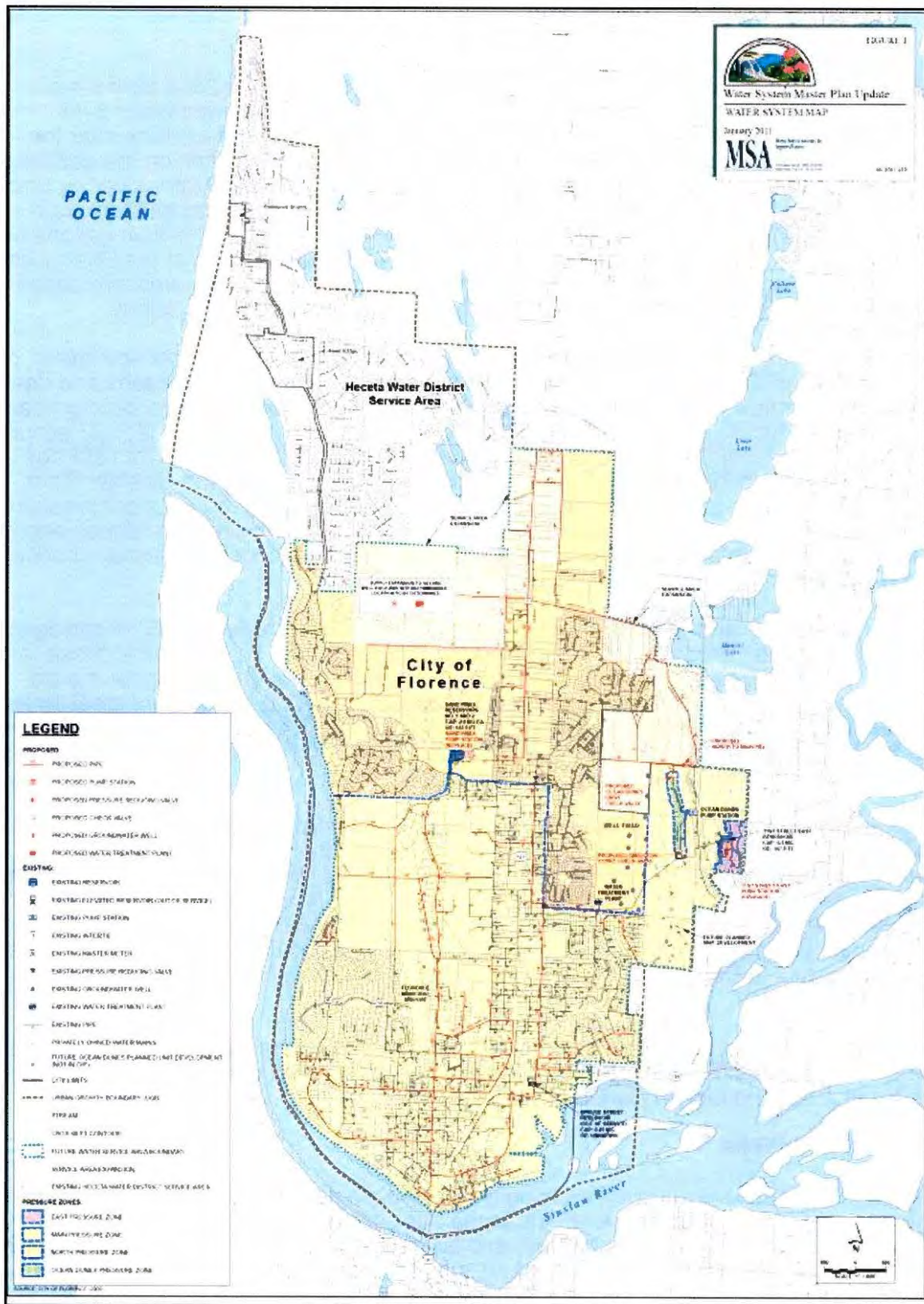
The City's three active storage reservoirs provide 4.5 million gallons (MG) of storage by gravity to the Main Pressure Zone. Emergency storage is also provided from these facilities by pumping to the North and East pressure zones through adjacent pump stations. The Sand Pines Reservoirs No. 1 and 2 are identical 2.0 MG welded steel tanks with an approximate overflow elevation of 167.5 feet. The 31st Street/East Reservoir is a 0.5 MG welded steel tank constructed in 1965 with an approximate overflow elevation of 167.5 feet.

A fourth Main Zone reservoir, the elevated, welded-steel Spruce Street Reservoir was taken offline approximately ten years ago and remains off-line and not in use. It has been reported by City staff that the reservoir experienced rapid uncontrolled fluctuations in water level. Based on discussions with City staff, the Spruce Street Reservoir may have a lower overflow elevation than the other three reservoirs which supply the Main Zone; and this could cause it to overflow during low demand times when the other three reservoirs are full. Due to these and other issues, the tank will remain off-line indefinitely.

The City's distribution system includes three booster pump stations designed to deliver water from the Main Pressure Zone reservoirs and distribution mains up to customers in the North, East and Ocean Dunes Pressure Zones.

Wellfield and Wells

The City of Florence is supplied drinking water by a single wellfield comprising 12 wells, with one additional well to come on line in the near future (Figure 2.1). Seven wells were installed between 1964 and 1994; and five wells were constructed between 2003 and 2004. Each of the wells is constructed in a manner consistent with Standards for Construction as outlined in Oregon Administrative Rules (OARs). Each of the wells has a concrete pad and locked enclosures to protect the wellheads from surface water contamination and public trespassing, respectfully. Each of the wells is located on City owned property. OWRD construction logs and copies of the well reports for the 13 wells are included in Appendix C.



Location of the Drinking Water Source

The location of City wells is shown in Table 2.1 and Figure 2.1.

Table 2.1 Location of Florence Wells

Well	Longitude	Latitude
Well 1	43° 59'24.851"N	124° 5'31.462"W
Well 2	43° 59'18.978"N	124° 5'28.603"W
Well 3	43° 59'17.735"N	124° 5'22.309"W
Well 4	43° 59'22.497"N	124° 5'21.383"W
Well 5	43° 59'38.727"N	124° 5'26.815"W
Well 6	43° 59'33.553"N	124° 5'26.790"W
Well 7	43° 59'28.560"N	124° 5'26.882"W
Well 8	43° 59'27.549"N	124° 5'16.516"W
Well 9	43° 59'33.825"N	124° 5'15.994"W
Well 10	43° 59'36.791"N	124° 5'16.461"W
Well 11	43° 59'47.737"N	124° 5'15.665"W
Well 12	43° 59'53.037"N	124° 5'15.445"W
Well 13	43° 59'41.027"N	124° 5'30.035"W

Groundwater Use

The City's water system currently provides potable water to approximately 9,580 people within the city limits through residential, commercial and industrial service connections. The current water service area lies entirely within the existing city limits. The City's current wellfield production capacity is 2.7 mgd during the dry summer months (Table 2.2, GSI, 2008). The City's existing groundwater rights total 3.8 mgd. Expansion of the drinking water treatment plant from 3.0 mgd to 4.0 mgd is feasible.

Table 2.2 City of Florence Well Capacities (August 2007)

Wells	Combined Capacities (mgd)	Capacity Pump Rate/Well (gpm)
Wells 1 through 7	1.2	120
Wells 8 through 12	1.6	222

The City anticipates an average annual population growth rate of 3.5 percent. Information provided by the City indicates that water production/demand has also grown, but at a slower rate than the projected 3.5 percent rate of population increase. GSI (2008) calculated the expected average rate of increase in water demand during the highest demand months at 2.9 percent, assuming no constraints to increased demand, such as well production capacity or drinking water treatment capacity limitations.

Source Construction

The City has drilled an additional well (#13) in the field and will bring it on line in the near future (Figure 2.1). However, additional sources will be needed and the City is adding a second wellfield. The location of the second wellfield has been identified (Figure 2.2) and the delineation of this wellfield was included in the delineation model. The purpose of delineating the proposed wellfield is to provide information that can be used to protect this future source of water.

Nature and Characteristics of the Aquifer

This section describes the nature and characteristics of the North Florence Sole Source Dunal Aquifer, which supplies drinking water to the City of Florence wellfield. For additional detail, refer to Appendix D, *Delineation of Drinking Water Protection Areas City of Florence, Oregon*, February 15, 2012, GSI Water Solutions, Inc.

As described in the well construction discussion above, the depth to first water encountered in the wells and the static water level after well completion is the same in the aquifer. This implies that the groundwater is under atmospheric pressure only and is thus unconfined, i.e., there are no materials of low permeability separating the aquifer, or water table, from the surface. Based on the well reports, the aquifer appears to range in thickness from ~100 to ~130 feet thick, although this will vary with season, being thicker in the spring after the winter precipitation recharge when water table rises. The mean sea-level (MSL) elevation of the well screens varies from -11 feet MSL (Well 2) to -43 feet MSL (Well 3).

Both of the studies described in the next section indicate that groundwater discharges to the Siuslaw River to the south and southwest, and to the Pacific Ocean to the west northwest. As a result, groundwater flow direction varies from north to south in the southern part of the City and to the west in the northern part of the area.

The local geology consists of younger (< 10,000 yrs) Holocene dunes overlying older (24-100,000 years) Late Pleistocene dunes. The ancestral Siuslaw River cut channels in the older dunes prior to the deposition of the younger dunes. This resulted in the Holocene dunes having variable thickness across the area. The variable thicknesses are shown in Appendix D (*OSU Geophysics Group, 1980*) and vary from less than 20 feet to more than 200 feet. Thicker sections, e.g., along the eastern margin of the dune field apparently mark the locations of past channels of the ancestral Siuslaw River (Peterson, 2011, personal communication), while shallow sections represent topographic highs on the underlying sedimentary rock surface.

Seismic data indicate the variable thickness of the dune deposits in the Florence Area. Deep troughs produce sand thicknesses of up to 200 ft. These troughs mark the locations of past channels of the ancestral Siuslaw River. Shallow (~20 feet) sand accumulations mark the location of topographic highs on the underlying sedimentary rock surface.

Recharge: Virtually the entire recharge to the Dunal Aquifer is from direct infiltration of precipitation that falls on the dune surfaces. Total rainfall in Florence varies from 47 inches in a dry year to 122 inches in a wet year, with an average of 69 inches (Florence Stormwater Management Plan, 2000).



Figure 2.2 Proposed wellfield. Red=10 yr TOT; blue=20 yr TOT; green=30 yr TOT.

Rainfall in the Florence area during the 2010-2011 rainfall year varied from 67.1 to 78.2 inches (from individual resident records). Accounting for evapotranspiration, Hampton (1963) estimated that annual recharge to the aquifer was 55 inches/year.

Porosity. The porosity, the volume fraction of the bulk material that consists of open pore space, is a function of particle size. Hampton (1963) demonstrated that the dunal sands in the Florence area are very uniform in size. Based on the data he provides, it would appear that ~80% of the sand is in the size range of 0.2 to 0.275 mm and therefore is considered to be fine to medium sand. The effective porosity of fine to medium sand varies from 0.23 to 0.28 (Moss and Moss, 1990).

Hydraulic Conductivity. The hydraulic conductivity (K) of the aquifer was initially based on aquifer tests within the City's current wellfield. These tests indicated that the hydraulic conductivity of the sand deposits varied from 50 to 100 ft/day (Brown and Caldwell (2001). Aquifer thickness in the area of the wellfield suggested that the deposits were in excess of 200 feet thick (the SE trough in Figure 2 in Appendix D). After a review of well reports and specific capacity data, DHS (2003) determined that the aquifer's permeability was higher in the eastern part of the area near the current wellfield than in the west. It was also noted that the variable thickness of the aquifer would significantly influence the movement of groundwater in specific regions of the Dunal Aquifer.

Groundwater Flow Model

The Groundwater Flow Model is described in detail in the *Drinking Water Protection Areas Delineation Report*, February 15, 2012, GSI Water Solutions Appendix D. Groundwater flow in the Florence area was modeled using the numerical finite element model MODFLOW 2000 (Harbaugh and others, 2000) packaged in the program Groundwater Vistas® 5.44 (Environmental Simulations, Inc., 2007). Numerical models allow the modeler to divide (discretize) the area of interest into discrete rectangular volumes (cells) in three dimensions that can be individually characterized in terms of aquifer properties, assigned head, boundary conditions, etc. The use of multiple layers and cell volumes/layer is permissible.

Numerical models use input data provided by the modeler to calculate the distribution of hydraulic head within the model area (domain). The input data is developed from a conceptual model of the area in which the modeler develops an understanding of the local geology, hydrogeologic units, their characteristics, including aquifer thickness, permeability and porosity, areal recharge, and boundary conditions, e.g., streams, geologic contacts, etc.

As a means of constructing a representative model, the model is generally “calibrated” to one degree or another against data, generally hydraulic head, collected in the field as a check. An important resource in developing the Florence area conceptual model was the U.S. Geological Survey Water Supply Paper, “Groundwater in the Coastal Dune Area Near Florence, Oregon” (Hampton, 1963). This publication provides descriptions of the major hydrogeologic units in the area and a map showing the distribution of hydraulic head in the area. A study by Brown and Caldwell (2001) provided a basis for estimating aquifer characteristics. The head map produced by Hampton (1963) and the model results of a three dimensional groundwater model developed by EGR & Associates (1997) for the purpose of evaluating the impact of increasing use of Clear Lake water, were used as first order calibration targets in this study.

Three layers were established initially to be able to account for subtle variations in the amount of clay associated with the sand. However, based on a seismic study, it became apparent that the properties chosen for the aquifer layers needed to be done in a manner to more accurately reflect the topographic high of the bedrock beneath the dunes in the central area and to establish the vertical and horizontal variation of the transmissivity (permeability X thickness) of the aquifer. No specific boundaries marking the layers are implied by the layer boundaries.

Model Grid. For characterization of model parameters, a rectangular grid, comprising 90 columns by 160 rows, was constructed as 3 layers. Each cell has a dimension of 200 x 200 feet (Figure 2.4). This grid spacing was arbitrarily chosen to provide for a manageable number of cells given the size of the model area. For a larger scale head map of the active wellfield to qualitatively evaluate the modeled interference of the individual wells each cell was refined to a 100 x 100 foot grid (see below).

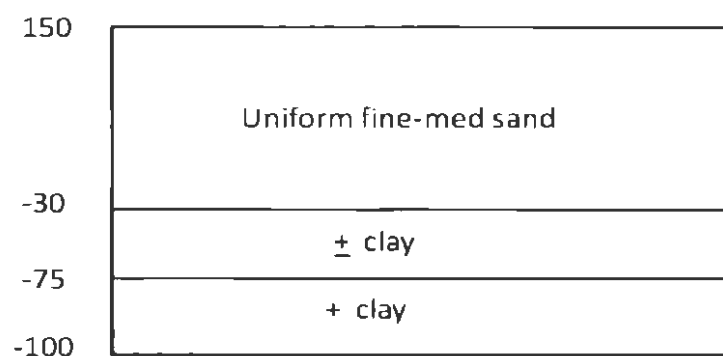


Figure 2.3. Schematic diagram of the layers originally established for the Florence Dunal Aquifer model (see text for discussion). Numbers on the y-axis reflect elevation (mean sea level).

The model grid was anchored to a specific location with UTM and Oregon State Plan coordinates. Specifically, the origin of the grid is at the UTM coordinates 409050E and 4868000N or $x = 3964455.55$ and $y = 857063.85$, NAD83 Oregon State Plane, South Zone, International feet, respectively.

Model Boundaries. The eastern boundary of the dune deposits (Figure 2.5) is marked by a topographic slope break at the contact between the dune deposits and underlying Flornoy Formation of Middle Eocene. These rocks, exposed in outcrop just east of Florence on Highway 26, consist of fine grained sediments, chiefly siltstone. Based on exposures, the Flornoy contains some fracturing. For the purpose of this model, the sedimentary unit was considered impermeable and was considered to be a no flow boundary, i.e., not contributing groundwater to the dune sands. Also considered to be a no flow boundary is the northernmost boundary arbitrarily drawn at $45^{\circ} 3.1' N$. The Pacific Ocean forms the western boundary and is considered to be a constant head at a value of 0.0 feet.

Surface Water. The rivers, the lakes, and Munsel Creek were integrated into the flow model based on available data. The stage of the Siuslaw River and the North Fork of the Siuslaw were estimated based on digital elevations derived from the Florence 7.5 minute topographic map. Munsel Creek headwater stage was set at the average elevation of the outflow of Munsel Lake where the creek originates. Average lake elevations were determined from Portland State University's Center for Lakes and Reservoirs. Parameters used as input to the model are given in Table 2.3.

Recharge: Runoff coefficients were used to adjust the recharge rate as a function of land use (City of Florence, 2008), e.g., open dunes = 0, residential areas = 0.4, and commercial/industrial = 0.6 (Dunne and Leopold, 1978).

Porosity. For modeling purposes, a porosity value of 0.26 was chosen for the aquifer.

Hydraulic Conductivity. The distribution of hydraulic conductivity in the Dunal Aquifer was weighted as a function of the thickness of the sand deposits. The final model values of K varied 5 to 55 ft/day.

Wells. Individual well locations were determined using gps latitude-longitude measurements converted in model coordinates. Well locations are independent of cell location. Casing diameters were used as well diameters.

Model Results. The flow model was run through a number of iterations, during which input parameters were varied within hydrogeologically reasonable limits, until the predicted distribution of hydraulic head (elevation of the water table) matched reasonably well the data from direct measurement. The resulting predicted head contours are compared with the measured head distribution (January 2012) shown in Figure 2.6 below. The predicted vs. measured head contours are similar in overall pattern indicating that the model is a reasonable representation of actual conditions.

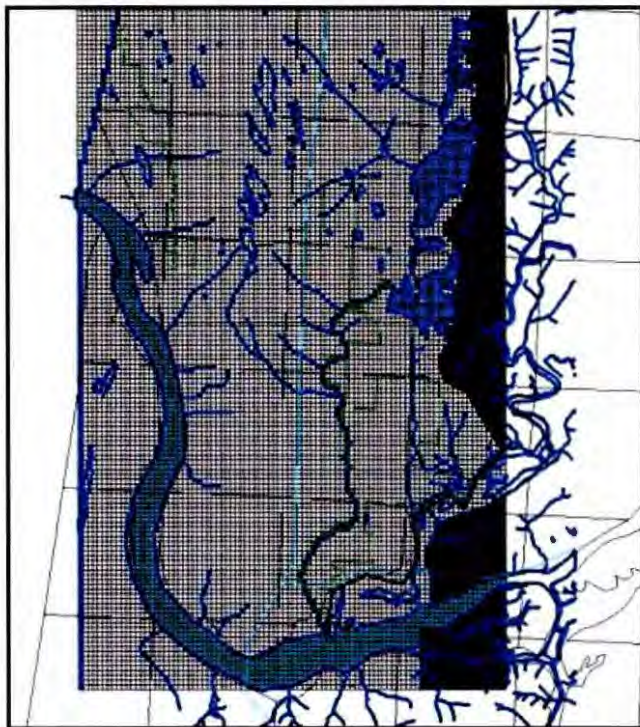


Figure 2.4. Model domain showing grid design, comprising 90 columns and 160 rows of cells with dimensions of 200 x 200 feet (14,400 individual cells).



Figure 2.5. Map showing the approximate extent of the Florence Dunal Aquifer. Thin red line is the City limits of Florence while the thin black line represents the urban growth boundary (UGB). Thick red line represents the eastern no-flow boundary of the model. The Siuslaw River and the Pacific Ocean form the southern and western boundaries. The thick green line forming the northern boundary is a no-flow boundary arbitrarily drawn at 45° 3.1' N.

Table 2.3. Model input for lakes, rivers and streams, Florence groundwater model.

	Stage (ft msl)	Bed Thickness	K (permeability) (ft/day)	W x L within cell
Siuslaw River	0	5 – 10	2 – 0.1	200 x 200
N. Fork Siuslaw River	2 - 0	3	2 - 1	100 x 200
Munsel Creek	89 – 0	2 – 1	1 – 0.5	50 x 200
Munsel Lake	89	3	0.5	NA
Ackerly Lake	93.5	3	0.5	NA
Clear Lake	98	3	0.5	NA
Collard Lake	115	3	0.5	NA

After the groundwater flow model described above was calibrated to a satisfactory level, the distribution of hydraulic head (Figure 2.6(a)) was used to predict the direction of groundwater flow in the vicinity of the existing and proposed wellfields. This was accomplished by using a reverse particle tracking method by which the model tracks the movement of water backwards in time. This allows for the determination of the boundaries and details of the Drinking Water Protection Area (DWPA).

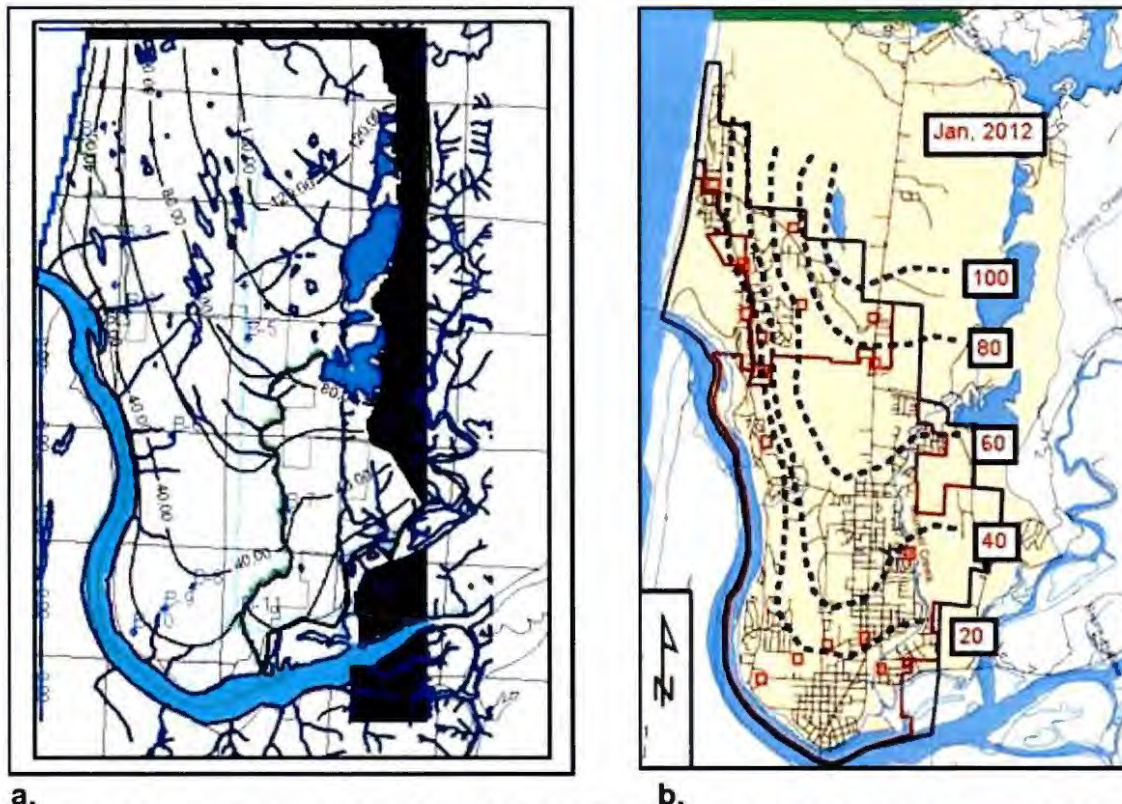
Drinking Water Protection Areas

The Oregon Health Authority (OHA) has certified the DWPA delineation for the existing wellfield (see *Drinking Water Protection Areas Delineation Report*, in Appendix D.) This certification assures that the delineations meet minimum requirements for the system size as outlined in OHA Oregon Administrative Rule (OAR) 333-61-0057 and that the delineation is a hydro-geologically reasonable representation of the capture zone of the well, wellfield or spring.

The delineation of capture zones for the proposed wellfield was not certified by OHA because the wells do not yet exist. OHA did approve the use of the delineation for the proposed wellfield for protection of possible future drinking water resources.

As stated in the certification letter from OHA in Appendix D, "The City of Florence has more than 3,000 service connections. As such, OHA DWP certification qualifies the existing wellfield delineation (i.e., wells 1 through 13) as a significant groundwater resource for the purposes of Statewide Planning Goal 5 (LCDC OAR 660-23-140)."

The DWPAs, or "capture zones," for the wellfields outline the land surface that overlies that part of the aquifer that supplies groundwater to the well over a given time period. For the delineation of the Florence DWPAs, the full well capacities determined by GSI (2007) and shown in Table 2.2 were used. Well 13 was not operational at the time of the GSI report; so, for planning purposes, the well was added to the model using a pumping rate of 220 gpm; and the pumping rate of 250 gpm was assumed for each of the proposed future wells.



a.
b.
Figure 2.6. A comparison of model head distribution prediction (a) with the actual head distribution during January 2012 (b).

OHA asks that specific time-of-travel (TOT) zones be delineated within a given capture zone, specifically, the 1-, 2-, 5-, and 10-year TOTs. For planning purposes, the City of Florence desired to extend the delineations out to include the 20- and 30-year TOTs. The results of the delineation modeling effort are shown in a regional view (30-yr) in Figure 2.7, a more focused view of the 10-yr TOTs for both wellfields in Figure 2.8, and closeup views of the 10-year TOT zones for the existing and proposed wellfields are shown in Figures 2.9 and 2.10, respectively.

Other Source Water Assessments (see Appendix E)

Confederated Tribes of the Coos, Lower Umpqua and Siuslaw Indians Source Water Assessment, June 2007 (Appendix E-2)

The Ancestral Territory of the Confederated Tribes of the Coos, Lower Umpqua and Siuslaw Indians is located along the central and south-central coast of Oregon. This homeland includes the coast, estuaries, tributaries, lakes, and upland forests of the Coos, lower Umpqua (including Smith) and Siuslaw Rivers, a portion of the North Fork Coquille River, and coastal tributaries from Tenmile Creek (Lane County) in the north to Whiskey Run Creek in the south.

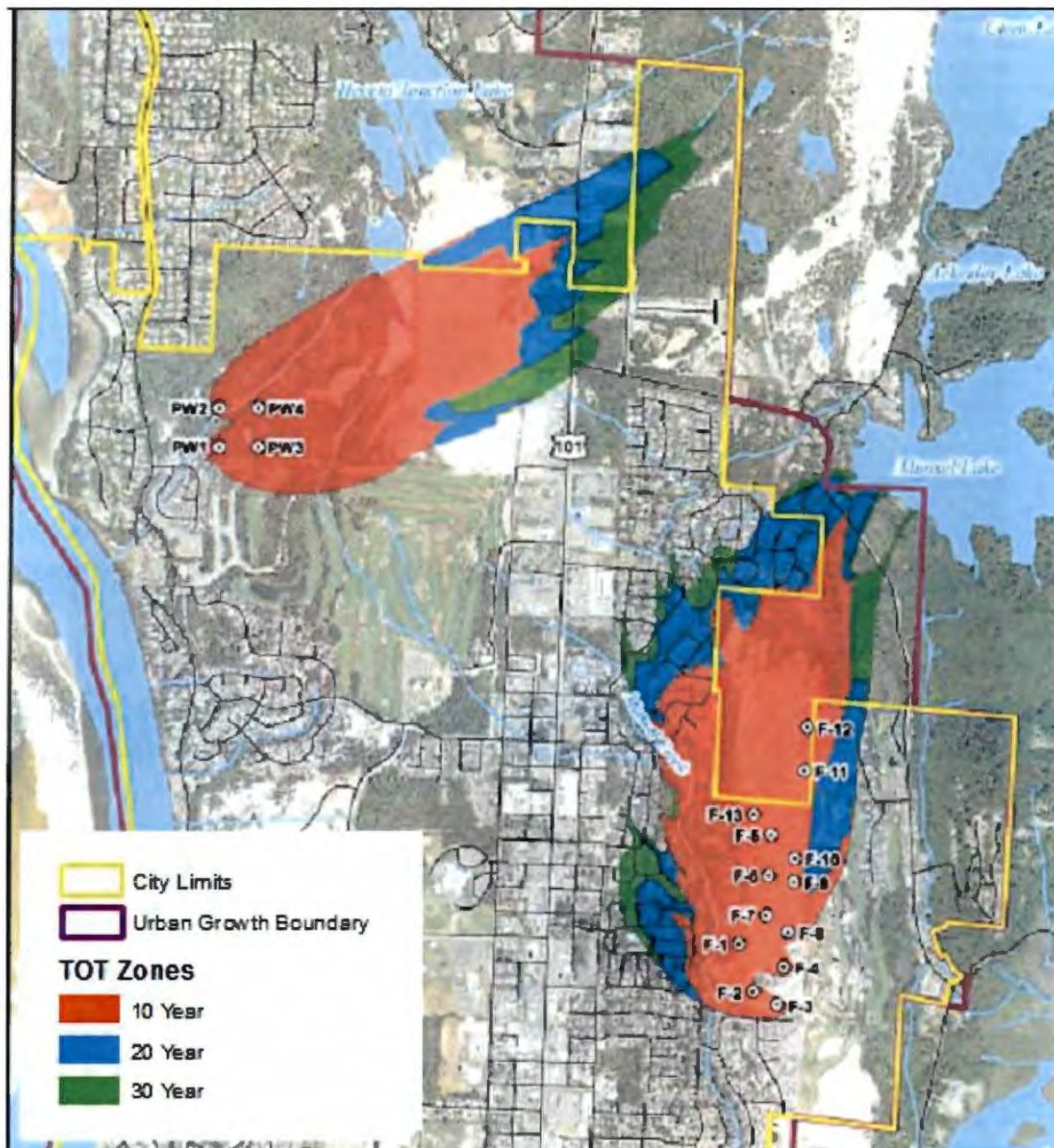


Figure 2.7. Regional view showing the 30-year capture zones of the existing well-field (lower right) and the proposed wellfield (upper left). Shading indicates the TOT zones: red = 10-yr, blue = 20-yr, and green = 30-yr TOT. Existing wells one through 13 and proposed wells 1 through 4 are shown.

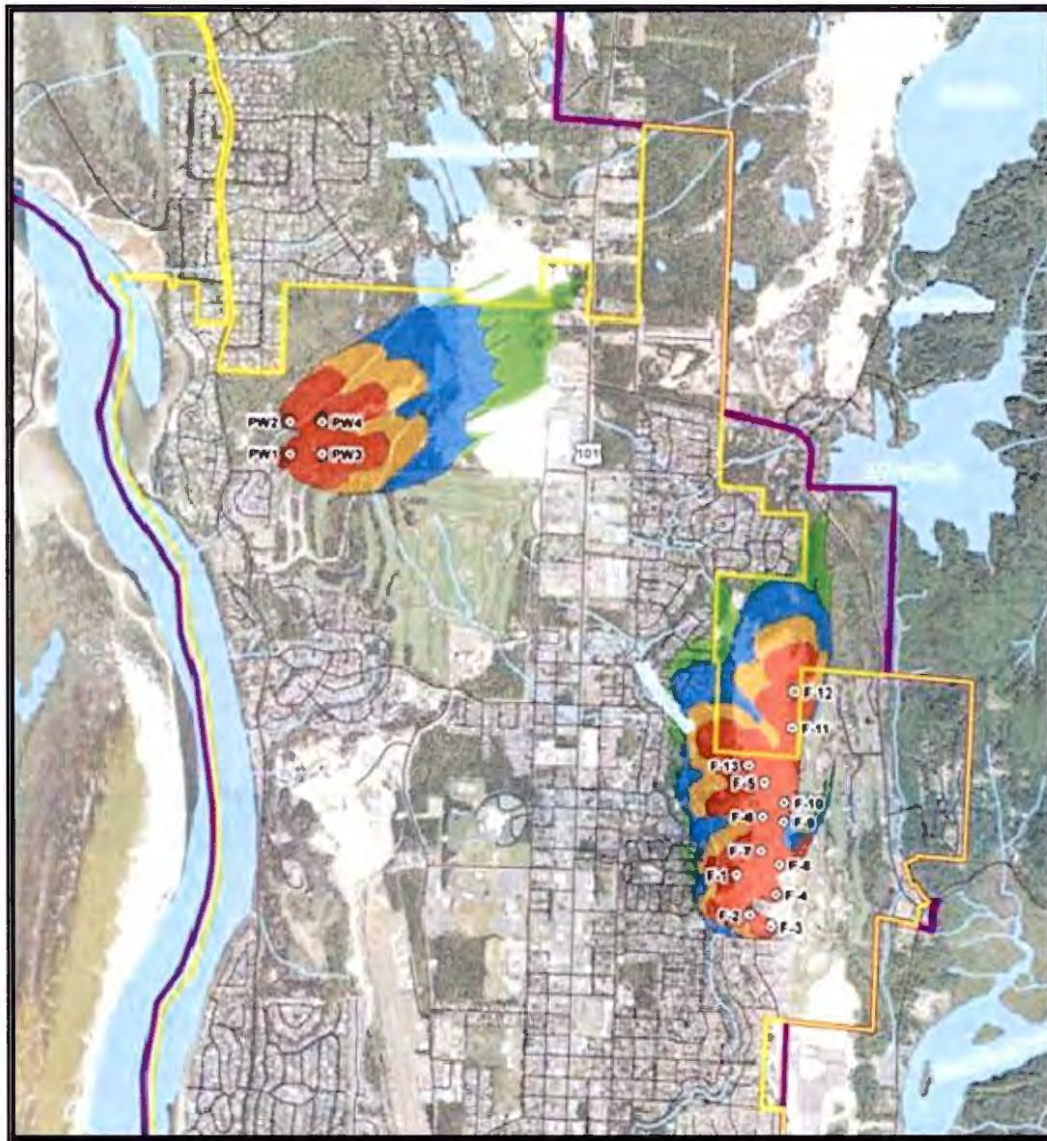


Figure 2.8. Ten-year capture zones for Florence's existing and proposed Wellfields. Different TOT zones indicated by shading: red = 1-yr TOT, orange = 2-yr TOT, blue = 5-yr TOT, and green = 10-yr TOT.

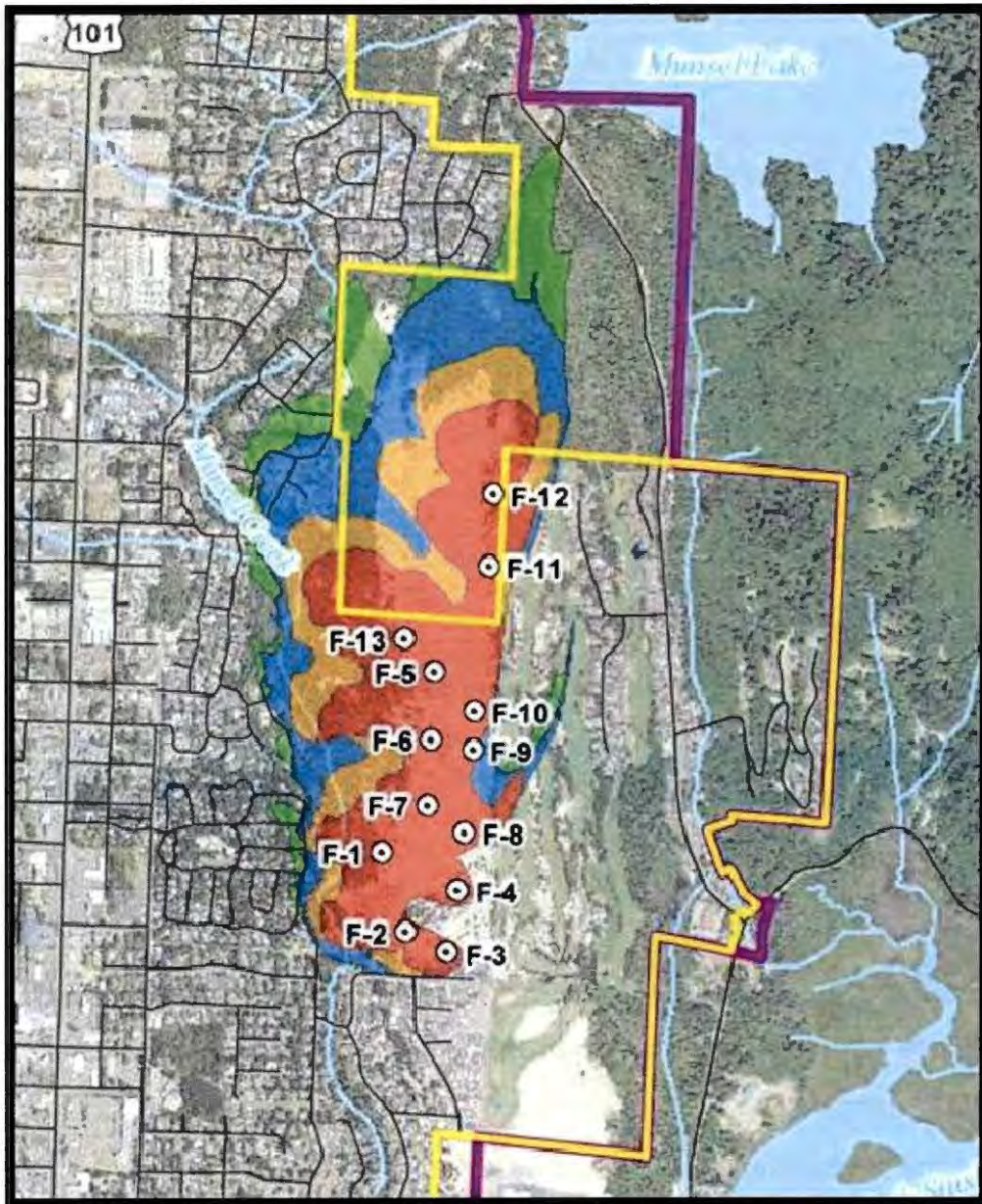


Figure 2.9. Existing wellfield 10-year TOT capture zones. Florence wells 1 through 13 are shown. Different TOT zones indicated by shading: red = 1-yr TOT, orange = 2-yr TOT, blue = 5-yr TOT, and green = 10-yr TOT.

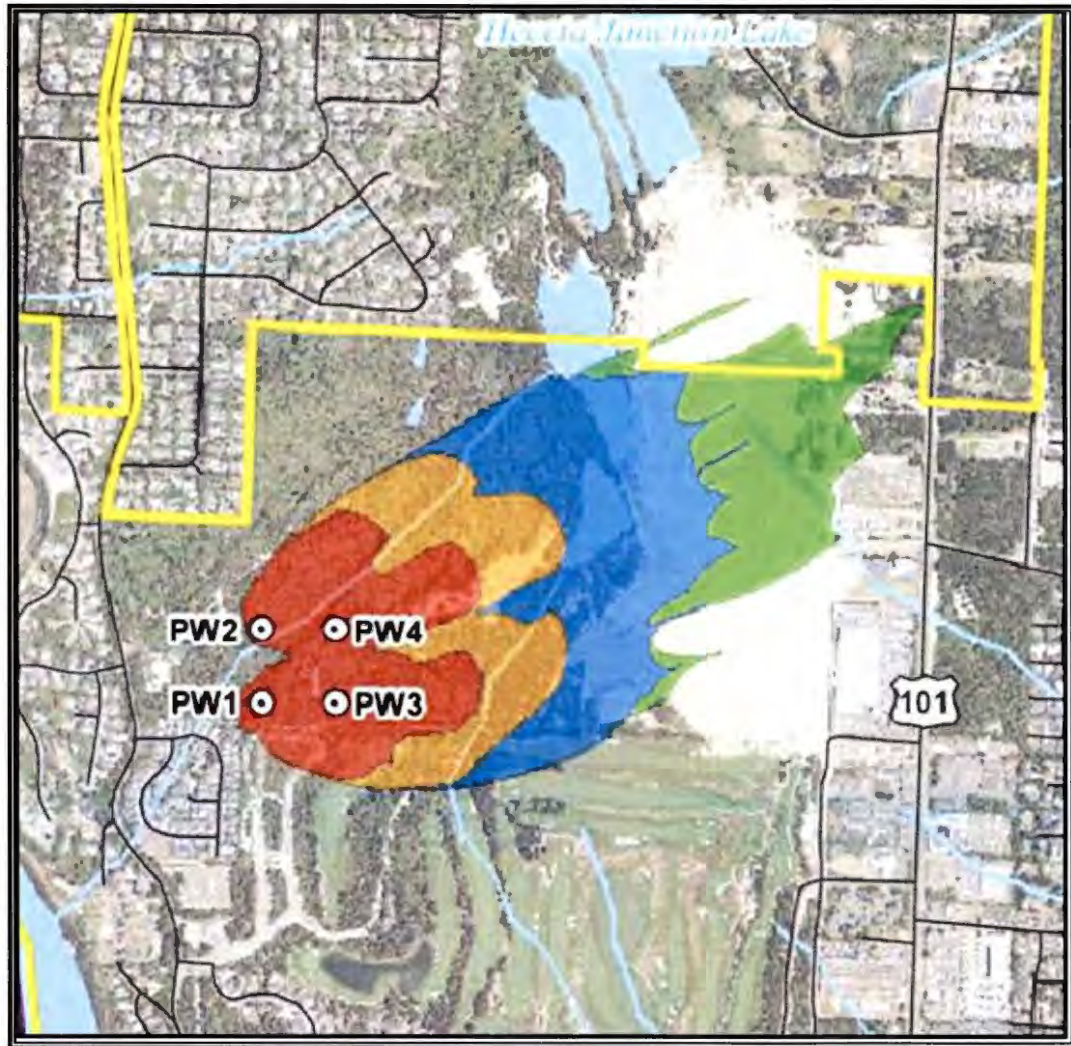


Figure 2.10. Proposed wellfield 10-year TOT capture zones. Florence wells 1 through 13 are shown. Different TOT zones indicated by shading: red = 1-yr TOT, orange = 2-yr TOT, blue = 5-yr TOT, and green = 10-yr TOT.

Currently, the reservation and trust land base of the Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians (CTCLUSI) consists of nineteen small and fragmented land holdings totaling 130 acres. These land holdings are scattered among the state of Oregon's Lane, Coos, and Curry counties. Only one of the Tribes' nineteen parcels is currently drawing source water directly from an aquifer. The other parcels either have no source water access or are reliant upon municipal water systems for drinking and waste water distribution.

Water and wastewater distribution to Tribal offices located in the Florence area are managed and maintained by the City of Florence. CTCLUSI's Department of Natural Resources (DNR) staff acquired copies of the City's reports for current and future assessment purposes. The Hatch Tract, located near the City of Florence, is not reliant upon a municipal water source and is drawing water directly from an aquifer. Water and wastewater distribution at the Hatch Tract is managed and maintained by the Tribes. The Tribes' Source Water Assessment describes source water conditions on the Tribes

Hatch Tract development site, identifies potential sources of contamination with a significant potential effect on Tribal source water quality at this site, and provides guidance for the Tribes' Hatch Tract source water management activities. The majority of development activities at the site are those associated with the Tribes' Three Rivers Casino (TRC) located on the Hatch Tract.

The Tribes' Hatch Tract and the Casino site location is a 98 acre parcel located in Lane County approximately 2 miles east of the City of Florence, Oregon at the confluence of the Siuslaw North Fork River and Mainstem of the Siuslaw River. The western part of the site is underlain by active dunes, whereas the eastern portion is underlain by a deflation plain. Segments of the North Fork Siuslaw River and Siuslaw Estuary are included on or immediately adjacent to portions of this tract. Hatch Tract is located over a sole source aquifer. According to the February 22, 2004 GeoScience, Inc. report titled *Dunal Aquifer Hydrogeology* prepared for the Confederated Tribes, "The site hydrology can be characterized as a dunal aquifer system which is recharged by precipitation and which discharges to surface water." Municipal wells for the City of Florence are reported to each yield 325 to 450 gallons per minute, or 468,000 to 648,000 gpd (gallons per day) (*ibid.*) Summer irrigation of the golf course to the north of the Hatch Tract can use 400,000 gpd. The Three Rivers Casino currently uses approximately 10,000 gallons per day. Future development of the site is not expected to use more than 70,000 to 200,000 gpd, based on other Tribal developments of this nature in western Oregon.

Water level measurements conducted at the Hatch Tract during December 2003, January 2004, and February 2004, indicate the groundwater gradient across the site is towards the southeast, at approximately 0.4 percent during periods of lower precipitation and 1.2 to 1.5 percent during periods with heavier precipitation. The highest elevations of the potentiometric surface are located in the northwestern portion of the site, where the seasonal high elevation is around 30 feet above mean sea level (AMSL). The minimum seasonal high elevation of the potentiometric surface at the Hatch Tract is likely located in the southeastern part of the site. Flowing and standing water was observed at the southern portion of the site at elevations of approximately 12 feet to 14 feet AMSL. This observation is consistent with an elevation change of the potentiometric surface across the southern two thirds of the site of approximately 27 feet over a distance of 1800 feet (1.5 percent).

Well logs from the City of Florence municipal wells, located approximately ½ mile north-northwest of the Hatch Tract (Map 4), indicate the thickness of the dune sand deposit in that area ranges from 120 to 170 feet. Municipal well elevations were determined using a USGS topographic map. The topographic map analysis indicated that the elevations in the vicinity of the municipal well field are similar to those at the Hatch Tract. The saturated thickness of the aquifer in that vicinity ranges from 100 to 120 feet. If the gradient remains similar to those measured at the site, it is probable that the saturated thickness of the aquifer beneath the site is approximately 80 to 100 feet.

The wells in the municipal field are constructed with screened intervals 30 to 40 feet long which terminate from 0 to 20 feet above the bottom of the aquifer. This indicates that salt water intrusion has not been considered a potential problem to date. The wells are located 2.5 miles from the ocean, with the Siuslaw River forming a barrier against salt water intrusion from the west and south. The presence of fine-grained sediments at the bottom of the aquifer reduces the risk of salt water intrusion.

Potential on site contaminant sources identified by the Tribes' Department of Natural Resources Staff (DNR) during site surveys and reviews of Hatch Tract construction plans are: pesticide/fertilizer/ petroleum/ storage (above ground storage tanks – ASTs),

handling, mixing and cleaning areas; stormwater outfalls; potential impacts to groundwater associated with cone of depression well interference or well head cone of depression induced recharge from the North Fork River or wetland located below the Hatch Tract's drain field; and percolation of reclaimed water irrigation used for dune stabilization on the site.

According to the Florence Source Water Assessment Report, the North Florence Dunal Aquifer is considered to be highly sensitive and susceptible to contamination from viral contaminant sources located within the two-year time-of-travel zone for the city's drinking water protection area (e.g. sewer lines and septic systems associated with residential housing).

The City of Florence Source Water Assessment Report includes an inventory of potential contaminant sources and an analysis of the results in terms of current, past, and future land uses; their time of travel (TOT) relationship to the well site; and their associated risk rating. In general, land uses that are closest to the well and those with the highest risk rating pose the greatest threat to the City of Florence and the Tribes' Hatch Tract drinking water supply.

The City of Florence's delineated two-year time-of-travel zone is primarily dominated by residential and municipal land use. Four potential contaminant sources were located within the two-year time-of-travel zone for all the wells located in the city's DWPA and included Ocean Dunes Golf Course, high density housing, the City of Florence Drinking Water Treatment Plant, and city sewer lines. The potential contaminant sources within the two-year time-of-travel all pose a risk of transmitting micro-organisms to the groundwater. A description of the potential contaminant sources associated with each of the municipal wells is provided below along with a map displaying these wells relative to TRC. The municipal drinking water protection area within the five-year and ten-year time of travel zones is primarily occupied by residential and municipal land use. Three potential contaminant sources were identified in this area and include B&E RV Park, stormwater outfalls, and Munsel Lake.

The City of Florence's Drinking Water Protection Area is upgradient of the Tribes' Hatch Tract facilities and does not include Hatch Tract in its delineation. However, due to the close proximity of Hatch Tract to the City of Florence's Drinking Water Protection Area, the potential contaminant sources for Hatch Tract source water are the same as those identified by the City of Florence Source Water Assessment Report.

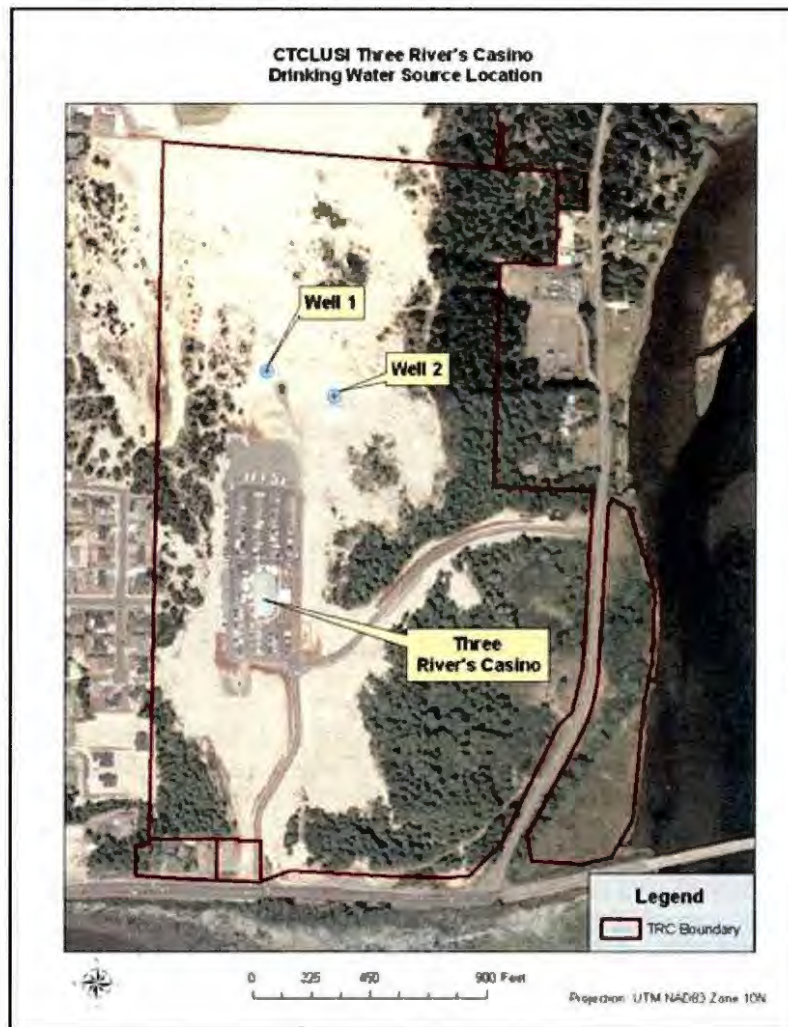


Figure 2.11. Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians Drinking Water Source location.

Seven monitoring wells have been installed around the perimeter of the Hatch Tract drainfield area. These wells have been placed to provide maximum protection to surrounding sensitive resources. There are three potentially sensitive resources located near the area. First, the drainfield is located downgradient of the casino's domestic wells and approximately 9,000 feet to the northwest. Down gradient to the drainfield lies a wetland area. This wetland area is located approximately 200 feet to the southeast of the drainfield. The third sensitive area is a residential area located cross gradient approximately 4,500 feet to the northeast. This residential area is serviced by well water rather than municipal supply.

Prior to moving into the protection phase, the Tribal Drinking Water Protection Team will review the information presented in this document in detail to clarify the presence, location, operational practices, actual risks, etc. of the identified facilities and land use activities.

Heceta Water District Source Water Assessment

Heceta Water District's Source Water Assessment was performed by the Oregon Department of Environmental Quality (DEQ) and the Oregon Health Division (now Oregon

Health Authority). The Assessment was formally transmitted to Heceta Water District on September 11, 2001 and is included in Appendix E-1.

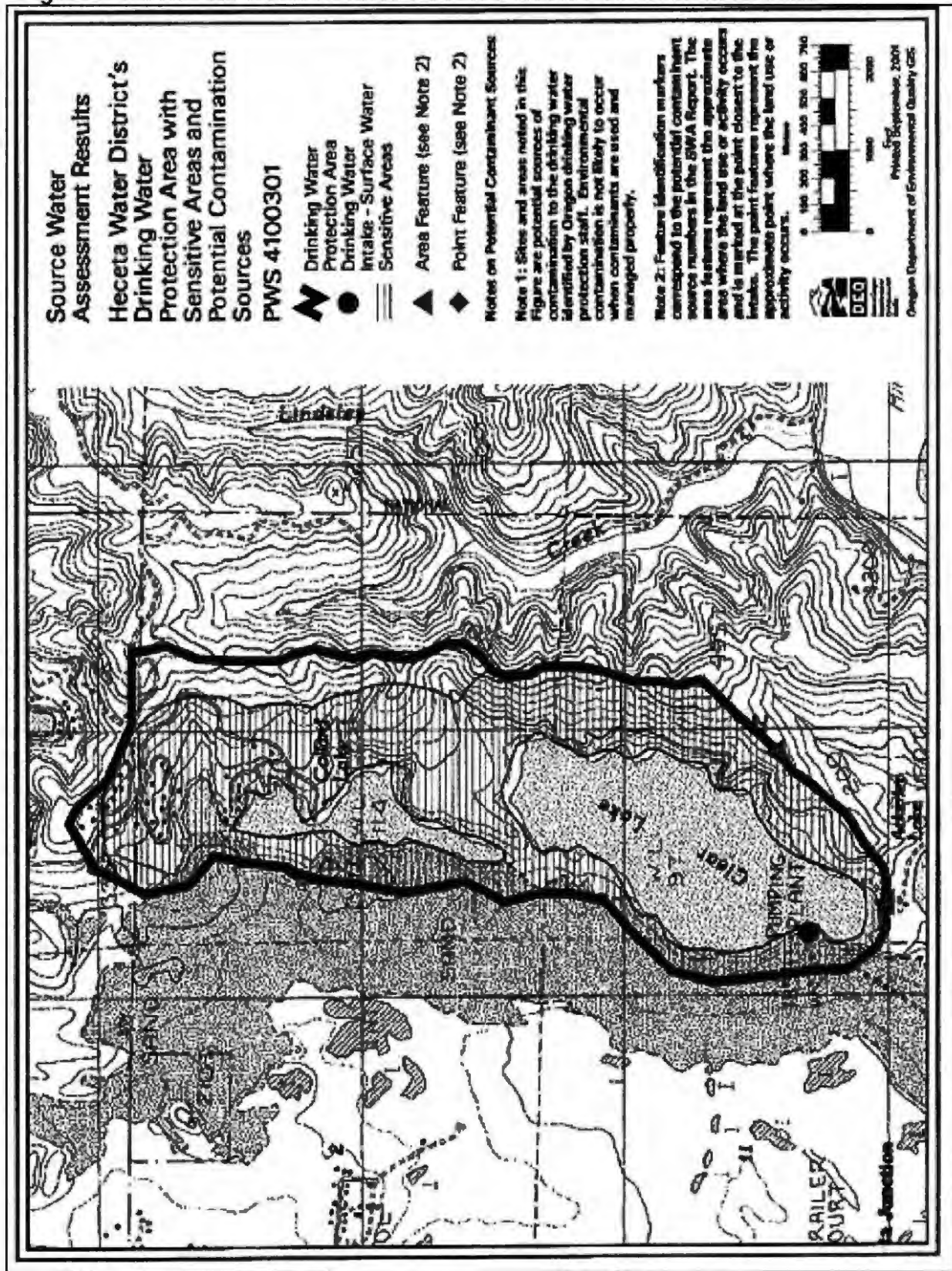
The drinking water for Heceta Water District is supplied by an intake on Clear Lake. This public water system serves about 4,500 citizens. The intake is located in the Lower Siuslaw River Watershed in the Siuslaw sub-basin of the Northern Oregon Coastal Basin. The geographic area providing water to Heceta Water District's intake, the Drinking Water Protection Area (DWPA), includes 149.6 acres of lakes (Clear Lake and Collard Lakes) and 0.23 miles of streams. The DWPA encompasses a total area of 0.96 square miles. The elevation change from the upper edge of the watershed to the intake is about 400 feet and the intake is located at an approximate elevation of 100 feet. Forestlands primarily dominate the delineated drinking water protection area.

The results of the Source Water Assessment are presented in Figure 2.12. As shown, the primary contaminants of concern for surface water intakes are sediments/turbidity, microbiological, and nutrients. The sites and areas identified are potential sources of contamination and water quality impacts are likely to occur only when contaminants are not used and managed properly.

Two potential sources of contamination were identified, both within sensitive areas: rural residential areas and future land development. These sources pose a relatively higher to moderate risk to the drinking water supply. These sources, if improperly managed, could impact the water quality in the watershed.

The existing Potential Contaminant Source Types in the DWPA are improperly installed or maintained wells and abandoned wells; and septic systems on lots less than one acre in size. The majority of the homes that could present a risk are around Collard Lake. Future land development in Lane County southeast of Clear Lake, outside the Florence UGB, is another potential contaminant source.

Figure 2.12. Heceta Water District's Source Water Assessment Results



Chapter 3: Water Monitoring and Potential Contaminant Source Inventories

This Chapter presents the City's surface and groundwater monitoring process and results and discusses the sensitivity of the aquifer and the Drinking Water Protection Areas (DWPAs) to these findings. Also presented are the results of the Potential Contaminant Source (PCS) Inventories for the existing and proposed wellfields. The results of the PCS inventory are combined with the sensitivity determination to provide an evaluation of the susceptibility of groundwater to those potential sources.

Surface and Groundwater Monitoring Process and Results

The EPA-funded Siuslaw Estuary Partnership includes a Surface- and Groundwater Monitoring Program to protect the North Florence Sole Source Dunal Aquifer and to protect and improve water quality in Munsel and Ackerley Creeks and the Siuslaw River, classified as Water Quality Limited under the Clean Water Act and on the state's 303(d) list of Impaired Water Bodies. Sixteen groundwater "test wells" are installed throughout the aquifer to monitor levels and quality; and stream gages, sondes, and grab sampling are used in Munsel and Ackerley Creeks to monitor stream flow and water quality. The Surface and Groundwater Monitoring Program is operating under an EPA-approved Quality Assurance Project Plan (QAPP) (Appendix F).

Appendix A contains the report "Water Quantity and Quality: Summary of Observations, October 2010-September 2012" prepared by GSI Water Solutions (Appendix A-1) and the report on Oregon beach Monitoring Program results (Appendix A-2). Eventually, data on the estuary, as available, from the Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians will also be examined.⁷ As of this writing, the City and its partners have collected, analyzed, and reported on two years of data on groundwater levels and quality and surface water flow rates and quality. The City was recently awarded an Urban Waters Small Grant to help fund continuation of the monitoring program for another two years.

Data collected and analyzed through the City's Surface and Groundwater Monitoring Program were used in the Groundwater Flow Model and all monitoring results have been reported in quarterly reports prepared by GSI Water Solutions, Inc., the hydrogeologists retained as consultants to the Partnership. These reports are summarized in Appendix A of this plan.

These data make a significant contribution to local, state, and federal knowledge about baseline conditions and issues in this highly sensitive urban environment. Through this Partnership, the City and its partners have also gained tools, such as groundwater monitoring wells, stream flow gages, temperature sondes, and hand-held measuring devices, and training in data collection, analysis, and reporting. The City is also a part of the Oregon Department of Environmental Quality's (DEQ) Volunteer Monitoring Program through which the groundwater and surface water data are entered into state and federal databases.

⁷ The tribes have agreed to place a sonde in the estuary near the Siuslaw Bridge in order to collect data on urban impacts on the estuary. As of this writing, the sonde has not yet been placed.

As reported in monthly and annual monitoring reports on the City's web site, the City has identified some contamination threats in both surface water and groundwater, including *E. coli*, coliform bacteria, caffeine, and elevated nitrate levels. Caffeine clearly indicates human impact on water quality. As discussed in Chapter 4, the City is working with its partner agencies to problem solve these findings. The City and some of its partners have agreed to continue to work together on the monitoring program for at least two more years in order to get a better sense of the trends, beyond the data being collected now.

At the same time, coho salmon, a federally-listed threatened species, have been observed spawning in both Munsel and Ackerley Creeks and the Salmon and Trout Enhancement Program (STEP) volunteers report that over 250 coho returned to Munsel Creek in the last year. The Confederated Tribes and the Watershed Council are sharing data on water quality in the estuary in order to begin to identify associated trends; the additional two years of monitoring will better enable these partners to start to identify and address urban impacts on the estuary.

Surface Water

Surface water flow and quality are monitored at four locations: three in Munsel Creek and one in Ackerley Creek (Figure 3.1).

The following is a summary of monitoring results as of October 1, 2012. See Appendix A for the full report.

Streamflow. City personnel measured streamflow monthly from November 2010 to September 2012 at the four surface water monitoring sites: Munsel Upstream (Munsel Creek upstream of Munsel Lake Road near the outlet of Munsel Lake), Munsel Midstream (Munsel Creek at Munsel Greenway Park), Munsel Downstream (Munsel Creek at the Public Works Department on Spruce Street), and Ackerley (Ackerley Creek upstream of Martin Road). Figure 3.1 shows the monitoring sites on a map.

Streamflow has peaked in each year in the spring (primarily April) and has reached its lowest levels in September at all monitoring sites. The peak in the spring is the result of a combination of spring rainfall, leading to a rise in the water table and causing more



Figure 3.1. Surface water monitoring sites:
ACK: Ackerley Creek upstream of Martin Road
MLK: Munsel Creek upstream of Munsel Lake Road
MGP: Munsel Creek at Munsel Greenway Park
PWS: Munsel Creek at Public Works on Spruce St.

groundwater to discharge at the surface, and the addition of high discharge from upgradient. The trough in September is the result of a prolonged period of decreased rainfall and a low water table, and lower discharge (less surface runoff and lower groundwater discharge) from upgradient. No data points are shown in the winter for Ackerley Creek, because the City did not enter the creek to measure streamflow because of the presence of salmon redds. The high streamflow measured in July at Munsel Upstream is an outlier, which City personnel believe may have been caused by the removal of a beaver or debris dam at the outlet of Munsel Lake that day, as City personnel found a large amount of recent debris on the banks near the outlet. City personnel explained that streamflow levels were low the day before streamflow measuring and when collecting water quality samples, and were surprisingly high the day of streamflow monitoring. City personnel said that streamflow at the other sites appeared reasonable the day of streamflow monitoring, suggesting either the increase in flows had not reached downstream or had dissipated along its course.

Munsel Upstream averaged 9.9 cubic feet per second (cfs), Munsel Midstream averaged 11.9 cfs, and Munsel Downstream averaged 13.6 cfs. This shows an increase in streamflow from upstream to downstream that suggests that Munsel Creek is generally a gaining stream, consistent with the conclusions concerning groundwater-surface water relationships discussed above.

In addition, continuous water level measurements are taken every 15 minutes by pressure transducers at Munsel Upstream, Munsel Midstream, and Ackerley Creek. The Oregon Water Resources Department (OWRD) owns the pressure transducer at Munsel Midstream while the City owns the others. GSI Water Solutions, Inc. (GSI), staff members are working with OWRD's regional staff to find someone to transform the water level data into streamflow data.

Water Quality

City personnel collected stream temperature, DO, specific conductance, and pH on a monthly basis from October 2010 through September 2012 using a hand-held probe. City personnel also deployed water temperature data loggers at each monitoring site that record stream temperature continuously every 30 minutes. The following describes this water quality data.

Water Temperature. Stream temperatures peak in July or August and drop to their lowest levels in the winter, particularly January. This is in contrast to groundwater temperatures (discussed above), which reach their lowest temperatures in the early spring. Ackerley and Munsel Upstream had the highest maximum stream temperatures of 19.9°C and 18.7°C, respectively. The Munsel Midstream and Munsel Downstream had maximum stream temperatures of 16.9°C and 16.6°C, respectively. These groupings reflect a trend that Ackerley and Munsel Upstream appear to have similar stream temperatures to each other while stream temperatures in Munsel Midstream and Munsel Downstream are similar. Minimum stream temperatures ranged from 6.3°C to 7.0°C among the four monitoring sites.

For comparison to the instantaneous probe readings taken in the morning, Ackerley and Munsel Upstream had maximum stream temperatures of 26.6°C and 23.9°C, respectively. Munsel Midstream and Munsel Downstream had maximum stream temperatures of 20.7°C and 18.1°C, respectively. This apparent "cooling downstream" is probably the result of the influx of groundwater, with temperatures generally less than 15°C. These stream temperature groupings are consistent with the probe stream temperature groupings described above. Minimum stream temperatures ranged from 3.4°C to 5.4°C

among the four monitoring sites. These data from the data loggers demonstrate the value of continuous temperature recording and its capability of recording the full extent of stream temperature fluctuations. The data logger maximum stream temperatures were as much as 6.7°C greater and minimum stream temperatures were as much as 2.9°C less than instantaneous stream temperatures recorded with the probe. The data logger also recorded diurnal stream temperature fluctuations, which showed Munsel Upstream and Ackerley with large changes in daily stream temperature in the summer compared with the other two sites. Both Munsel Upstream and Ackerley are near the outlets of lakes.

Dissolved Oxygen. DO concentrations are temperature dependent, being higher at cooler temperatures and lower at warmer temperatures. DO concentrations are generally close to or more than 10 mg/L from November through April. DO then drops in the summer months to about 8 mg/L in Munsel Midstream and Munsel Downstream and to about 6 mg/L or less in Munsel Upstream and Ackerley. These DO data correspond with the stream temperature data presented above: DO is higher in the winter months when stream temperatures are cooler and is lower in the summer months when stream temperatures are highest. The groupings of sites by similar DO concentrations correspond with the groupings by similar stream temperatures. In addition, the lowest DO levels occur in the summer when streamflow is at its lowest, likely reflecting how lower streamflow results in less oxygenation of the water.

Specific conductance. Specific conductance measures the ability of water to conduct an electrical current. Specific conductance depends on the water temperature and on the concentration of positively and negatively charged dissolved ions, and it is directly proportional to the concentrations of ions in the water. Ions can come from natural sources, such as soil and rocks, or from humans, such as human and livestock waste, fertilizers, and herbicides. As a result, spikes in specific conductance can indicate anthropogenic inputs in the stream. The specific conductance values reported in this study fall within the typical range for Oregon Coast Range streams of 150 µS/cm or less (Water Quality Monitoring, 1999). Specific conductance (reported at 25°C to account for the effect of temperature) has remained around 60 µS/cm throughout the study in Munsel Upstream and Ackerley. Munsel Midstream and Munsel Downstream were generally higher in specific conductance than the other two sites, potentially caused by groundwater discharging to the creek (see discussion of groundwater conductance above), and also had increases in specific conductance, most notably in periods of lower flow when the decreased streamflow likely concentrated the ions. The reason for the sudden decrease in specific conductance in those two streams in October 2011 could be related to 3.5 inches of rain that fell between October 2 and October 5.

pH. pH describes how acidic or basic water is by measuring the concentration of hydrogen ions in water. pH can affect fish egg production and survival along with the functioning of other biota. A primary cause for pH changes in streams is seasonal and daily variation in photosynthesis by aquatic plants. The process of photosynthesis uses hydrogen molecules, which cause the hydrogen ion concentration to decrease, resulting in an increase in pH. Conversely, respiration and decomposition lower pH. The pH of water, such as in streams, typically ranges from 6.5 to 8.5 (Washington Department of Ecology, 2012). pH at the monitoring sites generally has stayed within that typical range, with a few exceptions in Munsel Upstream in August and September and in Munsel Downstream in December 2011. The reasons for these exceptions are unknown, but in Munsel Upstream appear to be related to summertime stream conditions or human activities near the monitoring site.

Lab Results

Water quality grab samples were taken at each monitoring site for laboratory analysis to better characterize stream conditions. *E. coli* sampling occurred monthly, nitrate and total phosphorus sampling occurred quarterly, and a comprehensive sampling occurred semi-annually in March and September. The comprehensive sampling included testing for *E. coli*, nitrate, total phosphorus, alkalinity, total organic carbon, common ions, zinc and copper at Munsel Downstream only, lead in Munsel Creek below a gun club only, VOCs, inorganic compounds (IOC)(e.g., arsenic and chromium), glyphosate, chlorinated acid herbicides (e.g., 2,4-D), and caffeine.

Table 3.1 summarizes some of the lab results from surface water quality samples to date. Nitrate; total phosphorus; VOCs; glyphosate; 2,4-D; and chromium were not detected during the study. Arsenic was detected in Munsel Midstream in September 2012 only (0.0026 mg/L, just above the reporting limit of 0.002 mg/L). Lead was detected only below the gun club in September of 2011 and 2012, suggesting that streamflow, or perhaps increased use of the facility in the summer, may influence the detection of lead. The lead detections were just above the reporting limit of 0.0001 mg/L (0.00011 in 2011 and 0.000169 mg/L in 2012). Caffeine was detected at all four sites at least once during this study (ranging from 2.4 ng/liter (ng/L) to 49 ng/L) and the most detections occurred in September when streamflow was lower. Caffeine is used as an indicator of anthropogenic contamination because caffeine does not occur naturally in the environment and only humans consume it. *E. coli* was detected at levels of concern in 7 months of 2011 and 3 months in 2012, and is discussed in greater detail below.

Table 3.1. Lab results from surface water quality samples. MLK=Munsel Upstream, MGP= Munsel Midstream, PWS=Munsel Downstream, ACK=Ackerley.		
Parameter	Sampling Date	Result
Nitrate	10/10, 3/11, 6/11, 9/11, 11/11, 3/12, 6/12, 9/12	Not Detected
Total Phosphorus	3/11, 6/11, 9/11, 11/11, 3/12, 6/12, 9/12	Not Detected
VOCs	3/11, 9/11, 3/12, 9/12	Not Detected
Glyphosate/2,4-D	3/11, 9/11, 3/12, 9/12	Not Detected
Chromium	3/11, 9/11, 3/12, 9/12	Not Detected
Arsenic	3/11, 9/11, 3/12	Not Detected
	9/12	Detected (MGP)
Lead	3/11, 3/12	Not Detected
	9/11, 9/12	Detected (Below Gun Club)
Caffeine	3/11	Detected (PWS)
	9/11	Detected (MGP, MLK, ACK)
	3/12	Detected (MGP)
	9/12	Detected (PWS, MGP, MLK, ACK)
<i>E. coli</i>	11/10, 1/5/11, 1/31/11, 3/11, 5/11, 11/11, 1/12, 3/12, 4/12, 5/12, 6/12, 7/12	Detection Below Level of Concern
	4/11, 6/11, 7/11, 8/11, 9/11, 10/11, 12/11, 2/12, 8/12, 9/12	Possible Concern (See Table 3.2)

E. coli

A water body is considered to be in exceedance of the state standard for *E. coli*, and thus "impaired," when results show a "30-day log mean greater than 126 *E. coli* organisms per 100 ml based on a minimum of five (5) samples, or more than 10 percent of the samples exceed 406 *E. coli* organisms per 100 ml, with a minimum of at least two exceedances" (Oregon's 2010 Integrated Report). When *E. coli* samples cannot be taken frequently during the course of a month, as was the case with this monitoring program, a single sample criterion can be used to characterize the level of risk associated with *E. coli* levels. *E. coli* levels equal to and above the single sample criterion of 406 mpn/100 mL ("mpn" refers to an estimate of *E. coli* content using the Most Probable Number [mpn] method) are considered to be at "high risk" of impairment and between 127 and 405 mpn/100 mL are considered to be at "moderate risk" of impairment.

E. coli sampling in this monitoring program occurred on a monthly basis from late November 2010 to September 2012, with the exception of Ackerley, which could not be sampled on one occasion because of the presence of spawning salmon. Table 3.2 shows the sampling dates when at least one site had *E. coli* levels considered "moderate risk" or "high risk." For sampling dates not shown, *E. coli* levels were less than levels of concern at all sites.

Of the 22 sampling events to date, approximately 45 percent of the months had "moderate risk" or "high risk" *E. coli* levels. The incidences of elevated *E. coli* levels occurred throughout the year, instead of just one season. Twenty seven percent (6 of 22) of Munsel Downstream samples and 18 percent (4 of 18) of Munsel Midstream samples exceeded the 406 mpn/100 mL standard described above, which is more than the 10 percent that could indicate that Munsel Creek is "impaired." Ackerley had two exceedances and Munsel Upstream had one exceedance. In addition, five samples from the three Munsel Creek sites exceeded 406 mpn/100 mL within a 30-day period (June 8 to July 7). (Note: the sites are relatively close to one another and may be "autocorrelated," and thus, not independent.) Overall, these levels are sufficient to trigger concern and possibly may indicate that Munsel Creek is "impaired." Consequently, GSI recommends continued monitoring to determine whether *E. coli* levels continue to exceed the single sample criterion, particularly at Munsel Downstream and Munsel Midstream (PWS and MGP). Based on that information, more intensive monitoring studies can be planned to better characterize possible bacteria sources.

Table 3.2. <i>E. coli</i> lab results from surface water quality samples. Red indicates "High risk," more than 406 <i>E. coli</i> per 100 mL, and yellow indicates "Moderate risk," 127 to 406 <i>E. coli</i> per 100 mL.										
Site	Date									
	4/6/11	6/8/11	7/7/11	8/2/11	9/6/11	10/5/11	12/7/11	2/8/12	8/1/12	9/5/12
PWS	131.4	1119.9	517.2	112.6	187.2	980.4	770.1	1732.9	2420	45
MGP	816.4	1046.2	579.4	344.8	137.6	387.3	488.4	101.7	6	178
MLK	ND	1986.3	36.9	76.7	142.1	42	142.1	2	116	22
ACK	ND	365.4	5.2	19.9	27.5	34.5	686.7	2	20	548

Stormwater. Stormwater samples were collected on December 28, 2011, January 18, 2012, and March 21, 2012. The samples were taken at four sites: Munsel Downstream (PWS), a stormwater outfall into Munsel Creek at 38th Street (M38), a stormwater outfall in Old Town (OT), and at Rhododendron Drive near 35th Street (Site A). The stormwater sampling included testing for *E. coli*, nitrate, total phosphorus, alkalinity, total organic carbon, common ions, VOCs, IOCs (e.g., arsenic and chromium), glyphosate, chlorinated acid herbicides (e.g., 2,4-D and pentachlorophenol), caffeine, and total petroleum hydrocarbons (TPH). In addition, stormwater samples were tested for zinc and copper at PWS only and for lead in Munsel Creek below a gun club only.

Nitrate, VOCs, glyphosate, and 2,4-D were not detected. Phosphorus was detected at PWS in January (0.1 mg/L, the reporting limit), arsenic was detected at Site A in both samples (0.0026 mg/L in December and 0.0025 mg/L in March; 0.002 mg/L reporting limit), and lead was detected near the gun club in both samples (0.00018 mg/L in January and 0.00011 mg/L in March). Several constituents were detected at multiple sites. Pentachlorophenol and chromium (total; the lab did not determine the concentration as a function of valence) were detected at PWS and OT in both samples (December and March, at levels close to the reporting limit). TPH in the form of lube oil was detected at PWS and OT all three storm events, at M38 in January and March, and at Site A in January. Caffeine was detected at all four sites on both sampling dates (December and March, ranging from 6 ng/L to 960 ng/L) and *E. coli* was detected at levels of concern at all four sites in all three stormwater sampling events, with the exception of M38, which had a detection that was less than the level of concern in March 2012. Zinc and copper also were found at PWS in March.

Groundwater

Monitoring Wells

Data regarding the elevation of the water table, the overall configuration of the water table, and, ultimately, inferences regarding groundwater flow, were collected from a series of monitoring wells in the Florence area (Figure 3.2). Monitoring Wells B-1 through B-11 (B-4 was a failed attempt) were installed in September 2010. The locations of the monitoring well sites were selected to capture water derived from beneath the primary land use activities in Florence and in its urban growth boundary (UGB) (e.g., commercial/business, transportation corridors, sewer areas, non-sewer areas, etc.). The wells are shallow, varying from 15 to 25 feet deep, and are screened in the lower 10 feet. City personnel have collected monthly water levels and water quality data from these wells since October 1, 2010. Monitoring Wells B-12 through B-16 were installed by the City in March 2011. These wells vary from 20 to 30 feet deep, and are screened in the lower 10 feet. Wells B-12 through B-16 were designed to fill gaps, as needed, and to provide upgradient information. Data collection from these wells began in early April 2011.

The City's Miller Park Well (MPW in Figure 3.2) was added to the monitoring well list in May 2011. This well is deeper, derives its water from a greater depth (>57 feet), and has higher temperature and pH than the shallower monitoring wells (see discussion below). This information is interpreted as indicating that the well is "sampling" water that has been removed from the atmosphere longer than that from the shallow wells, and, therefore, the water quality data may not be directly comparable. The implications of the Miller Park Well data are discussed below.

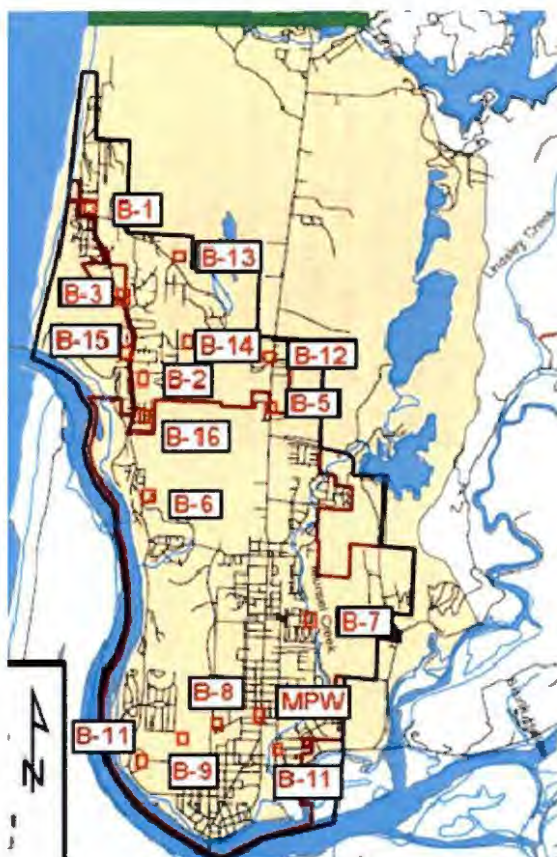
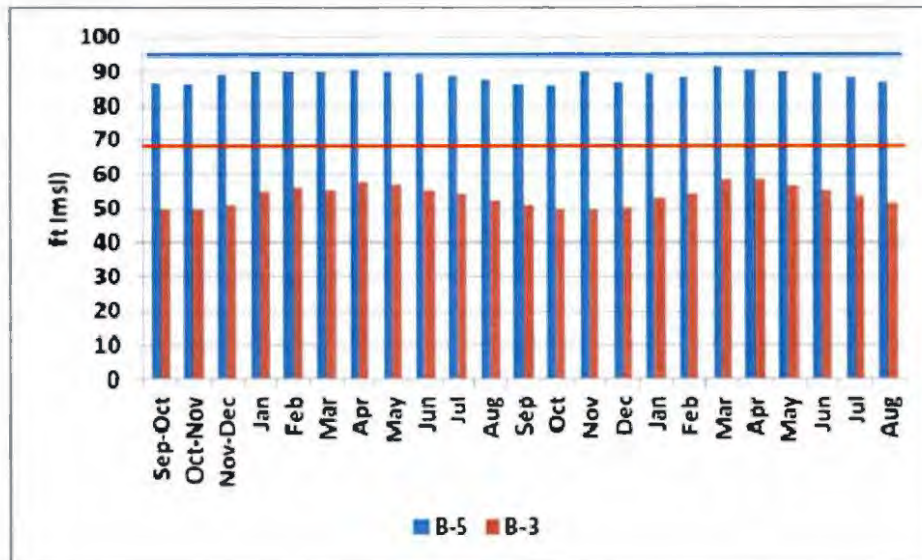


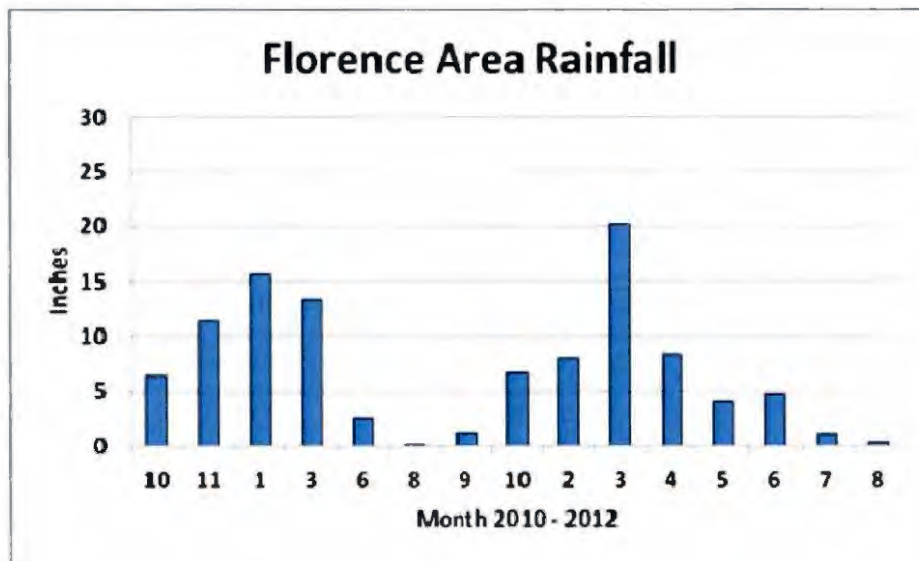
Figure 3.2. Maps of the Florence city limits and UGB. (a) An aerial view. (b) A Google image showing monitoring well locations (red symbols), surface water sites (yellow symbols), and stormwater sites (green symbols). The monitoring wells are all less than 30 feet deep. Wells B-1 through B-11 have been sampled monthly since October 1, 2010. Wells B-12 through B-16 have been sampled since April 1, 2011. The City-owned Miller Park Well (shown as MPW) derives its water from a depth > 50 feet. The Public Works Department, located just north of the Florence-Eugene Hwy, is the site of surface water, stormwater, and ground-water sampling.

Water Quantity

Water Table Elevation and Relation to Precipitation. It has been established that the elevation (head) of the water table undergoes significant variations as a function of season, with the most important controlling parameter being precipitation. Figure 3.3 illustrates how the elevation of the water table at two individual monitoring well sites varied from October 2010 through August 2012 for Wells B-3 and B-5. Well B-3 is near the coast at an elevation of 68.5 feet, while B-5 is farther inland and at a higher elevation of 95.6 feet (see Figure 3.2). Figure 3.3b provides the average rainfall per month for the Florence area. Data from monitoring wells (Figure 3.3a) during the year suggest that the water table is at its lowest near October 1 and at its highest near April 1.



(a)



(b)

Figure 3.3. (a) Average changes in the water table elevation at monitoring Wells B-3 and B-5 monthly (msl = mean sea level). Blue horizontal line is the ground elevation at B-5 (95.6 feet), while the red horizontal line is the ground elevation at B-3 (68.5 feet). (b) Average rainfall in the Florence area from October 2010 through August 2012.

Comparing Figures 3.3a with 3.3b indicates that the lowest water table lags behind the lowest precipitation by up to 2 months, while the higher water table corresponds closely with higher amounts of rainfall. This is consistent with the shallow water table and the rapid infiltration of precipitation. There is a significant rise (> 4 feet at several wells) in the water table in March 2012 in response to heavy rainfall.

Water Table Configuration and Groundwater Flow. Even though the water table elevation at an individual monitoring well might change significantly as a function of precipitation, in some cases as much as 4+ feet, the relative configuration of the water table as a whole remains similar in character. In other words, although the positions of the contours change, no significant changes in groundwater flow direction, generally perpendicular to the contours, is indicated. As in previous measurement periods, the water table slopes toward the Siuslaw River, the Pacific Ocean, and Clear and Munsel Lakes, implying that groundwater discharges directly to the lakes, to the Siuslaw River Estuary, and indirectly via streams, culminating in Munsel Creek's discharge.

Water Table Elevation and Ground Elevation

A review of the topography over the Florence Dunal Aquifer reveals that the elevation varies from more than 200 feet in the northeast area to near sea level to the south and west (see Figure 3.4). Data from the monitoring wells installed during this project suggest that at high water levels, the depth to the water table varies from 5 feet or less in the interior area of the aquifer to 15 to 20 feet near the Siuslaw River Estuary (Figure 3.5). This seemingly paradoxical situation results from two circumstances. First, the ground surface slopes gently to the south and west. Secondly, in contrast to ground elevation, the elevation of the water table is fixed by sea level and, therefore, the water table slopes more steeply than does the land surface. (Figure 3.6)

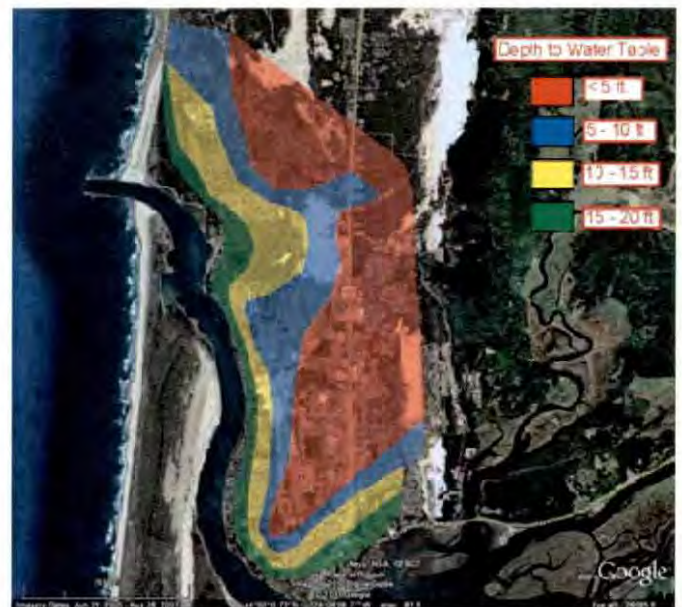


Figure 3.4. Approximate depth to the water table in the Florence Dunal Aquifer. This map is based on measurements taken at the monitoring wells in the City. Data reflected here were collected in April 2011, when the water table, coincident with rainfall, was high. Notice that the depth to the water table increases as one approaches the Siuslaw River Estuary.

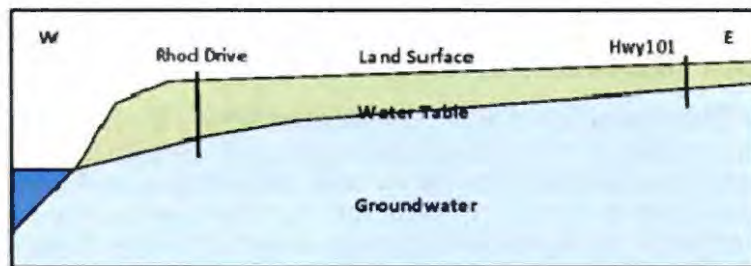


Figure 3.5. A diagrammatic profile of the water table elevation in the Florence Dunal Aquifer from east to west. The water table is tied to sea level and, therefore, slopes at a steeper rate than does the land surface.

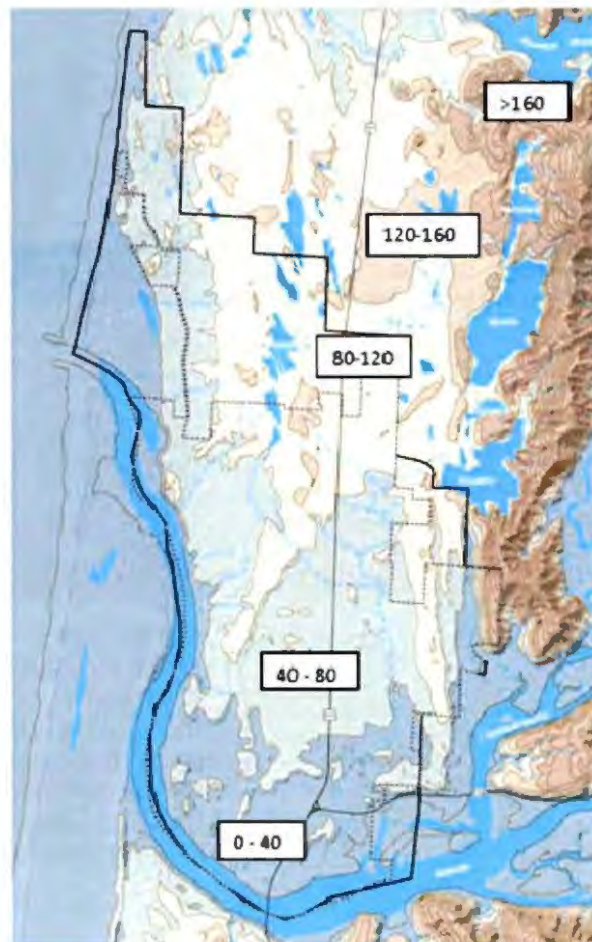


Figure 3.6. Map showing the general elevation of ground surface in the Florence Dunal Aquifer. Elevation varies from sea level to more than 160 feet. Elevation is shown in 40-foot increments as labeled and color coded.

In Figure 3.7, we provide an illustration of the inferred groundwater flow paths in the study area (dashed blue lines). It was clear to us early on that a correlation exists between water table elevation and ground surface elevation and that groundwater flow paths moved from areas of higher topography to areas with lower ground elevation. We have extended that inference throughout the Florence Dunal Aquifer, suggesting a coincidence of high topography and a groundwater high (mound) in the northeast part of the aquifer.

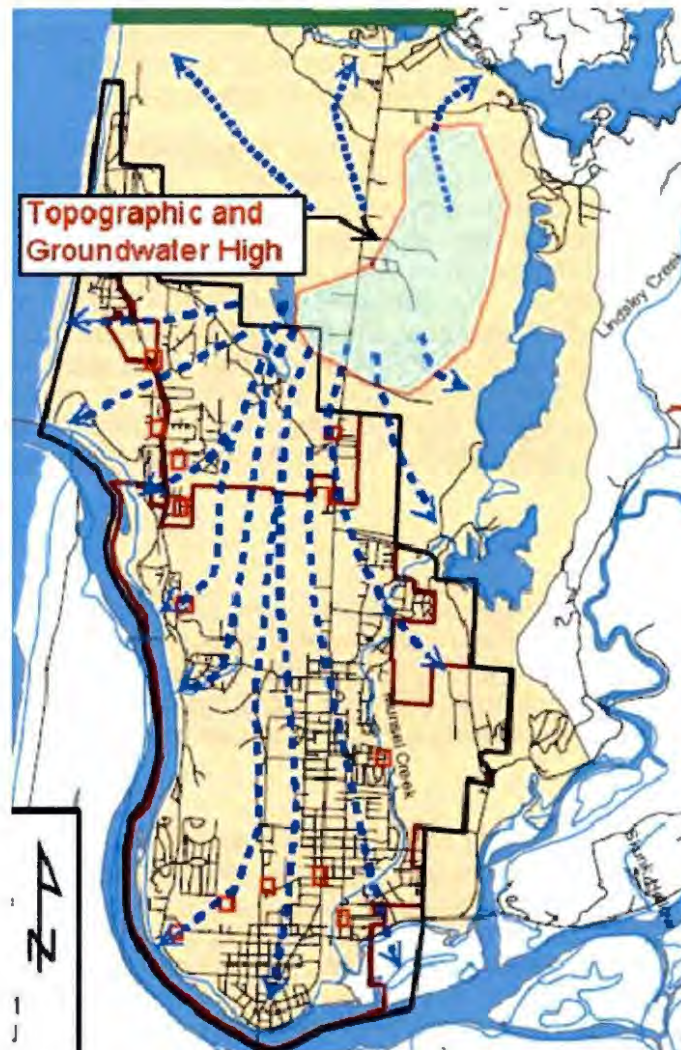


Figure 3.7. Approximate groundwater flow directions (dashed blue lines) as determined from contoured monitoring well data. It is inferred that in the northern part of the Dunal aquifer, groundwater flows northward (dotted blue lines) towards Sutton Lake and Sutton Creek. Pathways appear to originate from a topographic high that presumably is also a groundwater high as well (see text).

The ground penetrating radar (GPR) survey data provided clear evidence that groundwater is discharging to Clear and Munsel Lakes with groundwater flow moving in an easterly direction. To the west, direct water table elevation measurements indicate that groundwater is discharging to the west. That groundwater flows in opposite directions to the east and west of Hwy 101 indicates the presence of a groundwater mound separating the two areas. Traveling north on Hwy 101 through the Florence Dunal Aquifer, one finds that the elevation of the highway peaks at about 120 to 130 feet just north of monitoring Well 12. At Well 12, the elevation of the water table is 100± feet. As one proceeds northward, the elevation drops to approximately 50 feet near Sutton Lake. It is assumed that the elevation of lake surface, 30± feet, reflects the elevation of the water table at that location. The inferred drop in water table elevation from 100 feet to 30 feet from Well 12 to Sutton Lake is consistent with groundwater flow from a high near Well 12 to the northern parts of the Florence Dunal Aquifer.

Figure 3.6 shows an area where the elevation is approximately 120+ feet and suggest that the area is coincident with a groundwater high. It is important to realize that this groundwater high area is not the sole area of groundwater recharge for the aquifer. Recharge occurs throughout the aquifer, infiltrating downward from the surface. Naturally, where the topography is higher, downward percolation will result in the elevation of the water table also being higher. It is common to find that for an unconfined aquifer, the water table mimics, in a subdued way, the topography. Figure 3.6 also shows the groundwater flow directions based on the monitoring wells (dashed lines) as well as flow directions (dotted lines) based on the interpretation that a groundwater mound is coincident with the topographic high of the dune field. GSI's interpretation is that groundwater is flowing in a northerly direction in the northern dunal aquifer, discharging to Sutton Lake and Sutton Creek.

Groundwater Quality

Temperature. Groundwater temperature remains fairly uniform across the Florence area; however, small but significant seasonal changes are observed. Groundwater temperature varies by approximately 2.5 °C. It also appears that the groundwater temperature lags behind the air temperature by 1 to 2 months. The lowest average temperature is in April, while the lowest air temperatures are generally in January or February.

pH. The pH of area groundwater has remained fairly stable. From December 2010 through September 2012, the average pH of the shallow groundwater varied from 5.36 to 6.09, with no apparent seasonal trend. Some outliers were seen (e.g., Well B-7 at 7.08 in November 2011 and Well B-2 at 4.7 in October 2011). Lower pH values (5.5 to 6.0) are typical of shallow groundwater. The pH of the Miller Park Well typically is higher than the other wells (e.g., 6.1 to 6.5 compared to 5.4 to 5.7). The Miller Park Well is deeper. Both the temperature and pH difference in groundwater from the Miller Park Well compared to that from the shallow monitoring wells are consistent with a longer residence time for the deeper groundwater.

Groundwater Conductance. Conductivity is related to the dissolved mineral load of the water. An approximate relationship between the two is that the total dissolved solids (TDS) (milligrams per liter [mg/L]) of a sample is approximately 50 percent of the conductivity (micro Siemens per centimeter [$\mu\text{S}/\text{cm}$]) of that sample. Conductivity varies in wells from <70 to >500 $\mu\text{S}/\text{cm}$, with the bulk of the analyses at 100 to 160 $\mu\text{S}/\text{cm}$. Well B-2 is approximately 1.1 miles downgradient from Well B-5 in an area that is served by individual septic systems. Well B-6 is within the City, approximately 1.1 miles downgradient from Well B-5, and is downgradient from the Sand Pines Golf Course. Wells B-8

and B-10 are 2.3 and 2.85 miles, respectively, downgradient from Well B-5 in the City's downtown area and commercial area. Well B-11 is in the City, near Munsel Creek, approximately 2.6 miles from Well B-5 and downgradient from a commercial area.

As would be expected, the upgradient Well B-5 has lower and more uniform conductivity (TDS) values, while the downgradient wells (B-2, B-6, B-8, B-10, and B-11) tend to have higher conductivity values. Given the shallow nature of the water table, and the potential for local influence on a given well's water quality, it is not just water-rock reactions along a flow path that are controlling the conductivity values as is evidenced by the lack of correlation between flow path length and conductance. This can be most clearly seen in the anomalous behavior of Well B-2 where conductivity values vary significantly and have exceeded 600 $\mu\text{S}/\text{cm}$. Reactions between groundwater and the aquifer (which contains quartz, feldspar, and rock fragments) are likely to be slow. The values seen at Well B-2, in the 400 to 600 $\mu\text{S}/\text{cm}$ range, are unlikely to be the result of natural causes, suggesting that the groundwater at this well site has been affected by surface or near surface activities.

Groundwater Dissolved Oxygen. Dissolved oxygen (DO) varies from 0.09 mg/L (< 1 percent saturated) to more than 10 mg/L (> 90 percent saturated) in groundwater from the Florence Dunal Aquifer. Although the DO data collected thus far from study area monitoring wells do not seem to indicate any regional pattern to the values, the DO at a given monitoring well does not change significantly with time, often varying by less than 1 mg/L over time. Upgradient wells can have quite different values (e.g., Well B-7 = 10.1 mg/L, Well B-5 = 0.13 mg/L), as can downgradient wells (e.g., Well B-2 = 9.31 mg/L, Well B-6 = 0.47 mg/L).

Oxidation-Reduction Potential (ORP). Similar to DO, the ORP values do not display any regional pattern and, at a given site, are relatively consistent over time. The ORP is a measure of the ability of the environment to initiate oxidizing and reducing reactions and is a more complex parameter than is DO. Due to the lack of a regional pattern of the ORP parameter, and the relative consistency of the ORP value at a given site, a conclusion is reached that is the same as with DO, i.e., the ORP value is a function of what is happening in the immediate area of the well.

Chemical Analyses. Laboratory analyses in March and September of 2011 and 2012 included the full range of analytes, as detailed in the original proposal to the U.S. Environmental Protection Agency (EPA) (i.e., volatile organic chemicals [VOCs], select pesticides, metals, nitrate, and the common ions, [e.g., Ca, Na, K, HCO_3 , Cl, and SO_4] as well as the routine bacterial testing). This testing was conducted on Wells B-1 through B-11. Coliform and *E.coli* data were collected monthly from October 2010 through September 2012. Nitrate was collected monthly from March 2011 through September 2012.

Volatile Organic Chemicals and Pesticides. No VOCs or pesticides were detected in any of Florence's monitoring wells.

Metals and Nonmetals. This group of chemicals typically is found in areas of commercial and industrial land uses, but also may occur in a variety of other activities. Only two detections were noted: chromium was detected in Well B-2 at a concentration of 0.0056 mg/L and arsenic was detected in Well B-6 at 0.0052 mg/L. Both of these concentrations are below the respective drinking water standards (i.e., 0.10 mg/L for chromium and 0.010 mg/L for arsenic). No other detections were recorded and further metal analysis was discontinued.

Nitrate. The drinking water standard for nitrate is 10 mg/L NO₃-N. Natural concentrations of nitrate rarely exceed 2 to 3 mg/L. Concentrations exceeding natural levels often reflect areas affected by animal feedlots, septic systems, or over-application of fertilizer.

Elevated nitrate in shallow wells in areas not served by municipal sewer lines may reflect the impact of effluent from septic systems. Traditional septic systems are designed to discharge to groundwater. They are not designed to remove nitrate from domestic waste. A given area of land, with a given thickness of soil material above the water table, can assimilate (dilute, use, or convert) nitrate from domestic sewage up to a threshold controlled by the nature of that soil and the character of the aquifer. If that threshold is exceeded, nitrate may infiltrate to groundwater. Most of the area monitoring wells exhibit low to non-detect levels of nitrate concentrations (see Tables 3.3 and 3.4). Significant variations do occur. Nitrate has been found in Wells B-2 and B-10. Nitrate concentrations in Well B-10 are low (1.8 to 2.6 mg/L), while the nitrate concentrations for Well B-2 have varied from non-detect to as high as 45 mg/L. Well B-2 is within Florence's UGB, in an area serviced by individual septic systems. Elevated nitrate concentration is not the case for all wells in the areas downgradient from septic systems, which is evident from the lack of nitrate in groundwater from Well B-3, a nearby monitoring well. The conductivity of Well B-3 is much lower than Well B-2, and is similar to other downgradient wells (e.g., Wells B-6, B-8, and B-11 are located in areas serviced by sewers).

Table 3.3. Nitrate data for Florence-area monitoring wells: October 2010 to September 2011

Date	Oct 2010	Nov 2010	Mar 2011	Apr 2011	Jun 2011	Aug 2011	Sep 2011
B-1	ND ¹	ND ¹	ND ¹	NA ²	ND ¹	ND ¹	ND ¹
B-2	29.7	27.7	ND ¹	NA ²	12.6	45	22.8
B-3	ND ¹	ND ¹	ND ¹	NA ²	ND ¹	ND ¹	ND ¹
B-5	ND ¹	ND ¹	ND ¹	NA ²	ND ¹	ND ¹	ND ¹
B-6	ND ¹	ND ¹	ND ¹	NA ²	ND ¹	ND ¹	ND ¹
B-7	ND ¹	ND ¹	ND ¹	NA ²	ND ¹	ND ¹	ND ¹
B-8	ND ¹	ND ¹	ND ¹	NA ²	ND ¹	ND ¹	ND ¹
B-9	ND ¹	ND ¹	ND ¹	NA ²	ND ¹	ND ¹	ND ¹
B-10	ND ¹	ND ¹	2.6	NA ²	1.8	ND ¹	ND ¹
B-11	ND ¹	ND ¹	ND ¹	NA ²	ND ¹	ND ¹	ND ¹
B-12	NA ²	NA ²	NA ²	ND ¹	ND ¹	ND ¹	ND ¹
B-13	NA ²	NA ²	NA ²	ND ¹	ND ¹	ND ¹	ND ¹
B-14	NA ²	NA ²	NA ²	ND ¹	ND ¹	ND ¹	ND ¹
B-15	NA ²	NA ²	NA ²	ND ¹	ND ¹	ND ¹	ND ¹
B-16	NA ²	NA ²	NA ²	ND ¹	ND ¹	ND ¹	ND ¹

¹Not detected

²Not analyzed

Table 3.4. Nitrate data for Florence-area monitoring wells: October 2011 to September 2012

Date	Oct 2011	Nov 2011	Feb 2012	Mar 2012	Apr 2012	May 2012	Jun 2012	Jul 2012	Aug 2012	Sep 2012
B-1	NA ²	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
B-2	33.1	NA ²	19.2	ND ¹	4.9	ND ¹	4.9	16.4	18.2	15.2
B-3	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
B-5	NA ²	ND ¹	NA ²	ND ¹	NA ²	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
B-6	NA ²	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
B-7	NA ²	ND ¹	NA ²	ND ¹	NA ²	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
B-8	NA ²	ND ¹	NA ²	ND ¹	NA ²	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
B-9	NA ²	ND ¹	NA ²	ND ¹	NA ²	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
B-10	ND ¹	ND ¹	NA ²	2.1	NA ²	2.3	1.8	ND ¹	ND ¹	ND ¹

Table 3.4. Nitrate data for Florence-area monitoring wells: October 2011 to September 2012										
Date	Oct 2011	Nov 2011	Feb 2012	Mar 2012	Apr 2012	May 2012	Jun 2012	Jul 2012	Aug 2012	Sep 2012
B-11	ND ¹	ND ¹	NA ²	ND ¹	NA ²	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
B-12	NA ²	ND ¹	NA ²	ND ¹	NA ²	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
B-13	NA ²	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
B-14	NA ²	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
B-15	ND ¹	NA ²	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
B-16	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹

¹Not detected

²Not analyzed

Nitrate is often non-detect during periods of high rainfall, suggesting that high rates of infiltration during these high rainfall periods may have led to a dilution of nitrate concentrations. Typical precipitation rates decrease from late spring through early to late fall and increase from late fall to late spring. Conductivity values do the opposite, increasing from late spring to fall and decreasing during the rainy season. One explanation for this observation is that as the amount of dilution (rainfall) decreased, the relative concentration of dissolved chemical species increased. As noted above, nitrate reflects a similar trend (i.e., non-detect during high precipitation periods and higher concentrations as the dilution decreases). Nitrate concentrations show a moderate correlation with conductivity, suggesting a relationship between the two. The variation in the amount of dilution, driven by rainfall at the surface, produces the observed variations in both conductivity and nitrate.

Caffeine. Selected wells located within the land use areas residential non-sewered, residential sewer, residential/commercial sewer, and commercial sewer were analyzed for caffeine testing on a quarterly basis during the period from March 2011 through September 2012 (Table 3.5). Caffeine, because it is consumed exclusively by humans, is a commonly used indicator of groundwater contamination by infiltrating effluent from septic system drainfields. Because of the nitrate and bacterial monitoring history of Well B-2 (downgradient in a non-sewered area), it was suspected that this particular well was the most likely to contain caffeine. In fact, groundwater from Well B-2 was non-detect for this chemical in two out of the four quarterly sampling events. Caffeine concentration in water from B-2 was 3.4 ng/L (1 ng = 1 billionth [10^{-9}] of a gram or 1 nanogram) in September 2011 and 41 ng in September 2012. Three other wells in this area also had periodic detections of caffeine (i.e., B-3 [12 ng in March 2011 and 7.8 ng in September 2012], B-1 [4.1 ng in September 2012], and B-16 [4.3 ng in September 2012]). The presence of caffeine in these wells is anomalous and may suggest impact from septic effluent.

It is important to note, however, that other wells, within the City limits, have also had caffeine detections (i.e., Wells B-6 and B-7 have had caffeine detections). Well B-11 had two unconfirmed caffeine detections (not detected in a duplicate sample). Caffeine also has been detected in samples from Munsel Creek and in samples collected within the City limits during storm events (see Surface Water discussion below). The caffeine detections within the City are currently unexplained; however, leakage from Munsel Creek and local infiltration of stormwater may offer an explanation.

Table 3.5 Results of caffeine analysis – Florence monitoring wells 2011-2012 (see Figure 1a for well locations)		
Date	Wells Sampled/Land Use	Results
March 2011	B-1, B-2, B-3/UGB, non-sewered residential	B-1 and B-2: non-detect B-3: 12 ng
	B-11/sewered residential and commercial	B-11: non-detect

Table 3.5 Results of caffeine analysis – Florence monitoring wells 2011-2012 (see Figure 1a for well locations)		
Date	Wells Sampled/Land Use	Results
September 2011	B-2, B-3, B-15/non-sewered residential	B-2: 3.4 ng B-3 and B-15: non-detect
March 2012	B-1, B-2, B-3, B-5, B-12, B-13, B-14, B-15, B-16/UGB, non-sewered residential B-6 and B-7/sewered residential B-11/sewered residential and commercial	All non-detect B-6: 3.2 ng, B-7: 12 ng Non-detect
September 2012	B-1, B-2, B-3, B-5, B-12, B-13, B-14, B-15, B-16/UGB, non-sewered residential B-6 and B-7/sewered residential B-11/sewered residential and commercial B-8 and B-10/downtown commercial	B-1: 4.1 ng, B-2: 41 ng, B-3: 7.8 ng, B-16: 4.3 ng; all others non-detect Non-detect Non-detect Non-detect

Common Ions. General Interpretations. The common ions include Ca, Mg, Na, K, HCO_3 , Cl, and SO_4 and often reflect the nature of the aquifer in which the groundwater resides, the amount of residence time (i.e., how long the groundwater has been in contact with the aquifer materials), and, potentially, land use activities in the area. It is clear that, with the exception of sodium and chloride concentrations in Wells B-2 and B-3, the wells are similar in common ion concentrations. Further, the upgradient Well B-5 and downgradient Well B-6 compare similarly with the Menlo Park precipitation. The sodium and chloride concentrations in downgradient Wells B-2 and B-3 are in marked contrast to the concentrations of those components in downgradient Well B-6. The relationship of Na and Cl between Wells B-2 and B-3 with the other wells remains so throughout the year.

Natural increases in sodium and chloride in groundwater may result from evaporation or dissolution of sodium and chloride bearing minerals. Evaporation cannot explain the high sodium and chloride in Wells B-2 and B-3 because the process would affect all of the constituents. Further, it is unlikely that any chloride-bearing minerals occur in the dunal sands. If they did occur, it would be reasonable to conclude that groundwater from Well B-6 would have encountered the mineral as well. Another possible reason for the elevated sodium and chloride, and one that also has been considered (and discussed above) to explain anomalous conductivity and nitrate data and the caffeine occurrence in Well B-3, is that the elevated sodium and chloride reflect an impact of septic system effluent. Domestic septic effluent can add dissolved minerals to groundwater, especially sodium and chloride. Elevated chloride is a particularly good indicator of septic effluent, because of its nonreactive chemical behavior in the aquifer, it tends to reflect its source. It may be tempting to ascribe the elevated sodium and chloride to the proximity of the ocean; however, the hydraulic head of these wells is 40 to 50 feet above sea level, precluding seawater migrating into the shallow aquifer at these sites.

Groundwater-Surface Water Connections

One of the goals of this project is to determine the physical relationship, or the degree of hydraulic connection, between groundwater and surface water. Figure 3.8 compares the common ion data of the four surface water sites with nearby groundwater (Wells B-7 and B-11). Surface monitoring sites along Munsel Creek are: PWS = Florence Public

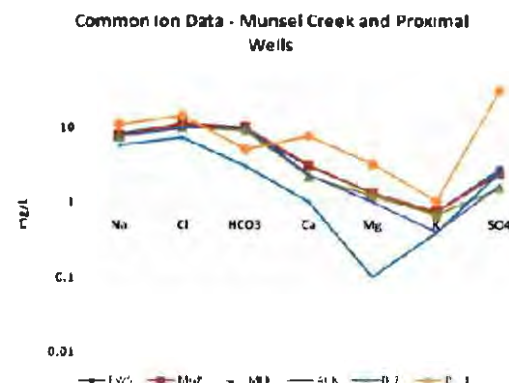


Figure 3.8 A comparison of the common ion concentrations in Munsel Creek (see below) with groundwater

Works building (Munsel Downstream), MGP = Munsel Greenway Park (Munsel Midstream), MLK = Munsel Lake (Munsel Upstream), and ACK = Ackerley Creek.

Coliform Bacteria. Groundwater from the monitoring wells is tested monthly for bacteria. If a sample comes back positive for the occurrence of total coliform, the lab routinely tests for *E. coli*. Total coliforms are common in the environment, but are not indigenous to groundwater (i.e., the aquifer). Their presence in groundwater generally indicates a potential problem with well construction (e.g., improper or failing well seal, or a nearby coliform source). *E. coli*, however, is a type of fecal coliform that originates from human or other warm-blooded animal waste. Detections of *E. coli* in the Florence monitoring wells are few, limited to being “Present” in Wells B-2 and B-10 in November 2010. Total coliforms were found in the Florence wells, primarily in the downgradient wells.

Several points are evident:

- Upgradient wells in all areas generally have been total coliform free.
- Downgradient wells in sewered areas are generally total coliform free.
- Downgradient wells in areas served by septic systems have experienced total coliform positive results.
- Downgradient wells in commercial areas have experienced total coliform positive results.

Although the source of coliform for wells in the last two bullets above is currently unknown, the wells were installed by licensed well drillers and well construction is not the likely cause of the detections.

Sensitivity Analysis

Most groundwater contamination originates at the surface (accidental/deliberate spills, chemical applications, roadway/parking lot runoff, etc.) or in the shallow subsurface (underground storage tanks, septic systems, shallow injection wells, etc.); therefore, a review of water quality monitoring results for each water system can provide valuable information regarding aquifer sensitivity. Clearly, if a contaminant has been detected in the water source, a pathway from the surface to the aquifer must exist.

As a means of protecting public health, public water systems in Oregon are required to routinely monitor drinking water quality for contaminants identified by the EPA as hazardous to human health. However, it is important to understand that the results from a given sample only provide information regarding water quality at the time that the sample was collected. Water quality within an aquifer can change with time for a number of reasons, including contamination and seasonal recharge. The fact that a water sample, or series of water samples, is free of contaminants is no guarantee that contamination of the aquifer cannot happen in the future.

This sensitivity analysis refers to the existing and proposed wellfields only. As described above, the City has been routinely monitoring since late 2010 – early 2011. These monitoring results are relevant to the sensitivity of the aquifer in general; they are not, however, within the wellfield capture zones and will not be considered at this stage of evaluation. A review of the water quality monitoring history, including all Volatile Organic Compounds (VOCs), Synthetic Organic Compounds (SOCs), Inorganic Compounds (IOCs), nitrate, and coliform monitoring results available in OHA’s Drinking Water Program SDWIS on-line database has been completed. Required routine monitoring

for nitrate and coliform occurs more frequently than that for VOCs, SOC, and IOC; therefore, both nitrate and coliform are particularly useful as indicators of contaminant pathways into the aquifer. Coliform bacteria are ubiquitous in the environment and their presence in source water (i.e., the aquifer) may indicate a microbial source nearby. Likewise nitrate provides similar information and is highly mobile compared to most contaminants and in some cases will act as a precursor to other contaminants entering the aquifer. Therefore an aquifer yielding water that meets any of the following criteria is considered highly sensitive to contamination:

- Any VOC or SOC detections,
- IOC detections greater than 50 percent of the EPA established maximum contaminant level,
- Source-related coliform detections, and/or
- Nitrate concentrations of 5 mg/L or greater.

The water table below the existing wellfield varies from less than 15 feet to more than 70 feet below the surface depending on the well. In some areas, the water table rises to even shallower depths (< 5 ft) in the spring after recharge of winter precipitation. The potential of contaminants migrating to the water table is based entirely on the geologic description included on the well driller's report for the individual wells. The permeability of the sands, based on past well pumping tests, varies between 50 and 100 ft/day. Based on this observation, the travel time for water to move from the surface to the water table occurs in a matter of hours. Using an average precipitation rate of 65 inches (Hampton, 1963) and the high infiltration rates associated with sandy soils, an annual recharge rate to the aquifer in excess of 40 inches was estimated, which combined with the permeability indicates a very high infiltration rate. Under these conditions, very little attenuation of contaminant concentration would likely occur.

Well report records indicate that there are approximately 120 other wells within the sections containing the City of Florence Wells. Of these, 100 were drilled prior to 1979, when well construction requirements were significantly upgraded by the Oregon Water Resources Department. The remaining wells were drilled after 1979. This leads to an Other Well Score of 420, a score that exceeds OHA's recommended significant risk indicator threshold of 400. Thus, other wells in the area potentially represent a significant risk to the water system in that they provide a conduit for contamination to migrate to the water table.

OHA Drinking Water Program records indicate that nitrate has not been detected at the entry point for the well field. Records also indicate that there have not been any positive detections for total coliform. Detections of VOCs, di(2-ethylhexyl)phthalate (0.0006 mg/L) on April 16m 2008, toluene (0.0023 mg/L on August 14, 2002) and chloromethane (methylchloride) (0.0034 to 0.0075 mg/L), have occurred. However, di(2-ethylhexyl)phthalate was not detected in subsequent analyses. With respect to toluene, it was later determined that the detections were false and a result of compounds contained in the tape used to secure sample caps (see Appendix G). Chloromethane has only been detected in the finished water produced by the City's treatment plant not in the raw water from the well field. It is thought to be simply a product of the chlorination process at the treatment plant. Sodium has been detected up to concentrations of 37 mg/L.

In the 2003 Source Water Assessment prepared by OHA, the aquifer sensitivity for the system was summarized on the sensitivity summary sheet (see Appendix G).

Potential Contaminant Source Inventories

The primary intent of the inventories is to identify and locate significant potential sources of any of the contaminants of concern within the DWPAs. Significant sources of contamination can be defined as any facility or activity that stores, uses, or produces the contaminants of concern and has a sufficient likelihood of releasing such contaminants to the environment at levels that could contribute significantly to the concentration of these contaminants in the source waters of the public water supply. The inventory is a very valuable tool for the local community in that it:

- Provides information on the locations of PCSs, especially those that present the greatest risks to the water supply,
- Provides an effective means of educating the local public about potential problems, and
- Provides a reliable basis for developing a local management plan to reduce the risks to the water supply.

Potential Contaminant Source Inventories were developed for both existing and future land use for both the existing wellfield and the proposed wellfield.

Potential Contaminant Source Inventory: Existing Land Use

Inventory results for existing land uses in the Existing Wellfield are shown in Figure 3.5 and Table 3.6; inventory results for the Proposed Wellfield are shown in Figure 3.6 and Table 3.7. Except for a few additions, the PCS Inventory for the Existing Wellfield has not substantially changed from that provided in the 2003 Source Water Assessment (Appendix G).

Inventories were focused primarily on the potential sources of contaminants regulated under the federal Safe Drinking Water Act. This includes contaminants with a maximum contaminant level, contaminants regulated under the Surface Water Treatment Rule, and the microorganism *Cryptosporidium*. The inventory was designed to identify several categories of potential sources of contaminants including microorganisms (i.e., viruses, *Giardia lamblia*, *Cryptosporidium*, and bacteria); inorganic compounds, (i.e., nitrates and metals); and organic compounds (i.e., solvents, petroleum compounds, and pesticides). Contaminants can reach a water body (groundwater, rivers, lakes, etc.) from activities occurring on the land surface or below it. Contaminant releases to water bodies can also occur on an area-wide basis or from a single point source.

It is advantageous to identify as many potential risks as possible within the DWPA during the inventory. It is important to remember the sites and areas identified in this section are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly. Not all of these inventoried activities pose actual high risks to the City's water supply. The day-to-day operating practices and environmental (contamination) awareness varies considerably from one facility or land use activity to another.

When identifying potential risks to a public water supply, it is necessary to make "worst-case" assumptions. This is important because it is the potential risk that must be determined. The worst-case assumption that has to be made when considering potential risks to water bodies is that the facility or activity is not employing good management practices or pollution prevention. Also, assumptions are made about what sources are

included in particular types of land use. For example, it is assumed that rural residences associated with farming operations have specific PCSs such as fuel storage, chemical storage and mixing areas, and machinery repair shops.

Past, current, and possible future potential sources of contaminants were identified through a variety of methods and resources. In completing this inventory, DEQ used readily available information including review of DEQ and other agencies' databases of currently listed sites, interviews with the public water system operator, and field observation as discussed below. In-depth analysis or research was not completed to assess each specific facility's compliance status with local, state and/or federal programs or laws. Further, the inventory process did not include an attempt to identify unique contamination risks at individual sites such as facilities (permitted or not) that do not safely store potentially hazardous materials.

The process for completing the updated inventory for the City of Florence's DWPA included several steps: (1) Conducted a DEQ database search of known cleanup sites and variously permitted sources, as well as sites registered with the Oregon Fire Marshal. (2) Reviewed aerial photography to identify sites not necessarily visible on the ground. (3) Conducted a field (windshield) survey, with the assistance of Shawn Stevenson of OHA, of the newly identified source water protection areas, primarily those associated with the future well field site. Activities recognized as potential contaminant sources, based on DEQ documents, were field and GPS located and rendered into a GIS coverage. (4) The original Source Water Assessment inventory of PCSs were reviewed and updated with any changes (e.g. new sites, sites that are no longer existing, etc.). As appropriate, these were also GPS-located for future GIS coverages. (5) The delineations were overlain onto the land use planning map of the Florence area to anticipate, for management purposes, the possible land uses that might be considered within the source water protection areas in the future.

Relative risk rankings of higher-risk, moderate-risk, or lower-risk were assigned to each PCS based on the Oregon Source Water Assessment Plan (1999).⁸ The comments section of the tables provides justification for any modifications to the risk rating that may have resulted from field observations that were different from what is typically expected for the specific facility. Relative risk ratings are considered an effective way for the water supply officials and community to prioritize management efforts for the DWPA.

A final summary of the inventoried sources (Tables 3.6 and 3.7) and the GIS base maps (Figures 3.5 and 3.6) were prepared and included in this report. Several PCS sites outside the delineated DWPA were included for completeness; however, their relative risk factors were downgraded because of their locations.

⁸ This resource lists risk levels associated with specific land-uses:
<http://www.deq.state.or.us/wq/dwp/docs/swainvimpacts.pdf>.

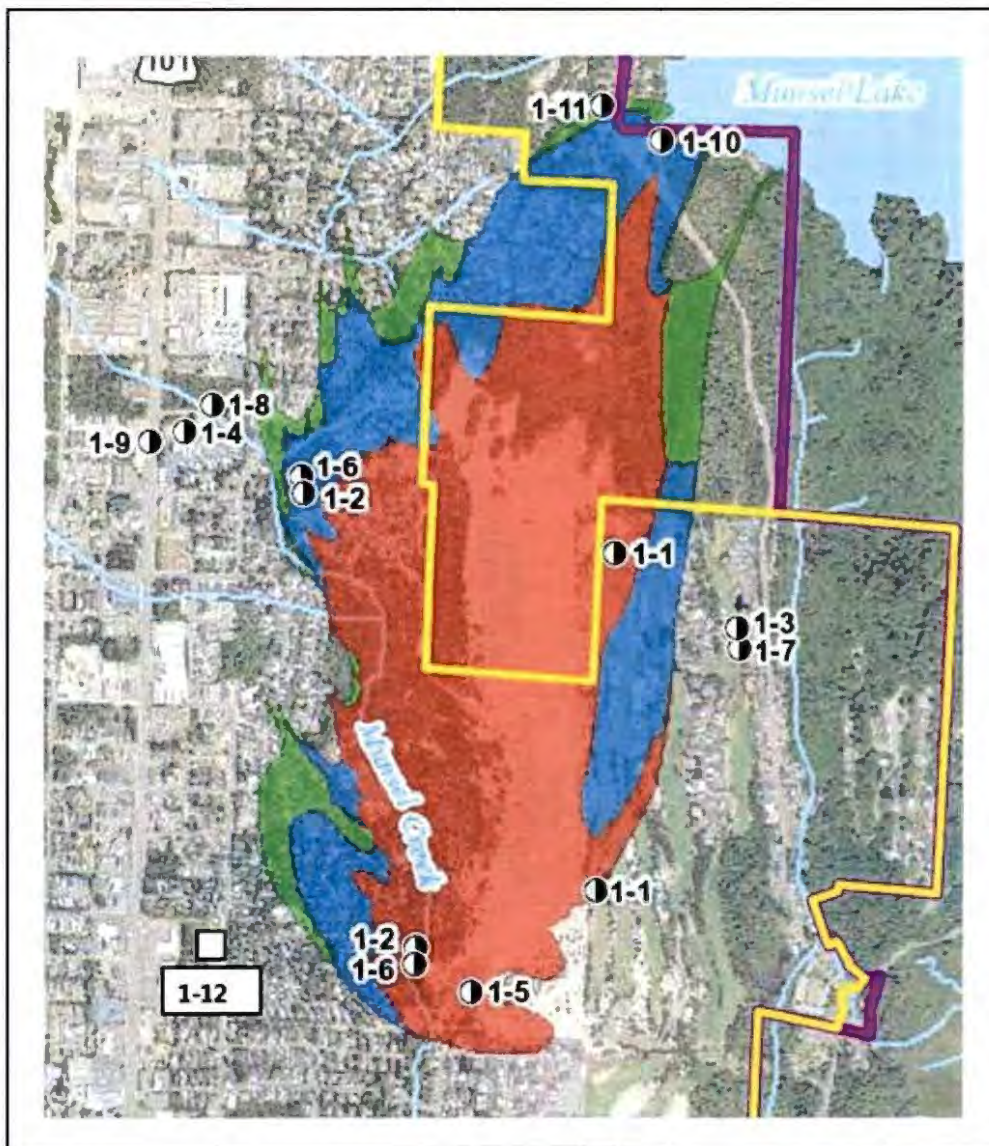


Figure 3.5. Potential Contaminant Source Inventory for existing land uses in and near the DWPA for the existing wellfield. Sites were identified in OHA's 2003 Source Water Assessment. Number designations, e.g., 1-2, refer to the specific PCSs listed in Table 3.6. Site 1-12 is located some distance from the DWPA and is included here for information purposes. The red areas are within the 10 year time of travel zone (TOTZ); blue are in the 20 year TOTZ; and green are in the 30 year TOTZ.

**Table 3.6 Potential Contaminant Source Inventory Existing Wellfield: Existing Land Uses
(Sites 1-1 through 1-10 are from the 2003 Source Water Assessment)**

Map Reference No.	PCS Source Type	Approximate Location	Time of Travel Zone	Relative Risk Level	Potential Impacts	Comments
1-1	Golf Course	In city limits; East-central part of Wellfield	1 year Wells 9, 10, 11	M	Over-application or improper handling of pesticides and fertilizers. Excessive irrigation may cause contaminant transport or runoff towards the wells	Identified in 2003 Source Water Assessment
	Above Ground Fuel Storage Tanks	In city limits; East of Wellfield	Just outside DWPA Boundary	M	Spills, leaks, or improper handling of stored fuel may impact drinking water source	Diesel and gasoline ASTs. Identified in 2003 Source Water Assessment
	Pesticide and Fertilizer storage, handling, mixing, etc.	In city limits; East of Wellfield	Just outside DWPA Boundary	H	Spills, leaks, or improper handling of stored pesticides and fertilizers may impact drinking water source	Identified in 2003 Source Water Assessment
1-2	Housing Density (>2 Dwelling Units (DU) per acre]	In city limits; Western margin of wellfield	1 year for Wells 1 and 2, 2-10 year for other wells along western side of field.	M	Improper use, storage, and disposal of household chemicals may impact drinking water supply. Stormwater runoff or infiltration may contaminate the drinking water supply	
1-3	Housing Density (>2 Dwelling Units (DU) per acre)	In city limits; East of wellfield	Outside of eastern boundary of DWPA	M	Improper use, storage, and disposal of household chemicals may impact drinking water supply. Stormwater runoff or infiltration may contaminate the drinking water supply	Identified in 2003 Source Water Assessment
1-4	Campgroundw/RV Park	In city limits; West of wellfield	Outside of western boundary of DWPA	L	Leaks or spills of automotive fluids or improperly management of wastewater may impact drinking water supply	Identified in 2003 Source Water Assessment
1-5	Drinking Water Treatment Plant	In city limits; Southern End of Wellfield	1 year	M	Treatment chemicals and equipment maintenance materials may impact drinking water supply	Identified in 2003 Source Water Assessment
1-6	Sewer Lines	In city limits; Sewered resi-	1 – 5 year	H	If not properly designed, installed, and maintained may impact wells if within 2 year TOT	Identified in 2003 Source Water Assessment

Table 3.6 Potential Contaminant Source Inventory Existing Wellfield: Existing Land Uses
(Sites 1-1 through 1-10 are from the 2003 Source Water Assessment)

Map Reference No.	PCS Source Type	Approximate Location	Time of Travel Zone	Relative Risk Level	Potential Impacts	Comments
		dential areas west side of DWPA				
1-7	Sewer Lines	In city limits; Sewered residential areas east of DWPA	Outside of eastern boundary of DWPA	H	If not properly designed, installed, and maintained may impact wells if within 2 year TOT	Identified in 2003 Source Water Assessment
1-8	Stormwater outfalls	In city limits; From 42 nd Street	Outside of western boundary of DWPA	L	Stormwater runoff may contain contaminants from residential homesites and road	Identified in 2003 Source Water Assessment
1-9	Hwy 101	In city limits; Runs N-S west of DWPA	Outside of western boundary of DWPA	M	Vehicle use increases the risk for leaks or spills of fuel and other hazardous materials. Stormwater may infiltrate to groundwater. Over application/improper handling of pesticides may impact water supply.	Identified in 2003 Source Water Assessment
1-10	Upstream Munsel Lake	Outside city limits; Northern tip of DWPA	10-20	L	During major storm events, discharge from the Lake may influence Munsel Creek which flows through DWPA	Effect on groundwater may be minimal
1-11	Septic systems (>1 system/acre)	Outside city limits; Northern tip of DWPA	20-30	M	If too high of density, infiltration of household wastes, cleaning chemicals, prescription drugs, etc., may impact shallow groundwater.	
1-12	Cleanup, Hazardous Waste	In city limits; 2630 Hwy 101	Outside of DWPA; West of southern end of delineated area	L-M	Improper placement of lead contaminated sludge; Lead and total petroleum hydrocarbons in soil, chromium in soil and groundwater	DEQ recommends further evaluation of this site

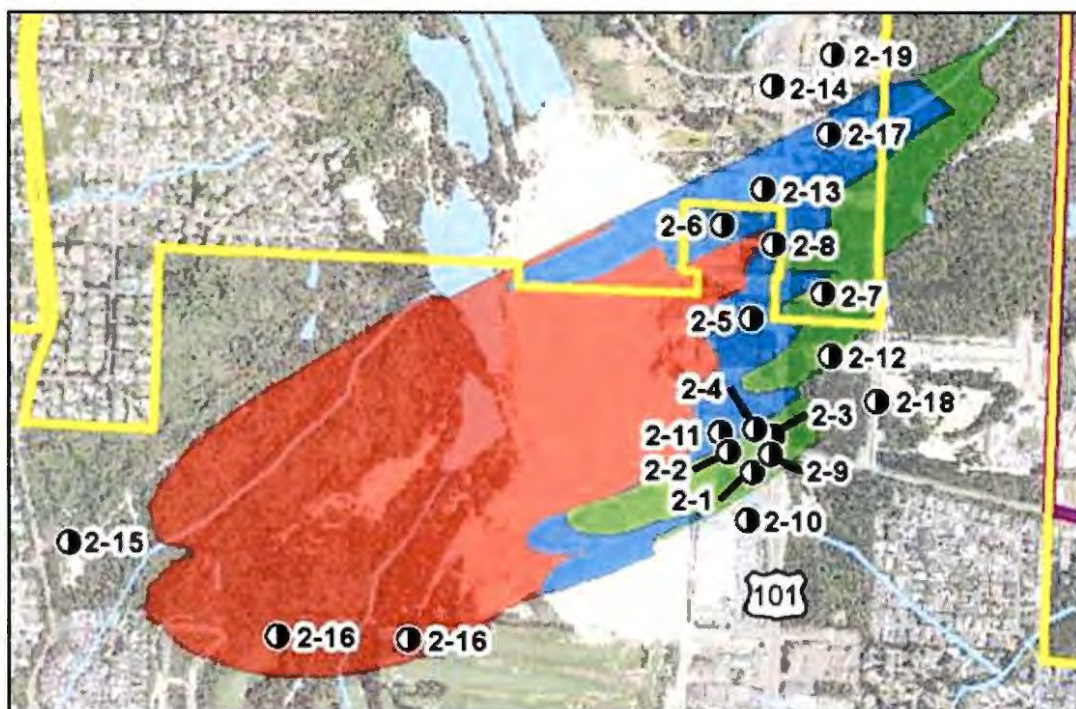


Figure 3.6. Potential Contaminant Source Inventory from Existing Land Uses in the Proposed Wellfield. 10-year (red), 20-year (blue), and 30-year (green) time-travel zones.

Table 3.7 Potential Contaminant Source Inventory Proposed Wellfield: Existing Land Uses

Map Reference No.	PCS Source Type	Approximate Location	Time of Travel Zone	Relative Risk Level	Potential Impacts	Comments
2-1	Parking Lot >50 cars	In city limits; Intersection Hwy 101 and Munsel Lk Rd	20-30 year	H	Spills, leaks of automotive fluids may impact the drinking water supply	Currently not in use
	Office Buildings/Complexes			L	Spills, leaks, or improper handling of chemicals and other materials stored and used in maintenance	Minimal use at present
2-2	Bud's Upholstery	In city limits; 4981 Hwy 101	20-30 year	M	Spills, leaks, or improper handling of chemicals and other materials stored and used	Activity uncertain
2-3	Quilt Emporium	In city limits; Intersection Hwy 101 and Munsel Lk Rd	20-30 year	L	Spills, leaks, or improper handling of chemicals and other materials stored and used	
2-4	Ron's Paint Supply	In city limits; 5071 Hwy 101	10-20 year	M	Spills, leaks, or improper handling of chemicals and other materials stored and used	
2-5	Sand Master Park	In city limits; 5351 Hwy 101	10-20 year	M	Spills, leaks, or improper handling of fuels, chemicals and other materials stored and used may impact drinking water supply	Sand boarding, dune buggy tours, helicopter tours
2-6	Central Disposal	In city limits; 5405 Hwy 101	5-10 year	M	Improper management of water contacting waste material may impact the drinking water supply.	Activity uncertain
2-7	Automobile Disposal-Storage	Outside city limits; N of intersection of Hwy 101 and Munsel Lake Rd	10-20 year	H	Spills, leaks, or improper handling of automotive chemicals, batteries, and other waste materials during storage and disposal may impact the drinking water supply; septic system infiltration of wastes, cleaning chemicals, prescription drugs, etc., may impact shallow groundwater.	Several vehicles present
2-8	Sand Ranch	In city limits; S of intersection of Hwy 101 and Hetceta Beach Rd	10-20 year	H	Leachate from mining operations or equipment use may contain chemicals and wastes that may impact the drinking water supply	Sand mining, bagging, and distribution
2-9	Golden Rule RV Sales	In city limits; Intersection of Hwy 101 and Munsel Lake Rd	20-30 year	L	Spills, leaks, or improper handling of automotive fluids and other waste materials during transportation and storage and disposal may impact the drinking water supply	Facility closed
2-10	Fred Meyer Gas Sta-	In city limits; North-		H	Spills, leaks, or improper handling of fuels and	

Table 3.7 Potential Contaminant Source Inventory Proposed Wellfield: Existing Land Uses

Map Reference No.	PCS Source Type	Approximate Location	Time of Travel Zone	Relative Risk Level	Potential Impacts	Comments
	tion	ern part of Fred Meyer facility	Just outside 20-30 year boundary		other materials during transportation, transfer, and storage impact drinking water supply	
2-11	RV/Mini Storage	In city limits; Located behind Ron's Paint Supply	10-20 year	L	Spills, leaks, or improper handling of fuels and other materials during transportation, transfer, and storage impact drinking water supply	
2-12	Historic Wrecking Yard	In city limits; East of Hwy 101 north of Munsel Lake Rd	20-30 year	H	Spills, leaks, or improper handling of automotive chemicals, batteries, and other waste materials during storage and disposal may impact the drinking water supply	
2-13	Heceta Self Storage	Outside city limits; S of intersection of Hwy 101 and Heceta Beach Rd	10-20 year	L	Spills, leaks, or improper handling of fuels and other materials during transportation, transfer, and storage impact drinking water supply; septic system infiltration of wastes, cleaning chemicals, prescription drugs, etc., may impact shallow groundwater.	
2-14	Steve's Automotive	Outside city limits; SW of intersection of Hwy 101 with Heceta Beach Rd	Just outside 10-20 year	H	Spills, leaks, or improper handling of automotive fluids, solvents and repair materials during transportation, use, storage and disposal may impact drinking water supply; septic system infiltration of wastes, cleaning chemicals, prescription drugs, etc., may impact shallow groundwater.	
2-15	Pesticide use	In city limits; West of proposed well sites along N Rhododendron Drive	Just outside 1 year	M	Over-application or improper handling of pesticides may impact drinking water supply	Herbicide use to control blackberries – downgradient from proposed wellfield
2-16	Golf Course	In city limits; SE of proposed wellfield	1 year	M	Over-application or improper handling of pesticides or fertilizers may impact drinking water. Excessive irrigation may cause transport of contaminants to groundwater	
2-17	Residential Area: Density > 2 DU/Acre	Outside city limits; E of Hwy 101 just	10-20 year	M	Improper use, storage, and disposal of household chemicals may impact drinking water supply.	

Table 3.7 Potential Contaminant Source Inventory Proposed Wellfield: Existing Land Uses

Map Reference No.	PCS Source Type	Approximate Location	Time of Travel Zone	Relative Risk Level	Potential Impacts	Comments
		south of intersection with Heceta Beach Rd			Stormwater runoff or infiltration may contaminate the drinking water supply; septic system infiltration of wastes, cleaning chemicals, prescription drugs, etc., may impact shallow groundwater.	
2-18	Residential Development	In city limits; E of Hwy 101, along 52nd Street	Upgradient of 30 year TOT	L	Stormwater runoff into roadside swales. infiltration may contaminate the drinking water supply	
2-19	Septic systems – Density <1 system/acre; Residential Development	Outside city limits; E of Hwy 101 at intersection of 101 and Heceta Beach Rd	Upgradient of 30 year TOT	L	If too high of density, infiltration of household wastes, cleaning chemicals, prescription drugs, etc., may impact shallow groundwater. Stormwater runoff into roadside swales may lead to infiltration, potentially contaminating the drinking water supply	2 of 3 drainfields have failed. Repair in process.
Not specifically marked	Hwy 101	In and outside city limits; runs N-S through DWPA	10-20 year	M	Vehicle use increases the risk for leaks or spills of fuel and other hazardous materials. Stormwater may infiltrate to groundwater. Over application/improper handling of pesticides may impact water supply.	

Potential Contaminant Source Inventory: Planned Land Use

In addition to existing land use, planned land use could pose a potential threat to the DWPAs and the City's wellfields. Planned land uses are shown in Figure 3.7, which overlays the boundaries of the DWPAs onto the Comprehensive Plan designations. Inventory results for both the Existing Wellfield and the Proposed Wellfield are shown in Table 3.8.

As with the Potential Contaminant Source Inventory (PCSI) for existing land uses, the PCSI for planned land uses provides a "worst case" scenario. In the planning context, all land uses that are allowed in a given Plan designation category could eventually locate there. For the purposes of this analysis, it is assumed that the allowed land uses that would have the greatest impact on the resource will locate there in the future and the risk associated with that occurrence is indicated. This analysis is a useful tool for determining how land use regulations might be used to minimize future risks to the drinking water source. Two types of these "source controls" are included in the management strategies in Chapter 4.: a Drinking Water Protection Overlay Zone in the DWPA for the proposed wellfield; and Comprehensive Plan and Code amendments to address the threat from future septic systems in both the existing and the proposed wellfield.

Susceptibility of the Drinking Water Source

Drinking water susceptibility can be defined as the potential for contamination within the DWPA to reach the well(s) and/or spring(s) being used by a Public Water System. The overall purpose of the susceptibility analysis is to identify the potential threats to drinking water quality and help prioritize community efforts for minimizing the contamination risk associated with those threats. Therefore, the susceptibility analysis is dependent on four factors: (1) identifying the location of the DWPA; (2) the sensitivity of the constructed intake (i.e., well); (3) the sensitivity of the aquifer to contamination; and (4) the occurrence and distribution of high- and moderate-risk PCSs within the DWPA. These four steps were accomplished during the delineation, sensitivity analysis, and PCS inventory phases of this project.

The susceptibility analysis is a management guidance tool that should be used to recognize and identify environmental conditions that are favorable for contamination of the drinking water supply. For example, if a contaminant is released to soils or groundwater in an area of high sensitivity, there is a greater likelihood that contamination of the aquifer will occur if remedial action is not taken. However, the susceptibility analysis should not be used to predict when or if contamination will actually occur.

The susceptibility analysis is generally completed by overlaying the PCS inventory results onto a map of the highly and moderately sensitive aquifer areas inside the DWPA (Figure 3.5). Florence's entire dunal aquifer area is considered to be highly sensitive. The PCSs identified here for the existing wellfield are largely the same as those discussed in the 2003 Source Water Assessment (Appendix G). PCS inventory results are analyzed in terms of current, past, and future land uses; their time of travel relationship or proximity to the well(s) and their associated risk rating (Figures 3.5, 3.6 and 3.7). High- and moderate-risk contaminant sources have been defined as any facility or activity that stores, uses, or produces a contaminant of concern in large enough quantities that if released, could be detectable in the public water supply.

In general, land use activities which pose the greatest threat to the drinking water supply are those which are closest to the wells and have the highest associated risk rating.

Therefore, the DEQ and OHA Drinking Water Programs strongly recommend that the community address all high- and moderate-risk PCSs that occur within their DWPA in order to reduce the risk of their drinking water supply becoming contaminated. How the PCSs are prioritized and the level of management strategies that are appropriate depend on the relative risk of the PCS and the proximity of the PCS to the well(s).

The City's drinking water source is considered to be susceptible to contamination, and it is recommended that the City identify those condition(s) that lead to the susceptibility and take steps to protect the resource (see Chapter 4).

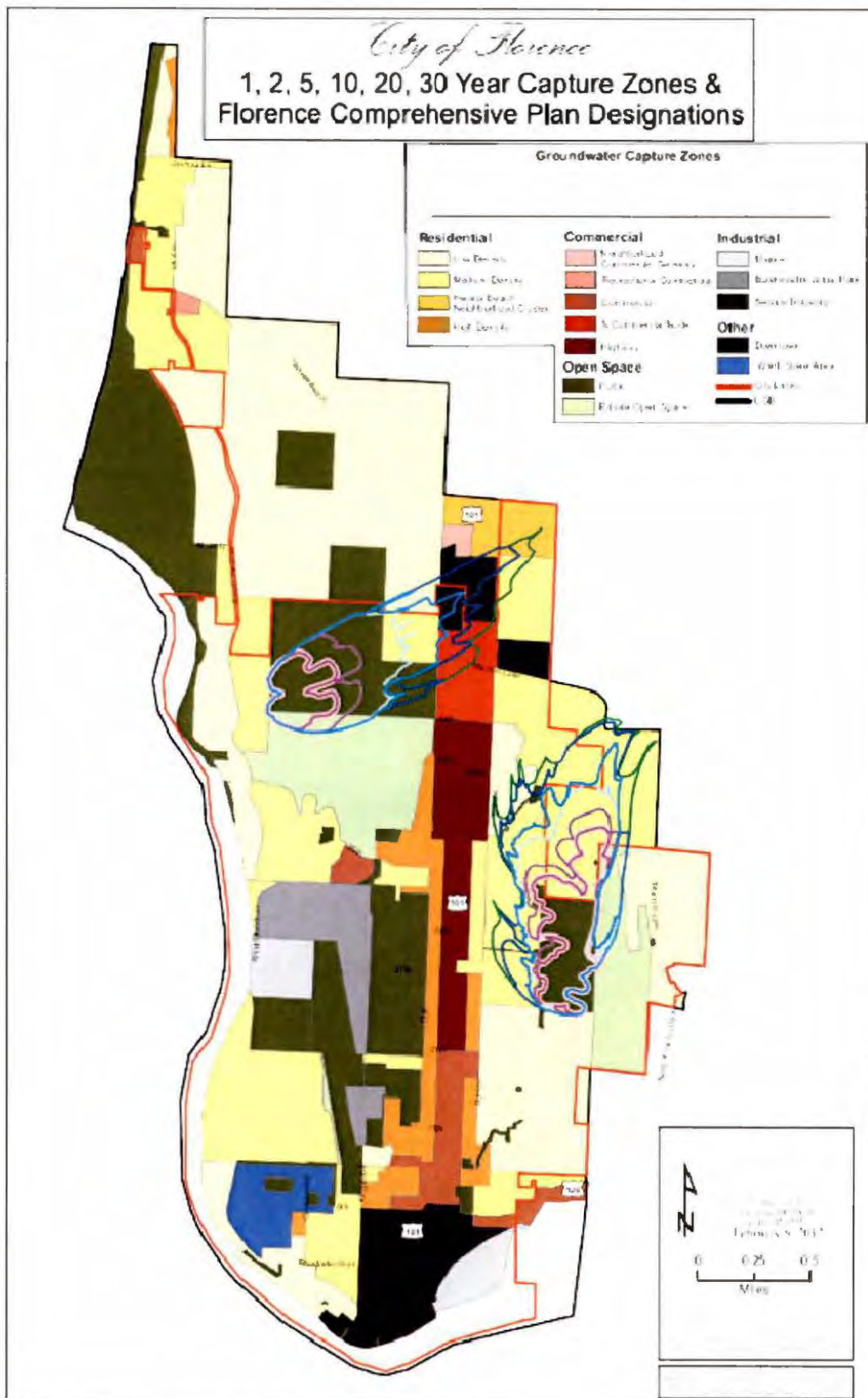


Figure 3.7 Planned land uses within capture zones of existing and proposed wellfields.

Table 3.8 Potential Contaminant Source Inventory: Planned Land Uses

Plan Designations in De-limited Areas	Where Located	Allowed Uses	Relative Risk Level	Potential Contaminants
Residential				
LOW DENSITY RESIDENTIAL Intended for areas where existing lot sizes are in the neighborhood of 9,000 square feet or larger, and for areas where environmental constraints preclude smaller lots. The corresponding zoning district is Restricted Residential.	<ul style="list-style-type: none"> Existing Wellfields: 20 & 30 YR TOTZ (inside city limits) Proposed wellfields: 10 & 20 YR TOTZ (outside city limits) 	<ul style="list-style-type: none"> Single family homes Sand mining and non-motorized recreational uses (Conditional Use) (in portion that is privately owned sand dunes suitable for non-motorized sand related recreational activities) 	L	<ul style="list-style-type: none"> Yard and garden: pesticide, herbicide, and fertilizer application Future septic systems (outside city limits)
MEDIUM DENSITY RESIDENTIAL Intended for areas where existing lot sizes are about 5,000 – 6,500 square feet, and for the majority of developable land remaining in the City, as well as urbanizable lands east of Highway 101. The corresponding zoning district is Single Family Residential.	<ul style="list-style-type: none"> Existing Wellfields: 1, 2, 10, 20 & 30 YR TOTZ (inside & outside city limits) Proposed wellfields: 5, 10 YR TOT inside city limits; 20, 30 TOT outside city limits) 	<ul style="list-style-type: none"> Single family homes Duplexes (Conditional Use) 	H: Existing wellfield outside city limits M: Existing wellfield inside city limits; and proposed wellfield	<ul style="list-style-type: none"> Yard and garden: pesticide, herbicide, and fertilizer application Future septic systems (outside city limits)
HECETA BEACH	<ul style="list-style-type: none"> Existing 	<ul style="list-style-type: none"> Commercial 		<ul style="list-style-type: none"> Yard and garden: pesticide, herbicide, and

Table 3.8 Potential Contaminant Source Inventory: Planned Land Uses

Plan Designations in De-limited Areas	Where Located	Allowed Uses	Relative Risk Level	Potential Contaminants
NEIGHBORHOOD CLUSTER Intended for the development of a mix of housing units at densities not exceeding 6,000 square feet per unit. The location of the various types of housing units should be planned around the capability of the land in a manner which allows natural features such as significant wetlands to become an open space feature within the housing complexes. The implementing zoning districts are Multi-family along Highway 101 and Single Family.	Wellfields: no Proposed wellfields: 20 & 30 YR TOTZ (outside city limits)	(Neighborhood Commercial Gateway) Medium and High Density Housing that may include mix of duplexes, triplexes, townhouses and multi-family units, and single family units, with a mix of owned and rented units.	M: proposed wellfield	fertilizer application Future septic systems (outside city limits) Heavy metals and petroleum products from parking areas (outside city)
Commercial				
North Commercial Node Established to address recent interest in regional commercial development where opportunities exist for large single parcels or consolidation of vacant parcels. Highway commercial uses are typically more auto-oriented due to their proximity to Highway 101. The implementing zoning district for this Plan designation is North Commercial District.	Existing Wellfields: no Proposed wellfields: 10, 20 & 30 YR TOTZ (inside city limits)	Large retail and service Professional offices Motels Residential in conjunction with commercial	H: proposed wellfield	Pesticide, herbicide, and fertilizer application Potential use of hazardous chemicals Heavy metals and petroleum products from parking areas
Industrial				
SERVICE INDUSTRIAL	Existing Wellfields:	Service businesses and	H: proposed wellfield	Potential use of hazardous chemicals Existing and future septic systems Heavy metals and petroleum products from

Table 3.8 Potential Contaminant Source Inventory: Planned Land Uses

Plan Designations in De-limited Areas	Where Located	Allowed Uses	Relative Risk Level	Potential Contaminants
The purpose is to provide lands for construction and development service businesses and related uses, while continuing the North Gateway theme begun in the Neighborhood Commercial Gateway designation. Heavy vegetation and berms will be used to separate the business/office structures along Highway 101 from the processing, storage, maintenance, and other more industrial functions to be located at the rear of the berms.	<ul style="list-style-type: none"> no Proposed wellfields: 10, 20 & 30 YR TOTZ (inside and outside city limits) 	<ul style="list-style-type: none"> related uses Processing, storage, maintenance activities Non-motorized sand related recreational activities (portion on private sand dunes) 		parking areas
Other Plan Designations				
PUBLIC Intended to identify existing, and planned locations for, public and semi-public uses. Future sites and public facility developments may take place within other plan designations subject to need and appropriate review. The implementing zoning districts are: Open Space District and Public Use Airport Zone (for the airport). Public Use Airport Safety and Compatibility Overlay Zone applies to the airport and to lands near the airport	<ul style="list-style-type: none"> Existing Wellfields: 1 YR TOTZ (inside city limits) Proposed wellfields: 1, 2, 5, 10 YR TOTZ (inside city limits) 	<ul style="list-style-type: none"> Airport Public parks Schools Community colleges Cemeteries Other public buildings Major utility facilities. 	H	<ul style="list-style-type: none"> Pesticide, herbicide, and fertilizer application Potential use of hazardous chemicals Heavy metals and petroleum products from parking areas

Table 3.8 Potential Contaminant Source Inventory: Planned Land Uses

Plan Designations in De-limited Areas	Where Located	Allowed Uses	Relative Risk Level	Potential Contaminants
<p>PRIVATE OPEN SPACE Intended to identify areas where the predominant character is a less intense development pattern consisting of natural uses or open areas. Any development shall be in such a manner that maintains the natural features of the site. Natural features include but are not limited to drainage ways, wetlands, scenic vistas, historic areas, groundwater resources, beaches and dunes, and habitat for sensitive species. Development within a Private Open Space area may occur subject to the Planned Unit Development process.</p>	<ul style="list-style-type: none"> ● Existing Wellfields: 1, 2, 10 & 20 YR TOTZ (inside city limits) ● Proposed wellfields: 1, 2, 5, & 10 YR TOTZ (inside city limits) 	<ul style="list-style-type: none"> ● Crop production ● Recreation ● Animal grazing ● Fish and wild-life habitat ● Golf courses ● Other similar uses 	<p>H</p>	<ul style="list-style-type: none"> ● Pesticide, herbicide, and fertilizer application ● Potential use of hazardous chemicals ● Heavy metals and petroleum products from parking areas

Well Susceptibility

As described in the sensitivity analysis, the wells of the City of Florence's wellfield are not considered to contribute to the sensitivity of the drinking water source. Therefore, it is reasonable to assume that the wells themselves do not contribute to the overall water system susceptibility. It is assumed that future wells in the Proposed Wellfield will be constructed in like manner.

Aquifer Susceptibility

The aquifer is considered to be highly sensitive due to its shallow unconfined nature and its high transverse and infiltration potentials. The aquifer is also considered to be moderately sensitive due to the presence of highly permeable soils throughout the DWPA and the large number of private wells in the area.

Results

The results of the inventory were analyzed in terms of current, past, and future land uses; their time of travel relationship to the well site; and their associated risk rating. In general, land uses that are closest to the well and those with the highest risk rating pose the greatest threat to the City's drinking water supply.

The susceptibility analysis is a management guidance tool that should be used to recognize and identify environmental conditions that are favorable for contamination of the drinking water supply. For example, if a contaminant is released to soils or groundwater in an area of high sensitivity, it is likely that contamination of the aquifer will occur if remedial action is not taken. However, the susceptibility analysis should not be used to predict when or if contamination will actually occur. Given the high sensitivity of the entire aquifer beneath the DWPAs, the susceptibility of the community's drinking water supply to contamination from each PCS can be determined by overlaying the PCS location map onto the individual DWPAs and associated time-of-travel zones. The tables below indicate the relationship between PCS risk and estimated contaminant travel time at the wells for the Existing Wellfield (Table 3.9) and Proposed Wellfield (Table 3.10).

The PCS location numbers on the inventory map are used in conjunction with the relative risk rankings for each PCS (Tables 3.6, 3.7, and 3.8) and respective time-of-travel zones to identify the susceptibility of the drinking water source to contamination from each PCS and to guide action for reducing the risk accordingly. The existing and proposed wellfields are treated separately.

Table 3.9 Relative risk of existing sites (Figure 3.5 & Table 3.6) and planned land uses (Figure 3.7 & Table 3.8) by time-of-travel zone in Existing Wellfield.*

Risk Ranking	Time-of-Travel Zone					
	<2	2 – 5	5 – 10	10 – 20	20 – 30	Proximity**
High	1-6; Planned land uses; Medium Density Residential outside city limits; Public; & Private Open Space				1-11	1-1, 1-7

Table 3.9 Relative risk of existing sites (Figure 3.5 & Table 3.6) and planned land uses (Figure 3.7 & Table 3.8) by time-of-travel zone in Existing Wellfield.*

Risk Ranking	Time-of-Travel Zone					
	<2	2 – 5	5 – 10	10 – 20	20 – 30	Proximity**
Moderate	1-1, 1-2, 1-5			Planned land uses: Medium Density Residential inside city limits		1-1, 1-3, 1-9, 1-12
Low				1-10		1-4, 1-8

** Proximity column lists PCS that are within close proximity to the identified DWPA (See Figure 3.5)

Table 3.10 Relative risk of existing sites (Figure 3.6 & Table 3.7) and planned land uses (Figure 3.7 & Table 3.8) by time-of-travel zone in Proposed Wellfield.*

Risk Ranking	Time-of-Travel Zone					
	<2	2 – 5	5 – 10	10 – 20	20 – 30	Proximity**
High	Planned Land Uses: Public & Private Open Space			2-8, 3-6; Planned Land Uses: North Commercial Node, Service Industrial	2-1, 2-7, 2-12	2-14
Moderate	2-15, 2-16		2-6, 3-2, 3-7; Planned Land Uses: Medium Density Residential inside city limits	2-4, 2-5, 2-17, Hwy 101	2-2, 3-3; Planned Land Uses: Medium Density Residential Areas outside city limits	
Low				2-11, 2-13, 3-1	2-3, 2-9	2-10, 2-18, 2-19

** Proximity column lists PCS that are within close proximity to the identified DWPA (See Figure 3.6)

Chapter 4: Management Goals and Strategies

In this chapter, management goals and strategies are presented in three categories: Aquifer-wide, Existing Wellfield, and Proposed Wellfield, followed by the Implementation Plan. The Management Strategies are presented in Tables 4.1, 4.2, and 4.3 for the three categories and the priorities shown reflect the following:

- H (High): Begin to implement immediately or continue to implement, if already being done
- M (Medium): Begin to implement in next two fiscal years
- L (Low): Implement as time and financial resources are available

The priorities and implementing groups and their roles were determined through the team and stakeholder processes. For all strategies, the City will take the lead role in implementation, unless noted otherwise.

Management goals are broad vision statements describing desired conditions or activities for the future. They provide direction for the development of management strategies. The management strategies more specifically describe a course of action for protecting the aquifer and Drinking Water Protection Areas (DWPAs).

The implementation of management strategies is key to the ultimate success of the Plan. Following City and County approval of the plan and certification of the plan by the Oregon Department of Environmental Quality (DEQ), the City will initiate amendments to the Comprehensive Plan and Code and begin to implement management strategies. Amendments that apply within city limits will be submitted for adoption by the City Council; amendments that apply outside the City, within the UGB, will be submitted to the County Board for adoption as well.

Aquifer-Wide Management Goals and Strategies⁹

Aquifer-wide management goals and strategies apply throughout the aquifer. They are presented in Table 4.1 with the implicated priority for implementation and implementing groups and their roles. Goals and strategies fall into four categories:

1. Surface and Groundwater Monitoring
2. Public Education
3. Coordination with Public and Non-profit Partners
4. Integrated Pest Management

⁹ The aquifer-wide strategies in this chapter apply aquifer-wide and are not intended for certification of a Source Water Protection Plan under OAR 340-040-0170, except as they are cross-referenced in the specific DWPA sections of this chapter.

Table 4.1 Aquifer-wide Management Goals and Strategies

Management Goals and Strategies	Priority* and Implementing Groups and Roles The City of Florence will work with the following entities:
<p>1. Surface and Groundwater Monitoring</p> <p>Management Goal: Protect water quality in Florence's sole source Dunal Aquifer through early detection of, and response to, contamination threats.</p> <p>Strategies: The City of Florence will pursue the following strategies to implement this goal:</p> <ol style="list-style-type: none"> Continue the City of Florence Surface and Groundwater Monitoring Program for another two years Seek funding to continue the program long-term Continue to participate in DEQ's Volunteer Water Quality Monitoring Program Adjust the monitoring program over time as indicated by results. Continue to partner with DEQ, OHA, ODFW, federal, local, and other state agencies to share data and collaborate on solutions to contamination incidents (see "Options for Responding to Contamination Threats in the North Florence Sole Source Dunal Aquifer, Appendix H) <p>2. Public Education</p> <p>Management Goal: Increase awareness among community members about aquifer vulnerability, sources of contamination, and methods for reducing the potential for contamination.</p> <p>Strategies: The City of Florence will pursue the following strategies to implement this goal:</p> <ol style="list-style-type: none"> Use and promote existing educational materials (flyers, brochures, newsletters, etc.) to raise awareness and educate people about the aquifer and the need to protect water quality; put item on City Council agendas for discussion; and distribute existing educational materials (see Appendix I for Resource List). Distribute educational materials through City Newsletter, Public Service Announcements, radio spots, through local groups (Rotary, Garden Clubs, etc.), permit process, at City 	<p>Priority: H</p> <p>Groups and Roles:</p> <ul style="list-style-type: none"> ■ Siuslaw Watershed Council (SWC): share data ■ Surfriders: share data ■ Tribes: share data ■ Lane County: help to address threats ■ Oregon Department of Environmental Quality (DEQ): collect data and address threats ■ Oregon Health Authority (OHA): address threats ■ Heceta Water District (HWD): collect data and help to address threats <p>Priority: H</p> <p>Groups and Roles:</p> <ul style="list-style-type: none"> ■ DEQ, OHA, and STEP: technical assistance and educational materials and other resources (see Appendix I) ■ Chamber of Commerce, Realtors, local businesses, local groups (Garden Clubs, Rotary, etc.), Home Owners Associations, local newspaper and radio: help get the word out ■ HWD: distribute information to customers ■ Port of Siuslaw: include information on aquifer

Table 4.1 Aquifer-wide Management Goals and Strategies

Management Goals and Strategies	Priority* and Implementing Groups and Roles The City of Florence will work with the following entities:
<p>counters, and in utility bills. Make the flyer and other information graphic – to catch people’s attention and make them available at various places in and around the City (e.g., the City library, local Chamber of Commerce, banks, doctor’s offices and clinics, and restaurants).</p> <p>b. Develop or tailor existing fliers to convey educational information, such as:</p> <ul style="list-style-type: none"> ■ The vulnerability of the City’s groundwater ■ How each citizen’s actions can affect groundwater quality ■ Why it is important to reduce the cumulative effects of groundwater impacts ■ The consequences of groundwater contamination ■ Tips on how each citizen can reduce the likelihood of contributing contaminants to the groundwater ■ Non-toxic alternatives to common contaminants ■ Safe use, disposal, and storage of toxic materials and hazardous waste ■ DEQ Technical Assistance Program. ■ Hazardous Waste events and information : contact local newspapers and radio and post to city web site: <ul style="list-style-type: none"> ■ Information and notices about the City’s and Lane County’s Hazardous Waste Programs and notices of the City and Lane County spring and fall hazardous waste collection days in the city, well in advance of the events; ■ promote the use of less hazardous alternatives to common household hazardous waste products ■ Upkeep and maintenance of home heating oil tanks ■ Upkeep and maintenance of septic systems (coordinate with Oregon State University on use of their materials) ■ Resources available to citizens ■ The City’s “take back” program for pharmaceuticals ■ What to do in the event of a spill ■ Information on landscaping strategies to encourage the use of plants to protect water quality and control floods <p>c. Hazardous Waste: contact local newspapers and radio and post to city web site:</p> <ol style="list-style-type: none"> 1) Information and notices about the City’s and Lane County’s Hazardous Waste Programs and notices of the City and Lane County spring and fall hazard- 	<p>protection in materials handed out at campground and in historic education sessions now being planned</p> <ul style="list-style-type: none"> ■ Siuslaw School District: add to curricula; help get the word out ■ Florence Public Works Department: use web site to distribute information and directly implement portions of education program through annual work programming ■ EMAC: help get the word out and enlist volunteers to help implement the strategy

Table 4.1 Aquifer-wide Management Goals and Strategies

Management Goals and Strategies	Priority* and Implementing Groups and Roles The City of Florence will work with the following entities:
<p>ous waste collection days in the city, well in advance of the events;</p> <ol style="list-style-type: none"> 2) Educational material promoting the use of less hazardous alternatives to common household hazardous waste products 3) Information and copies of the brochure explaining the DEQ Hazardous Waste Technical Assistance Program (see Appendix J) <ol style="list-style-type: none"> d. Continue to work with the Siuslaw School District to request that they incorporate information about the aquifer and the DWPA's in the curricula for elementary and middle school and seek involvement at the high school level. e. Consider applying to be a Groundwater Guardian Community, see: www.groundwater.org/gg/gg.html f. Have Aquifer Protection Plan and educational materials available to the public at the Florence Annual Green Fair g. Post signs at key locations (e.g., Old Town) for visitors to know how to dispose of waste appropriately; and at boat access areas at lakes to inform users of the DWPA and its vulnerability, with details on what precautions should be taken to prevent contamination. h. Devote a segment of the Public Works web site to Aquifer Protection and post the Aquifer Protection Plan to the web site. i. Work with Home Owners Associations to place articles in their newsletters and information in their community bulletin boards. j. Work with the City's Emergency Management Advisory Committee (EMAC) to enlist their assistance in some of these educational efforts. k. Work with businesses, including starting up a city-wide "green award" for actions to protect the aquifer. <p>3. Coordination</p> <p>Management Goal: Continue to work with public and non-profit partners to build on products and processes already in place, described below, and to develop new products and processes, described below, to protect water quality in the aquifer and to respond to contamination incidents.</p>	<p>Priority: H</p> <p>Groups and Roles:</p> <ul style="list-style-type: none"> ■ Lane County: Hazardous Waste Events ■ School District: include curricula and help get the word out ■ SWC, Siuslaw Soil and Water Conservation Dis-

Table 4.1 Aquifer-wide Management Goals and Strategies

Management Goals and Strategies	Priority* and Implementing Groups and Roles The City of Florence will work with the following entities:
<p>Strategies:</p> <p>The City of Florence will pursue the following strategies to implement this goal:</p> <ul style="list-style-type: none"> a. Lane County: Continue to coordinate with Lane County's Hazardous Waste Events. Use utility bills and City newsletter to get the word out about the events; ask Lane County to increase the hazardous waste program in Florence and to provide a storage area; obtain, and make available to the public, county-wide educational materials. b. School District: continue to work with the Siuslaw School District to include information on the aquifer, Drinking Water Protection Areas, and Management Strategies in middle and elementary school curricula; seek high school student involvement. c. Collaborate with community partners such as Siuslaw Watershed Council, Siuslaw Soil and Water Conservation District, Surfriders, and STEP on fish stenciling program and installing fish on drains using a more permanent method than in the past, and educating their membership on Drinking Water Protection Areas and the aquifer. d. Department of Environmental Quality (DEQ) Technical Assistance Program: use materials available on web site and confer with staff on questions related to protecting water quality in the aquifer e. Work with DEQ, Siuslaw Valley Fire and Rescue, and other emergency response providers (see Chapter 5). f. Continue to work with project partners, including Lane County, DEQ, OHA, STEP, ODFW, and the Watershed Council, to develop and implement strategies to respond to contamination incidents in the UGB (see Chapter 5). g. Coordinate with Heceta Water District and the Confederated Tribes on management strategies that provide mutual benefit for the Drinking Water Source Areas of all three entities. <p>4. Implement an Integrated Pest Management Strategy.</p> <p>Management Goal: Minimize the use of chemical-based products used to reduce or eliminate invasive species or insects that damage structures.</p>	<p>strict (SWCD): help with fish stenciling program and education</p> <ul style="list-style-type: none"> ■ DEQ: Technical Assistance and resources (Appendix I) ■ DEQ, Siuslaw Valley Fire and Rescue: Emergency Response ■ Lane County, DEQ, OHA, STEP, ODFW and SWC: develop and implement strategies to respond to contamination incidents ■ HWD and Confederated Tribes: Source Water Management Strategies of mutual benefit <p>Priority: M</p> <p>Groups and Roles:</p> <ul style="list-style-type: none"> ■ OSU Extension Program:

Table 4.1 Aquifer-wide Management Goals and Strategies

Management Goals and Strategies	Priority* and Implementing Groups and Roles The City of Florence will work with the following entities:
<p>Strategies:</p> <p>The City of Florence may pursue the following strategies to implement this goal:</p> <ol style="list-style-type: none"> Educate landowners on the potential risk to groundwater from over application of pesticides, using existing available resources as much as possible, e.g., Oregon State University (OSU) Extension Program's Master Gardeners. Start on City-owned property and use Lane County and ODOT program as a model. Consider targeting education and outreach to areas where the aquifer is particularly sensitive to contamination from the leaching of pesticides. Consider requesting the School District to incorporate aquifer protection concepts into the Siuslaw School District's Integrated Pest Management program. 	<p>educational materials and technical assistance to residents and businesses</p> <ul style="list-style-type: none"> ■ Lane County and ODOT: share information ■ School District: include aquifer protection concepts ■ Port: use integrated pest management for Port properties ■ HWD: help promote program with customers

* H (High): Begin to implement immediately or continue to implement, if already being done; M (Medium): Begin to implement in next two fiscal years; or L (Low): Implement as time and financial resources are available.

Existing Wellfield Management Goals and Strategies

DEQ and the Oregon Health Authority (OHA), and project consultants have identified planned and existing land uses that are in, or in close proximity to, the DWPA that pose a potential risk of contamination.

Management strategies are presented in Table 4.2 for existing and planned land uses with a high (H) or moderate (M) risk of DWPA contamination. Please see Potential Contaminant Source Inventory tables and figures in Chapter 3 for details on these and low risk uses. A susceptibility assessment is also provided in Chapter 3 that will help guide the implementation of management strategies. PCS with a High or Moderate risk rating are considered a priority for implementation.

Three types of land uses have been identified in the DWPA for the existing wellfield:

- Residential
- Private Open Space
- Public

Management goals and strategies and implementing priorities and groups/roles are linked to these existing and planned land use types and associated high- and moderate-

risk potential contaminant sources in Table 4.2, starting with strategies that apply to all land use types in the DWPA.

Goals and strategies fall into the following categories:

- Conduct targeted public education and outreach
- Continue to monitor potential contaminant sources
- Work with realtors
- Target integrated pest management efforts to DWPA
- Adopt comprehensive plan policies and code amendments
- Work with home owners associations
- Continue to work with golf course managers
- Continue to monitor sewer lines

Table Notes: **1.** See Table 3.9, 3.6 and Figures 2.9 and 3.5; **2.** See Table 3.10, 3.8 and Figures 2.10 and 3.7. **3.** High: Begin to implement immediately or continue to implement; Medium: Begin to implement in next two fiscal years; Low: Implement as time and financial resources are available; **4.** Due to the location of this use and its proximity to some of the City's wells, the risk/benefit assessment recommends this land use be given a higher priority with respect to implementation of management strategies.

Table 4.2 Management Goals and Strategies for the Existing Wellfield

PCS from Existing Land Use ¹	PCS from Planned Land Use ²	Management Goals and Strategies	Priority ³ and Implementing Groups and Roles The City of Florence will work with the following entities:
All Land Uses and Potential Contaminant Sources (PCS)			
<p>Management Goal: Protect water quality in the DWPA for the existing wellfield; reduce or eliminate contamination threats; and respond to contamination incidents.</p> <p>Strategies:</p> <p>1. Conduct Targeted Education and Outreach</p> <ul style="list-style-type: none"> a. Target aquifer-wide education and outreach to all uses in the DWPA (see Aquifer-wide Strategies) b. Work with Lane County and Heceta Water District to distribute educational materials to residents and businesses in the DWPA (see Aquifer-wide Strategies); and to educate them specifically about the DWPA and potential risk to their drinking water supply. c. Develop a household hazardous waste education program for the DWPA. d. Post information about the DWPA and the DWPA map to City web site. e. Consider making an interactive web tool to allow property owners to access a tax lot specific map and get responses to specific queries. <p>2. Continue to Monitor Potential Contaminant Sources</p> <ul style="list-style-type: none"> a. Develop a map, using GIS, of the DWPA that is overlaid on streets and maintains shapes so that it can easily be communicated to members and organizations within the City; b. Identify corresponding township, range, and sections to encompass this area for purposes of identifying locations inside the DWPA when reviewing building permit applications. <p>3. Work with Realtors</p> <ul style="list-style-type: none"> a. Provide them information on the aquifer and the Drinking Water Protection Area to show prospective buyers (research public education materials produced by other sources) b. Realtors can get credits through Realtor Training Board, as part of the already established program. c. Tie in with information on wetlands and riparian areas 			<p>Priority: M Groups and Roles:</p> <ul style="list-style-type: none"> ■ Lane County and HWD: distribute educational materials in DWPA ■ Florence Public Works: maps and web site (H) <p>Priority: H Groups and Roles:</p> <ul style="list-style-type: none"> ■ Florence Public Works: maps and web site <p>Priority: H Groups and Roles:</p> <ul style="list-style-type: none"> ■ Central Oregon Coast Board of Realtors and local agents: provide in-

Table Notes: **1.** See Table 3.9, 3.6 and Figures 2.9 and 3.5; **2.** See Table 3.10, 3.8 and Figures 2.10 and 3.7. **3.** High: Begin to implement immediately or continue to implement; Medium: Begin to implement in next two fiscal years; Low: Implement as time and financial resources are available; **4.** Due to the location of this use and its proximity to some of the City's wells, the risk/benefit assessment recommends this land use be given a higher priority with respect to implementation of management strategies.

Table 4.2 Management Goals and Strategies for the Existing Wellfield

PCS from Existing Land Use ¹	PCS from Planned Land Use ²	Management Goals and Strategies	Priority³ and Implementing Groups and Roles The City of Florence will work with the following entities: formation to clients
4. Target Integrated Pest Management: Target aquifer-wide Integrated Pest Management efforts to all uses in the DWPA (see Aquifer-wide Strategies).			Priority: M Groups and Roles: See Aquifer-wide Strategies
Residential Land Uses			
<ul style="list-style-type: none"> Housing >2 Dwelling Units (DU) per acre in 1-10 year TOT and in close proximity to the DWPA: improper use, storage, and disposal of household chemicals through stormwater runoff or infiltration may contaminate the drinking water supply (M). Septic systems outside City limits in 20-30 year TOT: infiltration of household wastes, cleaning chemicals, prescription drugs, etc., may impact shallow groundwater (M) 	<ul style="list-style-type: none"> Medium Density Residential: single family homes and duplexes outside city limits (future septic systems) in 1, 2 year TOT (H) and 10, 20, 30 year TOT (M) 	<p>Management Goal: Protect water quality in the DWPA and address potential threats from potential contaminant sources from existing and planned residential land uses.</p> <p>STRATEGIES:</p> <p>1. Adopt Comprehensive Plan Policies that apply in DWPA:</p> <ul style="list-style-type: none"> a. City will adopt, and request Lane County to co-adopt, Plan policy to protect the DWPA for existing wellfield. b. City will consider adopting a Comprehensive Plan recommendation to determine if transfer of development rights is a feasible tool in Florence. <p>2. Adopt City and County Code Requirements that apply in DWPA</p> <ul style="list-style-type: none"> a. City will consider specifying criteria and standards for transfer of development rights in City Code and work with 	<p>Priority: H Groups and Roles:</p> <ul style="list-style-type: none"> Florence Community Development Department will prepare amendments Lane County staff will work with City on language <p>Priority: H Groups and Roles:</p> <ul style="list-style-type: none"> Florence Community Development Department will pre-

Table Notes: **1.** See Table 3.9, 3.6 and Figures 2.9 and 3.5; **2.** See Table 3.10, 3.8 and Figures 2.10 and 3.7. **3.** High: Begin to implement immediately or continue to implement; Medium: Begin to implement in next two fiscal years; Low: Implement as time and financial resources are available; **4.** Due to the location of this use and its proximity to some of the City's wells, the risk/benefit assessment recommends this land use be given a higher priority with respect to implementation of management strategies.

Table 4.2 Management Goals and Strategies for the Existing Wellfield

PCS from Existing Land Use ¹	PCS from Planned Land Use ²	Management Goals and Strategies	Priority ³ and Implementing Groups and Roles The City of Florence will work with the following entities:
		<p>County to adopt similar standards, if this tool is determined to be feasible for Florence.</p> <p>3. Conduct targeted public education and outreach in DWPA:</p> <p>a. Work with Homeowners Associations (HMA) in the DWPA to distribute educational materials (see Aquifer-wide Public Education and Outreach); and meet with HMAs to distribute materials and discuss issues and concerns.</p>	<p>pare amendments</p> <ul style="list-style-type: none"> ■ Lane County staff will work with City on language <p>Priority: H</p> <p>Groups and Roles:</p> <ul style="list-style-type: none"> ■ PWD will work with HMAs to distribute materials
Private Open Space Land Uses			
<ul style="list-style-type: none"> ■ Pesticide and fertilizer storage, handling, mixing, etc. just outside DWPA: spills, leaks, or improper handling of pesticides and fertilizers (H) ■ Above ground fuel storage tanks just outside DWPA: spills, leaks or improper handling of stored fuel (M) ■ Golf course in 1 year TOT: over application or improper handling of pesticides and fertilizers; excessive irrigation may cause contaminant transport or runoff towards the wells (M).⁴ 	<ul style="list-style-type: none"> ■ Golf courses in 10 and 20 year TOT inside city limits (H): pesticide, herbicide, and fertilizer application; potential use of hazardous chemicals; heavy metals and petroleum products from parking areas. 	<p>Management Goal: Protect water quality in the DWPA and address potential threats from potential contaminant sources from existing and planned private open space land uses.</p> <p>STRATEGIES:</p> <p>1. City Public Works Department (PWD) will:</p> <p>a. Provide golf course manager with information and technical assistance in continuing to use, and identifying new, best management practices (BMPs), includ-</p>	<p>Priority: H</p> <p>Groups and Roles:</p> <ul style="list-style-type: none"> ■ Florence Public Works Department (PWD) will work with golf course managers

Table Notes: **1.** See Table 3.9, 3.6 and Figures 2.9 and 3.5; **2.** See Table 3.10, 3.8 and Figures 2.10 and 3.7. **3.** High: Begin to implement immediately or continue to implement; Medium: Begin to implement in next two fiscal years; Low: Implement as time and financial resources are available; **4.** Due to the location of this use and its proximity to some of the City's wells, the risk/benefit assessment recommends this land use be given a higher priority with respect to implementation of management strategies.

Table 4.2 Management Goals and Strategies for the Existing Wellfield

PCS from Existing Land Use ¹	PCS from Planned Land Use ²	Management Goals and Strategies	Priority ³ and Implementing Groups and Roles The City of Florence will work with the following entities:
		<p>ing: BMPs related to the use and storage of fertilizers and other chemicals; and to continued use of available groundwater-friendly products.</p> <p>b. Request golf course manager to provide the PWD with annual well reports and integrated fertilizer/pest management plans, as available.</p> <p>c. Provide golf courses a "green award" and public recognition for implementing BMPs; and to renew the award only as necessary when new BMPs are implemented over time, based on advance communication of new standards or information to the managers by the PWD.</p>	
Public Land Uses			
<ul style="list-style-type: none"> ■ Drinking Water Treatment Plant in 1 year TOT: treatment chemicals and equipment maintenance materials may impact drinking water supply (M) ■ Sewer lines in 1- 5 year TOT: if not properly designed, installed, and maintained, may impact wells if within 2 year TOT (H) ■ Highway 101, outside DWPA: 	<ul style="list-style-type: none"> ■ Airport, public parks, schools, community colleges, cemeteries, other public buildings, and major utility facilities in 10, 20, and 30 year TOT inside city limits 	<p>Management Goal: Protect water quality in the DWPA and address potential threats from potential contaminant sources from existing and planned public land uses.</p> <p>STRATEGIES:</p> <p>1. Continue to monitor sewer lines.</p> <p>a. Ensure that the sewer lines in the DWPA are carefully monitored to prevent contamination to the drinking wa-</p>	<p>Priority: H</p> <p>Groups and Roles:</p> <ul style="list-style-type: none"> ■ PWD to continue to monitor sewer lines

Table Notes: **1.** See Table 3.9, 3.6 and Figures 2.9 and 3.5; **2.** See Table 3.10, 3.8 and Figures 2.10 and 3.7. **3.** High: Begin to implement immediately or continue to implement; Medium: Begin to implement in next two fiscal years; Low: Implement as time and financial resources are available; **4.** Due to the location of this use and its proximity to some of the City's wells, the risk/benefit assessment recommends this land use be given a higher priority with respect to implementation of management strategies.

Table 4.2 Management Goals and Strategies for the Existing Wellfield

PCS from Existing Land Use¹	PCS from Planned Land Use²	Management Goals and Strategies	Priority³ and Implementing Groups and Roles The City of Florence will work with the following entities:
<p>vehicle use increases the risk for leaks or spills of fuel and other hazardous materials. Stormwater may infiltrate to groundwater.</p> <p>■ Over application/improper handling of pesticides may impact water supply (M)</p>	<p>(H): pesticide, herbicide, and fertilizer application, potential use of hazardous chemicals, heavy metals and petroleum products from parking areas</p>	<p>ter;</p> <ul style="list-style-type: none"> b. continue aggressive infiltration/inflow program meeting federal and state regulations to insure that sewer pipes have limited leakage; c. prioritize pipe replacement projects to repair aging infrastructure where appropriate; d. perform video surveys of sewer lines; and e. monitor water from the City wells for contaminants of concern on a frequent basis. 	<p>and City wells</p>

Proposed Wellfield Management Goals and Strategies

For the proposed wellfield, existing and planned land uses in, or in close proximity to, the DWPA that pose a potential risk of contamination have been identified in cooperation with the DEQ and the Oregon Health Authority (OHA). Management strategies are presented in Table 4.3 for existing and planned land uses with a high (H) or moderate (M) risk of DWPA contamination. Please see Potential Contaminant Source Inventory tables and figures in Chapter 3 for details on these and low risk uses. A susceptibility assessment is also provided in Chapter 3 that will help guide the implementation of management strategies. PCS with a High or Moderate risk rating are considered a priority for implementation.

Four types of land use have been identified in the DWPA for the proposed wellfield:

- Residential
- Commercial/Industrial
- Private Open Space
- Public

Management goals and strategies and implementing priorities and groups/roles are linked to these existing and planned land use types and associated high- and moderate-risk potential contaminant sources in Table 4.3, starting with strategies that apply to all land use types in the DWPA.

Goals and strategies are presented in Table 4.3 that fall into the following categories:

- Conduct targeted public education and outreach
- Adopt comprehensive plan policies and code amendments
- Continue to monitor potential contaminant sources
- Work with realtors
- Target integrated pest management efforts to DWPA
- Adopt drinking water protection overlay zone
- Inventory and rank chemicals used in the DWPA and prepare related responses
- Provide business assistance
- Continue to work with golf course managers
- Continue to monitor sewer lines

Implementation Plan

City will take the following actions to implement the management strategies:

1. The City Council concurred by motion with the Plan on July 11, 2012; The Lane County Board concurred by Board Order on July 25, 2012.
2. Locally accepted initial draft plan was submitted to the Oregon Department of Environmental Quality (DEQ) and OHA for review on July 25 and a revised draft that included all recommended changes was submitted in December 2012. City will request certification prior to adoption.
3. City will initiate amendments to the Comprehensive Plan and Code, including Drinking Water Protection Overlay Zone, and begin to implement management strategies: April 30, 2013.
4. City will submit to Lane County, for co-adoption, Comprehensive Plan amendments that apply outside the City, within the UGB: to be scheduled
5. City will set up internal procedures and assign staff to develop and implement annual work programs to implement the management strategies. City has obtained the assistance of a RARE (Resource Assistance for Rural Environments) Program participant to assist in the administration of the strategies.

Table Notes: 1. See Table 3.10, 3.7 and Figures 2.10 and 3.6; 2. See Table 3.10, 3.8 and Figures 2.10 and 3.7; 3. High: Begin to implement immediately; Medium: Begin to implement in next two fiscal years; Low: Implement as time and financial resources are available; 4. Due to the location of this use and its proximity to some of the City's wells, the risk/benefit assessment recommends this land use be given a higher priority with respect to implementation of management strategies.

Table 4.3 Management Goals and Strategies for the Proposed Wellfield

PCS from Existing Land Use ¹	PCS from Planned Land Use ²	Management Goals and Strategies	Priority ³ and Implementing Groups and Roles The City of Florence will work with the following entities:
All Land Uses and Potential Contaminant Sources (PCS)			
<p>Management Goal: Protect water quality in the DWPA for the proposed wellfield; reduce or eliminate contamination threats; and respond to contamination incidents.</p> <p>STRATEGIES:</p> <p>1. Conduct targeted public education and outreach</p> <ol style="list-style-type: none"> Target aquifer-wide education and outreach to all uses in the DWPA (see Aquifer-wide Strategies); Work with Lane County and Heceta Water District to distribute educational materials to residents and businesses in the DWPA (see Aquifer-wide Strategies); and to educate them specifically about the DWPA and potential risk to their drinking water supply. Develop a household hazardous waste education program for the DWPA. Post information about the DWPA and the DWPA map to City web site. Consider making an interactive web tool to allow property owners to access a tax lot specific map and get responses to specific queries. <p>2. Adopt Comprehensive Plan Policies that apply in DWPA</p> <ol style="list-style-type: none"> City will adopt, and request Lane County to co-adopt, Plan policy to protect the DWPA for proposed wellfield City will consider adopting a Comprehensive Plan recommendation to determine if transfer of development rights is a feasible tool in Florence. <p>3. Adopt City and County Code Requirements that apply in DWPA</p> <ol style="list-style-type: none"> City will consider specifying criteria and standards for transfer of development rights in City Code and work with County to adopt similar standards, if this tool is determined to 			<p>Priority: M Groups and Roles:</p> <ul style="list-style-type: none"> ■ Lane County and HWD: distribute educational materials in DWPA ■ Florence Public Works: maps and web site (H) <p>Priority: H Groups and Roles:</p> <ul style="list-style-type: none"> ■ Florence Community Development Department will prepare amendments ■ Lane County staff will work with City on language <p>Priority: H Groups and Roles:</p> <ul style="list-style-type: none"> ■ Florence Planning Depart-

Table Notes: 1. See Table 3.10, 3.7 and Figures 2.10 and 3.6; 2. See Table 3.10, 3.8 and Figures 2.10 and 3.7; 3. High: Begin to implement immediately; Medium: Begin to implement in next two fiscal years; Low: Implement as time and financial resources are available; 4. Due to the location of this use and its proximity to some of the City's wells, the risk/benefit assessment recommends this land use be given a higher priority with respect to implementation of management strategies.

Table 4.3 Management Goals and Strategies for the Proposed Wellfield

PCS from Existing Land Use ¹	PCS from Planned Land Use ²	Management Goals and Strategies	Priority ³ and Implementing Groups and Roles
be feasible for Florence.			The City of Florence will work with the following entities:
<p>4. Continue to monitor potential contaminant sources</p> <p>a. Develop a map, using GIS, of the DWPA that is overlaid on streets and maintains shapes so that it can easily be communicated to members and organizations within the City;</p> <p>b. Identify corresponding township, range, and sections to encompass this area for purposes of identifying locations inside the DWPA when reviewing building permit applications.</p> <p>5. Work with realtors</p> <p>a. Provide them information on the aquifer and the Drinking Water Protection Area to show prospective buyers (research public education materials produced by other sources)</p> <p>b. Realtors can get credits through Realtor Training Board, through the existing program</p> <p>c. Tie in with information on wetlands and riparian areas</p> <p>6. Target Integrated Pest Management: Target aquifer- wide Integrated Pest Management efforts to all uses in the DWPA (see Aquifer-wide Strategies).</p>			<p>ment will prepare amendments</p> <ul style="list-style-type: none"> Lane County staff will work with City on language <p>Priority: H Groups and Roles:</p> <ul style="list-style-type: none"> Florence Public Works: maps and web site <p>Priority: H Groups and Roles:</p> <ul style="list-style-type: none"> Central Oregon Coast Board of Realtors and local agents: provide information to clients <p>Priority: M Groups and Roles: See Aquifer-wide Strategies</p>
Residential Land Uses			
<ul style="list-style-type: none"> Housing >2 Dwelling Units (DU) per acre in 1-10 year TOT and outside DWPA: improper use, storage, 	<ul style="list-style-type: none"> Medium Density Residential (5, 10 year TOT inside city; 20, 30 year TOT outside city); Heceta Beach Neighbor- 	Management Goal: Protect water quality in the DWPA and address potential threats from potential contaminant sources from existing and planned residential land uses.	

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Table 4.3 Management Goals and Strategies for the Proposed Wellfield

PCS from Existing Land Use ¹	PCS from Planned Land Use ²	Management Goals and Strategies	Priority ³ and Implementing Groups and Roles The City of Florence will work with the following entities:
<p>and disposal of household chemicals through stormwater runoff or infiltration may contaminate the drinking water supply (M)</p> <p>■ Septic systems outside City limits >1 system/acre in 20-30 year TOT: infiltration of household wastes, cleaning chemicals, prescription drugs, etc., may impact shallow groundwater (H)</p>	<p>hood Cluster (20, 30 year TOT outside city limits) (M): yard and garden pesticide, herbicide, and fertilizer application; future septic systems; heavy metals and petroleum products from parking areas</p>	<p>STRATEGIES:</p> <p>1. Public Education: See Aquifer-wide Strategies.</p>	<p>Priority: M Groups and Roles: See Aquifer-wide Strategies</p>
Industrial and Commercial Land Uses			
<p>■ Parking lots >50 cars along Highway 101 in 20-30 year TOT: spills, leaks of automotive fluids may impact the drinking water supply (H)</p> <p>■ Automobile disposal and Storage along Highway 101 in and</p>	<p>■ Neighborhood Commercial Gateway uses in Heceta Beach Neighborhood Cluster in 20 and 30 year TOT outside city limits: pesticide, herbicide, and fertilizer application; future septic systems; heavy metals and petroleum products from parking</p>	<p>Management Goal: Protect water quality in the DWPA and address threats from potential contaminant sources from existing and planned industrial and commercial land uses.</p> <p>STRATEGIES:</p> <p>1. Adopt Drinking Water Protection Overlay Zone a. City will adopt a Drinking Water</p>	<p>Priority: H Groups and Roles: ■ City will prepare overlay</p>

Table Notes: 1. See Table 3.10, 3.7 and Figures 2.10 and 3.6; 2. See Table 3.10, 3.8 and Figures 2.10 and 3.7; 3. High: Begin to implement immediately; Medium: Begin to implement in next two fiscal years; Low: Implement as time and financial resources are available; 4. Due to the location of this use and its proximity to some of the City's wells, the risk/benefit assessment recommends this land use be given a higher priority with respect to implementation of management strategies.

Table 4.3 Management Goals and Strategies for the Proposed Wellfield

PCS from Existing Land Use ¹	PCS from Planned Land Use ²	Management Goals and Strategies	Priority ³ and Implementing Groups and Roles The City of Florence will work with the following entities:
<p>just outside 10-20 year TOT: spills, leaks, or improper handling of automotive chemicals, batteries, and other waste materials during storage and disposal may impact the drinking water supply; spills, leaks, or improper handling of automotive fluids, solvents and repair materials during transportation, use, storage and disposal may impact drinking water supply. (H)</p> <p>■ Sand mining (H) along Highway 101 in 10-20 year TOT: leachate from mining operations or equipment use may contain chemicals and wastes that may impact the drinking water supply (H)</p> <p>■ Fred Meyer Gas</p>	<p>■ areas (M).</p> <p>■ North Commercial Node large retail and service, professional offices, motels, residential in conjunction with commercial in 10, 20, and 30 year TOT inside city limits: pesticide, herbicide, and fertilizer application; potential use of hazardous chemicals; heavy metals and petroleum products from parking areas (H).</p> <p>■ Service Industrial businesses and related uses; processing, storage, maintenance activities; non-motorized sand related recreational activities (portion on private sand dunes) in 10, 20, and 30 year TOT inside and outside city limits: potential use of hazardous chemicals; existing and future septic systems (outside city limits); heavy metals and petroleum products</p>	<p>Protection Overlay Zone and apply the zone to commercial and industrial uses in the DWPA for the proposed wellfield.</p> <p>b. Specific code provisions will be determined through a separate ordinance process. The zone will restrict the use of certain hazardous chemicals in the Drinking Water Protection Area (DWPA), also called Time of Travel Zones (TOT) for the proposed wellfield. The City of Springfield Drinking Water Protection Overlay Zone in Appendix M will serve as a starting point for a City of Florence Ordinance.</p> <p>c. City Public Works and Planning Departments will implement the zone.</p> <p>2. Inventory and rank chemicals used in the DWPA and prepare related responses. Dense nonaqueous phase liquids (DNAPL) chemicals are an extreme risk in this aquifer setting and immediate clean up and removal is necessary.</p>	<p>zone and submit for City adoption</p> <p>■ City was granted a RARE (Resource Assistance for Rural Environments Program with the University of Oregon) participant to assist with setting up administration</p> <p>Priority: H Groups and Roles:</p> <p>■ PWD will prepare Inventory and Ranking from chemical use information to be requested in permit application.</p>

Table Notes: 1. See Table 3.10, 3.7 and Figures 2.10 and 3.6; 2. See Table 3.10, 3.8 and Figures 2.10 and 3.7; 3. High: Begin to implement immediately; Medium: Begin to implement in next two fiscal years; Low: Implement as time and financial resources are available; 4. Due to the location of this use and its proximity to some of the City's wells, the risk/benefit assessment recommends this land use be given a higher priority with respect to implementation of management strategies.

Table 4.3 Management Goals and Strategies for the Proposed Wellfield

PCS from Existing Land Use¹	PCS from Planned Land Use²	Management Goals and Strategies	Priority³ and Implementing Groups and Roles
<p>Station just outside 20-30 year TOT: spills, leaks, or improper handling of fuels and other materials during transportation, transfer, and storage impact drinking water supply (H)</p> <ul style="list-style-type: none"> ■ Wrecking yard in 20-30 year TOT: spills, leaks, or improper handling of automotive chemicals, batteries, and other waste materials during storage and disposal may impact the drinking water supply (H) ■ Septic system infiltration of wastes, cleaning chemicals, prescription drugs, etc., may impact shallow groundwater. (H) ■ Other commercial and industrial uses, i.e., upholstery, paint 	<p>from parking areas (H).</p>	<p>3. Provide business assistance</p> <ul style="list-style-type: none"> a. Help businesses to adopt groundwater protection strategies supplementing the regulatory structure by evaluating business practices working with DEQ Technical Assistance. The risk evaluation leads to reduced hazardous wastes and has many benefits for businesses: lower costs when alternatives are used; reduced liability; less risk to workers; less fire and spill hazard; and possible avoidance of citations. b. Conduct outreach to business support organizations, such as Chamber of Commerce and various industry-specific consortiums to get the word out. c. Create and distribute a letter/information flyer to businesses located in the DWPA that informs them of the drinking water protection effort and "green award program." City will provide information on technical assistance available at the local (Lane County Pollution Prevention Coalition), state (DEQ) and federal 	<p>The City of Florence will work with the following entities:</p> <p>Priority: H</p> <p>Groups and Roles:</p> <ul style="list-style-type: none"> ■ Chamber of Commerce, local business groups, businesses in DWPA: work with PWD to provide assistance to businesses in meeting requirements, and to provide incentives (green awards) to encourage best management practices ■ DEQ: Technical assistance through the Pollution Prevention Program ■ Siuslaw Valley RFP District: work with PWD on outreach to medium and high risk businesses ■ CDD to work with new businesses on site design ■ See Aquifer-wide strategies

Table Notes: **1.** See Table 3.10, 3.7 and Figures 2.10 and 3.6; **2.** See Table 3.10, 3.8 and Figures 2.10 and 3.7; **3.** High: Begin to implement immediately; Medium: Begin to implement in next two fiscal years; Low: Implement as time and financial resources are available; **4.** Due to the location of this use and its proximity to some of the City's wells, the risk/benefit assessment recommends this land use be given a higher priority with respect to implementation of management strategies.

Table 4.3 Management Goals and Strategies for the Proposed Wellfield

PCS from Existing Land Use ¹	PCS from Planned Land Use ²	Management Goals and Strategies	Priority ³ and Implementing Groups and Roles The City of Florence will work with the following entities:
supply, sand master park, central disposal, in 5-30 year TOT: spills, leaks, or improper handling of fuels, chemicals and other materials stored and used; improper management of water contacting waste material; and improper management of water contacting waste material may impact the drinking water supply. (M)		<p>levels (see example letter and flyer in Appendix I). City may encourage businesses to prepare an Integrated Turf Management Plan for fertilizers, herbicides and pesticides for developments with large turf areas (consider partnering with Oregon State University in this effort).</p> <ul style="list-style-type: none"> d. Encourage safe storage and handling of hazardous materials. City Public Works staff will help both new and existing businesses properly store and handle hazardous materials by identifying and addressing potential and existing problems. e. Give presentations to the Chamber of Commerce and other business groups about the City's drinking water protection efforts and provide information to members. f. Encourage local businesses to donate a sign to identify the DWPA and paint stencils on their storm drains. g. Provide hazardous materials regulation form and educational information with permit appli- 	

Table Notes: 1. See Table 3.10, 3.7 and Figures 2.10 and 3.6; 2. See Table 3.10, 3.8 and Figures 2.10 and 3.7; 3. High: Begin to implement immediately; Medium: Begin to implement in next two fiscal years; Low: Implement as time and financial resources are available; 4. Due to the location of this use and its proximity to some of the City's wells, the risk/benefit assessment recommends this land use be given a higher priority with respect to implementation of management strategies.

Table 4.3 Management Goals and Strategies for the Proposed Wellfield

PCS from Existing Land Use ¹	PCS from Planned Land Use ²	Management Goals and Strategies	Priority ³ and Implementing Groups and Roles The City of Florence will work with the following entities:
		<p>catons.</p> <ul style="list-style-type: none"> h. Work with the Siuslaw Valley RFP District to establish visits to medium- and high-risk businesses located within the DWPA to discuss safe storage and handling of hazardous materials and to verify locations/quantities of hazardous materials according to their schedule. i. Work with new businesses on their building's site design to minimize risk to the groundwater. j. Continue local hazardous waste collection and disposal opportunities in which businesses are strongly encouraged to participate. k. Provide information to businesses on how to dispose of hazardous waste through: collection opportunities, agency contacts, private businesses, insurance company or underwriter; and continue to publicize this information in a flyer to mail to businesses, distribute with permits, and distribute at the time of Fire District visits. 	

Table Notes: **1.** See Table 3.10, 3.7 and Figures 2.10 and 3.6; **2.** See Table 3.10, 3.8 and Figures 2.10 and 3.7; **3.** High: Begin to implement immediately; Medium: Begin to implement in next two fiscal years; Low: Implement as time and financial resources are available; **4.** Due to the location of this use and its proximity to some of the City's wells, the risk/benefit assessment recommends this land use be given a higher priority with respect to implementation of management strategies.

Table 4.3 Management Goals and Strategies for the Proposed Wellfield

PCS from Existing Land Use ¹	PCS from Planned Land Use ²	Management Goals and Strategies	Priority ³ and Implementing Groups and Roles The City of Florence will work with the following entities:
Private Open Space Land Uses			
<ul style="list-style-type: none"> Golf course in 1 year TOT: over application or improper handling of pesticides and fertilizers; excessive irrigation may cause contaminant transport or runoff towards the wells (M). Pesticides used to eradicate blackberries near the well-field: over application of pesticides may impact the aquifer. 	<ul style="list-style-type: none"> Golf courses and other similar uses in 1, 2, 5, and 10 year TOT inside city limits (H): pesticide, herbicide, and fertilizer application; potential use of hazardous chemicals; heavy metals and petroleum products from parking areas. 	<p>Management Goal: Protect water quality in the DWPA and address threats from potential contaminant sources from existing and planned private open space land uses.</p> <p>STRATEGIES:</p> <ol style="list-style-type: none"> City Public Works Department (PWD) will: <ol style="list-style-type: none"> Work with Sand Pines Golf Course owners to ensure that wells in the City's proposed well-field are drilled far enough north on the proposed site so that the golf course is removed from the DWPA. 	<p>Priority: H</p> <p>Groups and Roles:</p> <ul style="list-style-type: none"> Florence Public Works Department (PWD) will work with golf course managers
Public Land Uses			
<ul style="list-style-type: none"> Highway 101 in 10-20 year TOT: vehicle use increases the risk for leaks or spills of fuel and other hazardous materials. Stormwater may infiltrate to groundwater. Over application/improper han- 	<ul style="list-style-type: none"> Airport, public parks, schools, community colleges, cemeteries, other public buildings, and major utility facilities in 1, 2, 5, 10, 20, and 30 year TOT inside city limits: pesticide, herbicide, and fertilizer application, potential use of hazardous 	<p>Management Goal: Protect water quality in the DWPA and address threats from potential contaminant sources from existing and planned public land uses.</p> <p>STRATEGIES:</p> <ol style="list-style-type: none"> Continue to monitor sewer lines 	<p>Priority: H</p> <p>Groups and Roles:</p>

Table Notes: 1. See Table 3.10, 3.7 and Figures 2.10 and 3.6; 2. See Table 3.10, 3.8 and Figures 2.10 and 3.7; 3. High: Begin to implement immediately; Medium: Begin to implement in next two fiscal years; Low: Implement as time and financial resources are available; 4. Due to the location of this use and its proximity to some of the City's wells, the risk/benefit assessment recommends this land use be given a higher priority with respect to implementation of management strategies.

Table 4.3 Management Goals and Strategies for the Proposed Wellfield

PCS from Existing Land Use ¹	PCS from Planned Land Use ²	Management Goals and Strategies	Priority ³ and Implementing Groups and Roles
dling of pesticides may impact water supply (M).	chemicals, heavy metals and petroleum products from parking areas (H)	<ul style="list-style-type: none"> a. Ensure that the sewer lines in the DWPA are carefully monitored to prevent contamination to the drinking water; b. continue aggressive infiltration/inflow program meeting federal and state regulations to insure that sewer pipes have limited leakage; c. prioritize pipe replacement projects to repair aging infrastructure where appropriate; d. perform video surveys of sewer lines; and e. monitor water from the City wells for contaminants of concern on a frequent basis. 	<p>The City of Florence will work with the following entities:</p> <ul style="list-style-type: none"> ■ PWD to continue to monitor sewer lines and City wells

Chapter 5: Contingency Plan

Goals and management strategies presented in Chapter 4 focus on proactive efforts that are intended to protect the aquifer from contamination. In the event contamination or loss of the water source should occur, the City also needs to be prepared to react to with a contingency plan. A contingency plan is a designed response to the contamination or disruption of Florence's current water supply.

The contingency plan focuses on:

- Identification of the primary potential threats to the aquifer and water supply;
- Developing procedures that will be followed should the threats materialize.

Florence's contingency plan addresses ten elements required by the Oregon Drinking Water Protection Program:

1. Potential threats to the drinking water supply
2. Protocols for incident response
3. Prioritization of water usage
4. Key personnel and development of a notification roster
5. Short-term and long-term replacement of water supplies
6. Short-term and long-term conservation measures
7. Plan testing, review, and update
8. Personnel training
9. Provisions for public education
10. Logistical and financial resources

Potential Threats to the Drinking Water Supply

Primary threats to Florence's drinking water system are related to an interruption of water delivery or contamination of the aquifer used for the drinking water supply. The following types of events could cause an interruption in delivery and/or contamination of the water supply, in order of most likely events:

1. Electrical/mechanical problems: power outage, broken pipeline, pump failure
2. Spill in area surface waters, i.e., creeks, lakes, wetlands, beaches, stormwater systems that discharge to surface waters; stormwater contamination resulting in well water contamination; releases from a leaking underground fuel storage tank; chemical spill at a nearby business; or other hazardous materials spills (highway spills)
3. Flooding
4. Contamination at a wellhead
5. Earthquakes or Tsunamis (see "City of Florence Multi-Jurisdictional Natural Hazards Mitigation Plan")

The most likely threats to the drinking water supply are electrical/mechanical failure, contamination at or near a wellhead, a chemical release within the drinking water protection area (DWPA) or highway spills, a spill in area surface waters or in stormwater systems that discharge to surface waters. Of the identified risks, the one with the most potential for serious contamination is a spill from a transport vehicle traveling on Highway 101 adjacent to the DWPA. The likelihood of this happening is low, but the potential for contamination, should a spill occur is high. Should an incident like this occur, the Siuslaw Valley Incident Command Team would respond immediately and work to con-

tain the spread of the hazardous material as detailed in their Emergency Response Plan.

The City Water Treatment Plant has an operations manual that provides detailed procedures for containment of spills or other potential contaminant events. The pertinent portion of the Procedures Manual is located in Appendix K. Ocean Dunes Golf Course also has a spill containment plan, as part of the requirement for certification for application of agricultural chemicals.

Breaks or leakage in city sewer lines are repaired by City staff or by a contractor under City direction. Breaks are repaired under an emergency operations plan (see Appendix K). Leaks are identified and repaired through the use of routine TV surveillance of all sewer lines and routine manhole cover surveillance.

Prevention of contaminant incidents related to stormwater is the preferred option. The City's stormwater system is a combination of piped and infiltration facilities. The City requires oil and silt separator catch basins in all development, and has a stenciling program for all storm drains.

In the event of a contaminant incident in an infiltration system, standard containment procedures would be utilized according to the Florence Water Management and Conservation Plan. In the event of a contaminant incident in a piped system, if identified soon enough, the contaminating substance would be isolated in the affected area of the piped system. If identified only at the time a contaminant was detected at the outfall, standard containment procedures would be utilized. If the outfall were in the Siuslaw River, the Emergency Response Plan would provide for containment of the contaminant to the smallest possible affected area.

Should a spill occur with the potential for contamination, then the RV Park would call the Siuslaw Valley Incident Command Team.

Lane County has established procedures for dealing with potential contaminant incidents at its facilities.

Procedures to deal with contamination threats are outlined below.

Protocols for Incident Response

ELECTRICAL/MECHANICAL PROBLEMS AND FLOODING

Responses to these events include:

1. Rely on water source capacity and power system redundancy to the extent possible. During the summer peak demand times there is no excess source capacity. During the remainder of the year sources can be activated that are not affected by the interruption.
2. In the short-term (less than one-half day in summer and about one day in winter) rely on water tank storage.
3. Apply conservation measures, below.
4. Institute adopted four-stage water curtailment plan, below.

CONTAMINATION AT A WELLHEAD

The required response to detection of contamination at a wellhead depends on whether the contamination is less than or exceeds the maximum contaminant level (MCL). The MCL is considered to be the maximum allowed concentration of contaminant in drinking water. The community has applied a much higher standard in responding to man-made chemicals, like Dense Non-Aqueous Phase Liquids (DNAPL), and other volatile, semi-volatile, and synthetic organic chemicals. Every effort will be made to eliminate any detectable amounts of these man-made substances from the drinking water supply.

- Notify the Oregon Health Authority and the Department of Environmental Quality (DEQ) of any confirmed detection. (Contact Portland phone duty 971-673-0405 or local technical services contact 541-726-2587)

If the contamination exceeds MCL, take the following actions:

1. Shut down the affected wells. Follow OAR- 333-061-0025(2): take immediate corrective action-consult with OHA technical services. If an emergency exists and permission to use the well is granted by OHA and DEQ, water will be mixed with water from other wells to reduce the contaminant in the distribution system to below MCL, minimizing the concentration of the contaminant to the greatest extent possible.
2. Notify the City Council and Lane County Board of Commissioners
3. Follow OHA Public Notice requirements identified in OAR 333-061-0042
4. Send news release to the local media.
5. Flush affected system and reservoirs.
6. Implement curtailment or conservation plan as needed.
7. Work with the Oregon Water Resources Department to notify other nearby well owners and minimize contaminant movement. Water Master, Michael Mattick, 541-746-1856.
8. Expand cooperation with agencies investigating the contamination.

If the contaminant level is below the MCL, take the following actions:

1. Turn off well if not absolutely needed (non-critical demand periods). If an emergency exists, water will be mixed with water from other wells to reduce the contaminant in the distribution system to below the MCL, minimizing the concentration of the contaminant to the greatest extent possible.
2. Notify City Council and County Board of Commissioners.
3. Modify well operation to *last on, first off* during critical demand periods.
4. A minimum of quarterly monitoring (depending on the contaminant) will occur to track changes in contaminant levels over time and verify that contaminant levels remain below the MCL.
5. Run only in conjunction with other wells.
6. Send news release to local media.
7. Implement first stage conservation measures, below.
8. Work with WRD to notify other nearby well owners and minimize contaminant movement.
9. Cooperate with agencies investigating the contamination.

CONTAMINATION FROM HAZARDOUS MATERIALS RELEASE OR SPILLS

The release of contaminant from spills and leaking underground fuel storage tanks is primarily addressed through proactive management strategies intended to reduce the

likelihood of this risk. Standard operating procedure between the City Public Works Department and the Fire District is for notification of all releases in Florence and up-gradient of the aquifer from the Fire District to water suppliers (City and HWD). The suppliers coordinate their responses based on the risk of drinking water contamination.

In the event of a contaminant release or spill in the aquifer or surface waters, the following protocol applies.

Within Drinking Water Protection Area (DWPA)

1. Local public safety agencies such as law enforcement, fire and emergency medical services, normally provide the first response to an incident. Access to this local assistance is through 9-1-1.¹⁰
 - a. If City staff is first on the scene, or if emergency services responds, local public agencies would call OERS at 800-452-0311 or Salem Area 503 378 6377. If necessary, responsible parties would then call the National Response Center at 800-424-8802.¹¹
 - b. Contact CHEMTREC (1-800-424-9300) to determine spilled chemical characteristics and clean-up recommendations.
 - c. Notify all responders that the release is within the DWPA.
2. Notify OHA and local elected officials
3. Shut off nearby public water supply wells as an immediate precaution.
4. Determine short-, medium, and long-term well operation.
5. Work to facilitate an expedited cleanup, but leave cleanup to the responsible party.
6. Coordinate with responsible party's HAZMAT clean-up crew; and cooperate with DEQ and other responsible agencies to facilitate clean-up and any remedial action.
7. Implement conservation or curtailment plan as appropriate.
8. Send news release to local media.
9. Work with WRD to notify other nearby well owners and minimize contaminant movement.

Background:

When hazardous materials are released into the environment, the Hazardous Materials Emergency Response Team for the region that includes Lane County will respond. In 1989, the Oregon Legislature authorized the Office of State Fire Marshal (OSFM) to establish a statewide Hazardous Materials Emergency Response system. Oregon was the first state in the nation to respond to the hazardous materials response crisis, created by the new federal standards, with a statewide Hazardous Materials Emergency Response system. To date, Oregon is one of the few states able to establish and maintain a program of this type. The Hazardous Materials Emergency Response Teams program is a partnership between local government, industry, and the OSFM. For Team Configuration, see:

http://www.oregon.gov/OSP/SFM/ERU_IMTeams.shtml#Team_Configuration

For the Regional Team that responds in Florence, contact the City of Eugene Fire and EMS Department, 1705 W. Second Avenue, Eugene, OR 97402; Ph: 541-682-7100; Fax: 541-682-7116.

¹⁰ Source: OERS web site.

¹¹ Id.

SPILL IN SURFACE WATERS OR STORMWATER SYSTEMS THAT DISCHARGE TO SURFACE WATERS

1. Follow protocol for emergency response, above.
2. Notify the Oregon Department of Fish and Wildlife (ODFW) because a contaminant release in the Florence area surface waters could impact fish and wildlife, including threatened or endangered species.
3. Shut off nearby public water supply wells down-gradient of contamination as an immediate precaution.
4. Monitor outflows to receiving drainage ways for contaminants; the Fire District and Public Works should take extra precautions to prevent contaminant runoff.

Prioritization of Water Usage

Curtailment planning is the development of proactive measures to reduce demand during supply shortages resulting from prolonged drought, or system failure from unanticipated events including catastrophic events (flooding, landslides, earthquakes, and contamination), mechanical or electrical equipment failure, or events not under the control of the City (for example, localized or area-wide power outages and intentional malevolent acts). The City's current Curtailment Plan is presented below and is excerpted from Chapter 4 of the Florence Water Management and Conservation Plan, March 2010 (Appendix K).

The goal of this curtailment plan is to have objective criteria that trigger actions that will ensure sufficient water to meet the water demands of the water supply system, without jeopardizing the health, safety, or welfare of the community.

History of System Curtailment Episodes OAR 690-086-0160(1)

Although the City has not needed to impose mandatory water curtailment measures, the City placed ads in the newspaper encouraging residents to voluntarily conserve water during a drought in the early 1990s. The City has limited in-line storage. In the event of a major water supply disruption, the City's 4.5 million gallons (maximum) of stored water would need to be managed carefully, and major restrictions could be needed on all types of municipal water use. In the event of a drought, reduced aquifer recharge could reduce the City's ability to access groundwater from its wellfield. The provisions of the City's curtailment plan, as described below, are intended to address what would happen during such events.

Curtailment Stages and Event Triggers OAR 690-086-0160(2) and OAR 690-086-0160(3)

Table 5.1 summarizes the stages and initiating triggers for the City's water curtailment plan.

Table 5.1 Water Shortage Stages and Initiating Conditions Shortage

Shortage Stage	Initiating Conditions
Stage 1: Water Shortage Alert	<ol style="list-style-type: none"> 1. General recognition of drought conditions in Lane County; or 2. Demand reaches 80 percent of water supply capacity as determined by the City Manager for a period of 3 or more consecutive days; or 3. Water supply approaches the minimum required for fire protection or other essential needs as determined by the City Manager.
Stage 2: Serious Water Shortage	Governor has declared a drought in Lane County and the continuation of hot, dry weather is predicted, or if the City's water demand is 81 to 90 percent of water supply capacity for 3 or more consecutive days as a result of a natural or human caused event.
Stage 3: Severe Water Shortage	Water demand is more than 90 percent of water supply capacity for 3 or more consecutive days for any reason, whether natural or human-caused.
Stage 4: Critical Water Shortage	Failure of a system component or non-drought emergency conditions results in an immediate shortage of water. Examples include: failure of main transmission lines, failure of the intake or WTP, chemical spills, or a malevolent attack on the system that introduces a contaminant at some point in the system.

Stage 1: Water Shortage Alert

Stage 1: Water Shortage Alert will activate a program to inform customers of the potential for drought and water shortages, and reasons to voluntarily conserve water. Stage 1 will be activated by the City Manager and will be triggered when any of the following conditions exist:

1. General recognition of a drought in Lane County
2. Demand reaches 80 percent of water supply capacity as determined by the City Manager for a period of 3 or more consecutive days
3. Water supply approaches the minimum required for fire protection or other essential needs as determined by the City Manager.

Under Stage 1, the City will issue a written notice requesting voluntary reduction in water use by all customers. The notice will include a description of the current water situation, the reason for the requested conservation measures, and a warning that mandatory restrictions will be implemented if voluntary measures are not sufficient to achieve water use reduction goals. A similar notice could be issued through local media (such as

newspaper, radio, or TV). However, if the drought is regional, the media already may be alerting users of water supply concerns. Therefore, the City's Stage 1 plan does not automatically involve press releases or paid media announcements.

When Stage 1 is triggered, the City will ask customers to voluntarily comply with the following:

- Minimize landscape watering between 10 a.m. and 6 p.m., the period of highest water loss resulting from evaporation.
- Water landscapes on alternate days (even-numbered addresses water on even numbered days and odd-numbered addresses on odd-numbered days).

Stage 2: Serious Water Shortage

Stage 2 is similar to Stage 1 except the voluntary measures regarding outdoor water use will be made compulsory by the City Manager, and additional non-essential water use will be prohibited. Stage 2 will be initiated by the City Manager if the Governor has declared a drought in Lane County and the continuation of hot, dry weather is predicted, or if the City's water demand is 81 to 90 percent of water supply capacity for 3 or more consecutive days as a result of a natural or human-caused event.

Under Stage 2, City customers will be notified of the following water restrictions:

1. Water landscapes only between 6 p.m. and 10 a.m.
2. Water landscapes only when allowed by the odd/even schedule.
3. No water use for washing motorbikes, motor vehicles, boat trailers, or other vehicles except at a commercial washing facility that practices wash water recycling. (Exceptions include vehicles that must be cleaned to maintain public health and welfare, such as food carriers and solid waste transfer vehicles.)
4. No water use to wash sidewalks, walkways, driveways, parking lots, tennis courts, and other hard-surfaced areas.
5. No water use to wash building structures, except as needed for painting or construction.
6. No water use for a fountain or pond for aesthetic or scenic purposes, except where necessary to support fish life.
7. Discourage serving water to customers in restaurants unless water is requested by the customer. This action does not provide significant water savings, but is useful for generating awareness of the need to curtail use.
8. No water use for dust control unless absolutely necessary, as determined by the City Manager.

Stage 3: Severe Water Shortage

Stage 3 will be initiated by the City Manager when water demand is more than 90 percent of water supply capacity for 3 or more consecutive days for any reason, whether natural or human-caused. Stage 3 measures include the following:

1. Perform actions indicated for Stage 2.
2. Replace the restriction of odd/even watering from Stage 2 with a prohibition on all outdoor watering (exceptions include new lawn, grass, or turf planted after March 1st of the calendar year in which restrictions are being imposed; sod farms; high-use athletic fields; or park and recreation areas specifically designated by the City Council.)

3. No water use to fill, refill, or add to any indoor or outdoor swimming pools or hot tubs, except if one of the following conditions is met: the pool is used for a neighborhood fire control supply, the pool has a recycling water system, the pool has an evaporative cover, or the pool's use is required by a medical doctor's prescription.
4. No water use from hydrants for construction purposes (except on a case-by-case basis approved by the City Manager), fire drills, or any purpose other than fire fighting.
5. Implement limitations on commercial uses of water, depending on the severity of the shortage.
6. Issue public service announcements to notify customers of the severity of the conditions.

Stage 4: Critical Water Shortage

Stage 4 will be initiated by the City Manager when failure of a system component or non-drought emergency conditions results in an immediate shortage of water. Examples include failure of main transmission lines, failure of the WTP, chemical spills, or a malevolent attack on the system that introduces a contaminant at some point in the system. If the emergency causes, or is expected to cause, a shortage of water, the City will implement the curtailment measures of Stage 2 or Stage 3, as appropriate, in addition to the steps outlined below.

If water in the system is unsafe to drink (such as in the event of a chemical spill or malevolent attack) the City Manager will direct staff to notify customers as quickly as possible using local radio, print media, the City's website, and any other appropriate means. In addition, the City Manager will implement the following:

1. Contact the Oregon Drinking Water Program, Oregon Health Authority, and request its assistance in responding to the problem.
2. Notify the local news media, if appropriate, to ask for their assistance in notifying customers.
3. Call an emergency City Council meeting.
4. Contact the Oregon State Police and County Sheriff to obtain help in contacting customers.
5. Determine whether to use water system interties with other water providers, such as Heceta Water District (see "Mutual Emergency Water Agreement Between City of Florence and Heceta Water District, July 6, 2010, Appendix L).
6. The City will continue to investigate and develop specific backup plans for a Stage 4 emergency. These plans may include renting a water hauling truck and purchasing water from neighboring communities, sending customers to a pre-designated water distribution location, or supplying bottled water.

Key Personnel and Development of a Notification Roster

In the event of an emergency situation threatening the water supply, key people must be notified and response procedures coordinated among the City, the Fire District, Lane County, and State of Oregon personnel.

1. Call 9-1-1. If a call is received by the 9-1-1 center, the Fire District and City Police Department are to be dispatched to the event of an emergency spill.
2. Notify City Public Works immediately (541-997-4106) if a spill occurs within the DWPA. The police and public works personnel are responsible for aiding the fire chief in adequate, appropriate, and safe actions.

- The nature of the incident determines who is dispatched. If the incident involves a vehicle accident, the police department is often the first to be notified.
- If the event is non-vehicle related and a spill is reported, the appropriate fire department is normally the first to be notified by the 9-1-1 dispatch center.
- Both fire and police will be notified if a contaminant is known to be present.
- The incident commander will notify dispatch of the need for the Regional HAZMAT Response Team.
- With all spill reports in the Florence area, the Dispatch Center will notify the Florence Public Works Treatment Plant and relay all information available.
- During an emergency spill event, an incident command center is established to safely control the situation. The incident command system is dynamic, meaning that as events unfold, roles and responsibilities of personnel may change as the situation progresses.
- The person in charge may also change depending on which agency responds first. For example, police may be first on the scene and in control until the fire district arrives.

KEY PERSONNEL

Key personnel and their roles are listed below. An up-to-date list of these persons' name and their contact information will be posted in specific locations in each agency office.

Florence Police (Emergency 9-1-1) and Administrative.

Police personnel are often the first to be dispatched and respond to an emergency event. Police are in charge of public safety until fire personnel arrive, then the incident command control is relinquished to fire personnel. At the direction of the fire district incident commander, the police are responsible for keeping the area secured and providing support help.

Fire. Siuslaw Valley Fire & Rescue. 2625 Highway 101, Florence, OR 97439 (541) 997-3212.

The fire chief or other designated fire personnel will be responsible for determining if local personnel can adequately and safely respond to a spill event. The incident commander will contact Oregon Emergency Response System and request a Regional HAZMAT Response Team if the situation and/or contamination is beyond local equipment and personnel capabilities. If it is determined that local response is adequate, the incident commander determines and directs what is needed from police, Public Works, and other City personnel through a unified command system.

Florence Public Works Director (541) 997-4106.

This person coordinates necessary actions, making any decisions regarding the operation of the water system. The Director provides technical assistance and backup support as directed by the incident commander. It is this person's responsibility to inform the incident commander of the spill location within the DWPA and suggest any additional precautionary measures that need to be considered. Operational situations that may affect the Department will be coordinated directly with the responsible department representative as soon as possible. The OHA will be immediately notified in the event of any drinking water contamination. The director will designate a media relations person who will prepare a press release and handle all media contacts for the City.

Heceta Water District Manager (541) 997-2446.

This person coordinates necessary actions, making any decisions regarding the operation of the Heceta water system. Heceta Water District Manager provides technical assistance and backup support as directed by the incident commander. It is this person's responsibility to inform the incident commander of the spill location within the DWPA and suggest any additional precautionary measures that need to be considered. Operational situations that may affect the City will be coordinated directly with the responsible City representative as soon as possible. The OHA will be immediately notified in the event of any drinking water contamination. Heceta Water District Manager will designate a media relations person who will prepare a press release and handle all media contacts for the District.

Lane County Sheriff's Office, Emergency Response Coordinator (541) 682-6744.

The Lane County Emergency Coordinator should be notified and will inform the Lane County Public Health Department and the Oregon Emergency Response System, who in turn notifies other appropriate state agencies. Usually, the fire chief notifies the county coordinator if the event requires county resources for response. However, if the county coordinator is notified first, he will notify the City and Heceta Water District when a spill emergency occurs within the DWPA.

Other local officials to be notified include:

- Florence City Manager (541) 997-3437
- Florence Mayor (541) 997-3437

Other contacts include:

- Oregon Emergency Response System (OERS) 800-452-0311
- Oregon Health Authority (OHA): 1-971-673-0405
- Oregon Department of Environmental Quality (DEQ) 888-997-7888
- National Response Center: 1-800-424-8802
- Oregon Water Resources Department (WRD), Water Master: 541-682-3620
- Oregon State Fire Marshall: 503-378-3473
- Oregon Department of Fish and Wildlife (ODFW): 541-902-1384
- CHEMTREC 1-800-424-9300, www.cmahq.com
Call this 24-hour Emergency Notification number to report transportation related spills and to get MSDS sheet and related clean-up information on chemicals that have been spilled.

Short-term and Long-term Replacement of Water Supplies

In the event of an emergency, the minimum water needs of the community must be met with water that meets applicable health standards. Short-term options are those where the alternative supply is needed for a few hours or days. Long-term options are considered for a permanent replacement supply.

Short-term:

- Implement curtailment plan and conservation practices.
- Purchase water from Heceta Water District
- Bottled water (The City will establish distribution sites, and allocation rates per household based upon events)

- Deliver potable water from non-affected wells with private tanker trucks and/or National Guard
- Make water available for only a short duration each day and issue a Boil Water notice to insure public health; and, when applicable, insert language for bacteriological concerns.

Long-term:

- Develop new wells
- Construct well treatment facility(s)
- Construct surface water treatment plant
- Purchase water from Heceta Water District

A key concern for the City is that its entire water supply relies on a sole source, consisting of a number of wells located in a small area. In the event of an emergency, such as a chemical spill or malicious attack, the City may not be able to use its current wellfield. To provide for water supply redundancy and expand water supply, the City is evaluating a potential additional wellfield site located northwest of the existing wellfield. It is likely that new water rights would be required for the additional well field. This plan contains a "new well site analysis" for a new wellfield which will provide redundant supply (Chapter 6).

Florence primarily relies on reservoir capacity to meet water demands. The City of Florence has three active storage reservoirs providing 4.5 million gallons (MG) of storage by gravity to the Main Pressure Zone. Emergency storage is also provided from these facilities by pumping to the North and East pressure zones through adjacent pump stations. The Sand Pines Reservoirs No. 1 and 2 are identical 2.0 MG welded steel tanks with an approximate overflow elevation of 167.5 feet. The 31st Street/East Reservoir is a 0.5 MG welded steel tank constructed in 1965 with an approximate overflow elevation of 167.5 feet.

The City maintains two metered emergency interties with Heceta Water District at the northern boundary of the City's existing water service area. The first is an 8-inch diameter intertie on Rhododendron Drive between Treewood and Rhodowood Drives that can be used to supply water from the District to the City's system. At the second, 10-inch intertie on Highway 101 and Munsel Lake Road, water can be provided either from the District to the City or to the District from the City.

An updated emergency water supply agreement between the City and the District was approved on July 6, 2010 (Appendix L). The agreement provides for the purchase of water from the District in the event of an emergency. The source of HWD water is Clear Lake, a surface source located north and up-gradient of the DWPA for the City's well field. HWD has an Emergency Response Plan for incidents affecting their water source.

As described above, the City relies exclusively on its groundwater supply from Wells 1 through 12. The City does not use its water right on Munsel Creek, and it is unlikely that the City could obtain new surface water rights.

The City's water conservation and management measures can be a significant factor in slowing the growth of demand for water, but are not likely to eliminate all such growth. As previously described, the majority of the City's water use is for residential and multifamily use, which has a very low average per capita use. Moreover, the City has an overall average daily per capita use of 120 gpcd, which has slowly declined over the last 4 years. These low values and trends are likely to continue given the City's conservation

efforts such as its rate structure and landscape ordinance. These low values and assumed trends are incorporated into the demand projections in the City's Water Management and Conservation Plan. The City intends to implement the various water management and conservation practices outlined in this WMCP in an effort to maximize the benefits of conservation, as well.

The City can purchase surplus water supply from HWD pursuant to an IGA using the existing infrastructure interties. However, the amount of water the City could obtain from HWD is limited by the capacity of the interties and by the amount of "surplus" water that HWD decides is available for sale. HWD may be able to provide a portion of the City's demand, but is unable to sustain a long-term supply for the City. For example, HWD's ability to receive water under its water rights is limited by easements that restrict the flow of water across the easement lands.

The City's most feasible and economical alternative is to develop the remaining portion of groundwater permit G-15056 (0.6 cfs), which is the amount of "green light water" that the City requests access to in its Water Management and Conservation Plan (WMCP). It is likely that the City's groundwater rights authorize enough water to meet the City's MDD through the end of the WMCP's 20-year planning period. However, the City's actual water production is significantly less than its authorized water rights. The City needs to take immediate action to address its water infrastructure constraints. The City may need to pursue additional water rights within the 20-year planning period of the WMCP. Projections indicate a potential for demand to exceed the City's water rights by approximately 2026. Moreover, the City's infrastructure may not be sufficient to fully utilize the City's existing water rights, conveying the need for a new water right.

While conservation measures may help Florence avoid the need to have a new water right to meet MDDs, conservation measures will not eliminate the need for Florence to provide water supply/water right redundancy. Currently, Florence depends on a single source and a single well-field to supply water to the community. Florence needs, first and foremost, a new water right for redundancy that will provide security for its water supply, a need which conservation measures cannot avoid. It is unlikely that the City could obtain additional water rights for surface water sources in light of fish protection issues, regulatory requirements, and infrastructure constraints. MDD could equal actual well production as early as 2010, and could be equal to WTP capacity by 2013.

The City is investigating options to maximize its ability to divert groundwater under its existing water rights. Options include well rehabilitation, drilling new wells, and pursuing water right transfers to allow for use of water from additional wells. For instance, the City is evaluating submittal of a transfer application and construction of a new well (Well 13), and may pursue new water rights for a potential additional wellfield site north of the current wellfield. Because the City's entire water supply relies on a sole source, the City is focused on trying to provide a redundant supply. In an emergency, such as an infrastructure failure, chemical spill, or malicious attack, the City may not be able to use its current wellfield. The addition of a second wellfield could provide the City with additional source flexibility.

Short-term and Long-term Conservation Measures

Conservation of water use will lessen demands on Florence's public water supply system in the event of an emergency situation. The extent of conservation/curtailment measures necessary will depend on the nature and extent of the emergency. Conservation/curtailment practices and procedures are described in the section above, Prioritization of Water Usage.

Plan Testing, Review, and Update

This contingency plan will be evaluated, reviewed, and updated based on an annual review and mock exercise. The City and Heceta Water District will review any personnel or situational changes and make adjustments to the Plan annually. A copy of the Contingency Plan is included in the City's Water Production Emergency Procedure Manual. The Emergency Procedure Manual is reviewed and updated quarterly with corrections or modifications to the plan taking place during that process. In addition a simulated emergency (Mock exercise) will allow emergency responders to make necessary adjustments to the plan. Mock exercises will also serve as an educational tool for local citizens, reminding the community of the importance of protecting their drinking water supply and of the curtailment measures that might be imposed in the event of an emergency. The Public is informed of the exercise via the Public Works web site and local media.

Personnel Training

To be effective, contingency plans must rely on properly trained people operating within a well-organized and effective system with up-to-date information. County and state emergency responders have been professionally trained to deal with HAZMAT responses. Local personnel should also be trained in initial HAZMAT response because they could be the first to arrive on site. Police officers receive HAZMAT awareness level training as part of their officer training program. Currently, all fire personnel receive HAZMAT operations level of training. With this training, local personnel are able to adequately identify and contain many hazardous materials.

Provisions for Public Education

Public notification and education information builds and maintains support for the plan. It further encourages assistance and understanding when an emergency arises and the plan is put into effect. Management strategies for this plan have a strong educational imperative that satisfies this component of the contingency plan. However, before an emergency occurs, residents and businesses must be informed about the conservation and curtailment measures they will be expected to apply. This information should be prepared and distributed prior to a contamination or supply interruption.

Logistical and Financial Resources

The City and Heceta Water District should participate in an emergency response situation only to the extent of providing assistance and information regarding the water system and the particular needs of the community. The City and Heceta should not attempt any clean up on their own, although containment may be necessarily appropriate. The responsible party is legally obligated to report and clean up chemical releases. If no responsible party is found, the community may need to finance contamination clean up or treatment. Potential funding sources include:

- State emergency funds
- Federal emergency funds
- A bond measure for replacement, treatment, or cleanup needs.

Chapter 6: New Well Site Analysis

Evaluating potential new well sites from a groundwater risk perspective allows the City to develop proactive approaches to guide existing and future land use activities to protect their future drinking water source(s). The City has identified one potential new well field site. This chapter provides an evaluation and analysis of the need for new wells and for the selected well field site.

Need for New Wells

The 2011 Florence Water Master Plan recommends that the City expand the existing groundwater supply system by adding up to 4 new wells in a new wellfield to increase capacity by approximately 350 gpm (0.5 mgd) in order to provide a total supply capacity of 3.2 mgd at the end of the 20-year planning horizon in 2030. The City's projected demand in 2020 will require all of the City's existing 2.7 mgd supply capacity, thus supply expansion is recommended between 2015 and 2020.

The City holds sufficient groundwater rights to allow production of 3.8 mgd from existing and future wells. Existing treatment plant capacity is limited to approximately 3.0 mgd; thus further study is recommended to identify potential options for treating the recommended supply expansion. The Water Master Plan assumes that the City will develop two new supply wells and associated treatment facilities. The proposed treatment facilities should be designed to accommodate future upsizing to allow treatment capacity to be expanded as needed beyond the 20-year planning horizon.

Future Service Area

The City's future service area extends beyond the existing city limits. Although the City's Urban Growth Boundary (UGB) extends significantly further north of the existing city limits, customers in this area are currently served by the neighboring Heceta Water District (District). As land north of the City develops it is assumed that there will be some adjustment in water service area boundaries for both the City and District but the majority of new City water customers are anticipated to be within the city limits. The future service area includes the area within the City of Florence's existing city limits, areas on either side of Highway 101 between Munsel Lake Road and the UGB and areas west and south of Munsel Lake Road near Florentine Estates. Two recently annexed areas to the north, Driftwood Shores Resort and Conference Center and the Fawn Ridge subdivisions are not included in the study area and will continue to be served by the District.

Projected Population and Water Demand

The City of Florence's population forecasts are taken from the City's current Water Master Plan and are supported by population estimates from the Lane County Rural Comprehensive Plan: Coordinated Population Forecasts for Lane County and its Urban Areas, which have been incorporated into the Florence Comprehensive Plan. Future water demands are also taken from the current Water Master Plan which estimates water demands using a constant per capita approach. Both population and water demand projections are established assuming growth will occur within the current city limits. In the Water Master Plan, representative gallons per day per capita (gpcd) water demands based on historical population and demand were determined to be:

Average Day Demand (ADD) = 120 +/- 11 gpcd

Maximum Day Demand (MDD) = 225 +/- 25 gpcd

Planning and Analysis Criteria

The following criteria are used to assess the water system's ability to provide adequate water service under existing conditions and to guide improvements needed to provide for future water needs.

Water Supply and Treatment Criteria: The City's supply and treatment systems should be capable of providing estimated MDD through the end of the 20-year planning period.

Distribution System Criteria: The distribution system should be capable of supplying the maximum day demand while maintaining a minimum service pressure at any meter in the system of approximately 35 pounds per square inch (psi). The recommended minimum pipe size for new mains is 12-inch in commercial and industrial areas and 8-inch in all other areas.

Service Pressure Criteria: Minimum static system service pressures within each pressure zone should be at least 35 psi, with a recommended maximum upper limit of approximately 100 psi.

Pump Station Capacity Criteria: Pump stations supplying constant pressure service without the benefit of storage, such as those in Florence, should have sufficient firm pumping capacity to meet the pressure zone's MDD while simultaneously supplying fire suppression flow for the largest recommended fire flow rate in the pressure zone. Firm pumping capacity is the station's capacity with the largest pump out of service. All constant-pressure pump stations should also be equipped with emergency backup power generating facilities because water storage is not available to serve these areas by gravity flow alone.

Storage Volume Criteria: Recommended storage volume capacity for the City is the sum of the operational, emergency and fire storage volume components. Recommended operational storage volume is 25 percent of maximum day demand (MDD). Recommended emergency storage is 100 percent of MDD. The fire storage volume is determined by multiplying the largest recommended fire flow rate by the duration of that flow as defined in the 2007 Oregon State Fire Code.

Fire Flow Criteria: The distribution system should be capable of supplying the recommended fire flow rates while maintaining minimum residual pressures everywhere in the system of 20 psi.

Proposed New Well Field

The proposed new well field is located west of Highway 101 and immediately north of Sand Pines Golf Course. This site and its delineated drinking water protection area (DWPA) are shown in Figures 6.1 and 6.2. This DWPA has been given "provisional" certification by OHA, as explained in their letter in the delineation report in Appendix D. It should be noted that the actual well locations will most likely be farther to the south and west of where they are shown in these figures. The actual DWPA would also move accordingly to accurately reflect well locations.

The proposed site for this report was analyzed from a groundwater risk perspective. Selecting a preferred site from a groundwater risk view involves an analysis of various

land use components such as property ownership and contamination risks associated with various land uses within that well's delineated protection area.

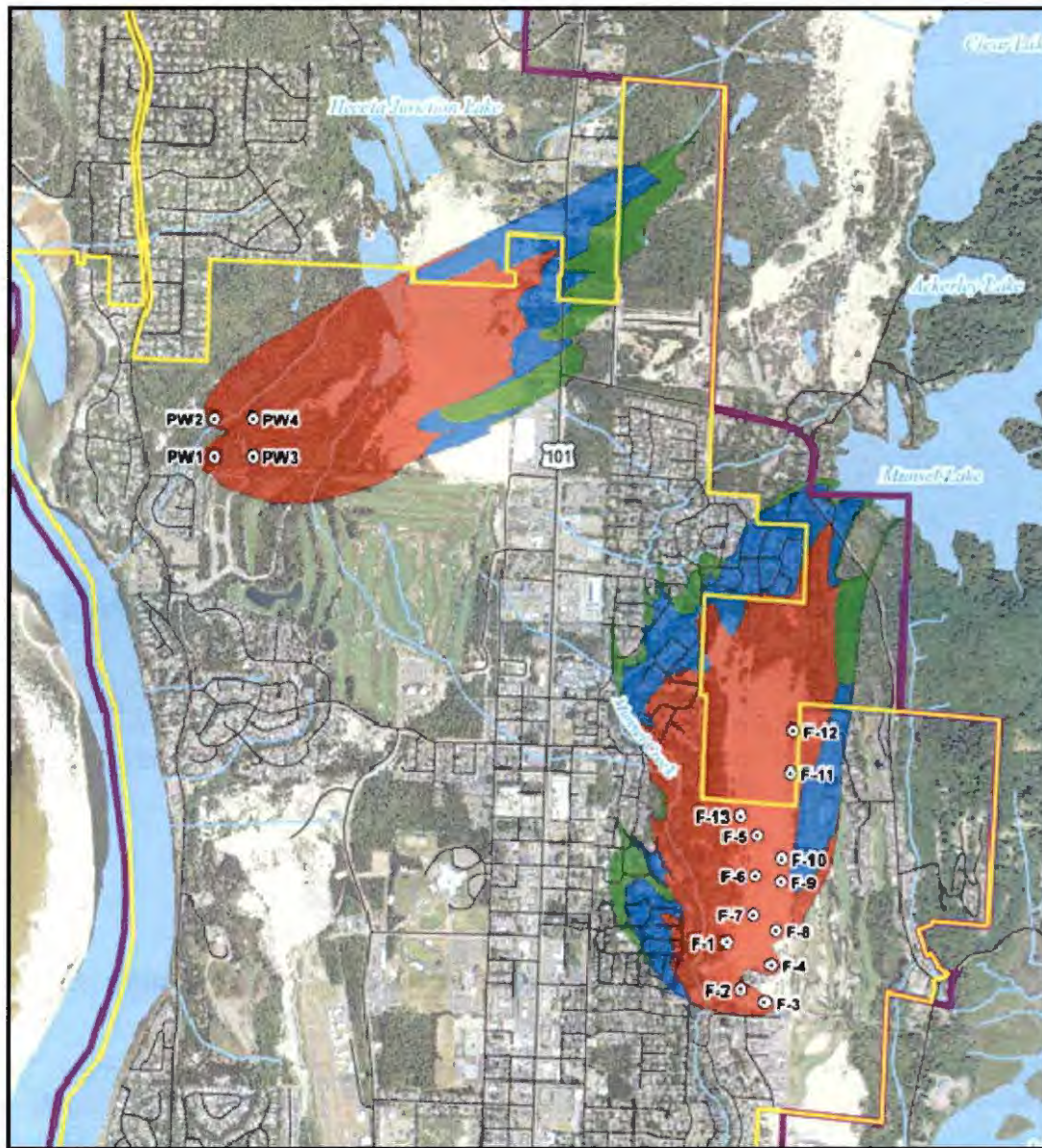


Figure 6.1. Regional view showing the 30-year capture zones of the existing well-field (lower right) and the proposed wellfield (upper left) for the City of Florence. Shading indicates the TOT zones: red = 10-yr, blue = 20-yr, and green = 30-yr TOT.

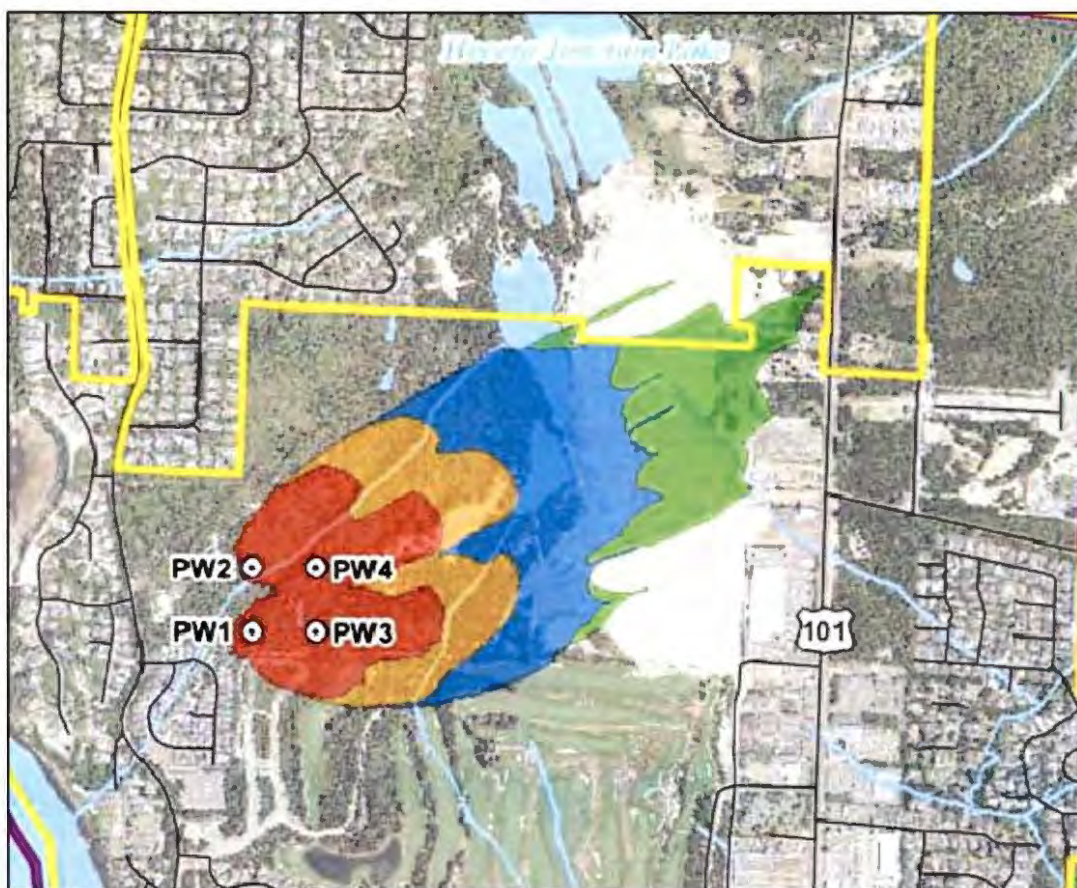


Figure 6.2. Proposed wellfield 10-year TOT capture zones. Approximate location of proposed wells 1 through 4 is shown. Different TOT zones indicated by shading: red = 1-yr TOT, orange = 2-yr TOT, blue = 5-yr TOT, and green = 10-yr TOT.

Selection Criteria

When selecting a future well field site, consideration should be given to the site's contamination potential using the criteria listed below:

- **City ownership of wellhead property.** City ownership (or possibility of purchase) of the property on which the wells are located is considered a top priority for a new well field. Having control over the immediate vicinity of the wellhead helps ensure protection of this most critical area.
- **Number of property owners.** Protecting and managing a DWPA generally becomes more complex with increasing numbers of property owners within the area. There is a greater chance that some of those property owners will not be supportive of a drinking water protection program and will increase the risk of contamination.

- **Cooperation of property owners.** Cooperative landowners within the drinking water protection area help ensure that the area will be protected to the best ability of those property owners. Property owners who are opposed to a siting of the new well field are less likely to voluntarily take extra precautions in protecting the area.
- **Risks associated with current land uses.** Land uses vary in the type and degree of potential risk to groundwater. The higher the overall risk associated with differing land uses within the DWPA, the less desirable that site is for selection of a new well field location.
- **Risks associated with expected future land uses.** Future land uses can influence the vulnerability of the DWPA if future land uses would exacerbate existing potential sources or present a higher risk than existing land uses. Potential future land uses are all uses currently allowed by Comprehensive Plan designation and zoning. The best opportunity for addressing future land uses that may pose a significant threat to the sole source aquifer is before those land uses locate in the DWPA.

Analysis

The City currently owns the property containing the proposed well field. All potential risks to the DWPA are identified and quantified in Table 2.10. Management strategies are included in Chapter 4 of this Plan to address all of these risks. Primary among these are education and, for industrial and commercial activities, the Drinking Water Protection Overlay Zone. This zone will prohibit the use of specific hazardous materials in the specific capture zones for the proposed wellfield. See Springfield Drinking Water Protection Overlay Zone in Appendix M for an example of one way this overlay zone could be applied in Florence.

The most significant risks to development of the proposed well field are as follows.

- **Highway 101 corridor.** A variety of hazardous materials are transported along this corridor, posing a risk primarily due to the potential of a spill event. Stormwater may infiltrate to groundwater. Over application/improper handling of pesticides may impact water supply.
- **Commercial and Industrial Activity.** Spills, leaks, or improper handling of motor vehicle fuels and other fluids, solvents, paints and repair materials during transportation, use, storage and disposal may impact drinking water supply. Planned land uses present a greater risk if development, e.g., dry cleaning services, uses hazardous materials.
- **On-site sewer treatment systems.** The potential risk of on-site sewage treatment systems in areas up gradient of the future well field site should be addressed. The density of septic systems can have a strong influence on nitrate levels because the septic system drainfields allow effluent to percolate into the soil. New septic systems require a permit from the DEQ. Lane County administers the permit process for most residential systems within the county as a contract agent of DEQ. Factors that are considered in granting the permit include the seasonal depth to the water table, soil characteristics, density, and required setbacks from waterways, wells, and other features. Housing development greater than 1 or 2 units per acre that rely on

septic systems can be of moderate to high risk because of the potential for elevated nitrate levels.

- **Golf course activities.** Over application or improper handling of pesticides or fertilizers may impact drinking water. Excessive irrigation may cause transport of contaminants to groundwater
- **Application of Pesticides.** Over-application or improper handling of pesticides may impact drinking water supply
- **Residential Development.** Stormwater runoff into roadside swales infiltration may contaminate the drinking water supply.

APPENDIX A

Final GSI Surface and Groundwater Monitoring Report and Secondary Data

	Page
A1: Water Quality and Quantity: Summary of Observations, October 2010 – September 2012, GSI Water Solutions, Inc....	A1-1 to A1-43
A2: Oregon Beach Monitoring Program Results.....	A2-1 to A2-3
A3: Siuslaw River Sediment Quality Evaluation Report, U.S. Army Corps of Engineers, 2012.....	A3-1

Note: This Appendix will be updated as new secondary data are available.

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Appendix A1: GSI Final Water Monitoring Report



Technical Memorandum

To: Mike Miller, Public Works Director, City of Florence

From: Dennis Nelson and Suzanne de Szoeka, GSI Water Solutions, Inc.

Date: November 20, 2012

Re: Water Quality and Quantity: Summary of Observations
October 2010 – September 2012

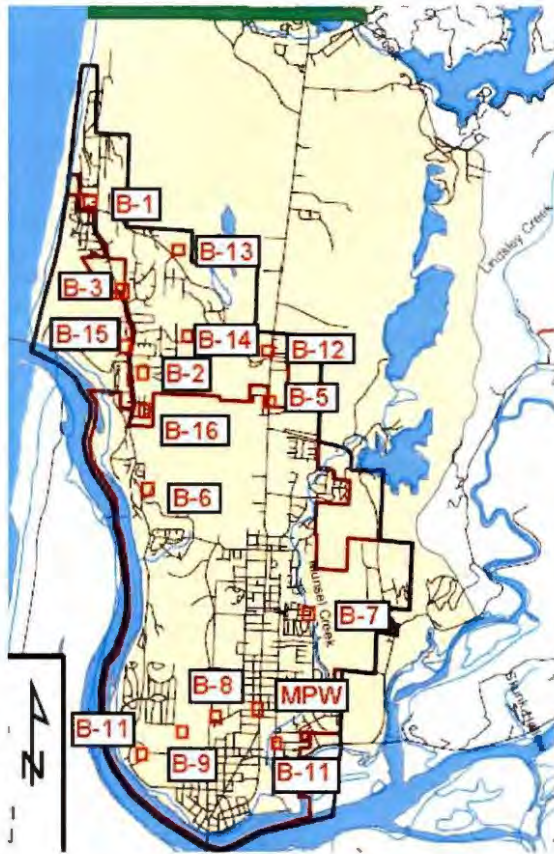
The purpose of this technical memorandum is to summarize field data collected from October 2010 through September 2012 for Munsel Creek and Ackerley Creek, and the array of monitoring wells in and near Florence, Oregon, and to report analytical data derived from laboratory analyses of groundwater and surface water quality.

Groundwater

Monitoring Wells

Data regarding the elevation of the water table, the overall configuration of the water table, and, ultimately, inferences regarding groundwater flow, were collected from a series of monitoring wells in the Florence area (**Figure 1**). Monitoring Wells B-1 through B-11 (B-4 was a failed attempt) were installed in September 2010. The locations of the monitoring well sites were selected to capture water derived from beneath the primary land use activities in Florence and in its urban growth boundary (UGB) (e.g., commercial/business, transportation corridors, sewer areas, non-sewered areas, etc.). The wells are shallow, varying from 15 to 25 feet deep, and are screened in the lower 10 feet. City personnel have collected monthly water levels and water quality data from these wells since October 1, 2010. Monitoring Wells B-12 through B-16

were installed by the City in March 2011. These wells vary from 20 to 30 feet deep, and are screened in the lower 10 feet. Wells B-12 through B-16 were designed to fill gaps, as needed, and to provide upgradient information. Data collection from these wells began in early April 2011.



(a)



(b)

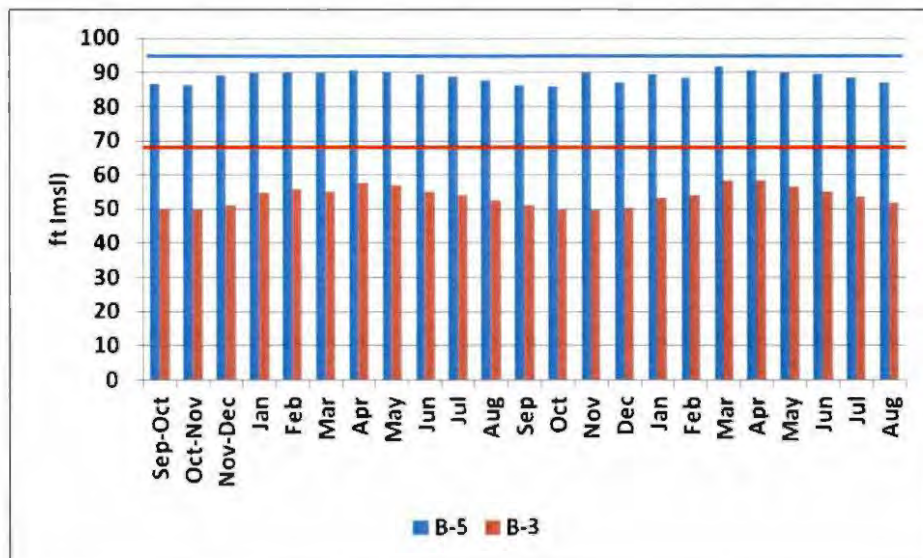
Figure 1. Maps of the Florence city limits and UGB. (a) An aerial view. (b) A Google image showing monitoring well locations (red symbols), surface water sites (yellow symbols), and stormwater sites (green symbols). The monitoring wells are all less than 30 feet deep. Wells B-1 through B-11 have been sampled monthly since October 1, 2010. Wells B-12 through B-16 have been sampled since April 1, 2011. The City-owned Miller Park Well (shown as MPW) derives its water from a depth > 50 feet. The Public Works Department, located just north of the Florence-Eugene Hwy, is the site of surface water, stormwater, and groundwater sampling.

The City's Miller Park Well (MPW in Figure 1a) was added to the monitoring well list in May 2011. This well is deeper, derives its water from a greater depth (>57 feet), and has higher temperature and pH than the shallower monitoring wells (see discussion below). This information is interpreted as indicating that the well is "sampling" water that has been removed from the atmosphere longer than that from the shallow wells, and, therefore, the water quality data may not be directly comparable. The implications of the Miller Park Well data are discussed below.

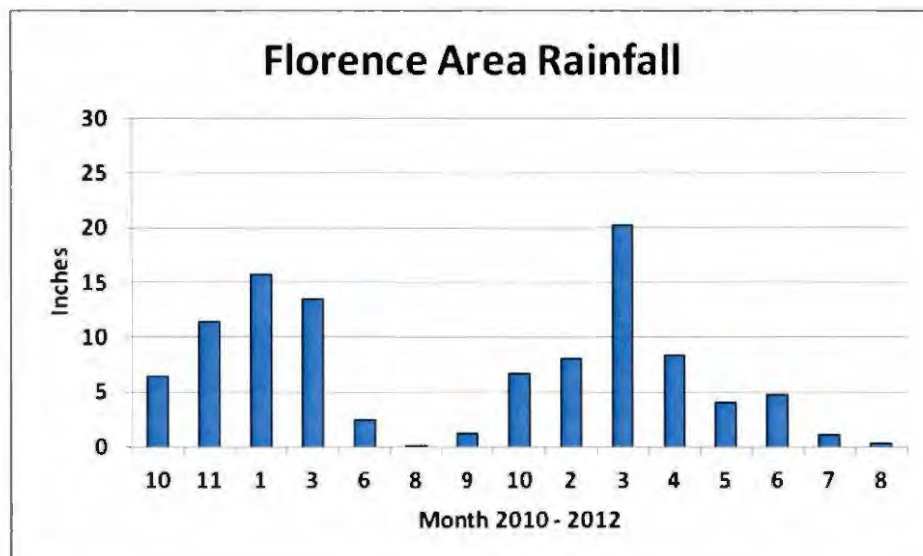
Water Quantity

Water Table Elevation and Relation to Precipitation. It has been established that the elevation (head) of the water table undergoes significant variations as a function of season, with the most important controlling parameter being precipitation.

Figure 2a illustrates how the elevation of the water table at two individual monitoring well sites varied from October 2010 through August 2012 for Wells B-3 and B-5. Well B-3 is near the coast at an elevation of 68.5 feet, while B-5 is farther inland and at a higher elevation of 95.6 feet (see **Figure 1**). Figure 2b provides the average rainfall per month for the Florence area. Data from monitoring wells (**Figure 2a**) during the year suggest that the water table is at its lowest near October 1 and at its highest near April 1.



(a)



(b)

Figure 2. (a) Average changes in the water table elevation at monitoring Wells B-3 and B-5 monthly (msl = mean sea level). Blue horizontal line is the ground elevation at B-5 (95.6 feet), while the red horizontal line is the ground elevation at B-3 (68.5 feet). (b) Average rainfall in the Florence area from October 2010 through August 2012.

Comparing Figures 2a with 2b indicates that the lowest water table lags behind the lowest precipitation by up to 2 months, while the higher water table corresponds closely with higher amounts of rainfall. This is consistent with the shallow water table and the rapid infiltration of precipitation. **Figure 3** illustrates this further by showing the significant rise (> 4 feet at several wells) in the water table in March 2012 in response to heavy rainfall.

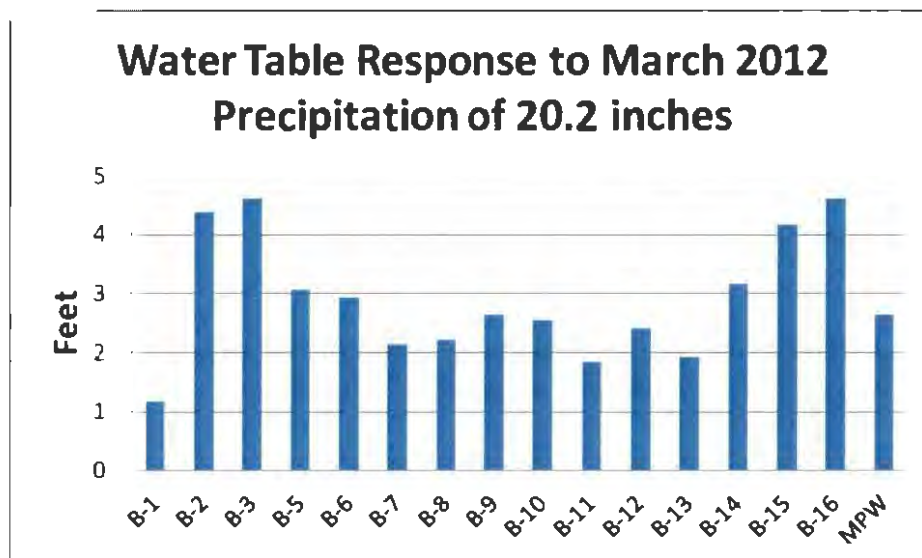


Figure 3. Rise of water table following a total of 20.2 inches of rainfall in March 2012.

Figures 4 and 5 illustrate the average change in the water table throughout the Florence area as a function of rainfall. Examination of these figures suggests that in the Florence area, a monthly rainfall of less than ~6-8 inches likely will result in a decline in the water table.

Water Table Configuration and Groundwater Flow. Even though the water table elevation at an individual monitoring well might change significantly as a function of precipitation (**Figure 3**), in some cases as much as 4+ feet, the relative configuration of the water table as a whole remains similar in character (**Figure 6**). In other words, although the positions of the contours change (e.g., note the positions of the 100-foot contour in **Figure 6**), no significant changes in groundwater flow direction, generally perpendicular to the contours, is indicated. As in previous measurement periods, the water table slopes toward the Siuslaw River, the Pacific Ocean, and Clear and Munsel Lakes, implying that groundwater discharges directly to the lakes, to the Siuslaw River Estuary, and indirectly via streams, culminating in Munsel Creek's discharge.

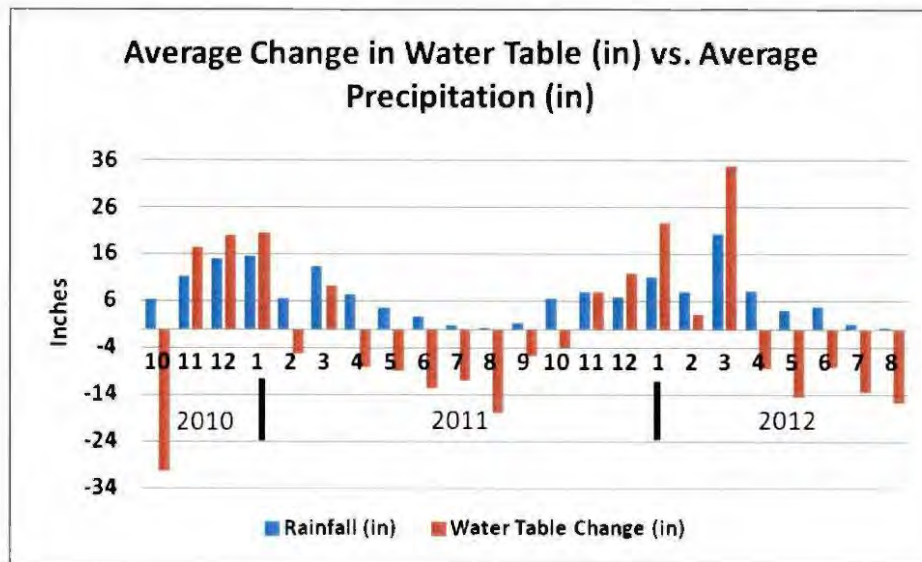


Figure 4. Illustrations of average monthly rainfall vs. average change in the water table. Negative numbers indicate a declining water table.

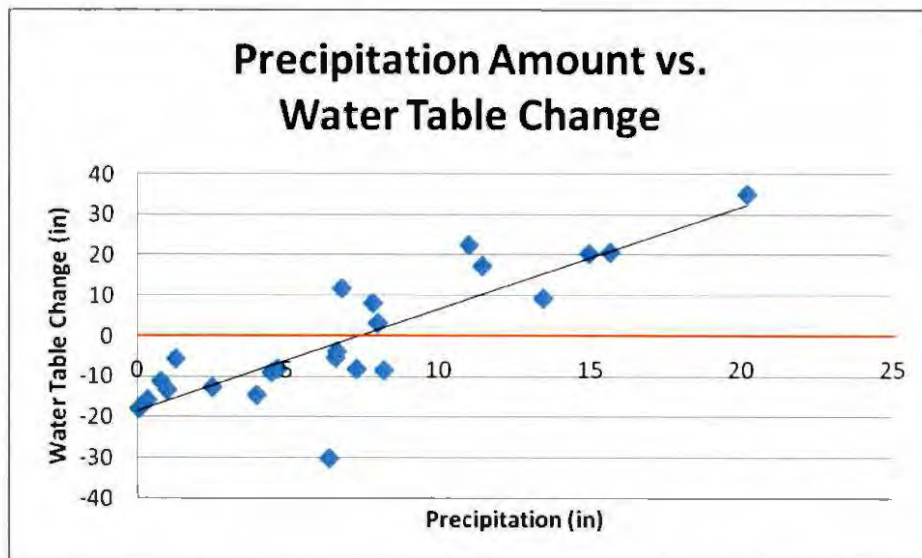


Figure 5. Correlation between rainfall and average elevation of the water table. According to the plot, rainfall has to exceed 6-7 inches for an increase in the water table to occur.

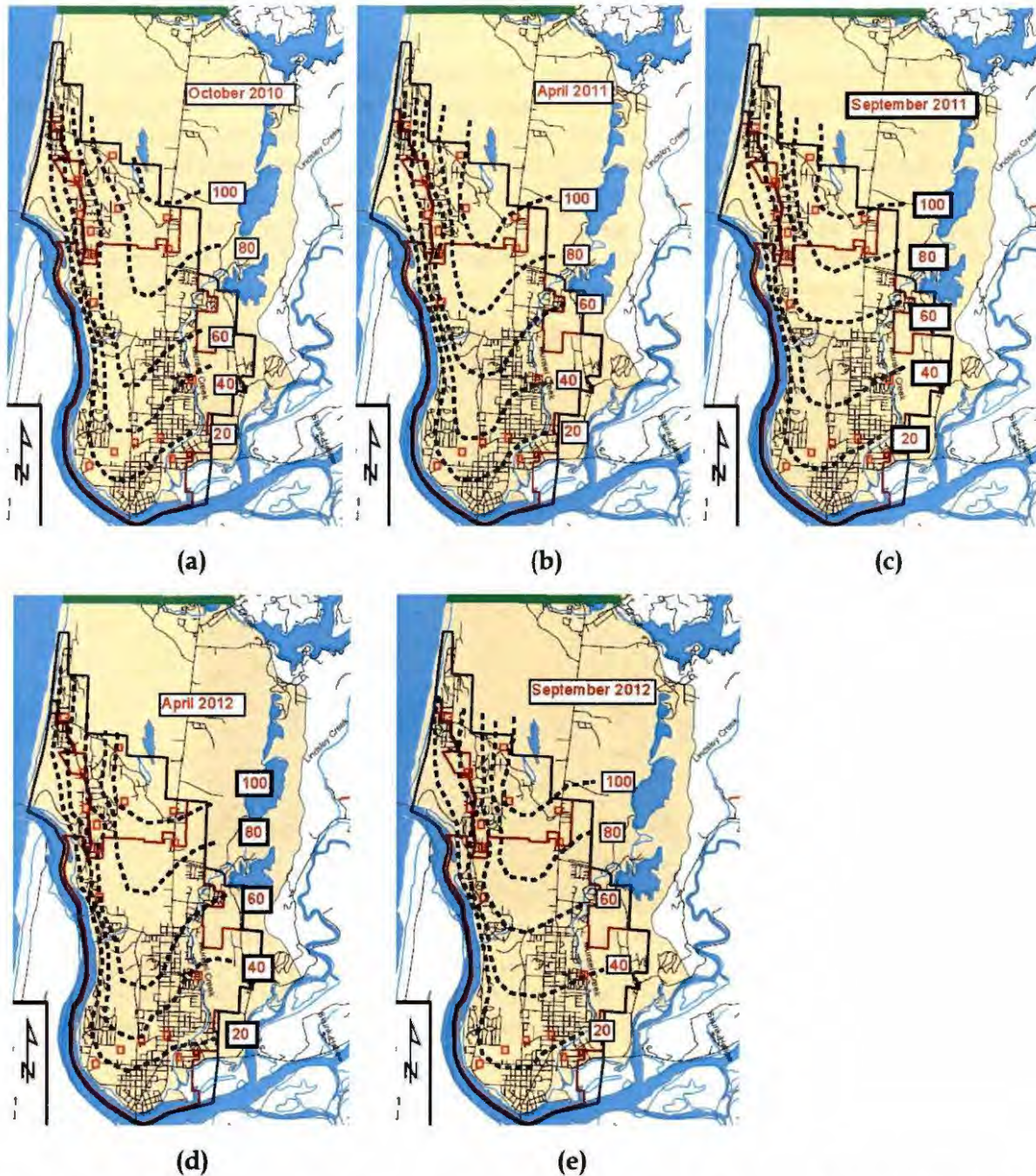


Figure 6. The configuration of the surface of the water table in the Florence area from October 2010 through September 2012 is illustrated in views (a) through (e) at its lowest elevation (September-October) and its highest elevation (April). Configuration of the water table remains similar although contours tend to migrate toward discharge areas during the rainy seasons. Contours indicate that the water table slopes toward the Siuslaw River, Pacific Ocean, and Clear and Munsel Lakes; therefore, groundwater discharges to those features, at both high and low water tables.

Water Table Elevation and Ground Elevation

A review of the topography over the Florence Dunal Aquifer reveals that the elevation varies from more than 200 feet in the northeast area to near sea level to the south and west (see **Figure 7**). Data from the monitoring wells installed during this project suggest that at high water levels, the depth to the water table varies from 5 feet or less in the interior area of the aquifer to 15 to 20 feet near the Siuslaw River Estuary (**Figure 8**). This seemingly paradoxical situation results from two circumstances. First, the ground surface slopes gently to the south and west. Secondly, in contrast to ground elevation, the elevation of the water table is fixed by sea level and, therefore, the water table slopes more steeply than does the land surface (**Figure 9**).



Figure 7. Approximate depth to the water table in the Florence Dunal Aquifer. This map is based on measurements taken at the monitoring wells in the City. Data reflected here were collected in April 2011, when the water table, coincident with rainfall, was high. Notice that the depth to the water table increases as one approaches the Siuslaw River Estuary.

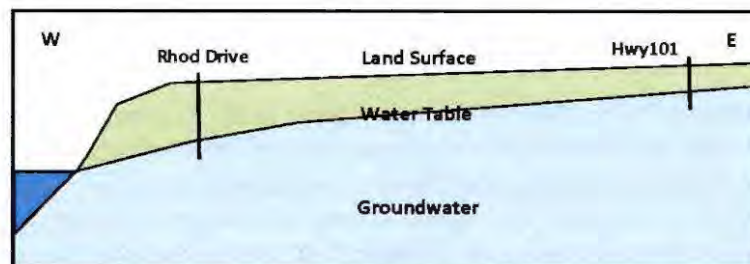


Figure 8. A diagrammatic profile of the water table elevation in the Florence Dunal Aquifer from east to west. The water table is tied to sea level and, therefore, slopes at a steeper rate than does the land surface.

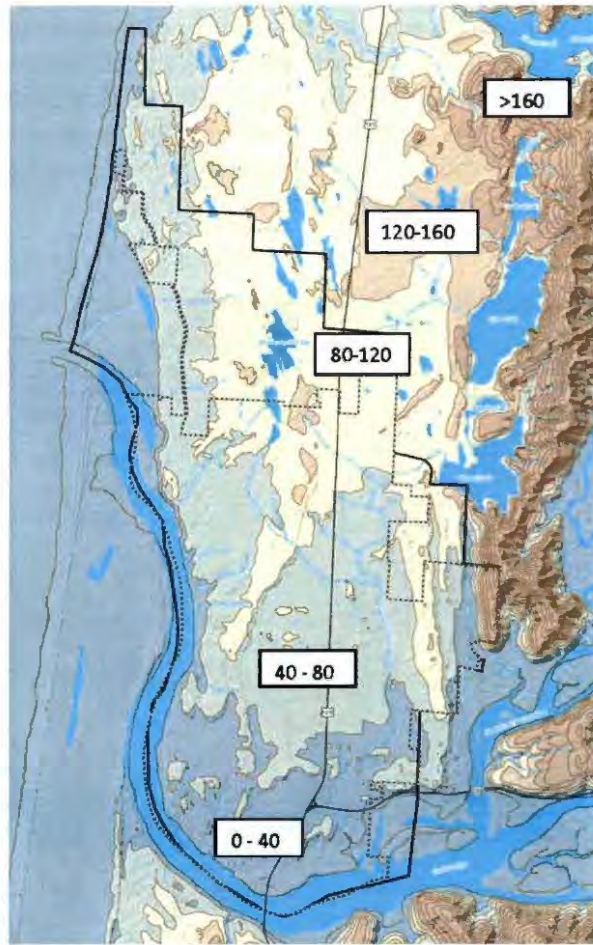


Figure 9. Map showing the general elevation of ground surface in the Florence Dunal Aquifer. Elevation varies from sea level to more than 160 feet. Elevation is shown in 40-foot increments as labeled and color coded.

In **Figure 10**, we provide an illustration of the inferred groundwater flow paths in the study area (dashed blue lines). It was clear to us early on that a correlation exists between water table elevation and ground surface elevation and that groundwater flow paths moved from areas of higher topography to areas with lower ground elevation. We have extended that inference throughout the Florence Dunal Aquifer, suggesting a coincidence of high topography and a groundwater high (mound) in the northeast part of the aquifer.

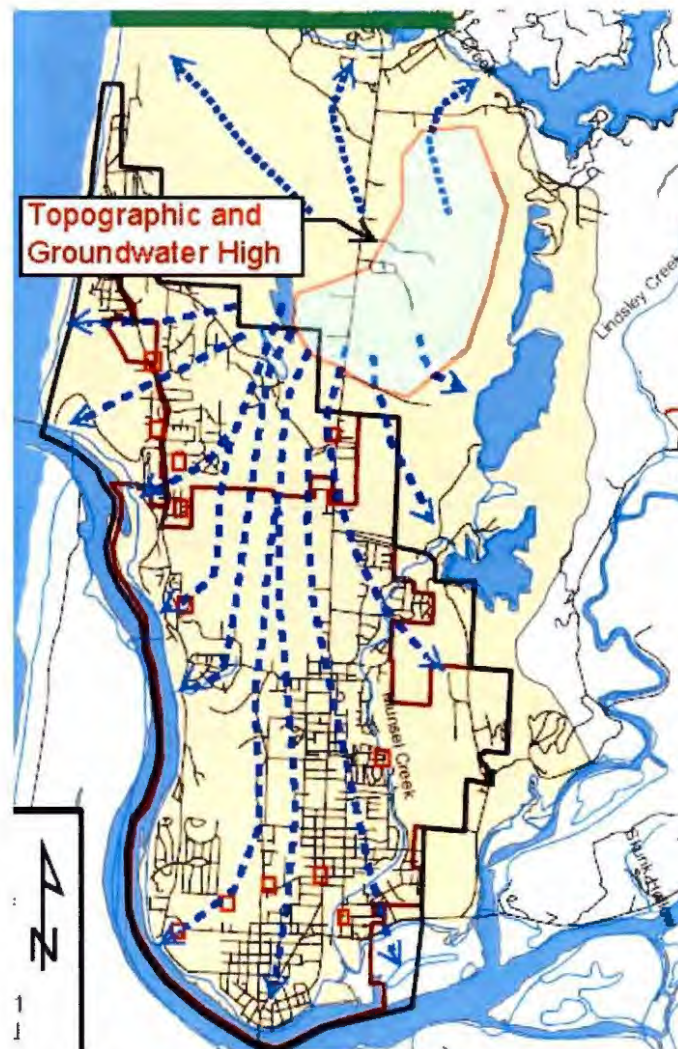


Figure 10. Approximate groundwater flow directions (dashed blue lines) as determined from contoured monitoring well data (see Figure 6). It is inferred that in the northern part of the Dunal aquifer, groundwater flows northward (dotted blue lines) towards Sutton Lake and Sutton Creek. Pathways appear to originate from a topographic high (see Figure 6c) that presumably is also a groundwater high as well (see text).

Although supported by the results of the ground penetrating radar (GPR) survey (see April 2012 Water Quality and Quantity report; Doliber, 2012), we have no direct water table elevation data from the aquifer north of the current study area. The GPR data provided clear evidence that groundwater is discharging to Clear and Munsel Lakes with groundwater flow moving in an easterly direction.

To the west, direct water table elevation measurements indicate that groundwater is discharging to the west. That groundwater flows in opposite directions to the east and west of Hwy 101 indicates the presence of a groundwater mound separating the two areas.

Traveling north on Hwy 101 through the Florence Dunal Aquifer, one finds that the elevation of the highway peaks at about 120 to 130 feet just north of monitoring Well 12. At Well 12, the elevation of the water table is 100± feet. As one proceeds northward, the elevation drops to approximately 50 feet near Sutton Lake. It is assumed that the elevation of lake surface, 30± feet, reflects the elevation of the water table at that location.

The inferred drop in water table elevation from 100 feet to 30 feet from Well 12 to Sutton Lake is consistent with groundwater flow from a high near Well 12 to the northern parts of the Florence Dunal Aquifer.

Figure 9 shows an area where the elevation is approximately 120+ feet (see **Figure 6c**) and suggest that the area is coincident with a groundwater high. It is important to realize that this groundwater high area is not the sole area of groundwater recharge for the aquifer. Recharge occurs throughout the aquifer, infiltrating downward from the surface.

Naturally, where the topography is higher, downward percolation will result in the elevation of the water table also being higher. It is common to find that for an unconfined aquifer, the water table mimics, in a subdued way, the topography.

Figure 9 also shows the groundwater flow directions based on the monitoring wells (dashed lines) as well as flow directions (dotted lines) based on the interpretation that a groundwater mound is coincident with the topographic high of the dune field. GSI's interpretation is that groundwater is flowing in a northerly direction in the northern dunal aquifer, discharging to Sutton Lake and Sutton Creek.

Groundwater Quality

Field Parameters

Groundwater Temperature. Groundwater temperature remains fairly uniform across the Florence area; however, small but significant seasonal changes are observed. **Figure 11** shows the average groundwater temperature as a function of the month the data were collected. Based on those averages, groundwater temperature varies by approximately 2.5°C. It also appears that the groundwater temperature lags behind the air temperature by 1 to 2 months. The lowest average temperature is in April, while the lowest air temperatures are generally in January or February. The lag time is the result of the insulating effect of the sands between the water table and the surface. The deeper Miller Park Well tends to have slightly higher groundwater temperatures, ranging from 12.0°C to 13.5°C from May 2011 through September 2012. Further, the Miller Park Well does not seem to experience the drop in temperature during April as observed in the shallower wells. Both the slightly higher temperature and the smaller temperature range exhibited by the Miller Park Well are consistent with the groundwater tapped by this well being deeper and less influenced by surface conditions.

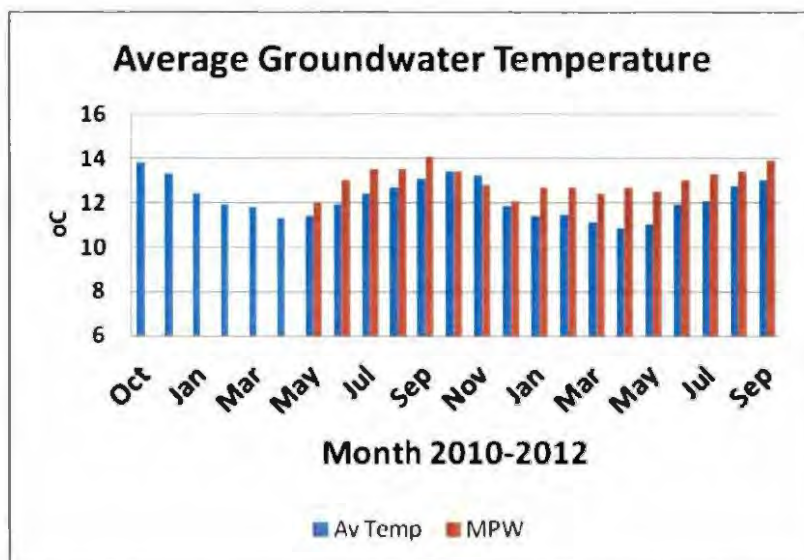


Figure 11. Average temperature of groundwater from shallow monitoring wells from October 2010 through September 2012 and for the deeper Miller Park Well (MPW) from May 2010 through September 2012.

Groundwater pH. The pH of area groundwater has remained fairly stable. From December 2010 through September 2012, the average pH of the shallow groundwater varied from 5.36 to 6.09, with no apparent seasonal trend. Some outliers were seen (e.g., Well B-7 at 7.08 in November 2011 and Well B-2 at 4.7 in October 2011). Lower pH values (5.5 to 6.0) are typical of shallow groundwater. Rainwater is slightly acidic because of carbon dioxide in the atmosphere, leading to the formation of carbonic acid. In Oregon, typical precipitation in the coastal areas has a pH of approximately 5.7. Reactions in the soil zone can reduce the pH of infiltrated rainwater even more. Groundwater that has a longer residence time below the soil zone generally will have a higher pH because of chemical reactions with aquifer materials.

The pH of the Miller Park Well typically is higher than the other wells (e.g., 6.1 to 6.5 compared to 5.4 to 5.7). In contrast to the shallow monitoring wells (<25 feet), the Miller Park Well is deeper, drawing groundwater from a screened interval from 57 to 82 feet below ground surface. Both the temperature and pH difference in groundwater from the Miller Park Well compared to that from the shallow monitoring wells are consistent with a longer residence time for the deeper groundwater.

Groundwater Conductivity. Conductivity is related to the dissolved mineral load of the water. An approximate relationship between the two is that the total dissolved solids (TDS) (milligrams per liter [mg/L]) of a sample is approximately 50 percent of the conductivity (micro Siemens per centimeter [$\mu\text{S}/\text{cm}$]) of that sample. Conductivity varies in wells from <70 to >500 $\mu\text{S}/\text{cm}$, with the bulk of the analyses at 100 to 160 $\mu\text{S}/\text{cm}$.

Figure 12 plots the conductivity of groundwater derived from selected wells within the study area (see **Figure 1a** for well locations). Well B-5 is an upgradient well whereas the remaining wells are downgradient wells:

- Well B-2 is approximately 1.1 miles downgradient from Well B-5 in an area that is served by individual septic systems.
- Well B-6 is within the City, approximately 1.1 miles downgradient from Well B-5, and is downgradient from the Sand Pines Golf Course.
- Wells B-8 and B-10 are 2.3 and 2.85 miles, respectively, downgradient from Well B-5 in the City's downtown area and commercial area.
- Well B-11 is in the City, near Munsel Creek, approximately 2.6 miles from Well B-5 and downgradient from a commercial area.

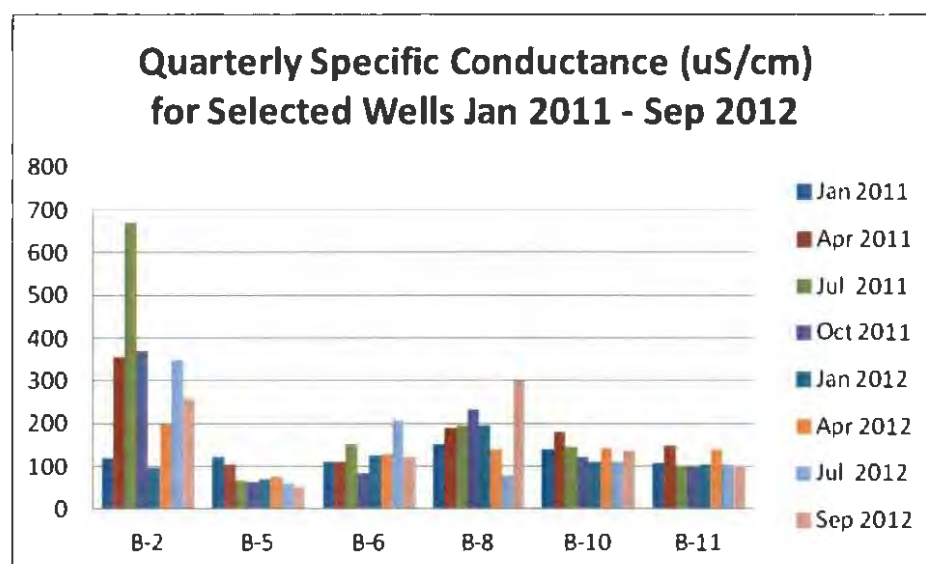


Figure 12. Conductivity in groundwater from select monitoring wells as a function of month. Well B-5 is upgradient, while Wells B-2, B-6, B-8, B-10, and B-11 are downgradient wells (see discussion in text and Figure 1a for well locations).

As would be expected, the upgradient Well B-5 has lower and more uniform conductivity (TDS) values, while the downgradient wells (B-2, B-6, B-8, B-10, and B-11) tend to have higher conductivity values. Given the shallow nature of the water table, and the potential for local influence on a given well's water quality, it is not just water-rock reactions along a flow path that are controlling the conductivity values as is evidenced by the lack of correlation between flow path length (see bullets above) and conductance. This can be most clearly seen in the anomalous behavior of Well B-2 where conductivity values vary significantly and have exceeded 600 $\mu\text{S}/\text{cm}$.

Reactions between groundwater and the aquifer (which contains quartz, feldspar, and rock fragments) are likely to be slow. Slow reactions are suggested by the conductivity data from groundwater from the deeper Miller Park Well. Although the temperature and pH data above suggest a longer residence time for this well's groundwater, the conductivity of the Miller Park Well varies from 124 to 146 $\mu\text{S}/\text{cm}$, indistinguishable from most of the shallower wells. Therefore, the values seen at Well B-2, in the 400 to 600 $\mu\text{S}/\text{cm}$ range, are unlikely to be the result of natural causes, suggesting that the groundwater at this well site has been affected by surface or near surface activities.

Groundwater Dissolved Oxygen. Dissolved oxygen (DO) varies from 0.09 mg/L (< 1 percent saturated) to more than 10 mg/L (> 90 percent saturated) in groundwater from the Florence Dunal Aquifer. Although the DO data collected thus far from study area monitoring wells do not seem to indicate any regional pattern to the values (see **Figure 13**), the DO at a given monitoring well does not change significantly with time, often varying by less than 1 mg/L over time (**Table 1**). Upgradient wells can have quite different values (e.g., Well B-7 = 10.1 mg/L, Well B-5 = 0.13 mg/L), as can downgradient wells (e.g., Well B-2 = 9.31 mg/L, Well B-6 = 0.47 mg/L).

The DO of a given groundwater sample is a function of the ability of groundwater to be able to exchange and equilibrate with the atmosphere, the amount of organic carbon in the aquifer, and the amount of organic matter that is added to the aquifer from the surface or near surface. As a result, the final DO is likely a function of location as opposed to evolution along a flow path.

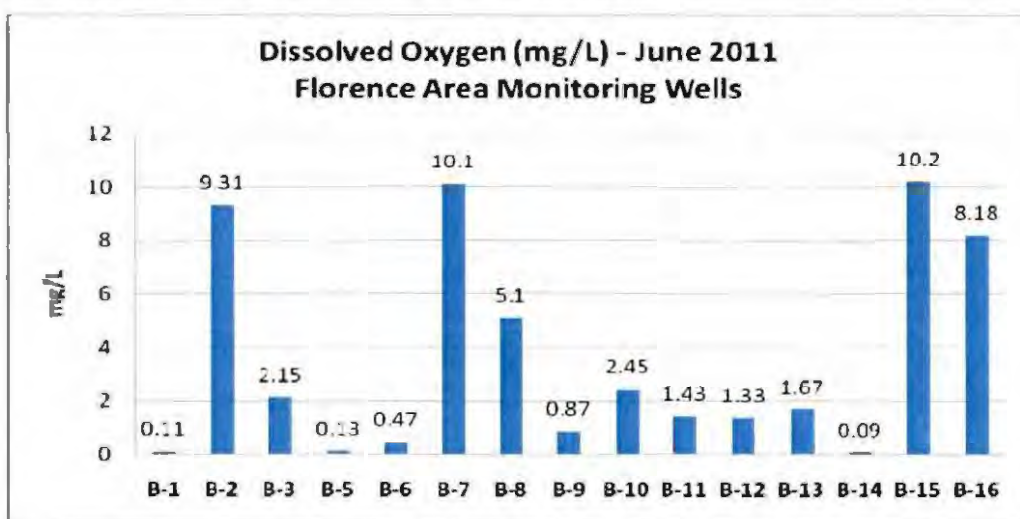


Figure 13. Range of dissolved oxygen levels in groundwater from the Florence area monitoring wells, June 2011.

Table 1. Variation of dissolved oxygen (DO) and oxidation-reduction potential (ORP) with time for monitoring Wells B-2 and B-5 (see Figure 1a for well locations).

Date	B-2		B-5	
	DO (mg/L)	ORP (mv)	DO (mg/L)	ORP (mv)
Jan 2011	9.5	337	0.17	8.7
Feb 2011	9.2	276	0.21	-86
Mar 2011	9.5	314	0.1	-72
Apr 2011	9.4	276	0.14	7.1
May 2011	9.6	278	0.13	57
Jun 2011	9.3	262	0.13	70
Jul 2011	10.2	231	0.11	48
Aug 2011	10.4	321	1.4	73
Sep 2011	10.4	336	0.21	65
Oct 2011	8.8	389	0.39	105
Nov 2011	NA ¹	NA ¹	0.13	47
Dec 2011	NA ¹	NA ¹	0.19	122

¹Well dry

Oxidation-Reduction Potential (ORP). Similar to DO, the ORP values do not display any regional pattern (Figure 14) and, at a given site, are relatively consistent over time (Table 1). The ORP is a measure of the ability of the environment to initiate oxidizing and reducing reactions and is a more complex parameter than is DO. Although DO is an oxidant, and can lead to oxidizing reactions (e.g., the oxidation of Fe causing the precipitation of Fe(OH)₃, the ORP is a function of the relative concentrations and valences of dissolved metal species, the pH of the solution, and rate of oxidation-reduction reactions. Multiple reactions may be taking place at once at different rates. Consequently, unlike the simple measurement of DO, the determination of the overall ORP of a solution is challenging. Thus, it is not surprising that the ORP values shown in Table 1 show a greater variation than DO.

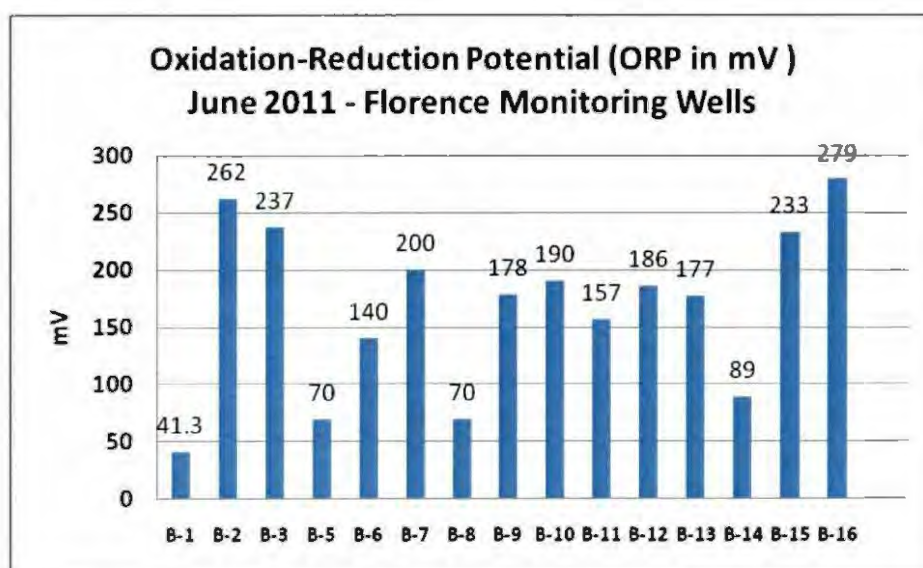


Figure 14. Range of oxidation-reduction potential (ORP) in groundwater from the Florence area monitoring wells, June 2011.

Oxidation-reduction reactions play a significant role in groundwater by causing the dissolved species to change their valence (charge) by gaining or losing an electron. The valence controls the chemical behavior of a specific element or molecule and may lead to dissolving and precipitating reactions (e.g., the oxidation of iron from Fe^{2+} to Fe^{3+} often will result in the precipitation of iron minerals, responsible for the orange-brown color of some of the sands, as well as producing stains on bathroom fixtures). In other cases, the change in valence may have health impacts (e.g., arsenic as As^{3+} is of more concern than As^{5+} in drinking water, as is the oxidized form of nitrogen [i.e., NO_3^-] than the reduced form [N_2]). Oxidizing conditions are indicated by a high ORP value and reducing conditions by a low ORP value.

The lack of a regional pattern of the ORP parameter, and the relative consistency of the ORP value at a given site, a conclusion is reached that is the same as with DO, i.e., the ORP value is a function of what is happening in the immediate area of the well.

A final point is that the consistency of the site-specific DO and ORP values collected during the time period of this project provide a testament to the precision of the equipment used and the careful sampling and measuring skills of the City staff.

Chemical Analyses

Laboratory analyses in March and September of 2011 and 2012 included the full range of analytes, as detailed in the original proposal to the U.S. Environmental Protection Agency (EPA) (i.e., volatile organic chemicals [VOCs], select pesticides, metals, nitrate, and the common ions, [e.g., Ca, Na, K, HCO_3^- , Cl, and SO_4^{2-}] as well as the routine bacterial testing). This testing was conducted on Wells B-1 through B-11. Coliform and *E.coli* data were collected monthly from October 2010 through September 2012. Nitrate was collected monthly from March 2011 through September 2012.

Volatile Organic Chemicals. VOCs include organic chemicals derived from solvents and fuel products. Groundwater samples from the Florence monitoring wells were tested for 42 VOCs, including the common ones listed in **Table 2**. Although this group of chemicals is not common in residential areas (except for small quantities of aerosol solvent, e.g., WD-40™, and other petroleum products), they may be used in commercial areas and commonly are found in stormwater runoff. No VOCs were detected in any of Florence's monitoring wells.

Table 2. Common volatile organic chemicals included in the analyte list for March analysis of groundwater from Florence-area monitoring wells.

1,1-Dichloroethane	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane
Benzene	Carbon Tetrachloride	1,1-Dichloroethylene
Ethylbenzene	Styrene	Tetrachloroethylene
Toluene	Vinyl Chloride	Xylenes

Pesticides. Groundwater from Wells B-1 through B-11 was sampled and analyzed for a select group of pesticides (**Table 3**). This group primarily consists of herbicides, including some that can be purchased over the counter (e.g., 2,4-D and glyphosate [Roundup, Rodeo, and Pond Master]). These pesticides were selected because they are among the most commonly used by

homeowners and small businesses, and along roadways. No pesticides were detected in any of Florence's monitoring wells.

Table 3. Selected pesticides included in the analyte list for March testing of groundwater from Florence-area monitoring wells.

2,4-D	Dalapon	Dicamba
Dinoseb	Pentachlorophenol	Picloram
2,4,5-TP (Silvex)	Glyphosate (a.k.a. Roundup and Rodeo)	

Metals and Nonmetals. Groundwater from the monitoring wells in Florence was tested for the inorganic chemicals shown in **Table 4**. This group of chemicals typically is found in areas of commercial and industrial land uses, but also may occur in a variety of other activities. Only two detections were noted: chromium was detected in Well B-2 at a concentration of 0.0056 mg/L and arsenic was detected in Well B-6 at 0.0052 mg/L. Both of these concentrations are below the respective drinking water standards (i.e., 0.10 mg/L for chromium and 0.010 mg/L for arsenic). No other detections were recorded and further metal analysis was discontinued.

Table 4. Selected metals and nonmetals included in the analyte list for March testing of groundwater from Florence-area monitoring wells.

Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)
Chromium (Cr)	Cyanide (CN)	Mercury (Hg)	Nickel (Ni)
Antimony (Sb)	Selenium (Se)	Thallium (Tl)	Phosphorus (P)

Nitrate. The drinking water standard for nitrate is 10 mg/L $\text{NO}_3\text{-N}$. Natural concentrations of nitrate rarely exceed 2 to 3 mg/L. Concentrations exceeding natural levels often reflect areas affected by animal feedlots, septic systems, or over-application of fertilizer.

Elevated nitrate in shallow wells in areas not served by municipal sewer lines may reflect the impact of effluent from septic systems. Traditional septic systems are designed to discharge to groundwater. They are not designed to remove nitrate from domestic waste. A given area of land, with a given thickness of soil material above the water table, can assimilate (dilute, use, or convert) nitrate from domestic sewage up to a threshold controlled by the nature of that soil and the character of the aquifer. If that threshold is exceeded, nitrate may infiltrate to groundwater.

Most of the area monitoring wells exhibit low to non-detect levels of nitrate concentrations (see **Tables 5 and 6**). Significant variations do occur. Nitrate has been found in Wells B-2 and B-10. Nitrate concentrations in Well B-10 are low (1.8 to 2.6 mg/L), while the nitrate concentrations for Well B-2 have varied from non-detect to as high as 45 mg/L. Well B-2 is within Florence's UGB, in an area serviced by individual septic systems. Elevated nitrate concentration is not the case for all wells in the areas downgradient from septic systems, which is evident from the lack of nitrate in groundwater from Well B-3, a nearby monitoring well. The conductivity of Well B-3 is much lower than Well B-2, and is similar to other downgradient wells (e.g., Wells B-6, B-8, and B-11 are located in areas serviced by sewers).

Table 5. Nitrate data for Florence-area monitoring wells: October 2010 to September 2011							
Date	Oct 2010	Nov 2010	Mar 2011	Apr 2011	Jun 2011	Aug 2011	Sep 2011
B-1	ND ¹	ND ¹	ND ¹	NA ²	ND ¹	ND ¹	ND ¹
B-2	29.7	27.7	ND ¹	NA ²	12.6	45	22.8
B-3	ND ¹	ND ¹	ND ¹	NA ²	ND ¹	ND ¹	ND ¹
B-5	ND ¹	ND ¹	ND ¹	NA ²	ND ¹	ND ¹	ND ¹
B-6	ND ¹	ND ¹	ND ¹	NA ²	ND ¹	ND ¹	ND ¹
B-7	ND ¹	ND ¹	ND ¹	NA ²	ND ¹	ND ¹	ND ¹
B-8	ND ¹	ND ¹	ND ¹	NA ²	ND ¹	ND ¹	ND ¹
B-9	ND ¹	ND ¹	ND ¹	NA ²	ND ¹	ND ¹	ND ¹
B-10	ND ¹	ND ¹	2.6	NA ²	1.8	ND ¹	ND ¹
B-11	ND ¹	ND ¹	ND ¹	NA ²	ND ¹	ND ¹	ND ¹
B-12	NA ²	NA ²	NA ²	ND ¹	ND ¹	ND ¹	ND ¹
B-13	NA ²	NA ²	NA ²	ND ¹	ND ¹	ND ¹	ND ¹
B-14	NA ²	NA ²	NA ²	ND ¹	ND ¹	ND ¹	ND ¹
B-15	NA ²	NA ²	NA ²	ND ¹	ND ¹	ND ¹	ND ¹
B-16	NA ²	NA ²	NA ²	ND ¹	ND ¹	ND ¹	ND ¹

¹Not detected²Not analyzed

Table 6. Nitrate data for Florence-area monitoring wells: October 2011 to September 2012										
Date	Oct 2011	Nov 2011	Feb 2012	Mar 2012	Apr 2012	May 2012	Jun 2012	Jul 2012	Aug 2012	Sep 2012
B-1	NA ²	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
B-2	33.1	NA ²	19.2	ND ¹	4.9	ND ¹	4.9	16.4	18.2	15.2
B-3	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
B-5	NA ²	ND ¹	NA ²	ND ¹	NA ²	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
B-6	NA ²	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
B-7	NA ²	ND ¹	NA ²	ND ¹	NA ²	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
B-8	NA ²	ND ¹	NA ²	ND ¹	NA ²	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
B-9	NA ²	ND ¹	NA ²	ND ¹	NA ²	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
B-10	ND ¹	ND ¹	NA ²	2.1	NA ²	2.3	1.8	ND ¹	ND ¹	ND ¹
B-11	ND ¹	ND ¹	NA ²	ND ¹	NA ²	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
B-12	NA ²	ND ¹	NA ²	ND ¹	NA ²	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
B-13	NA ²	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
B-14	NA ²	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
B-15	ND ¹	NA ²	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
B-16	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹

¹Not detected²Not analyzed

The question remains: if the elevated values of nitrate in Well B-2 reflect impact by septic system effluent, why is the nitrate not observed all of the time instead of ranging from non-detect to > 40 mg/L?

One possibility might be that during the high rainfall period, the groundwater became reducing (low ORP) and the nitrate was converted to nitrogen gas. The ORP values measured for Well B-2, however, refute that argument. As shown in **Figure 15**, the ORP of the groundwater from Well B-2 remained relatively high (oxidizing) during that period of time. Under such conditions, it is unlikely that nitrate would be reduced to nitrogen gas.

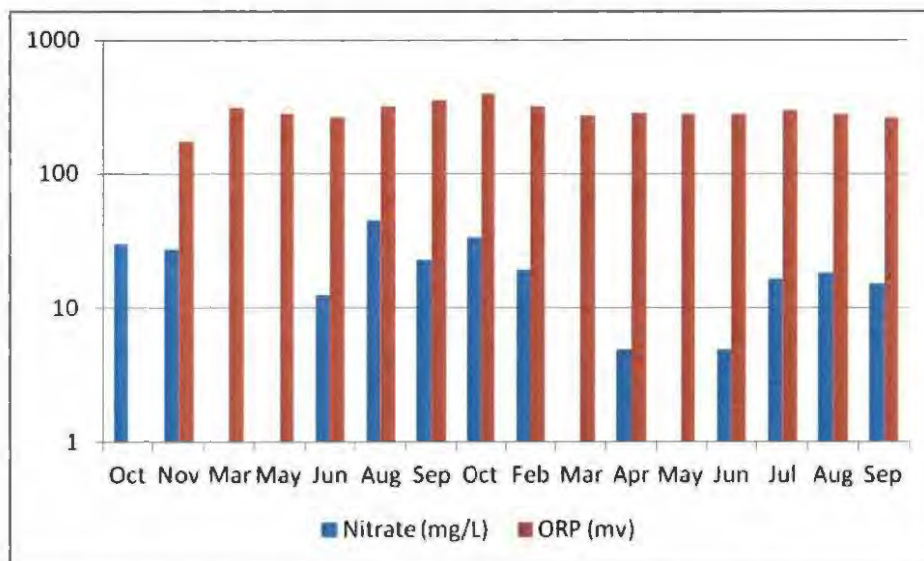
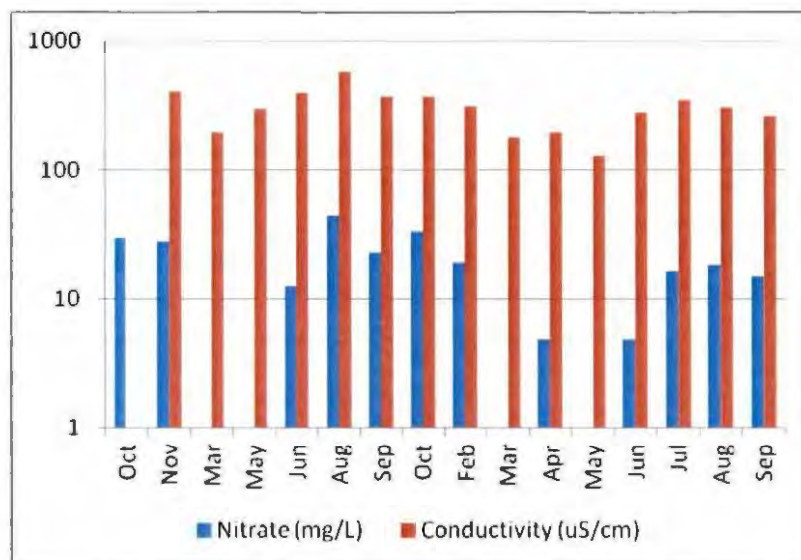


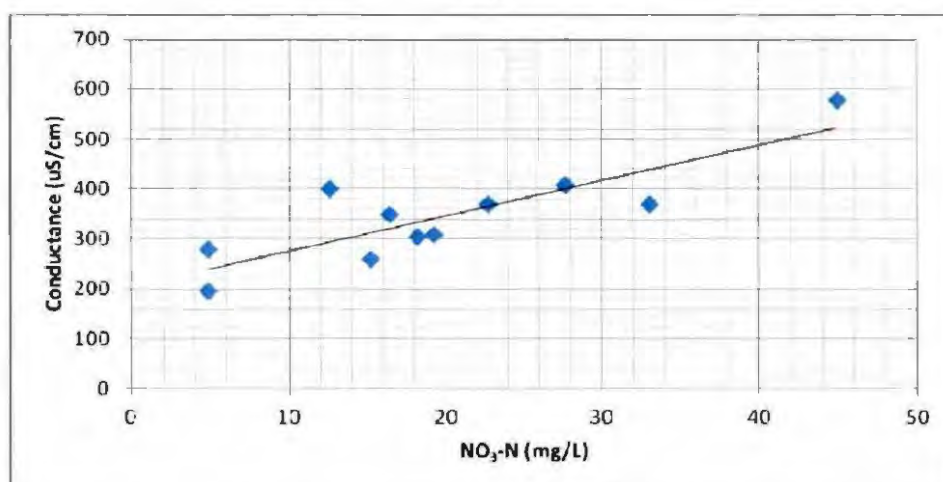
Figure 15. Nitrate concentrations (mg/L) and the oxidation-reduction potential (ORP) of groundwater from Well B-2 from October 2010 to September 2012. The ORP remains high and relatively constant while nitrate concentrations vary significantly.

Nitrate is often non-detect during periods of high rainfall, suggesting that high rates of infiltration during these high rainfall periods may have led to a dilution of nitrate concentrations.

Typical precipitation rates decrease from late spring through early to late fall and increase from late fall to late spring (see **Figure 4**). Conductivity values do the opposite (**Figure 16a**), increasing from late spring to fall and decreasing during the rainy season. One explanation for this observation is that as the amount of dilution (rainfall) decreased, the relative concentration of dissolved chemical species increased. As noted above and shown below (**Figure 16a**), nitrate reflects a similar trend (i.e., non-detect during high precipitation periods and higher concentrations as the dilution decreases). Nitrate concentrations show a moderate correlation with conductivity (**Figure 16b**), suggesting a relationship between the two. The variation in the amount of dilution, driven by rainfall at the surface, produces the observed variations in both conductivity and nitrate.



(a)



(b)

Figure 16. (a) Monthly variations in the conductivity and nitrate concentrations at Well B-2, October 2012 to September 2012. (b) The conductivity of the groundwater collected from this well correlates reasonably well with the nitrate concentrations, supporting a dilution model for nitrate concentration fluctuations.

Caffeine. Selected wells located within the land use areas residential non-sewered, residential sewered, residential/commercial sewered, and commercial sewered were analyzed for caffeine testing on a quarterly basis during the period from March 2011 through September 2012 (Table 7). Caffeine, because it is consumed exclusively by humans, is a commonly used indicator of groundwater contamination by infiltrating effluent from septic system drainfields.

Because of the nitrate and bacterial monitoring history of Well B-2 (downgradient in a non-sewered area), it was suspected that this particular well was the most likely to contain caffeine. In fact, groundwater from Well B-2 was non-detect for this chemical in two out of the four quarterly sampling events. Caffeine concentration in water from B-2 was 3.4, ng/L (1 ng = 1 billionth [10^{-9}] of a gram or 1 nanogram) in September 2011 and 41 ng in September 2012. Three other wells in this area also had periodic detections of caffeine (i.e., B-3 [12 ng in March 2011 and 7.8 ng in September 2012], B-1 [4.1 ng in September 2012], and B-16 [4.3 ng in September 2012]). The presence of caffeine in these wells is anomalous and may suggest impact from septic effluent.

It is important to note, however, that other wells, within the City limits, have also had caffeine detections (i.e., Wells B-6 and B-7 have had caffeine detections). Well B-11 had two unconfirmed caffeine detections (not detected in a duplicate sample). Caffeine also has been detected in samples from Munsel Creek and in samples collected within the City limits during storm events (see Surface Water discussion below). The caffeine detections within the City are currently unexplained; however, leakage from Munsel Creek and local infiltration of stormwater may offer an explanation.

Table 7. Results of caffeine analysis – Florence monitoring wells 2011-2012 (see Figure 1a for well locations)

Date	Wells Sampled/Land Use	Results
March 2011	B-1, B-2, B-3/UGB, non-sewered residential B-11/sewered residential and commercial	B-1 and B-2: non-detect B-3: 12 ng B-11: non-detect
September 2011	B-2, B-3, B-15/non-sewered residential	B-2: 3.4 ng B-3 and B-15: non-detect
March 2012	B-1, B-2, B-3, B-5, B-12, B-13, B-14, B-15, B-16/UGB, non-sewered residential B-6 and B-7/sewered residential B-11/sewered residential and commercial	All non-detect B-6: 3.2 ng, B-7: 12 ng Non-detect
September 2012	B-1, B-2, B-3, B-5, B-12, B-13, B-14, B-15, B-16/UGB, non-sewered residential B-6 and B-7/sewered residential B-11/sewered residential and commercial B-8 and B-10/downtown commercial	B-1: 4.1 ng, B-2: 41 ng, B-3: 7.8 ng, B-16: 4.3 ng; all others non-detect Non-detect Non-detect Non-detect

Common Ions

General Interpretations. The common ions include Ca, Mg, Na, K, HCO₃, Cl, and SO₄ (see Table 8) and often reflect the nature of the aquifer in which the groundwater resides, the amount of residence time (i.e., how long the groundwater has been in contact with the aquifer materials), and, potentially, land use activities in the area. **Figure 17** illustrates data from an upgradient well (B-5), downgradient wells (B-2 and B-3, within the City's UGB and Well B-6 is within the City limits) and, for comparison, an analysis of rainwater from the bay area of San Francisco, California.

Table 8. Common ion data (mg/L) from monitoring wells for March 2011 (first listing) and September 2012 (second listing)										
	Na	Cl	HCO ₃	Ca	Mg	K	Fe	SO ₄	TOC ¹	TDS ²
Monitoring Wells										
B-1	16.5	32.8	8	4	2.3	1.32	1.48	3.02	6.92	69.42
B-1	15.4	24.7	9	2.8	2.2	1.62	1.04	3.3	6.1	60.06
B-2	31.3	40.1	17	3.5	1.7	2.03	0.23	7.86	5.75	103.7
B-2	27.8	23	4	10.3	3.8	7.58	0.22	14.1	2.64	90.8
B-3	19.8	29.3	8	5.4	1.7	1.1	0.73	12.3	2.52	78.33
B-3	21.2	38.5	5	6.6	2.4	1.19	0.11	7.6	2.27	82.6
B-5	7.4	6	12	6.4	1.5	0.48	0.5	14.3	2.45	48.58
B-5	4.3	5.82	6	3.5	0.5 ³	0.29	0.35	5.7	1.9	26.46
B-6	8.6	10.7	10	5	1.2	0.49	0.26	6.9	2.41	42.15
B-6	8.6	11.2	9	9.4	3	0.55	0.45	25.3	2.13	67.5
B-7	5.7	7.26	3	1	ND ⁴	0.39	ND ³	2.49	0.33	19.84
B-7	6.2	5.9	7	1.2	0.5 ³	0.59	0.01 ³	1.95	0.17	23.35
B-8	19.5	34.5	12	7.7	2.5	0.97	0.14	6.6	2.23	83.9
B-8	25.1	43.8	14	23.6	6.3	1.35	0.05	45.7	1.95	160.2
B-9	15.5	24.4	4	1.2	1.3	0.73	0.26	4.59	1.48	51.97
B-9	13.7	16.1	6	0.5 ³	1.2	0.66	0.1	5.19	1.64	43.45
B-10	8.8	8.98	9	6.6	5.9	1.6	0.11	29	1.31	69.99
B-10	11.9	13	4	4.8	5.4	1.23	0.03	30	0.79	70.36
B-11	10.8	14.3	5	7.6	3.2	1.04	0.082	30.5	0.559	75.52
B-11	12.6	14.5	8	2.8	2	0.88	0.12	9.9	0.49	50.8

¹Total organic carbon

²Total dissolved solids

³Result below detection limit – reported as half of the detection limit

⁴Not detected

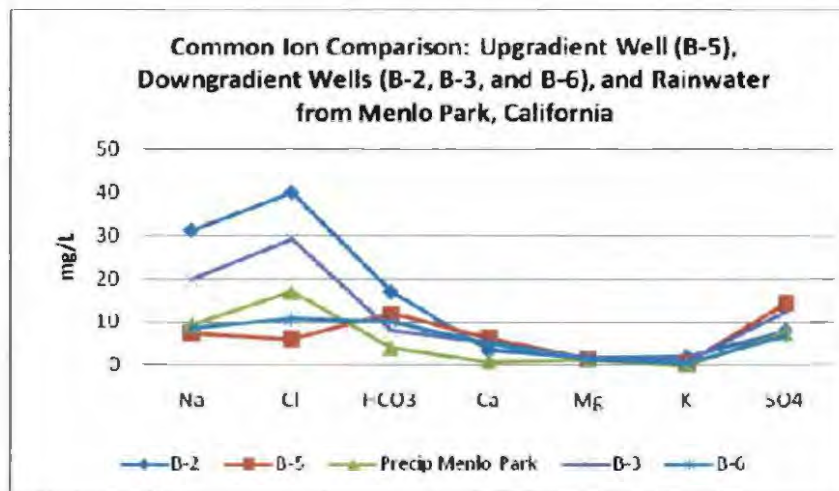


Figure 17. Comparison of common ion compositions of upgradient (B-5) and downgradient (B-2, B-3 and B-6) wells (refer to Figure 1 for well locations). Wells B-2 and B-3 are downgradient of a non-sewered area within Florence's UGB. Well B-6 is downgradient of a sewer area within the City limits. A rainwater analysis from Menlo Park, in the bay area of San Francisco, California, is shown for comparison.

It is clear that, with the exception of sodium and chloride concentrations in Wells B-2 and B-3, the wells are similar in common ion concentrations. Further, the upgradient Well B-5 and downgradient Well B-6 compare similarly with the Menlo Park precipitation. The sodium and chloride concentrations in downgradient Wells B-2 and B-3 are in marked contrast to the concentrations of those components in downgradient Well B-6. Figure 18 illustrates that the relationship of Na and Cl between Wells B-2 and B-3 with the other wells remains so throughout the year.

Natural increases in sodium and chloride in groundwater may result from evaporation or dissolution of sodium and chloride bearing minerals. Evaporation cannot explain the high sodium and chloride in Wells B-2 and B-3 because the process would affect all of the constituents. Further, it is unlikely that any chloride-bearing minerals occur in the dunal sands. If they did occur, it would be reasonable to conclude that groundwater from Well B-6 would have encountered the mineral as well.

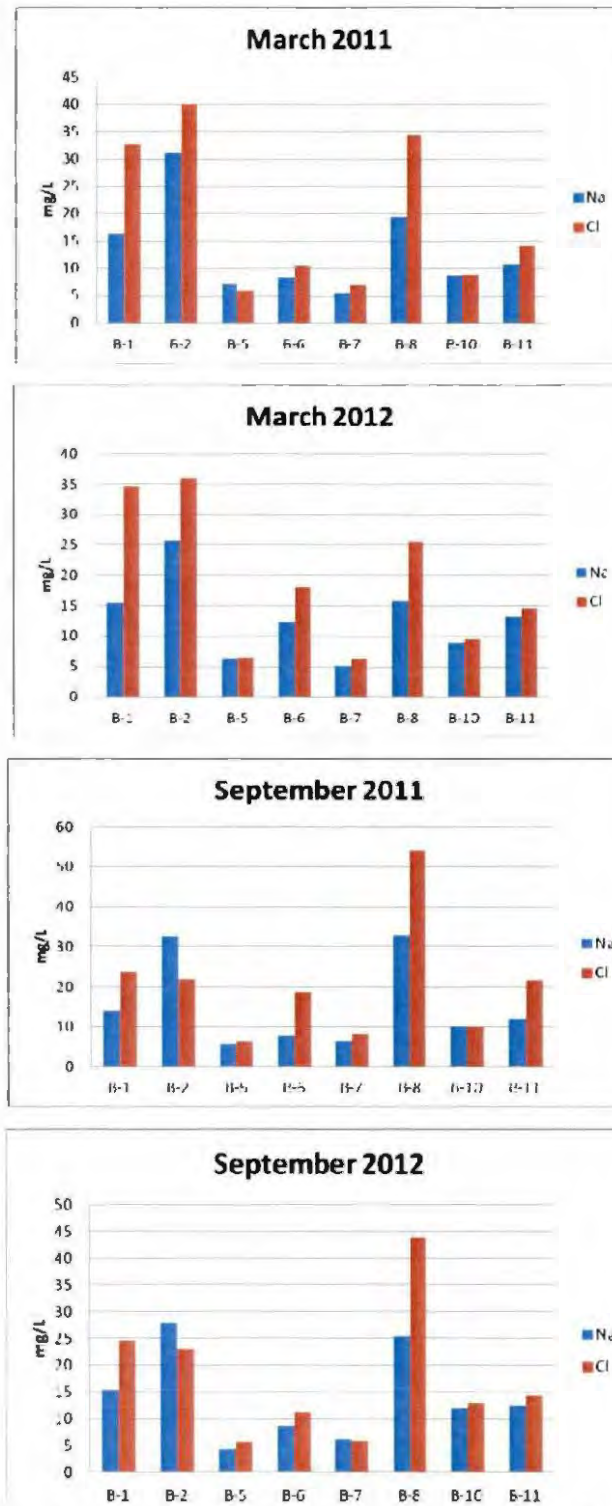


Figure 18. Comparison of Na and Cl concentrations in groundwater from select wells.

Another possible reason for the elevated sodium and chloride, and one that also has been considered (and discussed above) to explain anomalous conductivity and nitrate data and the caffeine occurrence in Well B-3, is that the elevated sodium and chloride reflect an impact of septic system effluent. Domestic septic effluent can add dissolved minerals to groundwater, especially sodium and chloride. Elevated chloride is a particularly good indicator of septic effluent, because of its nonreactive chemical behavior in the aquifer, it tends to reflect its source.

It may be tempting to ascribe the elevated sodium and chloride to the proximity of the ocean; however, the hydraulic head of these wells is 40 to 50 feet above sea level, precluding seawater migrating into the shallow aquifer at these sites.

Groundwater-Surface Water Connections. One of the goals of this project is to determine the physical relationship, or the degree of hydraulic connection, between groundwater and surface water. **Figure 19** compares the common ion data (see **Table 8**) of the four surface water sites with nearby groundwater (Wells B-7 and B-11). Surface monitoring sites along Munsel Creek are: PWS = Florence Public Works building (Munsel Downstream), MGP = Munsel Greenway Park (Munsel Midstream), MLK = Munsel Lake (Munsel Upstream), and ACK = Ackerley Creek.

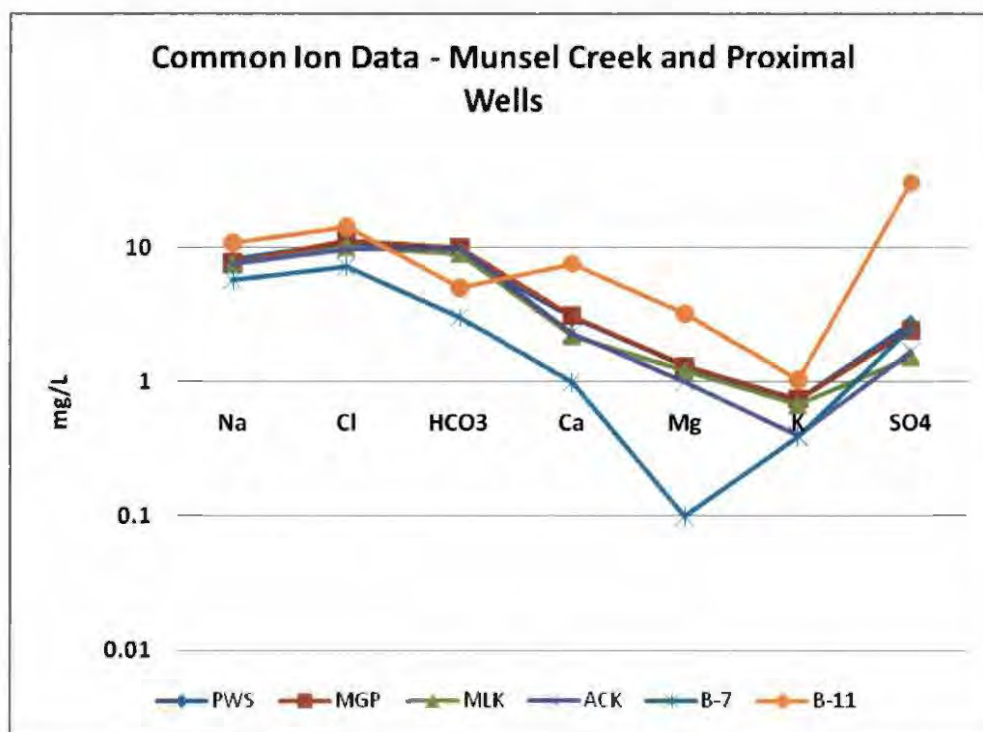


Figure 19. A comparison of the common ion concentrations in Munsel Creek (see below) with groundwater from Wells B-7 and B-11, located near the creek (see Figure 2). Surface monitoring sites along Munsel Creek are: PWS = Florence Public Works building, MGP = Munsel Greenway Park, MLK = Munsel Lake, ACK = Ackerley Creek

The similarity of the surface water samples is to be expected given the limited length of Munsel Creek and that the stream is fed by nearby Munsel Lake (**Figure 13**). The concentrations in local groundwater show considerable variation, from higher to low concentrations than surface water, perhaps reflecting local recharge. Proceeding downstream (ACK => MLK => MGP => PWS), the sample concentrations tend to increase for most constituents. The simplest explanation for this is that during March, lake water had been diluted by rainfall, and as the water exited the lake and flowed down the length of Munsel Creek, the concentrations increased because of groundwater discharging to the stream. The increases are not uniform because groundwater compositions are not uniform (**Figure 13**). Groundwater discharging to Munsel Creek is consistent with the generally increasing flow in Munsel Creek as one proceeds farther downstream (see Surface Water discussion below).

Coliform Bacteria

Groundwater from the monitoring wells is tested monthly for bacteria. If a sample comes back positive for the occurrence of total coliform, the lab routinely tests for *E. coli*. Total coliforms are common in the environment, but are not indigenous to groundwater (i.e., the aquifer). Their presence in groundwater generally indicates a potential problem with well construction (e.g., improper or failing well seal, or a nearby coliform source). *E. coli*, however, is a type of fecal coliform that originates from human or other warm-blooded animal waste. Detections of *E. coli* in the Florence monitoring wells are few, limited to being "Present" in Wells B-2 and B-10 in November 2010. Total coliforms were found in the Florence wells, primarily in the downgradient wells (**Table 9**).

Reviewing Table 9, several points are evident:

- Upgradient wells in all areas generally have been total coliform free.
- Downgradient wells in sewered areas are generally total coliform free.
- Downgradient wells in areas served by septic systems have experienced total coliform positive results.
- Downgradient wells in commercial areas have experienced total coliform positive results.

Although the source of coliform for wells in the last two bullets above is currently unknown, the wells were installed by licensed well drillers and well construction is not the likely cause of the detections.

Table 9. Total coliform results for selected monitoring wells in the Florence area

Well	B-2	B-3	B-12	B-13	B-6	B-11	B-5	B-7	B-8	B-10
Month/Yr	Downgradient Residential Septic Systems		Upgradient Residential Septic Systems		Downgradient Residential Sewered		Upgradient Residential/ Commercial Sewered		Downgradient Commercial Sewered	
Nov 2010	P ¹	NA ²	NW ⁴	NW ⁴	NA ²	NP ¹	NA ²	NP ¹	NA ²	P ¹
Dec 2010	NA ²	5.2	NW ⁴	NW ⁴	6.3	NA ²	2.0	NA ²	574	NA ²
Jan 2011	2247	1	NW ⁴	NW ⁴	ND ³	ND ³	ND ³	ND ³	150	325
Feb 2011	248	2	NW ⁴	NW ⁴	ND ³	ND ³	ND ³	ND ³	96	69
Mar 2011	770	4.1	NW ⁴	NW ⁴	ND ³	ND ³	ND ³	ND ³	51	9.8
Apr 2011	37	ND ³	ND ³	ND ³	ND ³	ND ³	ND ³	ND ³	7.4	4.1
May 2011	7.3	ND ³	ND ³	ND ³	ND ³	ND ³	ND ³	ND ³	16	1
Jun 2011	13	ND ³	ND ³	ND ³	ND ³	ND ³	ND ³	ND ³	13	ND ³
Jul 2011	ND ²	ND ³	ND ³	ND ³	ND ³	ND ³	ND ³	ND ³	27	ND ³
Aug 2011	ND ²	ND ³	ND ³	ND ³	ND ³	ND ³	ND ³	ND ³	436	ND ³
Oct 2011	33	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²
Nov 2011	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²
Dec 2011	ND ²	ND ²	ND ²	ND ²	2.0	ND ²	ND ²	ND ²	ND ²	ND ²
Jan 2012	1.0	ND ²	1.0	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	12.2
Feb 2012	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	58.3	ND ²
Mar 2012	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	228	ND ²
Apr 2012	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	5	ND ²
May 2012	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²
Jun 2012	4.9	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	345	ND ²
Jul 2012	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	14	ND ²
Aug 2012	ND ²	ND ²	1	ND ²	ND ²	ND ²	ND ²	ND ²	3	ND ²
Sep 2012	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²	ND ²

¹P = Coliform present; NP = coliform not present, ²NA = Not available. Sampling was split across November and December, ³ND = Coliform were not detected, ⁴NW = Well had not yet been drilled

Surface Water Monitoring Results

Water Quantity

Streamflow. City personnel measured streamflow monthly from November 2010 to September 2012 at the four surface water monitoring sites: Munsel Upstream (Munsel Creek upstream of Munsel Lake Road near the outlet of Munsel Lake), Munsel Midstream (Munsel Creek at Munsel Greenway Park), Munsel Downstream (Munsel Creek at the Public Works Department on Spruce Street), and Ackerley (Ackerley Creek upstream of Martin Road). **Figure 1b** shows the monitoring sites on a map.

Figure 20 shows that streamflow has peaked in each year in the spring (primarily April) and has reached its lowest levels in September at all monitoring sites. The peak in the spring is the result of a combination of spring rainfall, leading to a rise in the water table and causing more groundwater to discharge at the surface, and the addition of high discharge from upgradient. The trough in September is the result of a prolonged period of decreased rainfall and a low water table, and lower discharge (less surface runoff and lower groundwater discharge) from upgradient. No data points are shown in the winter for Ackerley Creek, because the City did not enter the creek to measure streamflow because of the presence of salmon redds. The high streamflow measured in July at Munsel Upstream is an outlier, which City personnel believe may have been caused by the removal of a beaver or debris dam at the outlet of Munsel Lake that day, as City personnel found a large amount of recent debris on the banks near the outlet. City personnel explained that streamflow levels were low the day before streamflow measuring and when collecting water quality samples, and were surprisingly high the day of streamflow monitoring. City personnel said that streamflow at the other sites appeared reasonable the day of streamflow monitoring, suggesting either the increase in flows had not reached downstream or had dissipated along its course.

Figure 21 shows the average streamflow from November 2010 to September 2012 at each sampling site along Munsel Creek. Munsel Upstream averaged 9.9 cubic feet per second (cfs), Munsel Midstream averaged 11.9 cfs, and Munsel Downstream averaged 13.6 cfs. This shows an increase in streamflow from upstream to downstream that suggests that Munsel Creek is generally a gaining stream, consistent with the conclusions concerning groundwater-surface water relationships discussed above.

In addition, continuous water level measurements are taken every 15 minutes by pressure transducers at Munsel Upstream, Munsel Midstream, and Ackerley Creek. The Oregon Water Resources Department (OWRD) owns the pressure transducer at Munsel Midstream while the City owns the others. GSI Water Solutions, Inc. (GSI), staff members are working with OWRD's regional staff to find someone to transform the water level data into streamflow data.

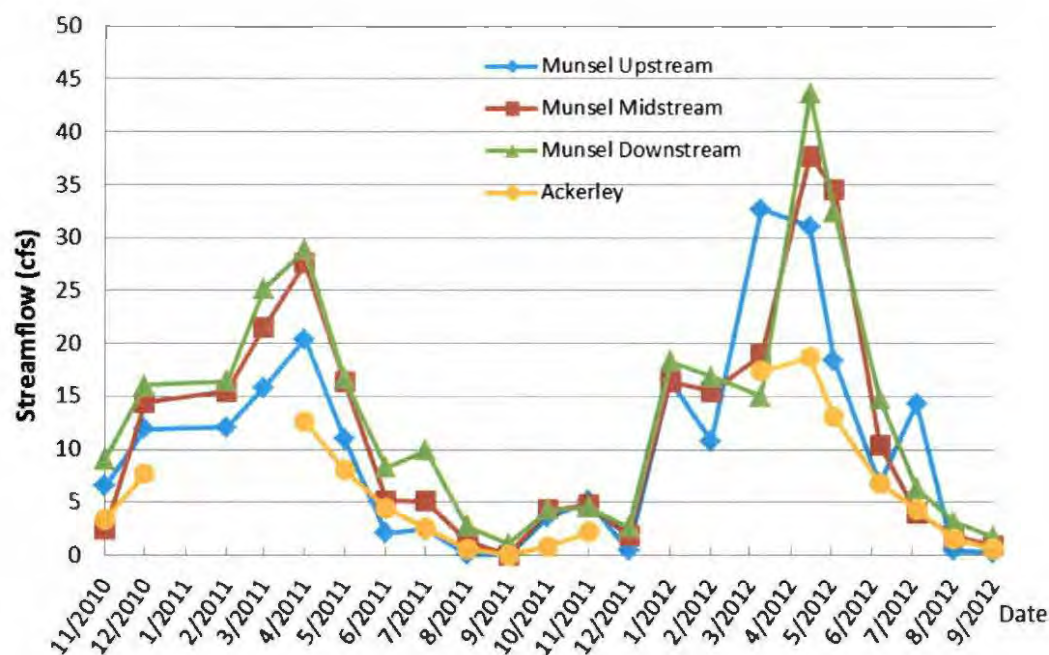


Figure 20. Streamflow over time (November 2010 to September 2012) in Ackerley Creek and sites on Munsel Creek, using a flowmeter.

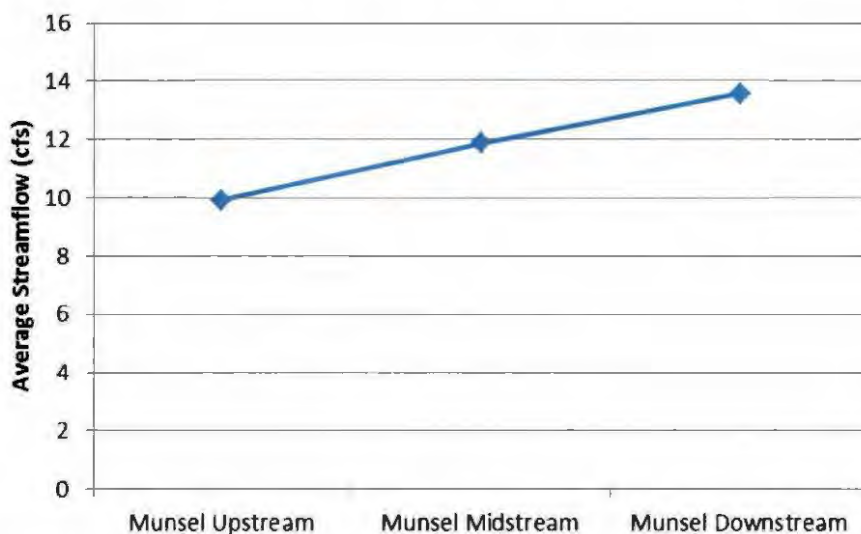


Figure 21. Average streamflow (November 2010 to September 2012) in upstream, midstream, and downstream sites on Munsel Creek, using a flowmeter. Munsel Upstream in July 2012 is not included.

Water Quality

City personnel collected stream temperature, DO, specific conductance, and pH on a monthly basis from October 2010 through September 2012 using a hand-held probe. City personnel also deployed water temperature data loggers at each monitoring site that record stream temperature continuously every 30 minutes. The following describes this water quality data. Note: In previous reports, some data points for Munsel Upstream and Munsel Downstream mistakenly were flipped in the process of making various figures. The errors have been corrected and those data now are depicted accurately.

Water Temperature

Figure 22 shows stream temperatures taken using the hand-held YSI Multimeter probe. Stream temperatures peak in July or August and drop to their lowest levels in the winter, particularly January. This is in contrast to groundwater temperatures (discussed above), which reach their lowest temperatures in the early spring. Ackerley and Munsel Upstream had the highest maximum stream temperatures of 19.9°C and 18.7°C, respectively. The Munsel Midstream and Munsel Downstream had maximum stream temperatures of 16.9°C and 16.6°C, respectively. These groupings reflect a trend that Ackerley and Munsel Upstream appear to have similar stream temperatures to each other while stream temperatures in Munsel Midstream and Munsel Downstream are similar. Minimum stream temperatures ranged from 6.3°C to 7.0°C among the four monitoring sites.

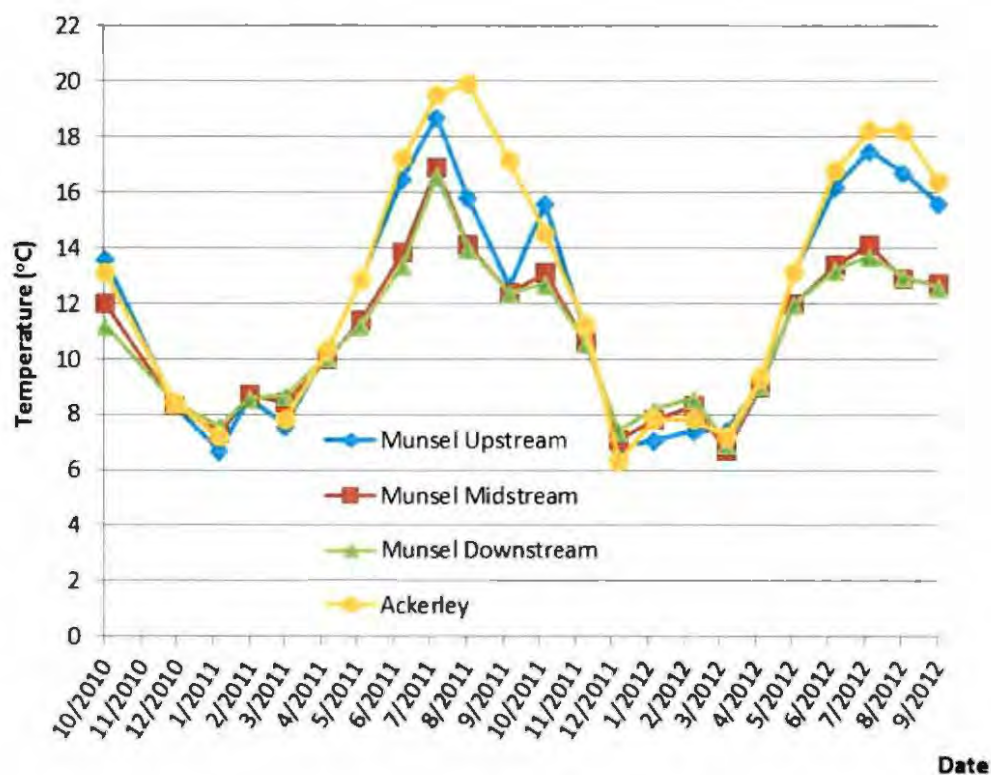


Figure 22. Stream temperature over time, using the YSI Multimeter probe.

Figure 23 through **Figure 26** show stream temperatures recorded every 30 minutes from October 2010 through September 2012 at each site by Onset Hobo water temperature data loggers. Missing data in the figures reflect data lost as a result of human error when transferring data to the computer and using the computer software, which in 2011, likely caused incorrect programming of date and time on the Shuttle (data transfer unit), and thereby, the data loggers.

For comparison to the instantaneous probe readings taken in the morning, Ackerley and Munsel Upstream had maximum stream temperatures of 26.6°C and 23.9°C, respectively. Munsel Midstream and Munsel Downstream had maximum stream temperatures of 20.7°C and 18.1°C, respectively. This apparent “cooling downstream” is probably the result of the influx of groundwater, with temperatures generally less than 15°C. These stream temperature groupings are consistent with the probe stream temperature groupings described above. Minimum stream temperatures ranged from 3.4°C to 5.4°C among the four monitoring sites. These data from the data loggers demonstrate the value of continuous temperature recording and its capability of recording the full extent of stream temperature fluctuations. The data logger maximum stream temperatures were as much as 6.7°C greater and minimum stream temperatures were as much as 2.9°C less than instantaneous stream temperatures recorded with the probe. The data logger also recorded diurnal stream temperatures fluctuations, which showed Munsel Upstream and Ackerley with large changes in daily stream temperature in the summer compared with the other two sites. Both Munsel Upstream and Ackerley are near the outlets of lakes.

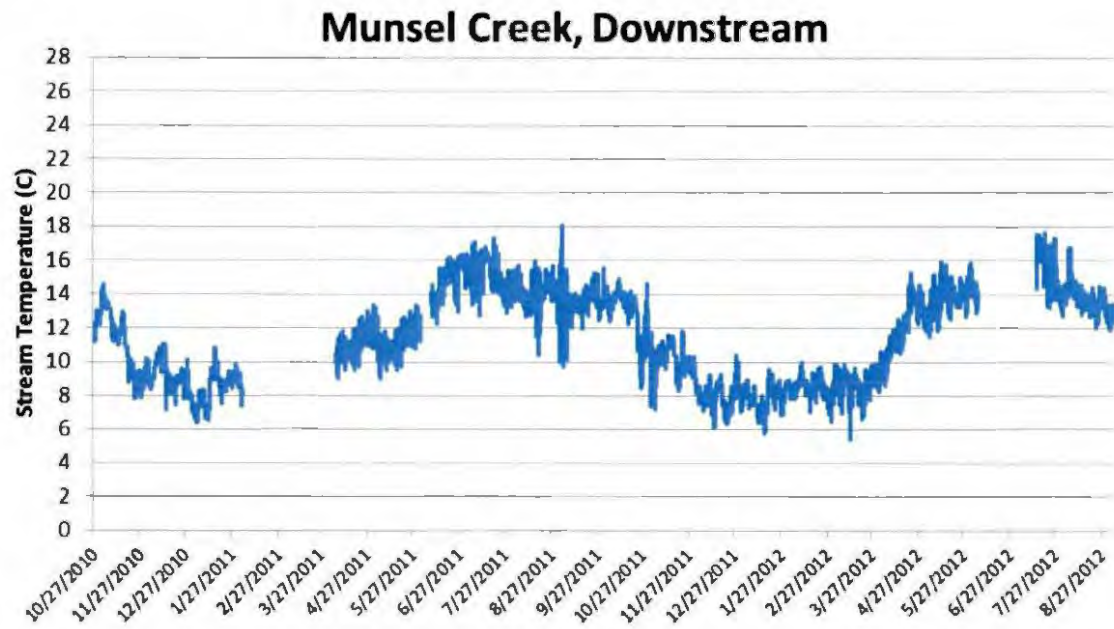


Figure 23. Munsal Creek Downstream stream temperature over time, using a continuous temperature recorder.

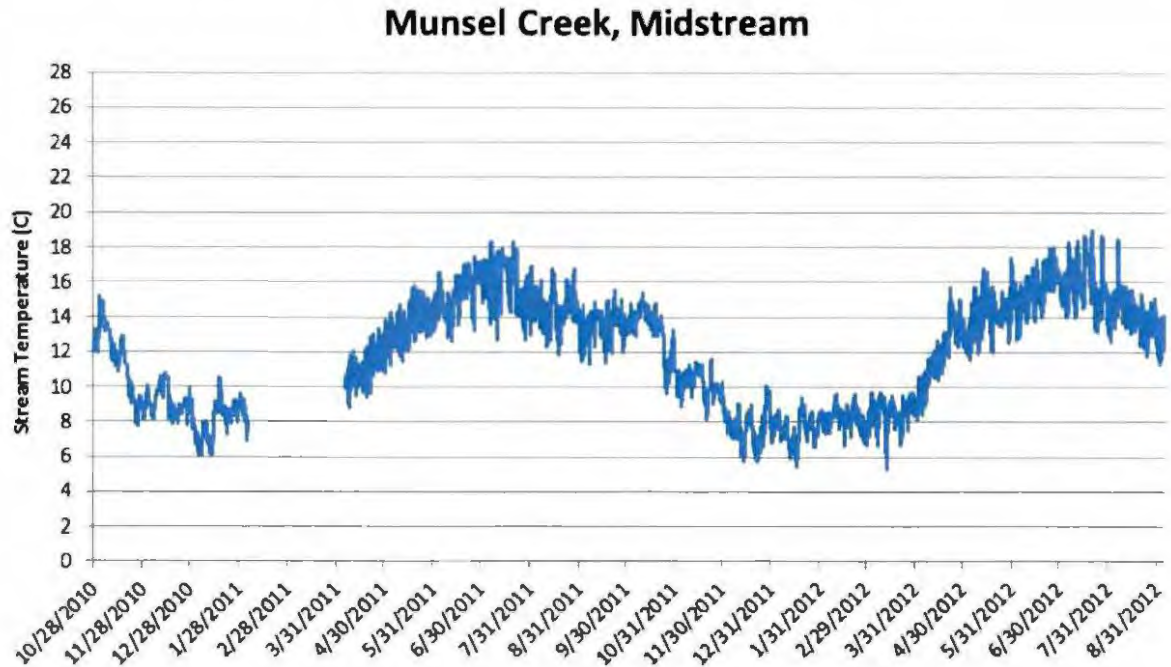


Figure 24. Munsal Creek Midstream stream temperature over time, using a continuous temperature recorder.

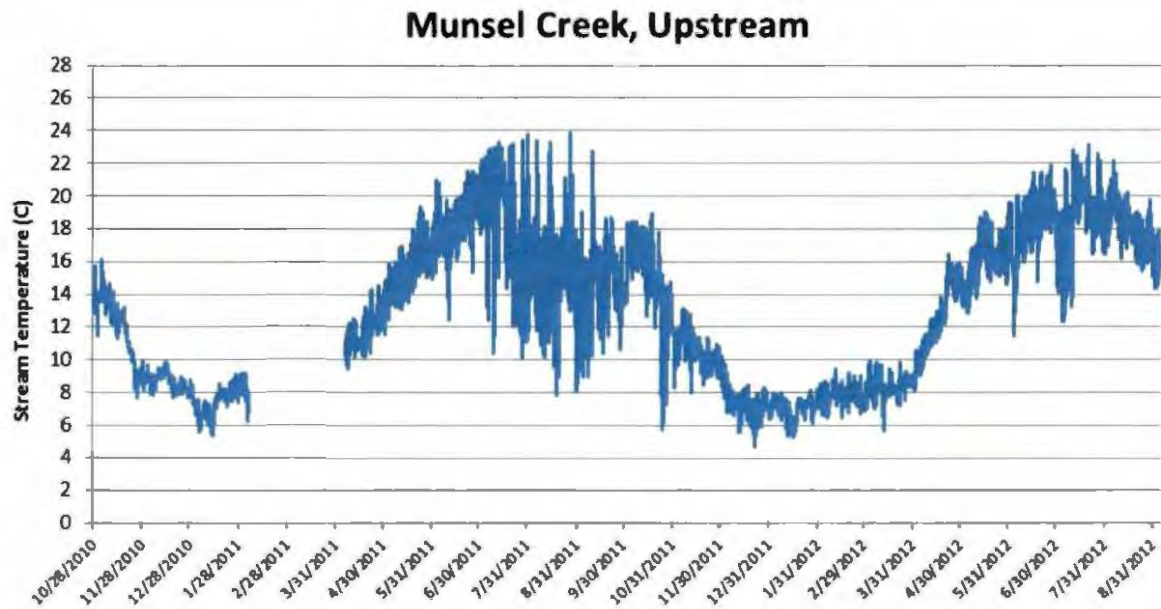


Figure 25. Munsel Creek Upstream stream temperature over time, using a continuous temperature recorder.

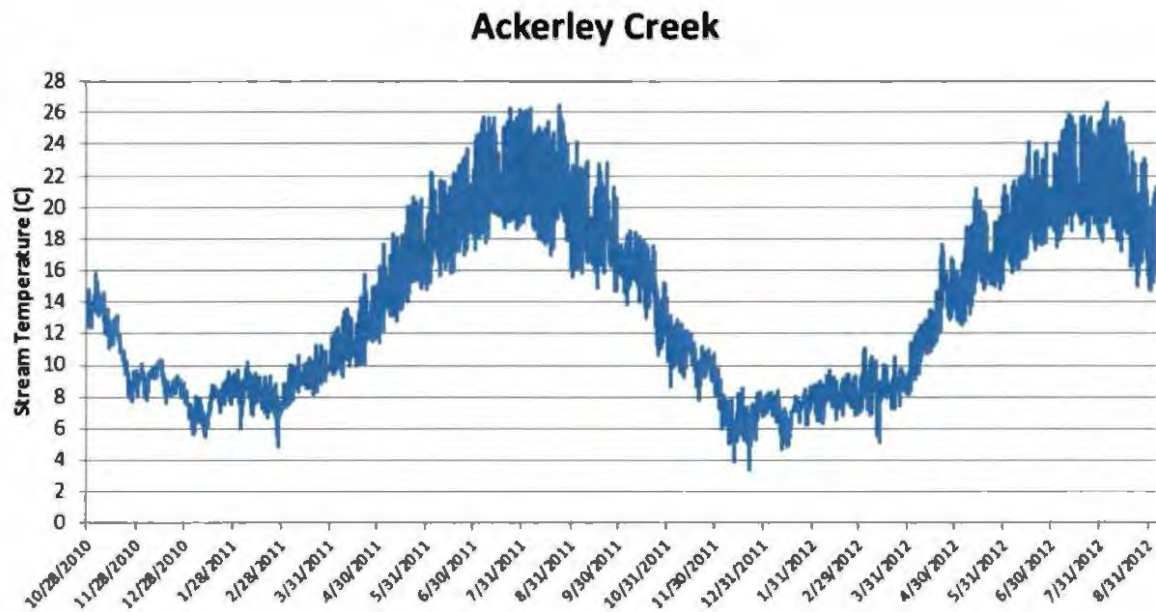


Figure 26. Ackerley Creek stream temperature over time, using a continuous temperature recorder.

Dissolved Oxygen

DO concentrations are temperature dependent, being higher at cooler temperatures and lower at warmer temperatures. **Figure 27** shows DO concentrations are generally close to or more than 10 mg/L from November through April. DO then drops in the summer months to about 8 mg/L in Munsel Midstream and Munsel Downstream and to about 6 mg/L or less in Munsel Upstream and Ackerley. These DO data correspond with the stream temperature data presented above: DO is higher in the winter months when stream temperatures are cooler and is lower in the summer months when stream temperatures are highest. The groupings of sites by similar DO concentrations correspond with the groupings by similar stream temperatures. In addition, the lowest DO levels occur in the summer when streamflow is at its lowest, likely reflecting how lower streamflow results in less oxygenation of the water.

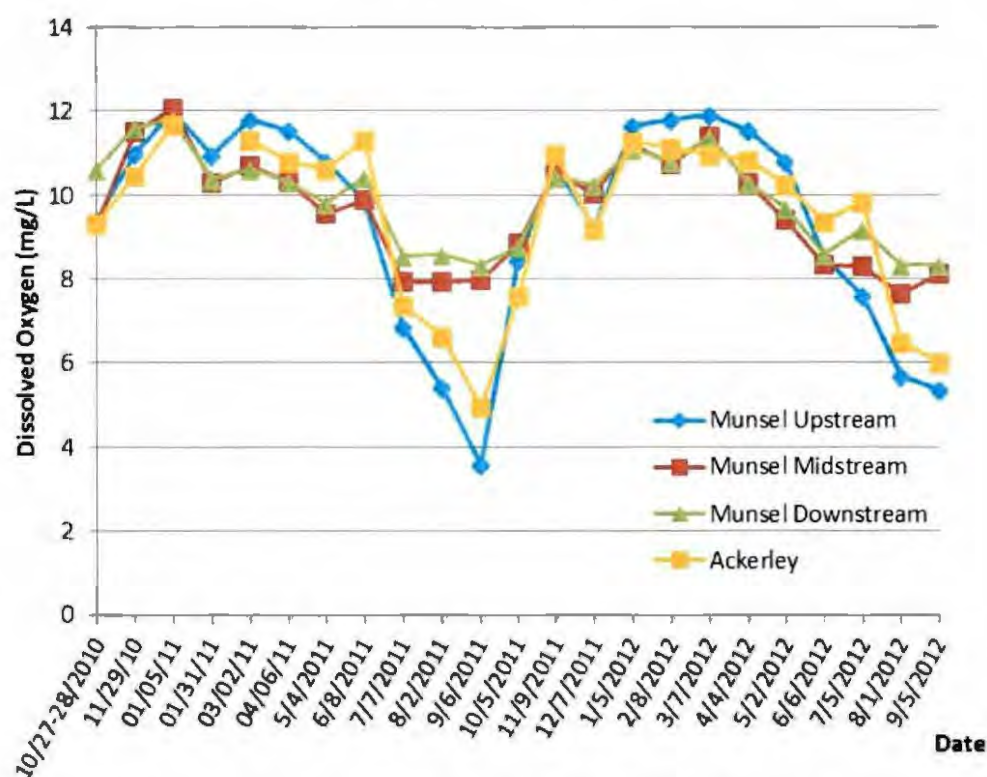


Figure 27. Dissolved oxygen over time, using the YSI Multimetric probe.

Specific Conductance

Specific conductance measures the ability of water to conduct an electrical current. Specific conductance depends on the water temperature and on the concentration of positively and negatively charged dissolved ions, and it is directly proportional to the concentrations of ions in the water. Ions can come from natural sources, such as soil and rocks, or from humans, such as human and livestock waste, fertilizers, and herbicides. As a result, spikes in specific conductance can indicate anthropogenic inputs in the stream. The specific conductance values reported in this study fall within the typical range for Oregon Coast Range streams of 150 $\mu\text{S}/\text{cm}$ or less (Water Quality Monitoring, 1999). Specific conductance (reported at 25°C to account for the effect of temperature) has remained around 60 $\mu\text{S}/\text{cm}$ throughout the study in Munsel Upstream and Ackerley, as shown in **Figure 28**. Munsel Midstream and Munsel Downstream were generally higher in specific conductance than the other two sites, potentially caused by groundwater discharging to the creek (see discussion of groundwater conductance above), and also had increases in specific conductance, most notably in periods of lower flow when the decreased streamflow likely concentrated the ions. The reason for the sudden decrease in specific conductance in those two streams in October 2011 could be related to 3.5 inches of rain that fell between October 2 and October 5.

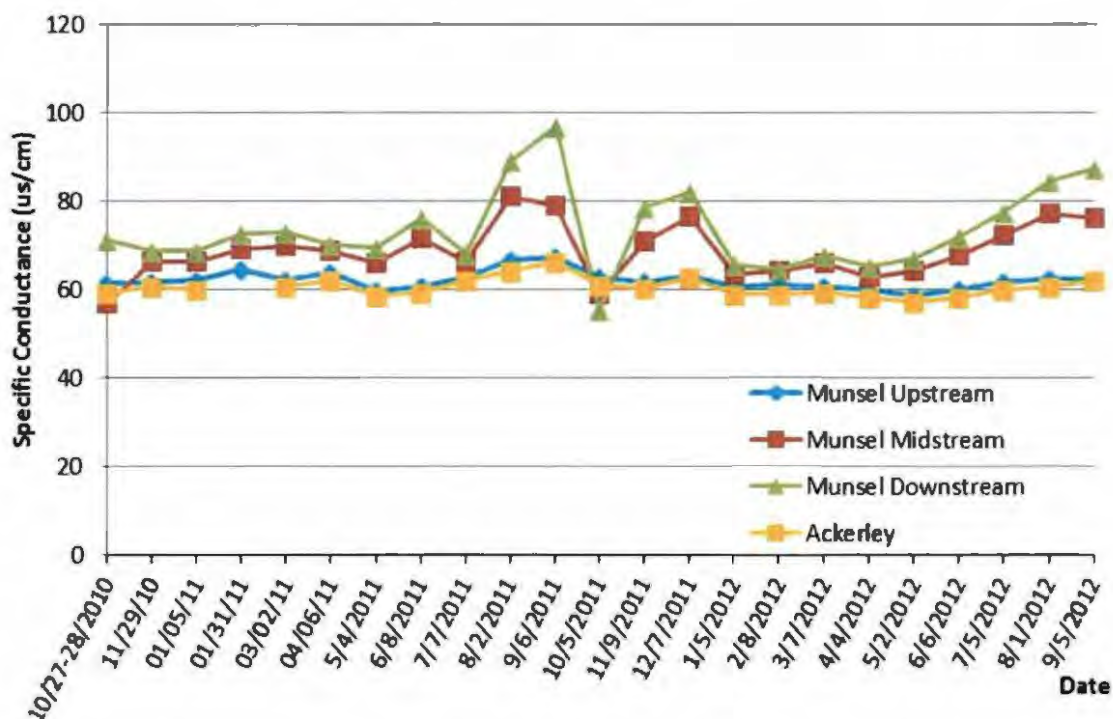


Figure 28. Specific Conductance over time, using the YSI Multimeter probe.

pH

pH describes how acidic or basic water is by measuring the concentration of hydrogen ions in water. pH can affect fish egg production and survival along with the functioning of other biota. A primary cause for pH changes in streams is seasonal and daily variation in photosynthesis by aquatic plants. The process of photosynthesis uses hydrogen molecules, which cause the hydrogen ion concentration to decrease, resulting in an increase in pH. Conversely, respiration and decomposition lower pH. The pH of water, such as in streams, typically ranges from 6.5 to 8.5 (Washington Department of Ecology, 2012). As shown in **Figure 29**, pH at the monitoring sites generally has stayed within that typical range, with a few exceptions in Munsel Upstream in August and September and in Munsel Downstream in December 2011. The reasons for these exceptions are unknown, but in Munsel Upstream appear to be related to summertime stream conditions or human activities near the monitoring site.

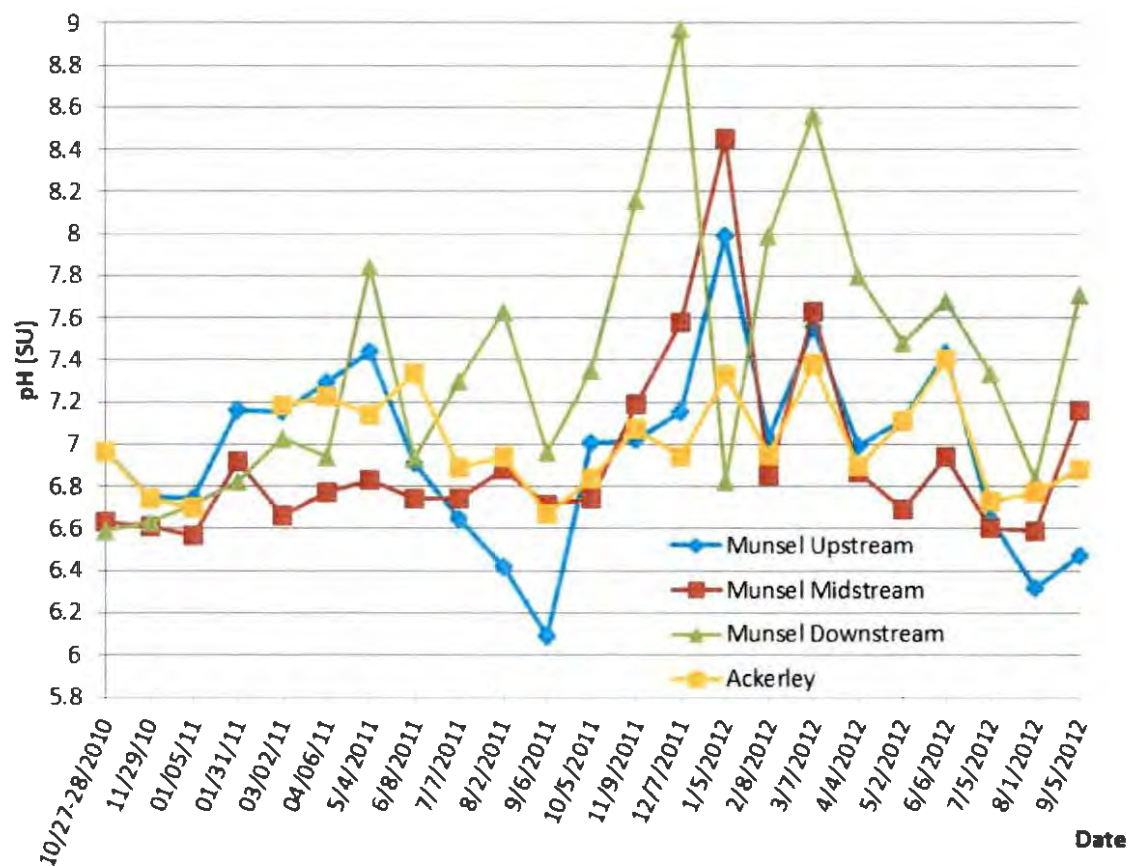


Figure 29. pH over time, using the YSI Multimeter probe.

Lab Results

Water quality grab samples were taken at each monitoring site for laboratory analysis to better characterize stream conditions. *E. coli* sampling occurred monthly, nitrate and total phosphorus sampling occurred quarterly, and a comprehensive sampling occurred semi-annually in March and September. The comprehensive sampling included testing for *E. coli*, nitrate, total phosphorus, alkalinity, total organic carbon, common ions, zinc and copper at Munsel Downstream only, lead in Munsel Creek below a gun club only, VOCs, inorganic compounds (IOC)(e.g., arsenic and chromium), glyphosate, chlorinated acid herbicides (e.g., 2,4-D), and caffeine.

Table 10 summarizes some of the lab results from surface water quality samples to date. Nitrate; total phosphorus; VOCs; glyphosate; 2,4-D; and chromium were not detected during the study. Arsenic was detected in Munsel Midstream in September 2012 only (0.0026 mg/L, just above the reporting limit of 0.002 mg/L). Lead was detected only below the gun club in September of 2011 and 2012, suggesting that streamflow, or perhaps increased use of the facility in the summer, may influence the detection of lead. The lead detections were just above the reporting limit of 0.0001 mg/L (0.00011 in 2011 and 0.000169 mg/L in 2012). Caffeine was detected at all four sites at least once during this study (ranging from 2.4 ng/liter (ng/L) to 49 ng/L) and the most detections occurred in September when streamflow was lower. Caffeine is used as an indicator of anthropogenic contamination because caffeine does not occur naturally in the environment and only humans consume it. *E. coli* was detected at levels of concern in 7 months of 2011 and 3 months in 2012, and is discussed in greater detail below.

Table 10. Lab results from surface water quality samples. MLK=Munsel Upstream, MGP= Munsel Midstream, PWS=Munsel Downstream, ACK=Ackerley.

Parameter	Sampling Date	Result
Nitrate	10/10, 3/11, 6/11, 9/11, 11/11, 3/12, 6/12, 9/12	Not Detected
Total Phosphorus	3/11, 6/11, 9/11, 11/11, 3/12, 6/12, 9/12	Not Detected
VOCs	3/11, 9/11, 3/12, 9/12	Not Detected
Glyphosate/2,4-D	3/11, 9/11, 3/12, 9/12	Not Detected
Chromium	3/11, 9/11, 3/12, 9/12	Not Detected
Arsenic	3/11, 9/11, 3/12	Not Detected
	9/12	Detected (MGP)
Lead	3/11, 3/12	Not Detected
	9/11, 9/12	Detected (Below Gun Club)
Caffeine	3/11	Detected (PWS)
	9/11	Detected (MGP, MLK, ACK)
	3/12	Detected (MGP)
	9/12	Detected (PWS, MGP, MLK, ACK)
<i>E. coli</i>	11/10, 1/5/11, 1/31/11, 3/11, 5/11, 11/11, 1/12, 3/12, 4/12, 5/12, 6/12, 7/12	Detection Below Level of Concern
	4/11, 6/11, 7/11, 8/11, 9/11, 10/11, 12/11, 2/12, 8/12, 9/12	Possible Concern (See Table 1)

E. coli

A water body is considered to be in exceedance of the state standard for *E. coli*, and thus “impaired,” when results show a “30-day log mean greater than 126 *E. coli* organisms per 100 ml based on a minimum of five (5) samples, or more than 10 percent of the samples exceed 406 *E. coli* organisms per 100 ml, with a minimum of at least two exceedances” (Oregon’s 2010 Integrated Report). When *E. coli* samples cannot be taken frequently during the course of a month, as was the case with this monitoring program, a single sample criterion can be used to characterize the level of risk associated with *E. coli* levels. *E. coli* levels equal to and above the single sample criterion of 406 mpn/100 mL (“mpn” refers to an estimate of *E. coli* content using the Most Probable Number [mpn] method) are considered to be at “high risk” of impairment and between 127 and 405 mpn/100 mL are considered to be at “moderate risk” of impairment.

E. coli sampling in this monitoring program occurred on a monthly basis from late November 2010 to September 2012, with the exception of Ackerley, which could not be sampled on one occasion because of the presence of spawning salmon. **Table 11** shows the sampling dates when at least one site had *E. coli* levels considered “moderate risk” or “high risk.” For sampling dates not shown, *E. coli* levels were less than levels of concern at all sites.

Of the 22 sampling events to date, approximately 45 percent of the months had “moderate risk” or “high risk” *E. coli* levels. The incidences of elevated *E. coli* levels occurred throughout the year, instead of just one season. Twenty seven percent (6 of 22) of Munsel Downstream samples and 18 percent (4 of 18) of Munsel Midstream samples exceeded the 406 mpn/100 mL standard described above, which is more than the 10 percent that could indicate that Munsel Creek is “impaired.” Ackerley had two exceedances and Munsel Upstream had one exceedance. In addition, five samples from the three Munsel Creek sites exceeded 406 mpn/100 mL within a 30-day period (June 8 to July 7). (Note: the sites are relatively close to one another and may be “autocorrelated,” and thus, not independent.) Overall, these levels are sufficient to trigger concern and possibly may indicate that Munsel Creek is “impaired.” Consequently, GSI recommends continued monitoring to determine whether *E. coli* levels continue to exceed the single sample criterion, particularly at Munsel Downstream and Munsel Midstream (PWS and MGP). Based on that information, more intensive monitoring studies can be planned to better characterize possible bacteria sources.

Table 11. *E. coli* lab results from surface water quality samples. Red indicates “High risk,” more than 406 *E. coli* per 100 mL, and yellow indicates “Moderate risk,” 127 to 406 *E. coli* per 100 mL.

Site	Date									
	4/6/11	6/8/11	7/7/11	8/2/11	9/6/11	10/5/11	12/7/11	2/8/12	8/1/12	9/5/12
PWS	131.4	1119.9	517.2	112.6	187.2	980.4	770.1	1732.9	2420	45
MGP	816.4	1046.2	579.4	344.8	137.6	387.3	488.4	101.7	6	178
MLK	ND	1986.3	36.9	76.7	142.1	42	142.1	2	116	22
ACK	ND	365.4	5.2	19.9	27.5	34.5	686.7	2	20	548

Stormwater

Stormwater samples were collected on December 28, 2011, January 18, 2012, and March 21, 2012. The samples were taken at four sites: Munsel Downstream (PWS), a stormwater outfall into Munsel Creek at 38th Street (M38), a stormwater outfall in Old Town (OT), and at Rhododendron Drive near 35th Street (Site A). The stormwater sampling included testing for *E. coli*, nitrate, total phosphorus, alkalinity, total organic carbon, common ions, VOCs, IOC (e.g., arsenic and chromium), glyphosate, chlorinated acid herbicides (e.g., 2,4-D and pentachlorophenol), caffeine, and total petroleum hydrocarbons (TPH). In addition, stormwater samples were tested for zinc and copper at PWS only and for lead in Munsel Creek below a gun club only.

As shown in **Table 12**, nitrate, VOCs, glyphosate, and 2,4-D were not detected. Phosphorus was detected at PWS in January (0.1 mg/L, the reporting limit), arsenic was detected at Site A in both samples (0.0026 mg/L in December and 0.0025 mg/L in March; 0.002 mg/L reporting limit), and lead was detected near the gun club in both samples (0.00018 mg/L in January and 0.00011 mg/L in March). Several constituents were detected at multiple sites. Pentachlorophenol and chromium (total; the lab did not determine the concentration as a function of valence) were detected at PWS and OT in both samples (December and March, at levels close to the reporting limit). TPH in the form of lube oil was detected at PWS and OT all three storm events, at M38 in January and March, and at Site A in January. Caffeine was detected at all four sites on both sampling dates (December and March, ranging from 6 ng/L to 960 ng/L) and *E. coli* was detected at levels of concern at all four sites in all three stormwater sampling events, with the exception of M38, which had a detection that was less than the level of concern in March 2012. Zinc and copper also were found at PWS in March.

Table 12. Lab results from stormwater samples taken in December, January, and March. PWS=Munsel Creek at Public Works Building, M38=Stormwater outfall into Munsel Creek at 38th Street, OT=Stormwater outfall in Old Town, Site A= Rhododendron Drive near 35th Street (Site A).

Parameter	Date	Result
Nitrate	12/28/11	Not Detected
	1/18/12	Not Tested
	3/21/12	Not Detected
Total Phosphorus	12/28/11	Not Detected
	1/18/12	Detected (PWS)
	3/21/12	Not Detected
VOCs	12/28/11	Not Detected
	1/18/12	Not Tested
	3/21/12	Not Detected
Glyphosate/2,4-D	12/28/11	Not Detected
	1/18/12	Not Tested
	3/21/12	Not Detected
Chromium	12/28/11	Detected (PWS, OT)
	1/18/12	Not Tested
	3/21/12	Detected (PWS, OT, SITE A)
Arsenic	12/28/11	Detected (Site A)
	1/18/12	Not Tested
	3/21/12	Detected (Site A)
Lead	12/28/11	Not Tested
	1/18/12	Detected (Near Gun Club)
	3/21/12	Detected (Near Gun Club)
Caffeine	12/28/11	Detected (PWS, M38, OT, Site A)
	1/18/12	Not Tested
	3/21/12	Detected (PWS, M38, OT, Site A)
<i>E. coli</i>	12/28/11	Possible Concern (PWS, M38, OT, Site A)
	1/18/12	Possible Concern (PWS, M38, OT, Site A)
	3/21/12	Possible Concern (PWS, OT, Site A)
Pentachlorophenol (Herbicide)	12/28/12	Detected (PWS, OT)
	1/18/12	Not Tested
	3/21/12	Detected (PWS, OT)
TPH: Lube Oil	12/28/11	Detected (PWS, M38, OT)
	1/18/12	Detected (PWS, M38, OT, Site A)
	3/21/12	Detected (PWS, OT)

Summary of Observations

Groundwater

- 15 shallow (<30 feet) groundwater monitoring wells plus one deep groundwater well (Miller Park, >50 feet) and 4 surface water sites on Munsel Creek, Clear Lake, and Ackerley Lake are being measured for water quality and quantity in the Florence area.
- 10 of the monitoring wells and all 4 surface water sites have been monitored for 24 months, MP well for 18 months, and 5 additional monitoring wells were added in April 2011.
- The locations of the monitoring well sites were selected to capture water derived from beneath the primary land use activities in Florence and in Florence's UGB (e.g., commercial/business, transportation corridors, sewer areas, non-sewered areas, etc.).
- The water table elevation fluctuates seasonally, up to 7 feet at some sites, but the overall water table configuration across the area remains similar throughout the year.
- Groundwater discharges to Munsel and Clear Lakes, the Siuslaw River Estuary, and Munsel Creek throughout most, if not all, of the year.
- Average groundwater temperature fluctuates seasonally from 11.3 to 13.8°C, but lags behind ambient air temperature variation by approximately 2 months.
- The pH of groundwater is generally low, 5.4 to 5.8, similar to typical values associated with precipitation.
- Groundwater conductivity, reflecting TDS, predictably increases in a downgradient direction, but apparently also is impacted by local land use.
- No VOCs or off-the-shelf pesticides were detected in any of the samplings of groundwater.
- *E. coli* was detected in groundwater from Wells B-2 and B-10 in November 2010, however, there have been no detections since.
- Total coliform detections are few in upgradient wells and downgradient wells in residential sewer areas.
- Total coliform detections are common in downgradient wells in residential non-sewered and commercial areas. Well B-8, in the downtown commercial district, has had the most coliform detections (15) while B-2, in the non-sewered UGB has had 9 coliform detections. The infiltration of stormwater may have played a role in the commercial area of downtown.
- Two monitoring wells have had nitrate detections: Well B-2 (nondetect to 45 mg/L) and Well B-10 (1.8 to 2.6 mg/L) during the 24-month period.
- Well B-2 is located within the non-sewered residential area in the UGB and Well B-10 is located in the downtown commercial area near the hospital.
- Nitrate in Well B-2 was nondetect during the spring 2011 high rainfall period. ORP values from Well B-2 remained high during this period indicating the absence of nitrate was not related to reducing conditions. Conductivity values dropped significantly during this period suggesting the absence of nitrate reflects dilution. Nitrate was detected in Well B-2 in February and April 2012.
- Caffeine has been detected in four wells within the City's UGB and in two wells within the City limits. Possible sources include the infiltration of stormwater and, additionally in the UGB, septic system effluent.

- Sodium and chloride concentrations are significantly higher in Wells B-2 and B-3, located downgradient in non-sewered residential areas, than in upgradient or downgradient wells in sewer areas. Na and Cl are variable in all wells, but remain relatively stable in any one well.
- Water table level versus sea level preclude the higher sodium and chloride concentrations in Wells B-2 and B-3 being related to the proximity of the ocean.

Surface Water

- Streamflow peaks in the spring (primarily April) at all sites as the result of spring rainfall, a high water table causing more groundwater discharge at the surface, and high discharge from upgradient.
- Streamflow reaches its lowest levels in September at all sites as the result of a prolonged period of decreased rainfall, a low water table, and lower discharge from upgradient.
- Average streamflow during the study period at each site indicates that Munsel Creek is a gaining stream (Munsel Upstream: 9.9 cfs; Munsel Midstream: 11.9 cfs; Munsel Downstream: 13.6 cfs).
- Stream temperatures peak in July and August at all sites, and Munsel Upstream and Ackerley reach the highest temperatures (maximum of 26.6°C and 23.9°C, respectively, as recorded by data loggers) and have the greatest diurnal stream temperature fluctuations.
- Minimum stream temperatures recorded by data loggers have ranged from 3.4°C to 5.4°C at the four monitoring sites and occurred in winter months.
- DO levels remain at about 10 mg/L at all sites from November through April, then drop in the summer, particularly in Munsel Upstream and Ackerley (to about 6 mg/L or less), which are both just downstream of lakes.
- Specific conductance levels at all sites have stayed within the typical range for Oregon Coast Range streams (less than 150 µS/cm).
- pH levels at all sites generally have stayed within the typical range for streams (6.5 to 8.5).
- No nitrate, total phosphorus, VOCs, glyphosate, 2,4-D, and chromium were detected at the four monitoring sites.
- Lead has been detected at levels just above detection limits in late summer near the gun club.
- Caffeine has been detected at all sites, suggesting contamination from human wastewater.
- More than 10 percent of samples from Munsel Downstream (27 percent) and Munsel Midstream (18 percent) had *E.coli* levels that exceeded the 406 mpn/100 mL standard, suggesting that Munsel Creek is "impaired" and should be monitored more frequently for *E. coli*.
- Stormwater at all stormwater sampling sites contained caffeine, *E.coli* (at levels of concern), and TPH (in the form of lube oil) while pentachlorophenol (herbicide), chromium, phosphorus, arsenic, and lead were each detected at select sites.
- No nitrate, VOCs, glyphosate, and 2,4-D were detected at the four stormwater sampling sites.

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Appendix A-2: Oregon Beach Monitoring Program Report

The Oregon Beach Monitoring Program (OBMP) monitors the waters along Oregon's coastline for the presence of fecal bacteria, and reports elevated levels to the public.

Marine waters are tested for enterococcus, which is an indicator of the presence of other bacteria. Enterococcus is present in human and animal waste and can enter marine waters from a variety of sources such as streams and creeks, storm water runoff, animal and seabird waste, failing septic systems, sewage treatment plant spills, or boating waste.

The OBMP works with the Oregon Coastal Atlas to share and display beach water quality monitoring data. The data in the table below are from the Atlas and, for 2012 reports, directly from the OBMP; the table shows only detections (i.e., 10 cfu/100ml or greater), not all sampling results. Detections are measured as 'colony-forming units' (cfu')

Oregon Beach Monitoring Results Showing Enterococcus Detections in Florence Area 3/9/10-9/1/12				
Sampling Date	Location			
	At North Jetty (Last sampled 5/24/2011)	100 m No. of No. Jetty (Last sampled 5/24/2011)	200 m No. of No. Jetty (Last sampled 5/24/2011)	Heceta Beach**
8/21/12				31 (S)
7/24/12				10 (N); 20 (M); 10 (S)
7/10/12				63 (S)
6/26/12				62 (S); 20 (S)
9/1/11				10 cfu/100ml
8/30/11				231 cfu/100ml*
3/29/11	20 cfu/100ml	31 cfu/100ml	31 cfu/100ml	
11/2/10	10 cfu/100ml			
10/5/10			10 cfu/100ml	
9/28/10	31 cfu/100ml			
5/18/10				31 cfu/100ml
4/20/10	10 cfu/100ml	10 cfu/100ml		
3/23/10		10 cfu/100ml		
3/9/10	52 cfu/100ml	20 cfu/100ml		

*Water contact discouraged.

**N=Heceta Beach at North Runoff; S=Heceta Beach at South Runoff; M=Heceta Beach Middle Site.

OBMP Sampling Program

OBMP sampled different locations during different seasons.

Station	Site Name
36225	Heceta Beach at the mouth of the north runoff at Driftwood Shores Resort
30480	Heceta Beach between the north and south runoff at Driftwood Shores Resort
36226	Heceta Beach at the mouth of the south runoff at Driftwood Shores Resort
36227	Heceta Beach in the south runoff (fresh water) where it flows on to the beach near the Driftwood Shores Resort

OBMP sampled Harbor Vista Park north jetty 2004-11

31826	Florence Harbor Vista Co. Park at the north jetty
31827	Florence Harbor Vista Co. Park 100m north of the jetty
31828	Florence Harbor Vista Co. Park 200m north of the jetty

OBMP sampled the south jetty at Harbor Vista Co. Park in Florence in 2003, 2004, 2008, and once in 2009

30604	Oregon Dunes Nat'l Rec Area Beach, S. Jetty, Florence

The right column is #30480 from this location at Driftwood Resort at Heceta Beach.

36225	Heceta Beach at the mouth of the north runoff at Driftwood Shores Resort
30480	Heceta Beach between the north and south runoff at Driftwood Shores Resort
36226	Heceta Beach at the mouth of the south runoff at Driftwood Shores Resort
36227	Heceta Beach in the south runoff (fresh water) where it flows on to the beach near the Driftwood Shores Resort

OBMP sampled Heceta Beach at the Driftwood Resort in the summer of 2010 (5/18/2010 – 8/24/2010), and sampled Harbor Vista Co. Park in the fall, winter, and spring (Sep. – May 2009 – 2010 and 2010 – 2011).

OBMP has sampled several sites around Florence and the Siuslaw during different seasons. Different sites during different seasons were selected to try and cover more of the beach.

Field Table

Station	Site Name	
	36225	Heceta Beach at the mouth of the north runoff at Driftwood Shores Resort
	30480	Heceta Beach between the north and south runoff at Driftwood Shores Resort
	36226	Heceta Beach at the mouth of the south runoff at Driftwood Shores Resort
	36227	Heceta Beach in the south runoff (fresh water) where it flows on to the beach near the Driftwood Shores Resort
	31826	Florence Harbor Vista Co. Park at the north jetty
	31827	Florence Harbor Vista Co. Park 100m north of the jetty
	31828	Florence Harbor Vista Co. Park 200m north of the jetty
	30604	Oregon Dunes Nat'l Rec Area Beach, S. Jetty, Florence

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Appendix A-3: Siuslaw River Sediment Quality Evaluation Report, U.S. Army Corps of Engineers, 2012

Summary: Siuslaw River Sediment Quality Evaluation Report, April 2012

Note: Please see Project Files for full report and 2011 report.

"The current hydrographic survey maps, (November 2010, May 2011, and August 2011), indicate a small shoal at the entrance at RM 0+25, shoaling within the FNC between RM 2 and 4+30, and within the turning basin up to RM 5. A box core, or ponar sampling, device was used to obtain surface sediment samples for physical and chemical analysis.

As part of this sampling event (2011), seven (7) samples were collected in the Siuslaw River from the entrance to River Mile (RM) 5. All samples were submitted for physical analyses, with grain-size ranging from 98.5% to 96.6% poorly graded sand (mean 97.4%), with total organic carbon (2 samples only) content ranging from 0.142% to 0.152% (mean 0.147 %). Two (2) samples were selected for chemical analyses to include: metals, total organic carbon (TOC), pesticides/polychlorinated biphenyls (PCBs), chlorinated hydrocarbons, phenols, phthalates, miscellaneous extractables, polynuclear aromatic hydrocarbons (PAHs), and organotin (TBT). Sample 6 was collected adjacent to the bridge; sample 7 was collected off the Port of Siuslaw facilities. Pore-water TBT was not analyzed due to insufficient pore-water volume in the samples, a result of the high sand content.

The chemical analyses indicated only low levels of contamination in any of the samples, with all levels well below their respective SEF screening levels (SLs). No pesticides, PCBs, phthalates, phenol, PAHs, chlorinated hydrocarbons, organotins or miscellaneous extractables were detected in any of the samples. Several metals were detected, but at low levels (below the method reporting level), well below their respective screening levels. Detection levels were sufficiently low enough to evaluate material proposed for dredging. The analytical results of this characterization are consistent with historical data.

Sediment represented by samples collected during this sampling event meet the Tier II guidelines established in the SEF for unconfined in-water placement without further characterization."

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Appendix B: Public Involvement Plan

Siuslaw Estuary Partnership

An Integrated Multiple Objective Approach To Watershed Protection and Restoration

Public Involvement Plan

Approved by the Florence Planning Commission, January 12, 2010

Current Status of this Plan

On January 12, 2010, this Public Involvement Plan (PIP) was approved by the Florence Planning Commission, the City's Committee for Citizen Involvement. A draft PIP was prepared with the guidance of the Public Education and Stewardship Staff Team, a sub-team of the Inter-disciplinary Team for the Siuslaw Estuary Partnership Project. The Siuslaw Estuary Partnership Project is funded by the Environmental Protection Agency's West Coast Estuaries Initiative for Coastal Watersheds Program and project partners to protect and restore water quality and wildlife habitat in the Siuslaw River Watershed.

Introduction

Public Education and Stewardship is one of the key objectives of the Siuslaw Estuary Partnership Project. It is intended to provide broad policy guidance on the structure and content of the public involvement program for the project. The detailed implementation of this PIP will be documented in a more detailed "Key Messages and Strategies" document that will be developed, updated and revised throughout the project as needed and appropriate to implement this PIP.

This PIP is further defined in the following sections:

- Purpose
- Target Populations
- Tools and Methods
- Key Messages and Strategies
- Guiding Principles
- Stakeholders Groups

Purpose

The purpose of this Public Involvement Plan (PIP) is to establish a framework for public involvement in the Siuslaw Estuary Partnership Project, consistent with the following Citizen Involvement Goal, Objectives, and Policies stated in the adopted Florence Realization 2020 Comprehensive Plan:

"Goal

To develop a citizen involvement program that insures the opportunity for citizens to be involved in all phases of the planning process.

Objectives

1. To encourage citizen input in the preparation of plans, implementation measures and plan revisions.
2. To take into account the desires, recommendations and needs of citizens during the planning process.

Policies

1. The Planning Commission shall act as the City's Committee for Citizen Involvement. (Approved by LCDC, March 1, 1976.)
2. A Citizen Advisory Committee, appointed by the City Council, shall serve in an advisory capacity to the Florence Planning Commission to assure the broadest input during periodic review and post acknowledgment Plan and zoning amendments.
3. The City Council shall ensure that a cross-section of Florence citizens is involved in the planning process, primarily through their appointments to the Planning Commission, Design Review Board, Citizen Advisory Committee and other special committees.
4. Official City meetings shall be well publicized and held at regular times. Agendas will provide the opportunity for citizen comment.
5. Records of all meetings where official action is taken shall be kept at City Hall and made available on request to the public.
6. Planning documents and background data shall be available to interested citizens.
7. The Citizen Involvement Program shall be reviewed annually.
8. Citizen involvement shall be assured in the review and update of the Comprehensive Plan."

Target Populations

The Siuslaw Estuary Partnership Project will impact specific population groups. The tools and methods described below will be used to ensure outreach and opportunities for involvement and stewardship by these groups and individuals. The following Target Populations have been identified:

- City of Florence Residents
- Heceta Water District Residents
- Rural Residents with private water source
- Property Owners with wetland, riparian, or upland resources
- Local Officials
- Youth
- Business Owners
- Development Community
- Tourists

Tools and Methods

The project will use the following tools and methods to foster Public Education and Stewardship in the Siuslaw Estuary Partnership project.

- **Web site**
Consultants will be hired to create a web site for the project. It will be maintained by Project Staff team members.
- **Newsletters**
Consultants will assist in the development and distribution of three newsletters for distribution throughout the Study Area. Distribution outside City limits will be conducted by Heceta Water District and other partners, as willing and able.
- **Media Outreach**
Efforts will be made to engage newspaper, radio and televised media in the project. In addition to newspaper notices, press releases will be prepared at key junctions and milestones; meetings will be held with media representatives to provide detailed background and respond to questions; and the media will be notified and invited to participate in all public events.
- **Signage around Clear Lake**
Five educational signs will be installed around Clear Lake, informing the public of lake water importance and risks.
- **Interested Parties List**
An Interested Parties List will be developed and maintained throughout the project. The list will be circulated at meetings, including open houses, Stakeholder Group meetings, and other meetings so that those interested in staying informed about the project can provide contact information. This list will be maintained and updated over time and direct mailings to this group will be sent notifying them of scheduled events, i.e., open houses, stakeholder meetings, and local official meetings where products are reviewed.
- **Targeted Outreach**
Targeted outreach to key groups will be conducted, including presentations to groups upon request. The Interdisciplinary Team and the Stakeholder Group will be invited to participate in this targeted outreach effort.
- **Estuary Trail Vision**
A vision for an Estuary Interpretive Trail system will be prepared that will, when it is implemented, be an important environmental education tool.
- **Public Open Houses**
The public will be invited to three open houses, one each year of the project. The purpose of the open houses is to provide an opportunity for all interested citizens to learn about the project and its outcomes and to provide comments on draft products, when they are available.
- **Local Official Public Meetings and Hearings**
City Planning Commission and Council will receive monthly reports on the project, including the Public Education and Stewardship Element; and will hold public hearings on the final products to be adopted by the City. Reports to other local

officials, including the Lane County Planning Commission and Board and Heceta Water District Board, will be coordinated by the Interdisciplinary Team member from the respective organization.

➤ **Stewardship Programs**

Several Stewardship Programs are planned and others will be developed during the course of the project. The Stormwater Demonstration Project in Old Town is an example of an opportunity to both educate and involve interested citizens in hands-on caretaking and monitoring of water quality in the estuary. Another opportunity will be promoting efforts to protect and restore wetlands on private property and public participation in protection and restoration of wetlands on City-owned properties. Other efforts are coordination with the Stream Team, to further foster stewardship of Munsel Creek, the estuary, and the North Fork; and involving youth and retirees in projects to clean up and remove invasive and noxious vegetation.

➤ **Coordination**

Coordination is a critical aspect of the Siuslaw Estuary Project. The Interdisciplinary Team provides an exceptional opportunity to pool resources and create a knowledge base and library for staff and the general public. For example, the Interdisciplinary Team will communicate via an intranet site in addition to team meetings. The web site for the project will include links to the partner agencies' web sites and the Team itself is an excellent resource for knowledge and expertise for this project. In addition, the project will coordinate with related public outreach efforts by the City and the partner agencies, e.g., Salmon and Trout Enhancement Program (STEP), Green Building Fair in April 2010, Lane County Extension Service, and others; and with all Stakeholder Group outreach, e.g., articles in the groups' newsletters and other coordination.

➤ **Stakeholder Groups**

The Stakeholder Groups will be a key element of the outreach program. This group list was approved by the Florence City Council on December 21, 2009, consistent with the City protocols, and will be modified by the Council over time as need and interest dictates.

The Council decided to form two groups: a general Stakeholder Group and an Elected Officials Stakeholder Group (see Stakeholder Group List for structure and membership).

Stakeholder Group:

The Stakeholder Group consists of representatives of key interests that will be affected by, or potentially affected by, the outcomes of the project. The Stakeholder Group will meet about ten times throughout the three year project; plus, they will be invited to participate in a nine week focus group in the last year of the project to review and comment on all final products. The mission of the Stakeholder Group is to:

- act as a spokesperson for the project
- help plan and implement the public outreach for their respective group
- review and comment on key products
- provide an effective liaison to his/her group, as applicable
- in Phase I, provide comment on the draft the Guiding Principles
- in Phase III, participate in a 9-week focus group to provide detailed feedback on all draft outcomes and products

Elected Officials Stakeholder Group

The Elected Officials Stakeholder Group will be comprised of representatives of elected bodies that will have a role in accepting, endorsing, and/or adopting some or all of the final products. These Stakeholders will be involved in the project more intensively than their respective elected bodies in terms of outreach, education, and stewardship. In this way, they will be positioned to facilitate acceptance of the final products by their respective agencies or organizations.

The Elected Officials Stakeholder Group will meet once or twice each year of the project; and they will meet as needed in Phase III to ensure the final products are consistent with the vision and mission of their respective agency or organization.

The mission of the Elected Officials Stakeholder Group is to:

- act as a spokesperson for the project
- review informational and educational materials
- provide an effective liaison to their elected body
- in Phase I, recommend the Guiding Principles
- in Phase III, meet as needed to ensure the final products are consistent with the vision and mission of their respective agency or organization.

Key Messages and Strategies

Key Messages

Key Messages convey both basic facts revealed in the research tasks, such as the results of the literature search and the water quality and quantity assessment and monitoring program, as well as the response to these facts, including any resulting policy options, recommendations, and conclusions. Key Messages also seek to portray the true purpose and intent of the project and, where indicated, to dispel myths and rumor which can sometimes lead to less than optimal courses of action.

Strategies

Strategies seek to link the Key Messages with the Target Populations, using the agreed-upon tools and methods (see above). Strategies evolve during the course of the project as need and interest demand. The Public Education and Stewardship Committee, Stakeholder Group, and the Interdisciplinary Team will work together to develop and modify public education and stewardship strategies to best fulfill the public involvement Goal, Objectives, and Policies identified in this PIP. When fully developed, Strategies identify timelines, products, and key staff/participants.

Guiding Principles

One of the primary products of the PIP, in concert with the Team Process, is consensus on Guiding Principles. The Guiding Principles will be the formally recognized vision for environmental protection in these watersheds. They will set environmental targets and measurable outcomes that will be used in the evaluation of each of the five work elements:

1. Foster Public Education and Stewardship
2. Protect Water Quality and Quantity
3. Protect and Restore Wetlands, Riparian and Upland Areas

4. Protect and Restore Key Estuary Wetlands
5. Plan for Ecological Growth

The Guiding Principles will evolve from a collaborative process of the Public Education and Stewardship Staff Team, the Interdisciplinary Team (aka the "Full Team") and the Stakeholders, with input invited by all groups and interests. Team members are encouraged to seek input from others in their respective organizations in every step in this process. The revised Draft Guiding Principles Paper will be the subject of input from Stakeholders (at the first Stakeholders Meeting), Elected Officials Stakeholders Group, and the general public via posting on the Project Web Site.

The environmental database for these watersheds is not sufficiently detailed or comprehensive to establish these targets and measures at this time. In addition, consensus among key partners is critical if the standards are to be accepted and administered effectively. For these reasons, it is important that the process, including the public education component of the project, be used to obtain this level of information, comprehension, and commitment.

Environmental targets and measurable outcomes will be established in the Guiding Principles that will guide all products and processes, as discussed above. Long-term outcomes are land use and water management policies and practices that maintain and protect rearing, migrating, and spawning habitat for resident and anadromous fish, and habitat for birds, mammals, amphibians and reptiles; conversion of rural lands to urban densities that do not impair water quality or result in dysfunctional stream conditions; enhanced floodplain functions and inter-connected wetlands and floodplain; and on-going surface and ground water quality monitoring and remedial action to prevent contamination. Ultimately, the natural resource economy will be re-invigorated. People will be drawn to the area with a renewed appreciation for its rich and complex ecosystem; and the area will be a model for other small coastal cities faced with growth pressures.

This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement WC-00J04801-0 to City of Florence. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

Appendix C:
Oregon Water Resources Department
Construction Logs and Well Reports

LANE 70360

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

AMENDED

Lane 70360

WELL I.D. # L N/A

START CARD # 204837

Instructions for completing this report are on the last page of this form.

(1) LAND OWNER Well Number 2
Name City of Florence
Address 250 Hwy 101
City Florence State OR Zip 97439

(2) TYPE OF WORK ☒ New Well
☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment ☐ Conversion

(3) DRILL METHOD
☐ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger ☐ Cable Mud
☒ Other jettable point 2"

(4) PROPOSED USE
☐ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☒ Other de-watering

(5) BORE HOLE CONSTRUCTION Special Construction ☒ Yes ☐ No
Depth of Completed Well 24 ft
Explosives used ☐ Yes ☒ No Type _____ Amount _____

BORE HOLE			SEAL			
Diameter	From	To	Material	From	To	Sacks or Pounds
2"	0'	24'				

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☐ Other _____

Backfill placed from _____ ft to _____ ft Material _____
Gravel placed from _____ ft to _____ ft Size of gravel _____

(6) CASING/LINER

Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing 2"	0'	24'	STD	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Liner				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Drive Shoe used ☐ Inside ☐ Outside ☒ None
Final location of shoe(s) _____

(7) PERFORATIONS/SCREENS
☐ Perforations Method _____
☒ Screens Type V Wire Material Steel

From	To	Slot Size	Number	Diameter	Tele/pipe size	Casing	Liner
18'	24'	.010		2"	PS	<input checked="" type="checkbox"/>	<input type="checkbox"/>

(8) WELL TESTS: Minimum testing time is 1 hour
☒ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
14	14.5'		8 hours

Temperature of water 51 Depth Artesian Flow Found _____
Was a water analysis done? ☐ Yes By whom _____
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other _____
Depth of strata _____

(9) LOCATION OF WELL (legal description)

County Lane
Tax Lot county right a way Lot _____
Township 18 S Range 12 W WM
Section 4 SW 1/4 NE 1/4
Lat _____ or _____ (degrees or decimal)
Long _____ or _____ (degrees or decimal)

Street Address of Well (or nearest address) Near 88416 First Ave
Florence, OR 97439

(10) STATIC WATER LEVEL

4.5 ft below land surface Date 1-4-10
_____ ft below land surface Date _____
Artesian pressure _____ lb per square inch Date _____

(11) WATER BEARING ZONES

Depth at which water was first found 4.5'

From	To	Estimated Flow Rate	SWL
4.5'	24'	14 gpm	4.5'

(12) WELL LOG

Ground Elevation _____

Material	From	To	SWL
sand	0	24	4.5'

RECEIVED

JUN 10 2010

WATER RESOURCES DEPT
SALEM, OREGON

RECEIVED

FEB 11 2011

WATER RESOURCES DEPT
SALEM, OREGONDate Started 1-4-10 Completed 1/20/10

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

WWC Number _____ Date _____

Signed _____

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 636 Date 2/11/10Signed Chris Christensen V-PropChris Christensen Water Drilling Co.

ORIGINAL - WATER RESOURCES DEPARTMENT

FIRST COPY - CONSTRUCTOR

SECOND COPY - CUSTOMER

06/16/2004

LANE 70361

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

AMENDED

Lane 70361

WELL I.D. # L N/A

START CARD # 204838

Instructions for completing this report are on the last page of this form.

(1) LAND OWNER Well Number 3
Name City of Florence
Address 250 Hwy 101
City Florence State OR Zip 97439

(2) TYPE OF WORK ☒ New Well
☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment ☐ Conversion

(3) DRILL METHOD
☐ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger ☐ Casing Mud
☒ Other jettable point 2"

(4) PROPOSED USE
☐ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☒ Other de-watering

(5) BORE HOLE CONSTRUCTION Special Construction ☒ Yes ☐ No
Depth of Completed Well 24 ft
Explosives used ☐ Yes ☒ No Type _____ Amount _____

BORE HOLE			SEAL			
Diameter	From	To	Material	From	To	Sacks or Pounds
2"	0'	24'				

How was seal placed Method ☐ A ☐ B ☐ C ☐ D ☐ E
☐ Other _____

Backfill placed from _____ ft to _____ ft Material _____
Gravel placed from _____ ft to _____ ft Size of gravel _____

(6) CASING/LINER

Casing	Diameter	From	To	Gauge	Steel				Plastic				Welded				Threaded			
					STD	XS	XXS	XXXS	4"	3"	2"	1 1/2"	1"	3/4"	1/2"	1/4"				
2"	0'	24'	STD	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Drive Shoe used ☐ Inside ☐ Outside ☒ None
Final location of shoe(s) _____

(7) PERFORATIONS/SCREENS
☐ Perforations Method _____
☒ Screens Type V Wire Material Steel

From	To	Slot Size	Number	Diameter	Tele/pipes size	Casing	Liner
19'	24'	.010		2"	PS	<input checked="" type="checkbox"/>	<input type="checkbox"/>

(8) WELL TESTS: Minimum testing time is 1 hour
☒ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
14	14.5'		8 hours

Temperature of water 51 Depth Artesian Flow Found _____
Was a water analysis done? ☐ Yes By whom _____
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other _____
Depth of strata _____

(9) LOCATION OF WELL (legal description)

County Lane
Tax lot county right a way Lot _____
Township 18 S Range 12 W WM
Section 4 SW 1/4 NE 1/4
Lat _____ or _____ (degrees or decimal)
Long _____ or _____ (degrees or decimal)

Street Address of Well (or nearest address) Near 88416 First Ave
Florence, OR 97439

(10) STATIC WATER LEVEL

4.5 ft below land surface Date 1-4-10
_____ ft below land surface Date _____
Artesian pressure _____ lb per square inch Date _____

(11) WATER BEARING ZONES

Depth at which water was first found 4.5'

From	To	Estimated Flow Rate	SWL
4.5'	24'	14 gpm	4.5'

(12) WELL LOG

Ground Elevation _____

Material	From	To	SWL
sand	0	24	4.5'

RECEIVED JUN 1 2010
WATER RESOURCES DEPT SALEM, OREGON
RECEIVED FEB 11 2010
WATER RESOURCES DEPT SALEM, OREGON

Date Started 1-4-10 Completed 1/29/10

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

WWC Number _____ Date _____

Signed _____

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 536 Date 2/11/10

Signed Gregory Christensen V-Pros
Christensen Well Drilling Co.

LANE 70362

Lane 70362

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

WELL I.D. # L N/A

START CARD # 204839

Instructions for completing this report are on the last page of this form.

(1) LAND OWNER Well Number 4
Name City of Florence
Address 250 Hwy 101
City Florence State OR Zip 97439

(2) TYPE OF WORK ☒ New Well
☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment ☐ Conversion

(3) DRILL METHOD
☐ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger ☐ Cable Mud
☒ Other Jettable point 2"

(4) PROPOSED USE
☐ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☒ Other de-watering

(5) BORE HOLE CONSTRUCTION Special Construction: ☒ Yes ☐ No
Depth of Completed Well 24 ft
Explosives used ☐ Yes ☒ No Type _____ Amount _____

BORE HOLE				SEAL			
Diameter	From	To	Material	From	To	Sacks or Pounds	
2"	0'	24'					

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☐ Other _____

Backfill placed from _____ ft to _____ ft Material _____
Gravel placed from _____ ft to _____ ft Size of gravel _____

(6) CASING/LINER

Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing 2"	0'	24'	STD	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Liner				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Drive Shoe used ☐ Inside ☐ Outside ☒ None
Final location of shoe(s) _____

(7) PERFORATIONS/SCREENS
☐ Perforations Method _____
☒ Screens Type V Wire Material Steel

From	To	Slot Size	Number	Diameter	Tele/pipe size	Casing	Liner
19'	24'	.010		2"	PS	<input checked="" type="checkbox"/>	<input type="checkbox"/>

(8) WELL TESTS: Minimum testing time is 1 hour
☒ Pump ☐ Bailor ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drift stem at	Time
14	14.5'		8 hours

Temperature of water 51 Depth Artesian Flow Found _____
Was a water analysis done? ☐ Yes By whom _____
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other _____
Depth of strata _____

(9) LOCATION OF WELL (legal description)

County Lane
Tax Lot county right a way Lot _____
Township 18 S Range 12 W WM
Section 4 SW 1/4 NE 1/4
Lat _____ or _____ (degrees or decimal)
Long _____ or _____ (degrees or decimal)

Street Address of Well (or nearest address) Near 88416 First Ave
Florence, OR 97439

(10) STATIC WATER LEVEL

4.5 ft below land surface Date 1-4-10
_____ ft below land surface Date _____
Artesian pressure _____ lb. per square inch Date _____

(11) WATER BEARING ZONES

Depth at which water was first found 4.5'

From	To	Estimated Flow Rate	SWL
4.5'	24'	14 gpm	4.5'

(12) WELL LOG

Ground Elevation _____

Material	From	To	SWL
sand	0	24	4.5'

RECEIVED
JUN 1 2010
WATER RESOURCES DEPT
SALEM, OREGON

RECEIVED
FEB 11 2010
WATER RESOURCES DEPT
SALEM, OREGON

Date Started 1-4-10 Completed 1/29/10

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

WWC Number _____ Date _____

Signed _____

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 635 Date 2/11/10

Signed Paul Christopher V-Pro
Christopher V-Pro

ORIGINAL - WATER RESOURCES DEPARTMENT

FIRST COPY - CONSTRUCTOR

SECOND COPY - CUSTOMER

06/16/2004

LANE 70363

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

Amended

Lane 70363
WELL I.D. # L N/A

START CARD # 204840

Instructions for completing this report are on the last page of this form.

(1) LAND OWNER Well Number 5
Name City of Florence
Address 250 Hwy 101
City Florence State OR Zip 97439

(2) TYPE OF WORK ☒ New Well
☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment ☐ Conversion

(3) DRILL METHOD
☐ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger ☐ Cable Mud
☒ Other jettable point 2"

(4) PROPOSED USE
☐ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☒ Other de-watering

(5) BORE HOLE CONSTRUCTION Special Construction ☒ Yes ☐ No
Depth of Completed Well 24 ft
Explosives used ☐ Yes ☒ No Type _____ Amount _____

BORE HOLE				SEAL			
Diameter	From	To	Material	From	To	Sacks or Pounds	
2"	0'	24'					

How was seal placed Method ☐ A ☐ B ☐ C ☐ D ☐ E
☐ Other _____

Backfill placed from _____ ft to _____ ft Material _____
Gravel placed from _____ ft to _____ ft Size of gravel _____

(6) CASING/LINER							
Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing 2"	0'	24'	STD	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Liner				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Drive Shoe used ☐ Inside ☐ Outside ☒ None

Final location of shoe(s) _____

(7) PERFORATIONS/SCREENS
☐ Perforations Method _____
☒ Screens Type V Wire Material Steel

From	To	Slot Size	Number	Diameter	Tele/pipe size	Casing	Liner
19'	24'	.010		2"	PS	<input checked="" type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>

(8) WELL TESTS: Minimum testing time is 1 hour
☒ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
14	14.5'		8 hours

Temperature of water 51 Depth Artesian Flow Found _____

Was a water analysis done? ☐ Yes By whom _____

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other _____

Depth of strata _____

(9) LOCATION OF WELL (legal description)

County Lane
Tax Lot: county right a way Lot _____
Township 18 S Range 12 W WM
Section 4 SW 1/4 NE 1/4

Lat _____ " or _____ (degrees or decimal)
Long _____ " or _____ (degrees or decimal)

Street Address of Well (or nearest address) Near 88415 First Ave
Florence, OR 97439

(10) STATIC WATER LEVEL

4.5 ft below land surface Date 1-4-10

_____ ft below land surface Date _____

Artesian pressure _____ lb per square inch Date _____

(11) WATER BEARING ZONES

Depth at which water was first found 4.5'

From	To	Estimated Flow Rate	SWL
4.5'	24'	14 gpm	4.5'

(12) WELL LOG

Ground Elevation _____

Material	From	To	SWL
sand	0	24	4.5'

RECEIVED

JUN 1 2010

WATER RESOURCES DEPT
SALEM, OREGON

RECEIVED

FEB 11 2010

WATER RESOURCES DEPT
SALEM, OREGON

Date Started 1-4-10

Completed 1/29/10

(unbonded) Water Well Constructor Certification

I certify that the work performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

W.W.C. Number _____ Date _____

Signed _____

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

W.W.C. Number 636

Date 2/11/10

Signed Michael Christensen V-Prod
CHRISTENSEN WELL DRILLING CO.

ORIGINAL - WATER RESOURCES DEPARTMENT

FIRST COPY - CONSTRUCTOR

SECOND COPY - CUSTOMER

06/16/2004

Amel

Laure 70364

START CARD # 204841

THE LAND OWNER Well Number 5
 Name City of Florence
 Address 250 Hwy 101
 City Florence State OR Zip 97439

(2) TYPE OF WORK ☒ New Well
☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment ☐ Conversion

(3) DRILL METHOD
☐ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger ☐ Cable Mud
☒ Other Jettable point 2"

14) PROPOSED USE:

<input type="checkbox"/> Domestic	<input type="checkbox"/> Community	<input type="checkbox"/> Industrial	<input type="checkbox"/> Irrigation
<input type="checkbox"/> Thermal	<input type="checkbox"/> Injection	<input type="checkbox"/> Livestock	<input checked="" type="checkbox"/> Other <u>de-watering</u>

(5) BORE HOLE CONSTRUCTION Special Construction ☒ Yes ☐ No
Depth of Completed Well 424 ft
Explosives used ☐ Yes ☒ No Type _____ Amount _____

[illegible]

How was seal placed Method ☐ A ☐ B ☐ C ☐ D ☐ E

☐ Other _____

Backfill placed from _____ ft to _____ ft Material _____

Gravel placed from _____ ft to _____ ft Size of gravel _____

(6) CASING/LINER					Steel	Plastic	Welded	Threaded
	Diameter	From	To	Gauge				
CASING	2"	0'	24'	STD	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LINE					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Drive Shoe used ☐ Inside ☐ Outside ☒ None
(Indicate location of shoe(s))

(7) PERFORATIONS/SCREENS
☐ Perforations Method _____
☒ Screens Type **V Wire** Material **Steel**

From	To	Slot Size	Number	Diameter	Tel./pipe size	Casing	Liur
19'	24'	.010		2"	PS	<input checked="" type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>

(K) WELL TESTS: Minimum testing time is 1 hour

☒ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
14	14.5'		8 hours

Temperature of water 51 Depth Artesian Flow Found _____

Was a water analysis done? ☐ Yes By whom _____

Does this strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Oily ☐ Colored ☐ Other _____

Depth of strata _____

County Lane
Tax Lot county right a way Lot _____
Township 18 S Range 12 W WM
Section 4 SW 1/4 NE 1/4

Lat _____ (degrees or decimal)
Long _____ (degrees or decimal)

Street Address of Well (or nearest address) Near 88416 First Ave
Florence, OR 97439

(10) STATIC WATER LEVEL
4.5 ft below land surface Date 1-4-10
 _____ ft below land surface Date _____
 Artesian pressure _____ lb per square inch Date _____

From	To	Estimated Flow Rate	SWL
4.5'	24'	14 gpm	4.5'

[illegible]

Date Started 1-4-10 Completed 1/29/10

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

WUC Number _____ Date _____

Signed _____

(banded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

W W L # 636 Date 2/11/10

Signed: W. L. Christensen, V. Pres
Christensen & Co.

LANE 70365

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

Lane 70365
WELL I.D. # L N/A

START CARD # 204842

Instructions for completing this report are on the last page of this form.

(1) LAND OWNER Well Number 7
Name City of Florence
Address 250 Hwy 101
City Florence State OR Zip 97439

(2) TYPE OF WORK ☒ New Well
☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment ☐ Conversion

(3) DRILL METHOD
☐ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger ☐ Cable Mud
☒ Other jettable point 2"

(4) PROPOSED USE
☐ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☒ Other de-watering

(5) BORE HOLE CONSTRUCTION Special Construction ☒ Yes ☐ No
Depth of Completed Well 24 ft
Explosives used ☐ Yes ☒ No Type _____ Amount _____

BORE HOLE				SEAL			
Diameter	From	To	Material	From	To	Sacks or Pounds	
2"	0'	24'					

How was seal placed Method ☐ A ☐ B ☐ C ☐ D ☐ E
☐ Other _____

Backfill placed from _____ ft to _____ ft Material _____
Gravel placed from _____ ft to _____ ft Size of gravel _____

(6) CASING/LINER

Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing 2"	0'	24'	STD	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Liner				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Drive Shoe used ☐ Inside ☐ Outside ☒ None
Final location of shoe(s) _____

(7) PERFORATIONS/SCREENS
☐ Perforations Method _____
☒ Screens Type V Wire Material Steel

From	To	Slot Size	Number	Diameter	Tele/pipe size	Casing	Liner
19'	24'	.010		2"	PS	<input checked="" type="checkbox"/>	<input type="checkbox"/>

(8) WELL TESTS: Minimum testing time is 1 hour
☒ Pump ☐ Bailor ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
14	14.5'		8 hours

Temperature of water 51 Depth Artesian Flow Found _____

Was a water analysis done? ☐ Yes By whom _____

(Did any strata contain water not suitable for intended use?) ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other _____

Depth of strata _____

(9) LOCATION OF WELL (legal description)

County Lane
Tax lot county right a way Lot _____
Township 18 S Range 12 W WM
Section 4 SW 1/4 NE 1/4

Lat _____ " or _____ (degrees or decimal)
Long _____ " or _____ (degrees or decimal)

Street Address of Well (or nearest address) Near 88416 First Ave
Florence, OR 97439

(10) STATIC WATER LEVEL

4.5 ft below land surface Date 1-4-10
_____ ft below land surface Date _____
Artesian pressure _____ lb per square inch Date _____

(11) WATER BEARING ZONES

Depth at which water was first found 4.5'

From	To	Estimated Flow Rate	SWL
4.5'	24'	14 gpm	4.5'

(12) WELL LOG

Material	From	To	SWL
sand	0	24	4.5'

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WATER RESOURCES DEPT
SALEM, OREGON

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FEB 11 2010

WATER RESOURCES DEPT
SALEM, OREGON

Date Started 1-4-10 Completed 1/29/10

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

WWC Number _____ Date _____

Signed _____

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 636 Date 2/11/10

Signed Stephen Chertman - V-Prod
Christopher W. Wessling Co.

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

AMENDED

Level 70366
WELL I.D. # L N/A

START CARD # 204843

Instructions for completing this report are on the last page of this form.

(1) LAND OWNER _____ Well Number 8
 Name City of Florence
 Address 250 Hwy 101
 City Florence State OR Zip 97439

(2) TYPE OF WORK ☒ New Well
☐ Deepening ☐ Alteration (repair/recondition) Abandonment ☐ Conversion

(3) DRILL METHOD
☐ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger ☐ Cable Mud
☒ Other Jettable point 2"

(4) PROPOSED USE

<input type="checkbox"/> Domestic	<input type="checkbox"/> Community	<input type="checkbox"/> Industrial	<input type="checkbox"/> Irrigation
<input type="checkbox"/> Thermal	<input type="checkbox"/> Injection	<input type="checkbox"/> Livestock	<input checked="" type="checkbox"/> Other <u>de-watering</u>

(5) BORE HOLE CONSTRUCTION Special Construction: ☒ Yes ☐ No
Depth of Completed Well 24 ft
Explosives used ☐ Yes ☒ No Type _____ Amount _____

BORE HOLE			SEAL			
Diameter	From	To	Material	From	To	Sacks or Pounds
2"	0'	24'				

How was seal placed Method ☐ A ☐ B ☐ C ☐ D ☐ E
☐ Other _____

Back fill placed from _____ ft to _____ ft Material _____
Gravel placed from _____ ft to _____ ft Size of gravel _____

(6) CASING/LINER				Steel	Plastic	Welded	Threaded
	Diameter	From	To	Gauge			
Casing	2"	0'	24'	STD	<input checked="" type="checkbox"/>		
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Liner					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Drive Shoe used ☐ Inside ☐ Outside ☒ None
Final location of shoe(s) _____

(7) PERFORATIONS/SCREENS
☐ Perforations Method _____
☒ Screens Type **V Wire** Material **Steel**

From	To	Slot Size	Number	Diameter	Tele/pipe size	Casing	Liner
19'	24'	.010		2"	PS	<input checked="" type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>

(8) WELL TESTS: Minimum testing time is 1 hour

☒ Pump ☐ Bailor ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
14	14.5'		8 hours

Temperature of water 51 Depth Artesian Flow Found _____

Was a water analysis done? ☐ Yes By whom _____

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other _____

Depth of strata _____

(9) LOCATION OF WELL (legal description)
County Lane
Tax Lot county right a way Lot _____
Township 18 S Range 12 W WM
Section 4 SW 1/4 NE 1/4

Lat _____ " or _____ (degrees or decimal)
Long _____ " or _____ (degrees or decimal)

Street Address of Well (or nearest address) Near 88416 First Ave
Florence, OR 97438

(10) STATIC WATER LEVEL
4.5 ft. below land surface Date 1-4-10
 _____ ft. below land surface Date _____
 Artesian pressure _____ lb. per square inch Date _____

(11) WATER BEARING ZONES			
Depth at which water was first found <u>4.5'</u>			
From	To	Estimated Flow Rate	SWL
4.5'	24"	14 gpm	4.5'

(12) WELL LOG Ground Elevation _____

[illegible]

WATER RESOURCES DEPT
SALEM, OREGON

WATER RESOURCES DEPT
DATE STAMPED 3-24-10 COMPLETED 1/29/10

Date Started 1-4-10 Completed 1/29/10 *24221.00-1000*

I certify that the work performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

WWC Number _____ Date _____

Signed _____

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

WAC Number 630 Date 2/11/10

Signed David Christensen, V-Pres
Christensen & Sons, Inc.

LANE 70367

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 337.765)

Amended

Lane 70367
WELL I.D. # L N/A

START CARD # 204845

Instructions for completing this report are on the last page of this form.

(1) LAND OWNER Well Number 9
Name City of Florence
Address 250 Hwy 101
City Florence State OR Zip 97439

(2) TYPE OF WORK ☒ New Well
☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment ☐ Conversion

(3) DRILL METHOD
☐ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger ☐ Cable Mud
☒ Other jettable point 2"

(4) PROPOSED USE
☐ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☒ Other de-watering

(5) BORE HOLE CONSTRUCTION Special Construction ☒ Yes ☐ No
Depth of Completed Well 24 ft
Explosives used ☐ Yes ☒ No Type _____ Amount _____

BORE HOLE				SEAL			
Diameter	From	To	Material	From	To	Sacks or Pounds	
2"	0'	24'					

How was seal placed Method ☐ A ☐ B ☐ C ☐ D ☐ E
☐ Other _____

Backfill placed from _____ ft to _____ ft Material _____
Gravel placed from _____ ft to _____ ft Size of gravel _____

(6) CASING/LINER

Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing 2"	0'	24'	STD	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Liner				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Drive Shoe used ☐ Inside ☐ Outside ☒ None
Final location of sheets _____

(7) PERFORATIONS/SCREENS
☐ Perforations Method _____
☒ Screens Type V Wire Material Steel

From	To	Slot Size	Number	Diameter	Telepipe size	Casing	Liner
19'	24'	.010		2"	PS	<input checked="" type="checkbox"/>	<input type="checkbox"/>

(8) WELL TESTS: Minimum testing time is 1 hour
☒ Pump ☐ Bailor ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
14	14.5'		8 hours

Temperature of water 51 Depth Artesian Flow Found _____
Was a water analysis done? ☐ Yes By whom _____
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other _____
Depth of strata _____

(9) LOCATION OF WELL (legal description)
County Lane
Twp Lot county right a way Lot _____
Township 18 S Range 12 W WM
Section 4 SW 1/4 NE 1/4

Lat _____ or _____ (degrees or decimal)
Long _____ or _____ (degrees or decimal)

Street Address of Well (or nearest address) Near 88416 First Ave
Florence, OR 97439

(10) STATIC WATER LEVEL
4.5 ft below land surface Date 1-4-10
_____ ft below land surface Date _____
Artesian pressure _____ lb per square inch Date _____

(11) WATER BEARING ZONES
Depth at which water was first found 4.5'

From	To	Estimated Flow Rate	SWL
4.5'	24'	14 gpm	4.5'

(12) WELL LOG Ground Elevation _____

Material	From	To	SWL
sand	0	24	4.5'

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WATER RESOURCES DEPT
SALEM, OREGON
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FEB 11 2010
WATER RESOURCES DEPT
SALEM, OREGON

Date Started 1-8-10 Completed 1/28/10

(unbonded) Water Well Constructor Certification
I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used, and information reported above are true to the best of my knowledge and belief.

WWC Number _____ Date _____

Signed _____

(bonded) Water Well Constructor Certification
I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 636 Date 2/11/10

Signed David Christensen, V-Pros
CHRISTENSEN WELL DRILLING CO.

ORIGINAL - WATER RESOURCES DEPARTMENT

FIRST COPY - CONSTRUCTOR

SECOND COPY - CUSTOMER

06/16/2004

LANE 70368

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

Lane 70368
WELL I.D. # L N/A

AMENDED

START CARD # 204846

Instructions for completing this report are on the last page of this form.

(1) LAND OWNER Well Number 10
Name City of Florence
Address 250 Hwy 101
City Florence State OR Zip 97439

(2) TYPE OF WORK ☒ New Well
☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment ☐ Conversion

(3) DRILL METHOD
☐ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger ☐ Cable Mud
☒ Other Jettable point 2"

(4) PROPOSED USE
☐ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☒ Other de-watering

(5) BORE HOLE CONSTRUCTION Special Construction ☒ Yes ☐ No
Depth of Completed Well 24 ft
Explosives used ☐ Yes ☒ No Type Amount

BORE HOLE			SEAL			Sacks or Pounds
Diameter	From	To	Material	From	To	
2"	0'	24'				

How was seal placed Method ☐ A ☐ B ☐ C ☐ D ☐ E
☐ Other

Backfill placed from ft to ft Material
Gravel placed from ft to ft Size of gravel

(6) CASING/LINER				Steel	Plastic	Welded	Threaded
Diameter	From	To	Gauge				
Casing 2"	0'	24'	STD	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Liner				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Drive Shoe used ☐ Inside ☐ Outside ☒ None
Final location of shoe(s)

(7) PERFORATIONS/SCREENS
☐ Perforations Method
☒ Screens Type V Wire Material Steel

From	To	Slot Size	Number	Diameter	Tele/pipe size	Casing	Liner
19'	24'	.010		2"	PS	<input checked="" type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>

(8) WELL TESTS: Minimum testing time is 1 hour
☒ Pump ☐ Bailor ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
14	14.5'		8 hours

Temperature of water 51 Depth Artesian Flow Found

Was a water analysis done? ☐ Yes By whom

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other

Depth of strata

(9) LOCATION OF WELL (legal description)

County Lane
Tax Lot county right a way Lot
Township 18 S Range 12 W WM
Section 4 SW 1/4 NE 1/4
Lat 0' 0" 0" or (degrees or decimal)
Long 0' 0" 0" or (degrees or decimal)

Street Address of Well (or nearest address) Near 88410 First Ave
Florence, OR 97439

(10) STATIC WATER LEVEL

4.5 ft. below land surface Date 1-4-10
ft. below land surface Date
Artesian pressure lb per square inch Date

(11) WATER BEARING ZONES

Depth at which water was first found 4.5'		Estimated Flow Rate	SWL
From	To		
4.5'	24'	14 gpm	4.5'

(12) WELL LOG

Ground Elevation		From	To	SWL
Material				
sand		0	24	4.5'

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JUN 1 2010

FEB 11 2010

WATER RESOURCES DEPT
SALEM, OREGON

WATER RESOURCES DEPT
SALEM, OREGON

Date Started 1-6-10 Completed 1/29/10

(bonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

WWC Number Date

Signed

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 636 Date 2/11/10

Signed [Signature] V-Ann
Christensen, WCC Deicing Co.

ORIGINAL - WATER RESOURCES DEPARTMENT

FIRST COPY - CONSTRUCTOR

SECOND COPY - CUSTOMER

06/16/2004

LANE 63365

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 517.703)

Instructions for completing this report are on the last page of this form.

WELL I.D. # 169480
START CARD # 153275

(1) LAND OWNER: Name City of Florence Well Number 12
Address P.O. Box 340
City Florence State OR Zip 97439

(2) TYPE OF WORK:
☒ New Well ☐ Deepening ☐ Alteration (requires revision) ☐ Abandonment

(3) DRILL METHOD:
☒ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger
☐ Other

(4) PROPOSED USE:
☐ Domestic ☒ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☐ Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☐ Yes ☒ No Depth of completed Well 194 ft
Explosives used ☐ Yes ☒ No Type _____ Amount _____

HOLE SEAL
Diameter From To Material From To
16" 10 24 Cement 10 24 1/2 Bentonite
12" 24 194
How was seal placed? Method ☐ A ☐ B ☒ C ☐ D ☐ E
☐ Other
Backfill placed from _____ ft to _____ ft Material _____
Gravel placed from _____ ft to _____ ft Size of gravel _____

(6) CASING/LINER:
Diameter From To Gauge Steel Plastic Vented Threaded
Casing: 12" 11 138 375 R ☐ ☐ ☐ ☐
12" 13.5 157 325 WTC ☐ ☐ ☐ ☐
12" 158.5 194 375 WTC ☐ ☐ ☐ ☐
Liner: ☐ ☐ ☐ ☐
Drive Shoe used ☐ Inside ☐ Outside ☐ None
Final location of shoe:

(7) PERFORATIONS/SCREENS:
☐ Perforations Method WIRE Material 304 SS
☒ Screens
From To Slot size Mesh Size Diameter Tensile/pipe size Casing Liner
132 138.5 006 12" 15 Casing ☐ ☐
194 194 006 12" 15 Liner ☐ ☐

(8) WELL TESTS: Minimum testing time is 1 hour
Well sample now finished
☒ Pump ☐ Bailor ☐ Air Flowing ☐ Artesian
Yield gpm: 184 Drawdown 41.35 Drill stem at Time
344 71.5 7hr

Temperature of water: 50° Depth Artesian Flow Found _____
Was a water analysis done? ☐ Yes ☒ No By whom _____
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Murky ☐ Odor ☐ Colored ☐ Other _____
Depth of strata _____

(9) LOCATION OF WELL by legal description:
County Lane Latitude _____ Longitude _____
Township 18S N or S Range 12W E or W
Section 23 SE 1/4 NE 1/4
Tax Lot City Lot _____ Block _____ Subdivision _____
Street Address of Well (or nearest street) 38th + Willow
Florence City Well Serial # _____

(10) STATIC WATER LEVEL:
63 ft below land surface Date 10-29-03
Atmospheric pressure _____ lb per square inch Date _____

(11) WATER BEARING ZONES:
Depth at which water was first found: 63
From To Estimated Flow Rate SWL
63 188 340 gpm

(12) WELL LOG:
Ground Elevation _____
Material From To SWL
Sand - Tan 0 11
Sand - w/wood 11 43
Sand - Tan 43 118
Sand - w/wood 118 148
Sand - Dark - w/Heavy wood 148 161
Sand - Dark blue 161 192
Clay - Blue 192 194
Concrete pipe 192 to 194
Grout in steel pipe 194 to 194
MAR 30 2004
WATER RESOURCES DEPT.
SALEM OREGON

Date started 7-28-03 Completed 3-16-04
(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

WWC Number _____
Signed _____ Date _____
(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is in the best of my knowledge and belief.
Signed David Christensen WWC # 636
Christensen Well Drilling Co.

ORIGINAL - WATER RESOURCES DEPARTMENT FIRST COPY - CONSTRUCTOR SECOND COPY - CUSTOMER

LANE 71033

Lane 71033

STATE OF OREGON
WATER SUPPLY WELL REPORT
(As required by ORS 517.965)

WELL I.D. # 102232

START CARD # 207005

Instructions for completing this report are on the last page of this form.

(1) LAND OWNER Well Number 13
Name City of Florence
Address 250 Hwy 101
City Florence State OR Zip 97438

(2) TYPE OF WORK ☒ New Well
☐ Deepening ☐ Alteration (repair/recumbition) ☐ Abandonment ☐ Conversion

(3) DRILL METHOD
☐ Rotary Air ☒ Rotary Mud ☐ Cable ☐ Auger ☐ Cable Mud
☐ Other

(4) PROPOSED USE
☐ Domestic ☒ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☐ Other

(5) BORE HOLE CONSTRUCTION Special (if present) ☐ Yes ☒ No
Depth of Completed Well 130 ft
Explosives used ☐ Yes ☒ No Type Amount

BORE HOLE				SEAL			
Diameter	From	To	Material	From	To	Seals or Perforations	
18"	0	10	concrete	0	10		
14"	10	130	with 4% bentonite				

How was seal placed: Method ☐ A ☐ B ☒ C ☐ D ☐ E

Backfill placed from 130 ft to 135 ft Material native sand
Gravel placed from ft to ft Size of gravel

(6) CASING/LINER
Diameter From To Gauge Steel Plastic Welded Threaded
Casing 12 125 130 375 12 125 130 375
Liner

Drive Shoe used ☐ Inside ☐ Outside ☒ None
Final (bottom of sheet)

(7) PERFORATIONS/SCREENS
Type ☒ Screens Method ☒ V-wing Material SS

From	To	Slot Size	Number	Diameter	Sub-type	Coating	Layer
75	125	.008		12"	pipe		

(8) WELL TESTS: Minimum testing time is 1 hour
☒ Pump ☐ Bailor ☐ Air ☐ Flowing Artesian

Yield gallons	Drawdown	Drift water at	Time
415	55.85		6 hours

Temperature of water 50 Depth Artesian Flow Found
Was a water analysis done? ☐ Yes If yes when
Did any strata contain water not suitable for intended use? ☐ Yes If yes when
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other
Depth of strata

(9) LOCATION OF WELL (legal description)
County Lane
Tax lot City of Florence - city lot Lot city lot
Township 18 S Range 12 W WM
Section 22 NW 1/4 NE 1/4
Lat " " " " " " (degrees or decimal)
Long " " " " " " (degrees or decimal)

Street Address of Well (or nearest address) 20th & Willow - Florence City
Well Field

(10) STATIC WATER LEVEL
ft below land surface Date 03-31-11
Artesian pressure ft below land surface Date

(11) WATER BEARING ZONES
Depth at which water was first found 9'
From To Estimated Flow Rate SWL

From	To	Estimated Flow Rate	SWL
25	125	400 gpm	9

(12) WELL LOG
Ground Elevation
Material From To SWL
sand, yellow 0 17 9
sand, brownish yellow silty 17 40 9
sand, blue gray silty 40 43 9
sand, blue gray 43 88 9
sand, grayish tan silty 88 107 9
sand, gray 107 120 9
sand, blue gray 120 125 9
clay, gray, sandy silty 125 135 9

RECEIVED

MAY 8 2011

User Started 03-15-11 Completed 03-31-11 WATER RESOURCES DEPT
(Sealed) Water Well Constructor Certification SALEM, OREGON
I certify that the work performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

WWC Number 1888 Date

Signed

(Sealed) Water Well Constructor Certification
I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 636 Date

Signed Paul Christensen & Fred Christensen Well Drilling Co

ORIGINAL WATER RESOURCES DEPT. SALEM, OREGON FIRST COPY - CONSTRUCTOR SECOND COPY - CUSTOMER 06/16/2004

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Appendix D

Delineation of Drinking Water Protection Areas

City of Florence, Oregon

February 15, 2012



Prepared by:





OREGON PUBLIC HEALTH DIVISION
Drinking Water Program

John A. Kitzhaber, M.D., Governor

Oregon
Health
Authority

444 A Street
Springfield, OR 97477
541-726-2587 ext.
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March 16, 2012

Matthew Burdett
City of Florence
250 HWY 101
Florence, Oregon 97439

Re: OHA Drinking Water Program Delineation Certification # 0016

Dear Matthew:

Under the Administrative Rules that apply to Oregon's EPA-approved Drinking Water Protection Program, the Oregon Health Authority has the responsibility of certifying groundwater-derived drinking water protection areas in the State (see DEQ's OAR 340-40-180 (3)). This certification is granted after technical review assures that the submitted delineations meet minimum requirements for the system as outlined in OHA's OAR 333-61-0057, and that the delineation is a hydrogeologically reasonable representation of the capture zone of the well, wellfield or spring. The delineation of the capture zones for the current City of Florence wellfield meets the above requirements and is therefore certified collectively as Oregon Health Authority Drinking Water Program (OHA DWP) Delineation Certificate #0016. The delineation of capture zones for the proposed wellfield by OHA definition is a provisional delineation and can not be included as part of this certification. Instead, OHA approves of the use of the provisional delineation for protection of possible future drinking water resources.

The City of Florence has more than 3000 service connections. As such, OHA DWP certification qualifies the existing wellfield delineation (i.e., Wells 1 through 13) as a significant groundwater resource for the purpose of State-Wide Planning Goal 5 (see LCDC's OAR 660-23-140). DLCD [(503) 373-0050] can answer questions regarding state-wide planning goals.

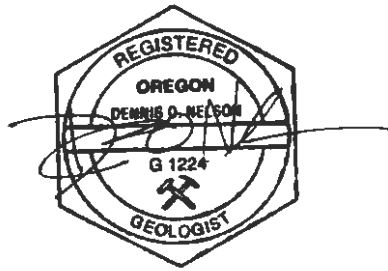
As you continue your efforts in implementing drinking water protection strategies, the Drinking Water Program can provide technical assistance. To complete this process please forward an ARCGIS compatible shapefile of the delineated capture zones for both wellfields to Steve Aalbers of DBQ (503-229-6798).

We appreciate the investment that the City of Florence is making on behalf of its drinking water resource. We also wish to thank you for your continued and constructive assistance in the development of Oregon's Drinking Water Protection Program.

Sincerely,

Tom Pattee
Groundwater Coordinator
OHA Drinking Water Program

cc: Sherree Stewart, DBQ; Dennis Nelson, GSI Water Solutions



October 25, 2011

Tom Pattee, Groundwater Coordinator
Drinking Water Program
Oregon Health Authority
444 A Street
Springfield, Oregon

Re: Identification of the Drinking Water Protection Areas, Florence, Oregon

The City of Florence is part of the Siuslaw Estuary Partnership whose objectives include the protection of the Florence Dunal Aquifer water quality and quantity in the current and future well fields, of streams and wetlands, and of fish and wildlife habitat. The City also has the objective of developing an Aquifer Protection Plan which includes the development of a Drinking Water Protection Plan for current and future resources.

GSI was asked to participate in this project in three areas: surface and groundwater quality and quantity, the update of the delineation of the drinking water protection areas completed in 2003 by OHA, and assistance in developing drinking water protection strategies. This communication addresses the updating of the City of Florence's delineations. We are submitting this document as the first step in obtaining certification of these delineations.

The delineation project's goals are:

- Develop a local-scale numerical groundwater flow model that can simulate area groundwater conditions using groundwater and surface water data collected during the monitoring phase of the Partnership study.
- Use the model to refine the existing Drinking Water Protection Areas (DWPAs) delineation for the existing water supply wells and establish delineations for the proposed City wells. This effort will consist of defining the capture zones that provide groundwater to the City's wells during the 1-year, 2-year, 5-year, 10-year, 20-year, and 30-year time periods.
- Submit documentation to DHS for certification of the City's new DWPA delineations.

The City of Florence has a population of approximately 8,400 and is supplied drinking water by a single wellfield comprising 12 wells, with one additional well to come on line in the near future. The City's current well field production capacity is 2.7 mgd during the dry summer months (Table 1, GSI, 2008). The City's existing ground water rights total 3.8 mgd. Expansion of the drinking water treatment plant from 3.0 mgd to 4.0 mgd is feasible.

Table 1. City of Florence Well Capacities (August 2007)		
Wells	Combined Capacities (mgd)	Capacity Pump Rate/Well (gpm)
Wells 1 through 7	1.2	120
Wells 8 through 12	1.6	222

The City anticipates an average annual population growth rate of 3.5 percent. Information provided by the City indicates that water production/demand has also grown, but at a slower rate than the projected 3.5 percent rate of population increase. GSI (2008) calculated the expected average rate of increase in water demand during the highest demand months at 2.9 percent, assuming no constraints to increased demand, such as well production capacity or drinking water treatment capacity limitations.

Given the projected water production growth of 2.9 percent, the capacity of the current wellfield may be reached by the end of 2011. The City has drilled an additional well (#13) in the field and will bring it on line in the near future, however, additional sources will be needed and the City is considering adding a second wellfield. The City wishes to include a future wellfield site in the delineation model. The purpose of delineating the proposed well field is to provide information that can be used to protect this future source of water.

Florence Groundwater Flow Model

Groundwater flow in the Florence area was modeled using the numerical finite element model MODFLOW 2000 (Harbaugh and others, 2000) packaged in the program Groundwater Vistas[®] 5.44 (Environmental Simulations, Inc., 2007). Numerical models allow the modeler to divide (discretize) the area of interest into discrete rectangular volumes (cells) in three dimensions that can be individually characterized in terms of aquifer properties, assigned head, boundary conditions, etc. The use of multiple layers and cell volumes/layer is permissible.

Numerical models use input data provided by the modeler to calculate the distribution of hydraulic head within the model area (domain). The input data is developed from a conceptual model of the area in which the modeler develops an understanding of the local geology, hydrogeologic units, their characteristics, including aquifer thickness, permeability and porosity, areal recharge, and boundary conditions, e.g., streams, geologic contacts, etc

As a means of constructing a representative model, the model is generally “calibrated” to one degree or another against data, generally hydraulic head, collected in the field as a check.

Conceptual Model

An important resource in developing the Florence area conceptual model was the U.S. Geological Survey Water Supply Paper, “Ground Water in the Coastal Dune Area Near Florence, Oregon” (Hampton, 1963). This publication provides descriptions of the major hydrogeologic units in the area and a map showing the distribution of hydraulic head in the area. A study by Brown and Caldwell (2001) provided a basis for estimating aquifer characteristics. The head map produced by Hampton (1963) and the model results of a three dimensional groundwater model developed by EGR & Associates (1997) for the purpose of evaluating the impact of increasing use of Clear Lake water, were used as first order calibration targets in this study.

Both of the studies above indicated that groundwater discharges to the Siuslaw River to the south and southwest, and to the Pacific Ocean to the west northwest. As a result, groundwater flow direction varies from north to south in the southern part of the City and to the west in the northern part of the area.

The local geology consists of younger (< 10,000 yrs) Holocene dunes overlying older (24-100,000 years) Late Pleistocene dunes. The ancestral Siuslaw River cut channels in the older dunes prior to the deposition of the younger dunes. This resulted in the Holocene dunes having variable thickness across the area. The variable thicknesses are shown in Figure 2 (*OSU Geophysics Group. 1980*) and vary from less than 20 feet to more than 200 feet. Thicker sections, e.g., along the eastern margin of the dune field apparently mark the locations of past channels of the ancestral Siuslaw River (Peterson, 2011, personal communication), while shallow sections represent topographic highs on the underlying sedimentary rock surface.

Model Development.

Model Grid. For characterization of model parameters, a rectangular grid was constructed as 3 layers with a grid spacing of 90 columns and 160 rows (Figure 3). Each cell has a dimension of 200 x 200 feet. This grid spacing was arbitrarily chosen to provide for a manageable number of cells given the size of the model area. For a larger scale head map of the active wellfield to qualitatively evaluate the modeled interference of the individual wells was refined to a 100 x 100 foot grid (see below).

The model grid was anchored to a specific location with UTM and Oregon State Plane coordinates. Specifically, the origin of the grid is at the UTM coordinates 409050E and 4868000N or $x = 3964455.55$ and $y = 857063.85$, NAD83 Oregon State Plane, South Zone, International feet, respectively.

Model Layers. Three layers were established (Figure 1) initially to be able to account for subtle variations in the amount of clay associated with the sand. However, based on a seismic study (Figure 2), it became apparent that the properties chosen for the aquifer layers needed to be done in a manner to more accurately reflect the topographic high of the bedrock beneath the dunes in the central area and

to establish the vertical and horizontal variation of the transmissivity (thickness) of the aquifer. No specific boundaries marking the layers are implied by the layer boundaries.

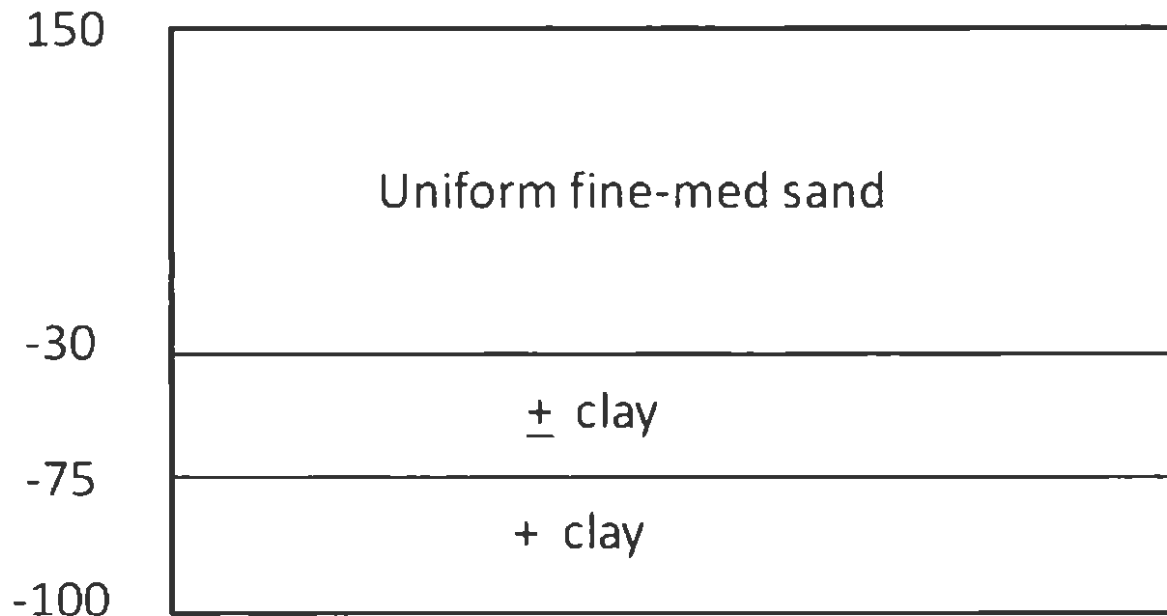


Figure 1. Schematic diagram of the layers originally established for the Florence Dunol Aquifer model (see text for discussion). Numbers on the y-axis reflect elevation (SMOW).

Model Boundaries. The eastern boundary of the dune deposits (Figure 3) is marked by a topographic slope break at the contact between the dune deposits and underlying Flournoy Formation of Middle Eocene. These rocks, exposed in outcrop just east of Florence on Highway 26, consist of fine grained sediments, chiefly siltstone. Based on exposures, the Flournoy contains some fracturing. For the purpose of this model, the sedimentary unit was considered impermeable and was considered to be a no flow boundary (Figure 4). Also considered to be a no flow boundary is the northernmost boundary arbitrarily drawn at 45° 3.1' N. The Pacific Ocean forms the western boundary and is considered to be a constant head at a value of 0.0 feet.

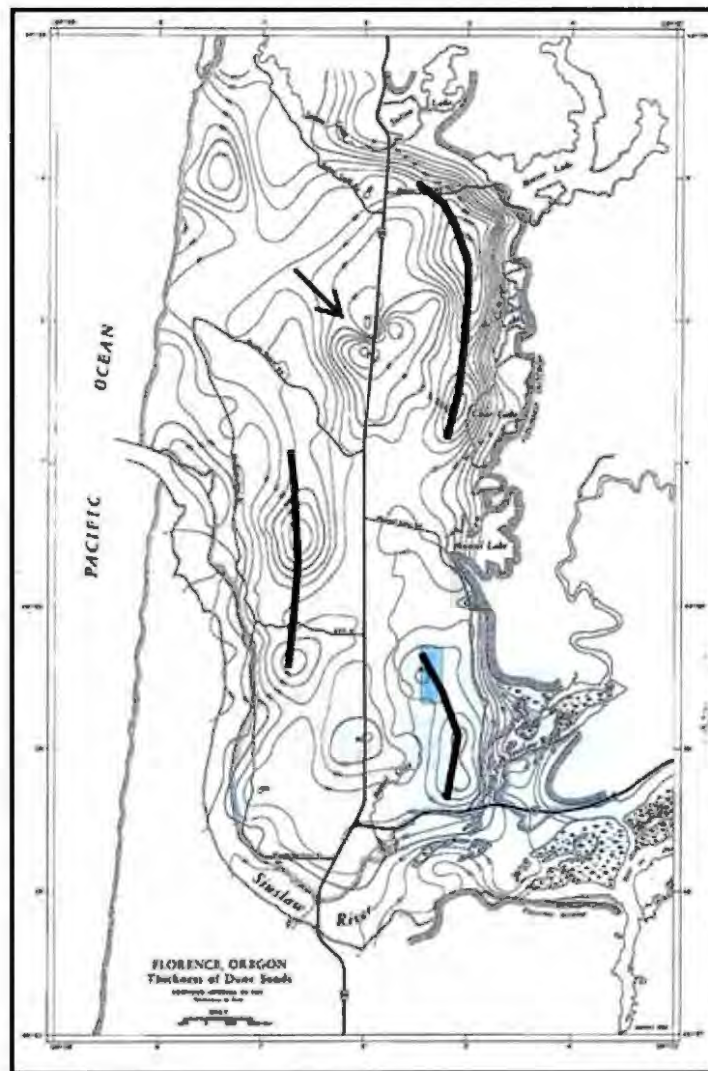


Figure 2. Seismic data indicating the variable thickness of the dune deposits in the Florence Area. Deep troughs (see dark lines) produce sand thicknesses of up to 200 ft. These troughs mark the locations of past channels of the ancestral Siuslaw River. Shallow (~20 feet) sand accumulations (see arrow) mark the location of topographic highs on the underlying sedimentary rock surface. Approximate location of the existing wellfield is shown in the lightly shaded rectangle. Map taken from (OSU Geophysics Group, 1980).

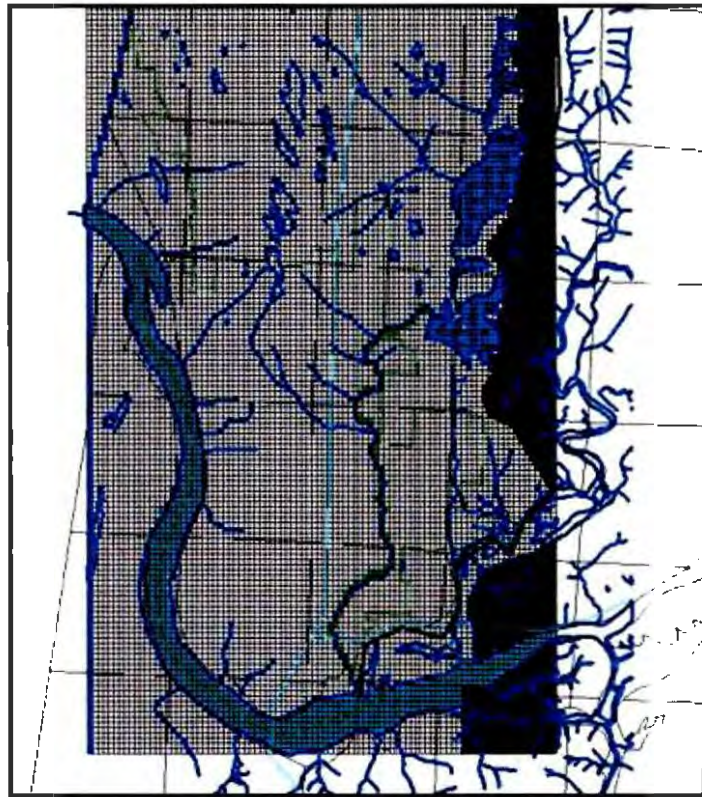


Figure 3. Model domain showing grid design, comprising 90 columns and 160 rows of cells with dimensions of 200 x 200 feet (14,400 individual cells).

Surface Water. The rivers, the lakes, and Munsel Creek were integrated into the flow model based on available data. The stage of the Siuslaw River and the North Fork of the Siuslaw were estimated based on digital elevations derived from the Florence 7.5 minute topographic map. Munsel Creek headwater stage was set at the average elevation of the outflow of Munsel Lake where the creek originates. Average lake elevations were determined from Portland State University's Center for Lakes and Reservoirs. Parameters used as input to the model are given in Table 2.

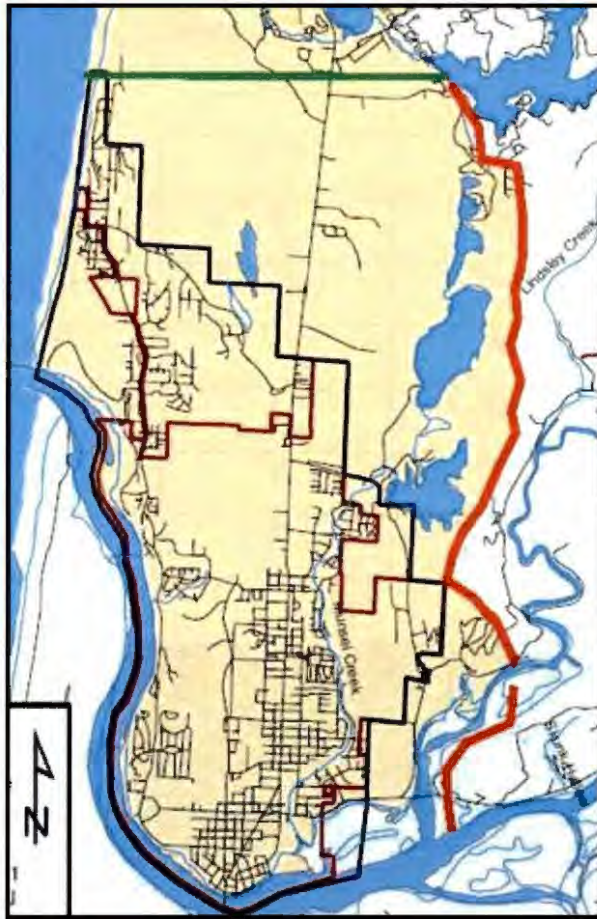


Figure 4. Map showing the approximate extent of the Florence Dunal Aquifer. Thin red line is the City limits of Florence while the thin black line represents the urban growth boundary (UGB). Thick red line represents the eastern no-flow boundary of the model. The Siuslaw River and the Pacific Ocean form the southern and western boundaries. The thick green line forming the northern boundary is a no-flow boundary arbitrarily drawn at $45^{\circ} 3.1' N$.

Recharge. Virtually the entire recharge to the Dunal Aquifer is from direct infiltration of precipitation that falls on the dune surfaces. Total rainfall in Florence varies from 47 inches in a dry year to 122 inches in a wet year, with an average of 69 inches (Florence Stormwater Management Plan, 2000). Rainfall in the Florence area during the 2010-2011 rainfall year varied from 67.1 to 78.2 inches (from individual resident records).

Table 2. Model input for lakes, rivers and streams, Florence groundwater model.

	Stage (ft msl)	Bed Thickness	K (ft/day)	W x L
Siuslaw River	0	5 – 10	2 – 0.1	200 x 200
N. Fork Siuslaw Riv	2 - 0	3	2 -1	100 x 200
Munsell Creek	89 – 0	2 – 1	1 – 0.5	50 x 200
Munsell Lake	89	3	0.5	NA
Ackerly Lake	93.5	3	0.5	NA
Clear Lake	98	3	0.5	NA
Collard Lake	115	3	0.5	NA

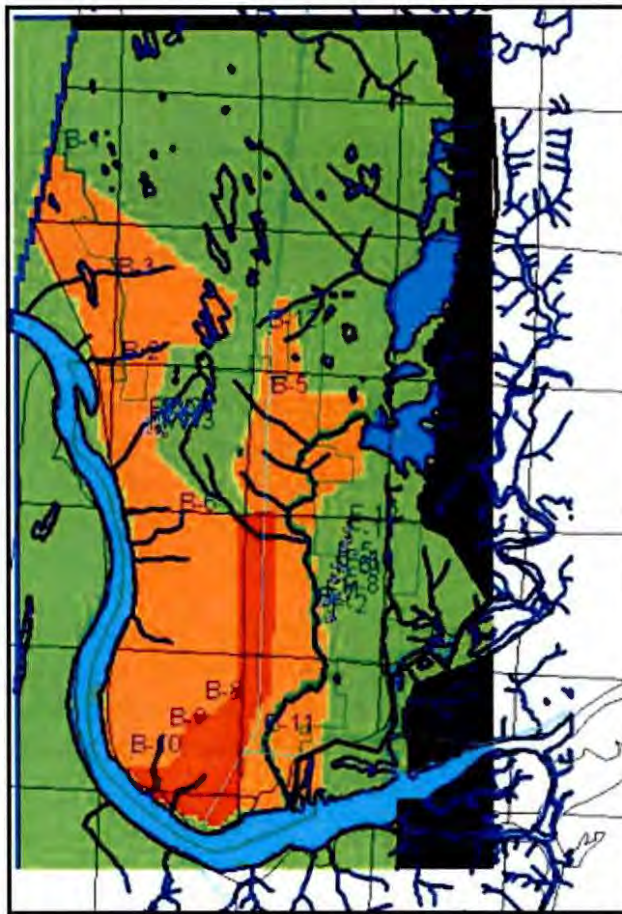


Figure 5. Distribution of recharge values as a function of specific land use activity. Open dunes (green) = 0.0133 ft/d, residential (orange) = 0.009 ft/d, and commercial/industrial (red) = 0.006 ft/d.

Accounting for evapotranspiration, Hampton (1963) estimated that recharge annually to the aquifer was 55 inches/year. Runoff coefficients were used to adjust the recharge rate as a function of land use (City of Florence, 2008)), e.g., open dunes = 0, residential areas = 0.4, and commercial/industrial = 0.6 (Dunne and Leopold, 1978). The final distribution of recharge rates used in the model are shown in Figure 5.

Porosity. The porosity, the volume fraction of the bulk material that consists of open pore space, is a function of particle size. Hampton (1963) demonstrated that the dunal sands in the Florence area are very uniform in size. Based on the data he provides, it would appear that ~80% of the sand is in the size range of 0.2 to 0.275 mm and therefore is considered to be fine to medium sand. The effective porosity of fine to medium sand varies from 0.23 to 0.28 (Moss and Moss, 1990). For modeling purposes here, a porosity value of 0.26 was chosen for the aquifer.

Hydraulic Conductivity. The hydraulic conductivity (K) of the aquifer was initially based on aquifer tests within the City's current wellfield. These tests indicated that the hydraulic conductivity of the sand deposits varied from 50 to 100 ft/day (Brown and Caldwell (2001). Aquifer thickness in the area of the wellfield suggested that the deposits were in excess of 200 feet thick (the SE trough in Figure 2). After a review of well reports and specific capacity data, DHS (2003) determined that the aquifer's permeability was higher in the eastern part of the area near the current wellfield than in the west. It was also noted that the variable thickness of the aquifer would significantly influence the movement of groundwater through aquifer in specific regions of the Dunal Aquifer.

The distribution of hydraulic conductivity in the Dunal Aquifer was weighted as a function of the thickness of the sand deposits (Figure 2). The final model values of K varied 5 to 55 ft/day. Figure 6 shows the final distribution of K values.

Wells. Individual well location was determined using gps latitude-longitude measurements converted in model coordinates. Well locations are independent of cell location. Casing diameters were used as well diameters.



Figure 6. Variation of hydraulic conductivity within the sand aquifer. Colors represent the following K values (ft/day): green = 55, white = 35, orange = 18, gray = 15, brown = 5.

Running the Model

Model Description. MODFLOW 2000 was used in this effort, assuming steady state conditions (assumes no changes in any input parameters, including precipitation and pumping rates (City of Florence wells @125 gpm). The initial input data was used and the model was allowed to run. Criteria for convergence (reaching an acceptable solution) for the model were a head change = 0.01 and a residual criteria = 0.4. Convergence is achieved if the above criteria are met for 10 outer iterations. Input parameters were modified within reasonable ranges until the convergence criteria were met and convergence was achieved. Modifications continued until the model head predictions most closely approximated observed hydraulic head.

The City constructed a total of 15 shallow (<30 ft) monitoring wells within the Holocene dunes, 10 in September 2010 and an additional 5 in March 2011 (Figure 7). The depth to the water table has been measured monthly in each well since they were emplaced. Water levels in the wells varied up to 7 feet throughout the year, lowest in October 2010 and highest in April 2011, however the configuration of the water table remained relatively constant (Figure 8). The static water levels for the September, 2010 wells (white symbols in Figure 7) were converted to water table elevation and the 12-month average of

the head at each well was used as a target to evaluate how representative the developing flow model was to reality.

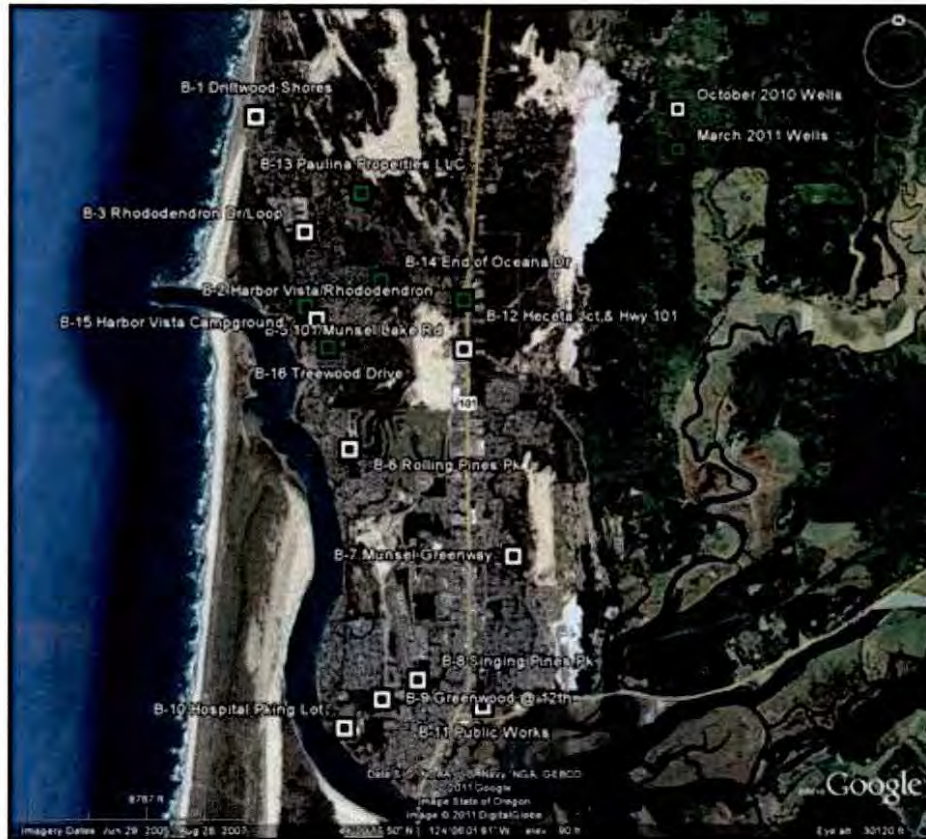
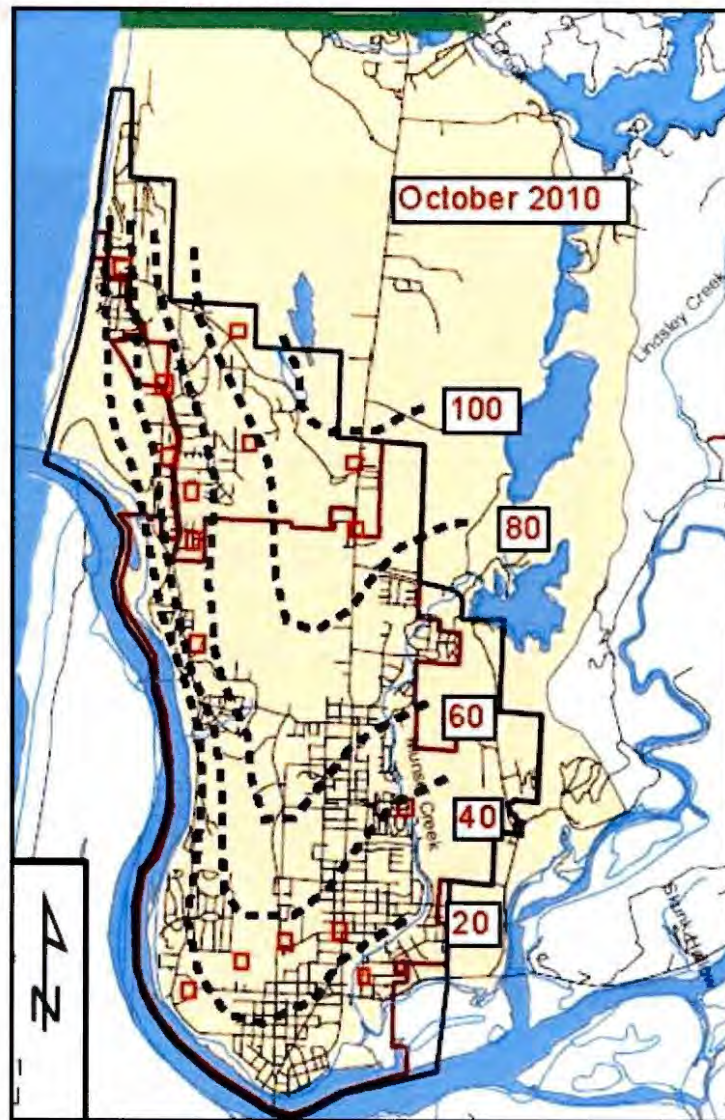
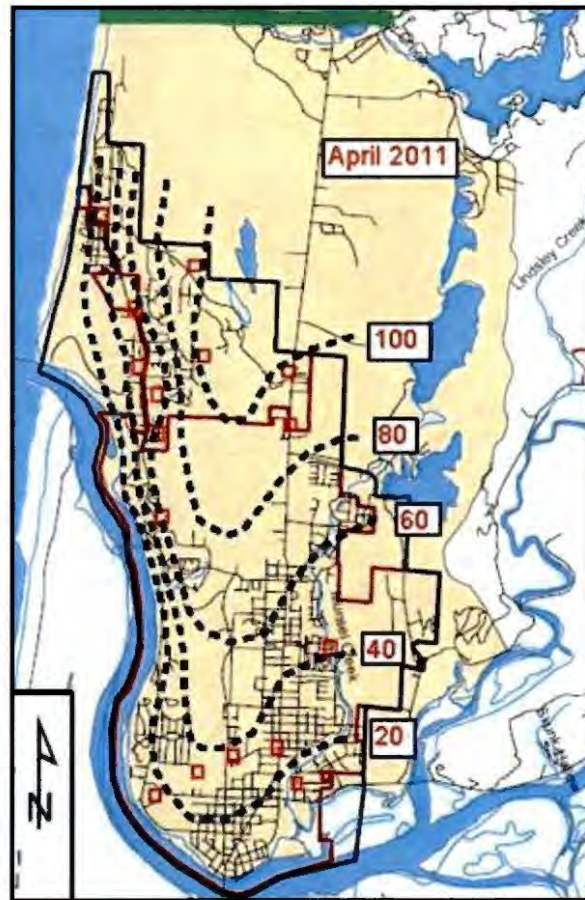


Figure 7. Location of monitoring wells in the Florence area. Wells with white symbols were installed in September 2010 while those with green symbols were installed in March 2011.



a.



b.

Figure 8. Comparison of the measured water table elevations from October 2010 (a) and April 2011 (b). Water table configuration remains similar throughout the year.

Model Calibration

Resources were not available to pursue the model calibration to a high degree of sophistication. The predicted water table elevations are in general agreement with the measured elevations (Figure 9). A more quantitative assessment of the model can be achieved by comparing predicted vs. observed heads at specific locations. Such an exercise was performed using monitoring wells B-1 through B-11 as shown in Figure 9 (B-4 was an unsuccessful well and is not listed).

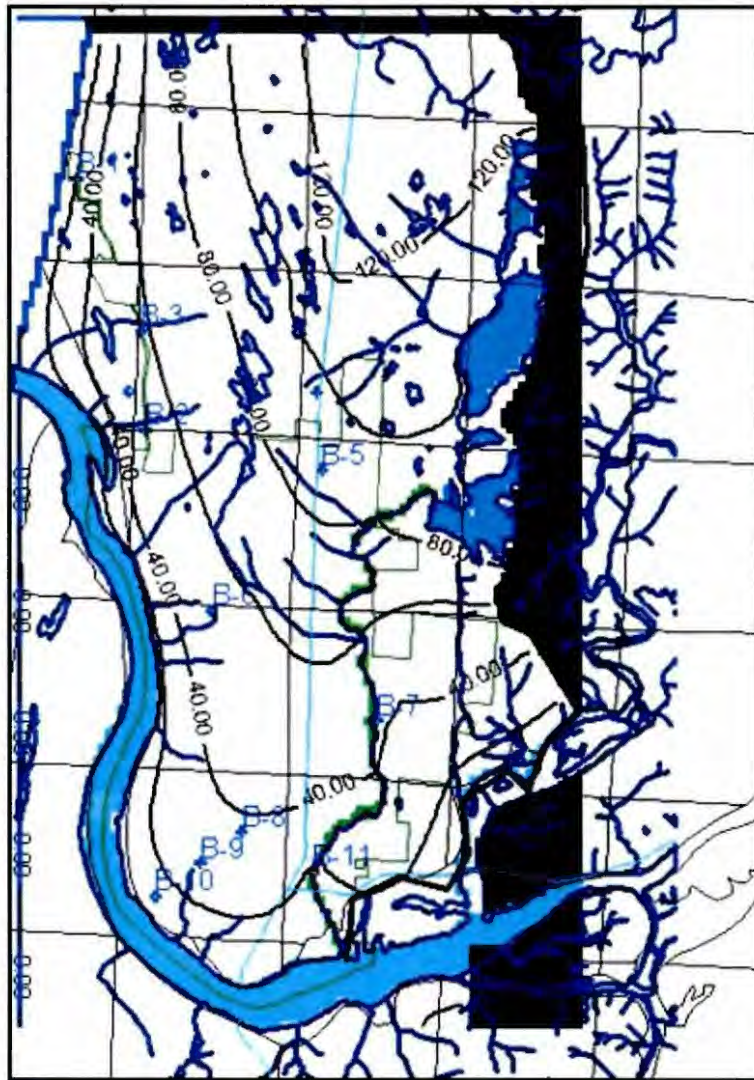


Figure 9. Model hydraulic head distribution. Contour interval is 20 ft. Monitoring wells used as calibration targets are labeled.

Differences between predicted and observed are referred to as residuals. In this model, the residuals varied from -7.29 feet to +10.4 feet with an absolute residual mean of 3.35 feet and a root mean squared error (RMS error) was 4.33. No geographic pattern of residuals is evident (Figure 10). The magnitude of the largest residual represents approximately 7.1% of the total head range in the area (~146 feet, based on GPR data provided by Sarah Doliber, 2012) while the residual mean value represents ~2.3% of the head range. Figure 11 is a plot of predicted vs. observed heads for the 10 monitoring wells used in the calibration.

Mass balance considerations indicate that the model is a reasonable representation of the groundwater flow system. The model wide mass balance error, comparing inflow to the model vs. outflow from the

model, is 0.159%. Accurate stream flow data was available for Munsel Creek only. During the pumping season, July through September 2011, discharge from Munsel Creek to the Siuslaw River increased progressively varying from 1 to 10 cfs and averaging 3 to 5 cfs. The model predicts that inflow from groundwater to Munsel Creek is ~2.9 cfs, well within that range.

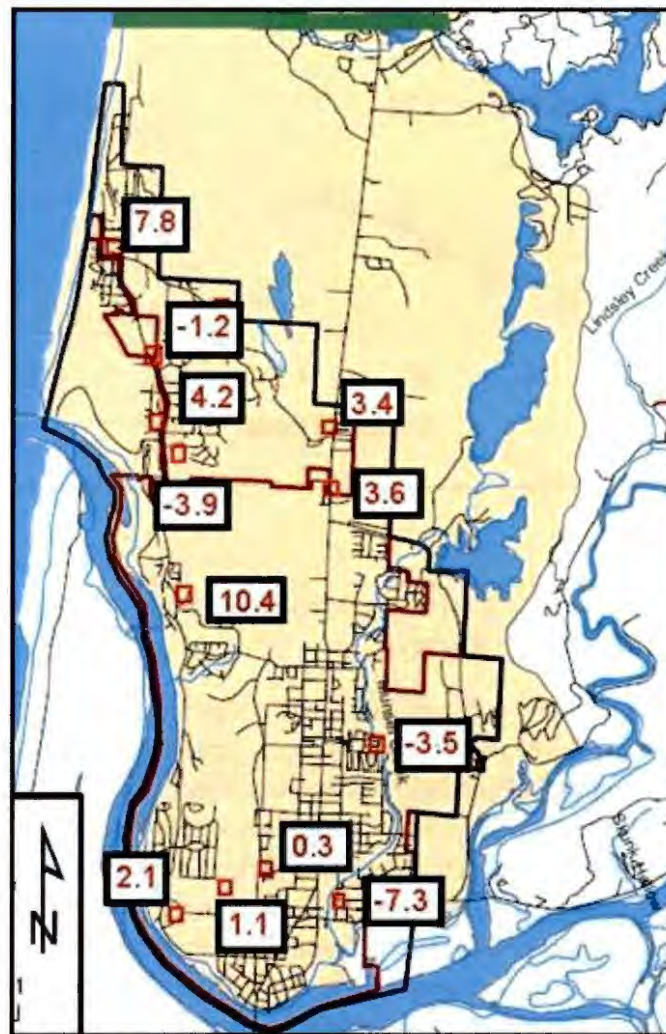


Figure 10. Map illustrating the residuals (= observed value - model value) at selected monitoring well sites. A negative number indicates that the model prediction is higher than the observed value, a positive value indicates that the model predicts a lower head than observed.

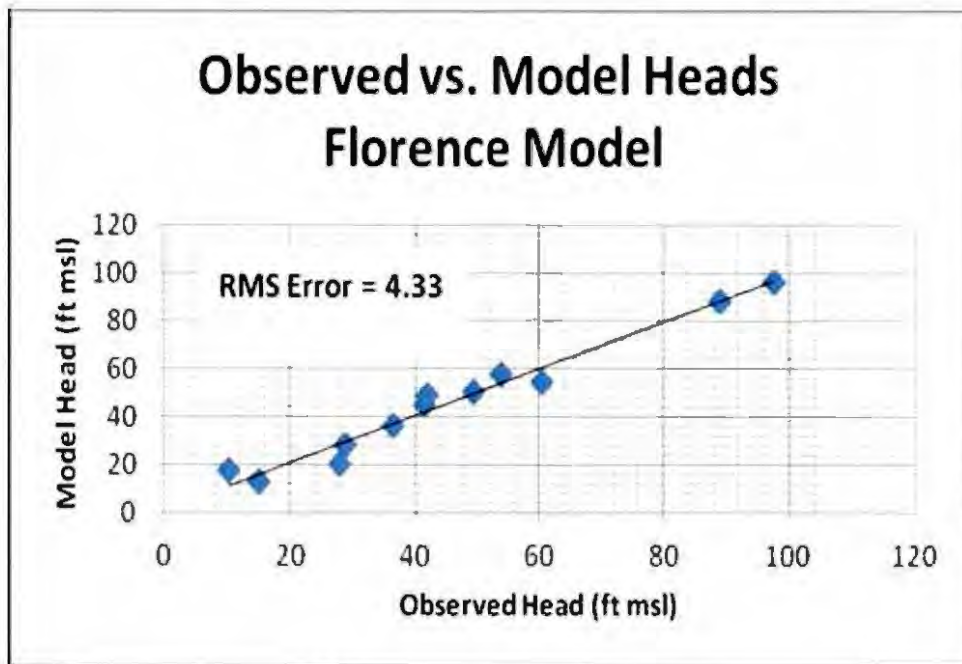


Figure 11. A plot of the observed vs. predicted heads as determined for the Florence area. The root mean of the squared residuals (RMS) is 4.33 feet.

Operation of the City's wellfield is recorded on a daily basis. Pumping schedules are variable as a function of demand, and mutual well interferences are complicated, however it is possible to estimate the combined impact of pumping wells on neighboring wells. Typical of an unconfined aquifer, the drawdown at the wellhead is considerable, e.g., 30 to 40 feet, rapidly becoming less as one moves away from the well. Reviewing the City's wellfield records suggests that the pumping of one well on a neighboring well produces a drawdown on the order of less than 1-2 feet. The flow model results in the vicinity of the wellfield are consistent with this small amount, reflecting the relatively high K value of the aquifer (Figure 12). To improve the local resolution in the wellfield, the model results represented in Figure 10 reflect a refinement of the grid in the wellfield to 100x100 foot cells (notice change in cell spacing in figure).

This refinement does not affect the overall results of the model described above. Figure 13 illustrates the positions of the groundwater contours over the model area. Aside from the shifting of the contours in the immediate vicinity of the existing and proposed wellfields, no significant changes in contour position are noted (compare with Figure 9).

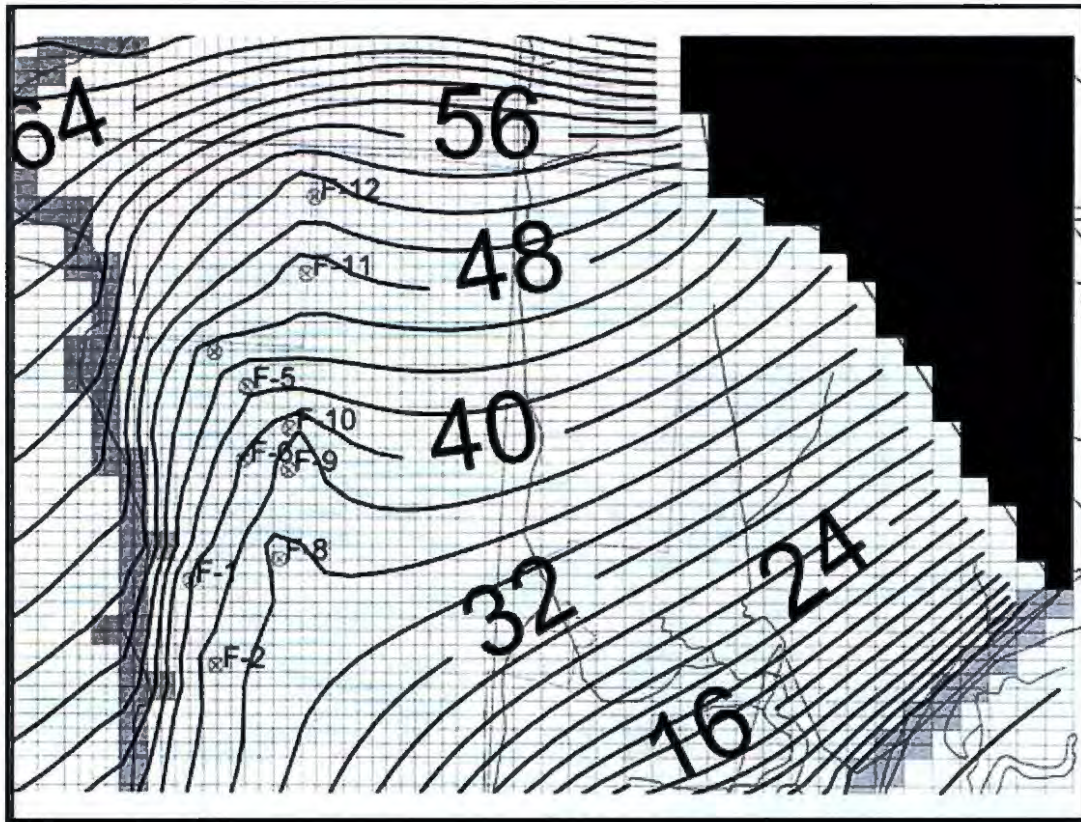


Figure 12. Head contours in the vicinity of the existing wellfield as predicted by the flow model (note grid has been refined to 100x100 ft for this model run). All wells are pumping at their respective capacities. Contour interval is 2 feet. Predicted impact of pumping on neighboring wells is minimal.

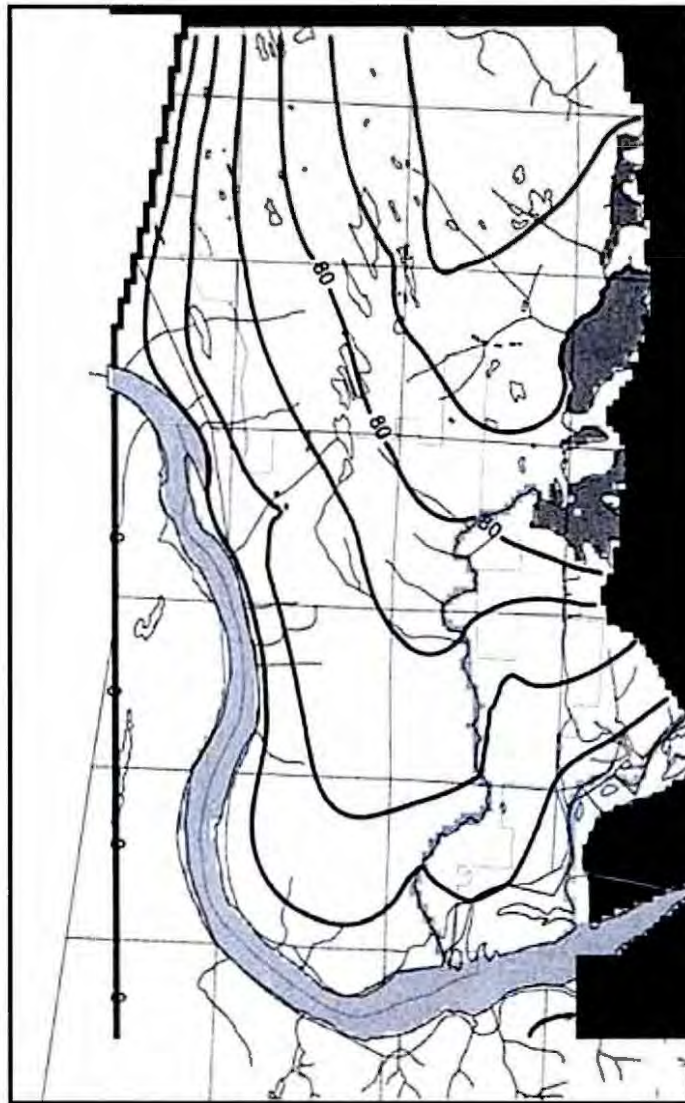


Figure 13. Contours of hydraulic head over the model area representing a refinement of the cell size within the wellfield to 100x100 feet (see Figure 12). No significant difference in contour placement is noted relative to the head distribution using the 200x200 cell dimension in the model used for capture zone analysis (compare Figure 9).

Capture Zone Analysis

The City of Florence has an existing Drinking Water Protection Plan (2003) and is in the process of updating it to make in consistent with the current conditions in the area. The updating process is as follows:

- Update the delineation of the current wellfield and proposed wellfield. The original delineation

by OHA included a possible new wellfield site, however that site is no longer being considered and an alternate site has been located.

- Update the Potential Contaminant Source (PCS) inventory and aquifer susceptibility analysis.
- Develop strategies to minimize the risk of contamination within the newly defined delineations.

The update of the delineation exercise is the purpose of the current project and GSI has used where possible the requirements laid out by OHA in their administrative rules (OAR 333-061-0057). With respect to model pumping rates, OHA allows the option of using a rate of 90% of the safe yield of a given well. For the delineation of the Florence Drinking Water Protection Areas, we have chosen to use the more conservative full well capacities determined by GSI (2008) and shown in Table 1 of this report. Well 13 is not operational at the time of this report, however, for planning purposes, the well was added to the model using a pumping rate of 220 gpm. Proposed wells were “pumped” at a value of 250 gpm.

The model is steady-state, therefore, all wells were on in the model continuously, again, employing a conservative, i.e., producing a larger capture zone, estimate of groundwater usage. Running the model with the existing and proposed wells pumping at capacity produced a slightly larger error (Absolute Residual Mean = 3.99, RMS = 4.95) primarily because of the proximity of one of the calibration wells (B-6) to the proposed wells.

MODPATH (Pollock, 1994) allows for the tracking of “particles” during a model run. These “particles” are allowed to flow with the groundwater to either predict where the groundwater is going (forward tracking), or, predict where it came from (reverse tracking). The latter reverse particle tracking exercise is referred to as capture zone analysis. The capture zone outlines the land surface that overlies that part of the aquifer that supplies groundwater to the well over a given time period.

Using the Groundwater Vistas¹ interface, particles were placed in a circle with a radius of 100 feet centered on each well in the layer in which the well is screened. Particles were released at the bottom and at 50% of the height of the specific grid cell in which the well was located. Well locations are independent of cell positions, i.e., they are not arbitrarily located at cell centers or corners.

OHA asks for specific time-of-travel (TOT) zones be delineated within a given capture zone, specifically, the 1-, 2-, 5-, and 10-year TOTs. For planning purposes, the City of Florence desired to extend the delineations out to include the 20- and 30-year TOTs.

The results of the delineation modeling effort are shown in a regional view (30-yr) in Figure 14, a more focused view of the 10-yr TOTs for both wellfields in Figure 15, and a closeup view of the 10-year TOT zones for the existing wellfield in Figure 16.

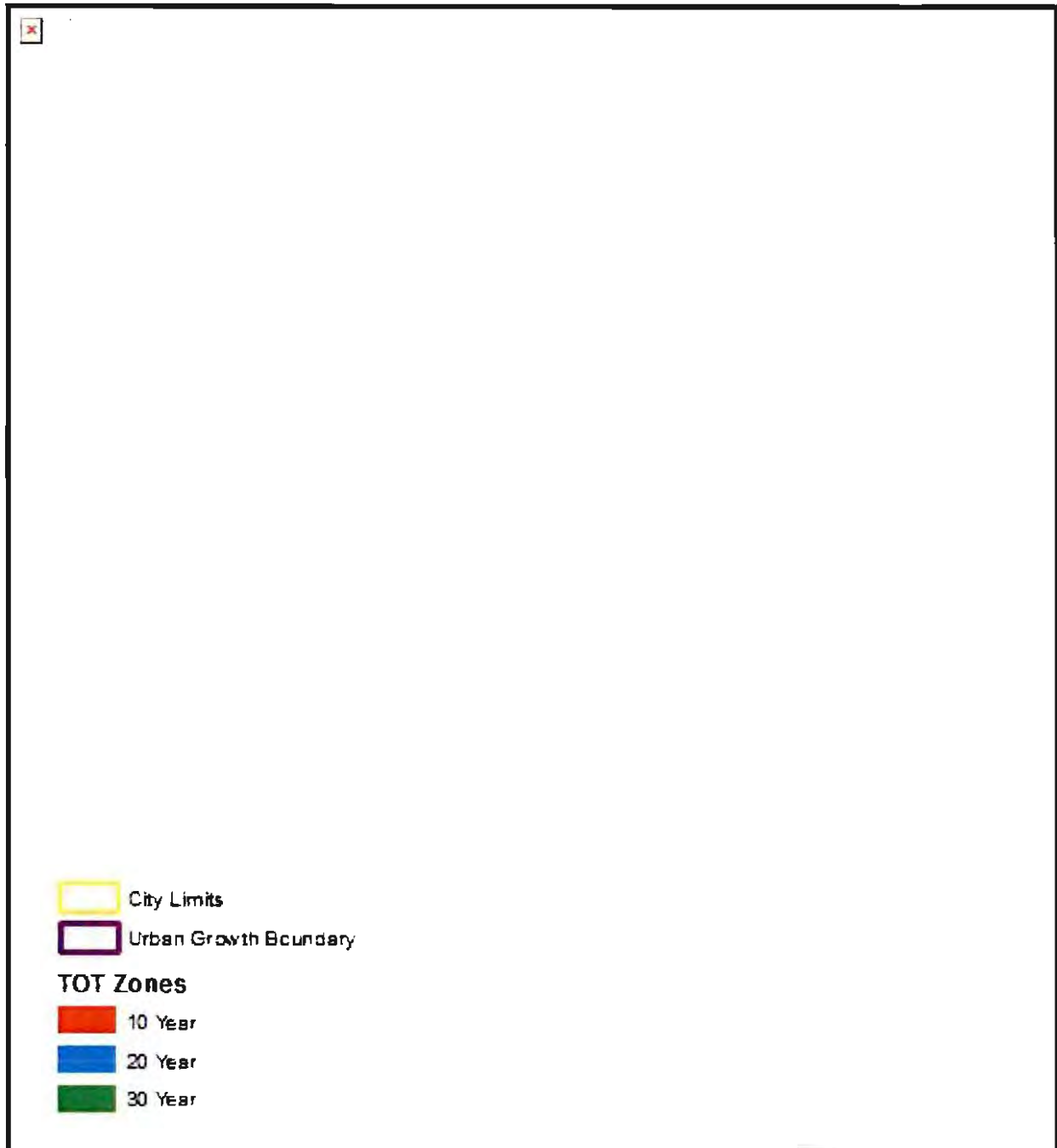


Figure 14. Regional view showing the 30-year capture zones of the existing wellfield (lower right) and the proposed wellfield (upper left) for the City of Florence.

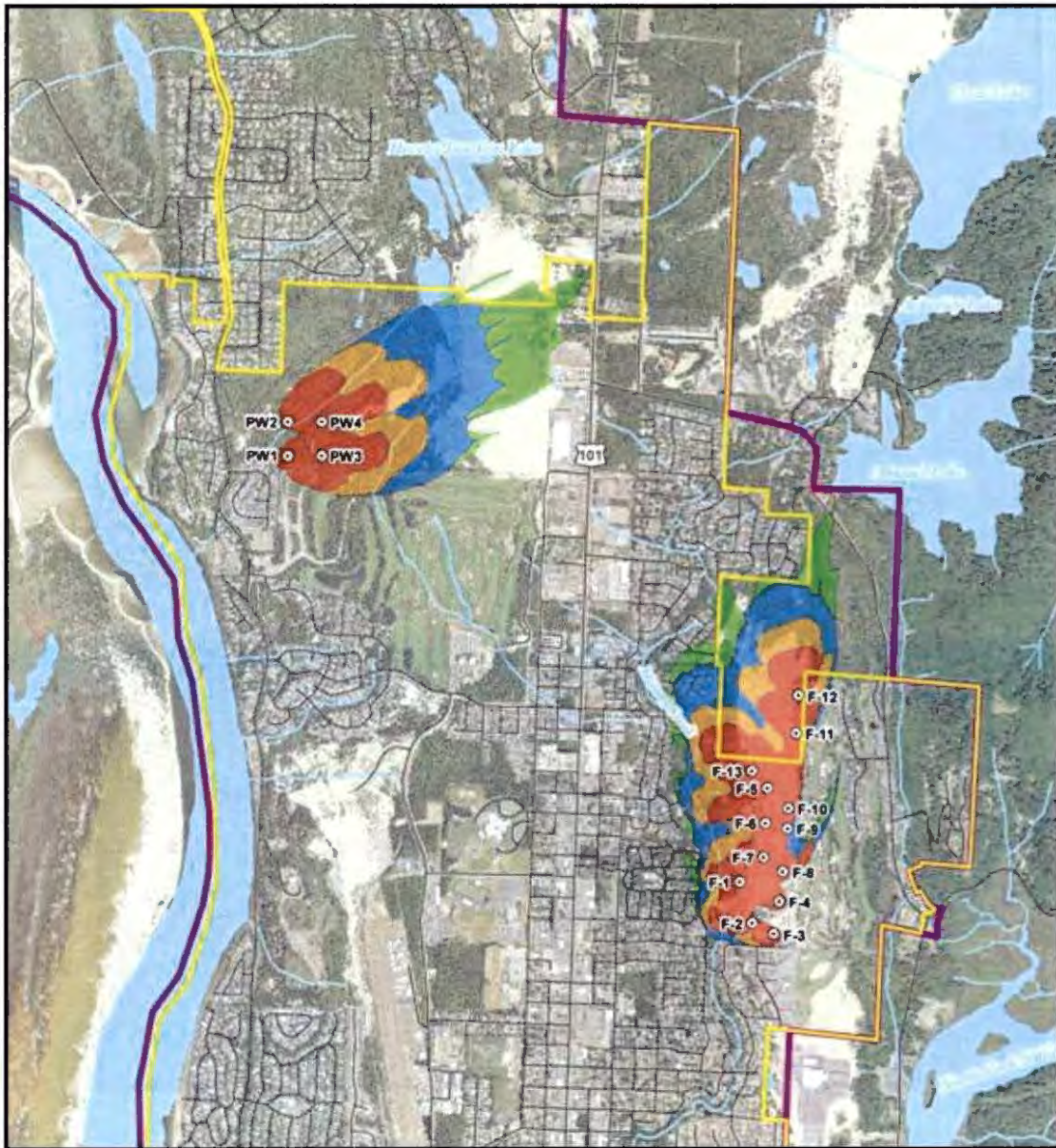


Figure 15. Ten-year capture zones for Florence's existing and proposed Wellfields. Different TOT zones indicated by shading: red = 1-yr TOT, orange = 2-yr TOT, blue = 5-yr TOT, and green = 10-yr TOT.

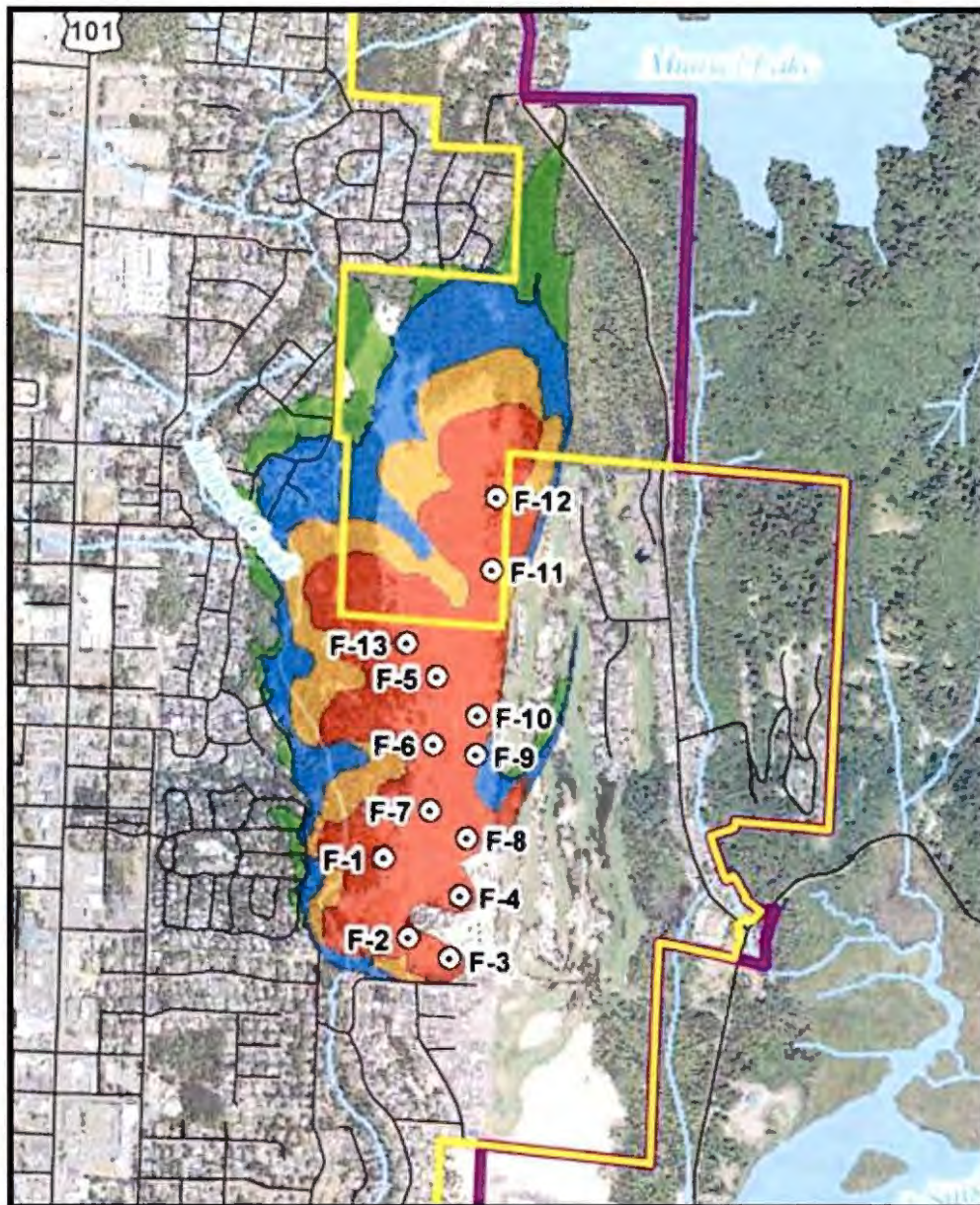


Figure 16. 10-year TOT capture zones for Florence's active wellfield. Florence wells 1 through 13 are shown. Different TOT zones indicated by shading: red = 1-yr TOT, orange = 2-yr TOT, blue = 5-yr TOT, and green = 10-yr TOT.

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Source Water Assessment Report

Heceta Water District
Florence, Oregon
PWS #4100301

September 11, 2001

Prepared for
Heceta Water District

Prepared by



State of Oregon
Department of
Environmental
Quality

Water Quality Division
Drinking Water Protection Program



Department of Human Services
Oregon Health Division
Drinking Water Program



Oregon

John A. Kitzhaber, M.D., Governor

Department of Environmental Quality

811 SW Sixth Avenue
Portland, OR 97204-1390
(503) 229-5696
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September 11, 2001

Mr. Mike Kendoll
Heceta Water District
87845 Highway 101
Florence, Oregon 97439

RE: Source Water Assessment Report
Heceta Water District
PWS # 4100301

Dear Mr. Kendoll:

Enclosed is the Source Water Assessment Report for the Heceta Water District. The assessment was prepared under the requirements and guidance of the Federal Safe Drinking Water Act and the US Environmental Protection Agency, as well as a detailed Source Water Assessment Plan developed by a statewide citizen's advisory committee here in Oregon over the past two years. The Department of Environmental Quality (DEQ) and the Oregon Health Division (OHD) are conducting the assessments for all public water systems in Oregon. The purpose is to provide information so that the public water system staff/operator, consumers, and community citizens can begin developing strategies to protect your source of drinking water.

As you know, the 1996 Amendments to the Safe Drinking Water Act requires *Consumer Confidence Reports* (CCR) by community water systems. CCRs include information about the quality of the drinking water, the source of the drinking water, and a summary of the source water assessment. Public water systems are responsible for notifying their customers of the assessment results. The information from this assessment can be presented by distributing the "Summary Brochure" attached to the report. There is a blank space to insert instructions for how customers can obtain or review a copy of your source water assessment report. Distribution of any copies of the report must be done at the local level. At a minimum, we would suggest that a copy be placed at the local library, city hall, and/or public water supply office and your customers can review the report at their convenience. By mid-2003, all results of these assessments will also be made available electronically to the public on DEQ's and OHD's websites.

There are no regulatory requirements for you to develop a protection plan using the assessment results, but we hope your community will take the initiative to do so voluntarily. One of the goals of developing a Drinking Water Protection Plan is to address the facilities and land use activities that pose high or moderate risks for contaminating your public water supply. At a minimum, we recommend that the community seek ways to communicate and extend outreach to these facilities/activities with education and technical assistance to minimize the risk of contamination. As you begin thinking about developing a protection plan, it is also important to

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remember that not all of the assessment's inventoried activities will need to be addressed in a voluntary protection plan. If you move forward with developing a protection plan, the next step is to enhance the assessment inventory and, at that time, the "potential contaminant sources" which pose little to no threat to your public water supply can be eliminated from your list.

We look forward to working with you to move forward with developing a protection plan and can assist you with limited resources at this time. In addition, we are developing some useful written guidance and materials that will assist your protection efforts and you will receive these when complete.

We have enclosed one copy of the large GIS map of the watershed and the assessment results. A smaller version of this exact map is found in the report. If you have a need for additional copies of the large map, we must charge a small fee for each to cover the costs that were not budgeted by the program. Let me know if you need additional copies.

If you have any questions or need more information, please do not hesitate to call me at 503-229-5664.

Sincerely,



Julie K. Harvey, R.G.
Drinking Water Protection Specialist
Water Quality Division

Enclosures

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Executive Summary

The drinking water for Heceta Water District is supplied by an intake on Clear Lake. This public water system serves approximately 4,500 citizens. The intake is located in the Lower Siuslaw River Watershed in the Siuslaw Sub-Basin of the Northern Oregon Coastal Basin. The geographic area providing water to Heceta Water District's intake (the drinking water protection area) includes 149.6 acres of lakes (Clear Lake and Collard Lakes) and 0.23 miles of streams. The protection area encompasses a total area of 0.96 square miles. The elevation change from the upper edge of the watershed to the intake is approximately 400 feet and the intake is located at an approximate elevation of 100 feet.

An inventory of potential contamination sources was performed within Heceta Water District's drinking water protection area. The primary intent of this inventory was to identify and locate significant potential sources of contaminants of concern. The inventory was conducted by reviewing applicable state and federal regulatory databases and land use maps, interviewing persons knowledgeable of the area, and conducting a windshield survey by driving through the drinking water protection area to field locate and verify as many of the potential contaminant source activities as possible. The primary contaminants of concern for surface water intakes are sediments/turbidity, microbiological, and nutrients. It is important to remember that the sites and areas identified are only potential sources of contamination to the drinking water, and water quality impacts are not likely to occur when contaminants are used and managed properly.

Forestlands primarily dominate the delineated drinking water protection area. Two potential sources of contamination were identified within Heceta Water District's drinking water protection area. Both are located in the sensitive areas. The potential contaminant sources identified in the watershed include rural residential areas and future land development. The potential contaminant sources within the drinking water protection area all pose a relatively higher to moderate risk to the drinking water supply. This provides a quick look at the existing potential sources of contamination that could, if improperly managed or released, impact the water quality in the watershed.

The susceptibility analysis combines the results of the locations of the potential contaminant sources with the locations of the sensitive areas. Overlaying the locations of the moderate- to high-risk sources within the sensitive areas provides an indication of the areas that are highly susceptible to contamination. In the Heceta Water District watershed, the results of the susceptibility "analysis" include the distribution of two identified high- to moderate-risk sources within the areas of high permeability soils and within the 1000' setback from the streams. The susceptibility analysis provides the community and the public water system with information on where the greatest risk occurs and where to focus resources for protection.

Introduction

In 1996, Congress amended the Safe Drinking Water Act, implemented some new requirements, and provided resources for state agencies to assist communities in protecting the sources of their public water supplies. The US Environmental Protection Agency (EPA) developed guidelines for implementing the new requirements to conduct "source water assessments" (EPA, 1997). In Oregon, the Oregon Health Division (OHD) and the Department of Environmental Quality (DEQ) are conducting the source water assessments. An assessment such as this one will be done for every public water system in Oregon regulated by the Safe Drinking Water Act. DEQ and OHD will each have specific tasks in accomplishing the assessments for a total of 2656 public water systems in Oregon. Of those 2656 public water systems, about 90% of these are groundwater systems drawing water from wells or springs, and 10% are surface water systems with intakes on streams, rivers, or lakes/reservoirs.

The assessments in Oregon include delineating the source area supplying the public water system, identifying areas "sensitive" to contamination, and conducting an inventory of potential contamination sources in the area. Using the results of the inventory and sensitive areas, the susceptibility of the public water system is determined. OHD will provide the delineation for all groundwater systems and the identification of the sensitive areas within their source area. DEQ will delineate and identify the sensitive areas within the watersheds for the surface water systems. DEQ will conduct all inventories of the potential contaminant sources inside the drinking water protection areas and this is then used to estimate the public water system's susceptibility to contamination.

Sources of information reviewed during this assessment included U.S. Geological Survey (U.S.G.S.) documents/websites, DEQ reports, EPA/DEQ databases, and other readily accessible reports. The reference list provides a few of the good sources of information used in the report. Time constraints do not allow research into all existing technical resources available for each system. As the assessment is performed, assistance from municipal water staff, state/federal land management officials, and community members will increase OHD and DEQ's abilities to characterize local hydrogeologic/hydrologic conditions, site-specific information, and ultimately increase the quality of the assessment. Where possible, DEQ staff has consulted local Natural Resource Conservation Service, county planning agencies, irrigation districts, and other natural resource officials.

Many watersheds in Oregon provide water used for public or "domestic" drinking water supplies, irrigation, industry, hydro power, fish hatcheries, and of course, natural in-stream fish rearing. Watersheds vary considerably in terms of overall health and susceptibility to contamination. Most surface water sources for drinking water are filtered and undergo treatment (disinfection) prior to delivery to the consumer. The ability to adequately (and cost-effectively) treat drinking water from a surface water source is directly related to the quality of the water at the intake. Surface water intakes for public water supplies are generally very susceptible to increases in coarse sediments. Treatment facilities for public water supplies are very susceptible to increases in fine sediments, nutrients and other organic and inorganic contaminants. Treatment facilities are also negatively impacted by changes in temperature.

Changes in surface water quality parameters can be caused by a variety of factors in any watershed. Detailed consideration of all the variables was beyond the scope of this assessment. The procedures for conducting these assessments were developed by a statewide advisory committee (Source Water Assessment Plan, 1999). The value of preparing detailed procedures

is in the ability to be consistent from one system to the next. There are also severe time constraints for the amount of time allowed to complete each public water system assessment. It is our intent to provide as much information about the watershed as our program resources allow.

Using the results of this assessment, the public water system and the local community can then move forward with voluntarily developing and implementing a *drinking water protection plan*. The requirements for water quality monitoring of public water systems in Oregon provide some degree of assurance of safe drinking water; however, all systems are vulnerable to potential contamination. One of the best ways to ensure safe drinking water and minimize future treatment costs is to develop a local plan designed to protect against potential contamination. Not only will this measure add a margin of safety, it will raise awareness in the local community of the risks of drinking water contamination, and provide information to them about how they can help protect the system. It is our hope that each community will use the assessment results as a basis for developing a drinking water protection plan.

Background

Heceta Water District is located in Lane County, Oregon near the city of Florence. The drinking water for the Heceta Water District is supplied by an intake on Clear Lake. This public water system serves approximately 4,500 citizens. The intake is located in the Lower Siuslaw River Watershed in the Siuslaw Sub-Basin in the Northern Oregon Coastal Basin, Hydrologic Unit Code (HUC) # 17100206. The intake coordinates are 44.01856 north latitude and -124.08372 west longitude. DEQ obtained the coordinates using a Geographic Positioning System (GPS) in February 1999.

The study area for evaluating the extent of the Heceta Water District Drinking Water Protection Area (DWPA) includes US Geological Survey topographic maps for the Mercer Lake (1984) quadrangle at the 1:24,000 scale.

The Siuslaw Sub-Basin where the Heceta Water District intake is located, is the catchment basin for 769 square miles (USGS) between the discharge point located at the ocean near Florence and the headwaters in the Coastal Range. The Sub-Basin includes the Siuslaw River and all of its tributaries including North Fork Siuslaw River, Deadwood Creek, Lake Creek, Wildcat Creek, Wolf Creek and Esmond Creek.

The climate in the Siuslaw Sub-Basin area is characterized by moderate annual temperature and precipitation variations. Information on climate in the Heceta Water District area is based on the National Oceanic and Atmospheric Administration's (NOAA) Honeyman State Park climate station located at the north end of Woahink Lake at an elevation of 110 feet above mean sea level (Western Regional Climate Center). The average annual temperature is 52 degrees for the period of 1971 to 2000. Winters are cool and wet, with temperatures usually staying above freezing. The Honeyman State Park station gets an average of one inch of total snowfall per year but none of it accumulates to measurable depths. The summers are dry and moderately warm with temperature highs of approximately 65 to 70 degrees. Average annual precipitation is about 71.5 inches, with 70% of that occurring between November and March.

Delineation of the Protection Area

Methodology

The delineation of the source area or the "drinking water protection area" is a fundamental aspect of the assessment of a public water system. For surface water systems such as Heceta Water District's, the drinking water protection area delineation process begins by identifying the *watershed*. The watershed area is also called the *catchment basin* of a receiving water body. The outer boundary of this watershed is the drainage divide formed by the surrounding ridges and hills. The surface water delineation includes the entire watershed area upstream of the public water system intake structure. This watershed area provides "source" water to the surface water intake.

A map of the drinking water protection area provides the community with the knowledge of the geographic area providing the water to the intake. This is the area where contamination poses the greatest threat to the drinking water supply. Information about the drinking water protection area allows the community to develop management strategies that will have the most impact on protecting the source of the drinking water.

Results

DEQ has collected and reviewed data for the purpose of delineating the drinking water protection area for Heceta Water District's intake on Clear Lake. The scope of work for this report included collecting information from the water system operator, researching written reports, and establishing a Geographic Information Systems (GIS) basemap of the delineated watershed. *Heceta Water District's drinking water protection area is shown in Figure 1.* Heceta Water District's drinking water protection area includes 149.6 acres of lakes (Clear Lake and Collard Lakes) and approximately 0.23 miles of streams. The protection area encompasses a total area of 0.96 square miles. The intake is located at an approximate elevation of 100 feet and the upper edge of the watershed is located at an elevation of approximately 500 feet. Therefore, the elevation change from the upper edge of the watershed to the intake is approximately 400 feet.

Identification of Sensitive Areas

Methodology

After delineating the entire watershed, DEQ identified the "sensitive areas" within the watershed. *The objective in determining the sensitive areas for surface water sources is to produce reliable information to the community and public water system that is useful in developing and prioritizing protection strategies.* The list of the sensitive areas to be identified within drinking water watersheds was defined by the DEQ advisory committee as the procedures were developed (SWAP, 1999). The sensitive areas within a drinking water watershed includes both setbacks (land adjacent to stream) and other natural factors that increase the risk of contamination of the surface water. The result is an identification of a subset of the entire watershed. *The sensitive areas are those where potential contamination sources or land use activities, if present, have a greater potential to impact the water supply.*

In establishing sensitive areas in a watershed, there are several limiting factors to take into account. In using a Geographic Information System (GIS) to delineate the sensitive areas within the watershed, DEQ locates existing GIS layers and other natural resource agency data sets. Not

all areas of the state have been mapped for the natural resource parameters of interest or at the level of detail ideal for this type of analysis. The availability of data at appropriate scales is also a potential limitation. The sensitive area mapping may be limited simply by the lack of readily available data, and conducting additional research is not possible within the time frame allowed to do this assessment. DEQ staff has sought to obtain the best available information for each water system as the source water assessment was performed.

There are four individual characteristics that determine the sensitivity of areas within the drinking water watersheds in the Source Water Assessment Plan (1999) procedures for Oregon water systems. A brief description of the sensitive area characteristics and the sources of the GIS data are included below.

Sensitive Area Setbacks

The first sensitive area is a setback using a consistent 1000' (about 300 meters) distance from the water body. The 1000' sensitive area setbacks are intended to identify those areas where there are higher risks of contamination by spills or other releases, simply due to their proximity to the water body. The sensitive area setbacks are identified as a minimum of 1000' from centerline of the intake stream and all perennial tributaries within the delineated drinking water watershed. The distance of 1000' was based on EPA national guidance for the distance to conduct the potential contamination source inventories adjacent to streams.

High Soil Erosion Potential

The soil erosion potential is determined by combining the effects of slope and the soil erodibility factor ("K-factor"). Slopes within a watershed are evaluated using the 1:24,000 SSURGO (Soil Survey Geographic Database) data sets from the *Natural Resources Conservation Service*. The slope for a map unit is a weighted average of the average slope. The soil erodibility factor is also available in the SSURGO database and quantifies the susceptibility of soil particles to detachment and movement by water including the effects of rainfall, runoff, and infiltration. The K-factor used is a weighted average of only the value for the surface layer of the map unit. In the watershed, only soils with "high" erodibility ratings were mapped as sensitive areas. Soils that classify as "high" include soil with slopes greater than 30% and K-factors greater than 0.25. This rating system is based on the *Revised Universal Soil Loss Equation* from the USDA Agricultural Research Service as defined in the Washington's Standard Methodology for Conducting Watershed Analysis (Washington Forest Practices Board, 1993).

High Permeability Soils

Soils identified in the *U.S. Geological Survey* geologic map of Oregon GIS layer (1:500,000 scale) as Recent Alluvial Deposits (Qal), Dune Sand (Qd) and Landslide and Debris Flow Deposits (Qls) are mapped as sensitive areas due to the high potential for groundwater recharge adjacent to the stream. Alluvial deposits, dune sand and landslide deposits are typically very high permeability soils. These areas may be very vulnerable to rapid infiltration of contaminants to groundwater and subsequent discharge to a stream or lake/reservoir.

High Runoff Potential

The potential for high runoff rates was evaluated using the 1:24,000 SSURGO (Soil Survey Geographic Database) data sets from the *Natural Resources Conservation*

Service. Class D soils, which are defined as soils with very slow infiltration rates were mapped as sensitive areas within the boundaries of the drinking water protection area. Map units are assigned to hydrologic groups based on their majority component. A Class D soil is typified as clayey, has a high water table, or an impervious layer occurs at a shallow depth. Soils with these characteristics would have the potential for rapid runoff and subsequent transport of sediments and possible contaminants to the surface water body supplying the public water system.

Additional Sensitive Areas

There may be other natural characteristics within a watershed that can be mapped as sensitive. Modifying the list of sensitive areas in this assessment can be done by the public water system or the community by identifying resources and procedures that are appropriate for the individual system. For example, the local community may choose to add "transient snow zones", high rainfall areas, and landslide/debris-flow hazards to the sensitive areas within their watershed. Due to time constraints, these additional areas will not be mapped by DEQ as part of this source water assessment, but can be added by the local community before developing a protection plan.

Transient snow zones are typically defined as areas above 1500 feet in the Oregon Coast Range, or above 2000 feet in the Cascades. In some watersheds, these areas may be subject to rapid snowmelt or rain-on-snow events which increase the likelihood of transport of sediments to the surface water bodies in the watershed. Areas of high rainfall or irrigation rates may increase the likelihood of transport of sediments and possible contaminants to the surface water body. These areas can be identified using average annual precipitation data from Oregon Climate Service (years 1961 through 1990) and irrigation/water rights data from Oregon Water Resources Department's water rights database. Mapping the high risk landslide and debris-flow areas can also be useful for evaluating sediment risks from natural hazards within a drinking water watershed. The Department of Forestry has recently completed GIS-based landslide and debris flow maps for western Oregon (Website address: <http://www.odf.state.or.us/gis/debris.html>).

The final watershed map for each public water system intake includes a composite of all sensitive areas identified by DEQ within the watershed. This composite or overlay will enable the communities and responsible agencies to focus future protection efforts in these sensitive areas.

Results

The sensitive areas within Heceta Water District's drinking water protection area are shown on Figure 2. The sensitive areas include primarily the setback from the lakes and all perennial streams and large areas of high permeability soils along the western portion of the protection area. Areas with high runoff potential and high soil erosion potential were not identified in the GIS layers. Good data coverage was available for the Heceta Water District watershed for each of the sensitive areas.

Inventory of Potential Contaminant Sources

Methodology

The primary intent of an inventory is to identify and locate significant potential sources of any of the contaminants of concern within the drinking water protection area. Significant potential sources of contamination can be defined as any facility or activity that stores, uses, or produces the contaminants of concern and has a sufficient likelihood of releasing such contaminants to the environment at levels that could contribute significantly to the concentration of these contaminants in the source waters of the public water supply. An inventory is a very valuable tool for the local community in that it:

- provides information on the locations of potential contaminant sources, especially those that present the greatest risks to the water supply,
- provides an effective means of educating the local public about potential problems,
- provides valuable awareness to those that own or operate facilities and land use activities in the drinking water protection area, and
- provides a reliable basis for developing a local protection plan to reduce the risks to the water supply.

Inventories are focused primarily on the potential sources of contaminants regulated under the federal Safe Drinking Water Act. This includes contaminants with a maximum contaminant level (MCL), contaminants regulated under the Surface Water Treatment Rule, and the microorganism *Cryptosporidium*. The inventory was designed to identify several categories of potential sources of contaminants including micro-organisms (i.e., viruses, *Giardia lamblia*, *Cryptosporidium*, and fecal bacteria); inorganic compounds (i.e., nitrates and metals); organic compounds (i.e., solvents, petroleum compounds and pesticides) and turbidity/sediments. Contaminants can reach a water body (groundwater, rivers, lakes, etc.) from activities occurring on the land surface or below it. Contaminant releases to water bodies can also occur on an area-wide basis or from a single point source.

When identifying potential risks to a public water supply, it is necessary to make "worst-case" assumptions. This is important because it is the POTENTIAL risk that we are attempting to determine through this procedure and it is simply not possible within our time constraints to conduct individual reviews or inspections at any of the facilities or land uses. The worst-case assumption that is made when considering potential risks to water bodies is that the facility or activity is not employing good management practices or pollution prevention. Under today's regulatory standards and environmental awareness, the majority of the identified activities and land uses employ "best management practices" (BMPs) in handling contaminants or preventing water quality degradation from their operations. It is important to note that while this assessment will list all POTENTIAL risks, many of these do not present actual risks to the water system. Environmental contamination is not likely to occur when contaminants are handled and used properly, or when BMPs are employed. The day-to-day operating practices and environmental (contamination) awareness varies considerably from one facility or land use activity to another. In-depth analysis or research was not completed to assess each specific source's compliance status with local, state and/or federal programs or laws. Further, the inventory process did not include an attempt to identify unique contamination risks at individual sites such as facilities (permitted or not) that do not safely store potentially hazardous materials. After the assessment is completed, the next step is to conduct an "enhanced" inventory that will look at the site-specific practices. The potential sources listed in the

assessment that employ BMPs (required through regulations OR voluntarily) can be removed from the list during the next step in the process of developing a voluntary drinking water protection plan.

Assumptions are also made about what potential contamination sources are included in the various types of land uses. For example, it is assumed that rural residences associated with farming operations have specific potential contamination sources such as fuel storage, chemical storage and mixing areas, and machinery repair shops. Again, any errors in these assumptions can be easily corrected as the community moves beyond the assessment to develop a protection plan.

Past, current, and possible future potential sources of contaminants were identified through a variety of methods and resources. In completing this inventory, DEQ used readily available information including review of DEQ, EPA, and other agencies' databases of currently listed sites, interviews with the public water system operator, and field observation as discussed below. The process for completing the inventory for Heceta Water District's drinking water protection area included several steps, which are summarized as follows:

1. Collected relevant information as of May 2001 from applicable state and federal regulatory databases including the following lists:
 - DEQ Environmental Cleanup Site Information System (ECSI) which includes the U.S. EPA National Priorities List (NPL) and the U.S. EPA Comprehensive Environmental Response, Compensation and Liability Information System (CERCLA) list;
 - DEQ leaking underground storage tank (LUST) list;
 - DEQ registered underground storage tank (UST) list;
 - DEQ Active Solid Waste Disposal Permits list;
 - DEQ Dry Cleaners list;
 - DEQ Site Information System (SIS) which includes Water Pollution Control Facility (WPCF) and National Pollutant Discharge Elimination System (NPDES) permitted facilities;
 - State Fire Marshall Hazardous Material Handlers (HAZMAT) site list (information on materials in a gas-form was not used since gaseous compounds rarely pose a threat to surface water or groundwater);
 - DEQ Underground Injection Control (UIC) list of facilities with registered underground injection control systems; and
 - DEQ Hazardous Waste Management Information System (HWIMSY) list which includes U.S. EPA Resource Conservation Recovery Act (RCRA) generators or notifiers and U.S. EPA RCRA Treatment, Storage, and Disposal Facility (TSDF) Permits.

Because of the way various state and federal databases are set up, the specific location of listed sites is not always given or accurate within the database. DEQ verified the presence and approximate location of potential contaminant sources and land uses within the drinking water protection area by consulting with local community members and/or by driving through the area (windshield survey) as discussed below in subsequent inventory steps.

2. Interviewed public water system officials, or someone they designated as knowledgeable of the area to identify potential sources that are not listed elsewhere in databases or on maps and to assist in locating potential sources listed in the state and federal databases.

3. Conducted a windshield survey by driving through the drinking water protection area to field locate and verify as many as possible of the potential contaminant source activities. We looked for potential contaminant sources within four general categories of land use: residential/municipal, commercial/industrial, agricultural/forest, and other land uses (see Table 1).
4. Assigned high-, moderate-, or low-risk ratings to each potential contaminant source based on the Oregon Source Water Assessment Plan (1999). A summary of the types of potential contaminant sources and level of assigned risk is presented in Table 1 (Summary of Potential Contaminant Sources by Land Use). The “comments” section of Table 2 (Inventory Results- List of Potential Contaminant Sources) provides justification for any modifications to the risk rating that may have resulted from field observations that were different from what is typically expected for the specific facility. Relative risk ratings are considered an effective way for the water supply officials and community to prioritize management efforts for the drinking water protection area. When the local water supply officials and community “team” enhance the inventory for use in developing management options, further analysis may need to be conducted to more closely evaluate the actual level of risk.
5. Produced final summary of the inventoried sources and the GIS base map, which are presented in this report.

Results

The results of the inventory were analyzed in terms of current, past, and future land uses; their proximity to the intake; and their associated potential risk. In general, land uses that are closest to the intake and those with the highest risk rating pose the greatest threat to your drinking water supply. *The inventory results are summarized in Tables 1 and 2 and are shown on Figure 3.*

Forestlands and several lakes dominate the delineated drinking water protection area. Two potential contaminant sources (detailed on Figure 3 and Table 2) were identified in the watershed. The potential contaminant sources identified in the watershed include rural residential areas on septic/wells and areas of potential forest management activities. The potential contaminant sources within the drinking water protection area all pose a relatively moderate risk to the drinking water supply. There were no facilities or sites identified on the regulatory databases that were searched (see Step 1 in the previous section) within the Drinking Water Protection Area.

This inventory of potential contaminant sources within Heceta Water District’s drinking water protection area provides a quick look at the potential sources that could, if improperly managed, impact the water quality in the watershed. Even very small quantities of certain contaminants can significantly impact water bodies. It is important to remember the sites and areas identified in this section are only **potential** sources of contamination to the drinking water.

Susceptibility Analysis

Methodology

Susceptibility can be defined as the potential for contamination in the drinking water protection area to reach the intake on the surface water body being used by a public water system for drinking water purposes. Whether or not a particular drinking water source becomes contaminated depends on three major factors: 1) the occurrence of a facility or land use that releases contamination, 2) the location of the release, and 3) the hydrologic and/or soil characteristics in the watershed that allow the transport of the contaminants to the surface water body.

In conducting a susceptibility analysis the first step is identifying that part of the watershed that is most sensitive to contamination. This was accomplished after the delineation phase of this assessment. The second step consists of identifying and locating the potential contaminant sources in the drinking water protection area. Based on the type of facility and the nature of the chemicals they use, these sources represent a lower-, moderate-, or higher-relative risk to the surface water body. This step was accomplished in the inventory phase of the assessment.

The third step in the susceptibility analysis is to overlay the results of the inventory with the map of the sensitive areas. The results of the inventory are analyzed in terms of current, past, and future land uses; their time-of-travel relationship or proximity to the intake site; and their associated risk rating. In general, land uses that are closest to the intake and those with the highest risk rating pose the greatest threat to a drinking water supply. The presence and locations of the potential contamination sources within the sensitive areas will determine where the water system has the highest susceptibility to contamination. The susceptibility analysis cannot predict when or if contamination will actually occur, but it does recognize conditions that are highly favorable for contamination to occur. If a contaminant release to soils or water should occur in a sensitive area, it is very likely that contamination of the surface water body would occur if remedial actions are not undertaken.

When several high or moderate risk sources are located within the sensitive areas, the public water system may also be said to have a high overall susceptibility to contamination. If a public water system's drinking water source is determined to be of high susceptibility, it is recommended that the system identify those condition(s) that lead to the high susceptibility and take steps to protect the resource (e.g., reducing soil erosion, or working directly with facility operators to implement sound management practices, etc.). Water systems with a low susceptibility should consider all identified factors that could lead to higher susceptibility in the future and take action to prepare a strategy to protect the resource in the future.

Results

The results of the potential contamination source inventory are combined with the locations of the sensitive areas to determine the most susceptible areas within Heceta Water District's drinking water watershed. The total number of sources within the sensitive areas are summarized as follows:

	Within Sensitive Areas	Outside of Sensitive areas	Total Within Drinking Water Protection Area
Total Number of High and Moderate Risk Potential Contamination Sources	2	0	2
Higher Risk Potential Contamination Sources Identified	0	0	0
Moderate Risk Potential Contamination Sources Identified	2	0	2
Lower Risk Potential Contamination Sources Identified	0	0	0
Total Potential Contamination Sources Identified	2	0	2

Overlaying the locations of the moderate- to high-risk sources with the sensitive areas provides an indication of the areas that are highly susceptible to contamination. The susceptibility analysis results are shown on Figure 3 (Source Water Assessment Results). *Where the moderate- to higher-risk sources fall within the sensitive areas are those areas most vulnerable to contamination.* In the Heceta Water District watershed, it includes the distribution of the two identified sources within the areas of highly permeable soils and within the 1000' setback from the streams. In general, potential contaminant sources within the sensitive areas in the lower watershed pose greater risk than those in the higher areas of the watershed. The susceptibility analysis provides the water system with information on where the greatest risk occurs and where to focus resources for protection.

When all of the assessments are completed in Oregon, DEQ will provide a second type of susceptibility analysis for the surface water systems, an "inter-system susceptibility" on a statewide basis. DEQ will develop a summary report describing how the Heceta Water District watershed compares with other drinking water watersheds in the state. To normalize the results of the assessments, the total number of potential contamination sources will not be used. The density of the moderate- to higher-risk sources within the drinking water protection area and within the sensitive areas will be calculated. This comparison will be based upon the number and distribution of the potential contamination sources in the watersheds that serve as drinking water resources. The purpose is not to rank individual systems, but to provide general groupings of overall risk relative to other Oregon public water systems. This will enable state agencies to develop priorities for staffing and funding more detailed assessments and protection measures.

Summary and Recommendations

This assessment provides a basis for focusing limited resources within the community to protect the drinking water source. The delineation provides the community with information regarding the location of the land area that directly supplies the surface water intake, i.e., the drinking water protection area. The sensitive areas are those where potential contamination sources or land use activities, if present, have the greater potential to impact the water supply. When the sensitive area information is combined with the potential contaminant source inventory, the highly vulnerable areas are identified (referred to as a susceptibility analysis). These should become high priority areas to be addressed first with educational information, technical assistance, and focused outreach to landowners to encourage voluntary cooperation in protecting the water quality in this watershed.

This assessment provides a basis for informed decision-making regarding community planning. The delineation, inventory and susceptibility analysis provides the community with a significant amount of information regarding where their drinking water comes from and an identification of some of the potential risks to the quality of that source. For example, knowing the location and status of the source area allows the community's planning authority to potentially make informed decisions regarding proposed land uses that are compatible with both the drinking water resource and the vision of community growth embraced by the community. Educating the community citizens about the susceptibility and risks to your system enables more public involvement in any future decisions about the public water system.

The results of this Source Water Assessment and the recommendations based on the results are summarized below.

- ◆ Heceta Water District's public water system draws water from Clear Lake. The source of this water is within the Siuslaw Sub-Basin of the Northern Oregon Coastal Basin. Heceta Water District's drinking water protection area includes 149.6 acres of lakes (Clear Lake and Collard Lake) and approximately 0.23 miles of streams. The protection area encompasses a total area of 0.96 square miles.

- ◆ Within the Heceta Water District drinking water protection area, there are large areas identified as sensitive to contamination. Areas that are adjacent to the streams/river, areas that have high soil erosion potential, high runoff potential, and high permeability should all receive special considerations for protection. These are some of the areas where the risk is greatest for existing **and future** potential sources of contamination impacting the water quality in the watershed. It is recommended that other natural conditions be considered and possibly added to the assessment results before proceeding with voluntary development of a drinking water protection plan.

There are also some highly-permeable soils adjacent to Clear Lake and Heceta Water District's intake that should be considered higher risk for groundwater contamination. These areas are very sensitive to any spills or release to soils because the contaminants could rapidly infiltrate into groundwater and discharge to Clear Lake. The community should take steps to evaluate current and future land use in areas of highly permeable soils. The facilities or land uses that have been identified either on or in close proximity to these soils should be informed of the sensitive nature of the area and encouraged to adopt best management practices designed to minimize the risk of a contaminant release.

♦ The susceptibility of the public drinking water system source depends on both the natural conditions in the watershed as well as the land uses and facilities operating in the watershed. The purpose of the susceptibility exercise is to identify those factors that may pose more of a risk than others within the community's drinking water protection area. It provides information with respect to facilities or land uses in the sensitive areas within the drinking water protection area that should be given greater priority in developing protection strategies. A review of the inventory and the sensitive areas indicates that the Heceta Water District public water system has at least two high and moderate-risk sources within the sensitive areas in the watershed. It is highly recommended that the community "enhance" or refine the delineation of the sensitive areas and the identification of the potential contamination sources through further research and local input.

♦ Due to the streamlined procedures for conducting the source water assessments, the results could potentially create a misperception that the "human activities" within the watersheds are higher risks than natural conditions or disturbances such as landslides and storm events. For example, it would be erroneous for communities to conclude that their source water was not at risk from natural conditions that produce sediments if there were no potential contamination sources identified within their watershed. It is recommended that the community take steps to ensure the natural conditions (both those identified in this assessment and any other additional areas identified by the community) within the watershed are considered when developing strategies for protection.

♦ Public water systems may be threatened by contamination already in the surface water. Many public water systems conduct routine tests for contamination in the raw water prior to treatment. It is highly recommended that such data be used to determine existing risks in the watershed. Collecting and analyzing this raw water data by DEQ or OHD has not been done and is beyond the scope of this assessment.

♦ This assessment provides a basis for dealing with future water quality work in the watershed. The delineation, inventory, and susceptibility analysis has been designed to serve as a strong foundation for further in-depth watershed assessments or water quality improvement efforts, such as Oregon's Total Maximum Daily Load (TMDL) plans.

♦ The primary intent of this source water assessment is to provide the background information for the community to use in developing a local Drinking Water Protection Plan. The Heceta Water District and/or the public water system should assemble a team to assist in the development and implementation of a Drinking Water Protection Plan. Clean safe drinking water is fundamental to the viability of any community. Protecting the drinking water source is a wise and relatively inexpensive investment in the community's future. The next section will discuss this voluntary process.

Developing a Drinking Water Protection Plan

This Source Water Assessment (SWA) Report for your public water system is a compilation of the results of the delineation of the source area, identification of the sensitive areas, and an inventory of significant risks. The final product, the susceptibility analysis, provides the basis for prioritizing the areas in and around your community that need to be protected. As we discussed in the introduction, our hope is that the community will use the assessment as a basis for developing a "Drinking Water Protection Plan".

The process for developing a complete Drinking Water Protection Plan can be summarized as follows:

ASSESSMENT PHASE (Source Water Assessment Report performed by DEQ and OHD)

1. Delineate the area that serves as the source of the public water supply ("drinking water protection area" for groundwater wells or surface water intakes)
2. Inventory the potential risks or sources of contamination
3. Determine the areas most susceptible to contamination

PROTECTION PHASE (performed by community)

4. Assemble a local Drinking Water Protection Team
5. Enhance the Source Water Assessment
6. Develop a plan to protect the supply (reduce the risks of contamination)
7. Develop a contingency plan to address the potential loss of the system
8. Certify (optional) and implement the Drinking Water Protection Plan

As you know, the assessment phase work was funded by the federal Safe Drinking Water Act. The assessment is simply the first three steps of developing a protection plan for your public water supply. Developing a protection plan is voluntary.

Prior to moving into the protection phase, DEQ recommends the inventory presented in this document be reviewed in detail to clarify the presence, location, operational practices, actual risks, etc. of the identified facilities and land use activities. The SWA inventory should be regarded as a preliminary review of potential sources of contamination within the drinking water protection area. Resources within the community should be used to do an "enhanced inventory" to complete this preliminary list of potential sources of contamination.

It is also important to remember that not all of the inventoried activities will need to be addressed if you choose to develop a Drinking Water Protection Plan. When developing a protection plan, sources which pose little to no threat to your public water supply can be screened out. For example, if any of the land use activities are conducted in a manner that already significantly reduces the risk of a contamination release, the facility would not need to re-evaluate their practices based on drinking water protection "management". One of the goals of developing a Drinking Water Protection Plan based on the inventory results is to address those land use activities that do pose high or moderate risks to your public water supply. The community should target these facilities with greater levels of education and technical assistance to minimize the risk of contamination.

Limited technical assistance is available through both DEQ and OHD for communities that choose to move beyond the assessments and voluntarily develop a Drinking Water Protection Plan. Using the results of the assessment (and enhanced inventory), the local community can

form a “Drinking Water Protection Team” of community members and develop a plan to reduce the risks of contamination from those sources.

Forming a local team to help with the development of a protection plan is very important. Oregon’s drinking water protection approach relies upon the concept of “community-based protection”, as are many other water quality programs. Community-based protection simply refers to the concept of allowing local control and decision-making to implement the water quality protection effort. Community-based protection is successful only with significant local citizen and stakeholder involvement.

The primary advantage of community-based protection is that it links community needs to environmental needs. Any successful protection program will need to be flexible enough to allow the community to adopt the “tools” or elements that are most appropriate for them. Allowing this local control in making the changes necessary for improving water quality will accomplish two key elements of restoration and protection. Community-based protection can draw on the knowledge and successful adaptive practices of the local area. Landowners generally know best how to achieve water resource restoration and protection as long as a thorough explanation of the problem is provided, the objectives are defined, and some free technical assistance is provided. Secondly, knowing they have more local control, citizens will also be more likely to participate in the program and more willing to assist with the educational and outreach effort which will make the plan successful. We recommend that the protection plan be developed so as to *minimize any burdens on individual property owners, but maximize the equity in responsibility for reducing the risks of future contamination.*

Drinking water protection involves developing protection strategies for groundwater or surface water sources of public water supplies. There are many similarities between this program and other water quality protection programs, and it is essential that water quality efforts are coordinated and linked in each geographic area as much as possible. DEQ is committed to linking the drinking water protection efforts to other habitat and water quality improvement efforts for fish in Oregon, as well as the ongoing work to address Clean Water Act 303(d) water-quality-limited streams. One of the primary means of providing technical assistance is to give your community the information and coordination necessary to create these links. Other agencies will also be involved in providing technical assistance as protection plans are developed. For example, on farmlands, the Oregon Department of Agriculture will provide assistance as provided for under Senate Bill 1010. In developing recommendations for protecting the drinking water source area, your community can maximize the use of existing programs in Oregon that offer free technical assistance. Examples of such programs include:

- pollution prevention technical assistance from the Department of Environmental Quality,
- sanitary survey assistance from the Oregon Health Division,
- household hazardous waste assistance from the Department of Environmental Quality,
- land use planning from the Department of Land Conservation and Development,
- agricultural water quality management plans Oregon Department of Agriculture,
- water conservation education from the Water Resources Department, or
- rural water quality outreach from the Oregon State University Extension Service.

Protecting the drinking water supply in a community can also be a very effective way to encourage all citizens to participate in an issue which directly affects everyone in that community. This often leads to more public involvement in other significant local decisions

concerning future livability issues (i.e., land use planning). In communities already developing and implementing Drinking Water Protection Plans, the process has served to bring many diverse interests together on a common goal and strengthened the local rural and urban relationships through communication and increased understanding. We must continue to do a better job in our outreach efforts to point out that we are all part of the existing water quality problems. The risks and sources of water quality problems are not only from industries, farmers, and managed forests, but every individual living, commuting and working in that area.

We encourage communities interested in developing Drinking Water Protection Plans to contact the DEQ or OHD resources listed below:

For technical assistance with the monitoring and operation of your public water system:

Oregon Health Division
Main Office - Portland Oregon
800 NE Oregon St., Room 611
PO Box 14450, Portland, OR 97293
(503) 731-4317
Fax (503) 731-4077

or:

Dennis Nelson, Groundwater Coordinator, (541) 726-2587
donelson@oregonvos.net
Oregon Health Division
Springfield Field Office
442 A Street, Springfield, OR 97477
Fax (541) 726-2596

For technical assistance with developing plans to protect your public water system:

Department of Environmental Quality
Water Quality Division
811 SW 6th Avenue
Portland, OR 97204-1390
(503) 229-5630 Fax (503) 229-5408
Toll Free 1-800-452-4011

Surface Water - Sheree Stewart, (503) 229-5413
stewart.sheree@deq.state.or.us

Groundwater - Julie Harvey, (503) 229-5664
harvey.julie@deq.state.or.us

References*

Environmental Protection Agency, 1997. State Source Water Assessment and Protection Programs Guidance, US EPA Office of Water, EPA816-R-97-009, August 1997.
<http://www.epa.gov/ogwdw/swp.html>

Natural Resource Conservation Service (NRCS). Soil Survey Geographic Database (SURGGO), National Cartography and Geospatial Center, Fort Worth, Texas.
<http://www.ftw.nrcs.usda.gov/ssurgo.html>

Source Water Assessment Plan: Implementation of the Safe Drinking Water Act 1996 Amendments. Sheree Stewart, Oregon Department of Environmental Quality, and Dennis Nelson, Oregon Health Division, February 1999.
<http://www.waterquality.deq.state.or.us/wq>

US Geological Survey, Oregon Hydrologic Units.
http://oregon.usgs.gov/data_dir/orchucolist.html

Washington Forest Practices Board. 1993. Standard Methodology for Conducting Watershed Analysis, Version 2.0, October 1993

Western Regional Climate Center, Oregon Climate Summaries.
<http://www.wrcc.dri.edu/summary/climsmor.html>

*Please note that there may be other sources of information for Clear Lake and the Siuslaw Sub-Basin. Conducting an exhaustive search of all data and technical reports was beyond the scope of this Source Water Assessment Report.

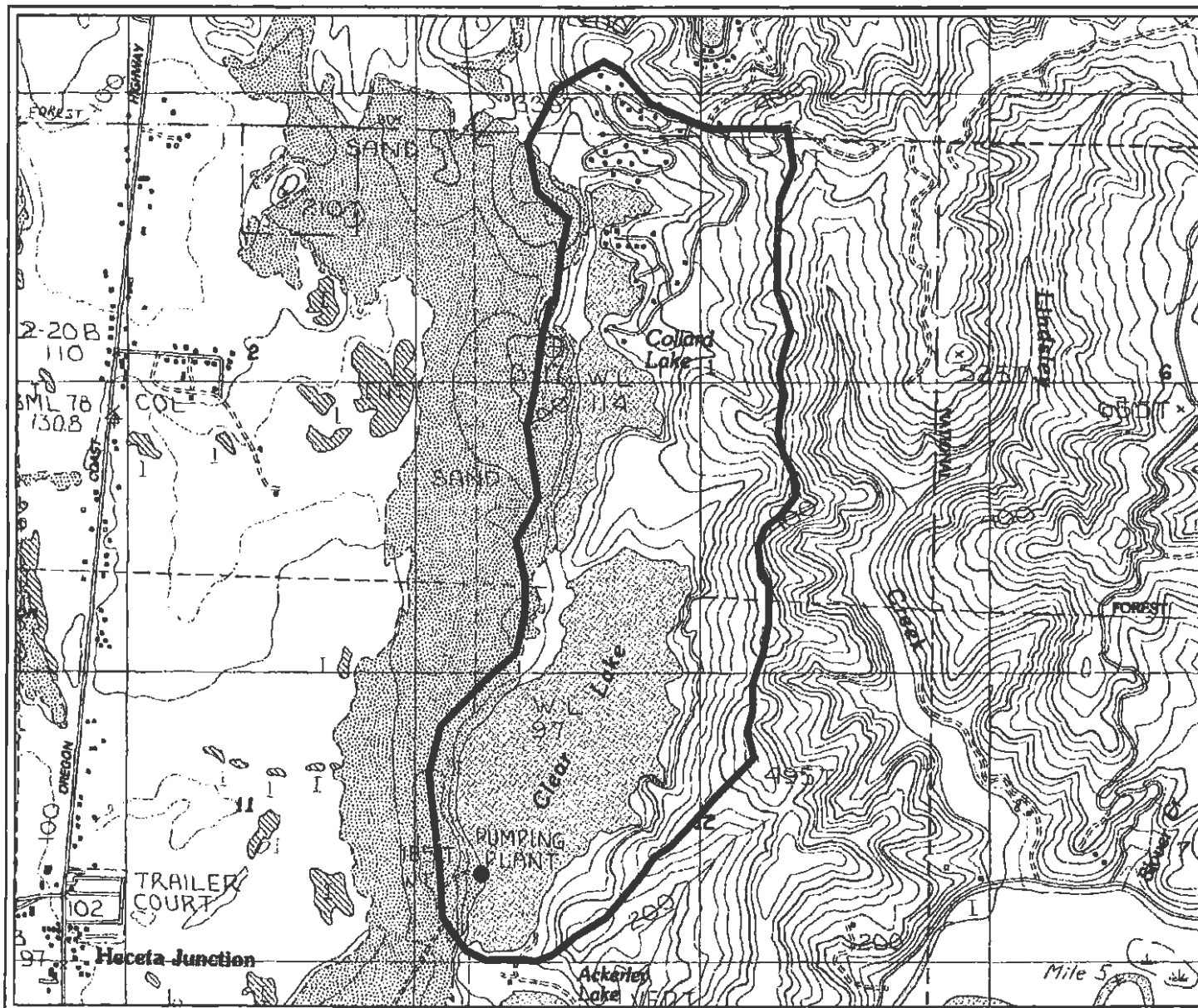
Figures

Source Water Assessment Report Heceta Water District PWS # 4100301

Figure 1. Heceta Water District's Drinking Water Protection Area

Figure 2. Sensitive Areas within Heceta Water District's Drinking Water Protection Area

**Figure 3. Source Water Assessment Results
Heceta Water District's Drinking Water Protection Area with
Sensitive Areas and Potential Contamination Sources**

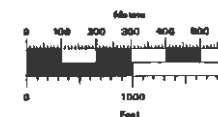
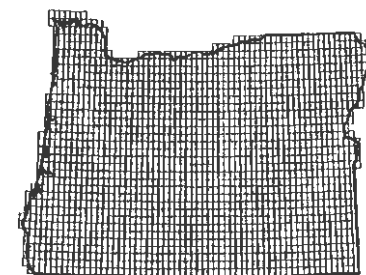


**Figure 1:
Heceta Water District's
Drinking Water Protection Area**

PWS 4100301

- Drinking Water Intake - Surface Water
- Drinking Water Protection Area

Note on Base Map: 1:24,000 scale U.S. Geological Survey Digital Raster Graphic (DRG) for Mercer Lake (1884), is displayed. DRGs are scanned images of topographic sheets. Where the DRGs join, seams and/or gaps may be visible. Between DRGs, variations in information displayed also may be seen.



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Figure 2: Sensitive Areas within Heceta Water District's Drinking Water Protection Area

PWS 4100301

● Drinking Water
Intake - Surface Water

■ Drinking Water
Protection Area

Sources of Information:

High Soil Erodibility: Defined by slopes greater than 30 percent and K factor greater than .25. Soils derived from 1:24,000, USDA, NRCS, SSURGO preliminary data. Slope is in the SSURGO database Component Table. Slope displayed is a weighted average of the average slope for the map unit. K factor is contained in the SSURGO Layer Table. K factor displayed is a weighted average (of only the surface layer) for the map unit. These SSURGO data are preliminary.

High Runoff Potential: Hydrology Group D (very slow infiltration rates) from the SSURGO Component Table. These SSURGO data are preliminary.

High Permeability Soils: Alluvial deposits (Qal), dune sand (Qd) and landslide and debris-flow deposits (Qls) from the U.S. Geological Survey Geologic Map of Oregon GIS layer; on-screen digitizing.

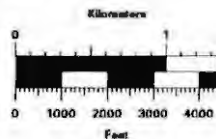
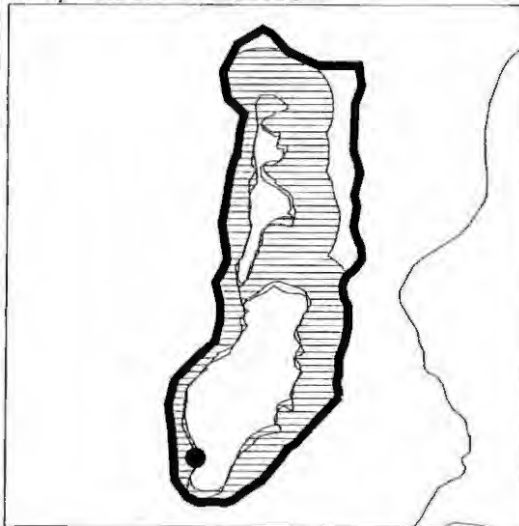
Sensitive Area Setbacks Adjacent to Streams and Reservoirs: 1000 foot buffer from the centerline of perennial streams and the shoreline of any reservoir.

Note on Sensitive Areas: In determining the most sensitive areas within this Drinking Water Protection Area, DEQ used existing GIS layers and other natural resource agency data sets. Not all areas of the state have been mapped for the natural resource parameters of interest or at the level of detail ideal for this type of analysis. DEQ has sought to obtain the best available information for this composite.



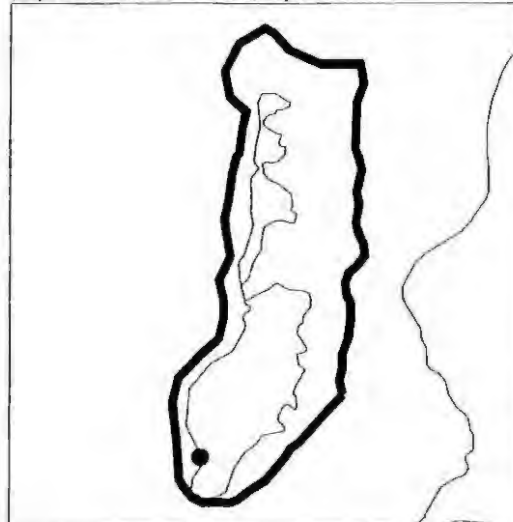
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Composite of Sensitive Areas

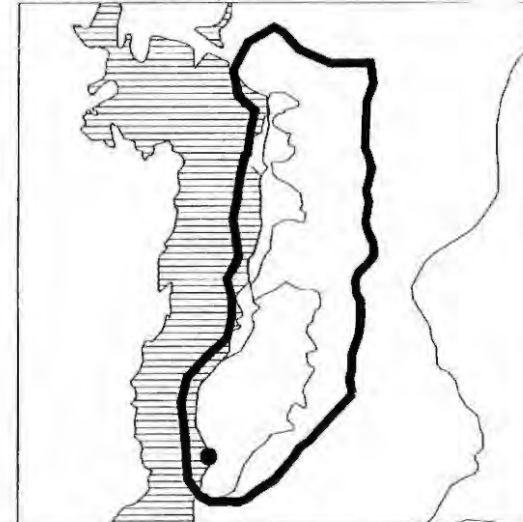


Sensitive Areas in Watershed

High Soil Erosion Potential
(Slope \geq 30 Percent and Soil Erodibility Factor \geq .25)



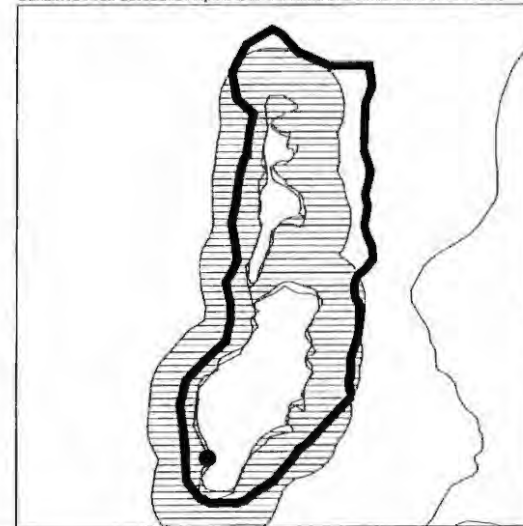
High Permeability Soils (Alluvial Deposits, Dune Sand,
Landslide and Debris-flow Deposits)

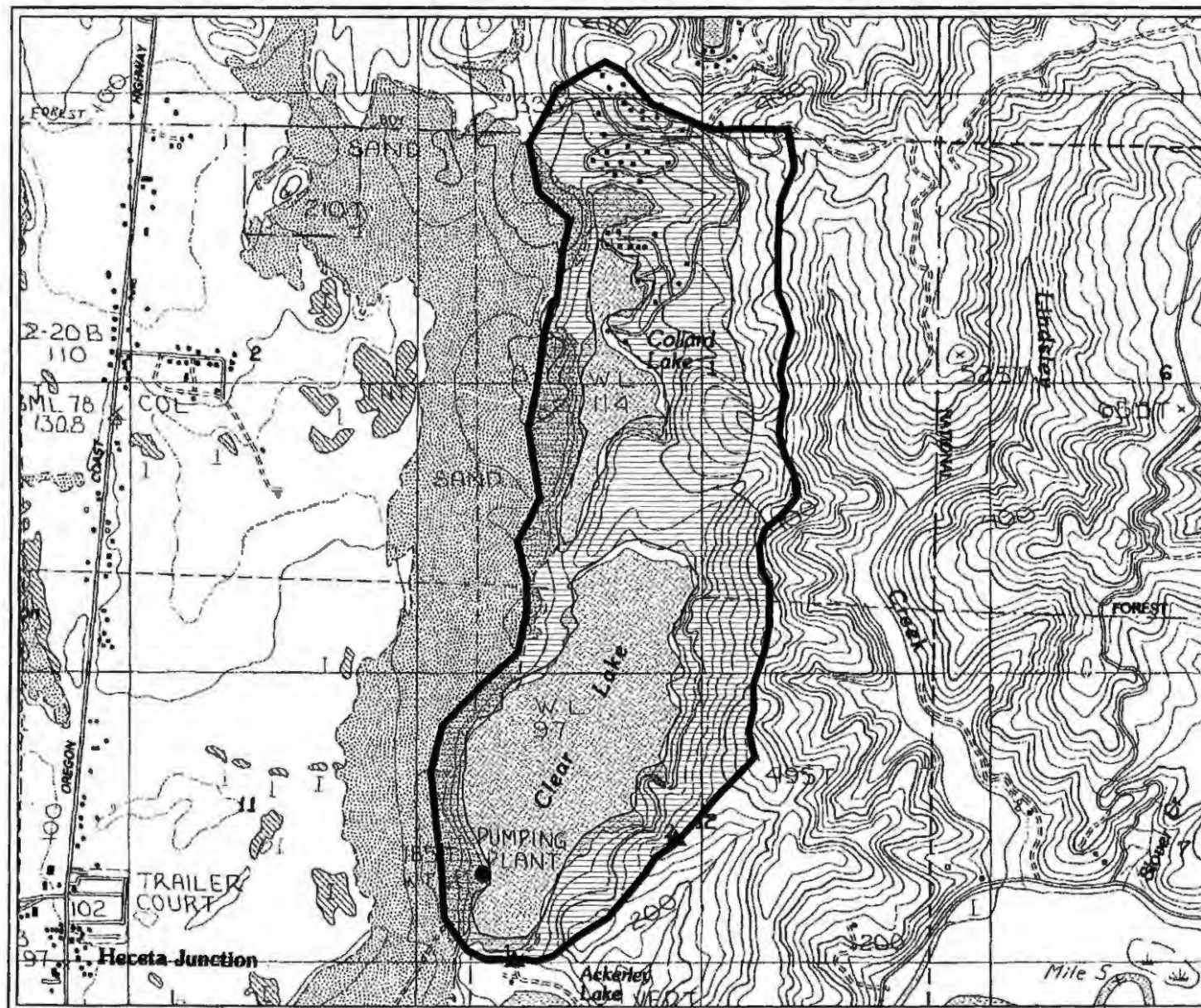


High Runoff Potential (Hydrologic Group D - slow infiltration rates)



Sensitive Area Setbacks Adjacent to Streams and Reservoirs (1000 feet)





**Figure 3:
Source Water Assessment
Results**

Heceta Water District's Drinking
Water Protection Area with Sensitive
Areas and Potential Contamination
Sources

PWS 4100301

- Drinking Water
Intake - Surface Water
- ▤ Drinking Water
Protection Area
- ▨ Sensitive Areas
- ▲ Area Feature (see Note 2)
- ◆ Point Feature (see Note 2)

Notes on Potential Contaminant Sources

Note 1: Sites and areas noted in this Figure are potential sources of contamination to the drinking water identified by Oregon drinking water protection staff. Environmental contamination is not likely to occur when contaminants are handled and used properly or when best management practices are employed.

Note 2: Feature identification numbers correspond to the potential contaminant source numbers in Table 2. The area features represent the approximate area where the land use or activity occurs and is marked at the point closest to the intake. The point features represent the approximate point where the land use or activity occurs.



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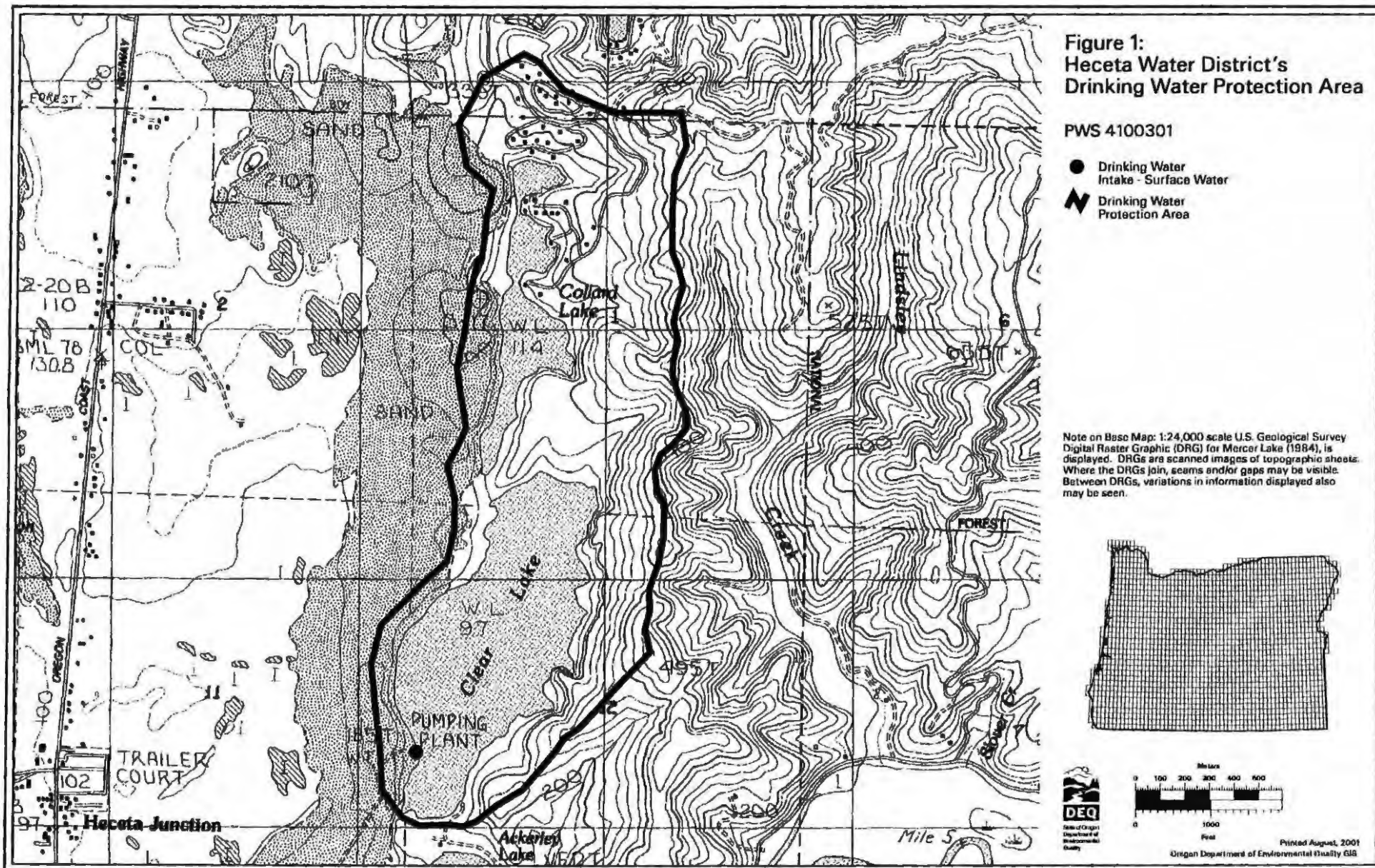


Figure 2:
Sensitive Areas within Heceta Water
District's Drinking Water Protection Area

PWS 4100301

● Drinking Water
 Intake - Surface Water

■ Drinking Water
 Protection Area

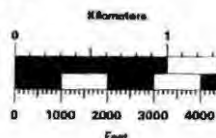
Sources of Information:

High Soil Erodibility: Defined by slopes greater than 30 percent and K factor greater than .25.
 Soils derived from 1:24,000, USDA, NRCS, SSURGO preliminary data. Slope is in the SSURGO
 database Component Table. Slope displayed is a weighted average of the average slope for the map
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High Runoff Potential: Hydrology Group D (very slow infiltration rates) from the SSURGO Component
 Table. These SSURGO data are preliminary.
High Permeability Soils: Alluvial deposits (Qal), dune sand (Qd) and landslide and debris flow
 deposits (Qls) from the U.S. Geological Survey Geologic Map of Oregon GIS layer; on-screen digitizing.
Sensitive Area Setbacks Adjacent to Streams and Reservoirs: 1000 foot buffer from the centerline
 of perennial streams and the shoreline of any reservoir.

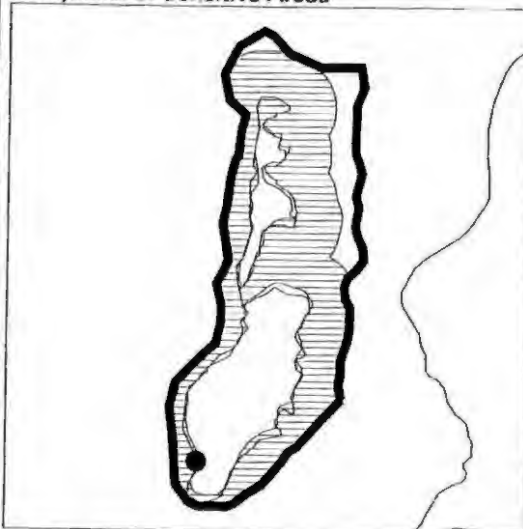
Note on Sensitive Areas: In determining the most sensitive areas within this Drinking Water Protection Area,
 DEQ used existing GIS layers and other natural resource agency data sets. Not all areas of the state have
 been mapped for the natural resource parameters of interest or at the level of detail ideal for this type
 of analysis. DEQ has sought to obtain the best available information for this composite.



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Composite of Sensitive Areas

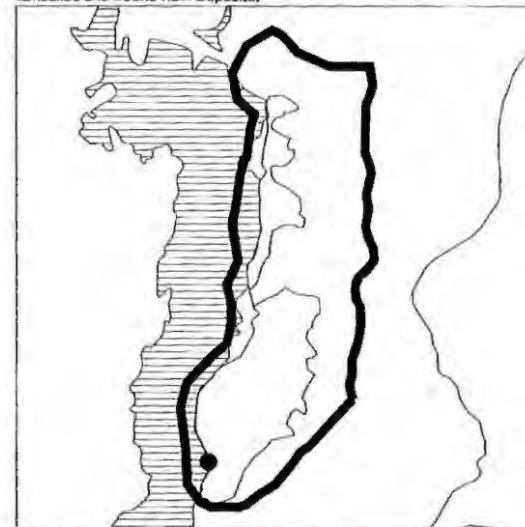


Sensitive Areas in Watershed

High Soil Erosion Potential
 (Slope ≥ 30 Percent and Soil Erodibility Factor $> .25$)



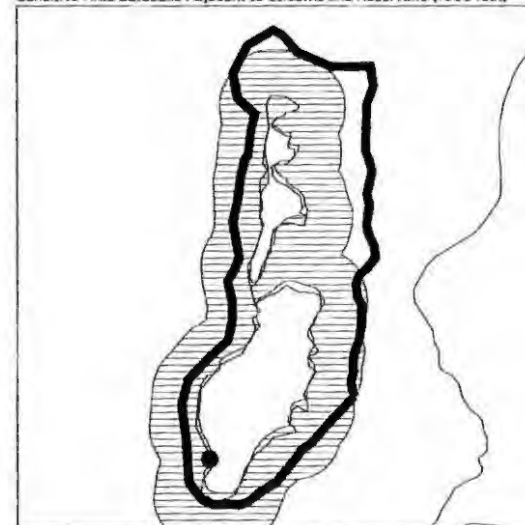
**High Permeability Soils (Alluvial Deposits, Dune Sand,
 Landslide and Debris-flow Deposits)**

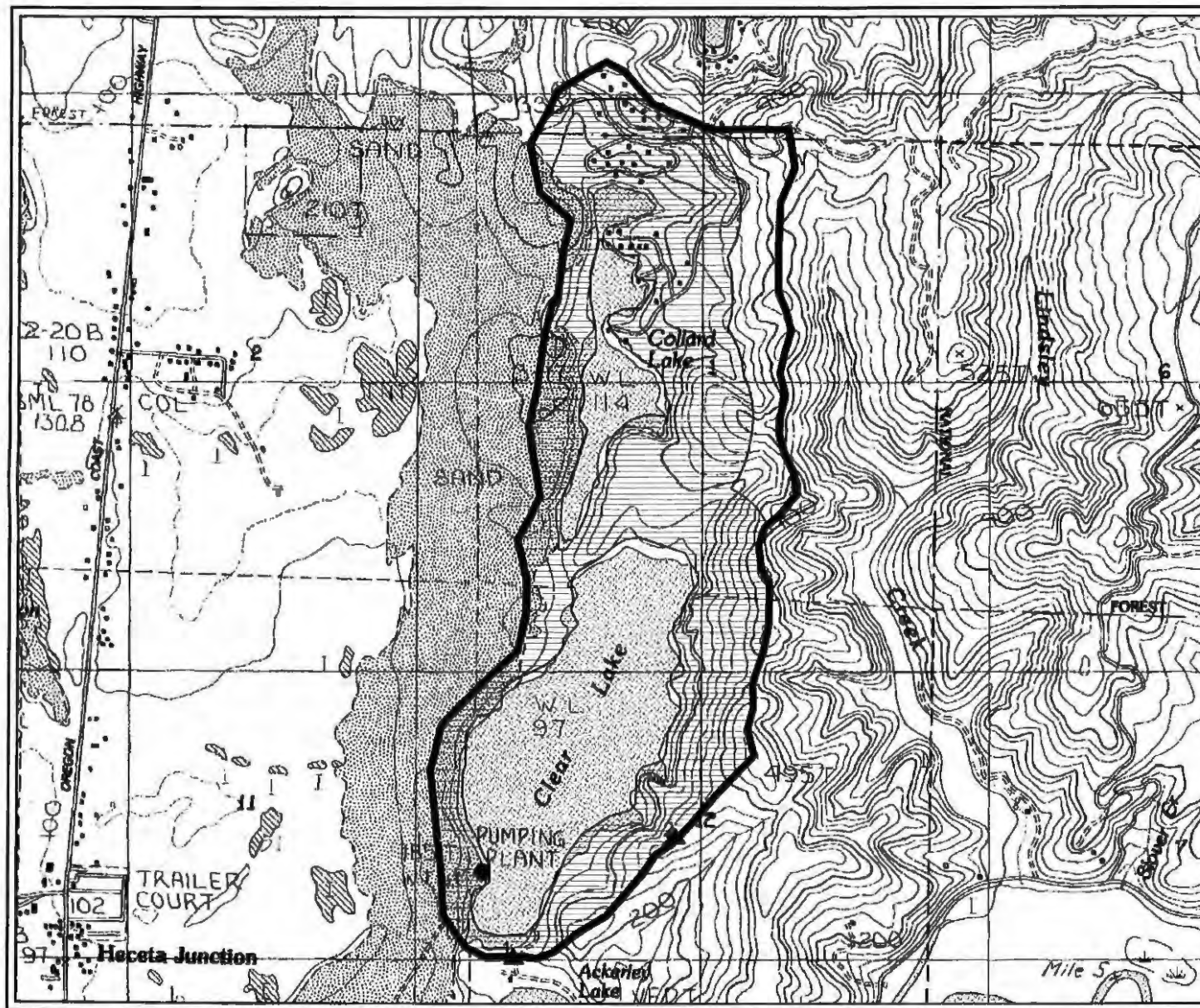


High Runoff Potential (Hydrologic Group D - slow infiltration rates)



Sensitive Area Setbacks Adjacent to Streams and Reservoirs (1000 feet)





**Figure 3:
Source Water Assessment
Results**

**Heceta Water District's Drinking
Water Protection Area with Sensitive
Areas and Potential Contamination
Sources**

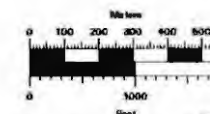
PWS 4100301

- Drinking Water Intake - Surface Water
- Drinking Water Protection Area
- ≡ Sensitive Areas
- ▲ Area Feature (see Note 2)
- ◆ Point Feature (see Note 2)

Notes on Potential Contaminant Sources

Note 1: Sites and areas noted in this Figure are potential sources of contamination to the drinking water identified by Oregon drinking water protection staff. Environmental contamination is not likely to occur when contaminants are handled and used properly or when best management practices are employed.

Note 2: Feature identification numbers correspond to the potential contaminant source numbers in Table 2. The area features represent the approximate area where the land use or activity occurs and is marked at the point closest to the intake. The point features represent the approximate point where the land use or activity occurs.



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Tables

Source Water Assessment Report Heceta Water District PWS # 4100301 Inventory Results

Table 1. Summary of Potential Contaminant Sources by Land Use

Table 2. Inventory Results – List of Potential Contaminant Sources

Notes for Tables

- Sites and areas identified in Tables 1 and 2 are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.
- Total number of sources listed in Table 1 in the DWPA may not add up to the total number of potential contaminant sources in Table 2 because more than one type of potential contaminant source may be present at any given facility.
- The data was collected by Rachel Burr, DEQ's Western Region Office, on June 25, 2001.

Acronyms

AST - Aboveground Storage Tank
DC - DEQ's Drycleaner database
DEQ - Oregon Department of Environmental Quality
DWPA - Drinking Water Protection Area
ECSI - DEQ's Environmental Cleanup Site Information database
HWIMSY - DEQ's Hazardous Waste Information Management System database
LUST - DEQ's Leaking Underground Storage Tank database
NPDES - National Pollution Discharge Elimination System
PCS - Potential Contaminant Source
PWS - Public Water System
SFM - State Fire Marshall's database of hazardous materials
SIS - DEQ's Source Information System database (includes WPCF and NPDES permits)
SWMS - DEQ's Solid Waste Management System database
UST - DEQ's Underground Storage Tank database or Underground Storage Tank
WPCF - Water Pollution Control Facility
WRD - Oregon Water Resources Division database for water rights information system

TABLE 1. SUMMARY OF POTENTIAL CONTAMINANT SOURCES BY LAND USE

PWS # 4100301 HECETA WATER DISTRICT

Residential/Municipal Land Uses

Potential Contamination Source	Notes	Relative Risk Level	Total in DWPA
Airport - Maintenance/Fueling Area		Higher	0
Apartments and Condominiums		Lower	0
Campgrounds/RV Parks	(1)	Lower	0
Cemeteries - Pre-1945		Moderate	0
Drinking Water Treatment Plants		Moderate	0
Fire Station		Lower	0
Fire Training Facilities		Moderate	0
Golf Courses		Moderate	0
Housing - High Density (> 1 House/0.5 acres)		Moderate	0
Landfill/Dumps	(1)	Higher	0
Lawn Care - Highly Maintained Areas		Moderate	0
Motor Pools		Moderate	0
Parks		Moderate	0
Railroad Yards/Maintenance/Fueling Areas		Higher	0
Schools		Lower	0
Septic Systems - High Density (> 1 system/acre)	(1)	Higher	0
Sewer Lines - Close Proximity to PWS	(1)	Higher	0
Utility Stations - Maintenance Transformer Storage		Higher	0
Waste Transfer/Recycling Stations	(1)	Moderate	0
Wastewater Treatment Plants/Collection Stations	(1)	Moderate	0
Other			0

NOTES:

Sites and areas identified in this Table are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

(1) - Potential source of microbial contamination

(2) - Drip Irrigated crops, such as vineyards and some vegetables, are considered lower risk than spray irrigation

(3) - For groundwater public water systems, septic systems located within the 2-year time-of-travel (TOT) are considered moderate risks.

TABLE 1. SUMMARY OF POTENTIAL CONTAMINANT SOURCES BY LAND USE

PWS # 4100301 HECETA WATER DISTRICT

Commercial/Industrial Land Uses

Potential Contamination Source	Notes	Relative Risk Level	Total In DWPA
Automobiles - Body Shops		Higher	0
Automobiles - Car Washes		Moderate	0
Automobiles - Gas Stations		Higher	0
Automobiles - Repair Shops		Higher	0
Boat Services/Repair/Refinishing		Higher	0
Cement/Concrete Plants		Moderate	0
Chemical/Petroleum Processing/Storage		Higher	0
Dry Cleaners		Higher	0
Electrical/Electronic Manufacturing		Higher	0
Fleet/Trucking/Bus Terminals		Higher	0
Food Processing		Moderate	0
Furniture/Lumber/Parts Stores		Moderate	0
Home Manufacturing		Higher	0
Junk/Scrap/Salvage Yards		Higher	0
Machine Shops		Higher	0
Medical/Vet Offices	(1)	Moderate	0
Metal Plating/Finishing/Fabrication		Higher	0
Mines/Gravel Pits		Higher	0
Office Buildings/Complexes		Lower	0
Parking Lots/Malls (> 50 Spaces)		Higher	0
Photo Processing/Printing		Higher	0
Plastics/Synthetics Producer		Higher	0
Research Laboratories		Higher	0
RV/Mini Storage		Lower	0
Wood Preserving/Treating		Higher	0
Wood/Pulp/Paper Processing and Mills		Higher	0
Other			0

NOTES:

Sites and areas identified in this Table are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

(1) - Potential source of microbial contamination

(2) - Drip irrigated crops, such as vineyards and some vegetables, are considered lower risk than spray irrigation

(3) - For groundwater public water systems, septic systems located within the 2-year time-of-travel (TOT) are considered moderate risks.

TABLE 1. SUMMARY OF POTENTIAL CONTAMINANT SOURCES BY LAND USE

PWS # 4100301 HECETA WATER DISTRICT

Agricultural/Forest Land Uses

Potential Contamination Source	Notes	Relative Risk Level	Total In DWPA
Auction Lots	(1)	Higher	0
Boarding Stables	(1)	Moderate	0
Confined Animal Feeding Operations (CAFOs)	(1)	Higher	0
Crops - Irrigated (inc. orchards, vineyards, nurseries, greenhouses)	(2)	Moderate	0
Crops - Nonirrigated (inc. Christmas trees, grains, grass seed, pasture)		Lower	0
Farm Machinery Repair		Higher	0
Grazing Animals (> 5 large animals or equivalent/acre)	(1)	Moderate	0
Lagoons/Liquid Wastes	(1)	Higher	0
Land Application Sites	(1)	Moderate	0
Managed Forest Land - Broadcast Fertilized Areas		Lower	0
Managed Forest Land - Clearcut Harvest (< 35 yrs.)		Moderate	0
Managed Forest Land - Partial Harvest (< 10 yrs.)		Moderate	0
Managed Forest Land - Road Density (> 2 mi./sq. mi.)		Moderate	0
Pesticide/Fertilizer/Petroleum Storage, Handling, Mixing, & Cleaning Ar		Higher	0
Recent Burn Areas (< 10 yrs.)		Lower	0
Managed Forest Lands - Status Unknown		Moderate	0
Other:		Moderate	1

NOTES:

Sites and areas identified in this Table are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

(1) - Potential source of microbial contamination

(2) - Drip Irrigated crops, such as vineyards and some vegetables, are considered lower risk than spray irrigation

(3) - For groundwater public water systems, septic systems located within the 2-year time-of-travel (TOT) are considered moderate risks.

TABLE 1. SUMMARY OF POTENTIAL CONTAMINANT SOURCES BY LAND USE

PWS # 4100301 HECETA WATER DISTRICT

Miscellaneous Land Uses

Potential Contamination Source	Notes	Relative Risk Level	Total in DWPA
Above Ground Storage Tanks - Excluding Water		Moderate	0
Channel Alterations - Heavy		Lower	0
Combined Sewer Outfalls	(1)	Lower	0
Stormwater Outfalls	(1)	Lower	0
Composting Facilities	(1)	Moderate	0
Historic Gas Stations		Higher	0
Historic Waste Dumps/Landfills	(1)	Higher	0
Homesteads - Rural - Machine Shops/Equipment Maintenance		Higher	0
Homesteads - Rural - Septic Systems (< 1/acre)	(1)(3)	Lower	1
Injection/Dry Wells, Sumps - Class V UICs	(1)	Higher	0
Kennels (> 20 Pens)	(1)	Lower	0
Military Installations		Higher	0
Random Dump Sites		Moderate	0
River Recreation - Heavy Use (Inc. campgrounds)	(1)	Lower	0
Sludge Disposal Areas	(1)	Moderate	0
Stormwater Retention Basins	(1)	Moderate	0
Transmission Lines - Right-of-Ways		Lower	0
Transportation - Freeways/State Highways/Other Heavy Use Roads		Moderate	0
Transportation - Railroads		Moderate	0
Transportation - Right-Of-Ways - Herbicide Use Areas		Moderate	0
Transportation - River Traffic - Heavy		Lower	0
Transportation - Stream Crossing - Perennial		Lower	0
UST - Confirmed Leaking Tanks - DEQ List		Higher	0
UST - Decommissioned/Inactive		Lower	0
UST - Nonregulated Tanks (< 1,100 gals or Large Heating Oil Tanks)		Higher	0
UST - Not Upgraded and/or Registered Tanks		Higher	0
UST - Upgraded/Registered - Active		Lower	0
UST - Status Unknown		Higher	0
Upstream Reservoirs/Dams		Lower	0
Wells/Abandoned Wells		Moderate	1
Large Capacity Septic Systems (serves > 20 people) - Class V UICs	(1)	Higher	0
Construction/Demolition Areas		Moderate	0
Other			0

NOTES:

Sites and areas identified in this Table are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

(1) - Potential source of microbial contamination

(2) - Drip irrigated crops, such as vineyards and some vegetables, are considered lower risk than spray irrigation

(3) - For groundwater public water systems, septic systems located within the 2-year time-of-travel (TOT) are considered moderate risks.

TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100301 HECETA WATER DISTRICT									
Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (2)	Potential Impacts	Comments
1	Wells/Abandoned Wells	Rural residential on septic	North of Clear Lake	Florence	Field-Observation	Within sensitive area.	Moderate	Improperly installed or maintained wells and abandoned wells may provide a direct conduit for contamination to groundwater and drinking water source.	Majority of homes are around Collard Lake. Presence and location of wells unknown. Needs verified. Potential risk should be verified during enhanced inventory.
	Homesteads - Rural - Septic Systems (< 1/acre)						Lower	If not properly sited, designed, installed, and maintained, septic systems can impact drinking water. Use of drain cleaners and dumping household hazardous wastes can result in groundwater contamination.	Majority of homes are around Collard Lake. Presence and location of wells unknown. Needs verified. Potential risk should be verified during enhanced inventory.
2	Other	Future Land Development	Southeast of Clear Lake	Florence	Interview	Within sensitive area.	Moderate	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	Forest clearing may occur in future according to contract. Potential future land use.

Note: Sites and areas identified in this Table are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

(1) Where multiple potential contaminant sources exist at a site, the highest level of risk is used.

(2) See Table 3 for database listings (if necessary).

Attachment

Source Water Assessment Report
Heceta Water District
PWS # 4100301

Attachment A. Source Water Assessment Summary Brochure

SOURCE WATER ASSESSMENT SUMMARY BROCHURE

HECETA WATER DISTRICT PWS # 4100301

WHAT IS A SOURCE WATER ASSESSMENT?

The Source Water Assessment was recently completed by the Department of Environmental Quality (DEQ) and the Oregon Health Division (OHD) to identify the surface areas (and/or subsurface areas) that supply water to Heceta Water District's public water system intake and to inventory the potential contaminant sources that may impact the water supply.

WHY WAS IT COMPLETED?

The Source Water Assessment was completed to provide information so that Heceta Water District's public water system staff/operator, consumers, and community citizens can begin developing strategies to protect the source of their drinking water, and to minimize future public expenditures for drinking water treatment. The assessment was prepared under the requirements and guidelines of the Federal Safe Drinking Water Act (SDWA).

WHAT AREAS ARE INCLUDED IN HECETA WATER DISTRICT'S DRINKING WATER PROTECTION AREA?

The drinking water for Heceta Water District is supplied by an intake on Clear Lake. This public water system serves approximately 4,500 citizens. The intake is located in the Lower Siuslaw River Watershed in the Siuslaw Sub-Basin of the Northern Oregon Coastal Basin. The geographic area providing water to Heceta Water District's intake (the drinking water protection area) includes 149.6 acres of lakes (including Munsel Lake, Clear Lake, Ackerley Lake and Collard Lakes) and 0.23 miles of streams. The protection area encompasses a total area of 0.96 square miles. The boundaries of the Drinking Water Protection Area are illustrated on the figure attached to this summary.

WHAT ARE THE POTENTIAL SOURCES OF CONTAMINATION TO HECETA WATER DISTRICT'S PUBLIC DRINKING WATER SUPPLY?

The primary intent of this inventory was to identify and locate significant potential sources of contaminants of concern. Forestlands primarily dominate the delineated drinking water protection area. The potential contaminant sources identified in the watershed include rural residential areas and future land development. This provides a quick look at the existing potential sources of contamination that could, if improperly managed or released, impact the water quality in the watershed.

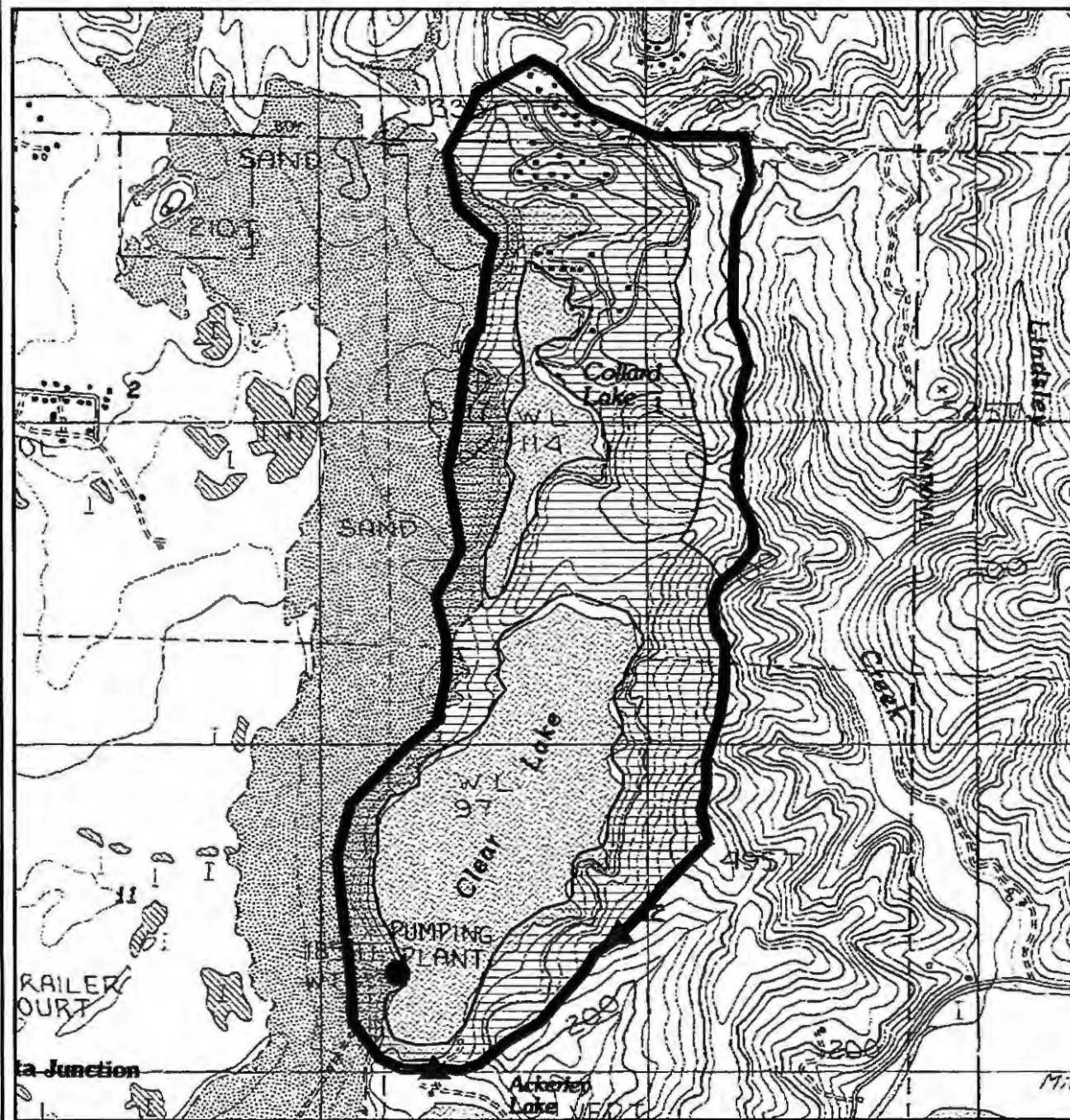
WHAT ARE THE RISKS FOR OUR SYSTEM?

Two potential contaminant sources were identified in Heceta Water District's drinking water protection area. Both are located in the sensitive areas and are high- to moderate-risk sources within "sensitive areas". The sensitive areas within the Heceta Water District drinking water protection area include areas with high soil permeability and areas located within 1000' from the river/streams. The sensitive areas are those where the potential contamination sources, if present, have a greater potential to impact the water supply. The information in this assessment provides a basis for prioritizing areas in and around our community that are most vulnerable to potential impacts and can be used by the Heceta Water District community to develop a voluntary Drinking Water Protection Plan.

NEED MORE INFORMATION?

Heceta Water District's Source Water Assessment Report provides additional details on the methodology and results of this assessment. The full report is available for review at:




Contact Heceta Water District staff if you would like additional information on these Source Water Assessment results.





Source Water Assessment Results

Heceta Water District's Drinking Water Protection Area with Sensitive Areas and Potential Contamination Sources

PWS 4100301

-  Drinking Water Protection Area
-  Drinking Water Intake - Surface Water
-  Sensitive Areas

 Area Feature (see Note 2)

 Point Feature (see Note 2)

Notes on Potential Contaminant Sources

Note 1: Sites and areas noted in this Figure are potential sources of contamination to the drinking water identified by Oregon drinking water protection staff. Environmental contamination is not likely to occur when contaminants are used and managed properly.

Note 2: Feature identification markers correspond to the potential contaminant source numbers in the SWA Report. The area features represent the approximate area where the land use or activity occurs and is marked at the point closest to the intake. The point features represent the approximate point where the land use or activity occurs.



Oregon
Department of
Environmental
Quality



Printed September, 2001

Oregon Department of Environmental Quality GIS

Appendix E2

Source Water Assessment (June 2007)

Deliverable as Specified in
CWA Section 106
Grant # I-98076401
and
Indian General Assistance Program (IGAP)
Grant # GA-97070101



Prepared By:

**Confederated Tribes of Coos,
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Introduction

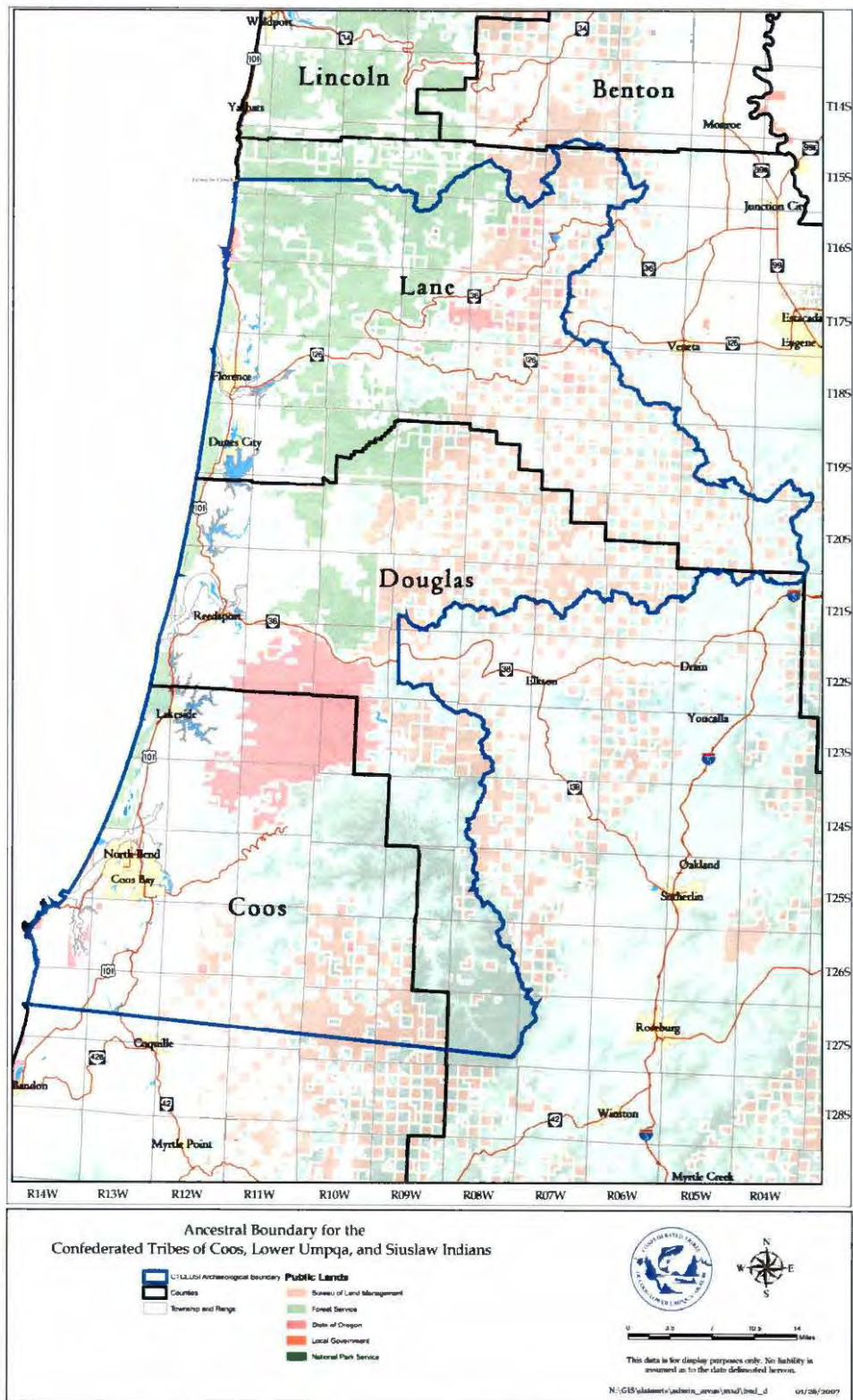
The Ancestral Territory of the Confederated Tribes of the Coos, Lower Umpqua and Siuslaw Indians is located along the central and south-central coast of Oregon (*Map 1*). This homeland includes the coast, estuaries, tributaries, lakes, and upland forests of the Coos, lower Umpqua (including Smith) and Siuslaw Rivers, a portion of the North Fork Coquille River, and coastal tributaries from Tenmile Creek (Lane County) in the north to Whiskey Run Creek in the south.

Currently, the reservation and trust land base of the Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians' (CTCLUSI) consists of nineteen small and fragmented land holdings totaling 130 acres. These land holdings are scattered among the state of Oregon's Lane, Coos, and Curry counties. Only one of the Tribes' nineteen parcels is currently drawing source water directly from an aquifer. The other parcels either have no source water access or are reliant upon municipal water systems for drinking and waste water distribution.

Purpose and Need

Source water is the water from reservoirs, streams, rivers, or underground aquifers that drinking water systems use to supply drinking water. Water and wastewater distribution to Tribal offices and facilities located in Coos County are managed and maintained by the Coos Bay-North Bend Water Board PWS# 4100205. Water and wastewater distribution to Tribal offices located in Lane county are managed and maintained by either the City of Florence PWS# 4100299 or the Springfield Utility Board. All of these municipal jurisdictions have conducted their own Source Water Assessment Reports. CTCLUSI Department of Natural Resources (DNR) staff acquired copies of these reports for current and future assessment purposes. The Hatch Tract, located in the City of Florence, is not reliant upon a municipal water source and is drawing water directly from an aquifer. Water and wastewater distribution at the Hatch Tract is managed and maintained by the Tribes. This Source Water Assessment is intended to describe source water conditions on the Tribes Hatch Tract development site, identify potential sources of contamination with a significant potential effect on Tribal source water quality at this site, and to provide guidance for the Tribes' Hatch Tract source water management activities. The majority of development activities at the site are those associated with the Tribes' Three Rivers Casino (TRC) located on the Hatch Tract. This source water assessment, prepared by CTCLUSI, relies on data and analysis from many sources. These sources include reports generated by the Confederated Tribes and City, State and Federal Government reports. Included in this list are municipal Source Water Assessment Reports, USGS groundwater studies and reports, Oregon State University Groundwater Stewardship publications, watershed assessments, the City of Florence Storm Water Management Plan, Oregon Department of Human Services (DHS) and Oregon Department of Environmental Quality

(ODEQ) well head protection program reports and data, and Oregon Department of Geology and Mineral Industries (DOGAMI) reports and data.



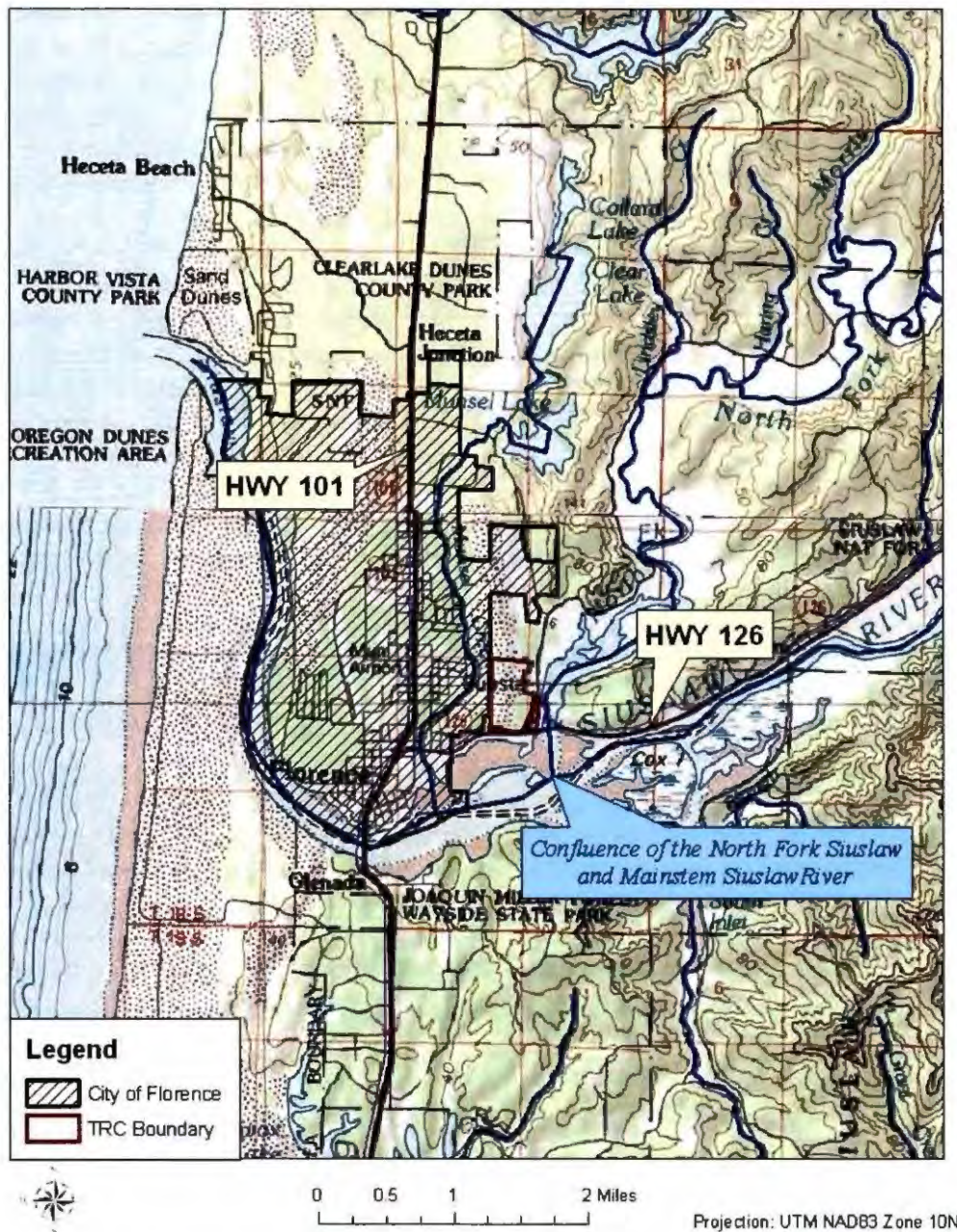
Map 1

Source Water Assessment Area

The Tribes' Hatch Tract and the TRC site location is a 98 acre parcel located in Lane County approximately 2 miles east of the city of Florence, Oregon at the confluence of the Siuslaw North Fork River and Mainstem of the Siuslaw River (Map 2). According to the Lane County Regional Land information Database, 57% of this tract is dune land, with slopes ranging between 0 to 30%. A dune ridge extends from the northeastern property corner south to near Highway 126 and then westward in the southern portion of the property. A narrower, lower, and dissected dune ridge extends northward from the southwest property corner approximately two thirds of the way to the eastern terminus of Coastal Highlands Drive. The eastern, southern and western slopes of the horseshoe-shaped main dune ridge are densely vegetated with salal, manzanita, rhododendrons, and fir trees. Disturbed areas in the lower portions east of the dune ridge are vegetated with scotch broom and blackberries. The western slopes of the dune ridge and the central portions of the site are either lacking vegetation or sparsely vegetated with European beach grass, scotch broom, and pines. This area is also characterized by "hummocky topography" as a result of sand dune deposition and deflation of the sand. A seasonal lake a few hundred feet across is present in the northeast-central portion of the site between the main dune ridge and the North Fork Road, and another seasonal lake of similar dimension is present straddling the western property line near the northwest property corner. The western part of the site is underlain by active dunes, whereas the eastern portion is underlain by a deflation plain. Segments of the North Fork Siuslaw River and Siuslaw Estuary are included on or immediately adjacent to portions of this tract.

Hatch Tract is located over a sole source aquifer. According to the February 22, 2004 GeoScience, Inc. report titled *Dunal Aquifer Hydrogeology* prepared for the Confederated Tribes, "The site hydrology can be characterized as a dunal aquifer system which is recharged by precipitation and which discharges to surface water." Municipal wells for the City of Florence are reported to each yield 325 to 450 gallons per minute, or 468,000 to 648,000 gpd (gallons per day) (*ibid.*) Summer irrigation of the golf course to the north of the Hatch Tract can use 400,000 gpd. The Three Rivers Casino currently uses approximately 10,000 gallons per day. Future development of the site is not expected to use more than 70,000 to 200,000 gpd, based on other Tribal developments of this nature in western Oregon.

TRC Site Location



Map 2

Location of Drinking Water Source

We have located our drinking water source using a Trimble Geo-XT Global Positioning System. These data have been differentially corrected to remove some of the common positioning errors. The location of the source(s) has been placed in a Geographic Information System (GIS) layer and projected onto sub-meter imagery (Map 3).

The raw data was subjected to differential correction using the PATHFINDER software. The location data for our wells using the WGS datum is as follows:

Source	Latitude	Longitude
Well 1	43° 58' 54.98" N	124° 05' 14.61" W
Well 2	43° 58' 54.11" N	124° 05' 11.01" W



Map 3

Well Construction

On site piezometers are constructed of two-inch, machine slotted, schedule 40 PVC. The filter packs consist of 20-40 mesh silica sand, or equivalent. Each well is equipped with a locking monument and protective posts. Boring logs are included in Appendix I and include appropriate well information (*i.e.* well depth, casing elevation, top of screen, top of filter pack, etc.).

Nature and Characteristics of the Aquifer

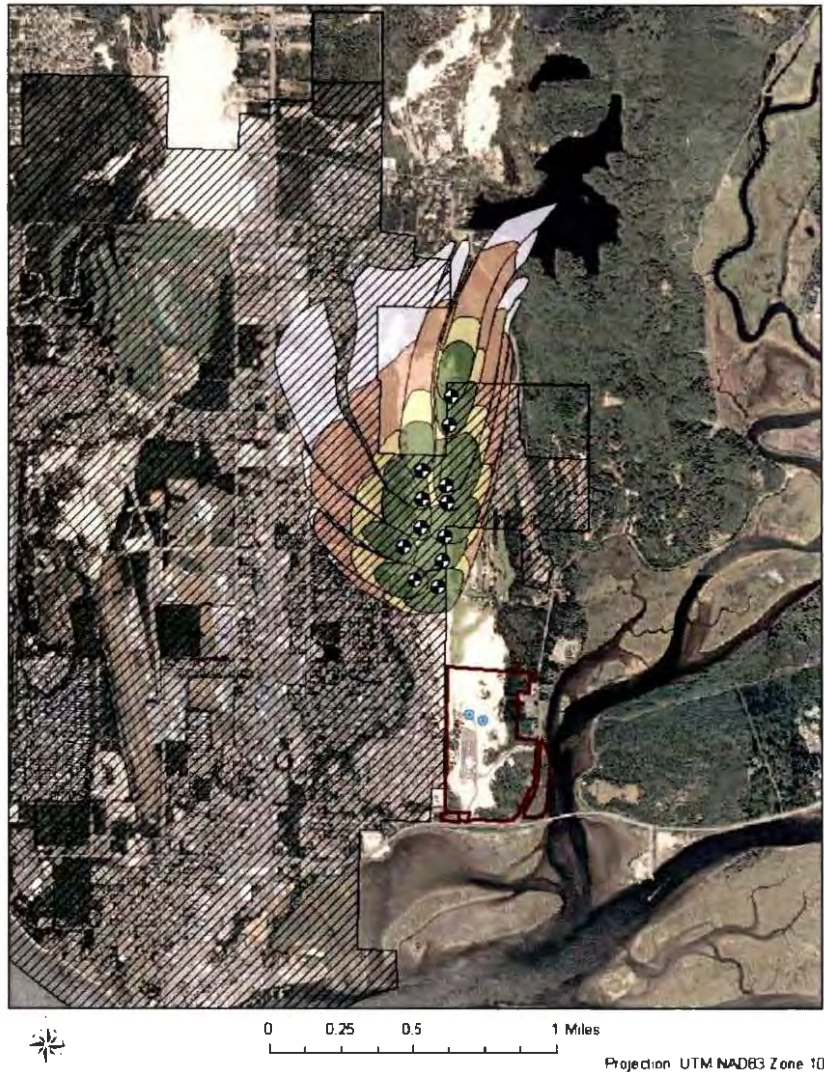
Water level measurements conducted at the Hatch Tract during December 2003, January 2004, and February 2004, indicate the groundwater gradient across the site is towards the southeast, at approximately 0.4 percent during periods of lower precipitation and 1.2 to 1.5 percent during periods with heavier precipitation. The highest elevations of the potentiometric surface are located in the northwestern portion of the site, where the seasonal high elevation is around 30 feet above mean sea level (AMSL). The minimum seasonal high elevation of the potentiometric surface at the Hatch Tract is likely located in the southeastern part of the site. Flowing and standing water was observed at the southern portion of the site at elevations of approximately 12 feet to 14 feet AMSL. This observation is consistent with an elevation change of the potentiometric surface across the southern two thirds of the site of approximately 27 feet over a distance of 1800 feet (1.5 percent).

Well logs from the City of Florence municipal wells, located approximately ½ mile north-northwest of the Hatch Tract (Map 4), indicate the thickness of the dune sand deposit in that area ranges from 120 to 170 feet. Municipal well elevations were determined using a USGS topographic map. The topographic map analysis indicated that the elevations in the vicinity of the municipal well field are similar to those at the Hatch Tract. The municipal well logs also indicate that the dune sheet rests on clay, which may be interpreted as a fine-grained alluvial deposit such as is found along the North Fork and Mainstem Siuslaw River in the form of tidal flats. It is also probable that the depths to this material are similar at the Hatch Tract to those found at the municipal wells. Therefore, it is likely that the thickness of the dunal aquifer at Hatch Tract is similar to that in the municipal well field. The saturated thickness of the aquifer in that vicinity ranges from 100 to 120 feet. If the gradient remains similar to those measured at the site, it is probable that the saturated thickness of the aquifer beneath the site is approximately 80 to 100 feet.

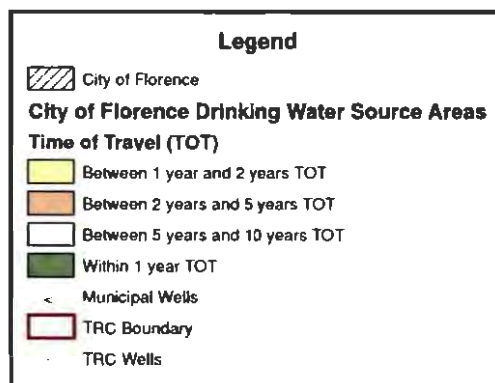
The wells in the municipal field are constructed with screened intervals 30 to 40 feet long which terminate from 0 to 20 feet above the bottom of the aquifer. This indicates that salt water intrusion has not been considered a potential problem to date. The wells are located 2.5 miles from the ocean, with the Siuslaw River forming a barrier against salt water intrusion from the west and south. The presence of fine-grained sediments at the bottom of the aquifer reduces the risk of salt water intrusion.

The aquifer supplying the drinking water to the City of Florence well field and the Tribes' Hatch Tract consists of sand of the Florence Dunal Aquifer. According to Florence's Source Water Protection Plan, the depth to first water encountered in the municipal well field and the static water level after well completion is the same in the aquifer. This implies that the groundwater is under atmospheric pressure only and that the aquifer should be considered as unconfined, i.e., there are no materials of low permeability separating the aquifer water table, from the surface.

**Location of Municipal Wells
and Drinking Water Source Area Relative to the Tribes' TRC Site**



Map 4



Hatch Tract Susceptibility of Water Supply to Contamination

Aquifer sensitivity is determined by the character of the soils and the geologic materials separating the aquifer from the surface. Because of the sandy nature of the geologic materials overlying the North Florence Dunal Aquifer (of which Hatch Tract is part), the aquifer is considered highly sensitive throughout (City of Florence Source Water Assessment Report, 2003).

It should be understood that the Tribes' Hatch Tract drinking water source cannot be susceptible to contamination, even if the aquifer is sensitive, unless potential contaminant sources are present within the source water protection area. Therefore, the intent of our susceptibility analysis is to identify those areas within the Tribes' drinking water source area where the aquifer is most sensitive to contamination.

Potential on site contaminant sources identified by the Tribes' Department of Natural Resources Staff (DNR) during site surveys and reviews of Hatch Tract construction plans are: pesticide/fertilizer/ petroleum/ storage(above ground storage tanks – ASTs), handling, mixing and cleaning areas; stormwater outfalls; potential impacts to groundwater associated with cone of depression well interference or well head cone of depression induced recharge from the North Fork River or wetland located below the Hatch Tract's drain field; and percolation of reclaimed water irrigation used for dune stabilization on the site.

According to the Florence Source Water Assessment Report, the North Florence Dunal Aquifer is considered to be highly sensitive and susceptible to contamination from viral contaminant sources located within the two-year time-of –travel zone for the city's drinking water protection area (e.g. sewer lines and residential housing).

The City of Florence Source Water Assessment Report conducted an inventory of potential contaminant sources and analyzed the results in terms of current, past, and future land uses; their time of travel (TOT) relationship to the well site; and their associated risk rating. In general, land uses that are closest to the well and those with the highest risk rating pose the greatest threat to the City of Florence and the Tribes' Hatch Tract drinking water supply.

PCS Within Two-Year Time of Travel for Municipal Wells

The City of Florence's delineated two-year time-of-travel zone is primarily dominated by residential and municipal land use. Four potential contaminant sources were located within the two-year time-of-travel zone for all the wells located in the city's DWPA and included Ocean Dunes Golf Course, high density housing, the City of Florence Drinking Water Treatment Plant, and city sewer lines. The potential contaminant sources within the two-year time-of-travel all pose a risk of transmitting micro-organisms to the groundwater. A description of the potential contaminant sources associated with each of the municipal wells is provided below along with a map displaying these wells relative to TRC.

Well 1: High density housing and city sewer lines.

Well 2: High density housing, city sewer lines, and the City of Florence Drinking Water Treatment Plant.

Well 3: High density housing and city sewer lines.

Well 8: Ocean Dunes Golf Course

Well 9: Ocean Dunes Golf Course

Well 10: Ocean Dunes Golf Course

PCS Within Five-Year and Ten-Year Time of Travel for Municipal Wells

The municipal drinking water protection area within the five-year and ten-year time of travel zones is primarily occupied by residential and municipal land use. Three potential contaminant sources were identified in this area and include B&E RV Park, stormwater outfalls, and Munsel Lake.

Hatch Tract Potential Contaminant Sources:

The City of Florence's Drinking Water Protection Area is upgradient of the Tribes' Hatch Tract facilities and does not include Hatch Tract in its delineation. However, due to the close proximity of Hatch Tract to the City of Florence's Drinking Water Protection Area, the potential contaminant sources for Hatch Tract source water are the same as those identified by the City of Florence Source Water Assessment Report. The delineated drinking water protection area for the wells located within the Florence drinking water protection area is primarily dominated by residential and municipal land use. However, four potential contaminant sources were identified in the two-year time-of-travel zone of the drinking water protection area: a golf course; high density housing; a drinking water treatment plant; and city sewer lines. Three potential contaminant sources were identified within the five-year and ten-year time-of-travel zones. The potential contaminants in this area are: and RV park; Stormwater outfalls; and a lake. These findings were confirmed by our own GIS analysis.

Monitoring Wells

Seven monitoring wells have been installed around the perimeter of the Hatch Tract drainfield area. These wells have been placed to provide maximum protection to surrounding sensitive resources. There are three potentially sensitive resources located near the area. First, the casino's domestic well is located generally upgradient from the drainfield and approximately 9,000 feet to the northwest. Down gradient to the drainfield lies a wetland area. This wetland area is located approximately 200 feet to the southeast of the drainfield. The third sensitive area is a residential area located cross gradient approximately 4,500 feet to the northeast. This residential area is serviced by well water rather than municipal supply.

The rationale for placement of each well is as follows:

- Monitoring Well 1 – This well is located up gradient from the leach field. It is also placed in-line between the leach field and the domestic well, for the purposes of detecting any discharge that could threaten the domestic well.
- Monitoring Well 2 – This well is located in a position to detect any discharge migrating to the south from an additional set of drainfields that may be constructed in the future. As the second set of drainfields has not yet been constructed, MW-2 serves only to provide water gradient data.
- Monitoring Well 3 – This well is located down gradient of the currently active leach field, and is also located in between the leach field and the neighboring wetland located approximately 200' east of the leach field.

- Monitoring Well 4 – This well is located to detect any discharge which could impact wells that supply water to the neighboring residential area, located 4,500' to the northeast of the leach field.
- Monitoring Well 5 - Located upgradient from treated wastewater irrigation field and down-gradient from drinking water source well.
- Monitoring Well 6 - Located cross gradient from nearest off-site neighbor.
- Monitoring Well 7 - Located for Point of Compliance where groundwater leaves site and enters the North Fork Siuslaw River.
- Protection planning

Using This Assessment for Protection

The process of developing a Drinking Water Protection Plan can be summarized as follows:

Assessment Phase

- Delineate the area that serves as the source of the public water supply (Drinking Water Protection Area-DWPA)
- Inventory the potential risks or sources of contamination with the DWPA
- Determine the areas most susceptible to contamination

Recommendations

Protection Phase

- Assemble a Tribal Drinking Water Protection Team
- Enhance the Source Water Assessment as necessary
- Develop a plan to reduce the risk of contamination (protect the resource)
- Develop a contingency plan to address the potential loss of the drinking water supply
- Certify and implement the a Drinking Water Protection Plan

Prior to moving into the protection phase, the Tribal Drinking Water Protection Team will review the information presented in this document in detail to clarify the presence, location, operational practices, actual risks, etc. of the identified facilities and land use activities.

Conclusions

This source water assessment should be regarded as a preliminary review of potential sources of contamination within the Tribes' source water protection area, e.g., Hatch Tract. Tribal resources will be used to conduct an enhanced inventory to refine this preliminary list of potential sources of contamination, develop a groundwater monitoring program strategy, and produce a groundwater monitoring Quality Assurance Project Plan (QAPP).

It is important to remember that not all of the inventoried activities will need to be addressed during the development of the Tribes' Drinking Water Protection Plan. When developing a protection plan, sources which pose little or no threat to the drinking water source can be screened out. For example, if any of the land use activities are conducted in a manner that already significantly reduces the risk of a contamination release, the Hatch Tract will not need to re-evaluate their practices based on drinking water protection management. One of the goals of developing a plan based on the information contained within this assessment is to address those land use activities that do pose high or moderate risks to the Hatch Tract water supply.

QUALITY ASSURANCE PROJECT PLAN (QAPP)

Siuslaw Estuary Partnership

*An Integrated Multiple Objective Approach To Watershed
Protection and Restoration*

Work Element III: Surface and Groundwater Assessment and Monitoring Program



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February 16, 2010

Title and Approval Sheet

Title: Siuslaw River Estuary Partnership: An Integrated, Multiple Objective Approach to Watershed Protection and Restoration, Work Plan Element III, Surface and Groundwater Assessment and Monitoring Program

Approving Officials:



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2/26/2010
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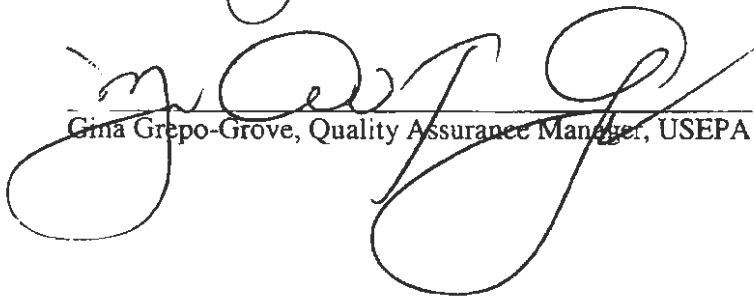
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3/9/2010
Date



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Acronyms and Abbreviations

DEQ	Oregon Department of Environmental Quality
DO	dissolved oxygen
DQOs	data quality objectives
IOC	inorganic chemical
OBMP	Oregon Beach Monitoring Program
ORP	oxidation-reduction potential
SOCs	synthetic organic chemicals, e.g., pesticides
TOC	total organic carbon
UGB	Urban Growth Boundary
USGS	U.S. Geological Survey
VOCs	volatile organic chemicals, e.g., fuels, solvents

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A. Project Management

1. Project/Task Organization

The project team shall be comprised of a consortium of experts and stakeholders needed to shepherd the creation of a Surface- and Groundwater Assessment and Monitoring Program; Source Water Protection Plan and implementation; Estuary Interpretive Trail; Stormwater Design Manual and Demonstration Project; Wetland, Riparian, and Upland Protection and Restoration Plan; Tidal Wetlands Restoration Projects; and Comprehensive Plan and Code amendments. Personnel responsible for project implementation are:

Florence Community Development Director/Project Manager

Sandra Belson, Florence Community Development Director, is the Project Manager (PM) for the Siuslaw Estuary Partnership Project. The PM shall be responsible for overall project coordination, including the production of all project deliverables, collection and submittal of environmental samples to the designated laboratories for the chemical and physical analyses, and data reporting and management as specified in this QAPP. The Project Manager is responsible for coordinating these tasks with the other interested and involved parties associated with this monitoring effort, and ensuring that the monitoring plan is implemented as specified.

Carol Heinkel, Planning Consultant, is responsible for Project Coordination. She will provide project coordination, grant administration support, facilitate the Interdisciplinary Team and Stakeholder Group, and support policy and public involvement.

Project QA/QC Manager

Mike Miller, or Water Quality Monitoring Designee, will serve as the Project QA/QC Manager, responsible for coordinating with the analytical laboratories, ensuring conformance with data quality objectives, overseeing data validation, and managing project quality assurance and quality control.

Contract Laboratory Project Manager

To Be Determined. Selection of a contract laboratory(ies) has not been conducted to date. Once the appropriate laboratory is selected to analyze the water samples discussed in this monitoring plan, a representative of that laboratory will serve as the laboratory project manager. The laboratory project manager will provide analytical support to this project and is responsible for ensuring that laboratory analyses are performed in accordance with the protocols, quality control criteria, and other specifications detailed in this QAPP.

PARTNERS: Partners that have committed to participate on the team are listed below with an *. Additional agencies listed below will be invited to participate on the Interdisciplinary Team or the Stakeholder Group, as appropriate.

Table 1. Project Partners		
Local Government, Tribes & Non-Profits	State Agencies	Federal Agencies
*Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians	*Oregon Department of Environmental Quality	*U.S. Environmental Protection Agency
*Lane County	*Oregon Department of Fish and Wildlife	*U.S. Geological Survey
*Heceta Water District	*Oregon Department of Human Services, Drinking Water Program	*U.S. Bureau of Land Management
*Siuslaw Watershed Council	*Oregon Department of Land Conservation and Development	*U.S. Army Corps of Engineers
*Siuslaw Water and Soil Conservation District	*Oregon Department of State Lands	National Oceanic and Atmospheric Administration, Marine Fisheries Service
Port of Siuslaw	*Oregon Department of Water Resources	*USFS, Siuslaw National Forest
Port of Coos Bay	*Oregon Department of Transportation	

2. Problem Definition/Background

Florence, Oregon, a city of 9,400 people covering 5 square miles of land and 0.6 square miles of water along the Siuslaw River estuary and Pacific Ocean, is Lane County's major coastal town and the largest city in the watershed. The urban growth boundary (UGB) population is projected to grow to 17,200 by 2030, almost double the UGB population in 2000. This growth is expected to occur primarily through urbanization of "urbanizable" land within the UGB.

Land cover includes urban development within city limits and vacant and rural land uses outside. The Siuslaw River estuary, designated a Shallow Draft Development estuary under the Oregon Estuary Classification System, is managed for navigation and other public needs with jetties and a main channel maintained by dredging at 22 feet or less. The geomorphology of the area is that of a Drowned River Mouth estuary. The estuary's broad floodplain, numerous wetlands, and tidal islands, lead to the dunes along the coastal plain at Florence. Here the land is characterized by barren sand dunes interspersed with pine woodlands and deflation plain lakes or wetlands. Since the decline of the forest industry, most of the revenue generated in the area is from tourism, recreation, and commercial fishing. Local community members, both tribal and nontribal, engage in subsistence fishing for marine and stream resources. The area is an important recreational area providing opportunities for fishing, boating, beach walking, shopping, dining, bird watching, and many other active and passive recreational activities.

The Siuslaw Watershed is a significant natural area that provides critical habitat for endangered and threatened animal species, contains sensitive plant species, and provides valuable habitat for sensitive animal species (U.S. Natural Resources Conservation Service; Oregon Natural Heritage Program). Under the federal Endangered Species Act, the brown pelican is listed as endangered; the bald eagle, western snowy plover, marbled murrelet, Aleutian Canada Goose, northern spotted owl, Nelson's checker mallow, Oregon silverspot butterfly and Oregon Coast coho salmon

are listed as threatened; and the estuary is proposed for critical habitat for the threatened Southern District Population segment of green sturgeon. The purple martin is listed as critical, and American marten as vulnerable, by Oregon. Twelve plant species in the area are listed as threatened, endangered, or possibly extirpated from Oregon. The estuary also supports shellfish resources, including clams, crab, mussels, and shrimp. Large animals include black bear, black-tailed deer, and mountain lion. In all, about 23 species of fish, almost 200 species of birds, and 40 species of marine mammals use the estuary and the surrounding wetlands, lakes, riparian and upland areas. The watershed supports spawning runs of fall Chinook, chum, winter steelhead, coho, and sea-run cutthroat; and receives significant waterfowl use. The estuary has retained a relatively large proportion of its tidal marshes (764 acres) and contains large eel grass beds, and very productive intertidal (sand and mud flats) and subtidal habitats, emergent marsh, scrub-shrub, and forested wetlands. The estuary has been designated an Important Bird Area by the National Audubon Society. There has been at least one winter count of more than 1,000 shorebirds. In addition, the South Jetty wetlands adjacent to the lower river are one of the two most important wintering areas for tundra swans on the Oregon coast.

The 1996 "Florence Local Wetlands and Riparian Area Inventory" identified 270 wetlands, totaling 572 acres, and about 315 acres of riparian area. The majority of the wetlands are of high quality, due to the proximity of a number of freshwater lakes, and the large areas of undeveloped land in the northern portion of the UGB. Plant communities with a high priority for conservation include three palustrine scrub-shrub assemblages and one palustrine forested assemblage. The majority of the riparian areas were found to have high or moderate functional values for thermal regulation, erosion control, flood control/water quality, and wildlife habitat function. In the northern part of the UGB, there are large wetlands, bogs, and flooded forests; if left undeveloped, they would help regulate stream flows and reduce flood waters.

The North Florence Dunal Aquifer, designated a sole source aquifer by the EPA in 1987, is the only sole source aquifer in the State of Oregon. It encompasses the entire continuous body of sand north of the Siuslaw River and east of the Pacific Ocean, the primary discharge points for the aquifer. About 85 percent of the rain percolates into the water table. Groundwater moves rapidly and almost uniformly toward a discharge point. Multiple seeps and springs occur along the coastline and riverbank, although the aquifer discharges mostly as underflow. Few streams cross the dunal area since most rainfall quickly infiltrates to the water table which is at the surface most of the year. Where streams flow across the sand, they are hydrologically connected with the groundwater system, as are Munsel Lake and Clear Lake, which is the only surface source of drinking water. When the last comprehensive testing of the aquifer was done 23 years ago, the groundwater was of good quality "from a human health standpoint." The 1987 EPA Sole Source Aquifer Resource Document states, "Possible sources of aquifer contamination include fuel storage tank failure, accidental spills of hazardous material, septic tank effluent, storm runoff, pesticides, and chemical fertilizers." Discharge of pharmaceutical by-products is also an environmental threat.

Historically, the Siuslaw Basin was one of the most abundant anadromous fish producers in the Pacific Northwest. Once the Oregon Coast's largest Coho-producing system next to the Columbia, the Siuslaw River is estimated to be at 1% of historic salmon production levels. The lower Siuslaw River watershed health is degraded and a significant amount of restoration action is needed to improve watershed conditions (Oregon Watershed Enhancement Board, 2007). The watershed is limited by all factors in aquatic/instream areas, tideland, riparian, freshwater wetlands, and upland areas. The Siuslaw River and a number of nearby waterways and lakes are classified as Water Quality Limited under the Clean Water Act and are included on the state's 303(d) list of Impaired Waterbodies by the Oregon Department of Environmental Quality. The River is failing in all these parameters: Dissolved Oxygen, Fecal Coliform, Habitat Modification, and Temperature, and potentially Alkalinity. Beneficial Uses impaired by these listed parameters include resident fish and aquatic life; salmonid fish spawning and rearing; anadromous fish

passage; trout rearing and migration; and shellfish growing. In 1992, DEQ developed Total Maximum Daily Loads for Clear Creek/Clear Lake, and Collard Lake due to year-round phosphorus impairments. In addition, Mercer Creek and Mercer Lake are impaired due to chlorophyll a and aquatic weeds/algae, and there is a potential concern of impairment from nitrate. DEQ is currently developing the Total Maximum Daily Load for the Mid-Coast Basin with a target completion date of 2012.

Urbanization of the UGB, development of rural areas along stream corridors for housing, and climate change will exacerbate long-term watershed changes caused by established land use patterns, including altered sediment and detritus deposition patterns, changed peak flows, water circulation patterns, flooding regimes, and surface and groundwater contamination from septic systems and non-point source pollution. The presence and increased discharge of nitrates and other pollutants into the ecosystem through urban groundwater and surface water activities, and the loss of riparian and floodplain function, can be expected to further degrade the system. Another deleterious effect is increased erosion, which is already a problem in developed portions of the estuary and along Munsel Creek. Existing contamination will likely increase recovery time for these impacted waterways.

The Project Partners are favorably positioned to document and, as resources allow, restore identified natural resources that are impaired in an effort to protect functions and values of these resources in the future. The City has upgraded its sewage treatment plant; extended lines into the UGB; adopted a wetland and riparian inventory; and requires stormwater BMPs. The City has updated the Comprehensive Plan for compliance with Statewide Planning Goals for Estuarine, Shoreland, and Ocean Resources. The City, Lane County, and Heceta Water District have begun to cooperate on water quality assessment and monitoring, and the City has set aside funds for an on-going monitoring program. A Source Water Protection Plan and monitoring program were top City Council goals for 2009. The Siuslaw Watershed Council Partners (WC) will be project lead for the Tidal Wetlands Restoration Project. These Partners have a ten-year relationship and work together on an EPA-funded Targeted Watershed Initiative (since 2005).

PROJECT COMPONENTS

The Project Components are laid out in detail below. The proposal is effective and innovative because it links environmental protection and restoration with growth management in a collaborative, multi-faceted manner; and the project partners will explore non-traditional methods and activities, including low impact development, and design specifications and demonstration project for on-site water management systems that can adapt to sea level rise as well as changes in temperature and precipitation. The project will also include incentives to implement integrated environmental management strategies that will provide environmental benefits that cannot be achieved through regulations.

WORK PLAN

Milestones/Outcomes	Work Elements and Tasks
Phase I: Form Siuslaw River Estuary Partnership and Integrated Approach October 2009 through September 2010	
Agenda Packets and meeting notes; web site; Guiding Principles Report; Baseline Monitoring Protocols Report; Research Reports; Quality Management Plan and	I. <u>Inter-disciplinary Team</u> a. Form/convene Team; agree on meeting, review, and consultation process b. Submit Quality Management Plan and Quality Assurance Project Plans to EPA Project Officer for approval by November 1, 2009. c. Design and create web page and links for project. d. Establish Guiding Principles e. Establish baseline monitoring protocols f. Study climate change and its effects relative to project area

Milestones/Outcomes	Work Elements and Tasks
Quality Assurance Project Plans; Reports to EPA.	g. Conduct literature search for range of issues, policies and measures h. Provide semi-annual reports to EPA on progress and seek technical assistance from EPA as needed.
Agenda packets, staff reports, meeting notes; Newsletter #1; Open House Report #1	<u>II. Stakeholder Group/Local Official Check-ins</u> a. Form Group; create e-mail and hard copy mail list b. Create and mail newsletter #1 c. Hold initial interactive meeting/open house to obtain input on goals, guiding principles, project design d. Provide monthly updates to Planning Commission (PC), City Council (CC), and Heceta Water District Board (Board)
Technical Memoranda on Standards, Meth- ods, Base Line Data, Sources of Contami- nation, and any Re- medial Actions	<u>III. Surface and Groundwater Assessment and Monitoring Program</u> a. Develop scientific-based standards b. Develop methods for assessment and monitoring program c. Install groundwater monitoring wells, stream flow gauges at inflow to Munsel Lake and Ackerly Creek; data loggers in estuary d. Collect base line data and identify sources of contamination e. Take immediate remedial action for any identified contamination
Report on Protection Areas, Potential Risks, and Alternative Meas- ures	<u>IV. Source Water Protection Plan and Implementation</u> a. Identify/refine source water protection areas b. Identify potential risks to the aquifer c. Develop alternative policies and implementation measures
Report on Trail Loca- tion and Design Op- tions	<u>V. Estuary Interpretive Trail</u> a. Identify alternative sites for potential acquisition of missing linkages in estu- ary trail b. Develop alternative design options
Stormwater Policy and BMP Options Re- port	<u>VI. Stormwater Best Management Practices Manual</u> a. Identify policies to support guiding principles (connectivity, flood plain resto- ration and preservation, low impact development) b. Develop design BMPs for typical subdivision and infill development, tailored to Florence area climate, soils, topography, aquifer sensitivity (this portion of the project is funded by a DLCD Grant with local match).
Stormwater Demon- stration Project Ac- quisition Report	<u>VII. Stormwater Demonstration Project</u> a. Identify demonstration project area and acquire site (preliminary site identifi- cation work has begun for Interpretive Center/ stormwater BMP demonstration project east of Siuslaw River Bridge)
Draft Inventory Re- port; Existing policies and measures: gaps and conflicts analysis	<u>VIII. Wetland, Riparian, and Upland Protection and Restoration Plan</u> a. Update wetland and riparian area inventory, assess floodplain capacity and connectivity, and conduct upland inventory b. Analyze existing policies and measures for gaps and conflicts with guiding principles
Prelim. site assess. for high priority wetlands, acquisition of highest priority conservation areas in estuary from willing landowners	<u>IX. Estuary Acquisition and Restoration (Watershed Council)</u> a. Secure landowner commitments for restoration projects b. Conduct site characterizations, limited baseline monitoring, conceptual design c. Raise sufficient matching funds for acquisition.
Preliminary List of Needed Plan and Code Amendments	<u>X. City Comprehensive Plan and Code Amendments</u> a. Describe needed amendments.
Phase 2: Alternatives Analysis, October 2010 through September 2011	
Agenda Packets and	<u>I. Inter-disciplinary Team</u>

Milestones/Outcomes	Work Elements and Tasks
Meeting Notes; Guiding Principles Evaluation and Alternatives Report; Reports to EPA.	<ul style="list-style-type: none"> a. Convene Team (assumes monthly meetings) b. Evaluate all milestones for consistency with Guiding Principles c. Propose alternatives d. Review and comment on all Draft Reports e. Provide semi-annual reports to EPA on progress and seek technical assistance from EPA as needed.
Agenda Packets and Meeting Notes; Newsletter #2; Open House Report #2	<u>II. Stakeholder Group/Local Official Check-ins</u> <ul style="list-style-type: none"> a. Convene Stakeholder Group to plan public outreach b. Create and send newsletter and maintain web page c. Hold second meeting/open house for input/feedback on milestones d. Update PC, CC and Board monthly
Report on Current Conditions and Alternative Solutions	<u>III. Surface and Groundwater Assessment and Monitoring Program</u> <ul style="list-style-type: none"> a. Problem-solve and remedy existing contamination incidents b. Develop and analyze alternative solutions to contamination threats
Draft Source Water Protection Plan; new Munscl Creek culvert; signs installed informing of lake water importance and risks	<u>IV. Source Water Protection Plan and Implementation</u> <ul style="list-style-type: none"> a. Continue to identify sources of contamination b. Test alternatives and monitor c. Develop protection strategies d. Prepare Draft Plan and implementation measures e. Implement identified measures (culvert; 5 signs around Clear Lake)
Estuary Interpretive Trail Report on Site and Design Options Preliminary Report	<u>V. Estuary Interpretive Trail</u> <ul style="list-style-type: none"> a. Analyze site and design options' environmental and cost impacts b. Identify and analyze strategies to retain trail as permanent open space c. Prepare draft report on site and design options
Draft Stormwater Best Management Practices Manual	<u>VI. Stormwater Best Management Practices Manual</u> <ul style="list-style-type: none"> a. Apply and evaluate design BMPs b. Analyze alternative policies and approaches based on lessons learned and refine BMPs
Demonstration Project Report on BMP design, installation, and estuary base line data	<u>VII. Stormwater Demonstration Project</u> <ul style="list-style-type: none"> a. Prepare stormwater BMP design specifications b. Install stormwater system c. Obtain baseline data on water quality in estuary
Draft Wetland, Riparian, and Upland Protection and Restoration Plan	<u>VIII. Wetland, Riparian, and Upland Protection and Restoration Plan</u> <ul style="list-style-type: none"> a. Evaluate biological soundness and feasibility of restoration goals using baseline data and follow-up monitoring program. b. Analyze policy and implementation alternatives c. Prepare Draft Plan
Lands in the highest priority zones of estuary permanently protected	<u>IX. Estuary Acquisition and Restoration (Watershed Council)</u> <ul style="list-style-type: none"> a. Implement restoration activities b. Purchase fee title and/or conservation easements
Draft Plan and code amendments	<u>X. City Comprehensive Plan and code amendments</u> <ul style="list-style-type: none"> a. Prepare draft City Plan and Code amendments; review and revise.
Phase 3: Propose Policies and Measures and Submit for Adoption, Oct. 2011 thru Sept. 2012	
Agenda Packets, meeting notes; Revised Draft and Final Report on Project, including On-going evaluation process; Reports to EPA.	<u>I. Inter-disciplinary Team</u> <ul style="list-style-type: none"> a. Convene Team (assumes monthly) b. Continue to evaluate milestone consistency with Guiding Principles c. Review and revise proposed plans and reports d. Develop on-going evaluation process for all milestones e. Review/revise final reports f. Provide semi-annual reports to EPA on progress and seek technical assistance from EPA as needed.

Milestones/Outcomes	Work Elements and Tasks
Agenda Packets and Meeting Notes; Newsletter #3; Open House Report #3; Stakeholder Focus Group Report on Outcomes	<u>II. Stakeholder Group/Local Elected Official Check-ins</u> a. Convene Stakeholder Group to plan public outreach b. Create and mail newsletter; maintain web page c. Hold third meeting/open house to obtain feedback on milestones d. Provide monthly updates to PC, CC and Board; e. Conduct 9-week focus group with Stakeholders to fully explain all outcomes and obtain feedback.
On-going Groundwater and Surface Water Assessment and Monitoring Program Adopted and Implemented.	<u>III. Surface and Groundwater Assessment and Monitoring Program</u> a. Adjust monitoring program as needed b. Collect updated data and analyze results c. Continue to problem-solve and remedy contamination incidents d. Establish on-going monitoring program for periodic surface and groundwater and stream flow monitoring to characterize natural conditions and ensure that unacceptable contaminants are not affecting water quality
Proposed Source Water Protection Plan and Implementation Strategies are adopted and implemented.	<u>IV. Source Water Protection Plan and Implementation</u> a. Propose Plan and Strategies (planning, zoning, education, technical assistance) to help prevent releases that could degrade water quality b. Submit to local officials for adoption and to ODHS and DEQ; begin implementation
Estuary Interpretive Trail Final Report	<u>V. Estuary Interpretive Trail</u> a. Prepare final Report: "Recommended Trail Design and Location Options" b. Present report to local officials for approval.
Proposed Stormwater Design Manual and Informational Hand-outs are adopted and implemented.	<u>VI. Stormwater Best Management Practices Manual</u> a. Propose policies to support goals and guiding principles b. Propose alternative design BMPs for typical subdivision and infill development, as needed c. Evaluate effectiveness of BMPs where applied d. Develop hand-outs with design specification sheets and illustrations
Stormwater Demonstration Project Final Report and BMP Design Modifications are adopted and implemented.	<u>VII. Stormwater Demonstration Project</u> a. Modify stormwater system to address water quantity/quality problems b. Revise stormwater BMP design specifications c. Continue to monitor water quality and quantity impacts on estuary
Proposed Wetland, Riparian, and Upland Protection and Restoration Plan is adopted.	<u>VIII. Wetland, Riparian, and Upland Protection and Restoration Plan</u> a. Prepare Proposed Wetland, Riparian, and Upland Protection and Restoration Plan with proposed implementation measures. b. Submit to local officials for adoption and DLCD for Goal compliance.
	<u>IX. Estuary Acquisition and Restoration (Watershed Council)</u> The Work Element is expected to be completed in Phase II.
Comprehensive Plan and Code Amendments are adopted to protect natural resources and water quality.	<u>X. City Comprehensive Plan and Code Amendments</u> a. Draft all proposed Comprehensive Plan and Code amendments b. Submit to local officials for adoption and DLCD for compliance with all applicable Statewide Planning Goals c. Begin public hearing process.

3. Project/Task Description

Project Objectives

Multiple objectives of the project and expected outcomes are:

- a. **Collaboration and Scientific Investigation:** An Inter-disciplinary Team will guide all work elements; shepherd the creation of "Guiding Principles" to tie each task together to meet multiple objectives; provide technical expertise on all products; and consider the latest scientific findings and research on climate change in the development of all plans, standards, policy, code, and monitoring programs. The Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians will be an active member of this team. The Guiding Principles will be the formally recognized vision for environmental protection in these watersheds. They will set environmental targets and measurable outcomes that will be used in the evaluation of each work element. Examples of expected environmental targets are: a return of the native fish population by x%; water quality maintained at current quality standards or improved by x%; wetland interconnectivity and habitat migration channels maintained and/or improved by x%; outreach to x% of the UGB population and 100% of key interest groups. The environmental database for these watersheds is not sufficiently detailed or comprehensive to establish these targets and measures at this time. In addition, consensus among key partners is critical if the standards are to be accepted and administered effectively. For these reasons, it is important that the process, including the public education component of the project, be used to obtain this level of information, comprehension, and commitment.
- b. **Public Education and Stewardship:** The project will include an outreach/public education program, including newsletters, signage around Clear Lake, development of an interested parties list (including organized interest and business groups and homeowners associations, among others) and targeted outreach to these groups; and a vision for an Estuary Interpretive Trail system. The Stakeholder Group will ensure long-term commitment to multiple objectives. The stakeholder group will be a key element of the outreach program. The group will consist of representatives of interests that will be affected by, or potentially affected by, the outcomes of the project. The specific composition of this group will help assure that the group will represent their respective interests, and that they will provide effective liaisons to their groups.
- c. **Water Quality and Quantity Protection:** The project will develop and implement a Surface- and Groundwater Monitoring Program and Source Water Protection Plan. The Monitoring Program will develop scientifically-based standards; conduct an on-going monitoring program; identify sources of contamination; take appropriate corrective action where problems exist; quantify groundwater flow and water table fluctuation within the aquifer; water table fluctuation; and determine and monitor flow patterns (hydrographs) in the surface streams. The Source Water Protection Plan will include: an enhanced inventory of potential contaminant sources within the dunal aquifer area; refined delineations of drinking water source areas; and strategies for addressing contamination threats. In addition, a failing culvert at the outfall into Munsel Creek will be appropriately addressed.

The project will develop effective, innovative non-point source pollution controls: Stormwater Design Manual; and a Demonstration Project adjacent to the estuary in Old Town that uses state-of-the-art BMPs tailored to Florence. Current DEQ-approved BMPs, i.e., the Portland Manual, now used by the City, have not achieved desired environmental results in on-the-ground installations in Florence. BMPs are needed that work with the area's specific soil, topography, hydrology, and climate. This work is not required under a stormwater discharge permit.

- d. **Wetland, Riparian, and Upland Area Protection and Restoration:** A “Wetland, Riparian, and Upland Protection and Restoration Plan” will use the Oregon Rapid Wetland Assessment Protocol (ORWAP) and will exceed State Goal 5 requirements: update 1996 biological and functional assessment; assess omitted tidal and non-tidal wetlands; include delineations made since 1996; include upland habitat; and adopt policies and measures to protect the resources (none adopted at present) and to reduce barriers that restrict floodwaters from dispersing in floodplains. The City will do preliminary work to assess the potential for restoration of riparian areas, wetlands, and uplands on City-owned property. The revised, updated Plan will provide a comprehensive functional assessment. This is especially important in this watershed. For example, the capacity of existing natural wetland systems, and potential future constructed wetlands, to store and slow the velocity of, stormwater prior to discharge to area creeks and the estuary, is not currently established; and it is not known whether the carrying capacity is sufficient for the environment to fully address the anticipated impacts from planned urbanization. The functional assessment of the wetlands within this urban growth area will provide critical information to help guide future urbanization policy and stormwater management policy and capital programs.
- e. **Protection and Restoration of Key Estuary Wetlands:** The Watershed Council will protect/restore, through easement or acquisition, over 200 acres of wetland in the Siuslaw Estuary. The SWC, McKenzie River Trust, ODFW, and other partners are working with state, federal, and private funding sources to achieve protection and restoration of high priority tidally influenced wetlands. Two sites have been identified. The Waite Ranch Restoration Site Project will include: preliminary site assessment; site characteristic and limited baseline monitoring; and potential hazards assessment and project development. A Management Plan will be prepared for the North Fork Marsh site. Project to include coordination of tasks, partners, and landowners for both sites.
- f. **Ecological Growth Planning:** Updates to the Comprehensive Plan and Land Use Code will be adopted and implemented that will protect water quality and quantity and ecology. Protection measures will include low impact development requirements, revised stormwater management BMPs, green spaces and riparian buffer Plan designations and zoning, requirements to protect unique wetland features, such as flooded forests and blueberry bogs, and other measures to address environmental impacts of growth. The base line data and monitoring regimes established through this project will set the stage for the City to perform scenario analyses of environmental impacts of UGB build-out.

Environmental targets and measurable outcomes will be established in the Guiding Principles that will guide all products and processes, as discussed above. Long-term outcomes are land use and water management policies and practices that maintain and protect rearing, migrating, and spawning habitat for resident and anadromous fish, and habitat for birds, mammals, amphibians and reptiles; conversion of rural lands to urban densities that do not impair water quality or result in dysfunctional stream conditions; enhanced floodplain functions and inter-connected wetlands and floodplain; and on-going surface and groundwater quality monitoring and remedial action to prevent contamination. Ultimately, the natural resource economy will be re-invigorated. People will be drawn to the area with a renewed appreciation for its rich and complex ecosystem; and the area will be a model for other small coastal cities faced with growth pressures.

The project will commence on October 1, 2009 and will be conducted in three phases, each resulting in deliverables for ten Work Elements. Elements I and II, Inter-disciplinary Team and Stakeholder Group/Local Official Check-in, ensure each Element is coordinated and meets common objectives of natural resource and water quality protection and enhancement. Specific outputs of these Elements, described in the Work Plan, below, and discussed in Section II, above,

include an extensive testing program to monitor the effectiveness of outputs in achieving multiple objectives (See Section VII and Logic Model).

Work Element III of this project will develop and implement a Surface- and Groundwater Monitoring Program: develop scientifically-based standards; conduct an on-going monitoring program; identify sources of contamination; take remedial action; quantify water flow within the aquifer; water table fluctuation; and determine and monitor flow patterns (hydrographs) in the surface streams; develop a Protection Plan, and implementation, including replacement of a failing culvert on outfall into Munsel Creek.

3.1 Work Element III Project/Tasks

This QAPP shall cover Work Element III of this project and shall complete the following major tasks and activities at the estimated timeline:

Note: Table was revised and content provided.

Table 3-1: Activities, Target Completion Dates, and Deliverables			
Activities	Start	Target Completion	Deliverables
1) Prepare a QAPP	10/1/09	10/31/09	Draft QAPP
2) Review and Approval of QAPP	10/31/09	3/1/2010	Review and Approval Memo from EPA
3) Develop scientific-based standard protocols	10/31/09	3/1/2010	Final QAPP
4) Develop assessment and monitoring program methods	10/31/09	4/1/2010	Technical Memorandum: Monitoring Program Assessment and Monitoring Methods
5) Installation of groundwater monitoring wells; data loggers in estuary; and stream flow gauges and data loggers in Munsel and Ackerley Creeks.	1/21/2010	5/31/2010	Technical Memorandum: Report on Installation of Monitoring Devices
6) Collect baseline data	3/1/2010	9/30/2012	Technical Memorandum: Report on Baseline Data for Groundwater, Estuary, and Munsel and Ackerley Creeks
7) Identify existing contamination and source and take corrective actions.	5/31/2010	9/30/2012, if and when indicated	Technical Memoranda: Report on Existing Contamination and Remedial Actions Taken and Planned
8) Identify contamination threats and source and plan corrective actions.	5/31/2010	9/30/2012	Technical Memorandum: Report on Contamination Threats and Remedial Actions Analyzed and Planned
9) Adjust monitoring program as needed and collect updated data and analyze results	5/31/2010	9/30/2012, if and when indicated	Amendments to QAPP

Table 3-1: Activities, Target Completion Dates, and Deliverables			
Activities	Start	Target Completion	Deliverables
10) Establish routine monitoring program for surface and groundwater	7/1/2012	9/30/2012	Final Report on Monitoring Program (combining all Technical Memoranda and including plan for on-going program)

3.1.1. Primary Data Collection Activities:

Primary data collection activities for Work Element III involve three scenarios:

Scenario #1: Groundwater (Dunal aquifer and Clear Lake)

Scenario #2: Lakes/Creeks

Scenario #3: The Estuary (at Stormwater Demonstration Project and near River mouth)

3.1.1.1 Scenario #1: Groundwater (Aquifer and Clear Lake)

It is the City's goal to maintain and protect a sustainable drinking water resource, from water quality and water quantity perspectives. The City is interested in protecting its current drinking water supply and protecting future water supplies within all portions of the Dunal Aquifer. The key elements of a groundwater protection program are:

- Identification of, or refinement of, the source water protection area(s)
- Identification of potential sources of groundwater contamination
- Implementation of control strategies (land use planning, zoning, ordinances) to help prevent releases that could degrade groundwater quality
- Periodic groundwater monitoring to characterize natural conditions and ensure that unacceptable contaminants are not affecting the use of the water for drinking

3.1.1.1.1 Scenario I Tasks:

- I. Expansion of the 2003 Oregon Drinking Water Program Groundwater Flow Model, a three-dimensional model GW Vistas 5.0.

Install 30 shallow (<20 ft) monitoring wells throughout aquifer, one to three deeper wells strategically located in deeper zones, and data loggers in one or two of the wells to determine lag time. Locations to include above and below Clear Lake to 1) quantify water flow within the aquifer (volume, direction, speed); track the rise and fall of the water table; establish head data as function of location and in response to storm events; 2) provide baseline water quality data; monitor static water levels in wells quarterly and after major storm events; and use data to calibrate Model.

- II. Collect water samples to establish variability of water quality. Place up- and down-gradient sites in various land use areas (residential, commercial/industrial, transportation corridors, golf courses, etc.) and tailor analysis to dominant land use of monitored area. Monitor quarterly for the first year, semi-annually on the second year with adjustments for pathogenic micro-organisms, as needed.

- III. Analyze water samples for fecal coliform, nitrate, common ions, water quality parameters, IOC's, Volatile Organic Compounds (VOC's), e.g., fuels, solvents; and Synthetic Organic Chemicals (SOC's), e.g., pesticides.
- IV. Analyze the analytical data and determine the existing contaminant problems and possible contaminant threats.
- V. Identify the probable source(s) of the contamination and implement source control actions, if necessary, to mitigate or eliminate the source(s).
- VI. Notify and work with the appropriate regulatory agencies that will determine whether the impacted water poses a health hazard and take necessary steps to protect public health and safety.

3.1.1.1.2 Monitoring Schedule:

The following schedule, as revised through mutual agreement with EPA and the project partners, will provide a representative and ongoing view of water quality and groundwater flow direction within the CITY and the CITY's urban growth boundary ("UGB") and within the Clear Lake watershed outside the UGB:

- Water Level Monitoring. The CITY will monitor the wells for static water levels quarterly for the first one or two years, and semi-annually thereafter. Monitoring may also include periods following major storm events. A monitoring well will be placed in proximity to Munsel Lake to the west. Water levels in this well will be monitored on the same frequency as the stream flow data (below).
- Chemical Monitoring. During the first year of the program, the CITY will conduct chemical monitoring on a quarterly basis, consistent with chemical monitoring requirements under the Safe Drinking Water Act, at all wells to identify the seasonal trends and variability that will establish baseline conditions for future comparison. After the first year, monitoring frequency may be reduced to semi-annually or annually, depending upon the results of the first year. The following chemical constituents will be monitored as part of a comprehensive groundwater monitoring program:
 - i) Analyze all monitoring well data for the common ions, pH, temperature, oxidation reduction potential, conductivity, total organic carbon, and coliform bacteria.
 - ii) test monitoring wells in the commercial and industrial areas annually for organic chemicals (volatiles and pesticides) following the drinking water standards protocols and /or the 40CFR136 analytical methods The frequency of testing may be reduced if the results are below drinking water standards.
 - iii) test all monitoring wells within the UGB north of the CITY once to determine the presence or absence of organic chemicals (e.g., fuels, solvents and pesticides) in the residential area. If any of these chemicals are detected, monitor the wells quarterly.

- iv) monitor all monitoring wells in the residential area of the UGB quarterly for nitrate, phosphorous and coliform bacteria, and after initial testing, monitoring frequency may be adjusted to further evaluate contamination threats.
 - v) confer with the Oregon Department of Environmental Quality (DEQ) and other appropriate parties to identify surface water sources to be tested. The CITY will test water from the identified sources for water quality parameters, including, coliform bacteria, pH, conductivity, nitrate, phosphorous, common ions, total organic carbon, and oxidation state.
- **Microbial Monitoring.** During the first year of the program, conduct microbial monitoring for coliform bacteria and e-coli, following standard protocols for sampling, handling, etc., on a quarterly basis at all wells to identify the seasonal trends and variability that will establish baseline conditions for future comparison. Depending on the results obtained after the first year of monitoring, sampling frequency may be reduced semi-annually or annually. Baseline is absent or non-detect for groundwater.

3.1.1.2 Scenario #2: Lakes/Creeks

Munsel Lake occurs on the eastern boundary of the Florence Dunal Aquifer and is in hydraulic connection with the aquifer. The extent of this connection must have a significant impact on groundwater flow to the west and south. Being able to characterize the water budget with respect to Munsel Lake will be of fundamental importance in developing the groundwater flow model. In order to quantify the influence of the lake on groundwater, two stream flow measurement systems will be installed. The first will be on Ackerly Creek that feeds into Munsel Lake from Ackerley and Clear Lake to the north. Although not the only feed into Munsel Lake, Ackerley Creek is the main inflow of water into Munsel Lake and is perennial in nature. The second stream flow monitoring point will be on Munsel Creek just below Munsel Lake and will supply a measurement of the outflow from the lake.

The stream flow monitoring stations will consist of a V-throated flume and standpipes operating on the principle that the height of the water level in a standpipe at a specific location within a V-throated flume of known dimensions can be converted to volume of water in the stream. The change of this instantaneous volume with time could then be used to compute volumetric stream flow.

3.1.1.2.1 Scenario 2 Tasks

- I. Collect grab seep samples and outflows of surface water in Heceta Beach area where quality concerns have arisen;
- II. Analyze samples collected annually from Clear Lake for pharmaceuticals and by-products, as recommended by the American Waterworks Association;
- III. Install three stream flow gauges in Munsel Creek, and one in Ackerley Creek to determine and monitor flow patterns (hydrographs);
- IV. Install three continuous three data loggers in Munsel Creek and one in Ackerley Creek to collect temperature data and use hand held devices and/or grab sampling to assess and monitor turbidity, DO, and pH. Coordinate these sampling activities with U.S. Geological Survey, ODFW, OWRD, and the Confederated Tribes.

3.1.1.2.2 Schedule

- Stream flow data will be collected at the two stations on a weekly basis between rain events, and every day before, during, and until flow stabilizes, around a storm event. A monitoring well will be placed in proximity to Munsel Lake to the west. Water levels in this well will be monitored on the same frequency as the stream flow data.
- The data loggers will be programmed to measure temperature at 10-minute intervals. Data will be uploaded and stored electronically on a weekly basis. This schedule may be modified during storm events.

3.1.1.3 Scenario #3: Estuary

3.1.1.3.1 Scenario 3 Tasks

- The City shall install continuous data loggers upstream of, adjacent to, and downstream of the City Stormwater Demonstration Project, near mouth of river, to collect temperature data and use hand held devices and or grab sampling to assess and monitor turbidity, DO, and pH plus salinity. Coordinate with U.S. Geological Survey, ODFW, OWRD, and the Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians.
- Obtain samples for microbial analyses monthly.

3.1.1.3.2 Schedule

- The data loggers will be programmed to measure temperature at 10-minute intervals. Data will be uploaded and stored electronically on a weekly basis. This schedule may be modified during storm events.

3.1.2 Secondary Data Collection

3.1.2.1 Marine

Collate and evaluate marine testing data previously collected by OBMP for bacteria in the Heceta Beach area and work with OBMP to add Heceta Beach back into program. Document established minimum QC criteria for data acceptance for this project for microbiological data.

3.1.2.2 North Fork

Continue to monitor the Tribes' monitoring using continuous data loggers for temperature, turbidity, DO, salinity, and Ph; and bacteria sampling starting from year 2005 to present. Document established minimum QC criteria for data acceptance for this project for conventional analyses.

3.1.2.3 Estuary

Continue to monitor data conducted by: Army Corps of Engineers for sedimentation; Watershed Council (8 locations, grab sampling); and Tribes' monitoring with continuous data loggers for temperature, turbidity, DO, salinity, and Ph; and bacteria sampling. Document established minimum QC criteria for data acceptance for this project for these analyses.

4. Data Quality Objectives

Data quality objectives (DQOs) are related to the specific investigation activities related to the water sampling activities planned for the Siuslaw Watershed Project. DQOs are defined as the qualitative and quantitative statements that characterize the data needed to support a particular data usage. Therefore, DQOs for data collection and analysis are based on the end use of the data. All data will be gathered and handled in accordance with the USGS National Field Manual for the Collection of Water-Quality Data.

The data collected will be used to assess water quality trends, identify problem areas, calculate pollution loadings, and support overall water quality assessment in the Siuslaw River Watershed.

Objectives

➤ Scenario #1 Groundwater, Objective:

To detect and address threats to water quality in the North Florence Solc Source Dunal Aquifer and Clear Lake, drinking water sources within the Florence Urban Growth Boundary (UGB);

To meet the above objective, groundwater monitoring wells must be constructed in a manner to be able to collect representative samples. Wells will be constructed according to the Oregon Department of Water Resources guidelines for the construction of monitoring wells.

In order to obtain representative groundwater samples from the properly constructed monitoring wells. The sampling protocol for the monitoring wells is described below.

The laboratory analytical methods that will be used in this study, their detection limits and precision are given in Table 4.1.

Static water level measurements within the monitoring wells will be conducted manually, at a minimum quarterly for the first two years of the study and semiannually from then on and may be more frequent as indicated. Additional contaminants may be monitored as indicated, e.g., lead near the gun range adjacent to Munsel Creek. Measurements will be accomplished by lowering a previously disinfected probe through the observation port and measuring the distance from ground surface to water level to the nearest 0.1 foot or 0.01 foot if feasible for manual measuring and recording.

Scenario #2 Lakes/Creeks, Objective:

To assess and monitor water flow patterns between the Creeks and Lakes and the aquifer; evaluate the hydraulic connection between the Lakes and aquifer, and to detect and address threats to water quality in Munsel Creek and Ackerley Creek to protect fish and wildlife habitat.

Scenario #3 Estuary, Objective:

To obtain baseline and on-going water quality data in the estuary at the point of the City's stormwater demonstration project and at the mouth of the river in order to assess and monitor the health of the estuary, in general, and to determine the effects of the demonstration project on water quality in the estuary; to protect fish and wildlife habitat.

4.1 Project Quality Objectives

The quality assurance objectives for this project are to develop and implement procedures that will ensure the collection of representative physical and chemical data of known and acceptable quality. Table 4-1 summarizes the quality assurance objectives for each type of water analysis in accordance with protocols for water analyses. The data quality parameters used to assess the acceptability of the data are precision, accuracy, representativeness, comparability, and completeness. These parameters are discussed below.

In order to identify and mitigate potential risks to water quality, the City, in consultation with the Oregon Department of Human Services' Drinking Water Program and the DEQ, will work together to establish chemical and microbial concentration action levels that, if exceeded, will result in response actions. Below are typical contaminants and their corresponding action levels.

Table 4: Typical Contaminants and Action Levels		
Contaminant	Trigger Concentration ¹	Health Concern
E. coli	Presence	Acute response possible
Nitrate	5.0 mg/L ²	Acute response possible
Phosphorous	0.1 mg/L	Nutrient
Fuels, solvents, etc.	Detection level	Chronic contaminant
Pesticides	Detection level	Chronic contaminant
Caffeine	Presence	Indicator

¹ Source: E. coli, Safe Drinking Water Act MCL; phosphorous, DEQ adopted Clean Water Act Criteria. Fuels, Solvents, Pesticides, DHS monitoring requirements for Public Water Systems. If referenced agencies change the established trigger concentrations, new standards shall apply unless otherwise agreed to by the partners.

² Trigger concentration to be 5 milligrams per liter (DHS standards for quarterly monitoring) unless otherwise determined by the partners based on analytical results of baseline monitoring. Since the naturally occurring nitrate level(s) is not known, a monitoring period of the groundwater for one year will be completed. A background or baseline level will be established through the testing program for groundwater in the areas outside of developed areas. Generally speaking, this would be areas north of the current Florence UGB.

4.2 Measurement Performance Criteria

Precision

Precision measures the reproducibility of measurements under a given set of conditions. Analytical precision is measured through matrix spike/matrix spike duplicate (MS/MSD) samples for organic analysis and through laboratory duplicate samples for inorganic analyses. Analytical precision measurements will be carried on project specific samples at a minimum frequency of 1 per laboratory analysis group or 1 in 20 samples, whichever is more frequent, per matrix analyzed. Laboratory precision will be evaluated against quantitative relative percent difference (RPD) performance criteria. General precision levels are presented in Table 4-1.

Field precision will be evaluated by the collection of blind field duplicates. One field duplicate per matrix will be collected. Currently, no performance criteria have been established for field duplicates. Field duplicate precision will therefore be screened against a RPD of 75 percent for water samples. However, no data will be qualified based solely on field duplicate precision. Precision measurements can be affected by the nearness of a chemical concentration to the method detection limit, where the percent error (expressed as either %RSD or RPD) increases. The equations used to express precision are as follows:

$$RPD = (C1 - C2) \times \frac{100\%}{(C1 + C2)/2}$$

Where:

RPD = relative percent difference
 C1 = larger of the two observed values
 C2 = smaller of the two observed values
 $\%RSD = (SD / \text{Dave}) \times 100$

Where:

$SD = \sqrt{(D - \text{Dave})^2 / (n - 1)}$
D = sample value
Dave = average sample value
n = number of samples

Table 4-1 Quality Assurance Objectives						
Analyte	Units	Precision	Accuracy	Completeness	EPA Method	Holding Times
Total and Dissolved Metals Cd, Cr, Cu, Pb, Hg, Ni, Zn	Mg/L	+/- 20%	+/- 25%	90%	200 Series	6 Months, 28 days for Hg
VOCs	Mg/L	+/- 20%	+/- 30%	90%	524.2	7 days to extract
SOCs (SVOCs ¹)	Mg/L	+/- 20%	+/- 30%	90%	E525.2, 508.1, 515.1, 515.2, 547.158.1, 549.2	7 days to extract
Alkalinity	Mg/L as CaCO ₃	+/- 20%	+/- 30%	90%	310.1	7 days to extract
pH	pH units	+/- 20%	+/- 30%	90%	150.1	Immediate
Fecal Coliform and <i>E. Coli</i>	Mg/L	+/- 20%	+/- 30%	90%	SM 9222	30 Hours for groundwater; 24 hours or less for creeks and storm runoff
Fecal Streptococcus and Enterococci	Mg/L	+/- 20%	+/- 30%	90%	SM 9230 B	30 Hours
Nitrate + Nitrite	Mg/L	+/- 20%	+/- 30%	90%	300	28 Days
Total Kjeldahl Nitrogen	Mg/L	+/- 20%	+/- 30%	90%	351.3, 351.4	28 Days
Total Phosphorus	Mg/L	+/- 20%	+/- 30%	90%	365.1, 365.3	28 Days
Total Organic Carbon	Mg/L	+/- 20%	+/- 30%	90%	415.3	7 Days
Total Suspended Solids	Mg/L	+/- 20%	+/- 30%	90%	160.2	7 Days
Ca, Mg, Na, K, SiO ₂	Mg/L	+/- 20%	+/- 30%	90%	200.5	7 Days
SO ₄ , Cl ₁	Mg/L	+/- 20%	+/- 30%	90%	300.0	7 Days
VOCs	Mg/L	+/- 20%	+/- 30%	90%	524.2	14 Days
pH ²	pH units	TBD	TBD	TBD	Data Logger	
Temperature ²	°C	TBD	TBD	TBD	Data Logger	
DO ²	Mg/L	TBD	TBD	TBD	Data Logger	
Turbidity ²	NTU	TBD	TBD	TBD	Data Logger	

1 = For those analyses on which sample spiking cannot be performed. QC reference standards will be analyzed to determine accuracy.

2 = Environmental parameters that will be collected using a continuous data logger in each of Ackery and Munsel Creeks

TBD = These values will be determined on site after data logger installation

Accuracy

Accuracy is an expression of the degree to which a measured or computed value represents the true value. Field accuracy is controlled by adherence to sample collection procedures outlined in the monitoring plan. To assess the potential for cross contamination in the field, one rinseate blank from the sampling device will be collected.

Analytical accuracy may be assessed by analyzing "spiked" samples with known standards (surrogates, laboratory control samples, and/or matrix spike) and measuring the percent recovery. Accuracy measurements on matrix spike samples will be carried out at a minimum frequency of one in 20 samples per matrix analyzed. Surrogate recoveries will be determined for every sample analyzed for organics.

Laboratory accuracy will be evaluated against quantitative matrix spike and surrogate spike recovery performance criteria as presented in the tables. Accuracy can be expressed as a percentage of the true or reference value, or as a percent recovery in those analyses where reference materials are not available and spiked samples are analyzed. The equation used to express accuracy is as follows:

$$\%R = 100\% \times (S-U)/C_{sa}$$

Where:

%R = percent recovery

S = measured concentration in the spiked aliquot

U = measured concentration in the unspiked aliquot

C_{sa} = actual concentration of spike added

Representativeness

Representativeness expresses the degree to which data accurately and precisely represent an environmental condition. For this program, the selected analyte has been identified as a constituent of concern based on numerous studies indicating the typical pollutants associated with groundwater.

Critical to the issue of representativeness is the sampling procedure. Samples must be collected in a manner that they reflect the sampling target. Individual sampling protocols are described below.

Representative water quality data had previously been obtained from other groundwater studies conducted by the EPA and USGS.

Comparability

Comparability expresses the confidence with which one data set can be evaluated in relation to another data set. For this monitoring program, comparability of data will be established through the use of standard analytical methodologies and reporting formats and of common National Institute of Standard and Technology or other traceable calibration and reference materials. Data will be used to evaluate trends over time and evaluate areas that appear to be contributing high pollution loads to the aquifer, the lakes, creeks, and the estuary.

Completeness

Completeness is a measure of the amount of data that is determined to be valid in proportion to the amount of data collected. Completeness will be calculated as follows:

$$C = \frac{(\text{Number of acceptable data points}) \times 100}{(\text{Total number of data points})}$$

The data quality objective for completeness for all components of this project is 90 percent. Data that have been qualified as estimated because the quality control criteria were not met will be considered valid for the purpose of assessing completeness. Data that have been qualified as rejected will not be considered valid for the purpose of assessing completeness.

5. Documentation and Records

The data reports will be stored in digital files on City's local area network as well as in EPA files. The data will be retained in accordance with the public records retention requirements in State law and the Cooperative Agreement with EPA. The reports will be posted to the staff intranet site for use by the Inter-disciplinary Team and stored in project binders. The data will be used in final reports, including the Source Water Protection Plan and Stormwater BMP Manual. Final results will be posted to the project web page for public review.

B. Measurement Data Acquisition

6. Sampling Process Design

Sampling procedures for this investigation will follow Oregon DEQ Lab's Field Sampling Reference Guide and are described in more detail below. Sampling procedures are designed to ensure that all samples collected are consistent with project objectives and samples are identified, handled, and transported in a manner such that data are representative of actual site conditions and that information is not lost in sample transferral. The data collected will ultimately be used in determining whether there is groundwater contamination that is a threat to the drinking water system. To meet project objectives, special consideration is given to sample procurement, sample containers, holding times and preservation, field duplicates, equipment decontamination, blanks, (rinseate and field), sample documentation, transport and storage. Trace contaminants from sources external to the sample must be minimized through the use of good sampling techniques and proper cleaning of sampling equipment that comes in contact with the material being sampled.

7. Analytical Methods Requirements

7.1 Organics

7.2 Inorganics

7.3 Process Control Monitoring

The Analytical Methods Requirements are summarized in Table 7-1.

Table 7-1 Summary of Analytical Requirements						
Analyte	Vol. Req. (mL)	Container	Preservation	Filter	EPA Method	Holding Times
Total and Dissolved Metals - (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)	100	250 ml poly bottle	25 drops Nitric Acid (pH<2)	No (for Total); 0.45 um filter for dissolved metals	200 Series	6 Months
Volatile Organic Compounds Ascorbic acid or sodium thiosulfate, pH < 2, 1:1 HCL, store at 4C	25 ml	40 ml VOC vials 3 @ 40 mL, glass w/PTFE lined septum	4 + 2C	No	524.2	14 Days
Synthetic Organic Compounds	800	1000 ml amber jar	Ice	No	E525.2, 508.1, 515.1, 515.2, 547, 158.1, 549.2	7 days to extract
Alkalinity	100	1000 ml poly bottle	Ice	No	310.1	72 hours
pH	100	1000 ml poly bottle	Ice	No	150.1	Immediate
Fecal Coliform and <i>E. Coli</i>	75	150 ml poly bottle	Ice	No	SM 9222	30 Hours for groundwater; 6-24 hours for creeks and runoff
Fecal Streptococcus and Enterococci	75	150 ml poly bottle	Ice	No	SM 9230 B	30 Hours
Nitrate + Nitrite	100	500 ml poly bottle	12 drops sulfuric acid (pH<2)	No	300	28 Days
Total Kjeldahl Nitrogen	500	500 ml poly bottle	12 drops sulfuric acid (pH<2)	No	351.3, 351.4	28 Days
Total Phosphorus	50	500 ml poly bottle	Add 12 drops concentrated H2SO4 – refrigerator	No		
Total Organic Carbon	20	500 ml poly bottle	Add 12 drops concentrated H2SO4 – refrigerator	No	415.3	28 Days
Total Suspended Solids	200	500 ml poly bottle	Ice	No	160.2	7 Days
Ca, Mg, Na, K, SiO2, Fe	100	250 ml poly bottle	25 drops HNO3 (pH<2)	No for total, 0.45 um filter for dissolved	200.5	28 Days
SO4, Cl	100	250 ml poly bottle	25 drops HNO3 (pH<2)	No for total, 0.45 um filter for dissolved	300.0	28 Days
pH ²	pH units	On-site	NA	NA	Data Logger	
Temperature ²	°C	On-site	NA	NA	Data Logger	
DO ²	Mg/L	On-site	NA	NA	Data Logger	

Table 7-1 Summary of Analytical Requirements						
Analyte	Vol. Req. (mL)	Container	Preservation	Filter	EPA Method	Holding Times
Turbidity	NTU	On-site	NA	NA	Data Logger	

1 = For those analyses on which sample spiking cannot be performed. QC reference standards will be analyzed to determine accuracy.

2 = Environmental parameters that will be collected using a continuous data logger in each of Ackery and Munsel Creeks

TBD = To be determined on site after recorder installation.

8. Quality Control Requirements

8.1 Field QC Requirements

All Scenarios

Sample Handling

Sample collection and handling procedures are detailed in the Oregon DEQ Lab's Field Sampling Reference Guide. To control the integrity of the samples during transit to the laboratory and during hold prior to analysis, established preservation and storage measures would be taken. Table 9-1 presents sample volume, container type, preservation, and maximum holding times for the various analyses of groundwater samples.

Sample Custody Documentation

The Laboratory Standard Operating Procedures (SOP) provided by the contract analytical laboratory will describe in detail the chemical analytical procedures for this study. These SOPs will be kept in the project file at the analytical laboratory and will include written protocols for the analytical methods used.

Scenario #1

Monitoring wells will be installed by Oregon licensed monitoring well drillers. Drilling will be overseen by an Oregon licensed geologist. The field groundwater monitoring leaders will be trained by an Oregon licensed geologist in the proper methods of groundwater sampling and water level measurement collection. These trained leaders may then train their rank-and-file monitors.

Field sampling procedures are detailed in the Oregon DEQ Lab's Field Sampling Reference Guide. To control the quality of field samples, one field duplicate and one rinseate blank will be analyzed. Although validation guidelines have not been established for field quality control samples, their analysis is useful in identifying possible problems resulting from sample collection or sample processing in the field. All field quality control samples will be documented in the field logbook. The field quality control samples that will be collected as part of the groundwater monitoring program are discussed below.

Field Duplicates. For all water samples collected, one homogenized field duplicate will be collected and submitted for analysis. One field duplicate will be collected per 20 water samples.

Rinseate Blanks. A rinseate blank, consisting of analyte-free media which has been used to rinse the sampling equipment, will be collected after completion of equipment decontamination and prior to sampling. Water and sample bottles used in the collection of rinseate blanks shall be supplied by the laboratory which will be performing the analysis. Rinseate blanks

are used to determine if cross contamination has occurred during sampling. One rinseate blank will be collected from DI water that has come in contact with the sampling device and will be submitted for analysis of organic and inorganic constituents being monitored during that given sampling event.

Trip Blanks. One trip blank consisting of organic-free water will be collected and carried through the sampling handling and analysis procedure. A trip blank will be included in each shipping container containing one or more samples to be analyzed for VOCs. All trip blanks submitted for analysis will be analyzed for VOCs.

Samples from the monitoring wells will be collected using a previously disinfected peristaltic pump or a sample bailer. We will be using typical low volume flow to prepare well for sampling, i.e., we will monitor temperature and/or conductivity during the pumping and will not collect samples until the values of these parameters stabilize, indicating that we are drawing directly from the aquifer.

Samples from Clear Lake will be collected in quiet water from the intake structure. Samples will be collected from the lake at a minimum of six inches below the surface.

Scenario #2: Lakes/Creeks

Continuous data loggers will be placed on Ackerly and Munsel Creek for temperature. Hand held devices and/or grab sampling will be used for pH, DO, and turbidity. Of prime importance in the placement of these data collection devices is that they are located in a manner that will reflect as close as possible the stream as a whole. Of equal importance is that the data loggers are properly calibrated, prior to and during the time frame of the study. The CITY will ensure that this is done and that the loggers are checked on a weekly basis, not only to upload data, but to ensure that the individual probes do not become fouled. As experience is gained with this process, less frequent checking will be employed, consistent with local conditions. Laboratory reproducibility of these instruments are generally reported to be within $\pm 1\%$, however, this value can be influenced by the matrix being analyzed. Data loggers will be set to record over short intervals initially to evaluate on site precision. During routine data collection, the frequency of measurement will be set at 10 minutes.

Scenario #3: Estuary

Continuous data loggers will be placed in the estuary adjacent to the planned Stormwater Demonstration Project and near the mouth of the River. Data will be collected for temperature. Hand held devices and/or grab sampling will be used for pH, DO, salinity and turbidity. Of prime importance in the placement of these data collection devices is that they are located in a manner that will reflect as close as possible the stream as a whole. Of equal importance is that the data loggers are properly calibrated, prior to and during the time frame of the study. The CITY will ensure that this is done and that the loggers are checked on a weekly basis, not only to download data, but to ensure that the individual probes do not become fouled. As experience is gained with this process, less frequent checking will be employed, consistent with local conditions. Laboratory reproducibility of these instruments are generally reported to be within $\pm 1\%$, however, this value can be influenced by the matrix being analyzed. Data loggers will be set to record over short intervals initially to evaluate on site precision. During routine data collection, the frequency of measurement will be set at 10 minutes.

8.2 Laboratory QC Requirements

The contract laboratory is expected to meet the following minimum requirements:

1. Be certified as a drinking water laboratory Adhere to the methods outlined in the Oregon Environmental Laboratory Accreditation Program which is the DHS program that certifies labs, including those that conduct drinking water analysis.;
2. Deliver fax, hard copy, and electronic data as specified;
3. Meet reporting requirements for deliverables;
4. Meet turnaround times for deliverables;
5. Implement QA/QC procedures, including the QAPP data quality requirements, laboratory analysis plan requirements, and performance evaluation testing requirements;
6. Allow laboratory and data audits to be performed, if deemed necessary; and
7. Follow documentation, chain of custody, and sample logbook procedures.

Changes in the laboratory procedures specified in the QAPP will not be permitted without written documentation of the intended change and the rationale. The Project QA/QC Manager must approve all changes in advance.

The analyst will review results of the quality control samples from each sample group immediately after a sample group has been analyzed. The quality control sample results will then be evaluated to determine if control limits have been exceeded. If control limits are exceeded in the sample group, the Project Manager or Project QA Manager will be contacted immediately and corrective action (e.g., method modifications followed by reprocessing the affected samples) will be initiated prior to processing a subsequent group of samples.

All primary chemical standards and standard solutions used in this project will be traceable to the National Institute of Standards and Technology, Environmental Resource Associates, National Research Council of Canada, or other documented, reliable, commercial sources. Standards will be validated to determine their accuracy by comparison with an independent standard. Any impurities found in the standard will be documented.

9. Instrument Calibration and Frequency

The laboratory will calculate the method detection limit for each analyte in each matrix of interest and will establish an initial calibration curve for all analytes. The methods of analysis, associated reporting limits, and screening levels for the water analyses are identified in Table 7-1. Reporting limits have been set at or below ambient.

The following sections summarize the procedures that will be used to assess data quality throughout sample analysis.

Initial and Continuing Calibration. Multipoint initial calibration will be performed on each instrument at the start of the project, after each major interruption to the analytical instrument, and when any ongoing calibration does not meet control criteria. Ongoing calibration will be performed daily for organic analyses and with every sample batch for conventional parameters (when applicable) to track instrument performance. Instrument blanks or continuing calibration blanks provide information on the stability of the baseline established. Continuing calibration blanks will be analyzed immediately prior to continuing calibration verification at a frequency of 1 continuing calibration blank for every 10 samples analyzed at the instrument for inorganic analyses and every 21 hours for organic analyses. If the ongoing calibration is out of control, the analysis must come to a halt until the source of the control failure is eliminated or reduced to meet control specifications. All project samples analyzed while instrument calibration was out of control will be reanalyzed.

Matrix Replicates. Analytical replicates provide information on the precision of the analysis and are useful in assessing potential sample heterogeneity and matrix effects. Analytical replicates are subsamples of the original sample that are prepared and analyzed as a separate sample. A minimum of 1 replicate will be analyzed per sample group or for every 20 samples, whichever is more frequent. When matrix spikes are not available or appropriate, a matrix triplicate will be analyzed per sample group or for every 20 samples, whichever is more frequent.

Matrix Spikes and Matrix Spike Duplicates. Analysis of matrix spike samples provides information on the extraction efficiency of the method on the sample matrix. By performing duplicate matrix spike analyses, information on the precision of the method is also provided for organic analyses. A minimum of 1 matrix spike will be analyzed for every sample group or for every 20 samples, whichever is more frequent, when possible Surrogate Spikes. All project samples analyzed for organic compounds will be spiked with appropriate surrogate compounds as defined in the analytical methods. The laboratories will report surrogate recoveries; however, no sample result will be corrected for recovery using these values.

Method Blanks. Method blanks are analyzed to assess possible laboratory contamination at all stages of sample preparation and analysis. A minimum of 1 method blank will be analyzed for every extraction batch or for every 20 samples (10 samples for conventional parameters), whichever is more frequent.

10. Non –Direct Data Acquisition Requirements

Types of data needed for project implementation and decision making that are obtained from non-measurement sources include such data as computer databases, programs, literature files, and historical databases. All data obtained from non-measurement sources will be fully documented as to source, data collection methodology, and any qualifications related to data accuracy and reliability.

Secondary Data Collection

Marine

Collate and evaluate marine testing data previously collected by OBMP, Siuslaw Watershed Council, and surfriders for bacteria on beaches and work with OBMP to add Heceta Beach back into program. Document established minimum QC criteria for data acceptance for microbiological data

North Fork

Continue to monitor the Tribes' monitoring data using continuous data loggers for temperature, turbidity, DO, salinity, and Ph; and bacteria sampling starting from year 2005 to present. Document established minimum QC criteria for data acceptance for this project for conventional analyses.

Estuary

Continue to monitor monitoring data conducted by: Army Corps of Engineers for sedimentation; Watershed Council (8 locations, grab sampling); and Tribes' monitoring with continuous data loggers for temperature, turbidity, DO, salinity, and Ph; and bacteria sampling. Document established minimum QC criteria for data acceptance for this project for these analyses.

Other examples are literature search results such as information on climate change effects; and data collected by agency partners.

11. Data Management

After environmental samples are collected in the field, they will be transported to the laboratory for analysis. Sample custody shall be maintained to preserve the integrity of the samples. Standard record-keeping procedures, chain-of custody and documented control systems, and the standard operating protocols used for data storage and retrieval on electronic media will be used.

The Project Manager will review the information gathered in the field with peer review of critical data elements. All errors will be corrected with oversight by the Project Manager.

All of the analytical results shall be reviewed and authorized for release by the contract laboratory's Project Manager. Standard data deliverables in Excel format shall be submitted by the laboratory.

At a minimum, all EPA data reporting requirements will be met. The format used to transmit the data to EPA will be compatible with EPA data format requirements.

C. Assessment/Oversight

12. Assessment and Response Actions

12.1 Technical Systems Audits

12.2 Performance Evaluation Audits

Laboratory and field performance audits and corrective action procedures are described in this section.

Laboratory and field performance audits consist of on-site reviews of quality assurance systems and equipment for sampling, calibration, and measurement. Laboratory audits will not be conducted as part of this study; however, all laboratory audit reports will be made available to the Project QC Coordinator upon request. All laboratories are required to have written procedures addressing internal QA/QC; these procedures will be submitted and reviewed by the Project QA/QC Manager to ensure compliance with the QAPP. All laboratories must ensure that personnel engaged in sampling and analysis tasks have appropriate training.

The Project Manager or QA/QC Manager will be notified immediately if any quality control sample exceeds the project-specified control limits. The analyst will identify and correct the anomaly before continuing with the sample analysis. The Laboratory Project Manager will document the corrective action taken in a memorandum submitted to the QA/QC Manager within five days of the initial notification. A narrative describing the anomaly, the steps taken to identify and correct the anomaly, and the treatment of the relevant sample batch (i.e., recalculation, reanalysis, re-extraction) will be submitted with the data package in the form of a cover letter.

Corrective Action for Field Sampling

The Project Manager will be responsible for correcting equipment malfunctions during the field sampling effort and for resolving situations in the field that may result in noncompliance with the QAPP. All corrective measures will be immediately documented in the field logbook.

Corrective Action for Laboratory Analyses

All laboratories are required to submit and comply with their Standard Operating Procedures (SOPs). The Laboratory Project Manager will be responsible for ensuring that appropriate corrective actions are initiated as required for conformance with this QAPP. All laboratory personnel will be responsible for reporting problems that may compromise the quality of the data.

13. Reports to Management

All data will undergo two levels of QA/QC evaluation: one at the laboratory, and one by the City's consultant (a chemist). Initial data reduction, evaluation, and reporting at the laboratory will be carried out as described in the appropriate analytical protocols and the laboratory's QA Manual. Quality control data resulting from methods and procedures described in this document will also be reported.

Minimum Data Reporting Requirements

The following describes the minimum data reporting requirements necessary for proper QA/QC evaluation of the analytical data.

Sample IDs. Records will be produced that clearly match all blind duplicate QA samples with laboratory sample IDs.

Sample Receipt. Chain of custody forms will be filled out for all sample shipments to document problems in sample packaging, custody, and sample preservation upon receipt at the laboratory.

Reporting. For each analytical method run, analytes will be reported as a detected concentration or as less than the specific reporting limit. The laboratories will also report dilution factors for each sample as well as date of extraction (if applicable) and date of analysis. Standard data packages will consist of a case narrative, sample results, QA sample results, and chain of custody forms.

Internal Quality Control Reporting

Internal quality control samples will be analyzed at the rates specified in the applicable analytical method.

Laboratory Blanks. All analytes will be reported for each laboratory blank. All non-blank sample results shall be designated as corresponding to a particular laboratory blank in terms of analytical batch processing.

Surrogate Spike Samples. Surrogate spike recoveries will be reported with all organic reports where appropriate. The report shall also specify the control limits for surrogate spike results. Any out of control recoveries (as defined in the specified method) will result in the sample being rerun or the data being qualified.

Matrix Spike Samples. Matrix spike recoveries will be reported for all analyses. All general sample results will be designated as corresponding to a particular matrix spike sample. The report will indicate what sample was spiked. The report will also specify the control limits for matrix spike results for each method and matrix.

Laboratory Duplicates and/or Matrix Spike Duplicate Pairs. Relative percent differences will be reported for all duplicate pairs as well as analyte/matrix specific control limits.

Laboratory Control Samples (LCS). When run for internal quality control, LCS results will be reported with the corresponding sample data. Control limits for LCS will be reported as specified.

Blind Duplicates. Blind duplicates will be reported as any other sample. Relative percent differences will be calculated for duplicate samples and evaluated as part of the data quality review.

D. Data Validation and Usability

14. Data Review, Validation, and Verification Requirements

Once data are received from the laboratory, a number of QC procedures will be followed to provide an accurate evaluation of the data quality. Specific procedures will be followed to assess data precision, accuracy, and completeness.

A qualified environmental chemist will perform a data quality review. The laboratories will deliver complete data packages for all chemical analyses. The data will be evaluated in accordance with the QAPP. All chemical data will be reviewed with regard to the following, as appropriate to the particular analysis:

- Completeness;
- Holding times;
- Blanks;
- Detection limits;
- Surrogate recoveries;
- Matrix spike/matrix spike recoveries; and
- Laboratory and field duplicate relative percent differences.

This data review will result in the proper data qualifiers being applied to the data. The results of the data quality review will be summarized as part of the annual monitoring report. This report will be submitted to the project QA Manager for final review and confirmation of the validity of the data.

15. Reconciliation with Data Quality Objectives

15.1 Assessment of Measurement Performance

15.2 Data Quality Assessment

Non-Direct Measurements

Water quantity, pump test data, water level, and other groundwater-related data records possessed by the City will be reviewed for potential use in constructing the groundwater flow model. Water quality records, compliance-related or otherwise, collected by the City will be included, as appropriate in the base-line water quality determination.

Corrective Action for Field Sampling

The Quality Assurance Officer will be responsible for correcting equipment malfunctions during the field sampling effort and for resolving situations in the field that may result in noncompli-

ance with the QAPP. All corrective measures will be immediately documented in the field log-book.

Corrective Action for Laboratory Analyses

All laboratories are required to submit and comply with their Standard Operating Procedures (SOPs). The Laboratory Project Manager will be responsible for ensuring that appropriate corrective actions are initiated as required for conformance with this QAPP. All laboratory personnel will be responsible for reporting problems that may compromise the quality of the data.

The Project Manager or QA/QC Manager will be notified immediately if any quality control sample exceeds the project-specified control limits. The analyst will identify and correct the anomaly before continuing with the sample analysis. The Laboratory Project Manager will document the corrective action taken in a memorandum submitted to the QA/QC Manager within five days of the initial notification. A narrative describing the anomaly, the steps taken to identify and correct the anomaly, and the treatment of the relevant sample batch (i.e., recalculation, reanalysis, re-extraction) will be submitted with the data package in the form of a cover letter.

SOURCE WATER ASSESSMENT REPORT

City of Florence
Florence, Oregon
Lane County
PWS #4100299

January, 2003

Prepared

by

Oregon Department of Human Services
Health Services
Drinking Water Program



and

Oregon Department of Environmental Quality
Water Quality Division
Drinking Water Protection Program



Available in Alternate Formats by contacting the DHS DWP at (541) 726-2587

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City of Florence: Source Water Assessment Report

Summary

The Source Water Assessment Program, mandated by the 1996 Amendments to the Safe Drinking Water Act, requires that states provide the information needed by public water systems to develop drinking water protection plans if they choose. The information that is provided includes the identification of the area most critical to maintaining safe drinking water, i.e., the Drinking Water Protection Area, an inventory of potential sources of contamination within the Drinking Water Protection Area, and an assessment of the relative threat that these potential sources pose to the water system.

This report is intended to provide the City of Florence with our conclusions regarding the source water assessment analysis. It is our hope that the information provided will be used as a basis for reducing the risk of contamination to your water source through the development of a voluntary Drinking Water Protection Plan (DWPP). Should you decide to proceed with the development of a DWPP, a comprehensive assessment analysis can be made available to you by contacting either the DHS Project Manager or the DHS Drinking Water Program Groundwater Coordinator. The comprehensive analysis includes a more in-depth description of the local hydrogeology, water system susceptibility, and the water system specific assumptions built into the source water assessment process.

The Drinking Water Protection Area for City of Florence is identified as the area at the surface overlying the critical portion of the aquifer that supplies groundwater to the well(s) or spring(s). The aquifer supplying drinking water to the City's wells has been identified as fine- to medium-grained sand of the Florence Dunal Aquifer. According to the well logs, groundwater occurs at depths ranging from 13 to 70 feet below the surface. The aquifer is considered to be shallow and unconfined.

The aquifer is considered highly sensitive because of the shallow unconfined nature of the aquifer, the highly permeable geologic material separating the aquifer from the surface, the high infiltration potential that exists for the aquifer and the past detection of toluene and chloromethane in the water supplied by the aquifer. The presence of highly permeable soils within the DWPA, the high number of other wells in proximity to the wellfield and the age of wells 1 and 2 also contribute to the overall sensitivity of the drinking water supply.

Potential Contaminant Source Inventory Summary

An inventory of potential contaminant sources was performed with the assistance of City representatives within the City of Florence's drinking water protection area. The primary intent of this inventory was to identify and locate significant potential sources of contaminants of concern. The inventory was conducted by reviewing applicable state and federal regulatory

databases and land use maps, interviewing persons knowledgeable of the area, and conducting a windshield survey by driving through the drinking water protection area to field locate and verify as many of the potential contaminant source activities as possible. It is important to remember the sites and areas identified are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

The City of Florence's drinking water protection area consists of 7 operating wells with 5 additional wells that are sited and will be drilled in the future. The delineated drinking water protection area for all 12 wells is primarily dominated by residential and municipal land use. Four potential contaminant sources were identified in the two-year time-of-travel zone of the drinking water protection area and include a golf course, high density housing, a drinking water treatment plant, and city sewer lines. Three potential contaminant sources were identified within the five-year and ten-year time-of-travel zones. The potential contaminant sources in this area include an RV park, stormwater outfalls, and a lake. Area-wide potential sources such as the golf course, high density housing, and city sewer lines extend from the two-year time-of-travel zone into the five-year and ten-year time-of-travel zones. All of the potential sources pose a relatively higher to moderate risk to the drinking water supply with the exception of the RV park, stormwater outfalls, and the lake, which pose a lower risk. One potential contaminant source, a transportation corridor, was identified outside the delineated drinking water protection area; however, this source poses a relatively moderate degree of potential contamination risk and is therefore included in this inventory.

The size of the Drinking Water Protection Area is designed to approximate the next 10 to 15 years of groundwater supply for the City of Florence Public Water System, depending on the type of delineation method. The DWPA for City of Florence is shown in Figure 1b (Appendix B). Additional 5-year, 2-year, and 1-year "time-of-travel" zones are identified inside the DWPA. The 2-year time-of-travel zone shown on the map is specifically used as a conservative estimate of the survival time of some viruses in groundwater. **Based on assessment results, the aquifer is considered to be highly sensitive to contamination. Given that viral contaminant sources have been identified inside the two-year time-of-travel zone for the DWPA, e.g., sewer lines and residential housing, we also consider the drinking water supply susceptible to viral contamination.**

The costs associated with contaminated drinking water are high. Developing an approach to protect that resource will reduce the risks of a contamination event occurring. In this report, we have summarized the local geology and well construction issues as they pertain to the quality of your drinking water source. We have identified the area we believe to be most critical to preserving your water quality (the Drinking Water Protection Area) and have identified potential sources of contamination within that area. In addition, we provide you with recommendations, i.e., Best Management Practices, regarding the proper use and practices associated with some common potential contamination sources. We believe public awareness is a powerful tool for

protecting drinking water. The information in this report will help you increase public awareness about the relationship between land use activities and drinking water quality.

1. Introduction

1.1 Source Water Assessment Project

Traditionally, water systems have relied on proper water system management, water quality monitoring and, if necessary, water treatment to ensure that the water they serve meets drinking water standards. In spite of the best of these efforts, contamination of drinking water still occurs. The costs, both tangible and intangible, to a water system contending with a contaminated water supply are significant. At a minimum, there is the cost of increased monitoring that will be required to make certain that the water does not pose a significant health risk. At contaminant concentrations exceeding a drinking water standard, the system may be dealing with the cost of installing and maintaining treatment, the loss of the drinking water source, i.e., a well, and most assuredly, a concerned and often frightened public.

Beginning with the 1986 Amendments to the Safe Drinking Water Act, an additional “barrier to contamination” was recognized at the federal level. A shift from the “reactive” approach of water treatment to a “proactive” approach of prevention began to occur. Although water treatment may be necessary in some cases, it is much more cost effective to prevent the contamination from happening in the first place. The Oregon Department of Environmental Quality (DEQ) and the Department of Human Services (DHS) Drinking Water Program recently compared the estimated cost of prevention (less than \$15 per resident) to the actual cost of investigation and treatment (more than \$1500 per resident) in a small Oregon community (population 330) impacted by a volatile organic contaminant that exceeded the drinking water standard.

Oregon has a Drinking Water Protection Program in place for groundwater systems, i.e., wells and springs. In order to protect a drinking water resource, a water system must know where the drinking water comes from, what potential sources of pollution exist and what level of threat each presents to the system’s drinking water. Until recently, the costs associated with acquiring this information were the responsibility of the water system, a financial burden that even the most proactive water systems found difficult to meet. The 1996 Amendments to the Safe Drinking Water Act lifted that burden from water systems by requiring that the states conduct Source Water Assessments for federally recognized public water systems that fall under state regulatory authority. The purpose of the Assessment is to provide the water systems with the information that they need to develop a strategy to protect their source of drinking water if they choose.

As mandated by the 1996 Amendments, a Source Water Assessment consists of the following:

1. The identification of the area that directly overlies that part of the aquifer supplying drinking water to the well or spring,
2. An inventory of potential sources of contamination within that area, and

3. The evaluation of the susceptibility of the water system to contamination from those sources.

Funding for assessments was provided to the states through the Act as part of the state's Drinking Water Revolving Loan Fund.

The DEQ and DHS worked with a citizen's advisory committee and with the DHS Drinking Water Advisory Committee to design a program that would meet the needs of Oregon's public water systems. The Environmental Protection Agency (EPA) has certified that Oregon's plan meets the requirements of the Safe Drinking Water Act. Within the program, DHS has the responsibility of working with groundwater systems and the DEQ works with surface water systems and conducts all potential contaminant inventories.

Within this report, you will find general descriptions of the various elements of the Source Water Assessment Program, as well as specific information identifying the Drinking Water Protection Area for your water system and an inventory of the potential threats to your drinking water quality. Although developing a Drinking Water Protection Plan is voluntary in Oregon, we hope that the information provided in the Source Water Assessment Report will be used as a basis for reducing the risk of contamination to your water supply. Risk reduction can be accomplished by correcting intake construction and/or set back deficiencies that contribute to water system susceptibility and by implementing Best Management Practices for identified potential contaminant sources. The bulk of our risk reduction recommendations center on developing a "state certified" Drinking Water Protection Plan, and providing information to those residences, agricultural operations and businesses, etc., that live or operate within the identified protection area.

A comprehensive assessment analysis can be made available to you should you decided to proceed with the development of a drinking water protection plan. The comprehensive analysis will include a more in-depth description of the local hydrogeology, water system susceptibility to the potential contaminant sources identified through the inventory process, and the water system specific assumptions built into the source water assessment process.

1.2 Groundwater Basics

In order to protect a groundwater source of drinking water, it is important to understand how the groundwater system works, e.g., where groundwater comes from, how it occurs in the subsurface, how it moves and how it can become contaminated. Included in Appendix G of this report is a Fact Sheet about groundwater that you can use to help increase the awareness of others regarding groundwater and its susceptibility to contamination.

When a well is drilled, the drilling equipment first passes through the vadose zone until it encounters the water-table. Within the vadose zone, the open pore spaces between soil and sediment particles and/or the open fractures within the bedrock material are only partially filled with water. Most of the open pore/fracture space is filled with air, therefore, little if any water can be obtained from the vadose zone. The water-table marks the top of the saturated zone, where the open pore/fracture spaces are, for the most part, completely saturated (full) with groundwater. It should be understood that within the saturated zone, groundwater does not occur as underground rivers, lakes, or veins. An aquifer is any geologic material located below the water-table (and is therefore water saturated) that can yield an adequate water supply to a well. Geologic materials that tend to yield large quantities of water to wells include sand and gravel deposits, porous lava flows, and fractured bedrock.

Groundwater is part of the hydrologic cycle which controls the distribution of water on the earth's surface. Groundwater is therefore linked to other water sources, notably surface water such as streams, rivers and lakes. Virtually without exception, groundwater originates as precipitation at the earth's surface which sinks through the soil and percolates down to the water-table. The fact that groundwater originates at the surface is what makes it vulnerable to contamination. As recharging groundwater moves downward through the soil and vadose zone, it comes in contact not only with the geologic materials present, but also with any contaminants contained within the soil and/or vadose zone. Therefore, recharging groundwater can carry contaminants downward to the aquifer. Likewise liquid chemicals, if present in large enough quantities, can enter the aquifer by following the same path as recharging groundwater.

The direction and speed with which groundwater moves is controlled by the slope of the water-table and aquifer permeability. The slope of the water-table often mimics, in a subdued sense, the earth's surface with groundwater moving from high areas to low areas. Aquifer permeability is a measure of how easy it is for groundwater to move through the geologic material that makes up the aquifer. Geologic materials with greater permeability allow groundwater to move with less restriction. In general, groundwater movement is measured in terms of a few inches to a few feet per day. A pumping well can significantly influence the speed and direction of groundwater movement by drawing the water-table down in its' vicinity, creating a depression in the water-table. As the well continues to pump, the depression in the water-table spreads out through the aquifer and leads to the formation of a "capture zone". Groundwater inside the capture zone is eventually pumped to the earth's surface by the well.

When wells are used as a water source, we identify the drinking water protection area for the water system by delineating those portions of the capture zone around the well(s) where, on average, it will take 15 or 10 years (depending on the delineation technique used) for water moving through the aquifer to arrive at the well. We have also identified the 5-, 2-, and 1-year capture zones around the well(s) to enhance the overall usefulness of the drinking water protection area.

2. City of Florence Water System Information

2.1 Location of the Drinking Water Source

We have located your source(s) using a Trimble GeoExplorer II Global Positioning System (GPS) unit. The data has been differentially corrected to remove some of the common positioning errors. The location of the source(s), with the corresponding Drinking Water Protection Area, has been placed in a Geographic Information System (GIS) layer and projected onto a U.S.G.S. 7.5 minute topographic map that is included within this report. In order to be consistent with the topographic map, the projection uses the NAD1927 datum. The latitude and longitude given on the map and below, however, reflects a projection in the more commonly used WGS1984 datum..

Data collection specifics include:

- ▶ 150 individual measurements,
- ▶ linked to a minimum of four satellites,
- ▶ a PDOP of less than 6 (pertains to precision of measurement),
- ▶ a signal to noise ratio of greater than 5

The raw data was subjected to differential correction using the PATHFINDER software. The location data for your well using the WGS84 datum is as follows:

Source	Latitude	Longitude
Well 1 - Source AA	43° 59' 24.851" N	124° 05' 31.462" W
Well 2 - Source AB	43° 59' 18.978" N	124° 05' 28.603" W
Well 3 - Source AC	43° 59' 17.735" N	124° 05' 22.309" W
Well 4 - Source AD	43° 59' 22.497" N	124° 05' 21.383" W
Well 5 - Source AE	43° 59' 38.727" N	124° 05' 26.815" W
Well 6 - Source AF	43° 59' 33.553" N	124° 05' 26.790" W
Well 7 - Source AG	43° 59' 28.560" N	124° 05' 26.882" W

2.2 Source Construction

No official well report for well 1 could be located. No information regarding the depth of the aquifer, static water level, or the placement of a casing seal is known. A 1964 document prepared by Carter's Drilling and Pump service indicates that the well is 105 feet deep and is screened from 62 to 97 feet.

Well 2 was constructed in March, 1976. A 16-inch hole was drilled to 20 feet with a 12 inch hole continuing to 125 feet. Twelve-inch casing was placed from two feet above the surface to a depth of 56.5 feet. Ten-inch screens were placed in the well to allow water access and at the same time hold the hole open. Although not specified, it is assumed that the screens extend to 120 feet where "blue clay" was encountered. The driller reported finding water at a depth of 12 feet and that the static water level after drilling was also 12 feet. Bentonite, an expanding clay, was placed between the casing and the outer wall of the hole from the surface to a depth of 20 feet to serve as a casing seal. The casing seal is there to provide protection from surface or near-surface water moving laterally to the casing and gaining access to the well bore. Given that the aquifer is unconfined, this casing seal is considered to be adequate. A copy of the well report for this well is included in Appendix D.

Well 3 was constructed in July, 1991. A 12-inch hole was drilled to 156 feet. Twelve-inch casing was placed from two feet above the surface to a depth of 120 feet. Ten-inch liners were placed in the well to hold the hole open from 115 to 121.5 and from 151.5 to 156. Twelve-inch diameter screens were placed from 121.5 to 151.5 feet to allow water access to the well. "Blue clay" was encountered in the well at 151 feet. The driller reported finding water at a depth of 49.67 feet and that the static water level after drilling was also 49.67 feet. Because the aquifer consists of dunal sand, the Water Resources Department has granted an exception to construction standards that require a casing seal. Given that the aquifer is sand, a casing seal will not hinder the downward movement of water and therefore would serve no real purpose.

Well 4 was constructed between July, 1994 and January, 1995. A 16-inch hole was drilled to 15 feet with a 12 inch hole continuing to 182 feet. Twelve-inch casing was placed from 1.5 feet above the surface to a depth of 119 feet. Ten-inch liners were placed in the well to hold the hole open from 115 to 126 and from 166 to 182 feet. Twelve-inch diameter screens were placed from 126 to 166 feet to allow water access to the well. The driller reported finding water at a depth of 70 feet and that the static water level after drilling was also 70 feet. Bentonite, an expanding clay, was placed between the casing and the outer wall of the hole from the surface to a depth of 15 feet to serve as a casing seal. Because the aquifer consists of dunal sand, the Water Resources Department has granted an exception to construction standards that require a casing seal be placed to a depth of 18 feet.

Well 5 was constructed between August, 1994 and January, 1995. A 16-inch hole was drilled to 15 feet with a 12 inch hole continuing to 143 feet. Twelve-inch casing was placed from 1.5 feet above the surface to a depth of 78 feet. Ten-inch liners were placed in the well to hold the hole

open from 76 to 78 and from 166 to 182 feet. Twelve-inch diameter screens were placed from 78 to 118 feet to allow water access to the well. The driller reported finding water at a depth of ~13 feet and that the static water level after drilling was also ~13 feet. Bentonite, an expanding clay, was placed between the casing and the outer wall of the hole from the surface to a depth of 15 feet to serve as a casing seal. Because the aquifer consists of dunal sand, the Water Resources Department has granted an exception to construction standards that require a casing seal be placed to a depth of 18 feet.

Well 6 was constructed between August, 1994 and January, 1995. A 16-inch hole was drilled to 15 feet with a 12 inch hole continuing to 140 feet. Twelve-inch casing was placed from 1.5 feet above the surface to a depth of 78 feet. Ten-inch liners were placed in the well to hold the hole open from 76 to 79 and from 119 to 140 feet. Twelve-inch diameter screens were placed from 79 to 119 feet to allow water access to the well. The driller reported finding water at a depth of ~14 feet and that the static water level after drilling was also ~14 feet. Bentonite, an expanding clay, was placed between the casing and the outer wall of the hole from the surface to a depth of 15 feet to serve as a casing seal. Because the aquifer consists of dunal sand, the Water Resources Department has granted an exception to construction standards that require a casing seal be placed to a depth of 18 feet.

Well 7 was constructed between August, 1994 and January, 1995. A 16-inch hole was drilled to 15 feet with a 12 inch hole continuing to 143 feet. Twelve-inch casing was placed from 1.5 feet above the surface to a depth of 78.5 feet. Ten-inch liners were placed in the well to hold the hole open from 77.4 to 82.6 and from 122.9 to 143 feet. Twelve-inch diameter screens were placed from 82.6 to 122.9 feet to allow water access to the well. The driller reported finding water at a depth of 19.1 feet and that the static water level after drilling was also 19.1 feet. Bentonite, an expanding clay, was placed between the casing and the outer wall of the hole from the surface to a depth of 15 feet to serve as a casing seal. Because the aquifer consists of dunal sand, the Water Resources Department has granted an exception to construction standards that require a casing seal be placed to a depth of 18 feet.

Copies of the well reports for these wells are included in Appendix D.

2.3 Nature and Characteristics of the Aquifer

The aquifer supplying the drinking water to the City of Florence Well Field consists of sand of the Florence Dunal Aquifer.

As described in the well construction discussion above, the depth to first water encountered in the wells and the static water level after well completion is the same in the aquifer. This implies that the groundwater is under atmospheric pressure only and that the aquifer should be considered as unconfined, i.e., there are no materials of low permeability separating the aquifer,

or water table, from the surface. Based on the well reports, the aquifer appears to range in thickness from ~100 to ~130 feet thick, although this will vary with season, being thicker in the spring after the winter precipitation recharge when water table rises. The elevation of the well screens varies from -11 feet (Well 2) to -43 feet (Well 3).

3. Delineation of the Drinking Water Protection Area

3.1 Methodology

The delineation of the Drinking Water Protection Area (DWPA) is a fundamental aspect of the source water assessment for a public water system. When information regarding the DWPA location is provided to the community, it enables the community to develop management strategies that will have the most impact with regard to preserving long-term drinking water quality. For groundwater systems, the DWPA identifies the area on the surface which directly overlies the portion of aquifer that supplies enough groundwater to the well, wellfield, or spring to meet long-term water demand (i.e., 10 to 15 years). Once delineated, the DWPA outline is placed on a map and provides the community with the knowledge of the geographic area providing water to the well. This is the area where contamination poses the greatest threat to the drinking water supply.

The delineation exercise requires the use of site-specific information so that the identified DWPA adequately reflects the hydraulic characteristics of the aquifer and the operation of the water system. The level of hydrogeologic assessment performed during the delineation depends on the population served, the presence of potentially interfering wells, and the complexity of the local hydrogeology. The delineation methods are described in the text and table below. The method used for your delineation is indicated in Appendix E (Parameters Used in the Delineation Model).

Calculated Fixed Radius (CFR): The CFR method determines the volume of the aquifer that would be needed to supply the system for next 15 years assuming a flat water-table. The delineation is circular in shape, centered on the well.

Enhanced CFR: If the water system has more than one well or a groundwater boundary is present near the well(s) and there is a potential for interference between the wells and/or the groundwater boundary, a more sophisticated analytical method is used. In such cases we specifically use an analytical model that allows interference to be accommodated. However, like the CFR, this delineation method does not account for groundwater flow direction (i.e., it assumes a flat water-table). As with the CFR, the next 15 years of groundwater supply is identified.

Analytical: Neither the CFR or Enhanced CFR method takes into account the direction and rate of groundwater flow. Analytical models incorporate the groundwater gradient into the calculations. Because of the more site-specific nature of this model, only the next 10 years of groundwater supply is identified. For systems serving 501 to 50,000 from aquifer sources lacking complex hydrogeologic boundaries, the groundwater gradient is either estimated from water-levels indicated on well logs or taken from published reports. For water systems that fall

in this category and serve more than 3,300, the gradient may be determined directly by field measurement.

Analytic or Numerical: These more sophisticated models allow for the incorporation of complex boundaries such as streams and formation contacts, can be checked with local water levels, and can incorporate spacial variations in aquifer properties.

Hydrogeologic Mapping: This delineation method involves identifying the hydrogeologic boundaries of the aquifer and is most often used in conjunction with the analytical, analytic element, and/or numerical delineation methods. Hydrogeologic boundaries include constant head boundaries (i.e. streams and/or reservoirs) and no-flow boundaries which occur when an aquifer comes in direct contact with a relatively impermeable material. Hydrogeologic mapping may be used as a stand alone delineation technique when identifying DWPAs for springs and/or wells where there is no means of determining aquifer properties.

Population	Interfering Wells?	Complex Hydrogeology?	Delineation Method	Parameters Needed ¹
25-500	N	N	CFR	Q, n, b
25-500	N	Y	Enhanced CFR	Q, b, n, K
25-500	Y	Y/N	Enhanced CFR	Q, b, n, K
501-3,300	Y/N	N	Analytical	Q, b, n, K, i
501-3,300	Y/N	Y	Analytic or Numerical	Q, b, n, K, i, h
3,301-50,000	Y/N	N	Analytical	Q, b, n, K, i, h
3,301-50,000	Y/N	Y	Analytic or Numerical	Q, b, n, K, i, h
50,000+	Y/N	Y/N	Numerical	Q, b, n, K, i, h
Spring	NA	Y/N	Hydrogeologic Mapping	Local Geology

1. Q = pump rate; n = aquifer porosity; b = aquifer thickness; K = hydraulic conductivity (permeability); i = gradient (slope of the water table); h = hydraulic head (elevation of the water table).

3.2 Results

DHS Drinking Water Program staff have collected and reviewed data for the purpose of delineating the DWPA for the City of Florence. The scope of work for this report included collecting information from the water system operator, researching written reports, and establishing a base map of the delineated area. **Based on the complex hydrogeologic boundaries and hydraulic head distribution, a numerical method was used to delineate the DWPA for the City's wells.** The resulting DWPA for the City's Wells are shown in Appendix B, Figure 1b. This delineation assumes that wells 8 through 12 have been added to the field and the wells are pumping at levels anticipated for 2006. In addition, the City is exploring the development of a second well field near Highway 101 northwest of the current field. Figure 1c offers the DWPA for one possible configuration of these wells. This data reflects use as is projected for the year 2020 and is offered for planning use purposes only.

Specific information regarding the parameters used in the delineation process including; the delineation method, estimated pump rate of each well, and aquifer characteristics can be found in Appendices E and H.

4. Sensitivity Analysis

After the Drinking Water Protection Area (DWPA) has been identified, aquifer susceptibility to potential contaminant sources inside the DWPA can be evaluated. Aquifer susceptibility is dependent on two factors, the natural environment's characteristics that permit migration of a contaminant into the aquifer (i.e., aquifer sensitivity) and the presence, distribution, and nature of the potential contaminant sources within the DWPA. It should be understood that the public water system's drinking water source cannot be susceptible to contamination, even if the aquifer is sensitive, unless potential contaminant sources are present within the DWPA. Therefore, the intent of the sensitivity analysis is to identify those areas within the DWPA where the aquifer is most sensitive to contamination. The analysis is based on data collected or generated during the DWPA delineation process and is designed to meet the needs of other existing or developing programs such as Monitoring Waivers and the Groundwater Rule.

4.1 Sensitivity Analysis Methodology

Aquifer sensitivity refers to those factors characteristic of the aquifer and overlying materials, in addition to those that are imposed upon the aquifer, such as well construction, that increase the potential for both surface and subsurface contaminants to gain access to the aquifer. The aquifer sensitivity analysis depends on a number of factors that can collectively or individually allow the aquifer to become contaminated. Factors considered during the sensitivity analysis are described below and are summarized in Appendix F, Sensitivity Summary. Characteristic factors pertaining to sensitivity are categorized as highly or moderately sensitive. **Those factors related to the public water supply well or wellfield are conditions that can be corrected by the water system, thus potentially lowering the overall sensitivity.** However, those factors related to the aquifer tend to be a direct result of natural conditions and in most cases can not be modified.

4.1.1 Depth to first water-bearing zone below casing seal

The depth to the first water-bearing zone below the casing seal is important in controlling the aquifer's sensitivity because it relates to the time of travel from the surface to groundwater. The greater the distance and estimated travel time, the greater the potential for the contaminant to be degraded to insignificant levels. Although not specifically evaluated on the sensitivity summary form in Appendix F, the depth to the first water-bearing zone below the casing seal is used in the traverse potential and infiltration potential calculations described later.

4.1.2 Aquifer Characteristics and Hydraulic Nature

Aquifer characteristics refer to the geologic material (lithology) that groundwater is moving through and how the lithology controls groundwater movement. Aquifer characteristics that contribute to sensitivity include materials that provide large open pore spaces and/or short pathways for contaminants to travel through the aquifer. Therefore, we consider aquifer materials such as gravels, boulders, and fractured bedrock to contribute to overall aquifer sensitivity. These types of materials do not provide for natural filtration of contaminants as water can move with relative ease through the larger diameter pore spaces and/or fractures. The presence of fractured bedrock at the surface inside the DWPA is also an indication that contaminants could move quickly from the surface into the local aquifer system. Therefore, our concern is raised if the characteristics and hydraulic nature of the aquifer cannot be determined.

For the purpose of the source water assessment, the hydraulic nature of the water inside the aquifer is described as either unconfined, confined, semi-confined, and/or fractured confined. Unconfined aquifers are often shallow and are not separated from the surface by a protective low-permeability layer. Confined aquifers are often deeper and are overlain by a protective low-permeability layer. As a result, unconfined aquifers have minimal protection from downward percolating contaminants and are considered sensitive to potential contaminant sources. However, the overall protective nature of the overlying low-permeability (confining) layer for a confined aquifer may be limited if it is thinner than 15 feet. Under such conditions the aquifer may be considered semi-confined, raising concern that the confining layer may be absent or ineffective within large portions of the DWPA. Likewise, concern is raised if a well or spring is drawing water from a fractured aquifer exhibiting confined characteristics which lies within 50 feet of the surface. At shallow depths, the potential for fractures to intercept the surface or near surface increases. Any fracture reaching the shallow subsurface can provide a pathway for contaminated shallow groundwater to enter the aquifer, effectively raising aquifer sensitivity.

4.1.3 Overburden Thickness and Characteristics

The material resting between the surface and the aquifer can have a significant impact the aquifer sensitivity analysis. Overburden thickness can be related to the time of travel from the surface to the aquifer. The greater the distance and time, the greater the potential for contaminants to be degraded to insignificant levels. In addition, laterally persistent materials of low permeability, such as silt, clay, and unfractured bedrock, will restrict the downward movement of contaminants. Therefore, the presence of a thick (greater than 15 feet) confining unit resting on top of the aquifer offers the greatest amount of natural protection to a drinking water supply. Confining units consisting of plastic clay and/or unfractured bedrock are much more protective than those consisting of silt.

4.1.4 Soil Types

Although soils usually compose a very small portion of the overburden above the aquifer, they are the first natural barrier between the surface and the water-table. Therefore, the amount of time it takes for water to pass through the soil zone can be used as a factor in determining overall aquifer sensitivity. Even over short distances, the permeability and thickness of different soil types can be highly variable as some soils are thinner and/or have a higher permeability than others. Therefore, for the purposes of the source water assessment, we identify soils with high, moderate and low sensitivity based on the amount of time it takes for water to pass through a specific soil under saturated conditions. Highly sensitive soils are those soils for which it has been estimated to take less than 65 hours for water to pass through their profile under saturated conditions. This means that there is little opportunity for degradation of a contaminant, such as nitrate, within the soil zone. In addition, the travel time through the soil indicates the amount of response time available before an accidental spill becomes significantly more difficult to clean up.

Moderately sensitive soils are those for which it has been estimated to take between 65 and 256 hours (approximately 2.7 to 10.7 days) for water to pass through their profile and low sensitivity soils are those which it has been estimated to take more than 256 hours for water to pass through. Recognition of these soil types and their occurrence within the Drinking Water Protection Area can indicate those parts of the protection area where contamination may pose a greater risk to the water system, therefore it is useful to compare the distribution of these soil types with respect to potential contaminant sources. The distribution and relative sensitivity of soils within the Drinking Water Protection Area is shown on the Sensitivity Map (Appendix B, Figure 3) and the distribution of potential contaminant sources with respect to soils is shown on the Susceptibility Map (Appendix B, Figure 4).

4.1.5 Infiltration Potential

The Infiltration Potential (IP) is an estimate of the ability of water to infiltrate from the surface to the aquifer. It is based on (1) the depth to the aquifer, (2) an estimate of the weighted permeability of the material between the surface and the aquifer, a parameter referred to as the Traverse Potential (TP), and (3) the hydraulic surplus, or amount of water available from precipitation and/or irrigation at the surface that is able to infiltrate into the aquifer. Both IP and TP values are determined for each drinking water source and are used as factors for determining overall aquifer sensitivity near the wellhead and/or springhead (i.e., within the 100 foot sanitary setback or 2-year Time-of-Travel Zone). If enough well log data is available for the surrounding area, DWPA sensitivity and susceptibility maps (Appendix B, Figures 3 and 4) can be produced based on TP and IP data rather than soil sensitivity for those water systems serving more than 500 people.

Both IP and TP scoring in Oregon varies from 1 to 10. A low TP value of 1 indicates that the materials above the aquifer are of very low permeability and/or are of great thickness. Conversely, a high TP value of 10 indicates materials above the aquifer have a very high permeability and/or are very thin. Therefore, we interpret TP values greater than 5 as an indication of areas where the potential for movement of water (and/or contaminants contained in the water) from the surface to the aquifer is greatest and we classify the Drinking Water Protection Area (or portions thereof, if TP is mapped) as highly sensitive to contamination.

IP values are determined using TP values and an estimate of the available water at the surface for aquifer recharge. Our estimate of available water at the surface assumes that rainfall, evaporation, plant uptake, and runoff remain constant throughout the DWPA, however we do recognize that irrigation practices can vary with regard to land use and/or crop type. Therefore, for those water systems where TP and IP have been mapped, IP values can vary even if TP values are constant throughout the DWPA. A low IP value of 1 indicates that it takes the available recharge water a long time to reach the aquifer. Conversely, a high IP value of 10 indicates that surface water is recharging the aquifer very quickly and therefore has the potential to transport large quantities of contaminants into the aquifer with little or no reduction in concentration. We classify the DWPA (or portions thereof, if IP is mapped) as having a high, moderate, or low sensitivity to contamination with respect to the calculated IP value as follows:

<u>Sensitivity</u>	<u>Infiltration Potential</u>
High	> 7
Moderate	4 to ≤ 7
Low	< 4

4.1.6 Source Construction

A groundwater based public water system's sensitivity to contamination is dependent not only on aquifer characteristics but also the integrity of the well(s) and/or spring boxes used to extract or collect water for distribution. If improperly constructed, these structures can also serve as conduits for contamination to move from the surface or near-surface environment and into the well and/or spring. We have evaluated the sensitivity of the water system's intakes to potential contamination by reviewing construction deficiencies reported on recent sanitary surveys, the construction and depth of casing seal for the public water supply well(s), and age of the constructed intake.

When a well is drilled in soft or loose materials, a casing (steel or plastic pipe) is inserted to hold the hole open during and after drilling. The casing does not in itself provide adequate protection from contaminated shallow water gaining access to the well. Contaminated shallow groundwater can migrate to the casing and follow the casing directly down to the well intake. The real protection from potentially contaminated shallow water is the casing seal. This seal is put in

place by drilling a hole that is at least four inches greater in diameter than the final casing. After the larger hole is drilled, the casing is installed and the annular space between the casing and the bore hole wall is filled with a sealant, either bentonite (an expanding clay), cement, or a combination of the two materials. The casing seal must, by law, be placed a minimum of 18 feet below the surface, however, it should be placed to a depth that is controlled by the local geology, e.g., for a confined aquifer, the casing seal should extend a minimum of five feet into the confining layer. Having a well drilled by a licensed well constructor greatly reduces the risk that the well will be improperly constructed.

4.1.7 Other Wells

Other wells that fall in close proximity to the public water supply well and/or spring may provide a conduit for contaminants to reach the local aquifer if their construction is inadequate or has been compromised. We assume that the risk of encountering an improperly constructed or compromised well increases as the density of wells in the vicinity of the public water supply well and/or spring increases. Even a properly constructed well has a given life-time, after which the casing seal may begin to deteriorate and eventually fail, allowing shallow water to gain access to the aquifer. Therefore, overall risk becomes significantly greater when older wells are present, in part due to age and also due to the less stringent construction standards that were in effect prior to 1979.

We evaluate aquifer sensitivity to contamination posed by other wells in the Drinking Water Protection Area (DWPA) by totaling the number of well reports on file at the Oregon Water Resources Department that are within the same section containing the public water system's well(s) and/or spring(s) and develop a score based on the number of wells and their age. The equation for determining the Other Wells Score is as follows:

$$\text{Other Well Score} = (\text{No. of wells 1979 or younger}) + 4 \times (\text{No. of wells older than 1979})$$

The above expression assumes that wells drilled before 1979 are four times more likely to lead to water quality problems than those wells drilled after 1978. An Other Wells Score greater than 400 is assumed to represent a high density of wells and a moderate risk to local groundwater resources. In addition, a score that falls between 225 and 400 indicates a moderate density of wells, which is not an immediate cause for concern, unless a large number of wells are observed inside the DWPA or routine water quality monitoring suggests an ongoing degradation of source water quality. In either case, local well owners can obtain useful information regarding private wells over the internet at www.wellowner.org or at <http://wellwater.orst.edu>. It might also be useful to provide Home-A-Syst assessment packets, available through the OSU Extension Service, to local well owners who are interested in protecting their private wells (and in turn, local groundwater resources) from contamination. For more information regarding the Home-A-Syst program contact:

Gail Glick Andrews
Oregon Home-A-Syst Coordinator
Bioresource Engineering
116 Gilmore Hall
Corvallis, OR 97331-3906
Phone: (541) 737-6294

4.1.8 Monitoring History

Most groundwater contamination originates at the surface (accidental/deliberate spills, chemical applications, roadway/parking lot runoff, etc...) or in the shallow subsurface (underground storage tanks, septic systems, shallow injection wells, etc...) therefore, a review of water quality monitoring results for each water system can provide valuable information regarding aquifer sensitivity. Clearly, if a contaminant has been detected in the water source, a pathway from the surface to the aquifer must exist. As a means of protecting public health, public water systems in Oregon are required to routinely monitor drinking water quality for contaminants identified by the U.S. Environmental Protection Agency as hazardous to human health. However, it is important to understand that the results from a given sample only provide information regarding water quality at the time that the sample was collected. Water quality within an aquifer can change with time for a number of reasons, including contamination and seasonal recharge. **The fact that a water sample, or series of water samples, is free of contaminants is no guarantee that contamination of the aquifer can not happen in the future.** Therefore, if a water system is determined to have a moderate or low sensitivity with respect to monitoring history, it still may in fact be highly sensitive to contamination with respect to one or more other sensitivity analysis criteria.

Our review of water quality monitoring history included all Volatile Organic Compounds (VOCs), Synthetic Organic Compounds (SOCs), Inorganic Compounds (IOCs), nitrate, and coliform monitoring results available in the DHS Drinking Water Program SDWIS on-line database. Required routine monitoring for nitrate and coliform occurs more frequently than that for VOCs, SOCs, and IOCs, therefore both nitrate and coliform are particularly useful as indicators of contaminant pathways into the aquifer. Coliform bacteria are ubiquitous in the environment and their presence in source water (i.e., the aquifer) may indicate a microbial source nearby. Likewise nitrate provides similar information and is highly mobile compared to most contaminants and in some cases will act as a precursor to other contaminants entering the aquifer. Therefore, we consider an aquifer yielding water that meets any of the following criteria to be highly sensitive to contamination:

- Any VOC or SOC detections,

- IOC detections greater than 50% of the EPA established MCL,
- Source-related coliform detections, and/or
- Nitrate concentrations of 5 mg/L or greater.

4.2 Sensitivity Analysis Results

During the delineation phase of this assessment, the Florence Dunal Aquifer was identified as the aquifer from which the wells are drawing water. This aquifer is composed primarily of sand with minor interbeds of silt or clay. First water and static water levels are equivalent in this aquifer indicating that it is unconfined in nature.

The water table varies from less than 15 feet to more than 70 feet below the surface depending on the well. It is likely that the water table rises to even shallower depths in the spring after recharge of winter precipitation. Traverse Potential (TP) and Infiltration Potential (IP) values for the wells are based entirely on the geologic description included on the well driller's report for the individual wells. On this basis, the calculated TP values for the DWPA's range from 8 to 9. Using an average precipitation rate of 65 inches (Hampton, 1963) and the high infiltration rates associated with sandy soils, we estimated an annual recharge rate to the aquifer in excess of 40 inches which combined with the TP values, yield an IP of 10.

Seven different soil types occur within the recognized DWPA's, all of which have time-of-travel for water across them under saturated conditions of less than 65 hours: Dunal sand (<10 hours), Yaquina loamy fine sand (10 hours), Waldo fine sand (2 hours), Netarts fine sand (12 hours), Yaquina urban land complex (10 hours) and Lint silty loam (45 hours).

Well report records indicate that there are approximately 120 other wells within the sections containing the City of Florence Wells. Of these, 100 were drilled before 1979. The remaining wells were drilled after 1978. This leads to an Other Well Score of 420, a score that exceeds the significant risk indicator threshold of 400. Thus, other wells in the area potentially represent a significant risk to the water system. In addition, it should be understood that the above numbers only represent wells on record at the Water Resources Department. Prior to 1960, well reports were not required to be filed. In addition, unauthorized wells are not uncommon in many areas. Therefore, the Other Well Score should be considered as a minimum assessment of risk.

DHS Drinking Water Program records indicate that nitrate has not been detected at the entry point for the wellfield. Records also indicate that there haven't been any positive detections for total coliform. Detections of toluene (0.0023 mg/L on August 14, 2002) and chloromethane (methylchloride) (0.0034 to 0.0075) have occurred in the wellfield. Sodium has been detected up to concentrations of 37 mg/L.

The aquifer sensitivity for the system is summarized on the sensitivity summary sheet in Appendix F. If a criterion on the form is checked “No”, it implies that, based on our evaluation, that criterion does not contribute significantly to the aquifer’s sensitivity. If neither box is checked for a criterion and/or “N/A” is written beside a criterion, it implies that there is either no information available for that specific criterion or that the criterion does not apply to the water system. We have identified the following criteria which we believe increases the aquifer’s sensitivity to contamination from the surface.

4.2.1 Highly Sensitive Criteria

Based on our assessment of the well report, most recent site visit, and available monitoring history for the City of Florence, the aquifer that the wells produce from is considered highly sensitive.

DHS Drinking Water Program records indicate that detections of the organic chemicals toluene and methyl chloride have occurred, the latter chemical several times throughout the 1990s. In addition, the aquifer is considered to be shallow and unconfined with the traverse potential and the infiltration potential exceeding the high sensitivity thresholds of 5 and 7, respectively.

4.2.2 Moderately Sensitive Criteria

The City of Florence’s drinking water source meets criteria for moderate sensitivity.

Based on our analysis within the DWPA for the wells, the entire wellfield DWPA is covered with highly permeable soils. Highly permeable soils are those soils for which it has been estimated to take less than 65 hours for water to pass through their profile under saturated conditions. Soils present and their respective time of travel in hours are dunal sand (<10), Yaquina loamy fine sand (10), Waldo fine sand (2), Netarts fine sand (12), Lint silty loam (45), and Yaquina-Urban land complex (10). The distribution of relative soil permeability within the DWPA is shown in Appendix B, Figure 3. In the figure, we have distinguished between soils that represent high sensitivity (10 to 45 hours) and those that represent extremely high sensitivity (2 to 10 hours). It is useful to compare the distribution of these highly permeable soils with respect to potential contaminant sources as shown in Appendix B, Figure 4.

5. Inventory of Potential Contaminant Sources

5.1 Methodology

The primary intent of an inventory is to identify and locate significant potential sources of any of the contaminants of concern within the drinking water protection area. Significant sources of contamination can be defined as any facility or activity that stores, uses, or produces the contaminants of concern and has a sufficient likelihood of releasing such contaminants to the environment at levels that could contribute significantly to the concentration of these contaminants in the source waters of the public water supply. The inventory is a very valuable tool for the local community in that it:

- Provides information on the locations of potential contaminant sources, especially those that present the greatest risks to the water supply,
- Provides an effective means of educating the local public about potential problems, and
- Provides a reliable basis for developing a local management plan to reduce the risks to the water supply.

Inventories were focused primarily on the potential sources of contaminants regulated under the federal Safe Drinking Water Act (SDWA). This includes contaminants with a maximum contaminant level (MCL), contaminants regulated under the Surface Water Treatment Rule, and the microorganism *Cryptosporidium*. The inventory was designed to identify several categories of potential sources of contaminants including micro-organisms (i.e., viruses, *Giardia lamblia*, *Cryptosporidium*, and bacteria); inorganic compounds (i.e., nitrates and metals); and organic compounds (i.e., solvents, petroleum compounds and pesticides). Contaminants can reach a water body (groundwater, rivers, lakes, etc.) from activities occurring on the land surface or below it. Contaminant releases to water bodies can also occur on an area-wide basis or from a single point source.

It is advantageous to identify as many potential risks as possible within the drinking water protection area during the inventory. It is important to remember the sites and areas identified in this section are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly. Not all of these inventoried activities pose actual high risks to your public water supply. The day-to-day operating practices and environmental (contamination) awareness varies considerably from one facility or land use activity to another.

When identifying potential risks to a public water supply, it is necessary to make “worst-case” assumptions. This is important because it is the potential risk that we are attempting to determine. The worst-case assumption that has to be made when considering potential risks to water bodies is that the facility or activity is not employing good management practices or pollution prevention. Also, assumptions are made about what sources are included in particular

types of land use. For example, it is assumed that rural residences associated with farming operations have specific potential contamination sources such as fuel storage, chemical storage and mixing areas, and machinery repair shops. Any errors in these assumptions can be easily corrected as the community moves beyond the assessment to develop a protection plan.

Past, current, and possible future potential sources of contaminants were identified through a variety of methods and resources. In completing this inventory, DEQ used readily available information including review of DEQ and other agencies' databases of currently listed sites, interviews with the public water system operator, and field observation as discussed below. In-depth analysis or research was not completed to assess each specific facility's compliance status with local, state and/or federal programs or laws. Further, the inventory process did not include an attempt to identify unique contamination risks at individual sites such as facilities (permitted or not) that do not safely store potentially hazardous materials.

The process for completing the inventory for the City of Florence's drinking water protection area included several steps, which are summarized as follows:

1. Relevant information as of February 2002 were collected from applicable state and federal regulatory databases including the following lists:
 - DEQ Environmental Cleanup Site Information System (ECSI) which includes the U.S. EPA National Priorities List (NPL) and the U.S. EPA Comprehensive Environmental Response, Compensation and Liability Information System (CERCLA) list;
 - DEQ leaking underground storage tank (LUST) list;
 - DEQ registered underground storage tank (UST) list;
 - DEQ Source Information System (for water discharge permit sites including National Pollutant Discharge Elimination System (NPDES) permits, Water Pollution Control Facility (WPCF) permits, storm water discharge permits, and on-site sewage (septic) system permits);
 - DEQ Active Solid Waste Disposal Permits list;
 - DEQ Dry Cleaners list;
 - DEQ Underground Injection Control (UIC) list of facilities with registered underground injection control systems; and
 - State Fire Marshall Hazardous Material Handlers (HAZMAT) site list (information on materials in a gas-form was not used since gaseous compounds rarely pose a threat to surface water or groundwater); and
 - DEQ Hazardous Waste Management Information System (HWIMSY) list which includes U.S. EPA Resource Conservation Recovery Act (RCRA) generators or notifiers and U.S. EPA RCRA Treatment, Storage, and Disposal Facility (TSDF) Permits.

Because of the way various state and federal databases are set up, the specific location of listed sites is not always given or accurate within the database. DEQ verified the presence and approximate location of potential contaminant sources within the drinking water protection area by consulting with local community members and/or by driving through the area (windshield survey) as discussed below in subsequent inventory steps.

4. Public water system officials, or someone they designated as knowledgeable of the area, were interviewed to identify potential sources that are not listed elsewhere in databases or on maps and to assist in locating potential sources listed in the state and federal databases.
5. A windshield survey was conducted by driving through the drinking water protection area to field locate and verify as many as possible of the potential contaminant source activities. We looked for potential contaminant sources within four general categories of land use: residential/municipal, commercial/industrial, agricultural/forest, and other land uses (see Appendix C, Table 1).
6. Relative risk rankings of higher-, moderate-, or lower-risk were assigned to each potential contaminant source based on the Oregon Source Water Assessment Plan (1999). A summary of the types of potential contaminant sources and level of assigned risk is presented in Appendix C, Table 1 (Summary of Potential Contaminant Sources by Land Use). The comments section of Appendix C, Table 2 (Inventory Results- List of Potential Contaminant Sources) provides justification for any modifications to the risk rating that may have resulted from field observations that were different from what is typically expected for the specific facility. For example, a “random dumpsite” is typically considered a moderate risk to groundwater. However, if disposal of hazardous or toxic substances was observed during the field visit, the risk rating may be modified to “higher”. Relative risk ratings are considered an effective way for the water supply officials and community to prioritize management efforts for the drinking water protection area. When the local water supply officials and community “team” enhance the inventory for use in developing management options, further analysis may need to be conducted to more closely evaluate the actual level of risk.
7. A final summary of the inventoried sources and the GIS base map were prepared and included in this report.

Not all of the activities that are potential contaminant sources were inventoried in the entire drinking water protection area. The inventory of sources of microorganisms such as bacteria, viruses and cryptosporidium focused primarily on areas within the 2-year time-of-travel because of limitations on survivability of the organism. Potential sources of microbes are highlighted on Appendix C, Table 1.

5.2 Results

The results of the inventory were analyzed in terms of current, past, and future land uses; their time of travel (TOT) relationship to the well site; and their associated risk rating. In general, land uses that are closest to the well and those with the highest risk rating pose the greatest threat to your drinking water supply. Inventory results are summarized in Appendix C, Tables 1 through 3 and are shown on Figure 2.

5.2.1 Within Two-Year Time of Travel for the Wells

The delineated two-year time-of-travel zone is primarily dominated by residential and municipal land use. In summary, four potential contaminant sources were located within the two-year time-of-travel zone for all the wells (Figure 2, Appendix C, and Table 2) and include Ocean Dunes Golf Course, high density housing, the City of Florence Drinking Water Treatment Plant, and city sewer lines. The potential contaminant sources within the two-year time-of-travel all pose a relatively higher to moderate risk to the drinking water supply. The city sewer lines have a high risk of transmitting micro-organisms to the groundwater. A description of the potential contaminant sources associated with each well is provided below.

Well 1: High density housing and city sewer lines.

Well 2: High density housing, city sewer lines, and the City of Florence Drinking Water Treatment Plant.

Well 3: High density housing and city sewer lines.

Well 8: Ocean Dunes Golf Course.

Well 9: Ocean Dunes Golf Course.

Well 10: Ocean Dunes Golf Course.

5.2.2 Overview of Inventory Results within Five-Year and Ten-Year Time of Travel for the Wells

The drinking water protection area within the five-year and ten-year time-of-travel zones is primarily occupied by residential and municipal land use. Three potential contaminant sources were identified in this area which are detailed on Table 2 in Appendix C and include B&E RV Park, stormwater outfalls, and Munsel Lake. The potential contaminant sources within the five-year and ten-year time-of-travel all pose a relatively lower risk to the drinking water supply. Area-wide potential sources such as the Ocean Dunes Golf Course, high density housing and city sewer lines extend from the two-year time-of-travel zone into the ten-year time-of-travel zone. These land uses occur throughout the drinking water protection area and are shown on Figure 2 in the location nearest to the well. A description of the potential contaminant sources located in the ten-year time-of-travel that are associated with each well is provided below.

Well 3: Ocean Dunes Golf Course.

Well 4: High density housing, city sewer lines, and Ocean Dunes Golf Course.

Well 5: High density housing and city sewer lines.

Well 6: High density housing, city sewer lines, and stormwater outfalls.

Well 7: High density housing, city sewer lines, and B&E RV Park.

Well 11: Munsel Lake.

Well 12: Munsel Lake.

In addition, one potential contaminant source, Highway 101, was identified just outside the drinking water protection area. Although this location is just outside the delineated area, the source poses a moderate degree of potential contamination risk, and is therefore included in this inventory.

This inventory of potential contaminant sources within the City of Florence's drinking water protection area provides a quick look at the potential sources of contaminants that could, if improperly managed, adversely impact the city's drinking water source. Even very small quantities of certain contaminants can significantly impact water bodies.

6. Susceptibility of the Drinking Water Source

Drinking water susceptibility can be defined as the potential for contamination within the Drinking Water Protection Area (DWPA) to reach the well(s) and/or spring(s) being used by a Public Water System. The overall purpose of the susceptibility analysis is to identify the potential threats to drinking water quality and help prioritize community efforts for minimizing the contamination risk associated with those threats. Therefore, the susceptibility analysis is dependent on four factors; (1) identifying the location of the DWPA, (2) the sensitivity of the constructed intake (i.e. well or spring), (3) the sensitivity of the aquifer to contamination, and (4) the occurrence and distribution of high- and moderate-risk potential contaminant sources within the DWPA. These four steps were accomplished during the delineation, sensitivity analysis, and potential contaminant source inventory phases of this assessment.

The susceptibility analysis is a management guidance tool that should be used to recognize and identify environmental conditions that are favorable for contamination of the drinking water supply. For example, if a contaminant is released to soils or groundwater in an area of high sensitivity, it is likely that contamination of the aquifer will occur if remedial action is not taken. However, the susceptibility analysis should **not** be used to predict when or if contamination will actually occur.

The susceptibility analysis is completed by overlaying the potential contaminant source inventory results onto a map of the highly and moderately sensitive aquifer areas inside the DWPA (Appendix B, Figure 4) which were identified using an overlay of either soil sensitivity, traverse potential (TP), or infiltration potential (IP) in Appendix B, Figure 3. These are areas within the DWPA where rapid infiltration of water from the surface is most likely to occur. Potential contaminant source inventory results are analyzed in terms of current, past, and future land uses; their time of travel relationship or proximity to the well and/or spring location(s); and their associated risk rating (Appendix B, Figure 2). High- and moderate-risk contaminant sources have been defined as any facility or activity that stores, uses, or produces a contaminant of concern in large enough quantities that if released, could be detectable in the public water supply.

In general, land use activities which pose the greatest threat to the drinking water supply are those which are closest to the well(s) and/or spring(s) and have the highest associated risk rating. Therefore, the DEQ and DHS Drinking Water Program strongly recommend that the community address all high- and moderate-risk potential contaminant sources that occur within their DWPA in order to reduce the risk of their drinking water supply becoming contaminated. How the potential contaminant sources are prioritized and the level of management strategies that are appropriate depend on the proximity of the potential contaminant source to the well and/or spring and whether the sensitivity of the aquifer at the PCS site is high, moderate, or low.

If a public water system's drinking water source is considered susceptible to contamination, it is recommended that the system identify those condition(s) that lead to the susceptibility and take steps to protect the resource (i.e., work directly with the public and facility operators to

implement sound management practices, etc...). Public water systems that are not considered susceptible should identify factors that could lead to future susceptibility and are encouraged to take action to preserve future water quality by developing a management strategy that will ensure on-going resource protection.

6.1 Well Susceptibility

As described in the sensitivity analysis, we do not consider the wells of the City of Florence's well field to contribute to the sensitivity of the drinking water source. Therefore, it is reasonable to assume that the wells themselves do not contribute to the overall water system susceptibility.

6.2 Aquifer Susceptibility

We consider the aquifer to be highly sensitive due to its shallow unconfined nature, its high transverse and infiltration potentials and because of the detections of organic chemicals. We also consider the aquifer to be moderately sensitive due to the age of wells 1 and 2, the presence of highly permeable soils throughout the Drinking Water Protection Area and the large number of private wells in the area.

6.2.1 Potential Contaminant Sources and Time-of-Travel Zones

In general, PCSs within the shorter time-of-travel zones pose greater risk than those in the longer time-of-travel zones. Also of concern is the location and distribution of these sources with respect to high and moderately sensitive areas. Overlaying the PCS location map and the sensitivity map for the Water System provides a tool to determine the susceptibility of the community's drinking water supply to contamination from each PCS (see Appendix B, Figure 4). The table below indicates the relationship between potential contaminant source risk, aquifer sensitivity, and estimated contaminant arrival time at the well, wellfield, and/or spring. The community can use the PCS location numbers on the inventory map in conjunction with the displayed aquifer sensitivity and relative risk rankings for each PCS from Table 2 (Appendix C) to identify the susceptibility of the drinking water source to contamination from each PCS and take steps to reduce the risk accordingly.

We have attempted to quantify the relative susceptibility of the water system with regard to the PCSs present in the DWPA using the table below. Across the top of the table, each Time-of-Travel (TOT) zone is subdivided to account for areas of high, moderate, and low sensitivity that may exist between each TOT. Potential contaminant source risk categories (high, moderate, and low) are listed down the left hand side of the table. The relative aquifer susceptibility to each PCS is demonstrated by the shading of each cell in the table. Cells that are shaded dark grey indicate a highly-susceptible condition, light grey shaded cells indicate a moderately-susceptible

condition, and white cells indicate conditions of low susceptibility. The number in each cell indicates the number of potential contaminant sources that meet the conditions for that cell. Cells that do not contain a number indicate that there are no known potential contaminant sources that meet the conditions for the cell. Potential contaminant sources that meet the specific criteria for a cell in the table can be identified by reviewing Table 2 in Appendix C. The number of potential contaminant sources are totaled across the bottom of the table.

Table. City of Florence Emergency Well Susceptibility as a Function of PCS Risk, TOT Zone, and Aquifer Sensitivity.									
	2-Yr TOT			2- to 5-Yr TOT			5- to 10-Yr TOT		
	High	Mod	Low	High	Mod	Low	High	Mod	Low
High Risk PCSs									
Moderate Risk PCSs									
Low Risk PCSs							3		
Total PCSs	4	0	0	0	0	0	5	0	0

The distribution of high, moderate, and low sensitivity areas inside the Drinking Water Protection Area can be determined using either soil sensitivity or the mapped distribution of Traverse Potential (TP) or Infiltration Potential (IP). In the case of the City of Florence Well Field, not only is the DWPA covered by highly permeable soils, both TP and IP scores (i.e. a measure of natural aquifer sensitivity) based on the well log are high, indicating that the geologic materials between the soil and the aquifer present no barrier to contaminant movement to the aquifer. Therefore, it is reasonable to assume that the natural aquifer sensitivity to contamination throughout the DWPA is high.

A total of 9 potential contaminant sources were identified inside the wellfield Drinking Water Protection Area. As indicated in the above table, four potential contaminant sources occur inside the 2-year TOT, the remaining sources are located between the 5- and 10-year TOTs. Of the PCSs inside the 2-year TOT, two are of high-risk and the remaining two are of moderate-risk. Based on the analysis results shown in the relative susceptibility table, we consider the City of Florence's well 2 and what will be well 9 to be highly susceptible to the high risk potential contaminant source inside the 2-year TOT. As a result of this analysis we recommend that the water system develop a Drinking Water Protection Plan that addresses all high and moderate risk potential contaminant sources within the Well Field DWPA, beginning with those sources which

represent the greatest susceptibility risk. At a minimum, the water system should work with representatives from those PCSs posing a moderate to high susceptibility risk within the DWPA to identify reasonable Best Management Practices that will lead to an overall reduction of contamination risk.

6.2.2 Susceptibility to Microbial Contaminant Sources

The U.S. EPA is authorized under the Safe Drinking Water Act to develop disinfection requirements for all public water systems. The EPA has already established such requirements for drinking water sources identified as surface water and groundwater under the direct influence of surface water through the Surface Water Treatment Rule. Currently the EPA is in the process of developing a National Primary Drinking Water Regulation that will address disinfection requirements for drinking water sources identified as groundwater. The purpose of the Groundwater Rule will be to protect the public from microbial (i.e., fecal) pathogens in groundwater and to prevent other waterborne disease outbreaks.

Under the Groundwater Rule, groundwater-based public water systems will have to disinfect their drinking water unless they can demonstrate that their source is not susceptible to fecal contamination. This demonstration will likely comprise four different elements: (1) enhanced sanitary surveys, (2) source water monitoring, (3) correction of source water intake defects, and (4) hydrogeologic assessments. The hydrogeologic assessment is based on determining the groundwater (aquifer) sensitivity with respect to microbial contamination. **If a sensitive aquifer exists in conjunction with a source of fecal contamination, the drinking water source is considered to be susceptible to microbial contamination.** In addition, it is also recognized that the source water intake construction may be significant in contributing to the susceptibility of a groundwater source to microbial contamination. **Specifically, if the current construction or condition of the source water intake (well or spring box) allows for the migration of shallow waters into the aquifer and/or the distribution system, the drinking water source should be considered susceptible.**

The susceptibility analysis used in the Source Water Assessment was developed with the pending Groundwater Rule in mind. The Source Water Assessment specifically includes an evaluation of aquifer characteristics, well construction, and estimated time for recharging surface water to reach the aquifer within the Drinking Water Protection Area, which are the critical factors in determining aquifer susceptibility to microbial contamination. In addition, the delineation effort includes the identification of the 2-year time-of-travel boundary where potential microbial sources of contamination (identified in the potential contaminant source inventory) may present an acute (immediate) risk to public health. Potential sources of microbial contamination include, but are not limited to, surface water bodies (lakes, rivers, streams), septic tanks and drainfields, sewer lines, parking lots, confined animal feed lots, landfills/dumps, cemeteries, and land application sites for sewage sludge.

The 2-year Time-of-Travel identifies the next two years of groundwater supply for the City of Florence's wellfield. The two year time frame is used as a conservative estimate of the survival time for some viruses. **Based on the assessment results, the aquifer is considered to be susceptible to viral contamination since viral contaminant sources (sewer lines and residential housing) have been identified within the 2-year Time-of-Travel.** We note that the system currently disinfects its water system.

7. Recommended Use of the Source Water Assessment Report

The process for developing a Drinking Water Protection Plan can be summarized as follows:

Assessment Phase (Source Water Assessment provided by DHS and DEQ)

- Delineate the area that serves as the source of the public water supply (Drinking Water Protection Area (DWPA))
- Inventory the potential risks or sources of contamination within the DWPA
- Determine the areas most susceptible to contamination

Protection Phase (performed by the water system or community)

- Assemble a local Drinking Water Protection Team
- Enhance the Source Water Assessment if necessary
- Develop a plan to reduce the risk of contamination (protect the resource)
- Develop a contingency plan to address the potential loss of the drinking water supply
- Certify (optional) and implement the Drinking Water Protection Plan

The assessment phase was funded by the federal Safe Drinking Water Act. Its purpose is to supply the water system with the information necessary to develop a Drinking Water Protection Plan. In Oregon, development of a protection plan is voluntary.

Prior to moving into the protection phase, DEQ recommends the inventory presented in this document be reviewed in detail to clarify the presence, location, operational practices, actual risks, etc. of the identified facilities and land use activities. The SWA inventory should be regarded as a preliminary review of potential sources of contamination within the drinking water protection area. Resources within the community should be used to do an “enhanced inventory” to refine this preliminary list of potential sources of contamination.

It is also important to remember that not all of the inventoried activities will need to be addressed if you choose to develop a Drinking Water Protection Plan. When developing a protection plan, sources which pose little or no threat to your drinking water source can be screened out. For example, if any of the land use activities are conducted in a manner that already significantly reduces the risk of a contamination release, the facility would not need to re-evaluate their practices based on drinking water protection “management”. One of the goals of developing a plan based on the inventory results is to address those land use activities that do pose high or moderate risks to your public water supply. The system should target these facilities with greater levels of education and technical assistance to minimize the risk of contamination.

Limited technical assistance is available through the DEQ and Drinking Water Program at DHS for water systems that choose to move beyond the assessments and voluntarily develop a Drinking Water Protection Plan. Using the results of the assessment, the water system/community can form a Drinking Water Protection Team of individuals that have a stake in the plans implementation.

Forming a local team to help with the development of a protection plan is very important. Oregon's drinking water protection approach relies upon the concept of "community based protection", as are many other water quality programs. This simply refers to the concept of allowing local control and decision-making to implement the water quality protection effort. Community-based protection is successful only with significant local citizen stakeholder involvement. Community-based protection can draw on the knowledge and successful adaptive practices within the area. Landowners generally know best how to achieve water resource restoration and protection as long as a thorough explanation of the problem is provided, the objectives to solve the problem are clearly defined and technical assistance is available.

In community-based protection, citizens have more control and are therefore more likely to participate in the program and be more willing to assist with the educational and outreach effort which will make the plan successful. We recommend that the protection plan be developed so as to minimize any burdens on individual property owners, but maximize the equity in responsibility for reducing the risks of future contamination.

Protecting the drinking water supply in a community can also be a very effective way to encourage all citizens to participate in an issue which directly affects everyone in that community. This often leads to more public involvement in other significant local decisions concerning future livability issues, e.g., land use planning. In communities already developing and implementing Drinking Water Protection Plans, the process has served to bring many diverse interests together on a common goal and strengthen the local rural and urban relationships through communication and increased understanding. The risks and sources of water quality problems are not only from industries, farmers and managed forests, but every individual living, commuting, and working in that area.

Communities/water systems interested in developing Drinking Water Protection Plans may contact the Department of Environmental Quality (503-229-5413) or the DHS Drinking Water Program (541-726-2587) for further information.

Appendix

- A. References
- B. Figures
- C. Inventory of Potential Contaminant Sources
- D. Well Report
- E. Parameters Used in Delineation Model
- F. Sensitivity Summary
- G. Groundwater Fact Sheet
- H. Florence MODFLOW Model Description
- I. Drinking Water Protection in Oregon

Additional copies of the appendix materials are available upon written request to the following address:

**Groundwater Coordinator
Drinking Water Program
Department of Human Services
442 A Street
Springfield, OR 97477**

Appendix A: References

Brown and Caldwell, 2002. City of Florence: Existing Well Field Aquifer Characterization Report. Unpublished consultant's report.

EGR & Associates, 1997. Quantitative Three Dimensional Groundwater Model of the Florence Dunal Aquifer, Lane County, Oregon. Unpublished consultant's report.

Hampton, E.R., 1963. Ground Water in the Coastal Dune Area Near Florence, Oregon. Geological Survey Water-Supply Paper 1539-K, 36p

Stewart, S. and Nelson, D., 1996. Oregon Wellhead Protection Program Guidance Manual. Oregon Department of Environmental Quality (available at www.deq.or.state.us).

Appendix B: Figures

Figure 1a: City of Florence Well Locations

Figure 1b: City of Florence Drinking Water Protection Areas

Figure 1c: Proposed Well Field Preliminary Drinking Water Protection Areas

Figure 2: Potential Contaminant Sources

Figure 3: Aquifer Sensitivity Map

Figure 4: Drinking Water Susceptibility Map

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EGR & Associates, 1997. Quantitative Three Dimensional Groundwater Model of the Florence Dunal Aquifer, Lane County, Oregon. Unpublished consultant's report.

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Appendix B: Figures

Figure 1a: City of Florence Well Locations

Figure 1b: City of Florence Drinking Water Protection Areas

Figure 1c: Proposed Well Field Preliminary Drinking Water Protection Areas

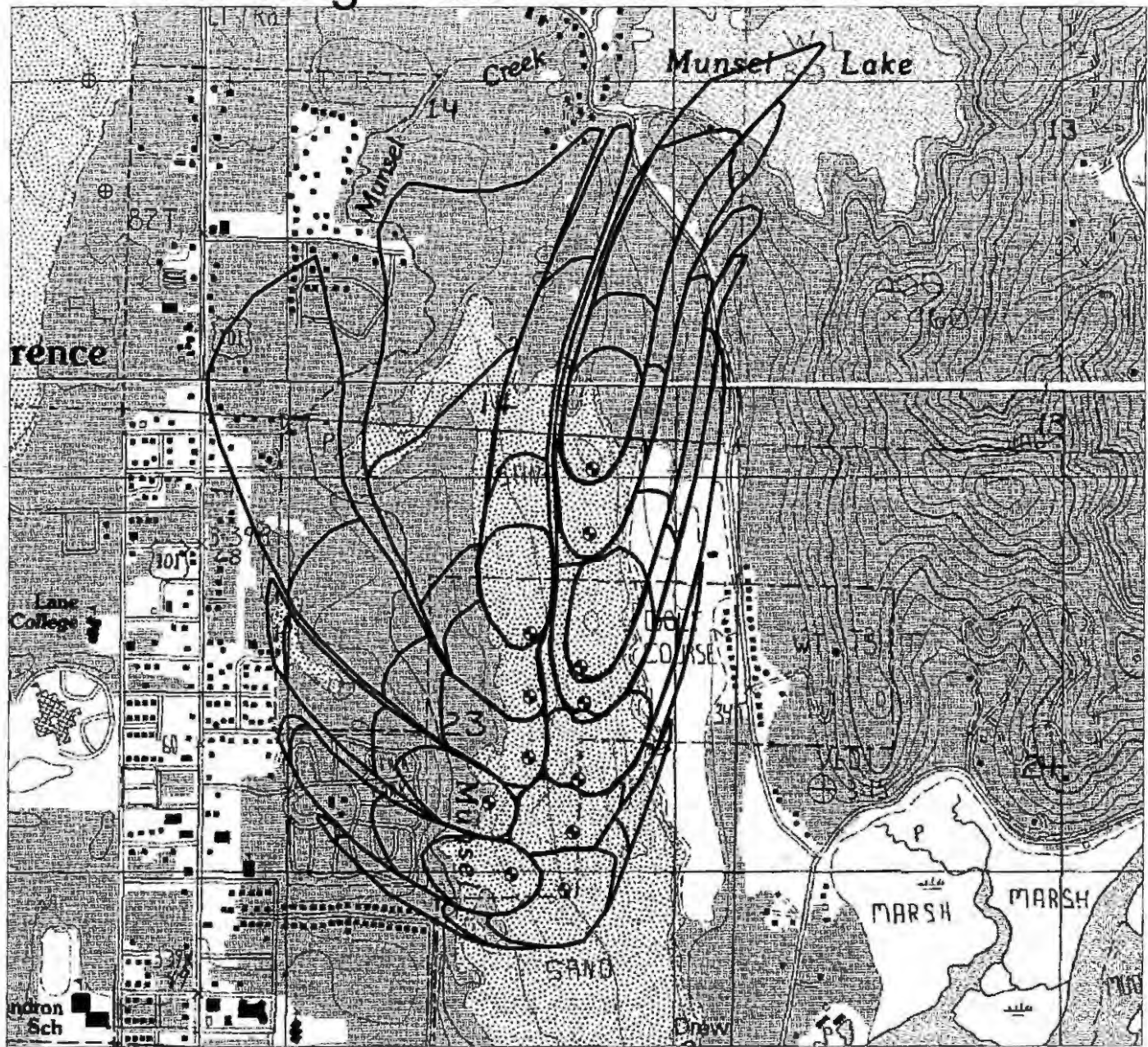
Figure 2: Potential Contaminant Sources

Figure 3: Aquifer Sensitivity Map

Figure 4: Drinking Water Susceptibility Map

City of Florence Drinking Water Protection Areas

Figure 1b



1000 0 1000 2000 Feet

Scale 1:15,000

Drinking Water Protection Areas
1-, 2-, 5- and 10 year Groundwater
time-of-travel within the aquifer to the wells shown.
Total area of delineation: 1.03 mi² (660 acres)
Model Used: MODFLOW numerical
Florence Dunal Aquifer: Unconfined sand
Permeability: 20 - 40 feet/day
Thickness: ~65 feet
Model Pump rates: 125 gpm for each well

Well Locations:

T18S R12W Sec 14 and 23
Florence and Mercer Lake USGS 7.5 minute
topographic quadrangles

Lane County

N

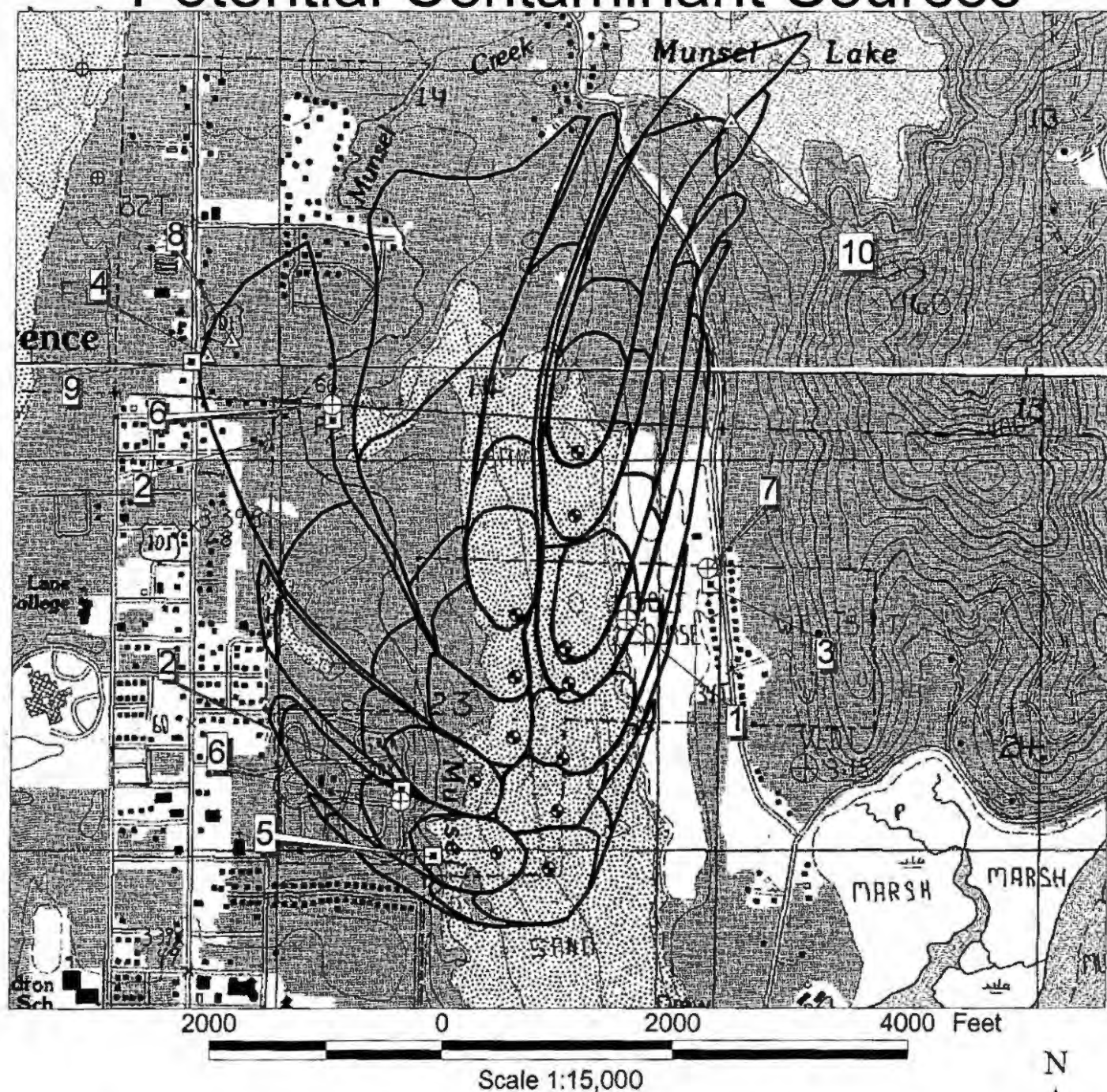


QUADRANGLE LOCATION

Prepared by: Dennis Nelson RG1224
Drinking Water Program
Department of Human Services
10/15/02
PWS# 4100299

City of Florence Potential Contaminant Sources

Figure 2



Drinking Water Protection Areas for the Florence Well Field with the 1-, 2-, 5- and 10-year time-of-travel for groundwater in the aquifer shown.

Note: Sites and areas noted in this figure are potential sources of contamination to the drinking water identified by Oregon drinking water protection staff. Environmental contamination is not likely to occur when chemicals are used and managed properly.

Potential Contaminant Sources

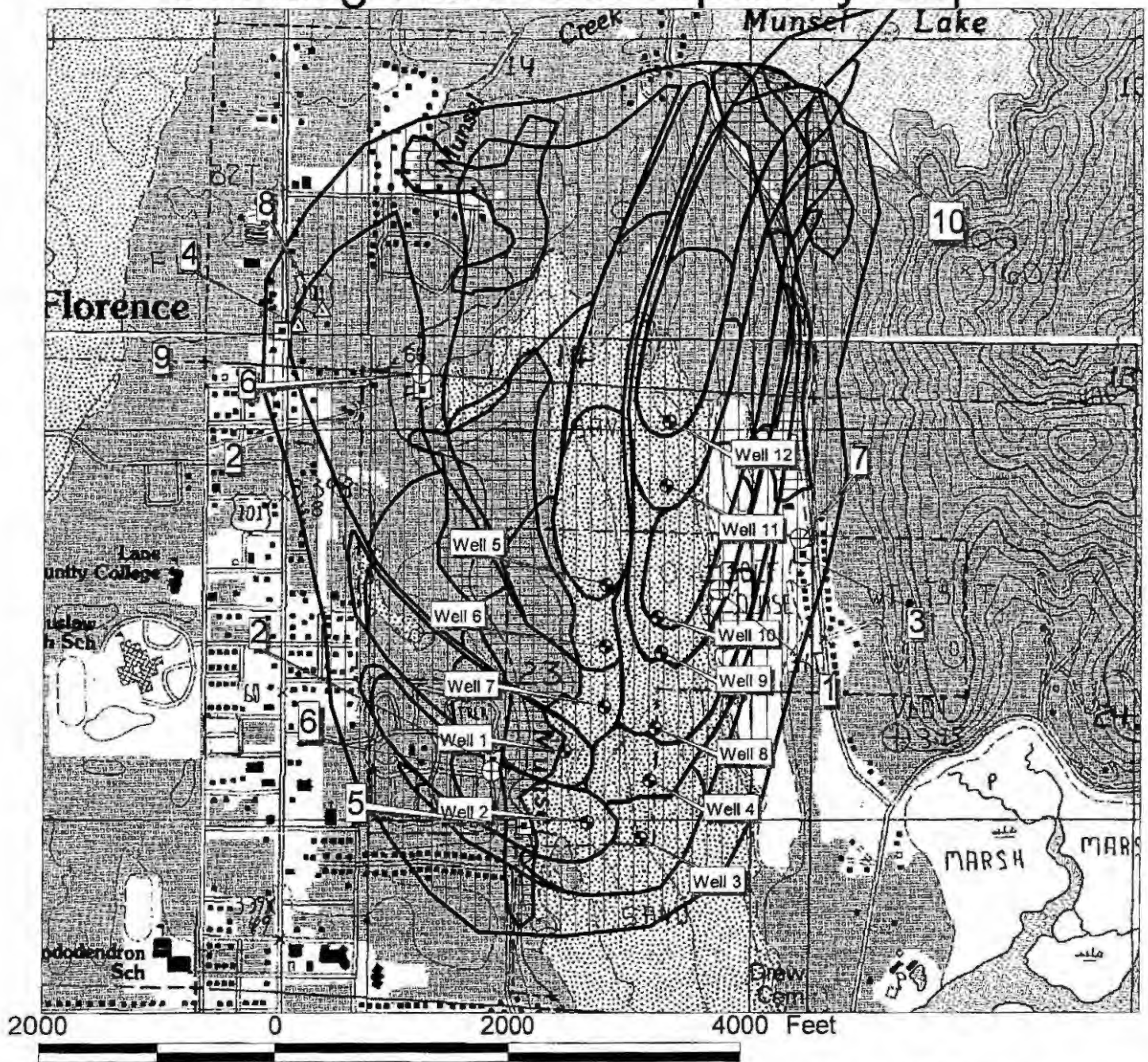
- ⊕ Higher Relative Risk
- ▣ Moderate Relative Risk
- △ Low Relative Risk

Numbers indicate potential contaminant sources which are explained in Appendix C, table 2.



City of Florence Drinking Water Susceptibility Map

Figure 4



Scale 1:15,000

Drinking Water Protection Areas for the Florence Well Field with the 1-, 2-, 5- and 10-year time-of-travel for groundwater in the aquifer shown.

Potential Contaminant Sources

- ⊕ Higher Relative Risk
- ▣ Moderate Relative Risk
- △ Low Relative Risk



Note: Sites and areas noted in this figure are potential sources of contamination to the drinking water identified by Oregon drinking water protection staff. Environmental contamination is not likely to occur when chemicals are used and managed properly.

Features or activities that are identified as high- or moderate-risk that occur within an area designated as high or moderate sensitivity (horizontally and vertically ruled lines) pose a greater risk to drinking water quality than those in areas of low sensitivity (areas with no pattern).

Numbers indicate potential contaminant sources which are explained in Appendix C, table 2.

TABLE 1. SUMMARY OF POTENTIAL CONTAMINANT SOURCES BY LAND USE

PWS # 4100299 FLORENCE, CITY OF
Residential/Municipal Land Uses

Potential Contamination Source	Note	Relative Risk Level	Total in DWPA
Airport - Maintenance/Fueling Area		Higher	0
Apartments and Condominiums		Lower	0
Campgrounds/RV Parks	(1)	Lower	1
Cemeteries - Pre-1945		Moderate	0
Drinking Water Treatment Plants		Moderate	1
Fire Station		Lower	0
Fire Training Facilities		Moderate	0
Golf Courses		Moderate	1
Housing - High Density (> 1 House/0.5 acres)		Moderate	3
Landfill/Dumps	(1)	Higher	0
Lawn Care - Highly Maintained Areas		Moderate	0
Motor Pools		Moderate	0
Parks		Moderate	0
Railroad Yards/Maintenance/Fueling Areas		Higher	0
Schools		Lower	0
Septic Systems - High Density (> 1 system/acre)	(1)	Higher	0
Sewer Lines - Close Proximity to PWS	(1)	Higher	3
Utility Stations - Maintenance Transformer Storage		Higher	0
Waste Transfer/Recycling Stations	(1)	Moderate	0
Wastewater Treatment Plants/Collection Stations	(1)	Moderate	0
Other			0

NOTES:

Sites and areas identified in this Table are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

(1) - Potential source of microbial contamination

(2) - Drip irrigated crops, such as vineyards and some vegetables, are considered lower risk than spray irrigation

(3) - For groundwater public water systems, septic systems located within the 2-year time-of-travel (TOT) are considered moderate risks.

TABLE 1. SUMMARY OF POTENTIAL CONTAMINANT SOURCES BY LAND USE

PWS # 4100299 FLORENCE, CITY OF

Agricultural/Forest Land Uses

Potential Contamination Source	Note	Relative Risk Level	Total in DWPA
Auction Lots	(1)	Higher	0
Boarding Stables	(1)	Moderate	0
Confined Animal Feeding Operations (CAFOs)	(1)	Higher	0
Crops - Irrigated (inc. orchards, vineyards, nurseries, greenhouses)	(2)	Moderate	0
Crops - Nonirrigated (inc. Christmas trees, grains, grass seed, pasture)		Lower	0
Farm Machinery Repair		Higher	0
Grazing Animals (> 5 large animals or equivalent/acre)	(1)	Moderate	0
Lagoons/Liquid Wastes	(1)	Higher	0
Land Application Sites	(1)	Moderate	0
Managed Forest Land - Broadcast Fertilized Areas		Lower	0
Managed Forest Land - Clearcut Harvest (< 35 yrs.)		Moderate	0
Managed Forest Land - Partial Harvest (< 10 yrs.)		Moderate	0
Managed Forest Land - Road Density (> 2 mi./sq. mi.)		Moderate	0
Pesticide/Fertilizer/Petroleum Storage, Handling, Mixing, & Cleaning Ar		Higher	1
Recent Burn Areas (< 10 yrs.)		Lower	0
Managed Forest Lands - Status Unknown		Moderate	0
Other			0

NOTES:

Sites and areas identified in this Table are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

(1) - Potential source of microbial contamination

(2) - Drip irrigated crops, such as vineyards and some vegetables, are considered lower risk than spray irrigation

(3) - For groundwater public water systems, septic systems located within the 2-year time-of-travel (TOT) are considered moderate risks.

TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100299 FLORENCE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
1	Golf Courses	Ocean Dunes Golf Course	Munsel Lake Road	Florence	Database (2) Field-Observation Interview	Within the 2-yr TOT.	Moderate	Over-application or improper handling of pesticides or fertilizers may impact drinking water. Excessive irrigation may cause transport of contaminants to groundwater or surface water through runoff.	Diesel and gasoline ASTs.
	Above Ground Storage Tanks - Excluding Water						Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	Diesel and gasoline ASTs.
	Pesticide/Fertilizer/Petroleum Storage, Handling, Mixing, & Cleaning Areas						Higher	Leaks, spills and improper handling of pesticides, fertilizers and petroleum products may impact drinking water source.	Diesel and gasoline ASTs.
2	Housing - High Density (> 1 House/0.5 acres)	High Density Housing West of the Well Field	West of the Well Field	Florence	Field-Observation Interview	Between 5-yr and 10-yr TOT	Moderate	Improper use, storage, and disposal of household chemicals may impact the drinking water supply. Stormwater run-off or infiltration may carry contaminants to drinking water supply.	
	Housing - High Density (> 1 House/0.5 acres)					Within the 2-yr TOT.	Moderate	Improper use, storage, and disposal of household chemicals may impact the drinking water supply. Stormwater run-off or infiltration may carry contaminants to drinking water supply.	
3	Housing - High Density (> 1 House/0.5 acres)	High Density Housing East of the Well Field	East of the Well Field	Florence	Field-Observation Interview	Between 5-yr and 10-yr TOT	Moderate	Improper use, storage, and disposal of household chemicals may impact the drinking water supply. Stormwater run-off or infiltration may carry contaminants to drinking water supply.	

Note: Sites and areas identified in this Table are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

(1) Where multiple potential contaminant sources exist at a site, the highest level of risk is used.

(2) See Table 3 for database listings (if necessary).

TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100299 FLORENCE, CITY OF									
Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
4	Campgrounds/RV Parks	B & E RV Park	Highway 101	Florence	Field-Observation Interview	Between 5-yr and 10-yr TOT	Lower	Leaks or spills of automotive fluids or improperly managed septic systems and wastewater disposal may impact drinking water supply. Heavy usage along edge of waterbody may contribute to erosion, causing turbidity.	
5	Drinking Water Treatment Plants	City of Florence Drinking Water Treatment Plant	Willow Street	Florence	Database (2) Field-Observation Interview	Within the 2-yr TOT.	Moderate	Treatment chemicals and equipment maintenance materials may impact groundwater or surface water source	
8	Sewer Lines - Close Proximity to PWS	City Sewer Lines West of the Well Field	West of the Well Field	Florence	Field-Observation Interview	Between 5-yr and 10-yr TOT	Higher	If not properly designed, installed, and maintained, sewer lines can impact drinking water, especially adjacent to a waterbody or within the 2-year time-of-travel zone for drinking water wells.	
	Sewer Lines - Close Proximity to PWS					Within the 2-yr TOT.	Higher	If not properly designed, installed, and maintained, sewer lines can impact drinking water, especially adjacent to a waterbody or within the 2-year time-of-travel zone for drinking water wells.	
7	Sewer Lines - Close Proximity to PWS	City Sewer Lines East of the Well Field	East of the Well Field	Florence	Field-Observation Interview	Between 5-yr and 10-yr TOT	Higher	If not properly designed, installed, and maintained, sewer lines can impact drinking water, especially adjacent to a waterbody or within the 2-year time-of-travel zone for drinking water wells.	
8	Stormwater Outfalls	Stormwater Outfalls	From 42nd Street Area	Florence	Field-Observation Interview	Between 5-yr and 10-yr TOT	Lower	Stormwater run-off may contain contaminants from residential (homesites and roads), commercial/industrial, and agricultural use areas.	Sheet water drainage north of 37th Street area (no curbs and gutters).

Note: Sites and areas identified in this Table are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

(1) Where multiple potential contaminant sources exist at a site, the highest level of risk is used.

(2) See Table 3 for database listings (if necessary).

TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

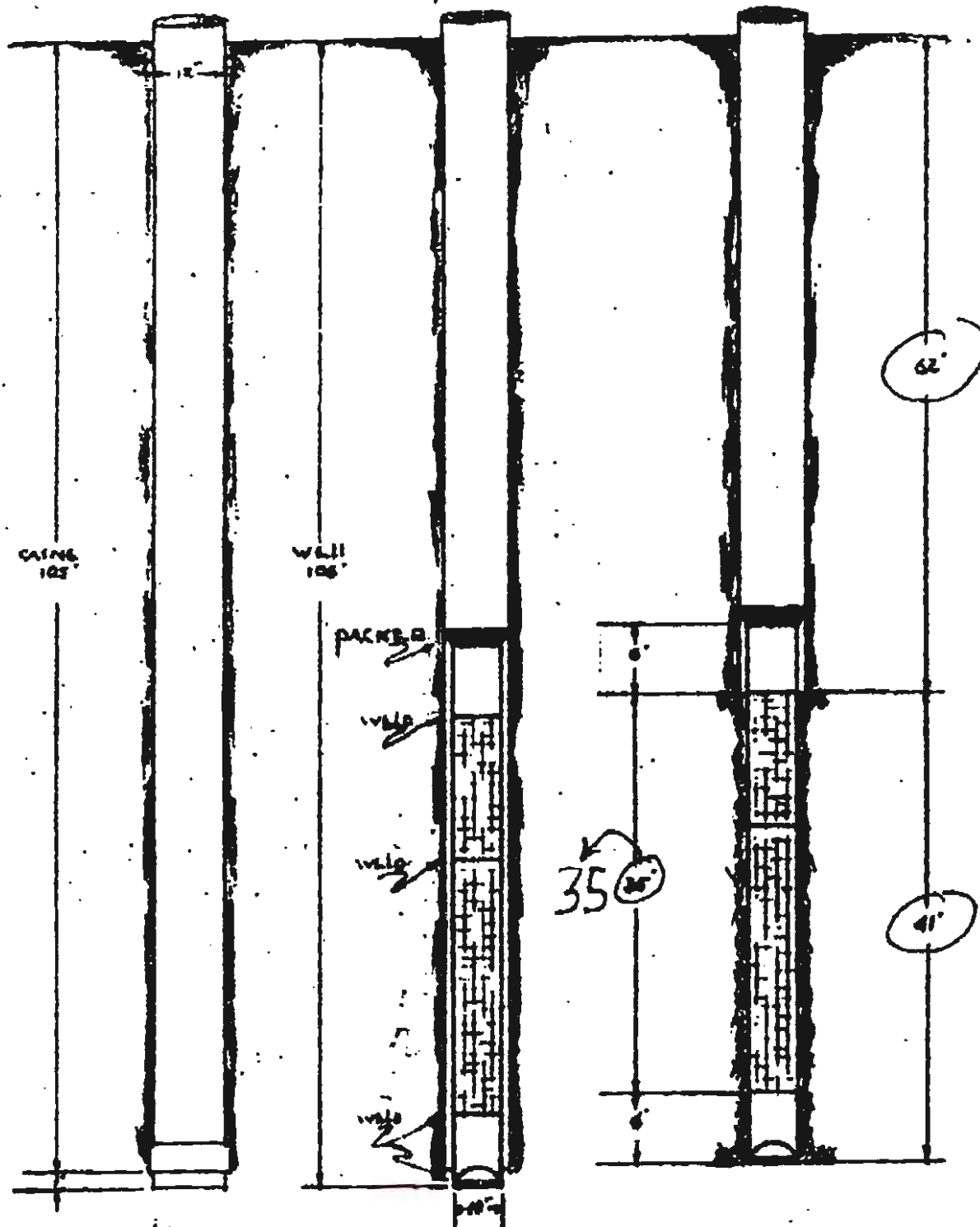
PWS# 4100299 FLORENCE, CITY OF									
Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
9	Transportation - Freeways/State Highways/Other Heavy Use Roads	Highway 101	Runs N-S West of the DWPA	Florence	Field-Observation Interview	Just outside DWPA	Moderate	Vehicle use increases the risk for leaks or spills of fuel & other haz. materials. Road building, maintenance & use can increase erosion/slope failure causing turbidity. Over-application or improper handling of pesticides/fertilizers may impact water.	
10	Upstream Reservoirs/Dams	Munsal Lake	Northern Tip of the DWPA	Florence	Field-Observation Interview	Between 5-yr and 10-yr TOT	Lower	During major storm events, reservoirs may contribute to prolonged turbidity for downstream intakes for drinking water. Construction, fluctuating water levels, and heavy waterside use can increase erosion and turbidity in reservoir/drinking water source.	

Note: Sites and areas identified in this Table are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

(1) Where multiple potential contaminant sources exist at a site, the highest level of risk is used.

(2) See Table 3 for database listings (if necessary).

CITY OF FLORENCE ORE.



By -
Carver's Drilling & Pump Service

FINAL SCREEN SETTING

SEPT. 1 - 1906

#2

STATE OF OREGON
WATER WELL REPORT
(as required by ORS 837.765)

Roll
7-29-91

JUL 31 1991

WATER RESOURCES DEPT.
SALEM, OREGON (START CARD) 1

LANE
2185

18S/12W/23E
25360

(1) OWNER:
Name City of Florence
Address PO Box 340
City Florence, Oregon State 97439

Well Number: 3

(2) TYPE OF WORK:
☒ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD
☐ Rotary Air ☐ Rotary Mud ☒ Cable
☐ Other

(4) PROPOSED USE:
☐ Domestic ☒ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval Yes ☒ No ☐ Depth of Completed Well 156 ft.
Explosives used ☐ Yes ☐ No ☐ Type ☐ Amount

HOLE		SEAL		Amount sacks or pounds
Diameter	From To	Material	From To	
12	0	156		

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☐ Other

Backfill placed from _____ ft. to _____ ft. Material _____
Gravel placed from _____ ft. to _____ ft. Size of gravel _____

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing	12	+2	120	380	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Liner					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Final location of sheet(s) _____

(7) PERFORATIONS/SCREENS:

	From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
	115	121.5			10"	pipe	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	121.5	151.5	.008		12"	tele	<input type="checkbox"/>	<input type="checkbox"/>
	151.5	156			10"	pipe	<input type="checkbox"/>	<input checked="" type="checkbox"/>

(8) WELL TESTS: Minimum testing time is 1 hour

	Yield gal/min	Drawdown	Drill stem at	Time
<input checked="" type="checkbox"/> Pump <input type="checkbox"/> Bailer <input type="checkbox"/> Air <input type="checkbox"/> Flowing <input type="checkbox"/> Artesian	325	60.25		1 hr.

Temperature of water 51°F Depth Artesian Flow Found _____
Was a water analysis done? ☐ Yes By whom _____
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Murky ☐ Odor ☐ Colored ☐ Other _____
Depth of strata: _____

(9) LOCATION OF WELL by legal description:

County Lane Latitude _____ Longitude _____
Township 18S N or S, Range 12W E or W.
Section 23 SE 1/4 NE 1/4
Tax Lot City property Block _____ Subdivision _____
Street Address of Well (or nearest address) City of Florence filter plant

(10) STATIC WATER LEVEL:
49' 8" ft. below land surface. Date 7-2
Artesian pressure _____ lb. per square inch. Date _____

(11) WATER BEARING ZONES:
Depth at which water was first found 49' 8"

From	To	Estimated Flow Rate
49' 8"	152	300

(12) WELL LOG: _____

Material	From	To
Brown Sand	0	76
Light blue + Brown sand	76	112
DK. blue sand / logs	112	151
Blue Clay	151	156

"K" packer at 115'

Date started 3-22-91 Completed 7-2-91

(unbonded) Water Well Constructor Certification:

I certify that the work I performed on the construction, alteration, abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my knowledge and belief.

WWC Number _____
Signed _____ Date _____

(bonded) Water Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment of this well during the construction dates reported above. Work performed during this time is in compliance with Oregon construction standards. This report is true to the best of my knowledge and belief.

WWC Number 104
Signed Paul Christensen Date 7/20/91

STATE OF OREGON
WATER WELL REPORT
(as required by ORS 537.765)

2 (LANE 5526)

Construction # 7

(START CARD) # 123846

(1) OWNER: Well Number 14
Name City of Florence
Address PO Box 340
City Florence State OR Zip 97439

(2) TYPE OF WORK:
☒ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD:
☐ Rotary Air ☒ Rotary Mud ☐ Cable
☐ Other

(4) PROPOSED USE:
☐ Domestic ☒ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☒ Yes ☐ No Depth of Completed Well 177 ft.
Explosives used ☐ Yes ☒ No Type _____ Amount _____

HOLE			SEAL			Amount sacks or pounds
Diameter	From	To	Material	From	To	
16"	0	15	Bentonite	0	15	12
12"	15	182	(SAND DRAPE WELL NO SEAL)			

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☐ Other

Backfill placed from _____ ft. to _____ ft. Material _____
Gravel placed from _____ ft. to _____ ft. Size of gravel _____

(6) CASING/LINER:

Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing: 12"	115	119	3/2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Liner:				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:
☐ Perforations Method _____
☒ Screens Type V WIRE Material Stainless

From	To	Slot size	Number	Diameter	Tile/pipo size	Casing	Liner
115	126	—		10"	P	<input type="checkbox"/>	<input checked="" type="checkbox"/>
126	166	.008		12"	T	<input type="checkbox"/>	<input type="checkbox"/>
166	182	—		10"	P	<input type="checkbox"/>	<input checked="" type="checkbox"/>

(8) WELL TESTS: Minimum testing time is 1 hour

☒ Pump ☐ Bailor ☐ Air ☐ Flowing
Yield gal/min _____ Drawdown _____ Drill stem at _____ Time _____
305 46.43 25 hrs

Temperature of Water 51° Depth Artesian Flow Found _____
Was a water analysis done? ☒ Yes By whom SWD Co.
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other _____
Depth of strata: _____

(9) LOCATION OF WELL by legal description:
County LANE Latitude _____ Longitude _____
Township 18S N or S. Range 12W E or W
Section 23 SE 1/4 18E 1/4
Tax Lot City Lot _____ Block _____ Subdivision _____
Street Address of Well (or nearest address) 28th & W. Ave
City Well Field

(10) STATIC WATER LEVEL:
70.1 ft. below land surface. Date 9/1
Artesian pressure _____ lb. per square inch. Date _____

(11) WATER BEARING ZONES:
Depth at which water was first found 70.1

From	To	Estimated Flow Rate
70	172	300

(12) WELL LOG:
Ground elevation _____

Material	From	To
SAND BROWN	0	96
SAND BLUE/BROWN	96	161
SAND BLUE Shell Frag	161	172
CLAY Blue	172	182

K PACKER @ 115'

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WATER RESOURCES
SALEM, OREGON

Date started 7/13/94 Completed 1/12/95
(bonded) Water Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or
ment of this well is in compliance with Oregon well construction standards.
used and information reported above are true to my best knowledge and b

WWC Number _____
Signed _____ Date _____

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment
formed on this well during the construction dates reported above. All work p
during this time is in compliance with Oregon well construction standards. T
is true to the best of my knowledge and belief.
Signed Christopher J. Decker WWC Number _____
Date 1-12

STATE OF OREGON
WATER WELL REPORT
(as required by ORS 517.765)

2 (LANE 5525)

Construction #5

(START CARD) # 23848

(1) OWNER: Well Number 6
Name City of Florence
Address P.O. Box 340
City Florence State OR Zip 97439

(2) TYPE OF WORK:
☒ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD:
☐ Rotary Air ☒ Rotary Mud ☐ Cable
☐ Other

(4) PROPOSED USE:
☐ Domestic ☒ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☒ Yes ☐ No Depth of Completed Well 139 ft.
Explosives used ☐ Yes ☐ No Type Amount

HOLE			SEAL			Amount sacks or pounds
Diameter	From	To	Material	From	To	
16"	0	15	Bentonite	0	15	12
12"	15	143	SAND DUNE WALL NO SEAL			

How was seal placed: Method ☐ A ☐ B ☒ C ☐ D ☐ E
☐ Other

Backfill placed from ft. to ft. Material
Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing: 12"	1.5	78.2	3/12	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Liner:				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:
☐ Perforations Method
☒ Screens Type V-Wire Material Stainless

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
76.1	78	—		10"	P	<input type="checkbox"/>	<input checked="" type="checkbox"/>
78	118	.008		12"	T	<input type="checkbox"/>	<input type="checkbox"/>
118	143	—				<input type="checkbox"/>	<input checked="" type="checkbox"/>

(8) WELL TESTS: Minimum testing time is 1 hour

☒ Pump ☐ Bailor ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
410	53.71		25 hr

Temperature of Water 51° Depth Artesian Flow Found
Was a water analysis done? ☒ Yes By whom CWDC
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other
Depth of strata:

(9) LOCATION OF WELL by legal description:

County LANE Latitude Longitude
Township 18S N or S Range 12W E or W
Section 23 SW NE W
Tax Lot City Lot Block Subdivision
Street Address of Well (or nearest address) 28th Ave.
CITY WELLS FIELD

(10) STATIC WATER LEVEL:

12.7 ft. below land surface. Date 10
Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:

Depth at which water was first found 12.7

From	To	Estimated Flow Rate

(12) WELL LOG:

Ground elevation

Material	From	To
SAND BROWN	0	26
SAND BLUE/BROWN	26	53
SAND DK BLUE/BROWN	53	124
SAND BLUE w/shell Frag	124	140
CLAY BLUE	140	143

"K" Backer @ 76.1'

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WATER RESOURCES DEPT.
SALEM, OREGON

Date started 8/16/94 Completed 1/12/95

(unbonded) Water Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or ment of this well is in compliance with Oregon well construction standards. used and information reported above are true to my best knowledge and b

Signed _____ WWC Number _____
Date _____

(bonded) Water Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment formed on this well during the construction dates reported above. All work p during this time is in compliance with Oregon well construction standards. Tt is true to the best of my knowledge and belief.

Signed _____ WWC Number _____
Date 1-12-95

STATE OF OREGON
WATER WELL REPORT
(as required by ORS 537.765)

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2 LANE 5528

Construction #6

WATER RESOURCES DEPT (START CARD) #123849

(1) OWNER: Well Number 5
Name City of Florence Well 6
Address PB Box 340
City Florence State OR Zip 97439

(2) TYPE OF WORK:
☒ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD:
☐ Rotary Air ☒ Rotary Mud ☐ Cable
☐ Other

(4) PROPOSED USE:
☐ Domestic ☒ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☒ Yes ☐ No Depth of Completed Well 137 ft.
Explosives used ☐ Yes ☒ No Type _____ Amount _____

HOLE			SEAL			Amount sacks or pounds
Diameter	From	To	Material	From	To	
16"	0	15	Bentonite	0	15	13
12"	15	140	SAND DUNE WALL			NO SEAL

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☐ Other

Backfill placed from _____ ft. to _____ ft. Material _____
Gravel placed from _____ ft. to _____ ft. Size of gravel _____

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	12"	15	79.2	312	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Liner:					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Final location of shoe(s) _____

(7) PERFORATIONS/SCREENS:
☐ Perforations Method _____
☒ Screens Type V WIRE Material Stainless

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
76.4	79	—		10"	P	<input type="checkbox"/>	<input checked="" type="checkbox"/>
79	119	.008		12"	T	<input type="checkbox"/>	<input type="checkbox"/>
119	140	—		10"	P	<input type="checkbox"/>	<input type="checkbox"/>

(8) WELL TESTS: Minimum testing time is 1 hour

<input checked="" type="checkbox"/> Pump	<input type="checkbox"/> Baller	<input type="checkbox"/> Air	<input type="checkbox"/> Flowing
<input type="checkbox"/> Artesian			
Yield gal/min	Drawdown	Drill stem at	Time
420	51.4		1 hr.
			24

Temperature of Water 51° Depth Artesian Flow Found _____
Was a water analysis done? ☐ Yes By whom CWD Co.
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other _____
Depth of strata: _____

(9) LOCATION OF WELL by legal description:
County LANE Latitude _____ Longitude _____
Township 18S N or S. Range 12W E or W _____
Section 23 SW NE _____
Tax Lot City Lot _____ Block _____ Subdivision _____
Street Address of Well (or nearest address) 28th & W. Ave
City Wells Field

(10) STATIC WATER LEVEL:
13.8 ft. below land surface. Date 10
Artesian pressure _____ lb. per square inch. Date _____

(11) WATER BEARING ZONES:
Depth at which water was first found 13.8

From	To	Estimated Flow Rate
70	126	400

(12) WELL LOG: Ground elevation _____

Material	From	To
SAND BROWN	0	39
SAND BLUE/BROWN	39	57
SAND LT BLUE	57	55
SAND BLUE/BROWN FINE	55	69
SAND BLUE/BROWN	69	121
SAND BLUE w/Shell Frag	121	126
CLAY BLUE w/Shell Frag	126	132
CLAY BLUE	132	140
"K" packer @ 76.4'		

Date started 8/17/94 Completed 1/12/95

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. I need and information reported above are true to my best knowledge and belief.

Signed _____ WWC Number _____
Date _____

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment of this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. It is true to the best of my knowledge and belief.
Signed Christopher J. Dilling WWC Number 6
Date 1-12-95

STATE OF OREGON
WATER WELL REPORT
(as required by ORS 537.765)

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(START CARD) # 23847

(1) OWNER: City of Florence
Name: City of Florence
Address: PO Box 340
City: Florence State: OR Zip: 97439

Well Number: 7

(2) TYPE OF WORK:
☒ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD:
☐ Rotary Air ☒ Rotary Mud ☐ Cable
☐ Other

(4) PROPOSED USE:
☐ Domestic ☒ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☒ Yes ☐ No Depth of Completed Well: 138 ft.
Explosives used ☐ Yes ☒ No Type: Amount:

HOLE			SEAL			Amount sacks or pounds
Diameter	From	To	Material	From	To	
16"	0	15	Pentonite	0	15	13
12"	15	143	(SAND DONE WITH NO SEAL)			

How was seal placed: Method ☐ A ☐ B ☒ C ☐ D ☐ E
☐ Other

Backfill placed from _____ ft. to _____ ft. Material: _____
Gravel placed from _____ ft. to _____ ft. Size of gravel: _____

(6) CASING/LINER:

Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing: 12"	+1.5	78.5	1312	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Liner:				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Final location of shoe(s):

(7) PERFORATIONS/SCREENS:
☐ Perforations Method: _____
☒ Screens Type: V Wire Material: Stainless

From	To	Slot size	Number	Diameter	Tube/pipe size	Casing	Liner
77.4	82.6	—		10"	P	<input type="checkbox"/>	<input checked="" type="checkbox"/>
82.6	122.9	.008		12"	T	<input type="checkbox"/>	<input type="checkbox"/>
122.9	143	—		10"	P	<input type="checkbox"/>	<input checked="" type="checkbox"/>

(8) WELL TESTS: Minimum testing time is 1 hour
☒ Pump ☐ Bailor ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
410	52.31		25

Temperature of Water: 51 Depth Artesian Flow Found: _____
Was a water analysis done? ☒ Yes - By whom: CWD Co.
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other: _____
Depth of strata: _____

(9) LOCATION OF WELL by legal description:
County: LANE Latitude: _____ Longitude: _____
Township: 18S N or S Range: 12W E or W
Section: 23 NW 1/4 SE 1/4
Tax Lot: _____ Lot: _____ Block: _____ Subdivision: _____
Street Address of Well (or nearest address): 28th & Will
City: Walla Walla

(10) STATIC WATER LEVEL:
19.1 ft. below land surface. Date: 9/1
Artisan pressure: _____ lb. per square inch. Date: _____

(11) WATER BEARING ZONES:
Depth at which water was first found: 19.1

From	To	Estimated Flow Rate
80	124	400

(12) WELL LOG:
Ground elevation: _____

Material	From	To
SAND BROWN	0	30
SAND BLUE/BROWN	30	38
SAND BROWN	38	43
SAND BLUE/BROWN	43	58
SAND LT BLUE/BROWN	58	125
SAND BLUE/BROWN Shallow	125	141
CLAY BLUE	141	143

Date started: 8/4/94 Completed: 1/12/95

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. I used and information reported above are true to my best knowledge and belief.

WWC Number: _____
Signed: _____ Date: _____

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment of this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This is true to the best of my knowledge and belief.
Signed: _____ WWC Number: _____
Date: 1-12-95

Appendix E: Parameters Used in Delineation Model

Delineation Method: ☐ Calculated Fixed Radius ☐ Enhanced CFR ☐ Analytical
☒ Numerical ☐ Hydrogeologic Mapping

Pump Rate (Q in gpm): All wells: 125 gpm

Source: ☒ System ☐ Water Resources Dept ☐ Comparable Community
☐ Pump Capacity ☐ Population Estimate ☐ 90% of Safe Yield

Nature of the Aquifer: ☐ Unknown ☒ Unconfined
☐ Semiconfined ☐ Confined

Aquifer name: Florence Dunal Aquifer

Confining unit lithology: NA
Depth to 1st confining unit:
Thickness of confining unit:
Depth to 2nd confining unit:
Thickness of confining unit:
Depth to Aquifer: 13 to 70 feet

Aquifer Characteristics:

Lithology:

☐ Unknown ☐ Sandy Silt ☐ Layered Volcanic Rocks
☒ Sand ☐ Sand & Gravel ☐ Fractured Volcanic Rocks
☐ Gravel ☐ Cobbles/Gravel ☐ Fractured Sedimentary Rocks
☐ Other: _____

Thickness (b): ~100 feet

Effective Porosity (n): 0.25

Hydraulic Conductivity (Permeability): 20-40 ft/day ☐ N/A
☐ Estimated from lithology ☒ Specific Capacity (Well Report)
☐ Published Report ☒ Aquifer Test

Hydraulic Gradient: _____ Flow Direction: W to S ☐ N/A
☐ Published Report ☐ Graphical Solution
☐ Field Measurements ☒ Model Results

Irrigation Wells Accounted for: 5 wells

Appendix F: Sensitivity Summary: City of Florence Wells

Highly Sensitive Source: ☒ Yes ☐ No

Yes	No	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Unconfined Aquifer: Shallow (< 100 Ft), No significant clay layers
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unconfined Aquifer: Cobbles/gravel
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unconfined Aquifer: Fractured bedrock
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Fractured Confined Aquifer <50 feet Below the Surface
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Other Aquifer (describe:
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Organic Chemical Detection: ... Toluene and Chloromethane
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Inorganic Chemical Detection (>50% MCL)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Source-related Coliform: total fecal Date
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Nitrate-N \geq 5mg/L: Concentration Date
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Well Construction/Setback or Monitoring Deficiencies from Site Visit:
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Well Report Missing/Unavailable: Well 1 only
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Casing Seal Missing/Unknown: Exemption for seal in dunal aquifer
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Inappropriate Casing Seal Depth (depth recommendation:)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Inappropriate Casing Seal Material
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Casing Seal Not Constructed Properly:
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Traverse Potential >5 (Not performed on TNCWS)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Infiltration Potential >7 (Not performed on TNCWS)

Moderately Sensitive Source: ☒ Yes ☐ No

Yes	No	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Shallow (<50 feet) Confined Alluvial Aquifer and Thin (<15ft) Confining Unit
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Deep Unconfined Aquifer
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Fractured Bedrock at Surface
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Aquifer Character unknown
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Commingleing of Aquifers Suspected
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Nitrate-N 1-4.9 mg/L: Concentration Date
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Inorganic Chemical Detection (<50% of MCL):
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Well Construction Deficiencies from Site Visit.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Well constructed prior to 1979 Wells 1 and 2 only
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Other Wells Score \geq 400
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Soil with TOT <65 hours or lack of soil information in DWPA
<input type="checkbox"/> NA	<input type="checkbox"/>	Infiltration Potential 4 to \leq 7 (Not performed on TNCWS)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Surface water within 500 feet

1. Note that it is possible for a single system to have criteria from both the high and moderately sensitive lists. Having a criterion checked "yes" indicates that this characteristic contributes to the sensitivity at the indicated level.

Additional Comments Sodium content up to 37 mg/L

Sensitivity Analysis Completed by: Dennis Nelson Date: 10/14/02

Appendix H: Florence MODFLOW Model Description.

In order to better understand the nature of groundwater occurrence and movement in the Florence area, defined here as the area bordered on the south by the Siuslaw River, on the west by the Pacific Ocean, on the north by an east-west line placed arbitrarily through Clear Lake and on the east by a line that marks the ridge line just east of Clear- and Munsel Lakes, a three-dimensional numerical groundwater flow model was developed using Visual MODFLOW. MODFLOW allows the area to be divided into layers and each layer into "cells". Each cell can be assigned unique aquifer properties of permeability (hydraulic conductivity) and storage. Figure H-1 illustrates the model grid for the Florence model. In addition, the model provides the opportunity to characterize the relation between streams and the aquifer and to specify the areal recharge to the aquifer.

Once the model is provided the input data above, it can calculate the distribution of hydraulic head horizontally and vertically. This model head data can be compared to actual water levels in wells and the model parameters adjusted within reasonable limits until the model and observed heads agree to within acceptable limits. This "calibration" step allows the modeler to better represent the actual groundwater system. In addition to heads, the model is generally calibrated to volumetric flow between the aquifer and various boundaries. Once calibrated, the model can be used to estimate the impact of changing conditions, e.g., the effect of pumping. The model also allows us to determine the drinking water protection areas by identifying time-of-travel zones within the aquifer to the well.

The type of MODFLOW model used in the delineation process is called a "steady state" model. This model assumes that once the parameters have been set, they do not change. The model then determines what the groundwater situation would be once the system has come in to balance (equilibrated) with recharge and discharge.

The first and most important step in developing a groundwater flow model is to put together a conceptual picture of the groundwater system, i.e., what are the important geologic units, what are their hydraulic properties, what boundaries occur within the system, e.g., streams, what is the source of recharge to the aquifer, etc. Conceptualizing the groundwater system provides the values for the input parameters in the model and is accomplished through a combination of the evaluation of existing groundwater reports, well reports and field work.

An important resource in developing the Florence area conceptualization were the U.S. Geological Survey Water-Supply Paper, "Ground Water in the Coastal Dune Area Near Florence, Oregon" by E.R. Hampton in 1963. This publication provided descriptions of the major hydrogeologic units in the area and a map showing the distribution of hydraulic head in the area. This map served as a calibration target for the development of the model used here. Of equal value was the "Well Field Aquifer Characterization Report by Brown and Caldwell (2001) which provided a basis for estimating aquifer characteristics. A three-dimensional groundwater model of the Florence Aquifer had been generated by EGR & Associates for the purpose of evaluating the impact of increasing use

of Clear Lake water during the summer months. These results were consistent with the head distribution produced during the present model effort.

The Florence area geology comprises approximately 100 to 200 feet of fine- to medium sand that were deposited, primarily as sand dunes, on bedrock of the Tyee Formation, consisting primarily of fractured siltstone. The lower third of the Dunal Aquifer contains a higher percentage of clay and is therefore less permeable than the upper 2/3 of the formation. Compared to the dunal sands, the Tyee Formation is a low-yield aquifer, often containing groundwater of elevated total dissolved solids (TDS). Groundwater from the Dunal Aquifer discharges to the Siuslaw River as well as to the Pacific Ocean, resulting in groundwater flowing to the west in the upper half of the area and to the south and southwest in the southern half of the area. Groundwater also discharges to the lakes along the eastern border of the aquifer. Recharge estimates are approximately 48 inches per year, owing to the highly permeable nature of the soil and vadose zone material. Recharge is less in urbanized areas.

The hydraulic property of hydraulic conductivity was estimated from long-term aquifer tests and short-term specific capacity tests. The Brown and Caldwell report indicate that the hydraulic conductivity of the dunal aquifer varies from 50 to 100 feet, based on aquifer tests. They report an aquifer thickness in the area of the existing wellfield as approximately 200 feet thick. Evaluation of well reports and specific capacity data suggested that the sand aquifer in the area of the existing well field was slightly more permeable than its counterpart to the west. Also, the aquifer thickness varied significantly as a result of topography that existing on the surface of the Tyee Formation when the sands were deposited. This topography was represented in the current model.

The interaction of the rivers/streams with the aquifers was estimated as follows: river elevation (stage) was estimated from 7.5-minute USGS topographic maps. Water depth and basal sediment thickness were estimated based on the width of the river and general discharge. The hydraulic conductivity of these basal sediments were assumed to be on the order of 3 feet/day for the Siuslaw River and Munsel Creek.

The initial estimates were input into the model and the model was allowed to run. The resulting head distribution was compared to that of Hampton (1963) and adjustments were made until the model head distribution was similar to that of Price's. After over 25 iterations, the model heads and their distribution were similar to reported heads in the existing wellfield, at the Florence Resort community, and lake levels in Clear and Munsel Lakes (Fig. H-2).

No data was available for discharge in the Siuslaw River at Florence. The model predicted that groundwater was discharging approximately 21 cubic feet/second (cfs) to the Siuslaw River and approximately 5 cubic feet/second to Munsel Creek. The former prediction is probably low in both cases, however model manipulations were not successful in producing more realistic, i.e., 50 to 70 cfs for the Siuslaw and 9 to 12 cfs for Munsel Creek (Hampton, 1963). Varying the stream bed characteristics did not have a significant impact on the head distribution, and therefore, given the

similarity in heads and head distribution, the model was judged to be calibrated. The final input parameters used in the model are as follows:

- Hydraulic Conductivity for the Dunal Aquifer: 40 ft/day in the east and 20 ft/day in the west. Vertical K values were estimated as approximately 10% of the horizontal K values.
- Hydraulic Conductivity for the Tyee Formation: 0.1 ft/day horizontally, 0.001 ft/day vertically.
- Recharge Rate: 55 inches/year, except in urban areas where recharge was set to 20 inches/year.
- North Boundary: Set as constant head varying from 32 ft in the east to 0.01 feet at the Pacific Ocean
- Eastern Boundary: No flow boundary
- Stream Conductance: Siuslaw River 100,000 m²/day; Munsel Creek 750 m²/day

Pumping rates for public water supply wells were based on estimated future use when the City develops an additional five wells in the current field. Brad Taylor (2002) of Brown and Caldwell estimated that the City's use in 2006 with all 12 wells (Appendix B, Fig. 1a) operational will average 125 gpm per well. The delineation provided in Appendix B, Fig. 1b represents the drinking water protection areas under this scenario. In addition, the City is considering developing a second wellfield just west of Highway 101 in the northern part of the City. Figure 1c in Appendix B is one representation of the capture zones for that field. The pump rates used here are 115 gpm for each well, based on Taylor's estimate of water need in 2020. It is emphasized that the location of the wells in this proposed wellfield is approximate only. This delineation was provided to assist the community in future land use decisions only.

The Florence Resort Area (Sand Pines Golf Course) has wells that it is currently using for irrigation. These wells are in proximity to the future wellfield that the City has in the planning stages. To account for their impact, particularly in the vicinity of the City's future supply wells, Sand Pine's wells were located using water rights maps provided by the Water Resources Department web page (www.wrd.state.or.us). Pumping rates for these wells were determined from records at the Water Resources Department.

Drinking Water Protection Areas were determined by allowing the well of interest to pump from the aquifer that it is actually screened within. Pumping rates were assigned as described above. The capture zones are produced using MODFLOW's particle tracking routine. Specifically, the model allows for the placement of particles around the well at the appropriate depth. The model then calculates back in time to determine the trajectory that the particle would have followed in order to

arrive at the well. Drinking Water Protection Areas are constructed by enclosing the particle paths for the specific time of interest, e.g., 1 year, 2-year, 5-year, etc. Figures 1b and 1c in Appendix B show the resulting delineations for the wellfields described above.

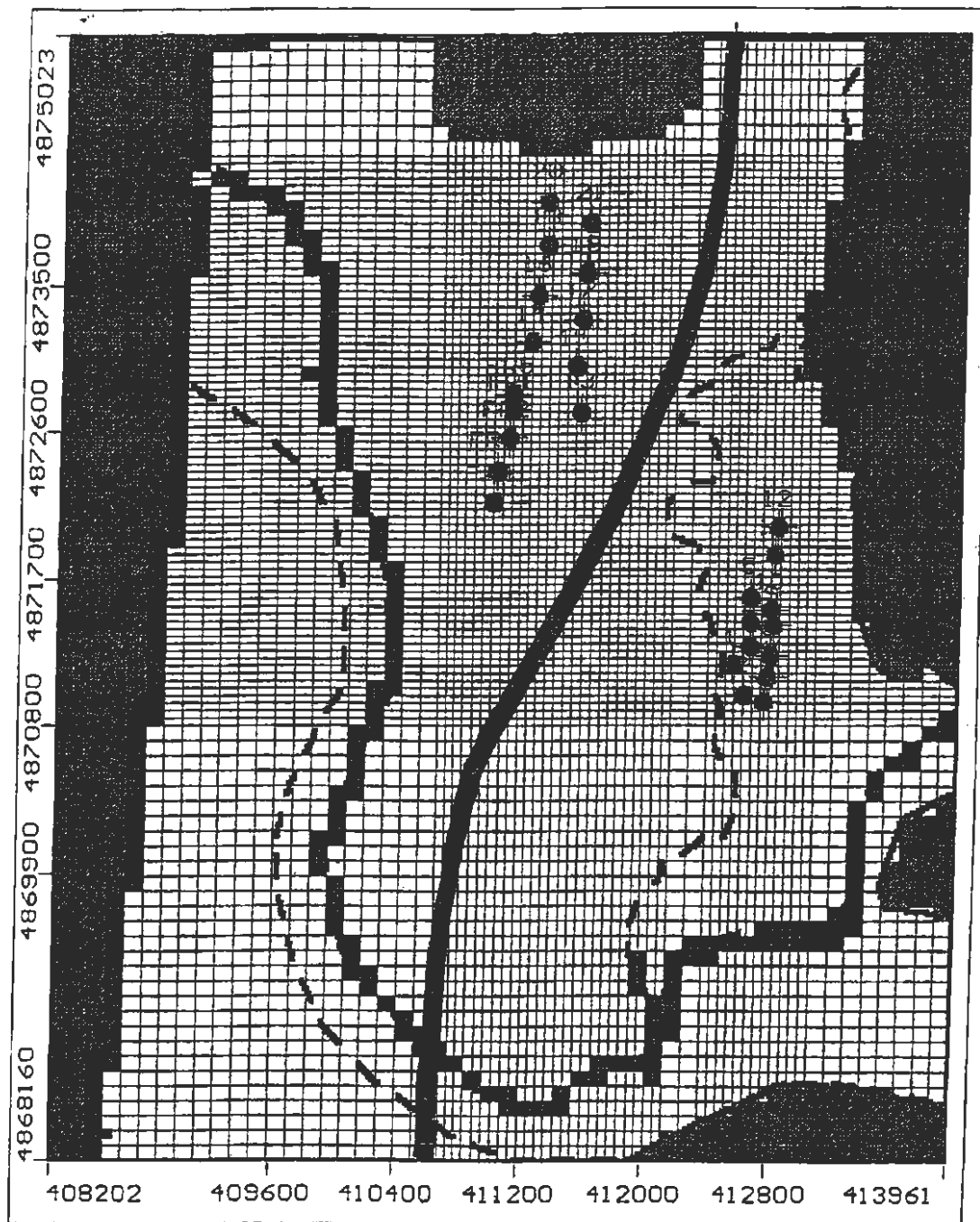


Figure H-1. Model grid for the Florence groundwater model. Active part of the model area shown by open rectangles (cells), each of which is assigned aquifer parameters. City's current and proposed fields shown along with wells of the Florence Resort (Sand Pines). Hydraulic conductivity east of north-south solid line is 40 feet/day, west is 20 feet/day. Siuslaw River represented by sinuous dark line of cells.

Water Table Elevation

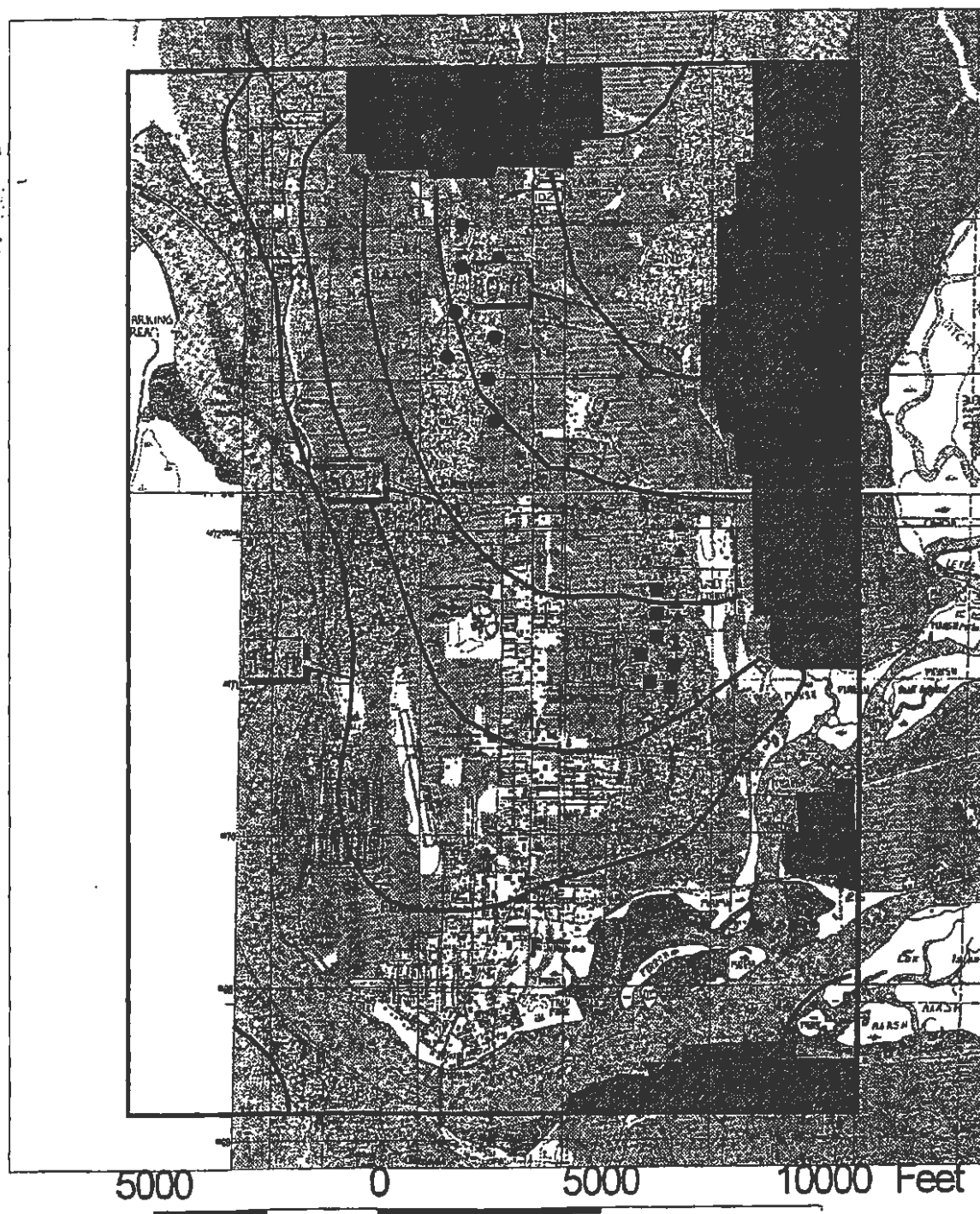


Figure H-2. Water table elevation for the Florence groundwater model area as predicted by the MODFLOW model.

Appendix H

North Florence Dunal Aquifer Discussion Paper

Options to Protect Surface Water and Groundwater Quality

In Response to Contamination Threats

July 25, 2012

This Discussion Paper presents the results of a dialogue among staff members from the City of Florence, Lane County, and the Oregon Department of Environmental Quality regarding options available to the City and its partners to respond to threats to water quality in the North Florence Sole Source Dunal Aquifer. The information in this paper is based on responses to questions raised at the January 25, 2012 meeting with City of Florence, Lane County, and Oregon Department of Environmental Quality staff, as modified by staff through review and comment on the draft notes.

Participants

Oregon Department of
Environmental Quality (DEQ):

Michael Kucinski, On-Site Regional Manager;
Randy Trox, On-Site Program; Jacquie Fern, Drinking
Water Protection Program; David Waltz, Water Quality
Program Basin Coordinator

City of Florence:

Jacque Betz, City Manager; Mike Miller, Public Works
Director; Sandra Belson, Community Development Di-
rector; Carol Heinkel, Planning Consultant;
Dennis Nelson, Hydrogeologist Consultant

Lane County:

Daniel Hurley, Waste Management; George Ehlers,
Environmental Health Specialist, Mark Rust, Associate
Planner.

Questions and Answers

Questions are shown in bold and discussion/responses provided by participants are in plain type below.

1. **The City of Florence has initiated a Surface and Groundwater Monitoring Program in partnership with Lane County and Heceta Water District (see attached signed IGA). Do you have any questions or comments about this program?**

The City of Florence's surface and groundwater monitoring program results are contained in Appendix A. It is extremely difficult to identify, with certainty, the exact source of groundwater contamination indicated by the presence of nitrates and caffeine. These contaminants are characteristic of contamination from septic systems, although a great deal of data over a long period of time is needed to tie the contamination findings to a specific on-site system or systems.

2. **What are the DEQ/OHA thresholds for concern/action with respect to groundwater and surface water contamination by nitrate, coliform bacteria and other contaminants or constituents of concern? How do thresholds dif-**

fer with respect to current/future drinking water source areas vs. non-drinking water source areas? How were these thresholds defined, specifically with respect to the potential impact of nitrate on groundwater?

Groundwater:

The presence of *E. coli* or frequent total coliform detections in well water are causes for concern since coliform bacteria do not occur naturally in groundwater. Detections of *E. coli* or fecal coliform indicate possible groundwater contamination by human or animal waste and associated pathogens in these wastes.

The 1982 North Florence Dunal Aquifer Study establishes a threshold of 5 parts per million (5 mg/liter) for nitrate in drinking water. In the Florence UGB, this concentration equates to 2.8 dwelling units per acre.

Oregon Administrative Rule 340 Division 40 states that DEQ designates Groundwater Management Areas when "concentrations are detected on an area-wide basis which exceed 70 percent of the nitrate maximum measurable level, or 50 percent of other maximum measurable levels." The maximum measurable level for nitrate is 10 ppm; area-wide, concentrations exceeding 70% of that maximum measurable level (i.e. over 7 ppm nitrate) would trigger the designation of a Groundwater Management Area.

For discussion regarding nitrate levels in the test wells, the Oregon Health Authority considers nitrate levels over 5 ppm for public water systems to be an "alert" situation, and over 10 ppm to be a violation of the Maximum Contaminant Level. Also, there seems to be agreement among the experts that any concentrations of nitrate over 1 to 2 ppm indicate the presence of anthropogenic sources.

Surface Water:

In surface water, DEQ sets thresholds for individual surface waters, as referenced below. DEQ is in the process of establishing Total Maximum Daily Load (TMDL) standards for the Siuslaw River. The process includes quantification, pollutant source and allocation and the development of strategies and controls. These can include working with the City and County to address on-site systems, education and outreach, and paying attention to "hot spots." The final TMDL must be completed by June 30, 2013.

Specific thresholds/action levels:

- Nitrate: OAR 340-041-0007; Statewide Narrative Criteria: there is no numeric standard in OARs; DEQ uses EPA nutrient guidelines by Ecoregion and TMDL analysis to set surface water "targets" and load allocations via TMDL; eutrophication usually results in visual signs or indicator (excessive algae, low DO, harmful algae blooms).
- Bacteria OAR 340-041-0009;
 - (freshwater): specific rule/criteria for *E.coli*: recreational beneficial use, (406/126 MPN/100ml);
http://arcweb.sos.state.or.us/pages/rules/oars_300/oar_340/340_041.html

- (Estuarine waters): fecal coliform and enterococcus standards; see Bacteria IMD for details on applying the standards: <http://www.deq.state.or.us/wq/pubs/imds/BacterialIMDre11F.pdf>
- other contaminants or constituents of concern: case-specific; standards in recent toxics rulemaking may apply: <http://www.deq.state.or.us/wq/standards/humanhealthrule.htm>

3. Does the fact that the North Florence Dunal Aquifer is a sole source aquifer and the shallow and sensitive nature of the aquifer create special circumstances that would indicate different thresholds?

Statewide, for soils with rapid or very rapid permeability in areas with permanent water table (as in the Florence UGB area), the OAR for sand filters and pressurized distribution systems (OAR 340-71-290(2)(c), and OAR 340-71-275(3), respectively) state that systems may not discharge more than 450 gallons of effluent per ½ acre per day. 450 gallons per day is the amount required for a new single family dwelling, - so this limitation on discharge essentially limits development to 2 single family dwellings per acre, unless a detailed hydrogeological study determines loading rates exceeding 450 gallons per ½ acre per day would not increase nitrate-nitrogen concentrations in the groundwater beneath the site or any downgradient location to above 5 mg/L. The North Florence Dunal Aquifer Study is such a study, and it concluded that because of the substantial recharge from rainfall and the rapidly draining nature of the sand, that a higher density could be allowed, namely 2.8 dwellings per acre, rather than 2 dwellings per acre in unstudied areas.

Yes, the Environmental Quality Commission's Geographic Area Rule specifies the nitrate loading that is permitted in the NFDA, which includes the land within the Florence Urban Growth Boundary. The rule allows septic systems when "the agent determines the system in combination with all other previously approved systems owned or legally controlled by the applicant will not contribute to the local groundwater more than 58 pounds of nitrate-nitrogen per year per acre owned or controlled by the applicant." The rule, and the formulas used to implement it, are explained below in response to question #8. According to DEQ files, the rule was initiated in 1982 by DEQ and Lane County in response to their concern about the potential contamination of the aquifer by septic systems.

4. How do detections of constituents of concern trigger some type of remedial action and what types of action are authorized under existing administrative rules? What would DEQ recommend as a course of action for addressing a localized groundwater or surface water contamination issue?

Please see the response to question 6 c. Whatever course of action is taken, it is critical to involve property owners early on in the process and, to the extent possible, to provide assistance to homeowners in meeting the standards. The DEQ State Revolving Loan Fund (SRF Program) was mentioned as an example.

As discussed in the response to question 6. c, individual properties requesting a new or replacement septic permit will be served by the City of Florence wastewater system, where that system is physically and legally available. Single family lots within the UGB that are more than 300-ft from city sewer are not considered "physically available." Other lots that are within 300-ft may not be able to connect due to physical impracticalities. The definition of "physically available" depends on the type of land use (see OAR 340-071-0160 in response to question 6.c.2 below) One of the potential issues with hooking up individual properties to the City's

wastewater system along Rhododendron Drive within the UGB is that it is a sewer force main (pressure sewer system). Individual connections to a force main, from a City operations standpoint, are not an option due to the requirement of the City maintaining and operating the individual pumps. This is because if the City were to change the dynamics of the force main (change the head or direction of flow) it may be enough of a change that the individual pumps will not be able to pump into the force main.

The City is the responsible party for insuring the sewer system works properly. Individual pump stations for each parcel would be pretty costly for the City to operate. The residential subdivision known as Idylwood 4th Addition has a gravity collection system from each dwelling that meet at a pump station and it will be sized to be a regional pump station with capacity to serve areas outside of the 4th Addition; and connect to the City's force main in Rhododendron Drive. Due to topography, strictly gravity sewer systems may be impracticable due to excessive depths combined with the dunal sands which cause excessive trench width.

DEQ advised that the City speak with folks in other locations who already operate pressure sewer systems with individual connections via septic tanks with individual pumps, such as the City of Glide, Oregon, and the City of Lacey, Washington, to determine if these types of setups, if used in Florence, would be cost-effective from an installation and operation and maintenance perspective. Coburg is currently in the process of constructing such a system and could also be a valuable information source. The City will conduct a cost-benefit analysis of the options for providing sanitary sewer service to properties that apply for new or replacement septic systems where City sanitary service is "physically available" as defined in OAR 340-071-0160).

It was noted that no new land divisions are allowed outside the City in the UGB. Anyone wishing to divide their property must annex and hook up to the City system. As per county code as adopted by Ordinance 7-08, no land divisions (which includes both subdivisions and partitions) within the North Florence Dunal Aquifer boundary (as designated by the U.S. Environmental Protection Agency in September, 1987) of the UGB are allowed prior to annexation to the City of Florence. If city sewer is not physically available and the property owner does not want to extend city sewer to the property, then the owner may not divide the single property into two lots. S/he may only develop the one lot.

For surface waters, there is usually a distinction between "detection," "trigger level," and "risk," which is a more complicated analysis. The TMDL evaluation process includes:

- Assessment Phase: Quantification of the extent and nature (to extent possible at an early stage)
- Source identification (Point or Nonpoint source?)
- Sector/jurisdictional responsibility (Agriculture, Industrial activity, rural residential, etc)
- Possible 303(d) listing
- Subsequent TMDL or other water quality plan to address impairments
- Potential voluntary actions to remediate specific or localized problem

5. What role do advanced on-site systems play in preventing or correcting contamination of groundwater or surface water? Please respond for both groundwater and surface water.

Most on-site septic systems do not control for nitrates completely. In the Florence UGB, the nitrate and minimum lot size standard is based on "the installation of a conventional sand-filter system¹ or an equivalent treatment system where there has been shown a 47% or more reduction of total TN."

Septic system cost varies by type of system and location. According to local septic system installers in the Florence UGB, generally, a low pressure system may cost \$8,500 plus permits and the cost of an electrician, whereas a sand filter system can run from \$12,500 to more than \$15,000 plus permits and the cost of an electrician. An advanced treatment system, such as the Orenco Advantex system, that greatly reduces the amount of nitrates that are discharged from a septic system, can cost between \$17,000 to \$25,000 depending on the size of the property and use (this price does not include costs for permits). To estimate costs before the purchase, the type and size of system required must be determined. It is recommended that bids from at least two DEQ licensed septic system installers are obtained to get an idea of costs in the area.

The City of Glide and Coburg are using a STEP (Septic Tank Effluent Pump) system. It requires the City to maintain the pumps, tank and routine pumping of the solids from the septic tank (depending on the size of the family removal of the solids can be once every three to five years). The beauty of the STEP system is it is less capital investment upfront (sewer lines are 2-inch, no manholes, and typically no large pump stations); however, long term maintenance costs and life cycle analysis suggest they may be more costly in the long term, according to the Florence Public Works Director. STEP systems are a good tool, but need to be reviewed for long term costs. DEQ recommends that the City research this question to determine if this may be a viable option in some situations in the Florence UGB. The City will conduct a cost-benefit analysis of the options, including STEP systems, for providing sanitary sewer service to properties that apply for new or replacement septic systems when municipal sanitary sewer is physically available, as that term is defined in OAR 340-071-0160.

On-site septic systems can be a source of surface water contamination, especially in Florence where there is a strong connection between groundwater and surface waters. The threat of surface water contamination is a major concern in the Florence UGB for the City, DEQ, and EPA, given that the residents of the UGB rely on the aquifer as the "sole source" of drinking water. Munsel Creek and the Siuslaw River are critical habitat for coho salmon, a threatened species. Coho have been seen spawning in both Munsel and Ackerley Creeks. Caffeine and bacteria have been detected in Munsel Creek. Portions of the Siuslaw River are classified as "Water Quality Limited," under the Clean Water Act for temperature, dissolved oxygen, fecal coliform, and sediment; and the River is included on the State's 303(d) list of Impaired Water Bodies by the Oregon Department of Environmental Quality. Nitrates are not included in the list of parameters because of the cost of sampling in such a diluted environment. DEQ is in the process of establishing TMDL standards for the Siuslaw River. The process for doing that includes quantification, pollutant source and allocation and the development of strategies and controls. These can include working with the City and County to address on-site

¹ The guidance does not define a "conventional sand filter system." However, it is clear from the qualifying statement that follows that it does not mean a "conventional" septic system because conventional septic systems do not reduce total TN by 47% or more.

systems, education and outreach, and paying attention to "hot spots." The final TMDL must be completed by June 30, 2013 to meet the litigation requirements.

6. a) **By design, septic systems are sited to meet certain conditions, one of which is the vertical separation to a water table so that the separation distance provides adequate time for treatment to occur before reaching the water table. Failed septic systems can contaminate the groundwater, especially shallow groundwater. With detections of coliform bacteria, caffeine, and elevated levels of nitrate (it is interesting that we had caffeine detected in both groundwater and surface water) what concerns does DEQ have?**

The findings will need to be made over a much longer period of time and/or be more widespread before DEQ will consider this a Groundwater Management Area or before there would be enough evidence to support a Health Hazard Annexation.

- b) **What is meant by a "failed" septic system? How is a failed system identified? What is the required action or options when a failed system is identified? What role do failing septic systems typically play in contributing to contaminant levels vs. functioning systems? Can a functioning septic system that pollutes groundwater be considered a failed system?**

DEQ Rules define a failed septic system as one that fails to function in discharging to the groundwater (i.e., backs effluent up to the surface) and one that contaminates the groundwater (OAR). Although septic system contamination may be recognized, it is very difficult to link groundwater contamination to an individual on-site system or systems. One effective method would be to put a tracer substance in the waste disposal system of the home or homes and track its progress toward a specific test well. Questions that need to be addressed are: how many houses? How dense is the area? how old are the septic systems in that area?

A septic system that contaminates the groundwater is, by definition, a "failed" system. A failed system is one that must be replaced by a new system in order to function properly. Problems with septic systems can cause temporary contamination of the groundwater but they do not always require a replacement system. Examples of such problems include roots in the drainfield and a malfunctioning pump. The latter was a possible cause of the contamination in well B2, according to George Ehlers, Lane County Environmental Health Specialist. This issue is not yet resolved, based on subsequent monitoring that shows nitrate levels at 19 mg/l in well B2. Additional research is needed to determine the extent of the contamination and to more precisely identify the source.

- c) **What would the remedial or required action be under these circumstances (i.e., from failed septic systems)?**

Several options are available for responding to threats to the aquifer, including the following.

1. If a septic system fails, or for new septic systems, the property owner will need to apply to Lane County for a septic system permit.

2. State law requires property in a UGB to hook up to a municipal wastewater system at the time a new or replacement septic system permit is applied for, if the service is physically and legally available.

In accordance with OAR 340-071-0160, below, prior to issuing new or replacement septic permits, the City must complete a "Land Use Compatibility Statement," in response to a request from Lane County. Through this process, if the property meets the OAR definitions and the property can be served by the municipal system, the property will need to annex to the City and hook up to the municipal system, i.e., if the City determines that City sanitary sewer is "physically available" to serve the property, as defined in OAR 340-071-0160, below.

"OAR 340-071-0160:

(2) Application. A completed application for a construction -- installation, alteration, or repair permit must be submitted to the appropriate agent on approved forms with all required exhibits the applicable permit application fee in OAR 340-071-0140(3). Applications that are not completed in accordance with this section will not be accepted for filing. Except as otherwise allowed in this division, the exhibits must include:

(b) A land use compatibility statement from the appropriate land use authority signifying that the proposed land use is compatible with the Land Conservation and Development Commission-acknowledged comprehensive plan or complies with the statewide planning goals.

(4) Permit denial. The agent must deny a permit if any of the following occurs.

(f) A sewerage system that can serve the proposed sewage flow is both legally and physically available, as described in paragraphs (A) and (B) of this subsection.

(A) Physical availability.

(i) A sewerage system is considered available if topographic or man-made features do not make connection physically impractical and one of the following applies.

(I) For a single family dwelling or other establishment with a maximum projected daily sewage flow not exceeding 899 gallons, the nearest sewerage connection point from the property to be served is within 300 feet.

(II) For a proposed subdivision or group of two to five single family dwellings or other establishment with the equivalent projected daily sewage flow, the nearest sewerage connection point from the property to be served is not further than 200 feet multiplied

by the number of dwellings or dwelling equivalents.

(III) For proposed subdivisions or other developments with more than five single family dwellings or equivalent flows the agent will determine sewerage availability.

(B) Legal availability. A sewerage system is deemed legally available if the system is not under a department connection permit moratorium and the sewerage system owner is willing or obligated to provide sewer service."

3. Other remedial actions currently available in State law are for Lane County to declare the area a "Health hazard Annexation" or for DEQ to designate the area a "Groundwater Management Area (GWMA)." These designations are triggered by a long history of contamination over a large area. The former requires a demonstration that the contamination endangers the health of people. The Health Hazard Annexation in Waldport in 1990 due to contamination from septic systems is one example. Declaring a GWMA requires data on the cumulative impacts from possible nitrate sources, such as livestock, leaking sewer systems, fertilizers, or septic systems. A great deal more data and a much more widespread contamination would be needed to demonstrate that either of these actions is warranted in the Florence UGB.

Oregon Administrative Rule 340 Division 40 states that DEQ designates Groundwater Management Areas when "concentrations are detected, on an area-wide basis, which exceed 70 percent of the nitrate maximum measurable level, or 50 percent of other maximum measurable levels." The primary contributing sources of nitrate in the Southern Willamette Valley Groundwater Management Area (GWMA) are formally documented as fertilizers, septic systems, and manure management practices. Agricultural practices clearly do play an important role, but so do the other contributors. Many of the long-term monitoring wells in the GWMA with elevated nitrate could very well be impacted by multiple contributing sources to varying degrees (some of which could be historic practices).

4. The City and/or County can adopt more stringent requirements, than DEQ requires, in the local comprehensive plan and ordinance. In terms of existing and future wellfields for drinking water, the group agreed that it would make sense to propose a Comprehensive Plan policy that requires advanced on-site systems for new or replacement septic systems in the capture zones for existing and proposed wells in cases where the City is not able to provide sanitary sewer service. The policy language should be crafted so that it requires a certain level of nitrate removal and allows for flexibility in advances in technology in the future. Staff agreed to work on the policy language together.

7. **How was the DEQ involved in the expansion of sewer to the east Multnomah County area. What was involved in this process? (In Multnomah County there was a groundwater study and there were no contaminants detected but**

the sewer was installed for source water protection purposes anyway. Therefore does a groundwater study itself trigger a sewer expansion project?)

Note: This question was not addressed because DEQ needed to research the question before responding.

8. Will you please explain the Geographic Area Rule for Florence?

"OAR 340-071-0400

Geographic Area Special Considerations.

(2) General North Florence Aquifer, North Florence Dunal Aquifer Area, Lane County.

(a) Within the area described in subsection (b) of this section, an agent may approve sites or issue construction-installation permits for new onsite systems under either of the following circumstances.

(A) The lot and proposed system comply with all rules in effect at the time the site is approved or the permit is issued.

(B) The lot and proposed system comply with paragraph (A) of this subsection except for the projected daily sewage loading rates, and the agent determines the system in combination with all other previously approved systems owned or legally controlled by the applicant will not contribute to the local groundwater more than 58 pounds of nitrate-nitrogen per year per acre owned or controlled by the applicant.

(b) Subsection (a) of this section applies to the following area designated the General North Florence Aquifer of the North Florence Dunal Area and defined by the hydrologic boundaries identified in the June 1982, 208 North Florence Dunal Aquifer Study. The area is bounded on the west by the Pacific Ocean; on the southwest and south by the Siuslaw River; on the east by the North Fork of the Siuslaw River and the ridge line at the approximate elevation of four hundred (400) feet above mean sea level directly east of Munsel Lake, Clear Lake, and Collard Lake; and on the north by Mercer Lake, Mercer Creek, Sutton Lake, and Sutton Creek and includes all or portions of T17S, R12W, Sections 27, 28, 33, 34, 35, 36, and T18S, T12W, sections 1, 2, 3, 4, 9, 10, 11, 12, 13, 14, 15, 16, 22, 23, 24, 25, 26, 27; W.M., Lane County, except that portion defined as the Clear Lake Watershed, which is the area beginning at

This rule is administered according to the following guidelines.

"The conclusions of the North Florence Dunal Aquifer Study (1982) were based on issues of averages for the entire geographic area identified for issuance of on-site sewage disposal installation permits. The rule, OAR 340-71-400(2), was adopted base on the results of the study. The rule specifies that installation permits for proposed new individual or community on-site sewage disposal system can be issued if they are projected to contribute to the local groundwater not more than fifty-eight (58) pounds of nitrate-

nitrogen $\text{NO}_3\text{-N}$ per year per acre owned or controlled by the applicant. This applies to all of the area defined in the rule.

The 450 gallons per day (gpd) minimum design flow required in the on-site rules for a single family dwelling (Table 1) is considered a maximum peak loading. The average is usually considered to be about one half or 225 gpd. The 2.8 dwelling units per acre that Lane County has allowed for new development is based on the 225 gdp average flow from a single-family residences with a total nitrogen (TN) concentration of 30.3 mg/L from the on-site sewage disposal system. The average gdp sewage flow is used in the NFDA because the rule is based on averages not peak flows. The 30.3 mg/L is the TN average from intermittent sand filter performance results from the 1982 DEQ Experimental Report.

This limits the septic systems installed to a "conventional sand-filter system" or an equivalent treatment system where there has been shown a 47% or more reduction of total TN. Nitrogen in any form leaving the sand filter is presumed to be eventually oxidized to nitrate (NO_3). The formula used is:

$$\frac{225 \text{ gpd} \times 365 \text{ days} \times 30.3 \text{ mg/L} \times 8.34 \text{ lb/gal}}{1 \times 10^{-6}} = 20.75 \text{ lb N yr/dwelling (D)}$$

$$58 \text{ lb/acre} / 20.75 \text{ lb NO}_3 \text{ yr} = 2.8 \text{ D/acre}$$

$$43,560 \text{ sq. feet acre} / 2.8 \text{ D/acre} = 15,557 \text{ sq. ft. per lot}$$

For existing lots that were created prior to March 1, 1978 [OAR 340-71-220 (2)(a)], the rules allow for the consideration of a system for a single-family dwelling to be sized down to two (2) bedrooms at 150 gdp per bedroom for the first two bedrooms for a total 300 gdp peak flow. Using the same formulas as above, ...:

$$13.835 \text{ lbs N}; 4.2 \text{ D/acre}; \text{ and } 10,371 \text{ sq. ft. lot.}''$$

"The rule did not adopt the NFDA study or the methods of determining what the NO_3 loading per house would be. It has always been recognized that this can change with improved technology and even discoveries of what old technology is already accomplishing."

"We can make predictions using the best available information, but predictions are only a forecast and not for certain. Every installation permit that is issued for the construction of an on-site sewage disposal system is issued with a predictable performance and the stipulation that if the treatment system does not perform as predicted or if groundwater is unacceptably impacted, then the treatment system needs to be enhanced to provide the necessary additional treatment to protect the groundwater."

"The NFDA Geographic Rule was written to allow for new treatment technology that could give better nitrogen removal. There has been no further Department experimental program since 1982, and as a consequence, no new advanced treatment systems that would allow a greater density have been approved to be installed by installation permits. However, we can allow for a system that produces a high quality effluent under an operating permit call a Water Pollution Control Facility (WPCF) permit issued by the

DEQ. This could allow for greater density of new development as well as accommodate older existing lots of record."

Based on the background documents provided by DEQ, quoted above, the Geographic Area Rule formulas assumed a sand filter system would be installed. Following the meeting, the Lane County sanitarian commented that the "North Florence Dunal Aquifer Study (NFDA Study), page 99, states that conventional low head pressure systems (commonly referred to as Pressurized Seepage Beds) could be established at a density of 2.9 dwelling units per acre and that sand filter systems might approach five (5) dwelling units per acre before the 58 lb/acre/year limit is reached." While it is true that the NFDA Study contains this statement, the Geographic Area Rule was adopted prior to the Study's completion and, as stated in the background documents provided by DEQ staff at the meeting, quoted above, "the rule did not adopt the NFDA study or the methods of determining what the NO₃ loading per house would be."

Other questions were raised by Dennis Nelson about the formula, specifically: How was the formula derived? Where in this equation are the conversions of mg to lb (= 454000mg/lb) and L to gal (3.78L/gal)? Also, for the equation to yield the number 20.75, the denominator must be 1×10^6 not -6 . And, what are the units for the denominator?

DEQ staff provided the following response:

"I agree that this equation doesn't make sense as written. I broke it into two separate calculations:

1. Convert gallons per day to gallons per year

$$225 \text{ gpd} \times 365 \text{ days} = 82125 \text{ gpy}$$

2. Convert TN from mg/L to pounds/gallon:

$$1 \text{ mg/L} = (8.345 \times 10^{-6}) \text{ lbs/gallon}$$

$$30.3 \text{ mg/L} = 30.3 \times (8.345 \times 0.000001)$$

$$30.3 \text{ mg/L} = 30.3 \times 0.000008345$$

$$30.3 \text{ mg/L} = 0.0002528 \text{ lbs/gallon}$$

To determine lbs of N per year per dwelling unit we have to make the assumption that a 4 bedroom dwelling unit produces 82125 gallons per year:

$$82125 \text{ gallons/year} \times 0.0002528 \text{ lbs/gallon}$$

$$20.7666 \text{ lbs N per dwelling unit per year}$$

To determine the number of dwelling unit per acre:

$$58 \text{ lbs/acre} / 20.7666 \text{ lbs}$$

$$2.7929 \text{ dwellings per acre}$$

To determine the minimum lot size for a 4 bedroom dwelling:

1 acre = 43560 ft²

43560 ft² / 2.7929 dwellings

15596.6916 square foot lot for a 4 bedroom home using 30.3 mg/L TN entering the drainfield.

If you used something like 20 mg/L TN to reflect a system that can provide better nitrogen removal, that would result in:

20 mg/L = 0.0001669 lbs/gallon

13.7073 lbs

4.2313 dwellings per acre

43560 / 4.2313

10294.7084 square foot lot for a 4 bedroom home"

9. **Is it true that the Geographic Area Rule for Florence was adopted in response to the Sole Source Aquifer Designation and Investigative Report prepared in 1987? That 1987 report explores options available at that time which did not include servicing the area with municipal wastewater service because the City's wastewater system did not have the capacity. Now that that situation has changed, and the City does have the capacity to extend wastewater service to the UGB, and has installed a line as far north as Driftwood Shores, does that create the need to reevaluate the conclusions from the 1982 reports and to revise the rule to be consistent with other urbanizable areas of the state?**

The Geographic Area Rule was adopted in 1982 in response to concerns by Lane County and DEQ about contamination threats to the North Florence Dunal Aquifer (NFDA) caused by on-site septic systems. Since the adoption of Senate Bill 100 on May 29, 1973, and subsequent State laws and administrative rules, cities have been required to adopt comprehensive plans that establish urban growth boundaries (UGBs) for future expansion of city limits. The extension of municipal wastewater services to properties in the Florence UGB was always assumed to occur through annexation to the City.

In 1982, municipal sewer service was not available to serve the UGB; thus there was a need to create a special rule to address the concern for water quality in the portion of the aquifer that was within the UGB. Nevertheless, the 300 foot rule still applies to the Florence UGB; and, as in all Oregon cities, the City of Florence will annex, and provide municipal wastewater services to, all properties in the UGB where that service is within 300 feet and the city can provide the service, in response to a proposal for development or a referral from Lane County for a new or replacement on-site septic system permit.

Currently, there is insufficient data to justify a more stringent geographic rule. Results from the City's surface and groundwater monitoring program could include a recommendation to DEQ for a more stringent rule requirement, although there

would be no guarantee that DEQ would change the rule. Another option would be for the City and/or County to have more stringent requirements in the local comprehensive plan and ordinance.

9. At what point would the information from City monitoring efforts trigger a reconsideration of the Geographic Area Rule, and who would initiate that reconsideration?

The Geographic Area Rule for Florence predates the adoption of statewide density limits in unincorporated areas. The existing rules pertaining to other areas of the state are slightly stricter than they are for Florence; but not sufficiently different to warrant a reconsideration of the rule for Florence.

10. Should urban level densities be allowed to develop without municipal sewer

No, urban levels of densities should not be, and are not currently, allowed to develop without municipal sewer. The existing urban levels of density without sewer were developed prior to the current rules that prohibit such development. For purposes of this discussion, urban densities are those that are allowed within Florence city limits while rural densities are those that are allowed outside the UGB in Lane County.



State of Oregon
Department of
Environmental
Quality

Web Resources and Factsheets for Drinking Water Protection

Updated: February 2012

PLEASE NOTE: The Internet URL Addresses listed in this document were included as a convenience for the users of this document. All URL Addresses were functional at the time this publication was posted.



General Resources	
Groundwater Basics (DEQ)	http://www.deq.state.or.us/wq/pubs/factsheets/drinkingwater/GroundwaterBasics.pdf
Protecting Oregon's Groundwater from Contamination	http://groundwater.orst.edu/groundwater/
Combating Illegal Dumping (DEQ)	http://www.deq.state.or.us/lq/pubs/factsheets/sw/CombatIllegalDumping.pdf
Information for Residential Areas, Parks and Golf Courses	
OSU Well Water Program	http://wellwater.oregonstate.edu/
After You Buy: Wells, Septic Systems, and a Healthy Homesite (NRCS)	http://www.or.nrcs.usda.gov/news/factsheets/fs19.pdf
Household Hazardous Waste Program website(DEQ)	http://www.deq.state.or.us/lq/sw/hhw/index.htm
Household Hazardous Waste (HHW) Program Locally-Sponsored Collection Programs	http://www.deq.state.or.us/lq/sw/hhw/collection.htm
Household Pharmaceutical Waste Disposal (DEQ)	http://www.deq.state.or.us/lq/pubs/factsheets/sw/HouseholdPharmaceuticalWasteDisposal.pdf
Household Hazardous Wastes (EPA)	http://www.epa.gov/epawaste/conserves/materials/pubs/hhw-safe.pdf
Hazardous Products in the Home (DEQ)	http://www.deq.state.or.us/lq/sw/hhw/products.htm
Recycle Used Motor Oil - EPA's You Dump It, You Drink It campaign material	http://www.epa.gov/osw/conserves/materials/usedoil/ydydi.htm
Healthy Lawns, Healthy Families (DEQ)	http://www.healthylawns.org/how/print.pdf
Managing Turfgrass and Garden Fertilizer Application to Prevent Contamination of Drinking Water	http://www.epa.gov/safewater/sourcewater/pubs/fs_swpp_turfgrass.pdf
Managing Pet and Wildlife Waste to Prevent Contamination of Drinking Water (EPA)	http://www.epa.gov/safewater/sourcewater/pubs/fs_swpp_petwaste.pdf
Frequently Asked Questions About Heating Oil Tanks (DEQ)	http://www.deq.state.or.us/lq/pubs/factsheets/tanks/hot/FAQAboutHOT.pdf
Proper Care and Maintenance of Heating Oil and Other Unregulated Tank Systems	http://www.deq.state.or.us/lq/pubs/factsheets/tanks/hot/ProperCareMaintenance.pdf
Heating Oil Tank Program (DEQ)	http://www.deq.state.or.us/lq/tanks/hot/index.htm
Managing Septic Systems to Prevent Contamination of Drinking Water (EPA)	http://www.epa.gov/safewater/sourcewater/pubs/fs_swpp_septic.pdf
Septic Tank Maintenance (DEQ)	http://www.deq.state.or.us/wq/pubs/factsheets/onsite/septic_tankmaint.pdf
Septic Tank Maintenance (EPA)	http://cfpub.epa.gov/owm/septic/septic.cfm?page_id=269
Septic Systems OSU Extension website (OSU)	http://groundwater.oregonstate.edu/html/septicsystems.htm
Septic System Management— Landscaping and Other Activities on Your Property (OSU)	http://groundwater.oregonstate.edu/documents/septic_system_management.pdf
Groundwater protection and your septic system (National Small Flows Clearinghouse)	http://www.nesc.wvu.edu/pdf/ww/septic/septic_tank3.pdf
After You Buy: Wells, Septic Systems, and a Healthy Homesite (NRCS)	http://www.or.nrcs.usda.gov/news/factsheets/fs19.pdf

Twelve Simple Things You Can Do to Protect Your Well Water	http://extension.oregonstate.edu/catalog/pdf/em/em8651-e.pdf
<i>A consumer's guide to Water Well Construction, Maintenance, And Abandonment (WRD)</i>	http://www1.wrd.state.or.us/pdfs/wellcon05-01B.pdf
Oregon Water Resources Department	http://egov.oregon.gov/OWRD/
Disposal of Chlorinated Water from Swimming Pools and Hot Tubs (DEQ)	http://www.deq.state.or.us/wq/pubs/factsheets/wastewater/bmpchlorwaterdisp.pdf
Information for Agriculture/Forestry Land Uses	
Tips for Small Acreages in Oregon - Fact Sheets on wells, septic systems, animal and crop management, streamside erosion protection (NRCS)	http://www.or.nrcs.usda.gov/news/factsheets.html
Managing Agricultural Fertilizer Application to Prevent Contamination of Drinking Water (EPA)	http://www.epa.gov/safewater/sourcewater/pubs/fs_swpp_fertilizer.pdf
Managing Small-Scale Application of Pesticides to Prevent Contamination of Drinking Water (EPA)	http://www.epa.gov/safewater/sourcewater/pubs/fs_swpp_sspesticides.pdf
Managing Large-Scale Application of Pesticides to Prevent Contamination of Drinking Water (EPA)	http://www.epa.gov/safewater/sourcewater/pubs/fs_swpp_lspesticides.pdf
Managing Waste Pesticide (DEQ)	http://www.deq.state.or.us/lq/hw/pesticide.htm
Oregon Department of Agriculture	http://www.oregon.gov/ODA/index.shtml
Soil and Water Conservation Districts (OACD)	http://www.oacd.org/
Natural Resources Conservation Service, Oregon (NRCS)	http://www.or.nrcs.usda.gov/
NRCS Conservation Programs: Voluntary Financial and Technical Assistance for Your Farm, Ranch, Forest & Wildlife Lands	http://www.or.nrcs.usda.gov/news/factsheets/NRCSconservationPROGRAMS2008.pdf
Oregon Department of Fish and Wildlife Hatchery Information (ODFW)	http://www.dfw.state.or.us/fish/hatchery/
Protecting your Watershed (NRCS) (location specific factsheets for Eastern, Western, NW and SW Oregon)	http://www.or.nrcs.usda.gov/news/factsheets.html
Managing Pastures in Eastern Oregon (NRCS)	http://www.or.nrcs.usda.gov/news/factsheets/fs6.pdf
Managing Pastures in Western Oregon (NRCS)	http://www.or.nrcs.usda.gov/news/factsheets/fs7.pdf
Managing Weeds in Pasture (NRCS)	http://www.or.nrcs.usda.gov/news/factsheets/fs8.pdf
Managing Stockwater in Pastures and Streamside Areas (NRCS)	http://www.or.nrcs.usda.gov/news/factsheets/fs9.pdf
Animal Care and Handling Facilities (from California stormwater program)	http://www.cabmphandbooks.net/Documents/Industrial/AnimalCareandHandlingFacilities.pdf
Managing Small-acerage Horse Farms (OSU)	http://extension.oregonstate.edu/catalog/pdf/ec/ec1558.pdf
Managing Mud and Manure (livestock and horses) (NRCS)	http://www.or.nrcs.usda.gov/news/factsheets/fs11.pdf
National Management Measures to Control Nonpoint Source Pollution from Forestry (EPA)	http://www.epa.gov/owow/nps/forestrygmt/
Managing Nonpoint Source Pollution from Forestry (EPA)	http://www.epa.gov/owow/nps/facts/point8.htm
Drinking Water from Forests and Grasslands: Chapter 10: Forest Management and Chapter 13: Pesticides (USFS)	http://www.srs.fs.usda.gov/pubs/gtr/gtr_srs039/gtr_srs039-part_3.pdf

Commercial/Industrial/Municipal Land Uses	
Business and Industry (DEQ)	http://www.deq.state.or.us/wq/pubs/factsheets/drinkingwater/busindtips.pdf
Find Solutions – Free Assistance from DEQ's Toxics Use and Waste Reduction Assistance Program	http://www.deq.state.or.us/lq/pubs/docs/hw/TABrochure.pdf
Managing Small Quantity Chemical Use to Prevent Contamination of Drinking Water (EPA)	http://www.epa.gov/safewater/sourcewater/pubs/fs_swpp_chemical_2001.pdf
Managing Used Computers and Other Electronic Equipment <i>A guide for businesses and institutions</i> (DEQ)	http://www.deq.state.or.us/lq/pubs/factsheets/ManagingUsedComputers.pdf
Computer and Electronic Equipment Recyclers (DEQ)	http://www.deq.state.or.us/lq/pubs/factsheets/OregonECyclesConsumers.pdf
Drinking Water Protection for shallow injection well owners & operators (DEQ)	http://www.deq.state.or.us/wq/pubs/factsheets/uic/shallowinjwell.pdf
Underground Injection Control (UIC) Program (DEQ)	http://www.deq.state.or.us/wq/uic/uic.htm
Managing Storm Water Runoff to Prevent Contamination of Drinking Water (EPA)	http://www.epa.gov/safewater/sourcewater/pubs/fs_swpp_stormwater.pdf
Best Management Practices For Storm Water Discharges Associated With Industrial Activities	http://www.deq.state.or.us/wq/stormwater/docs/nwr/indbmps.pdf
Oregon DEQ Recommended Best Management Practices For Washing Activities March 1998	http://www.deq.state.or.us/wq/pubs/bmps/washactivities.pdf
Managing Vehicle Washing to Prevent Contamination of Drinking Water (EPA)	http://www.epa.gov/safewater/sourcewater/pubs/fs_swpp_vehicle.pdf
Best Management Practices (BMPs) for Washing (DEQ)	http://www.deq.state.or.us/wq/pubs/bmps/washactsnoprft.htm
DEQ's Environmental Cleanup Program	http://www.deq.state.or.us/lq/cu/index.htm
Managing Underground Storage Tanks to Prevent Contamination of Drinking Water (EPA)	http://www.epa.gov/safewater/sourcewater/pubs/fs_swpp_ust.pdf
Underground Storage Tank Program	http://www.deq.state.or.us/lq/tanks/ust/index.htm
Proper Care and Maintenance of Heating Oil and Other Unregulated Tank Systems	http://www.deq.state.or.us/lq/pubs/factsheets/tanks/hot/ProperCareMaintenance.pdf
Frequently Asked Questions About Heating Oil Tanks (DEQ)	http://www.deq.state.or.us/lq/pubs/factsheets/tanks/hot/FAQAboutHOT.pdf
Heating Oil Tank Program (DEQ)	http://www.deq.state.or.us/lq/tanks/hot/index.htm
Leaking Underground Storage Tank Program	http://www.deq.state.or.us/lq/tanks/lust/index.htm
Dam Safety Publications and Resources FEMA website	http://www.fema.gov/plan/prevent/damfailure/publications.shtm
Boating/Marinas/Recreation Areas	
Oregon Clean Marina Program and Clean Boats Challenge (OSMB)	http://www.oregon.gov/OSMB/Clean/index.shtml
Clean Boater Guide (OSMB)	http://www.oregon.gov/OSMB/Clean/docs/Clean_Boater_Booklet_Final.pdf
Marine Sewage and Wastewater Disposal (DEQ)	http://www.deq.state.or.us/wq/pubs/factsheets/consumerinfo/marinesanitation.pdf
Best Management Practices for Oregon's Marinas (DEQ)	http://www.deq.state.or.us/wq/pubs/bmps/marinas.pdf

Contacts For FREE Assistance from DEQ



Ask to speak with a Hazardous Waste Technical Assistance Staff Person:

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▲ **EASTERN REGION**

Bend – 541-388-6146

● **WESTERN REGION**

Eugene – 541-686-7838

Medford – 541-776-6010

Salem – 503-378-8240



Or

Toll-Free within Oregon:
1-800-452-4011

Or

Visit our web site:
www.deq.state.or.us/lq/hw/

07-LQ-003



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Land Quality Division
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Portland, OR 97204

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Oregon Department of Environmental Quality
Toxics Use & Waste Reduction Assistance Program
Land Quality Division

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- Jeff Shay, Rejuvenation, Inc.

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Bend: 541-338-6146

Medford: 541-776-6010

Portland: 503-229-5263

Salem: 503-378-8240

Ask to speak with an Air Quality Small Business Assistance Staff Person.

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For household hazardous waste and some small business (Conditionally Exempt Generator) waste, call:

Metro in NW Portland/Oregon City
1-800-732-9253 or 503-234-3000

Lane County Glenwood Facility in Eugene
541-682-4120

Marion County Facility in Salem
503-588-5169

Other resources are available, contact us.

Water Management and Conservation Plan

*Final Version
March 2010*

*Prepared for
City of Florence, Oregon*



Prepared by



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Executive Summary

The City of Florence (City) submits this Water Management and Conservation Plan (WMCP) for review and approval by the Oregon Water Resources Department (OWRD). The City's water use permit G-15056 originally required submittal of a WMCP by April 18, 2005. However, the City requested and was granted an extension of this deadline to September 19, 2009.

On June 23, 2009, OWRD issued a final order approving an extension of time for development of permit G-15056. The final order provides that the City is limited to diversion of 2.4 cubic feet per second (cfs) under permit G-15056 until OWRD issues a final order approving the City's WMCP. As part of this WMCP, the City requests access to the remaining undeveloped portion (0.6 cfs) of extended permit G-15056, which is the most feasible and appropriate water supply alternative available to the City.

The City operates a public community water system that supplies drinking water to approximately 9,410 City residents. The City is committed to maintaining and improving existing water management and conservation measures, and will initiate a number of new measures within the next five years.

This WMCP satisfies the requirements of Oregon Administrative Rule (OAR) Chapter 690, Division 86. The Plan also presents existing and planned water conservation programs for the City. The Plan is organized according to the major sections of the Division 86 rules.

<u>WMCP Section</u>	<u>OAR Requirement</u>
Section 1 – Introduction	<i>OAR 690-086-0125</i>
Section 2 – Water Supplier Description	<i>OAR 690-086-0140</i>
Section 3 – Water Conservation	<i>OAR 690-086-0150</i>
Section 4 – Curtailment	<i>OAR 690-086-0160</i>
Section 5 – Water Supply	<i>OAR 690-086-0170</i>

Description of Municipal Water Supplier

As of 2008, the City provided water to a service population of approximately 9,410 within the City limits, and two residential accounts outside the City limits. The City's municipal water supply comes from groundwater supplied by Wells 1 through 12, located on the eastern margin of the City, which appropriate water from a dunal aquifer. Currently, these wells do not have the capacity to produce the full amount of water authorized by the City's water rights. Furthermore, the City's population and demand for water are increasing and likely will exceed the existing water supply within the 20-year planning period for this WMCP. The City also holds a water right to divert water from Munsel Creek, but this water right is not currently in use. The City has four aboveground reservoirs, one of which is currently offline. Water diverted under the City's groundwater rights is treated at the City's water treatment plant (WTP).

Water Conservation Element

Current Conservation Measures

The City is committed to wise water use and employs several existing water management and conservation measures, as summarized below.

- Inclining Block Water Rate Structure
- Monthly Water Billing Cycle (New as of August, 2009)
- System Development Charges
- Landscaping Code
- Housing Rehabilitation Grant Program
- Residential Water Conservation Partnership
- Water Quality Report
- Meter Testing and Maintenance
- Leak Detection and Repair
- Water Audits
- Public Education

Five-Year Benchmarks for Conservation and Management Measures

During the next 5 years, the City plans to initiate, continue, or expand the following programs:

- Conduct an annual City-wide water audit using a systematic and documented methodology for estimating water produced and consumed, unaccounted-for water, and unmetered authorized and unauthorized uses.
- Separate the data and tracking of multi-family accounts from the commercial accounts to better characterize those user categories. This will help clarify the extent of commercial and residential use.
- Maintain City utility billing records for at least 5 years to provide historical water consumption data.
- Continue to require meters for all development within the City.
- Continue to conduct annual meter testing and maintenance for 3-inch and larger meters.
- Continue to use an inclining block water rate structure that supports and encourages water conservation.
- Continue routine water system surveillance and response to reported leaks.
- Provide more detailed conservation messages and tips in monthly water bills, including reminders to turn off irrigation systems during the winter.
- Expand the City's website to include tips and techniques for indoor, outdoor, and commercial water conservation.
- Host a water conservation booth at annual City events and festivals.
- Provide informative materials (brochures, samples) in the City's building department where people come to apply for permits.
- Post "how-to" technical information about conservation on the City's website for residential and commercial users.

- Conduct property manager workshops on conservation at multi-family residences.
- Conduct an evaluation of conservation opportunities at multi-family residential facilities, and conduct water audits of the three largest water users in that category.
- Make available indoor conservation kits. Kits could include faucet aerators, low-flow shower heads, toilet leak detectors, and a list of other indoor water conservation options and techniques.
- Make available outdoor conservation kits. Kits could include lawn watering measuring cans, rain gauges, hose nozzles with variable spray, and packages of drought-resistant plant seeds.
- Evaluate opportunities to reuse water and use non-potable water.

Water Curtailment Element

The City proposes a water curtailment plan that contains four stages:

Stage 1 - Water Shortage Alert

Stage 2 - Serious Water Shortage

Stage 3 - Severe Water Shortage

Stage 4 - Critical Water Shortage

The “triggers” for each stage, and the actions taken during each stage, are described in Section 4 of this WMCP. In general, the actions taken progress from voluntary to mandatory and from minor to major in response to the severity of the water shortage.

1. Introduction

This section satisfies the requirements of OAR 690-086-125.

Overview

OAR 690-086-0125

The City of Florence (City) is located on Highway 101 and along the north bank of the Siuslaw River on the central Oregon coast. The City, located in the southern third of the western edge of Lane County, is approximately 172 miles southwest of Portland and 61 miles west of Eugene. Florence is the major coastal town in Lane County. The City hosts several events and festivals throughout the year and has an increased resident and visitor population during the summer months.

As of 2008, the City provided water to a service population of approximately 9,410. The City also serves two residential accounts outside of the City limits, but the population represented by these accounts is within the error of the population estimates for the City, so the service area population is not adjusted to include these two accounts.

The City's municipal water supply is from groundwater supplied by Wells 1 through 12, located along the eastern margin of the City, that appropriate water from a dunal aquifer. Currently, these wells do not have the capacity to produce the full amount of water authorized by the City's water rights. Furthermore, the City's population and demand for water are increasing and will likely exceed the existing water supply within the 20-year planning period for this water management and conservation plan (WMCP). The City also holds a water right to divert water from Munsel Creek, tributary to the Siuslaw River, but this water right is not currently in use. Historically, the City purchased a portion of its water supply from Heceta Water District (HWD); however, the City stopped purchasing water from HWD in 2003 after the expansion of the water treatment plant (WTP) and wellfield that included Wells 8-12.

The City has four aboveground reservoirs: an elevated 250,000-gallon tank near the City shop (currently offline and not in use); a 500,000-gallon steel tank on the east hills; and two 2,000,000-gallon tanks near the Sand Pines Golf Course. Water diverted under all of the City's groundwater rights is treated at the City's WTP. Currently, the WTP has a capacity of 4.6 cubic feet per second (cfs) or 3 million gallons per day (mgd). This capacity is 1.24 cfs (0.8 mgd) less than the full value of the City's existing groundwater rights.

Plan Organization

This WMCP fulfills the requirements of Oregon Administrative Rule (OAR) Chapter 690, Division 86. The WMCP describes water management, conservation, and curtailment measures that will assist the City in the wise management of its water resources. The WMCP is organized according to the major sections of the Division 86 rules, as follows:

Section	Requirement
Section 1 – Introduction	OAR 690-086-0125
Section 2 – Water Supplier Description	OAR 690-086-0140
Section 3 – Water Conservation	OAR 690-086-0150
Section 4 – Curtailment	OAR 690-086-0160
Section 5 – Water Supply	OAR 690-086-0170

Affected Local Governments

The following entity is an “affected local government,” according to OAR 690-005-0015:

- Lane County

Thirty days before submitting this WMCP to OWRD, the draft plan was made available for review by the affected local government listed above along with a request for comments related to consistency with the local government’s comprehensive land use plan (if any). The letter requesting comments is included in **Appendix A**. Lane County did not submit any comments during the 30-day comment period. Although not an “affected local government” as defined by the rule cited above, a courtesy copy of this draft WMCP was also sent to Heceta Water District (HWD). HWD did not provide any informal comments.

Plan Update Schedule

The City plans to submit an update of this WMCP within 10 years of receiving the final order approving the WMCP. As required by OAR Chapter 690, Division 86, a progress report will be submitted within 5 years of receiving a final order approving this WMCP.

2. Water Supplier Description

This section satisfies the requirements of OAR 690-086-0140.

Source and Facilities

OAR 690-086-0140(1), (8)

The City's water source is groundwater. City wells are completed in dunal sand deposits that cover much of the coastal plain along the central Oregon coast. The thickness of the sand dunes in this area varies from approximately 100 to 200 feet. The quality of water pumped from the dunal wellfield is generally good, with the exception of high concentrations of naturally occurring iron that creates taste and staining problems. To remove the iron, the City operates a biological treatment system that treats the groundwater before disinfection and distribution.

The City holds three groundwater rights totaling 5.89 cfs (3.8 mgd). Currently, the City's wellfield (Wells 1 through 12) does not have the capacity to produce the full amount of water allowed by its water rights. Based on observed production capacity in August 2007, the City wells produce only 4.2 cfs (2.7 mgd). Historically, the City purchased a portion of its water supply from HWD; however, the City stopped purchasing water from HWD in 2003 after the expansion of the WTP and completion of the wellfield including Wells 8-12.

The City has four aboveground reservoirs: an elevated 250,000-gallon tank near the City shop (currently offline and not in use); a 500,000-gallon steel tank on the east hills; and two 2,000,000-gallon tanks near the Sand Pines Golf Course. Water diverted under all of the City's groundwater rights is treated at the City's WTP. The WTP currently has a capacity of 4.6 cfs or 3 mgd. This capacity is currently 1.24 cfs (0.8 mgd) less than the full face value of the City's existing groundwater rights.

Appendix B depicts the City's water system, including sources of water, storage facilities, treatment facilities, major transmission and distribution lines, pump stations, interconnections with other municipal water supply systems, and the existing and planned future service area.

In recent years, the City has made several improvements to its water system infrastructure. In 1994-1995, green sand filters 4, 5, and 6 were installed, along with Wells 4, 5, and 6. In 2003-2004, Wells 8 through 12 were constructed and biological filters (for iron removal) were installed. In 2004, the City stopped using chlorine gas and changed to sodium hypochlorite and added a chlorine contact chamber. As part of the WTP expansion with the biological filters, the City installed pumps to transfer the backwash water from the biological filters to settling ponds. This included the installation

of air compressors for the biological filter process and replacement of the existing air blower with two new air blowers.

The City's distribution system has expanded to accommodate new subdivisions. The City recently installed a 12-inch water main beginning just south of the intersection of Highway 101 and Munsel Lake Road, crossing easterly across Highway 101 and continuing east to Spruce Street. The 12-inch water main then extends from Munsel Lake Road north along the recently constructed Spruce Street to its terminus. Additionally, a new 8-inch water main was extended along the east side of Highway 101 from Munsel Lake Road to the current City limits to approximately 52nd Street.

Interconnections with Other Systems

OAR 690-086-0140(7)

The City has two metered interconnections with HWD, located as follows:

- Rhododendron Drive. Water can flow through an 8-inch-diameter pipe from HWD to the City.
- Highway 101 and Munsel Lake Road. Water can flow through a 10-inch-diameter pipe either way between HWD and the City.

Intergovernmental Agreements

OAR 690-086-0140(1)

In 1997, the City, Lane County (County), and HWD entered an intergovernmental agreement (IGA) regarding cooperative planning for public water services. The purpose of the 1997 IGA was improved planning coordination and efficient provision of necessary public water services for residents and businesses in the Florence area. The 1997 IGA included provisions for mutual exchange of information, development of an Urban Services Agreement, notice to HWD of land use actions being considered by the City and/or County, and notice to the County and City of new long-range or capital improvement plans or amendments considered by HWD.

In 2003, the City and HWD signed an IGA for Sale of Surplus Water to Out-of-District Customers for Municipal Use. This IGA allows the City to purchase surplus water from HWD.

Service Area Description and Population

OAR 690-086-0140(2)

The City is located on Highway 101 and along the north bank of the Siuslaw River on the central Oregon coast. The City, located in the southern third of the western edge of Lane County, is approximately 172 miles southwest of Portland and 61 miles west of Eugene, and is the major coastal town in Lane County. The City hosts several events and festivals throughout the year and has an increased resident and visitor population during the non-winter months.

The current service area, shown in **Appendix B**, consists of the area within the City limits and two residential accounts outside the City limits but within the UGB. As of 2008, the City provided water to a service population of approximately 9,410. The City uses population estimates developed annually by Portland State University's (PSU) Population Research Center for the population within City limits to estimate its service population. The City also serves two residential accounts outside the City limits, but the population represented by these accounts is within the error of the population estimates for the City, so the service area population is not adjusted to include these two accounts.

Exhibit 2-1 presents City population estimates from U.S. Census data in 1990 and 2000, and PSU's annual estimates.

EXHIBIT 2-1
City of Florence Service Population Estimates

	PSU (July 1)	U.S. Census
1990	ND	5,171
2000	7,340	7,263
2001	7,460	ND
2002	7,600	ND
2003	7,780	ND
2004	7,830	ND
2005	8,185	ND
2006*	8,270	ND
2007*	8,270	ND
2008	9,410	ND

ND = no data

* The population estimates for 2006 and 2007 are the same because the City did not submit data to PSU in 2007.

The City has experienced growth since 1990. The average annual growth rate between 1990 and 2000 was approximately 3.5 percent, and from 2000 to 2008 was approximately 3.3 percent.

Records of Water Use

OAR 690-086-0140(4) and (9)

Terminology

Demand refers to total water production, or the sum of metered consumption (residential, commercial, industrial, and municipal), unmetered uses (for example, fire fighting or hydrant flushing), and water lost to leakage and reservoir overflow. For the City, demand (production) is the total amount of water entering the distribution system.

Metered use or consumption refers to the portion of water use that is recorded by customer meters.

Connection refers to a metered connection of a customer to the distribution system.

Unaccounted-for water (sometimes known as unbilled or non-revenue water) refers to the difference between production and billed consumption. Unaccounted-for water includes unmetered hydrant use, other unmetered uses, water lost to reservoir overflow, and leakage. Meter inaccuracies (both production and customer), and data handling errors also contribute to unaccounted-for water.

Specific *demand* terms include:

- *Average day demand (ADD)*: total annual production divided by 365 days.
- *Maximum day demand (MDD)*: the highest daily production during a calendar year.
- *3-day maximum day demand (3-d MDD)*: the average of the daily demand the day before, the day of, and the day after the maximum day event. This parameter gives an indication of the duration of a high water demand period.
- *Maximum monthly demand (MMD)*: the average daily demand during the calendar month with the highest total demand.
- *Monthly demand*: The volume of water produced during each of the 12 calendar months. Monthly demand is expressed either as a total volume produced per month or as an average daily demand per month by dividing the monthly volume by the number of days in the month.
- *Maximum day per month demand*: the highest daily production during each of the 12 calendar months.
- *Peaking factor*: a ratio of one demand to another. The most common is MDD to ADD.

MDD is an important value for water system planning. The City's supply facilities and water rights must be capable of meeting the MDD. If the MDD exceeds the combined supply capacity on any given day, finished water storage levels will be reduced. Consecutive days at or near the MDD will result in a water shortage.

The most common units for expressing demands are mgd. One mgd is equivalent to 695 gallons per minute (gpm) or 1.55 cfs. Units of million gallons (MG) also are used.

Demand

Annual Demand: Overall and Per Capita

Overall demands reflect the amount of water produced or purchased from another water provider during a given period and are expressed in units of gallons per day (gpd) or mgd. Overall per capita demands are overall demands normalized to a community's population and are presented in units of gallons per capita per day (gpcd). Because overall demand includes all use by commercial, industrial, and municipal customers as well as residential customers, the calculated per capita demand values exceed the amounts of water actually used by a typical individual, residential customer. Estimates of residential per capita demand are presented later in this section.

Exhibit 2-2 summarizes the City's average day, maximum day, and maximum month demand data for the period 2004 through 2008. **Exhibit 2-3** presents the overall per capita demands, or the total demand from all sources divided by the service area population. **Exhibit 2-4** graphically displays overall demand values, and **Exhibit 2-5** displays per capita values.

EXHIBIT 2-2

City of Florence Historic Average, Maximum and 3-day Maximum Day Demand, and Maximum Month Demand

Year	ADD (mgd)	Date of MDD	MDD (mgd)	3-d MDD (mgd)	Month of Maximum Demand	MMD (mgd)
2004	1.23	13-Aug	2.32	2.22	July	2.03
2005	1.10	31-Aug	1.94	1.80	August	1.79
2006	1.23	28-Jun	2.16	2.08	July	1.98
2007	1.11	20-Jun	2.17	1.91	July	1.68
2008	1.06	11-Jul	1.99	1.94	July	1.68
Average	1.15		2.12	1.99		1.83

EXHIBIT 2-3

City of Florence Historic Overall Per Capita Demands (gpcd), 2004-2008

Year	Population	ADD	MDD	MMD
2004	7,830	157	296	283
2005	8,185	135	237	220
2006	8,270	149	261	251
2007	8,270	135	262	231
2008	9,410	112	211	206

EXHIBIT 2-4
City of Florence Historic Overall Demands, 2004–2008

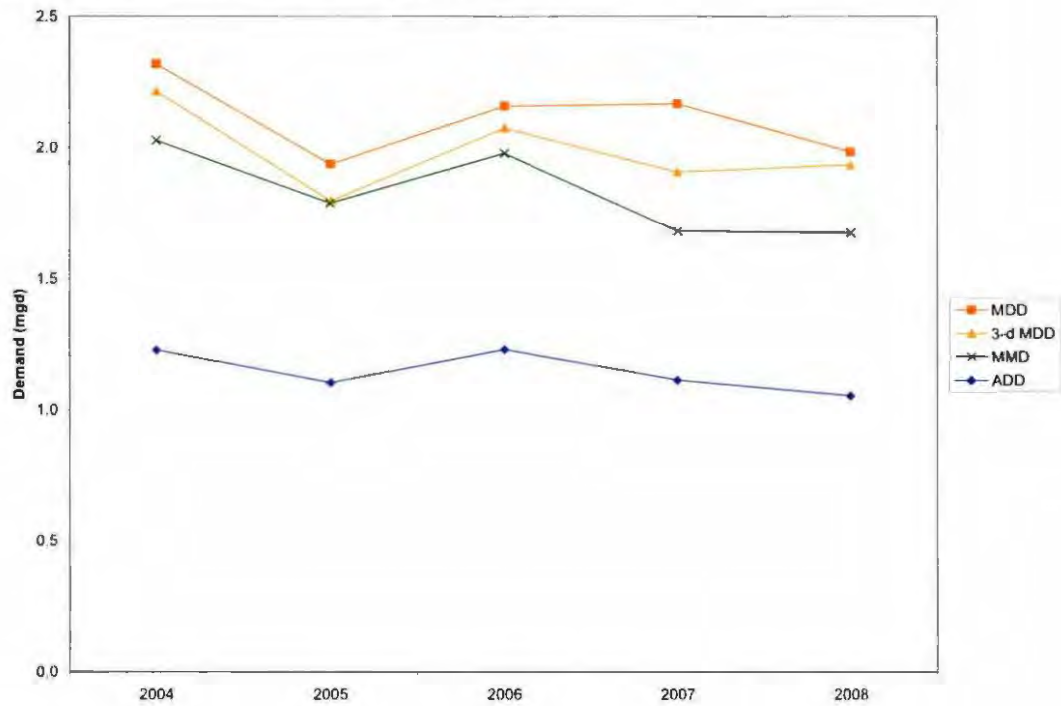
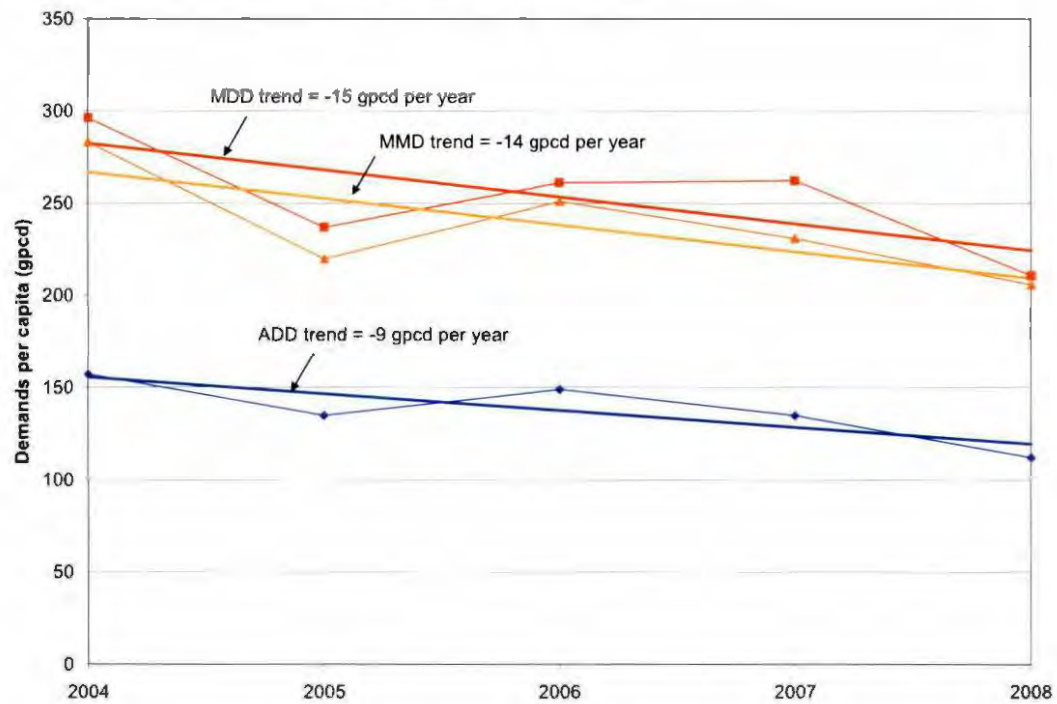


EXHIBIT 2-5
City of Florence Historic Overall Per Capita Demands, 2004–2008



Between 2004 and 2008, ADD ranged from 1.06 mgd to 1.23 mgd, and averaged 1.15 mgd. While the City's overall ADD was relatively constant from 2004 to 2008, the per capita ADD decreased at a rate of approximately 9 gpcd per year. Similar trends were observed for MMD and MDD. These trends may be partially the result of increased conservation awareness, but also may result from building codes requiring more water-efficient appliances for new dwellings.

Overall system MDD ranged from 1.94 mgd to 2.32 mgd, with the highest value occurring on August 13, 2004. Per capita MDD decreased approximately 15 gpcd per year between 2004 and 2008. The MDD occurred in June two years, in July one year, and in August two years.

Overall system 3-d MDD ranged from 1.80 mgd to 2.22 mgd, and averaged 1.99 mgd. The 3-day MDD averaged 94 percent of the MDD during the period.

MMD ranged from 1.68 mgd to 2.03 mgd, and averaged 1.83 mgd. Per capita MMD decreased at a rate of approximately 14 gpcd per year. During the 5-year period, MMD occurred in July four years and in August one year.

MDDs often fluctuate from year to year because they are strongly influenced by weather patterns such as the following:

- Maximum temperatures
- The number of consecutive days at high temperatures
- When the high temperatures occur during the summer. (For example, if high temperatures occur early in the summer, the demand may be higher because residents are more consistent in their outdoor irrigation. Later in the summer, customers may not be as inclined to maintain green landscapes.)
- Overall rainfall levels during the summer
- Consecutive days without rainfall
- Number of new homes with new landscapes because owners generally will keep newly installed landscapes thoroughly watered

Furthermore, the City's economy is partially supported by tourism. Economic factors that affect tourism can influence water demand. **Exhibit 2-6** lists regularly scheduled events and estimated visitor population.

EXHIBIT 2-6
City of Florence Annual Events

Event	Month	Visitor Population
Winter Folk Festival	January	3,500
Home and Garden Show	March	3,500
Rhododendron Festival ¹	May	15,000 to 20,000
Quilt Show ²	August	1,500
Chowder Blues & Brews	October	3,500

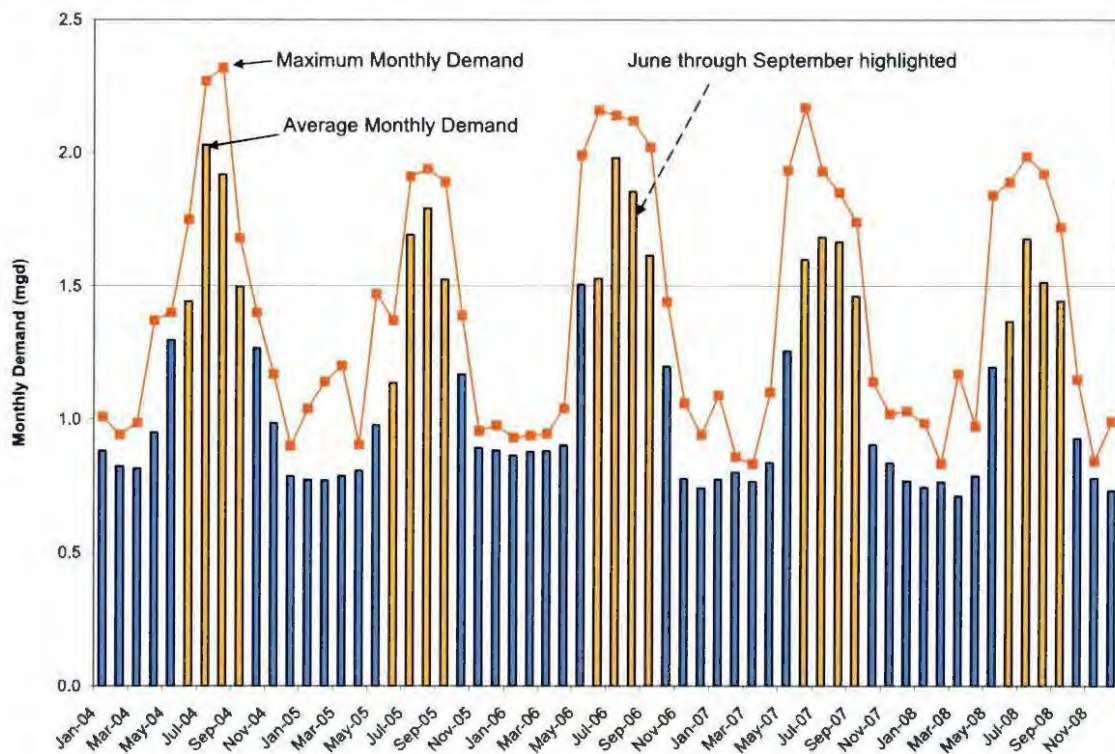
¹ This is a 3-day event

² Occurs only in odd-numbered years

Monthly Demands

The City experiences considerably higher demands during the summer months. These higher demands likely are related to irrigation of landscapes and increased resident and tourist populations. **Exhibit 2-7** shows the City's monthly demand pattern from January 2004 to December 2008. Both average monthly demand and maximum day per month demand are shown. The peak summer demand period of June through September for each year also is indicated. This peak demand period has accounted for an average of 47 percent of total annual demand for the City, with the remaining 53 percent of demand distributed across the remaining two-thirds (8 months) of the year.

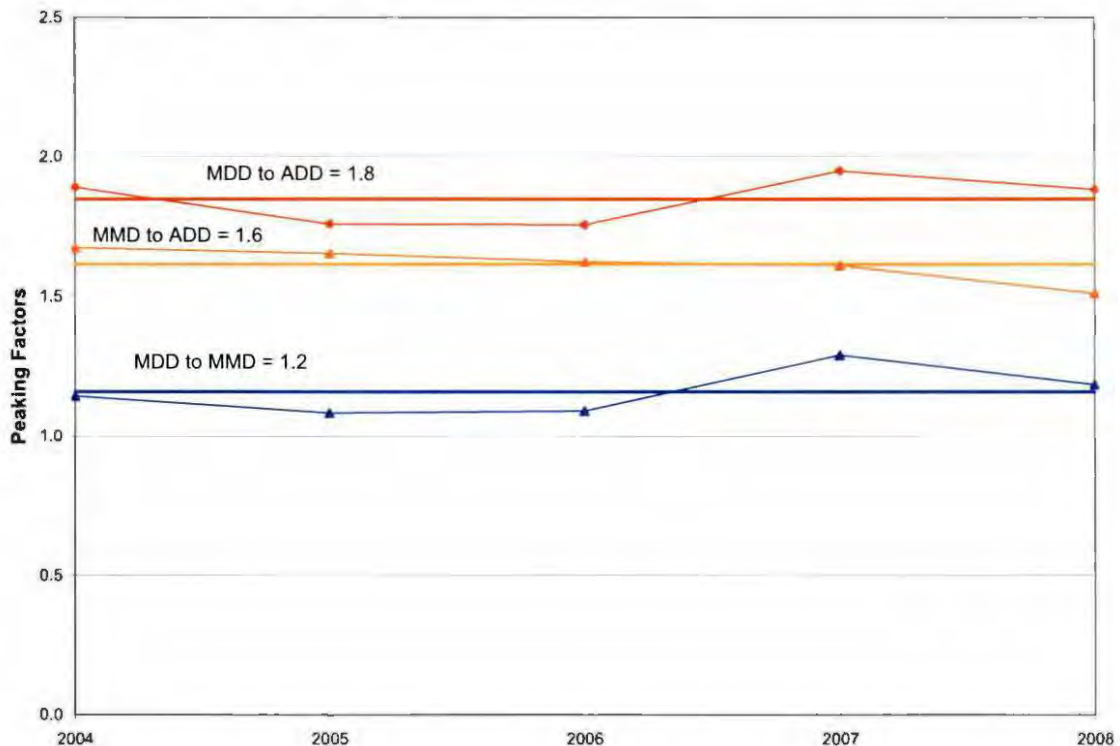
EXHIBIT 2-7
City of Florence Historic Monthly Demands, 2004-2008



Peaking Factor

Peaking factors are useful for estimating peak demands when only average day or maximum month demands are known or measured. The maximum to average day demand (MDD/ADD) peaking factor helps describe peak summer demand within the system. **Exhibit 2-8** shows several peaking factors. The system MDD to ADD peaking factor has averaged 1.8 during the period 2004 through 2008. The system-wide MDD to MMD peaking factor averaged 1.2 during the same period, and the MMD to ADD peaking factor averaged 1.6.

EXHIBIT 2-8
City of Florence Historic Peaking Factors, 2004-2008



Consumption

Consumption is equal to the metered water use within the system. Consumption data from billing records are used to analyze and describe the ways in which water is used within the City. All customers served by the City have water meters.

Customer Characteristics and Use Patterns

The City has four general customer categories: Residential, Commercial, Irrigation, and City Owned. The Residential category refers to single-family residences. The Commercial category includes service to multi-family apartments and complexes, and is subdivided by meter size from $\frac{3}{4}$ -inch to 8 inches in diameter. The $\frac{3}{4}$ -inch Commercial meters are further subdivided by typical volume used. Irrigation accounts are accounts

that are not associated with a sewer account, and City Owned accounts are used for public buildings and irrigation of public parks and landscaping. **Exhibit 2-9** summarizes the billed customer categories and the number of accounts per category in December 2008.

Water use for hydrant flushing currently is not included in consumption data.

EXHIBIT 2-9
Customer Categories and Numbers of Accounts, December 2008

Customer Category	No. of Accounts	Percent of Total
Residential		
¾-inch meter	3,252	84.9
Commercial		
¾-inch meter (Low Volume)	266	6.9
¾-inch meter (Large Volume)	83	2.2
1 1/2-inch meter	13	0.3
2-inch meter	56	1.5
3-inch meter	8	0.2
4-inch meter	3	0.1
6-inch meter	2	0.1
8-inch meter ¹	1	0.02
Irrigation	133	3.5
City Owned	15	0.4
Total	3,832	100

¹ This meter serves a community of approximately 480 people in a development called Greentrees East.

Annual Consumption

The City maintains 3 years of billing records. **Exhibit 2-10** summarizes annual consumption data by customer category for the period 2006 through 2008. **Exhibit 2-11** presents a pie chart that indicates the percentage of water used by each customer category in 2008.

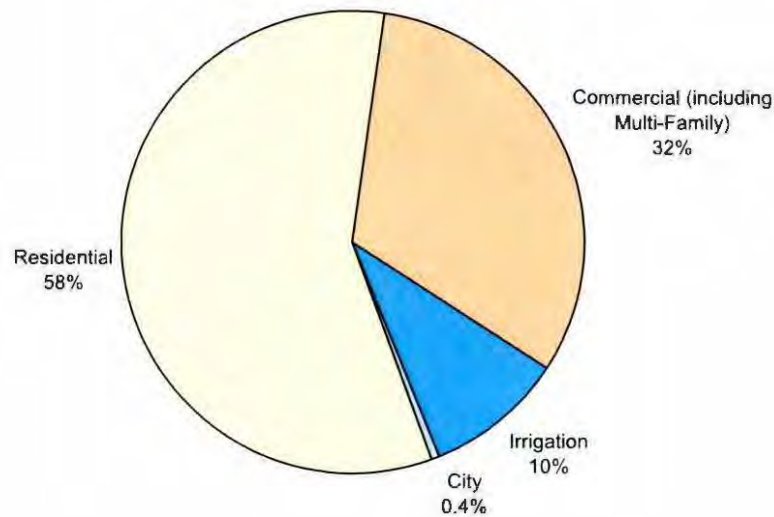
EXHIBIT 2-10

City of Florence Annual Metered Consumption by Customer Category, MG

Year	Residential	Commercial (including Multi-Family)	Irrigation	City	Total
2006	227	136	51	2	416
2007	208	114	47	2	371
2008	205	112	35	2	353

EXHIBIT 2-11

Percentage of Annual Water Use by Customer Category, 2008



As shown in Exhibits 2-10 and 2-11, most annual water consumption was in the Residential category, which is primarily single-family residences. In 2008, the Residential category accounted for approximately 58 percent of total metered water use. The combined Commercial and Multi-Family category accounted for the next highest percentage of use, at 32 percent. Irrigation use accounted for 10 percent of total metered use, and City use for irrigation and public buildings accounted for 0.4 percent of annual metered water use.

Top Water Users

Exhibit 2-12 presents the largest 15 individual water accounts for 2008. These accounts represented approximately 20 percent of all metered consumption in 2008. Ten of the 15 accounts were for multiple-family residential accounts. The highest water-using account is for the community of Greentrees East. This community of approximately 480 people accounted for approximately 5 percent of annual consumption.

EXHIBIT 2-12

City of Florence Largest Individual Water Accounts Annual Consumption, 2008

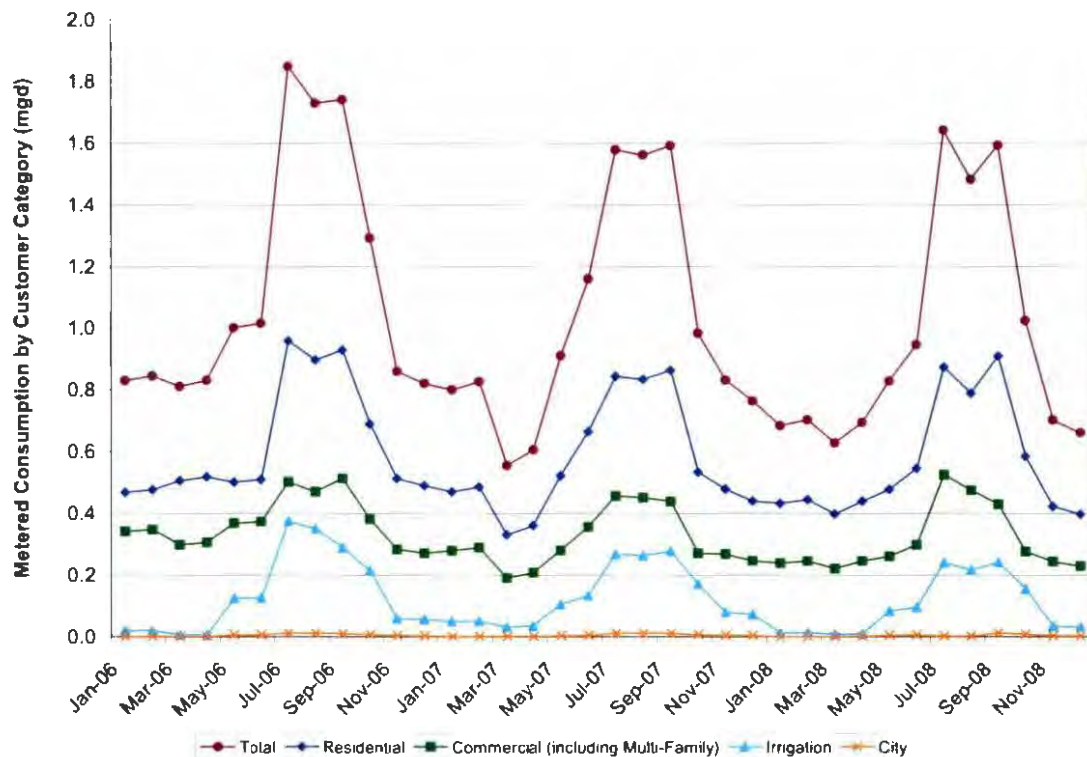
	Total (MG)	Percent of Annual Consumption
Greentrees East	19.2	5.4%
Coast Village	10.9	3.1%
Greentrees VCC	9.3	2.6%
School	9.2	2.6%
Safeway	3.4	1.0%
Hospital	3.1	0.9%
Siuslaw Appt	2.7	0.8%
Coast Guard	2.2	0.6%
Lane County Housing – Housing and Community Services Agency of Lane County	2.1	0.6%
Viking Redi Mix	1.9	0.5%
Oak Terrace	1.8	0.5%
Shorewood Retirement	1.8	0.5%
Spruce Point	1.8	0.5%
Timbers Apt	1.6	0.5%
Elderberry Square	1.2	0.3%
Total	72.3	20.4%

Monthly Consumption

All meters are read bimonthly during even-numbered months. Bimonthly data were converted to monthly data based on production data for each bimonthly period. Beginning in August 2009, the City will be implementing monthly meter reading and billing. **Exhibit 2-13** shows the estimated monthly metered consumption by customer category from 2006 through 2008. As shown, metered consumption increased for all categories during the summer months. The large increase in Residential and Commercial use during the summer months likely can be attributed to a combination of water for irrigation, increased resident population, and increased tourist presence in motels, summer homes, and restaurants. December through March likely represent the period during which no outdoor use occurs, and the “shoulder” months of April, May, October, and November reflect transitions between seasons. Water use during these transitional periods may reflect some irrigation, or seasonal changes in commercial and industrial water requirements.

EXHIBIT 2-13

Monthly Metered Consumption by Category for Customers within the City of Florence, 2006-2008



Seasonal trends are further illustrated in **Exhibit 2-14**, which shows the average monthly consumption for City, Irrigation, Residential, and Commercial customer categories by season for 2008. The summer season was defined as the 4 months with the highest overall metered consumption. In 2006 and 2008, these months were July through October, and in 2007 these months were June through September.

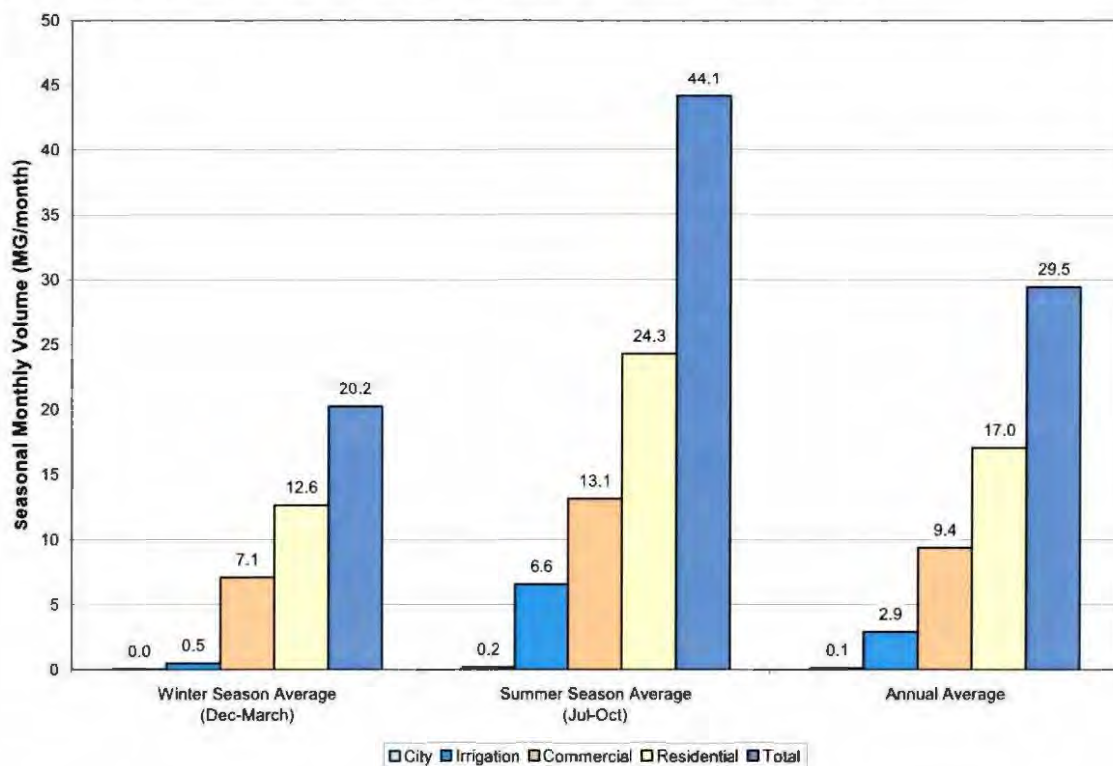
Annual consumption for City uses is relatively small in comparison to other customer categories, accounting for only 0.4 percent of total metered consumption in 2008.

Some water use from Irrigation accounts (averaging 500,000 gallons per month) occurred during the winter months. This water may represent a conservation opportunity for the City to investigate. If, for example, this use results from customers' failure to turn off automated sprinkler systems, the City could work with customers to ensure appropriate irrigation uses.

Residential consumption rates were approximately two times greater during the summer than during the winter.

EXHIBIT 2-14

City of Florence Average Monthly Consumption by Season and Customer Category, 2008



The total average monthly consumption for the summer months was 44 MG per month (1.4 mgd) compared to an annual average of 29.5 MG per month (1.0 mgd) and a winter

season average of 20.2 MG per month (0.7 mgd). A summer season to winter season ratio of approximately two to one is typical of many communities in western Oregon.

Indoor and Outdoor Water Use

To estimate the amount of indoor versus outdoor water use for select customer categories, the following assumptions were made:

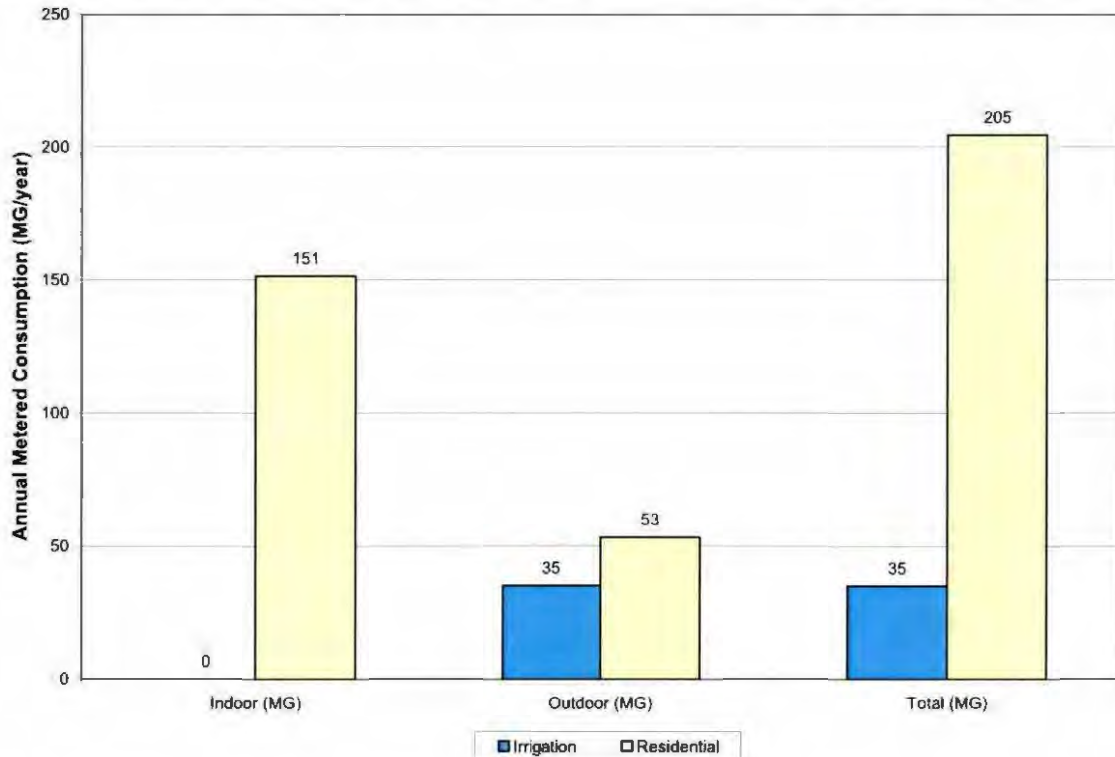
- Irrigation use was all assigned to outdoor use even though some of the use occurred during winter months.
- Residential account wintertime use was assumed to be representative of annual indoor water use.
- An estimated 1 percent decrease (approximately 100 people) in the residential population was assumed to occur during the winter months.¹ To estimate the indoor use for the summer population, winter consumption plus 1 percent was assumed to be representative of annual indoor water use for the residential category. (This does not account for increased tourist occupancy of residences.)

¹ Estimate by City of Florence staff.

Exhibit 2-15 presents the estimated average annual indoor and outdoor use by category for the Irrigation and Residential categories in 2008. Outdoor use represented approximately 26 percent of annual use by single-family residences, which is a relatively modest rate of outdoor use. Based on these data, conservation efforts targeting indoor water consumption of residences may prove beneficial.

EXHIBIT 2-15

City of Florence Average Annual Indoor and Outdoor Metered Consumption; Select Customer Categories, 2008



Use by Commercial and Multi-family customers was not included in this analysis because of the varied types of customers included in the Commercial category. The City may want to consider separating the Multi-family accounts from the Commercial accounts to better characterize this water consumption.

As noted above, non-summer season use of irrigation accounts may provide an opportunity for conservation. Individual seasonal use analyses for the largest volume water users may be justified to help further identify areas to target for conservation.

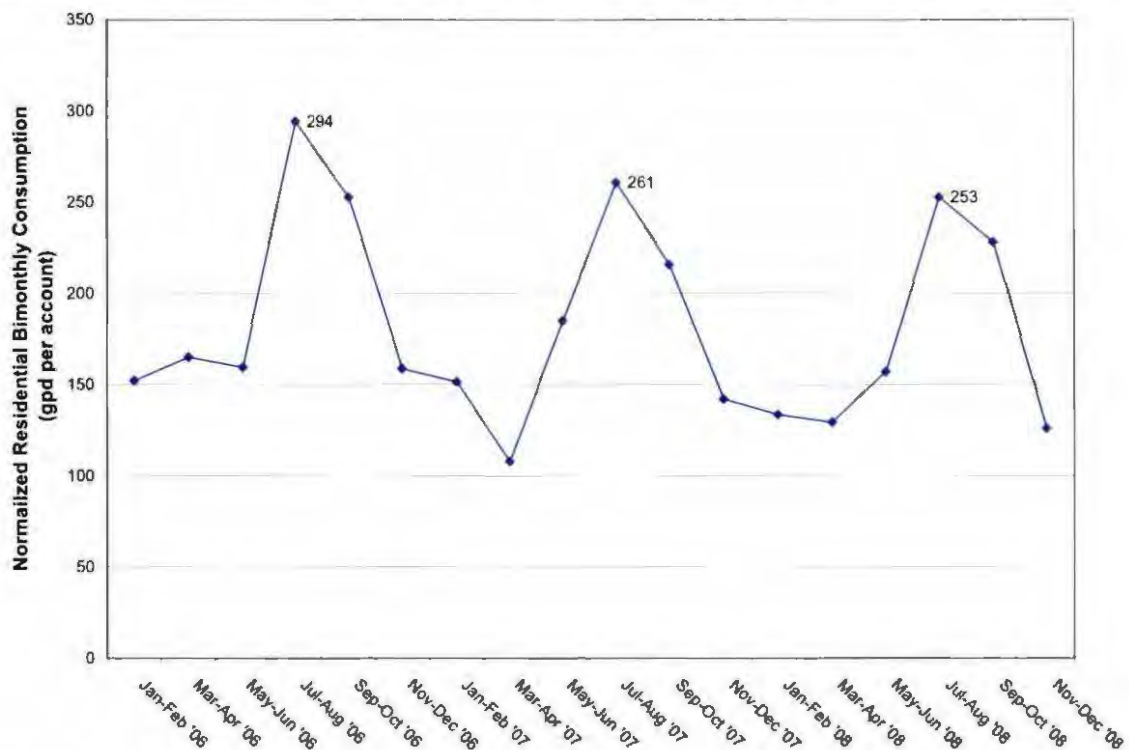
Single-Family Residential and Commercial Water Use Trends

Normalizing different categories of water use data by the number of accounts per category is helpful for determining trends in water use.

Exhibit 2-16 presents normalized single-family residential water use data. During the period 2006 to 2008, peak normalized single-family residential bimonthly water consumption declined from 294 gpd per account to 253 gpd per account in 2008. The reduction in peak water use per account may be partially the result of heightened interest in water conservation and more efficient landscape irrigation in new residences. Winter season normalized use also showed a decline from approximately 155 gpd per account in 2006 to 135 gpd per account in 2007-2008. Additional data will help confirm whether these reductions are trends or the result of normal variation.

EXHIBIT 2-16

City of Florence Historic Monthly Single-family Residential Water Bimonthly Use per Account, 2006-2008



Residential Per Capita Demand

Indoor, outdoor, and overall single-family residential per capita demands were estimated on the basis of overall annual demand in 2008, the fraction of demand for the residential customer category based on billed consumption, and an estimate of the proportion of single-family resident population to total population as follows:

- 2008 overall ADD per capita from trendline = 120 gpcd
- Single-family portion of total use = 58 percent
- Single-family portion of total population = 60 to 74 percent

Based on these data, single-family average daily per capita demand ranged from 94 to 116 gpcd. Of this, 74 percent, or between 70 and 86 gpcd, was for indoor use and 26 percent, or between 24 and 30 gpcd, was for outdoor use.

Typical indoor per capita residential demand ranges from 60 to 80 gallons per person per day.² Typical outdoor per capita residential demand ranges from 10 to 80 gpcd for single-family residences.³ Based on these typical ranges, indoor and outdoor residential per capita demand for the City residents were within the typical range for indoor consumption and on the low end of the typical range for outdoor consumption.

Unaccounted-for Water

OAR 690-086-0140(9)

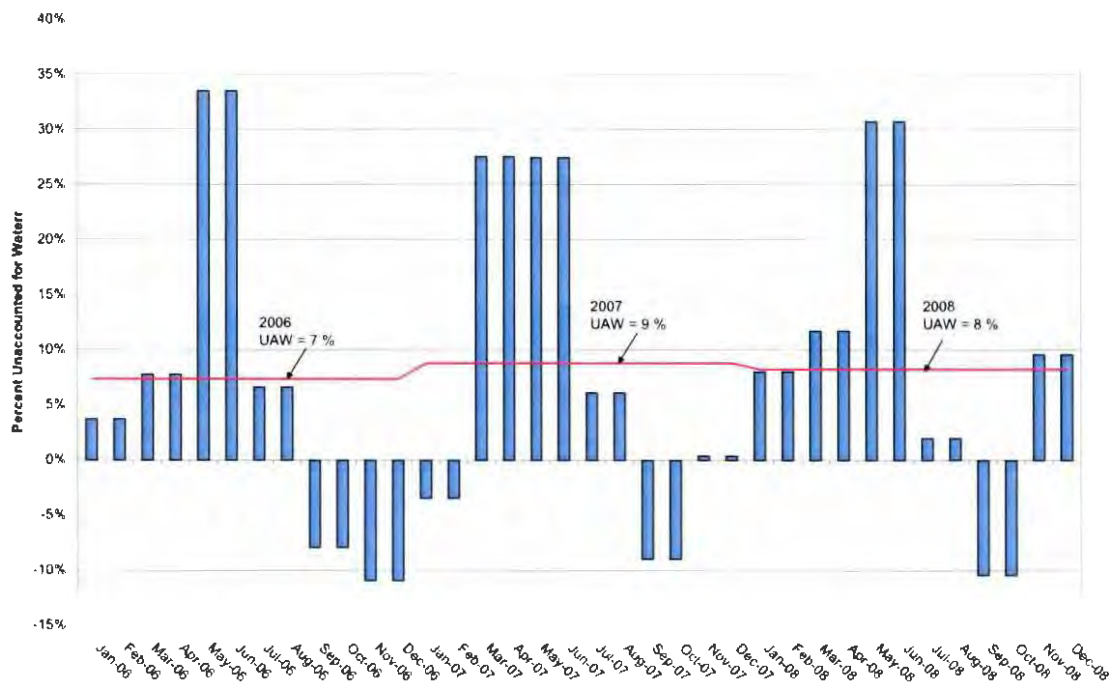
The difference between production and metered consumption divided by production equals the percent of unaccounted-for water (also known as non-revenue water) for the system. The causes of unaccounted-for water may include meter inaccuracies, reservoir overflows because of operational constraints, unmetered use, and leakage.

² AWWA, *Water Conservation Programs – A Planning Manual: Manual of Water Supply Practices M52*, 1st Edition, 2006.

³ *Ibid.*

Exhibit 2-17 graphically displays the monthly percentage of unaccounted-for water and the annual average unaccounted-for water for 2006 through 2008. Unaccounted-for water rates often vary from month to month because the timing of meter reading for production and consumption meters is not synchronized. This sometimes leads to larger consumption values than production values for a given period, and a calculated negative unaccounted-for water rate. Variations are reduced when the data are averaged for longer periods, such as an entire year. In Florence, production meters were read monthly while customer meters were read bimonthly before August 2009. The transition from bi-monthly to monthly billing in August 2009, described under “Annual Water Audit” will allow comparison of water production and consumption monthly. This should make the monthly rates of unaccounted-for water more consistent in the future.

EXHIBIT 2-17
Monthly and Annual Rates of Unaccounted-for Water, 2004-2008



The City's annual unaccounted-for water rates have been below the OWRD goal for municipal systems. The OARs set a goal for municipal system leakage (a potential portion of unaccounted-for water) of 15 percent or less, and, if feasible, 10 percent.

City Water Rights

OAR 690-086-0140(5)

The City holds four water rights totaling 6.69 cfs or 4.3 mgd. **Appendix C** provides detailed information about each of the City's water rights. Of these water rights, three are for the use of groundwater totaling 5.89 cfs (3.8 mgd) and one is for the use of 0.8 cfs (0.5 mgd) of surface water. Currently, the surface water right is not in use.

Groundwater

The City's three groundwater rights for 5.89 cfs (3.8 mgd) are evidenced by a certificate (certificate 81398), a final order following a transfer of certificate 50606 (T-9301), and a permit (G-15056). Each right is described in more detail below.

Certificate 81398 has a priority date of September 16, 1965, and authorizes the use of up to 2.0 cfs (1.3 mgd) of groundwater from Wells 1 through 7 for municipal use.

The water right currently evidenced by transfer T-9301 (previously certificate 50606) has a priority date of July 1, 1976, and authorizes the use of up to 0.89 cfs (0.57 mgd) of groundwater from Wells 1 through 7 for municipal use. This right was previously certificated with Well 2 (now referred to as Well 1) as the only point of appropriation. The City requested a transfer (T-9301) to add the additional wells to this water right. OWRD issued a final order for T-9301, authorizing use of the additional points of appropriation and cancelling certificate 50606. The transfer order required the City to complete the change before October 1, 2008. The City requested, and OWRD approved, an extension of time to complete the change until October 1, 2013.

Permit G-15056 has a priority date of February 2, 2001, and authorizes the use of up to 3.0 cfs (1.9 mgd) of groundwater from Wells 8 through 12 for municipal use. The City filed an application for an extension of time for permit G-15056. OWRD issued a final order extending the time limits for development of this permit until October 1, 2025. The City submitted a Claim of Beneficial Use (COBU) requesting to partially perfect permit G-15056 for 2.4 cfs of the 3.0 cfs total authorized by the permit. Currently, the City is limited to using 2.4 cfs of permit G-15056 until a final order is issued approving the City's WMCP. Permit G-15056 contains conditions for mitigating impacts to surface water, which require delivery of water to the wetlands in late October and diversion of clarified backwash from the City's WTP to the wetlands.

Surface Water

The City's surface water right is evidenced by certificate 32115, which authorizes the use of up to 0.8 cfs (0.5 mgd) of surface water from Munsel Creek for municipal use. The certificate has a priority date of August 6, 1948. The point of diversion for this water right is more than a mile downstream from the City's WTP and the water under this certificate currently is not being used. Different water treatment systems would be required to treat water from Munsel Creek. Furthermore, there are sensitive and threatened fish species in Munsel Creek.

Aquatic Resource Concerns

The City's current water supply is from groundwater. The dunal sand aquifer that is developed by the City's wells is not in an OWRD-designated Critical Groundwater Area or Groundwater Limited Area, however, the wells are located within the only Environmental Protection Agency designated Sole Source Aquifer in Oregon. In addition, the City holds a water right to divert water from Munsel Creek. **Exhibit 2-18** shows the listed fish species that occur in Munsel Creek. Munsel Creek is not on the Oregon Department of Environmental Quality's (DEQ) 303(d) list as water quality limited for any parameters.

EXHIBIT 2-18

Listed Fish Species in Munsel Creek

Species	Evolutionarily Significant Unit (ESU)	Federal Listing	State Listing	Notes
Coho salmon (<i>Oncorhynchus kisutch</i>)	Oregon Coast	Threatened	Sensitive – Vulnerable	
Steelhead trout (<i>O. mykiss</i>)	Oregon Coast	Sensitive	Sensitive – Vulnerable (winter runs)	State listed winter runs, federal did not list the specific seasonal runs
Western brook lamprey (<i>Lampetra richardsoni</i>)		N/A	Sensitive – Vulnerable	
Pacific lamprey (<i>L. tridentate</i>)		N/A	Sensitive - Vulnerable	

- Federal ESA listed species (threatened and endangered) were obtained from www.nmfs.noaa.gov/pr/species/esa/fish.htm
- Federal Sensitive species were obtained from the Interagency Special Status/Sensitive Species Program (Oregon and Washington) at www.fs.fed.us/r6/sfpnw/issssp/agency-policy/
- State ESA listed species (threatened and endangered) were obtained from www.dfw.state.or.us/wildlife/diversity/species/threatened_endangered_candidate_list.asp
- State Sensitive species were found at www.dfw.state.or.us/wildlife/diversity/species/docs/SSL-by-taxon.pdf

Evaluation of Water Rights/Supply

OAR 690-086-0140(3)

As described above, the City holds groundwater rights that authorize the use of up to 5.89 cfs (3.8 mgd) of groundwater, and these water rights have never been regulated (curtailed) by OWRD. The dunal sand deposits have a relatively high effective porosity and permeability that creates an aquifer with a high capacity to store and transmit groundwater. The characteristics of the sand deposits coupled with the high annual recharge rates from rainfall along the Oregon Coast create a productive and reliable municipal water supply. Based on a recent aquifer recharge analysis, it is likely that the City could sustainably appropriate approximately 4.34 to 7.6 cfs (2.8 to 4.9 mgd) from the sand deposits without causing long-term declines in groundwater levels.

Infrastructure Improvements to Maximize Water Rights

The City's water supply is limited by the current capacity of its wells. Based on recent field observations, the production capacity of the City's wells is insufficient to produce

the full rate of 5.89 cfs (3.8 mgd) authorized by the City's groundwater rights. In August of 2008, the City's wells produced approximately 2.7 mgd. For the period 2004 through 2008, the City's ADD averaged 1.15 mgd, and its MDD averaged 2.12 mgd. The City recently took steps to improve water production at its existing wells, but additional actions may be needed. In addition, the City has allocated funding for, and is evaluating submittal of a transfer application and construction of new Wells 13 and 14.

Another constraint is that the City's WTP has a capacity of only 3 mgd, which is less than the 5.89 cfs (3.8 mgd) of groundwater rights held by the City. The City will need to upgrade its WTP in order to treat the full quantity of water authorized by its groundwater rights.

Need for New Water Rights

As described in later chapters, the City's water rights are reliable and adequate to meet current demand, but the City may need additional water rights near the end of the 20-year planning period considered in this WMCP.

A key concern for the City is that its entire water supply relies on a sole source, consisting of a number of wells located in a small area. In the event of an emergency, such as a chemical spill or malicious attack, the City may not be able to use its current wellfield. To provide for water supply redundancy and expand water supply, the City is evaluating a potential additional wellfield site located northwest of the existing wellfield. It is likely that new water rights would be required for the additional well field.

As noted above, the City does not divert water under its surface water right for Munsel Creek, and it is unlikely that new water rights would be approved for the use of surface water. Thus, the City may need to pursue new groundwater rights to help meet future demand and water supply redundancy needs.

3. Water Conservation

This section satisfies the requirements of OAR 690-086-0150.

Current Conservation Measures

OAR 690-086-0150(1) and (3)

The City does not have a previously approved WMCP. The City recognizes that conservation measures are needed to maximize the efficient use of water and thereby help to slow the growth of demand for water. The City's current water management and conservation measures are described below.

Inclining Block Water Rate Structure

One of the highlights of the City's current water conservation measures is its recently updated water billing structure. The City is proud to be one of the few Oregon municipalities that have adopted a water rate structure that strongly encourages water conservation. In June 2009, the City Council adopted several resolutions amending fees for water, wastewater, and stormwater. The inclining block water rate structure has a base rate with no allowance and three rate blocks that increase the cost per unit of water as more water is used. This provides a direct financial incentive for the City's water customers to maximize conservation. The current block rates are as follows:

- Zero to 1,000 cubic feet: \$0.0136 per cubic foot
- 1,001 to 1,500 cubic feet: \$0.0149 per cubic foot
- 1,501+ cubic feet: \$0.0178 per cubic foot

The City plans to continue using this rate structure as a key component of its water conservation measures.

Monthly Water Billing Cycle

In the past, the City billed customers for water every other month. In August, 2009, the City adopted a new billing schedule so that customers receive monthly water bills. This provides the customer with much more direct and timely feedback on their water use. As a result, customers are more likely to be aware of increases in their water use, and can take more timely action to conserve water and keep their water bill as low as possible. The monthly billing cycle is an important component of the City's current conservation efforts.

System Development Charges

The City assesses a water system development charge for commercial uses based on the area to be landscaped and irrigated. As of July 1, 2009, the City will charge \$3,268.48 per 2,500 square feet of turf landscaping with conventional irrigation and \$3,268.48 per 4,000 square feet of landscaping with drip irrigation or very low-spray emitting heads.

Landscaping Code

The City encourages the use of native vegetation. Currently, proposed code amendments are being reviewed in a public hearing process that includes a landscaping preservation credit. One obtains a "preservation credit" in the form of a reduction of the overall landscape area and planting requirements if existing significant vegetation on the site is preserved. This approach will save on water use because existing native vegetation will not require irrigation and less landscaping and irrigation will be required if a preservation credit is granted.

Housing Rehabilitation Grant Program

The City is involved in a housing rehabilitation grant program. While this program does not specifically focus on reducing water usage, rehabilitation and renovations often include measures that improve water use, such as replacing existing fixtures and appliances with more efficient ones.

Residential Water Conservation Partnership

In the early 1990s, the City partnered with Central Lincoln People's Utility District (PUD), which provides electrical service, to encourage water conservation. This program included shower head, toilet tank, and faucet aerator replacement, as well as written communication about these conservation opportunities through the PUD's billing system.

Water Quality Report

The City's annual Water Quality Report contains a section devoted to water conservation tips. This document is posted on the City's webpage and is mailed to water customers.

Meter Testing and Maintenance

The City conducts regular meter testing and maintenance for large meters (3-inch or greater). These large meters are typically found in multi-family residential complexes, hotels, other businesses, and schools.

Leak Detection and Repair

City staff routinely inspects elements of the City's water system and strives to detect leaks as soon as possible to minimize water loss. The City responds promptly to leaks reported by customers and makes appropriate repairs.

Water Audits

Beginning in August 2009, the City began to track and compare water production and metered consumption data monthly. This practice helps City staff to determine the amount of unaccounted-for water.

Public Education

The City's water bills include messages encouraging conservation. In addition, City staff members have participated in radio talk shows to discuss the City's water system and conservation.

Use of Non-Potable Water

The City currently irrigates Miller Park with non-potable water from a well.

Use and Reporting Program

OAR 690-086-0150(2)

The City collects its water use data at an in-line master meter going into its water treatment plant. The City's water measurement and reporting program complies with the measurement standards in OAR Chapter 690, Division 85. The City's water use records can be found at http://apps2.wrd.state.or.us/apps/wr/wateruse_report/.

Required Conservation Programs

OAR 690-086-0150(4)

OAR 690-086-150(4) requires that all water suppliers establish 5-year benchmarks for implementing the following water management and conservation measures:

- Annual water audit
- System-wide metering
- Meter testing and maintenance
- Unit-based billing
- Leak detection and repair (if system leakage exceeds 10 percent)
- Public education

Five-Year Benchmarks for Required Existing or Expanded Conservation Measures

During the next 5 years, the City plans to initiate, continue, or expand the following programs that are required of all municipalities:

- **Annual Water Audit.** In August, 2009, the City transitioned from bi-monthly billing to monthly billing, and began to compare water production and consumption monthly. These measures will help the City, its residents, and its businesses to monitor and conserve water, and will aid in the water auditing process. Unlike many other municipalities, Florence has a very low percentage of unaccounted-for water. The City is committed to expanding its water auditing to further maximize the efficiency of its water system.

5-Year Benchmarks:

- Conduct an annual City-wide water audit using a systematic and documented methodology for estimating water produced and consumed, unaccounted-for water, and unmetered authorized and unauthorized uses.

- Separate the data and tracking of multi-family accounts from the commercial accounts to better characterize those user categories. This will help clarify the extent of commercial and residential use.
 - Maintain City utility billing records for at least 5 years to provide historical water consumption data.
- **System Metering.** All customers served by the City are metered.

5-Year Benchmark:

- Continue to require meters for all development within the City.
- **Meter Testing and Maintenance.** Currently, the City conducts annual meter testing and maintenance for large meters (3-inch or greater). These large meters are typically found in multi-family residential complexes, hotels, other businesses, and schools that use relatively large amounts of water. In addition, the City has been replacing its residential manual read meters with radio read meters during the last several years. Approximately 50 percent of the City's residential meters have been converted to radio read at this point. While retrofitting the residential meters, the City staff has been checking the existing meters to ensure that the meters are not older than the manufacturers suggested longevity. If the meters are older or are found to be malfunctioning, they shall be replaced.

5-Year Benchmark:

- Continue to conduct annual meter testing and maintenance for 3-inch and larger meters.
 - Continue to retrofit meters to radio read. Over the next 5 years, approximately 500 residential meters will be retrofitted and checked for age and function.
- **Inclining Block Water Rate Billing Program.** One of the highlights of the City's current water conservation measures is the recently updated water billing structure. The inclining block water rate structure has a base rate with no allowance and three rate blocks that increase the cost per unit of water as more water is used. This provides a direct financial incentive for the City's water customers to maximize conservation.

5-Year Benchmark:

- The City will continue to use an inclining block water rate structure that supports and encourages water conservation.

- **Leak Detection and Repair.** While the City's unaccounted-for water is less than 10 percent, the City will continue its current leak detection and repair activities.

5-Year Benchmark:

- Continue routine water system surveillance and response to reported leaks.
- **Public Education.** Currently, the City's water bills include messages encouraging conservation. In addition, City staff has participated in radio talk shows to discuss the City's water system and conservation.

5-Year Benchmarks:

- Provide more detailed conservation messages and tips in monthly water bills, including reminders to turn off irrigation systems during the winter.
- Expand the City's website to include tips and techniques for indoor, outdoor, and commercial water conservation.
- Host a water conservation booth at annual City events and festivals.
- Provide informative materials (brochures, samples) in the City's building department where people come to apply for permits.

Expanded Use under Extended Permits

OAR 690-086-0150(5)

Although the City plans to expand or initiate diversion of water under an extended permit, the City does not plan to do so with any permit for which resource issues have been identified under OAR 690-086-0140(5)(i). Therefore, the requirements of OAR 690-086-0150(5) are not applicable. Nonetheless, the City's unaccounted-for water, and therefore its system leakage, is less than 15 percent, as described in Section 2.

Requirements Based on Water Service Population in Excess of 7,500

OAR 690-086-0150(6)

OAR 690-086-0150(6) requires municipal water suppliers serving a population greater than 7,500 to implement an additional set of conservation measures or to provide documentation showing that implementation of the measures is neither feasible nor appropriate. Because the City serves a population of more than 7,500, a discussion of implementation to date and 5-year benchmarks for these measures follows:

- **System-wide leak repair program or line replacement program.** *The City's unaccounted-for water, and therefore its system leakage is less than 10 percent. The City will continue its leak detection and repair activities, as described above.*
- **Technical and financial assistance programs to encourage and aid residential, commercial, and industrial customers in implementation of conservation measures.**

5-Year Benchmarks:

- Post "how-to" technical information about conservation on the City's website for residential and commercial users.
- Conduct three property manager workshops on conservation at multi-family residences.
- Conduct an evaluation of conservation opportunities at multi-family residential facilities, and conduct water audits of the three largest water users in that category.
- **Supplier financed retrofitting or replacement of existing inefficient water using fixtures, including distribution of residential conservation kits and rebates for customer investments in water conservation.**

5-Year Benchmarks:

- Make available 100 indoor conservation kits. Kits could include faucet aerators, low-flow shower heads, toilet leak detectors, and a list of other indoor water conservation options and techniques.
- Make available 100 outdoor conservation kits. Kits could include lawn watering measuring cans, rain gauges, hose nozzles with variable spray, and packages of drought-resistant plant seeds.
- The City does not intend to provide rebates for replacing water using fixtures at this time for the following reasons:
 - A large proportion of the housing stock in the City is relatively recent and outfitted with modern efficient appliances.
 - The City recently implemented a tiered water rate structure to provide an incentive for its customers to reduce their water consumption, which should provide an incentive to replace inefficient fixtures.
 - Current budget constraints prevent the City from developing such a program at this time.

- **Adoption of rate structures, billing schedules, and other associated programs that support and encourage water conservation.**

5-Year Benchmarks:

- The City will continue to use an inclining block rate water billing system that supports and encourages water conservation.
 - The City will continue to use a monthly water billing cycle.
 - The City will provide more detailed conservation messages and tips in monthly water bills, including reminders to turn off irrigation systems during the winter.
- **Water reuse, recycling, and non-potable water opportunities.** The City currently irrigates Miller Park with non-potable water from a well. Although the City does not currently have any water reuse programs, the City will investigate opportunities to do so.

5-Year Benchmark:

- Evaluate opportunities to reuse water and expand use of non-potable water.
- **Any other conservation measures identified by the water supplier that would improve water use efficiency.**

5-Year Benchmark:

- Provide messages in water bills during the winter reminding customers to make sure that automated irrigation systems are turned off during the winter.

4. Curtailment Plan

This section satisfies the requirements of OAR 690-086-0160.

Introduction

Curtailment planning is the development of proactive measures to reduce demand during supply shortages resulting from prolonged drought, or system failure from unanticipated events including catastrophic events (flooding, landslides, earthquakes, and contamination), mechanical or electrical equipment failure, or events not under the control of the City (for example, localized or area-wide power outages and intentional malevolent acts).

The goal of this curtailment plan is to have objective criteria that trigger actions that will ensure sufficient water to meet the water demands of the water supply system, without jeopardizing the health, safety, or welfare of the community.

History of System Curtailment Episodes

OAR 690-086-0160(1)

Although the City has not needed to impose mandatory water curtailment measures, the City placed ads in the newspaper encouraging residents to voluntarily conserve water during a drought in the early 1990s. The City has limited in-line storage. In the event of a major water supply disruption, the City's 4.5 million gallons (maximum) of stored water would need to be managed carefully, and major restrictions could be needed on all types of municipal water use. In the event of a drought, reduced aquifer recharge could reduce the City's ability to access groundwater from its wellfield. The provisions of the City's curtailment plan, as described below, are intended to address what would happen during such events.

Curtailment Stages and Event Triggers

OAR 690-086-0160(2) and OAR 690-086-0160(3)

Exhibit 4-1 summarizes the stages and initiating triggers for the City's water curtailment plan.

EXHIBIT 4-1

Water Shortage Stages and Initiating Conditions

Shortage Stage	Initiating Conditions
Stage 1: Water Shortage Alert	1. General recognition of drought conditions in Lane County; or 2. Demand reaches 80 percent of water supply capacity as determined by the City Manager for a period of 3 or more consecutive days; or 3. Water supply approaches the minimum required for fire protection or other essential needs as determined by the City Manager.
Stage 2: Serious Water Shortage	Governor has declared a drought in Lane County and the continuation of hot, dry weather is predicted, or if the City's water demand is 81 to 90 percent of water supply capacity for 3 or more consecutive days as a result of a natural or human-caused event.
Stage 3: Severe Water Shortage	Water demand is more than 90 percent of water supply capacity for 3 or more consecutive days for any reason, whether natural or human-caused.
Stage 4: Critical Water Shortage	Failure of a system component or non-drought emergency conditions results in an immediate shortage of water. Examples include: failure of main transmission lines, failure of the intake or WTP, chemical spills, or a malevolent attack on the system that introduces a contaminant at some point in the system.

Stage 1: Water Shortage Alert

Stage 1: Water Shortage Alert will activate a program to inform customers of the potential for drought and water shortages, and reasons to voluntarily conserve water. Stage 1 will be activated by the City Manager and will be triggered when any of the following conditions exist:

1. General recognition of a drought in Lane County
2. Demand reaches 80 percent of water supply capacity as determined by the City Manager for a period of 3 or more consecutive days
3. Water supply approaches the minimum required for fire protection or other essential needs as determined by the City Manager.

Under Stage 1, the City will issue a written notice requesting voluntary reduction in water use by all customers. The notice will include a description of the current water situation, the reason for the requested conservation measures, and a warning that mandatory restrictions will be implemented if voluntary measures are not sufficient to achieve water use reduction goals. A similar notice could be issued through local media (such as newspaper, radio, or TV). However, if the drought is regional, the media already may be alerting users of water supply concerns. Therefore, the City's Stage 1 plan does not automatically involve press releases or paid media announcements.

When Stage 1 is triggered, the City will ask customers to voluntarily comply with the following:

- Minimize landscape watering between 10 a.m. and 6 p.m., the period of highest water loss resulting from evaporation.
- Water landscapes on alternate days (even-numbered addresses water on even-numbered days and odd-numbered addresses on odd-numbered days).

Stage 2: Serious Water Shortage

Stage 2 is similar to Stage 1 except the voluntary measures regarding outdoor water use will be made compulsory by the City Manager, and additional non-essential water use will be prohibited. Stage 2 will be initiated by the City Manager if the Governor has declared a drought in Lane County and the continuation of hot, dry weather is predicted, or if the City's water demand is 81 to 90 percent of water supply capacity for 3 or more consecutive days as a result of a natural or human-caused event.

Under Stage 2, City customers will be notified of the following water restrictions:

1. Water landscapes only between 6 p.m. and 10 a.m.
2. Water landscapes only when allowed by the odd/even schedule.
3. No water use for washing motorbikes, motor vehicles, boat trailers, or other vehicles except at a commercial washing facility that practices wash water recycling. (Exceptions include vehicles that must be cleaned to maintain public health and welfare, such as food carriers and solid waste transfer vehicles.)
4. No water use to wash sidewalks, walkways, driveways, parking lots, tennis courts, and other hard-surfaced areas.
5. No water use to wash building structures, except as needed for painting or construction.
6. No water use for a fountain or pond for aesthetic or scenic purposes, except where necessary to support fish life.

7. Discourage serving water to customers in restaurants unless water is requested by the customer. This action does not provide significant water savings, but is useful for generating awareness of the need to curtail use.
8. No water use for dust control unless absolutely necessary, as determined by the City Manager.

Stage 3: Severe Water Shortage

Stage 3 will be initiated by the City Manager when water demand is more than 90 percent of water supply capacity for 3 or more consecutive days for any reason, whether natural or human-caused. Stage 3 measures include the following:

1. Perform actions indicated for Stage 2.
2. Replace the restriction of odd/even watering from Stage 2 with a prohibition on all outdoor watering (exceptions include new lawn, grass, or turf planted after March 1st of the calendar year in which restrictions are being imposed; sod farms; high-use athletic fields; or park and recreation areas specifically designated by the City Council.)
3. No water use to fill, refill, or add to any indoor or outdoor swimming pools or hot tubs, except if one of the following conditions is met: the pool is used for a neighborhood fire control supply, the pool has a recycling water system, the pool has an evaporative cover, or the pool's use is required by a medical doctor's prescription.
4. No water use from hydrants for construction purposes (except on a case-by-case basis approved by the City Manager), fire drills, or any purpose other than fire fighting.
5. Implement limitations on commercial uses of water, depending on the severity of the shortage.
6. Issue public service announcements to notify customers of the severity of the conditions.

Stage 4: Critical Water Shortage

Stage 4 will be initiated by the City Manager when failure of a system component or non-drought emergency conditions results in an immediate shortage of water. Examples include failure of main transmission lines, failure of the WTP, chemical spills, or a malevolent attack on the system that introduces a contaminant at some point in the system. If the emergency causes, or is expected to cause, a shortage of water, the City will implement the curtailment measures of Stage 2 or Stage 3, as appropriate, in addition to the steps outlined below.

If water in the system is unsafe to drink (such as in the event of a chemical spill or malevolent attack) the City Manager will direct staff to notify customers as quickly as possible using local radio, print media, the City's website, and any other appropriate means. In addition, the City Manager will implement the following:

1. Contact the Oregon Drinking Water Program, Department of Human Services, and request its assistance in responding to the problem.
2. Notify the local news media, if appropriate, to ask for their assistance in notifying customers.
3. Call an emergency City Council meeting.
4. Contact the Oregon State Police and County Sheriff to obtain help in contacting customers.
5. Determine whether to use water system interties with other water providers, such as HWD.

The City will continue to investigate and develop specific backup plans for a Stage 4 emergency. These plans may include renting a water hauling truck and purchasing water from neighboring communities, sending customers to a pre-designated water distribution location, or supplying bottled water.

5. Water Supply

This section satisfies the requirements of OAR 690-086-0170.

Delineation of Service Areas

OAR 690-086-0170(1)

The current water service area for the City is within the City limits, as shown in **Appendix B**. Several small areas within the City limits are currently served by HWD. Water customers outside the City limits, but within the UGB, also are served by HWD.

As the City limits expand, discussions and agreements between the City and HWD will determine the evolving service areas of each entity. For planning purposes, two scenarios were considered for the limits of possible future service area for the City. The first scenario assumes that the City's future service area would be limited to the existing City limit boundary and areas outside the City limits that already are served by the City. The second scenario assumes that the City's future service area would be the current UGB. Most likely, the City's future service area will be greater than the area bounded by the current City limits and less than the area bounded by the UGB. The assumption that the City may need to serve the area bounded by the UGB is included for planning purposes because it reflects the largest area that the City might be required to serve in the future. Also, the City must be prepared to serve the entire UGB if HWD is unable to serve areas outside the City limits for any reason, such as by agreement with the City, or because of an emergency, such as an infrastructure failure, chemical spill, or malicious attack.

Population Projections

OAR 690-086-0170(1)

Data and planning estimates from PSU's Population Research Center, the *City of Florence Comprehensive Land Use Plan* (2004), the *Lane County Rural Comprehensive Plan: Coordinated Population Forecasts for Lane County and its Urban Areas* were used to estimate future populations within the City limits and within the UGB.

When population projections from the two comprehensive land use plans differed, the *Lane County Rural Comprehensive Plan* was used. Projected populations for 2010, 2020, and 2030 are presented in **Exhibit 5-1**.

EXHIBIT 5-1
City of Florence Population Projections

Year	Population Within City Limits	Population Between City Limits and UGB	Total Population Within UGB ¹
2010	9,783	1,429	11,212
2020	11,994	1,753	13,747
2030	14,251	2,072	16,323

¹ *Lane County Rural Comprehensive Plan: Coordinated Population Forecasts for Lane County and its Urban Areas*

Demand Forecast

OAR 690-086-0170(3)

Approach for Developing Demand Projections

Future demands for the City were projected using a constant per capita demand approach. This method of projecting demand assumes that per capita demand factors remain constant throughout the 20-year projection period.

Historical demand and population estimates were used to determine representative average day per capita demands and maximum day per capita demands for the City. Linear regression analyses of per capita demands from 2004 through 2008 were used to determine the following overall demand factors and standard errors.

- ADD per capita = 120 ± 11 gpcd
- MDD per capita = 225 ± 25 gpcd

These per capita demand values represent all types of water use within the City's service area including residential, commercial, and public water uses, and were assumed to remain constant through 2030. The per capita demand values were multiplied by the future populations to project future ADD and MDD.

Demand Projection Summary

Average and maximum day demand projections for 2020 and 2030 for the potential City water service areas are summarized in **Exhibit 5-2**.

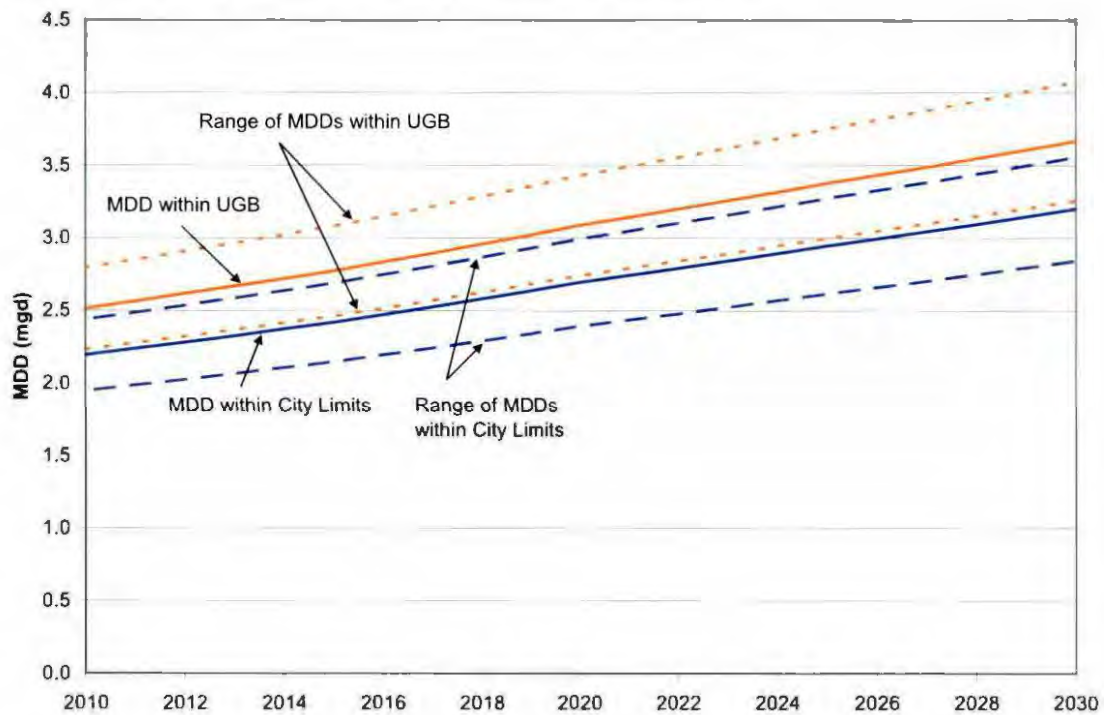
EXHIBIT 5-2

Average and Maximum Day Demand Projections for Limits of City of Florence Water Service Area, mgd

Year	City Limits		UGB	
	ADD	MDD	ADD	MDD
2020	1.4	2.7	1.6	3.1
2030	1.7	3.2	2.0	3.7

Because a city's infrastructure and water rights must be adequate to meet a system's MDD, projected MDD values are critical for planning purposes. **Exhibit 5-3** depicts the City's MDD projections. Also shown is the range of MDDs forecasted on the basis of variation in the per capita demand factor. The range of MDD in Exhibit 5-3 incorporates opportunities for increasing conservation at the lower end of the range and recognizes anomalies that may occur in demand due to weather, special events, and economic growth at the upper end. Although smooth demand curves are shown in Exhibit 5-3, the actual pattern of demand increase will vary depending on when expansion of water service within the UGB occurs. As shown in Exhibit 5-3, the difference between the two scenarios, which represents the MDD associated with the area between the City limits and the UGB, ranges from 0.3 mgd in 2010 to 0.5 mgd in 2030. Overlapping ranges of expected MDD for either scenario also are apparent in Exhibit 5-3. By 2030, the total MDD within the UGB is expected to range from 3.26 mgd to 4.07 mgd, and the MDD within the current City limits is expected to range from 2.84 mgd to 3.56 mgd.

EXHIBIT 5-3
Projected Maximum Day Demands for the City of Florence City Limits and UGB



Schedule to Exercise Permits and Comparison of Projected Need to Available Sources

OAR 690-086-0170(2) and (4)

Regardless of whether the City's future service area is limited to the current City limits and areas already served by the City outside the City limits but within the UGB, or the entire UGB, the City likely will need access to the entire undeveloped portion of water right permit G-15056 within 20 years. Thus, the City requests access to the remaining 0.6 cfs undeveloped portion ("green light water") of permit G-15056.

The City holds 5.89 cfs (3.8 mgd) of water rights from groundwater and 0.8 cfs (0.52 mgd) of water rights on Munsel Creek. As noted above, the City does not divert water from Munsel Creek. The authorized point of diversion for Munsel Creek is approximately 1 mile downstream of the WTP. The City's current infrastructure does not allow access to, or treatment of, Munsel Creek water, and there are sensitive and threatened fish species in Munsel Creek. The City's largest MDD to date was 3.43 cfs (2.22 mgd) in 2004.

Exhibit 5-4 shows the projected MDD and the upper range of the projected MDD for a water service area bounded by the current City limits, superimposed upon the City's groundwater water rights in units of cfs. As shown in Exhibit 5-4, by 2030 the City may need to supply approximately 5.0 cfs, and up to 5.5 cfs. This may require accessing more than 2.4 cfs of permit G-15056 by approximately 2027. However, this scenario is not used for planning purposes because it assumes the smallest service area and water use.

EXHIBIT 5-4

Projected Maximum Day Demands within the City of Florence City Limits, and Groundwater Rights, cfs

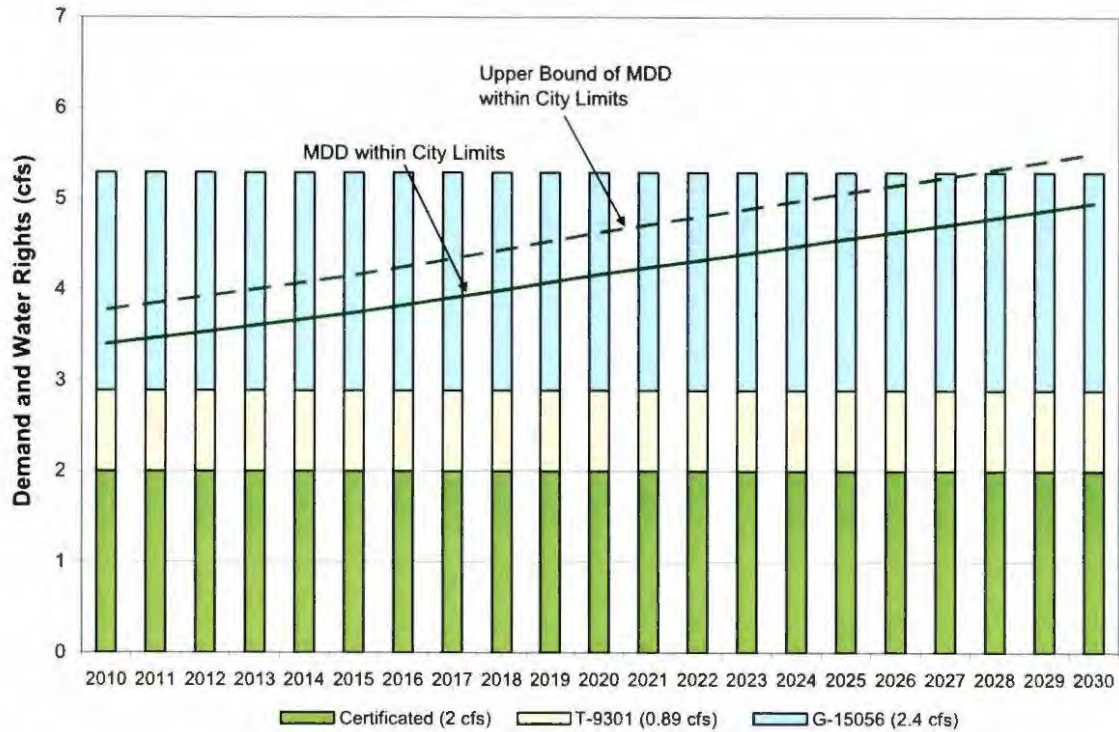
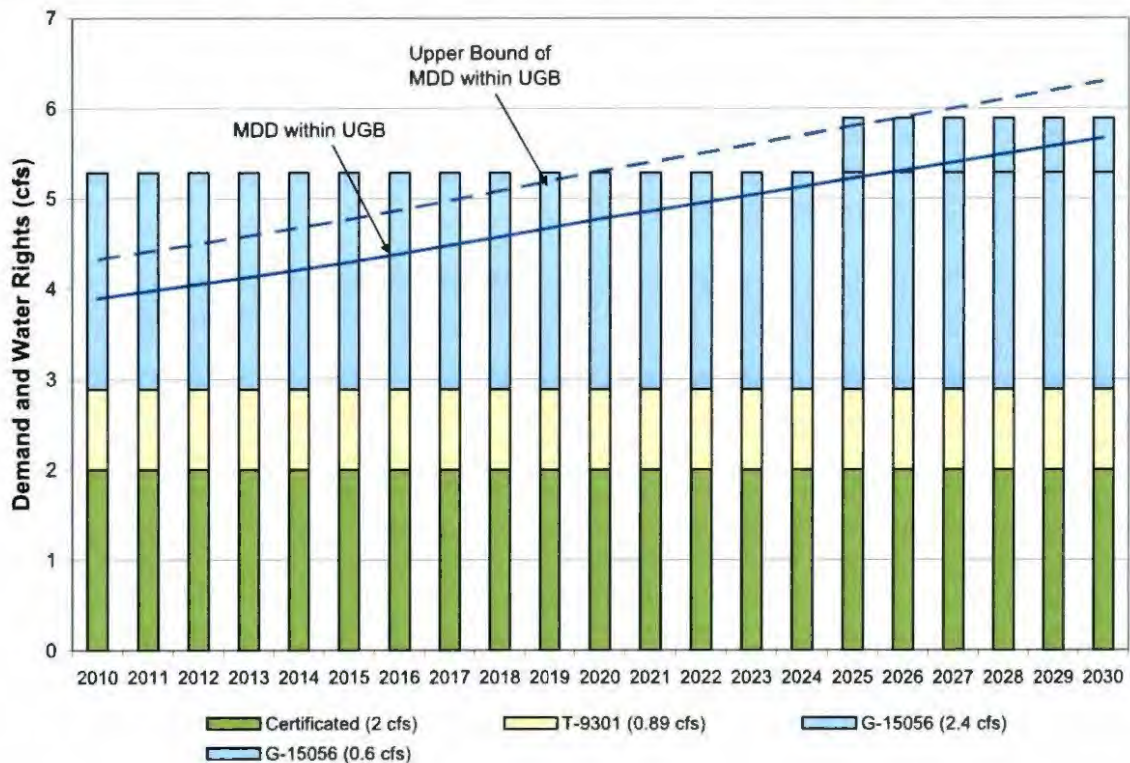


Exhibit 5-5 shows the projected MDD and the upper range of the projected MDD for a water service area bounded by the City's UGB, superimposed upon the City's groundwater rights in units of cfs. As shown in Exhibit 5-5, by 2030 the City may need to supply approximately 5.7 cfs, and up to 6.3 cfs to meet the community's MDD. This will require accessing more than 2.4 cfs of permit G-15056 by approximately 2025, or as early as 2020. Exhibit 5-5 also highlights the need for the City to seek additional water rights as described below. The City must also be prepared to serve water to the entire UGB. Based on these projections, the City requests access to the remaining undeveloped portion of permit G-15056 ("green light water"), which is 0.6 cfs.

EXHIBIT 5-5
Projected Maximum Day Demands within the City of Florence UGB, and Groundwater Rights, cfs



Alternative Sources

OAR 690-086-0170(5), (8)

As described above, the City relies exclusively on its groundwater supply from Wells 1 through 12. The City does not use its water right on Munsel Creek, and it is unlikely that the City could obtain new surface water rights.

The City's water conservation and management measures can be a significant factor in slowing the growth of demand for water, but are not likely to eliminate all such growth. As previously described, the majority of the City's water use is for residential and multifamily use, which has a very low average per capita use. Moreover, the City has an

overall average daily per capita use of 120 gpcd, which has slowly declined over the last 4 years. These low values and trends are likely to continue given the City's conservation efforts such as its rate structure and landscape ordinance. These low values and assumed trends are incorporated into the demand projections in Exhibit 5-3 and 5-5. The City intends to implement the various water management and conservation practices outlined in this WMCP in an effort to maximize the benefits of conservation, as well.

The City can purchase surplus water supply from HWD pursuant to an IGA using the existing infrastructure interties. However, the amount of water the City could obtain from HWD is limited by the capacity of the interties and by the amount of "surplus" water that HWD decides is available for sale. HWD may be able to provide a portion of the City's demand, but is unable to sustain a long-term supply for the City. For example, HWD's ability to receive water under its water rights is limited by easements that restrict the flow of water across the easement lands.

The City's most feasible and economical alternative is to develop the remaining portion of groundwater permit G-15056 (0.6 cfs), which is the amount of "green light water" that the City requests access to in this WMCP.

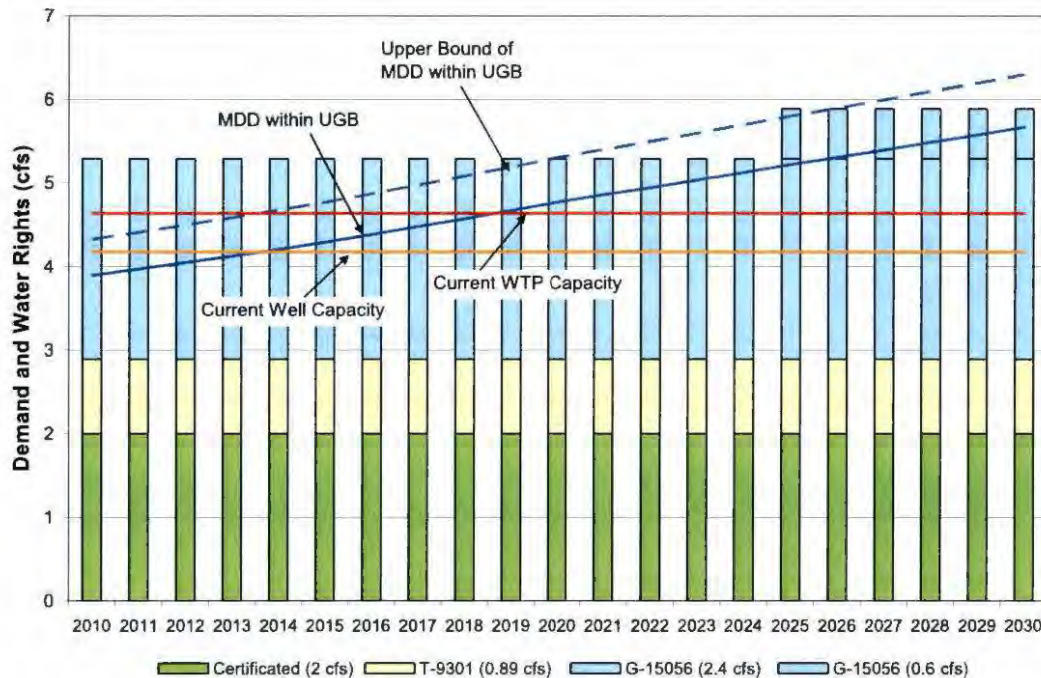
It is likely that the City's groundwater rights authorize enough water to meet the City's MDD through the end of this WMCP's 20-year planning period. However, the City's actual water production is significantly less than its authorized water rights. The City needs to take immediate action to address its water infrastructure constraints.

The City may need to pursue additional water rights within the 20-year planning period of this WMCP. Exhibit 5-5 provides a range in MDD over the next 20 years. A lower limit representing conservation was also shown in Exhibit 5-3. Projections indicate a potential for demand to exceed the City's water rights by approximately 2026. Moreover, Exhibit 5-6 shows that the City's infrastructure may not be sufficient to fully utilize the City's existing water rights, conveying the need for a new water right. While conservation measures may help Florence avoid the need to have a new water right to meet MDDs, conservation measures will not eliminate the need for Florence to provide water supply/water right redundancy. Currently, Florence depends on a single source and a single well-field to supply water to the community. Florence needs, first and foremost, a new water right for redundancy that will provide security for its water supply, a need which conservation measures cannot avoid. It is unlikely that the City could obtain additional water rights for surface water sources in light of fish protection issues, regulatory requirements, and infrastructure constraints.

Exhibit 5-6 shows the projected MDD within the City's UGB along with current well production capacity and WTP capacity. The City's MDD may equal the actual well production in 2013, and may equal the WTP capacity by 2019. The upper bound value of the projected MDD within the UGB indicates that MDD could equal actual well production as early as 2010, and could be equal to WTP capacity by 2013.

EXHIBIT 5-6

Projected Maximum Day Demands within the City of Florence UGB, Groundwater Rights, and Current Water System Capacities, cfs



Thus, the City's actual well production and WTP capacity quickly could become critical constraints on water supply. The City must take immediate action to address those constraints and ensure its ability to meet growing water demand, and is doing so through the development of a Water System Master Plan.

The City is investigating options to maximize its ability to divert groundwater under its existing water rights. Options include well rehabilitation, drilling new wells, and pursuing water right transfers to allow for use of water from additional wells. For instance, the City is evaluating submittal of a transfer application and construction of a new well (Well 13), and may pursue new water rights for a potential additional wellfield site north of the current wellfield.

Because the City's entire water supply relies on a sole source, the City is focused on trying to provide a redundant supply. In an emergency, such as an infrastructure failure, chemical spill, or malicious attack, the City may not be able to use its current wellfield. The addition of a second wellfield could provide the City with additional source flexibility.

Quantification of Projected Maximum Rate and Monthly Volume

OAR 690-086-0170(6)

OAR 690-086-0170(6) requires a quantification of the maximum rate of withdrawal and maximum monthly use if initial diversion of water allocated under an existing permit is necessary to meet demands in the 20-year planning period. As described above, the City may need access to the entire amount of water authorized by its groundwater rights to provide system flexibility and to meet demand as soon as 2025. The maximum projected rate of withdrawal would be the full rate authorized by the City's groundwater permits (5.89 cfs, or 3.8 mgd). The maximum projected monthly volume, based on a 24-hour daily pumping cycle for 1 month, is 114 mgd.

Mitigation Actions under State and Federal Law

OAR 690-086-0170(7)

The City's water use permit G-15056 contains conditions for mitigating impacts to surface water, which require delivery of water to the wetlands in late October and diversion of clarified backwash from the City's WTP to the wetlands. The permit states the following:

- **Mitigation Condition #1:** *During the period October 16 through October 31 of each year after this permit is first exercised, the City will deliver to the wetlands adjacent to Munsel Creek the equivalent of 26% of the average pumping rate under this permit for the previous June, July, August, and September.*
- **Mitigation Condition #2:** *Any time this permit is being exercised, all clarified backwash water from the City's water treatment plant will be diverted to wetlands adjacent to Munsel Creek.*

The City is in compliance with these mitigation conditions. Currently, the City is not subject to any other state or federal mitigation requirements.

Appendix A

Letter to Affected Local Government



August 19, 2009

Kent Howe, Planning Director
Lane County Land Management Division
125 E. 8th Ave.
Eugene, OR 97401

Subject: Request for Comments on the City of Florence's DRAFT Water Management and Conservation Plan

Dear Mr. Howe,

Attached please find a copy of the City of Florence's DRAFT Water Management and Conservation Plan (WMCP). Please review the WMCP and provide me with any comments you may have relating to consistency with Lane County's comprehensive land use plans.

The City of Florence has prepared this WMCP to fulfill the requirements of Oregon Administrative Rules (OAR) Chapter 690, Division 86 of the Oregon Water Resources Department (OWRD). Under OAR Chapter 690, Division 86, OWRD requires that entities developing a WMCP submit it to affected local governments with a request for comments related to consistency with the local government's comprehensive land use plan.

Please provide comments to me within 30 days of the date of this letter. You may either send your comments to me at the address on this letterhead or e-mail them to me at asussman@gsiwatersolutions.com

If you have any questions, please call me at 541-753-0745, extension 201.

Sincerely,
GSI Water Solutions, Inc.

A handwritten signature in black ink, appearing to read "Adam Sussman", is written over a horizontal line.

Adam Sussman
As Representative for City of Florence

Cc: Mike Miller, City of Florence

Enclosure

Appendix B

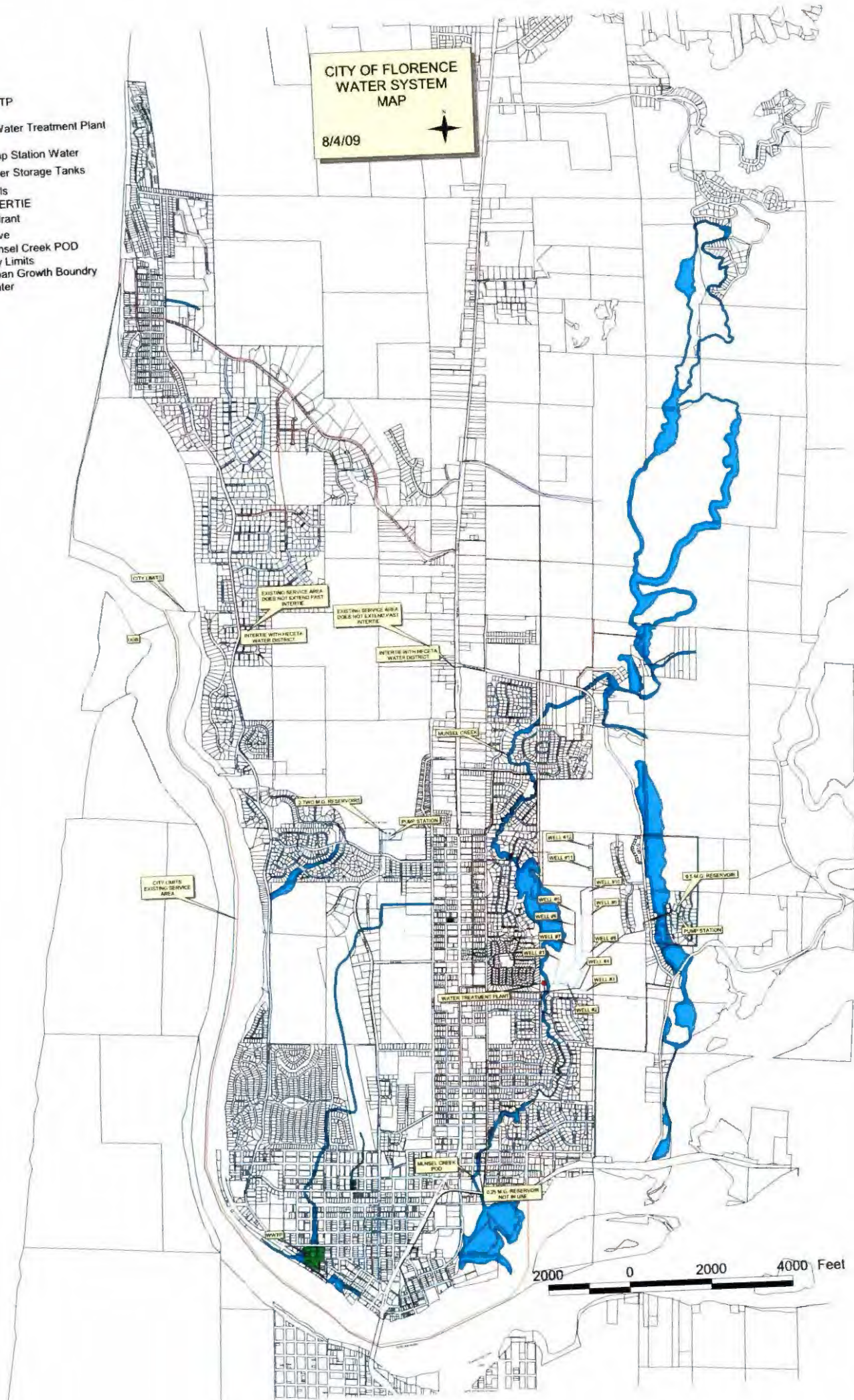
City of Florence Water System Map

CITY OF FLORENCE WATER SYSTEM MAP

8/4/09



- WWTP
- Water Treatment Plant
- Pump Station Water
- Water Storage Tanks
- Wells
- INTERTIE
- Hydrant
- Valve
- Munsel Creek POD
- City Limits
- Urban Growth Boundry
- Water



2000 0 2000 4000 Feet

Appendix C

City of Florence Water Right Table

Appendix C
City of Florence Water Right Table

App.	Permit	Certificate	Transfer	Source	Priority Date	Deadline for Completion Date	Type of Beneficial Use	Maximum Instantaneous Rate Allowed (cfs)	Maximum Annual Quantity of Water Allowed (MG)	Maximum Instantaneous Rate Diverted to Date (cfs)	Maximum Annual Quantity Diverted to Date (MG)	Average Monthly Diversion for 2008 (MG)	Average Daily Diversion for 2008 (MG)	Streamflow-dependent Species Listed by State or Federal Agency as Sensitive, Threatened, or Endangered that are Present in the Source	Listed Water Quality Limitations and Parameters	Source in Critical Groundwater Area?
G-3234	G-3080	81398	None	Groundwater Wells 1-7	9-16-1965	N/A	Municipal	2.0 cfs	N/A	2.0 cfs	449 MG for Wells 1-12	32.1 MG for Wells 1-12	1.06 MG for Wells 1-12	N/A	N/A	No
G-7319	G60064	50066 (canceled)	T-9301	Groundwater Wells 1-7	7-1-1976	10-1-2011	Municipal	0.89 cfs	N/A	Infinite	449 MG for Wells 1-12	32.1 MG for Wells 1-12	1.06 MG for Wells 1-12	N/A	N/A	No
G-15295	G-15056	None	None	Groundwater Wells 8-12	2-5-2001	10-1-2025	Municipal	3.0 cfs	N/A	2.4 cfs	449 MG for Wells 1-12	32.1 MG for Wells 1-12	1.06 MG for Wells 1-12	N/A	N/A	No
S-2148	S-24525	32115	None	Municipal Cx	8-6-1948	N/A	Municipal	0.8 cfs	N/A	0.8 cfs	Information not available	None	None	See Exhibit 2-18 (in Section 2 of the WMC P)	None	N/A

Mutual Emergency Water Agreement

**Between
City of Florence
and
Heceta Water District**

This agreement is made and entered into this 6th day of July, 2010, between City of Florence, Oregon, hereinafter designated "City," and Heceta Water District, hereinafter designated "District," collectively designated as "Parties."

RECITALS:

WHEREAS, City is an Oregon municipal corporation and is the owner and operator of a community water system that supplies safe drinking water to customers in Florence;

WHEREAS, District is a domestic water supply district organized and operating under the laws of the State of Oregon. The purpose of the District is to supply potable water to the customers of the District;

WHEREAS, both City and District have community water systems that meet all current requirements of the Oregon Department of Human Services, Public Health Division, Drinking Water Program for safe drinking water supplied to customers;

WHEREAS, both City and District have an adequate safe drinking water supply to serve their respective service areas under normal conditions, peak season conditions and most emergency situations;

WHEREAS, both City and District have a desire to cooperate with each other to provide to each other in case of an agreed upon emergency situation a temporary safe drinking water supply;

NOW, THEREFORE, in consideration of the covenants and agreements hereinafter set forth to be kept and performed by the parties hereto, it is mutually agreed as follows:

City of Florence Agrees:

1. To sell safe drinking water to District on as "as needed" basis during emergency conditions as provided for in Section 3 of this Agreement.

Heceta Water District Agrees:

2. To sell safe drinking water to City on an "as needed" basis during emergency conditions as provided for in Section 3 of this Agreement.

Both City and District Agree:

3. **Emergency Conditions.** To provide safe drinking water to one another for temporary emergency conditions. Whether or not temporary emergency conditions exist which require the provision of emergency water supply to the other party will require the consent and agreement of both parties. When emergency safe drinking water may be required by either City or District, the requesting party shall contact the other party to determine if there is agreement as to whether an emergency exists and whether safe drinking water is available to provide to the requesting party. Whether an emergency exists and, if so, to what extent drinking water is available on a temporary basis will be determined by the City Manager and the District Manager. Once the emergency is declared by agreement of the parties and it is determined that safe drinking water is available to the requesting party to address the emergency condition, representatives of each party shall immediately coordinate the operations of appropriate valves, measuring devices, and auxiliary systems to facilitate prompt delivery of safe drinking water to the requesting party. Emergency safe drinking water provided under this section shall be provided at sixty-five percent (65%) of either the City's highest rate per one thousand gallons or the District's highest rate per one thousand gallons, whichever is higher. As used in this section, "highest rate" means the current first tier water rate charged to residential customers residing within the respective service areas of the Parties.
4. The provision of supply of emergency safe drinking water to the requesting party may be limited by the providing party solely in its discretion, taking into account water supply, demands and needs of its own customers.
5. The parties agree to jointly conserve safe drinking water during a declared regional water shortage, which may be caused by tsunami, drought, flood, or other regional emergency condition.
6. This Mutual Water Agreement can be terminated with or without cause by either party by giving the other party ninety (90) days written notice.

Limitation of Liability and Indemnification. No liability for damage to facilities shall attach to either party on account of any failure to accurately anticipate availability of emergency water or of failure of water supply or water quality.

To the extent permitted by Article XI, Section 7 and Section 10 of the Oregon Constitution and by the Oregon Tort Claims Act, each party shall indemnify, within the limits of the Tort Claims Act, the other party against liability for damage to life or property arising from the indemnifying party's own activities under this agreement, provided that a party will not be required to indemnify the other party for any such liability arising out of the wrongful acts of employees or agents of that other party.

Term. The term shall be ten (10) years from the date of this agreement.

HECETA WATER DISTRICT

By: Robert V. Hursh
Robert V. Hursh, President

Date: 7/12/10

CITY OF FLORENCE

By: Phil Brubaker
Phil Brubaker, Mayor

Date: 7/8/10

Springfield Development Code[Up](#)[Previous](#)[Next](#)[Main](#)[Collapse](#)[Search](#)[Print](#)[No Frames](#)[CHAPTER 3 LAND USE DISTRICTS](#)**Section 3.3-200 Drinking Water Protection Overlay District**

3.3-205 Purpose

A. The Drinking Water Protection (DWP) Overlay District is established to protect aquifers used as potable water supply sources by the City from contamination. This Section establishes procedures and standards for the physical use of hazardous or other materials harmful to groundwater within TOTZ by new and existing land uses requiring development approval. The provisions of this Section are designed to:

- 1.** Protect the City's drinking water supply which is obtained from groundwater resources from impacts by facilities that store, handle, treat, use, produce, or otherwise have on premises substances that pose a hazard to groundwater quality; and
- 2.** Provide standards for hazardous or other materials that pose a risk to groundwater within the TOTZ.

B. In order to accomplish this purpose, the DWP Overlay District includes methods and provisions to:

- 1.** Restrict or prohibit the use of hazardous or other materials which are potential groundwater contaminants;
- 2.** Set standards for the storage, use, handling, treatment, and production of hazardous or other materials that pose a risk to groundwater within TOTZ; and
- 3.** Review new or expanded uses of hazardous or other materials that pose a risk to groundwater.

(6238)

3.3-210 Applicability

As of May 15, 2000, all areas within specified wellhead TOTZ automatically are rezoned to add the DWP Overlay District to the underlying zoning district. The areas to which the DWP Overlay District is applied are shown on the Drinking Water Protection Area Maps on file in the Development Services Department and incorporated in this Section by reference.

3.3-215 Warning and Waiver of Liability

The degree of aquifer protection required by this Section in the areas designated in Section 3.3-220 is based on scientific and engineering considerations. The nature of these considerations is that the exact boundaries of Time of Travel Zones (TOTZ) have an associated uncertainty that renders conclusions based on them to be

estimates. Under no conditions should this Section be construed to guarantee the purity of the ambient ground water or guarantee the prevention of ground water contamination. Therefore, this Section shall not create liability on the part of the City, or any City personnel, for any contamination that may result from reliance on this Section or any administrative decision made under this Section.

3.3-220 Time of Travel Zones

- A.** The DWP Overlay District includes 4 TOTZ: 0-1 year; 1-5 years; 5-10 years; and 10-20 years. The locations of the TOTZ for each wellhead are shown on Drinking Water Protection Area Maps on file with the City's Development Services, Public Works, and Fire and Life Safety Departments; and Springfield Utility Board (SUB) and Rainbow Water District (RWD).
- B.** The areas within specified wellhead TOTZ are those drinking water protection areas certified by the Oregon Health Division, under the Oregon Administrative Rules that apply to Oregon's EPA-approved Drinking Water Protection Program, in Oregon Health Division Delineation Certification #0002R, March 18, 1999.
- C.** In determining the location of a property within a TOTZ, the following criteria apply:
- 1.** The Lane County Department of Assessment and Taxation maps shall be used as a base map with the addition of TOTZ boundaries.
 - 2.** That portion of a tax lot that lies within a TOTZ is governed by the restrictions applicable to that TOTZ.
 - 3.** Tax lots having parts lying within more than one TOTZ are governed by the standards of the more restrictive TOTZ.

EXCEPTION: The Director may waive the requirement that the more restrictive standards apply when all of the following apply:

- a.** Storage, use, handling, treatment, and/or production of hazardous or other materials that pose a risk to groundwater will not take place within the portion of the tax lot having the more restrictive TOTZ standards; and
 - b.** Storage, use, handling, treatment, and/or production of hazardous or other materials that pose a risk to groundwater will not take place within 50 feet of the portion of the tax lot having more restrictive TOTZ standards; and
 - c.** The tax lot is 20,000 square feet or larger.
- 4.** A property owner may request the TOTZ be modified by submitting a Zone Change application to the City. Any request for modification of the TOTZ shall be accompanied by certification of the TOTZ as proposed to be modified by the Oregon Health Division, under the Administrative Rules that apply to Oregon's EPA-approved Drinking Water Protection Program.

(6238)

3.3-225 Review

A. A DWP Overlay District Development Application is required when the criteria of both Subsections A.1. and 2., below are met:

1. A site is affected by one of the following:

- a.** There is a change of land use, occupancy or tenancy of a property, including, but not limited to: a change from vacant to occupied; or
- b.** During the Building Permit process; or
- c.** In conjunction with any development application, including, but not limited to: Site Plan review and Minimum Development Standards.

2. The action in Subsection A.1., above will:

- a.** Affect the storage, use, and/or production of hazardous or other materials that pose a risk to groundwater; or
- b.** Increase the quantity of hazardous or other materials that pose a risk to groundwater that are stored, used and/or produced.

B. Prior to the submittal of a DWP Overlay District Development Application, an exemption request may be submitted to the Director as specified in Section 3.3-230B.1.

C. DWP Overlay District applications shall be reviewed under Type I procedures.

D. Prior to undertaking an activity covered by Section 3.3-225A., the owner or tenant shall submit a DWP Overlay District Application to the City for review and approval. Applications shall include the following information:

- 1.** A Hazardous Material Inventory Statement and a Material Safety Data Sheet for any or all materials entered in the Statement unless exempted under Section 3.3-230. Hazardous material weights shall be converted to volume measurement for purposes of determining amounts; 10 pounds shall be considered equal to one gallon as specified in Springfield Fire Code 2703.1.2.;
- 2.** A list of the chemicals to be monitored through the analysis of groundwater samples and a monitoring schedule if ground water monitoring is anticipated to be required;
- 3.** A detailed description of the activities conducted at the facility that involve the storage, handling, treatment, use or production of hazardous materials in quantities greater than the maximum allowable amounts as stated in Section 3.3-235A.;
- 4.** A description of the primary and any secondary containment devices proposed, and, if applicable, clearly identified as to whether the devices will drain to the storm or sanitary sewer;
- 5.** A proposed Hazardous Material Management Plan for the facility that indicates procedures to be followed to prevent, control, collect and dispose of any unauthorized release of

a hazardous material;

6. A description of the procedures for inspection and maintenance of containment devices and emergency equipment;

7. A description of the plan for disposition of unused hazardous materials or hazardous material waste products over the maximum allowable amounts including the type of transportation, and proposed routes.

E. For those development proposals requiring Site Plan Review (Section 5.17-100) or Minimum Development Standards review (Section 5.15-100), applications may be submitted concurrently.

F. The Director shall review the application and make a decision based on the standards contained in Section 3.3-235, after consulting with the Building Official, Fire Marshall, Public Works Director, and the managers of SUB and RWD, as appropriate.

(6238)

3.3-230 Exemptions

This Section does not exempt any material or use from Fire Code regulations adopted by the City.

A. Exemptions are as specified in this Section unless the Director, in consultation with SUB and Fire/Life Safety, determines that a hazardous material, activity, and/or facility that is exempt pursuant to this Section has a significant or substantial potential to degrade groundwater quality. Then the Director may require compliance with the requirements of this Section related to that hazardous material, activity or facility. This determination will be based upon site and/or chemical-specific data and are eligible for appeal to the Hearings Official as specified in Section 3.3-245.

B. Unless otherwise provided herein, the following materials are exempt from regulation hereunder:

1. Use, storage and handling of specific hazardous materials that do not present a risk to the aquifer, as determined and listed by the Director in consultation with SUB, are exempt from all regulation under this Section with the exception of the potential requirement to list these hazardous materials on the Hazardous Material Inventory Statement as found in the most recent Fire Code regulations adopted by the City. A Hazardous Materials Exemption Request may be submitted to the Director for Hazardous Materials that can be demonstrated to pose no threat to the aquifer. These materials may be exempted from regulation and added to the list. The demonstration of no threat is the responsibility of the applicant seeking the exemption and will be subject to review by technical experts.

2. Hazardous materials offered for sale in their original sealed containers of 5 gallons or less are exempt from the 500-gallon storage limit specified in Section 3.3-235A.1.

3. Hazardous materials in fuel tanks and fluid reservoirs attached to a private or commercial motor vehicle and used directly in the motoring operation of that vehicle, or machinery, including, but not limited to: fuel, engine oil and coolant.

4. Fuel oil used in existing heating systems.

5. Emergency use, storage, and handling of hazardous materials by governmental organizations in the public interest.
6. Hazardous materials used and stored specifically for water treatment processes of public water systems and private systems for the same purposes when approved by the Director.
7. Hazardous materials contained in properly operating sealed units (including, but not limited to: transformers, refrigeration units) that are not opened as part of routine use.
8. Local natural gas distribution lines.
9. Fuel for emergency generators located at facilities that provide essential community services (including, but not limited to: hospitals, fire/life safety, police, public shelters, and telephone systems).
10. Any commonly used office supply—including, but not limited to: correcting fluid for typewriters, toner for computer printers or cleaners for windows and bathrooms—where the supplies are purchased off-site for use on-site.
11. Aggregate quantities equal to or less than 20 gallons of hazardous materials that do not contain DNAPLs.

3.3-235 Standards for Hazardous Materials within Time of Travel Zones

Applications shall comply with the following standards. Where the following standards are more restrictive than the standards of the Springfield Fire Code, the following standards apply:

A. Zero to One Year TOTZ Standards.

1. Within the zero to one year TOTZ, hazardous materials that pose a risk to groundwater may be stored in aggregate quantities of no more than 500 gallons if in original containers not exceeding 5 gallons* in size. Within that aggregated 500-gallon inventory, no more than 150 gallons of hazardous materials that pose a risk to groundwater may be on the premises in opened containers for handling, treatment, use production, or dispensing on site. Hazardous materials that pose a risk to groundwater are allowed only upon compliance with containment and safety standards specified by the most recent Fire Code adopted by the City.

* A waiver of the 5-gallon maximum size may be given by the Director if the applicant can demonstrate that a larger size container would pose less risk to the aquifer.

2. Unless exempted, all hazardous or other materials that pose a risk to groundwater shall be stored in areas with approved secondary containment in place (Springfield Fire Code 2702.1 and 2704.2.2).
3. All new uses of Dense Non-Aqueous Phase Liquids (DNAPLs) are prohibited.
4. Any change in type of use or an increase in maximum daily inventory quantity of any DNAPL shall be considered a new use and prohibited.

5. The following certain types of new facilities or changes in use and/or storage of hazardous or other materials that pose a risk to groundwater are prohibited:

- a.** Underground hazardous material storage facilities;
- b.** Hazardous material product pipelines used to transport the hazardous material off of the tax lot where it is produced or used;
- c.** Injection wells;

EXCEPTION: Dry wells for roof drainage;

- d.** Solid waste landfills and transfer stations;
- e.** Fill materials containing hazardous materials;
- f.** Land uses and new facilities that will use, store, treat, handle, and/or produce DNAPLs.

6. Requirements found in Springfield Fire Code 2704.2.2.5 for a monitoring program and monitoring methods to detect hazardous materials in the secondary containment system shall be met for all amounts of hazardous or other materials that pose a risk to groundwater unless exempted.

7. The following requirements for inspection and record keeping procedures for monthly in-house inspection and maintenance of containment and emergency equipment for all amounts of hazardous or other materials that pose a risk to groundwater shall be met unless exempted: Schedules and procedures for inspecting safety and monitoring and emergency equipment. The applicant shall develop and follow a written inspection procedure acceptable to the Director for inspecting the facility for events or practices which could lead to unauthorized discharges or hazardous materials. An inspection check sheet shall be developed to be used in conjunction with routine inspections. The check sheet shall provide for the date, time, and location of inspection; note problems and dates and times of corrective actions taken; and include the name of the inspector and the countersignature of the designated safety manager for the facility.

8. Application of fertilizers containing nitrates are restricted to no more than the amount recommended by the Lane County, Oregon State University Extension Service for turf grass and are prohibited within 100 feet of a wellhead. In no event shall a single application exceed one half pound per 1,000 square feet of area per single application or a total yearly application of 5 pounds nitrogen fertilizer per 1,000 square feet.

B. One to Five Year TOTZ Standards.

1. The storage, handling, treatment, use, application, or production or otherwise keeping on premises of more than 20 gallons of hazardous materials that pose a risk to groundwater in aggregate quantities not containing DNAPLs are allowed only upon compliance with containment and safety standards specified by the most recent Fire Code adopted by the City.

2. Unless exempted, all hazardous or other materials that pose a risk to groundwater shall be stored in areas with approved secondary containment in place (Springfield Fire Code 2702.1 and 2704.2.2).

3. All new use of DNAPLs are prohibited.

4. Any change in the type of use or an increase in maximum daily inventory quantity of any DNAPL is considered a new use and is prohibited.

5. The following certain types of facilities or changes in chemical use and/or storage of hazardous or other materials that pose a risk to groundwater are prohibited:

a. Hazardous material product pipelines used to transport the hazardous material off of the tax lot where it is produced or used;

b. Injection wells;

EXCEPTION: Dry wells for roof drainage;

c. Solid waste landfills and transfer stations;

d. Fill materials containing hazardous materials;

e. Land uses and new facilities that will use, store, treat handle, and/or produce DNAPLs.

6. Requirements found in Springfield Fire Code 2704.2.2.5 for a monitoring program and monitoring methods to detect hazardous or other materials in the secondary containment system shall be met for all amounts of hazardous materials that pose a risk to groundwater unless exempted.

7. The following requirements for inspection and record keeping procedures for monthly in-house inspection and maintenance of containment and emergency equipment for all amounts of hazardous or other materials that pose a risk to groundwater shall be met unless exempted: Schedules and procedures for inspecting safety and monitoring and emergency equipment. The applicant shall develop and follow a written inspection procedure acceptable to the Director for inspecting the facility for events or practices which could lead to unauthorized discharges or hazardous materials. An inspection check sheet shall be developed to be used in conjunction with routine inspections. The check sheet shall provide for the date, time, and location of inspection; note problems and dates and times of corrective actions taken; and include the name of the inspector and the countersignature of the designated safety manager for the facility.

C. Five to Ten Year TOTZ Standards.

1. The storage, handling, treatment, use, production or otherwise keeping on premises of more than 20 gallons of hazardous materials that pose a risk to groundwater in aggregate

quantities not containing DNAPLs is allowed upon compliance with containment and safety standards specified by the most recent Fire Code adopted by the City

2. All hazardous or other materials that pose a risk to groundwater shall be stored in areas with approved secondary containment in place (Springfield Fire Code 2702.1 and 2704.2.2).
3. All new use of DNAPLs are prohibited.
4. Any change in type of use or an increase in the maximum daily inventory quantity of any DNAPL is considered a new use and is prohibited.
5. The following requirements for inspection and record keeping procedures for monthly in-house inspection and maintenance of containment and emergency equipment for all amounts of hazardous or other materials that pose a risk to groundwater shall be met unless exempted: Schedules and procedures for inspecting safety and monitoring and emergency equipment. The applicant shall develop and follow a written inspection procedure acceptable to the Director for inspecting the facility for events or practices which could lead to unauthorized discharges or hazardous materials. An inspection check sheet shall be developed to be used in conjunction with routine inspections. The check sheet shall provide for the date, time, and location of inspection; note problems and dates and times of corrective actions taken; and include the name of the inspector and the countersignature of the designated safety manager for the facility.

D. Ten to Twenty Year TOTZ Standards. The storage, handling, treatment, use, production or keeping on premises of more than 20 gallons of hazardous materials that pose a risk to groundwater in aggregate quantities is allowed only upon compliance with containment and safety standards specified by the most recent Fire Code adopted by the City. (6238)

3.3-240 Conditions

The Director may attach conditions of approval that will minimize negative impacts of regulated substances on groundwater and ensure that the facility or the proposed development can fully meet the standards specified in Section 3.3-235. These conditions may include, but are not limited to: on-site monitoring wells, Wellhead Protection Area signs, special storm water facilities or other conditions to address specific risks associated with the proposed development.

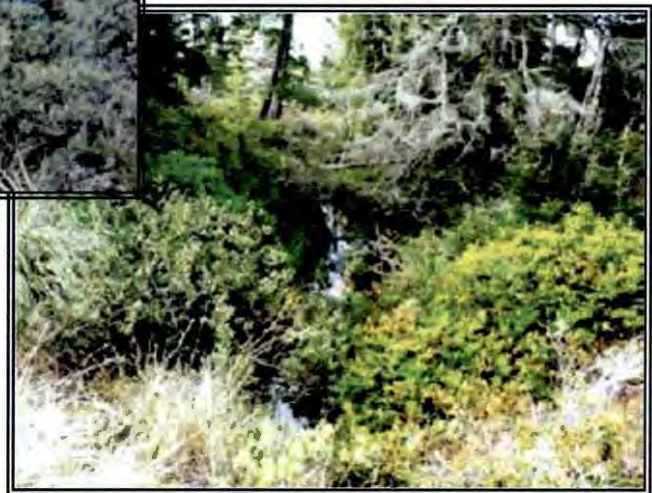
3.3-245 Appeals

The only portions of this Section that are subject to appeal are Section 3.3-225F., the Director's decision on a DWP application, Section 3.3-230, Exemptions, and Section 3.3-235A.1., Waiver. The appeal of a decision of the Director may be appealed as specified in Section 5.3-115.

Siuslaw Estuary Partnership
*An Integrated Multiple Objective Approach
To Watershed Protection and Restoration*



**City of Florence Significant
Wetlands and Riparian Corridors Plan**
Proposed Comprehensive Plan and Code Amendments



June 2013

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Stakeholders

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Central Oregon Coast Board of Realtors: Rob Shepherd
Florence Chamber of Commerce: Lisa Walter-Sedlacek
Fisheries: Steelheader Group: David Hunnington
Florence Area Hospitality Association: Tiffany Rogato
Florence Planning Commissioners: Mark Tilton
Lane County Planning Commission: Nancy Nichols
Oregon Shores Conservation Coalition: Anne Caples and Sue Noble
Scuba Club/Divers: Clarence Lysdale
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Surfrider Foundation: Gus Gates
Volkswalkers: Jean White
Ocean Dunes Golf Links: Randy Curtola
Coast Village: Mary McGann
Sand Ranch: Deacon Mathews
Florentine Estates: Nola Xavier and Del Phelps
Koning and Cooper (business owners): Art Koning and Gary Cooper
Recycling and Solid Waste: Dave Twombly

Elected Official Stakeholder Group

Siuslaw Watershed Council Leadership Board: Jim Grano, Chair
Florence City Council: Phil Brubaker, Mayor; Sue Roberts, City Councilor
Lane County Board of Commissioners: Jay Bozievich
Heceta Water District Board: Jerry Nordin
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Executive Summary

This *2013 City of Florence Significant Wetlands and Riparian Corridors Plan* (2013 Plan) is one of the products of the Siuslaw Estuary Partnership, a multi-year project funded by the Environmental Protection Agency (EPA) and project partners to protect water quality and fish and wildlife habitat in the lower Siuslaw Watershed.

This 2013 Plan will be submitted to the City for adoption as a supporting document of the Comprehensive Plan along with the "2013 Florence Area Local Wetlands and Riparian Inventory," Pacific Habitat Services, Inc. (2013 Inventory) within the Florence urban growth boundary (UGB) and the Florence City Code amendments in Chapter 4. Lane County will co-adopt the 2013 Inventory for the area outside city limits within the UGB and related Comprehensive Plan policies. No County Code will be part of this adoption process.

These amendments will bring the City into compliance with Statewide Planning Goal 5: Natural Resources, Scenic and Historic Areas, and Open Spaces (Goal 5). Specifically, adoption of these amendments will result in adoption of the following, in compliance with Oregon Administrative Rules for Goal 5:

- Comprehensive Plan and City Code amendments to adopt the 2013 Inventory, including maps and lists of significant Goal 5 wetlands and riparian corridors: **Chapter 2**
- Comprehensive Plan amendment to adopt the Economic, Social, Environmental, and Energy (ESEE) Analysis for Public Infrastructure in wetlands and the Munsel Creek Side Channel Riparian Reach: **Chapter 3**
- The following Comprehensive Plan and City Code amendments in **Chapter 4**:
 - To implement the Limited Protection Program
 - For internal consistency and housekeeping

Purpose

- The 2013 Inventory updates the currently adopted 1997 Florence Area Wetland and Riparian Areas Inventory, i.e., "1997 Inventory." The updated study of wetlands and riparian corridors was conducted to provide more current and precise data on these resources using more advanced research tools and assessment methods.
- The 2013 list and maps of locally significant wetlands and riparian corridors is almost identical to the 1997 lists and maps. The significance of these resources is largely based on their role in preventing flooding and protecting water quality in the North Florence Sole Source Dunal Aquifer, two critical concerns for residents and businesses in the Florence UGB.
- State law requires the City to adopt Comprehensive Plan policies and local regulations to protect locally significant wetlands and riparian corridors; and those state requirements are reflected in the proposals.

What does this 2013 Plan do?

This 2013 Plan regulates the following two natural resource areas through application of the Limited Protection Program in Chapter 4:

1. Freshwater wetlands
2. Freshwater riparian corridors

The 2013 Local Wetlands Inventory (2013 LWI), approved by DSL, replaced the 1997 Florence Local Wetlands Inventory (1997 LWI) in the State Wetland Inventory (SWI), both within and outside the UGB. The updated wetland information in the 2013 LWI provides better data for land owners and public agencies to use in determining the general location of wetlands in the study area.

When an application for a land use or building permit is made to the City or the County, these offices are required by state law to notify DSL if there is a wetland on the property; the City will also notify DSL of riparian corridors, and the 2013 Inventory will help the City identify these properties.

How are these resources regulated today?

Existing policies and Code for the City of Florence already regulate the two natural resources that are affected by the proposed Limited Protection Program, as discussed below. In addition, federal and state requirements apply, as discussed below.

Wetlands

A list and map of significant Goal 5 wetlands is already adopted as part of the Comprehensive Plan. Currently, City Code does not prohibit development in wetlands. Existing code does regulate wetlands by requiring a 50 foot vegetated buffer around wetlands as part of the City's Stormwater Management requirements in Title 9 Chapter 5. These "Buffer Zones" are required to protect the water quality and flood control functions of wetlands and riparian corridors identified in the City of Florence's Local Wetlands and Riparian Inventory, as well as lakes and rivers and sensitive areas identified by state and federal resource agencies.

Riparian Areas

Riparian corridors are also protected by the buffer zone requirements in Florence City Code (FCC) 9-5-3-3-F, above. In addition, existing Comprehensive Plan policy contains Statewide Planning Goal 5 (Goal 5) protection for riparian corridors, although existing policy omits some of the exemptions allowed by Goal 5. Specific sections of Title 10 Code also regulate riparian corridors, as specifically set out in Table ES-1, below.

State and Federal Requirements

The Oregon Department of State Lands (DSL) requires a permit for certain activities in wetlands and riparian corridors. This permit is required for regulated activities in all wetlands and riparian corridors, not just locally significant ones. State law requires cities and counties to notify DSL when there is a wetland on the site of a development proposal. State law administered by DSL and federal law administered by the U.S. Army Corps of Engineers (Corps) may require the property owner to obtain a permit to remove material from or to fill a wetland and to make up for, or "mitigate," any wetland disturbed by the development.

DSL will not require a permit in a riparian corridor if the area impacted is not located within "waters of the state." Oregon's Removal-Fill Law (ORS 196.795-990) requires any person who plans to "remove or fill" material in "waters of the state" (means all natural waterways, tidal and non-tidal bays, intermittent streams, constantly flowing streams, lakes, wetlands, that portion of the Pacific Ocean that is in the boundaries of this state, all other navigable and non-navigable bodies of water in this state and those portions of the ocean shore, as defined in ORS 390.605) to obtain a permit from DSL. In determining whether a permit is required for a proposed activity, the Department must determine all of the following: 1) the activity is proposed in a water of the state (i.e., a jurisdictional waterway or wet-

land); 2) the activity meets the definition of removal or fill; and 3) the activity is not exempt.

Many projects in wetlands and waterways also may be subject to federal Clean Water Act and Endangered Species Act provisions. The Corps of Engineers Portland District Office web site provides further information on the federal permitting requirements. In addition, both the Corps and DSL are responsible for coordinating with other federal agencies. Both agencies websites have information on these interactions with other agencies.

Existing Requirements, Proposed Goal 5 Limited Protection Program, and Net Impacts

Existing policies and Code that apply to significant wetlands and riparian corridors are described in detail in Appendix A and summarized below, followed by a summary of the Limited Protection Program and Table ES-1 that presents the net impact of the proposed Limited Protection Program.

Existing Requirements

In general, today:

- Existing development is “grandfathered.” Legally constructed structures are allowed to remain as legal non-conforming lots and uses (per FCC 10-8).
- Future development must proceed in accordance with adopted City policy and code.
- Comprehensive Plan policy and code apply within city limits.
- Comprehensive Plan policies apply in the UGB, if they have been co-adopted by Lane County.
- Today, inventoried riparian corridors and locally significant wetlands are adopted in the Florence Comprehensive Plan.

Existing Comprehensive Plan policies applicable to wetlands and riparian corridors are:

- Chapter 5 Riparian Areas Policy #2 protects riparian corridors from development in accordance with Statewide Planning Goal 5.
- Chapter 5 does not protect wetlands from development in compliance with Goal 5 because the City was not required to do so at the time of periodic review.
- Chapter 11 Stormwater Management Policy #2 calls for protection of wetlands and riparian corridors to protect stormwater quality and quantity.
- Chapter 17 protects wetlands and riparian corridors subject to Statewide Planning Goal 17, Coastal Shorelands. Goal 5 requirements cannot be applied to these areas.

Existing Florence City Code provisions applicable to wetlands and riparian corridors are:

- Title 10 Chapter 7 Special Development Standards protect Munsel Creek “and other drainageways” with a 50 foot setback.
- Title 10 Chapter 19 Coastal Shorelands Overlay Zone applies to all wetlands and riparian corridors in those zones. Goal 5 requirements cannot be applied to these corridors.
- Title 10 Chapter 21 regulates wetlands in Airport Impact Boundaries.
- Title 9 Chapter 5, Stormwater Requirements, protect all wetlands and riparian corridors in the Wetland and Riparian Inventory with a vegetated buffer.

Limited Protection Program Summary

The Limited Protection Program that results from the ESEE Analysis in Chapter 3 is implemented in the Comprehensive Plan and Code amendments in Chapter 4.

The principle changes made by these amendments are:

- The Guiding Principles related to wetlands and riparian corridors are incorporated into the Comprehensive Plan policy. These were endorsed by the City and its partners and are intended to guide the development of future policies and regulations for wetland and riparian protection.
- Significant wetlands are now protected from development in order to comply with Statewide Planning Goal 5, except that public infrastructure in the City's Public Facilities Plan are exempt (see ESEE Analysis).
- Significant riparian corridors continue to be protected from development, with special setback adjustments and provisions pertaining to the Munsel Creek Side Channel and Coast Village (see ESEE Analysis and special provisions in Code amendments).
- All existing lawfully created structures can be replaced in the same location that do not disturb additional riparian corridor or wetland buffer zone surface area provided they are designed and constructed to minimize intrusion into the riparian corridor or wetland buffer zone. No land use permit is needed and all existing Coast Village structures are grandfathered.
- Setback adjustments and variances are allowed for significant wetlands and streams to ensure that no property is rendered unbuildable by the requirements. These adjustments are granted through Administrative Review (at the counter) for proposals 20 feet or more from the significant stream or wetland; the Variance process is required for proposals within 20 feet. The Variance fee is waived for Coast Village residents.
- Processes are provided for establishing wetland and riparian boundaries, claims of map error, updating the inventory, a Plan amendment option, and incentives to encourage restoration and maintenance of the resources.
- Consistency amendments are made to existing City Code and Comprehensive Plan policies for Stormwater and Coastal Shorelands (Goal 17) to make them consistent with the Limited Protection Program. (See "Consistency Amendments" in Chapter 4).
- Housekeeping amendments are made to Code for consistency with Goal 16 and to Comprehensive Plan for consistency with state law regarding notice to DLCD.

Net Impact of Limited Protection Program

Table ES-1 presents a summary of the net impact of the proposed Limited Protection Program. A "Frequently Asked Questions Sheet" was prepared, posted to the web site, and distributed to facilitate public discussion about the proposal and to clarify the federal and state legal framework that the Comprehensive Plan and Code amendments must comply with.

Table ES-1 Net Impact of the Proposed Goal 5 Limited Protection Program

Today	Limited Protection Program
Existing development is "grandfathered." Legally constructed structures are allowed to remain as legal non-conforming lots and uses (per FCC 10-8).	Allows replacement of existing lawfully created structures in the same location that do not disturb additional riparian corridors or wetland buffer zone surface area provided they are designed and constructed to minimize intrusion into the riparian corridor or wetland buffer

Table ES-1 Net Impact of the Proposed Goal 5 Limited Protection Program

Today	Limited Protection Program
	<p>zone.</p> <ul style="list-style-type: none"> ■ No land use permit will be required to replace the existing structures above. ■ A federal/state removal fill permit will not be required to replace existing structures if no wetland or waterway impacts are proposed. ■ Contains special provisions related to existing structures and other aspects of the Code for affected properties in Coast Village and Florentine Estates, along the Munsel Creek side channel (see Chapter 4 Code).
<ul style="list-style-type: none"> ■ Future development must proceed in accordance with adopted City policy and code. 	<ul style="list-style-type: none"> ■ Allows an adjustment or variance to required minimum setback distance for all properties subject to significant riparian or wetland standards and requirements in City Code where the property is rendered unbuildable by the standard or requirement. ■ Provides a process to address map errors and identification of wetland and riparian setback boundaries. ■ Provides a "Plan Amendment Option" for property owners to submit a site-specific "ESEE" analysis for their property.
<ul style="list-style-type: none"> ■ Comprehensive Plan policy and code apply within city limits. 	<ul style="list-style-type: none"> ■ Same applicability as today.
<ul style="list-style-type: none"> ■ Comprehensive Plan policies apply outside city limits, in the UGB, if they have been co-adopted by Lane County. 	<ul style="list-style-type: none"> ■ Same applicability as today. ■ The 2013 Florence Area Local Wetlands and Riparian Inventory ("2013 Inventory") for the area within the UGB will be submitted to Lane County for co-adoption.
<ul style="list-style-type: none"> ■ Today, riparian areas and locally significant wetlands are adopted in the Florence Comprehensive Plan via the 1997 Inventory and adopted list of significant wetlands. 	<ul style="list-style-type: none"> ■ Replaces these inventories with the 2013 Inventory, including locally significant wetlands and riparian corridors lists and maps. ■ Includes the Munsel Creek side channel in the riparian inventory with special Code provisions, setback reductions, and other special provisions in accordance with the ESEE Analysis adopted as part of the Comprehensive Plan (see Chapter 3 of this 2013 Plan).
<ul style="list-style-type: none"> ■ Comprehensive Plan Chapter 5 Riparian Areas Policy #2 protects riparian ar- 	<ul style="list-style-type: none"> ■ Replaces this policy with policies to protect significant resources through Flor-

Table ES-1 Net Impact of the Proposed Goal 5 Limited Protection Program

Today	Limited Protection Program
<p>eas from development in accordance with Statewide Planning Goal 5.</p>	<p>ence City Code and adds policies for adjustments and hardship variances, claims of map error, and Plan Amendment Option.</p> <ul style="list-style-type: none"> ■ Adds policies to this chapter consistent with the Guiding Principles.
<ul style="list-style-type: none"> ■ Chapter 5 does not protect wetlands from development in compliance with Goal 5 because the City was not required to do so at the time of periodic review. 	<ul style="list-style-type: none"> ■ Includes Comprehensive Plan Chapter 5 policy to protect significant wetlands in the City from development in accordance with Goal 5, negating the City's need to accomplish this in the future. ■ Policy is implemented through City Code amendments.
<ul style="list-style-type: none"> ■ Chapter 11 Stormwater Management Policy #2 calls for protection of wetlands and riparian areas. 	<ul style="list-style-type: none"> ■ "Consistency amendments" clarify this policy applies to "significant" wetlands and riparian corridors; not all wetlands and riparian areas.
<ul style="list-style-type: none"> ■ Chapter 17 protects wetlands and riparian areas subject to Statewide Planning Goal 17, Coastal Shorelands. Goal 5 requirements cannot be applied to these areas. 	<ul style="list-style-type: none"> ■ Makes no change to the Goal 17 Management Units in the Comprehensive Plan.
<ul style="list-style-type: none"> ■ Title 9 Chapter 5 (FCC 9-5-3-3-F), Stormwater Requirements protect "sensitive areas" including wetlands and riparian areas in the Wetland and Riparian Inventory with a 50 foot vegetated buffer. ■ FCC 9-5-3-3-F cross references FCC 10-7, which is where the Significant Wetland and Riparian Standards are located in the Limited Protection Program. 	<p>"Consistency Amendments" to FCC 9-5-3-3-F and definitions clarify that the stormwater buffer applies to <i>significant</i> wetlands greater than ½ acre and <i>significant</i> riparian areas; and refer to FCC 10-7 for "significant wetland and riparian area standards," and to FCC 10-19 for standards implementing Statewide Goal 17.</p> <p>Amends FCC 10-7, Special Development Standards to:</p> <ul style="list-style-type: none"> ■ Incorporate the standards in FCC 9-5-3-3-F and add Goal 5 standards, exemptions, adjustments, variances, and ESEE results. ■ Allow an adjustment or variance to requirements or standards for properties rendered unbuildable by the setback requirement. ■ Apply the standards only to "significant" wetlands and riparian corridors; non-significant wetlands and riparian areas will no longer be subject to the 50 foot setback. ■ Exempt public and private facilities from the riparian and wetland setback requirements, and public facilities from

Table ES-1 Net Impact of the Proposed Goal 5 Limited Protection Program

Today	Limited Protection Program
	<p>wetland requirements and standards, in accordance with the Department of State Lands and Army Corps of Engineers permits and with minimum impacts in setback corridor.</p> <ul style="list-style-type: none"> ■ Allow up-to a 25 foot setback reduction in the Munsel Creek side channel (RMC-Cs) in exchange for maintaining the riparian corridor. Note: Almost all Florentine Estates lots already meet these standards through prior Planning Commission approval and Conditions of Approval of the PUD. ■ See Chapter 4 Code amendments for details.
<ul style="list-style-type: none"> ■ Title 10 Chapter 7 Special Development Standards protect Munsel Creek “and other drainageways” with a 50 foot setback. 	<ul style="list-style-type: none"> ■ Allows an adjustment or variance to required setback distance for properties rendered unbuildable by the setback requirement. ■ Measures the 50 foot setback for Munsel Creek from top of bank. ■ Allows setback reduction up to 25 feet from the Munsel Creek side channel in exchange for restoring and maintaining the riparian corridor.
<ul style="list-style-type: none"> ■ Title 10 Chapter 19 Coastal Shorelands Overlay Zone applies to all wetlands and riparian areas in those zones. Goal 5 requirements cannot be applied to these areas. 	<ul style="list-style-type: none"> ■ “Consistency amendments” amend City Coastal Shoreland Overlay Zone for Prime Wildlife to also reference the 2013 Florence Area Local Wetlands and Riparian Inventory in determining the general location of and assessment data for the South Heceta Junction Seasonal Lakes inside city limits. Today, this area inside the city is publicly owned parkland. Makes housekeeping amendments to FCC 10-19 consistent with Goal 17.
<ul style="list-style-type: none"> ■ Title 10 Chapter 21 regulates wetlands in Airport Impact Boundaries. 	<ul style="list-style-type: none"> ■ No modifications are proposed to Chapter 21 for consistency with this 2013 Plan.

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Chapter 1: Introduction

This Chapter presents the purpose and background for this 2013 *City of Florence Significant Wetland and Riparian Corridors Plan* (2013 Plan) and discusses the Siuslaw Estuary Partnership and the public involvement for this 2013 Plan.

This 2013 Plan is one of the products of the Siuslaw Estuary Partnership, a multi-year project funded by the Environmental Protection Agency (EPA) and project partners to protect water quality and fish and wildlife habitat in the lower Siuslaw Watershed.

This 2013 Plan will be submitted to the City for adoption as a supporting document for the Comprehensive Plan along with the "2013 Florence Area Local Wetlands and Riparian Inventory," Pacific Habitat Services, Inc. (2013 Inventory) within the Florence urban growth boundary (UGB) and the Florence City Code amendments in Chapter 4. Lane County will co-adopt the 2013 Inventory for the area outside city limits within the UGB and related Comprehensive Plan policies. No County Code will be part of this adoption process.

These amendments will bring the City into compliance with Statewide Planning Goal 5: Natural Resources, Scenic and Historic Areas, and Open Spaces (Goal 5). Specifically, adoption of these amendments will result in adoption of the following, in compliance with Oregon Administrative Rules for Goal 5:

- Comprehensive Plan and City Code amendments to adopt the 2013 Inventory, including maps and lists of significant¹ Goal 5 wetlands and riparian corridors:² **Chapter 2**
- Comprehensive Plan amendment to adopt the Economic, Social, Environmental, and Energy (ESEE) Analysis for Public Infrastructure in wetlands and the Munsel Creek Side Channel Riparian Reach:³ **Chapter 3**
- The following Comprehensive Plan and City Code amendments in **Chapter 4**:
 - To implement the Limited Protection Program:⁴
 - For internal consistency and housekeeping

¹ For the purposes of this report, the term "significant" refers only to the application of Statewide Planning Goal 5 to wetlands and riparian areas. Wetlands that are significant through the application of Statewide Planning Goal 17, Coastal Shorelands, are identified in the Lane County Coastal Resources Inventory, the Management Unit descriptions in the Comprehensive Plan, and in the Overlay Zone map and standards in Florence City Code Title 10 Chapter 19.

² OAR 660-023-00100: "(2) Local governments shall amend acknowledged plans and land use regulations prior to or at periodic review to address the requirements of this division, as set out in OAR 660-023-0250(5) through (7)." OAR 660-023-0030 Inventory Process: "(5) Adopt a list of significant resource sites: When a local government determines that a particular resource site is significant, the local government shall include the site on a list of significant Goal 5 resources adopted as a part of the comprehensive plan or as a land use regulation."

³ OAR 660-023-0040 "4)...The analyses of the ESEE consequences shall be adopted either as part of the plan or as a land use regulation."

⁴ OAR 660-023-0050 Programs to Achieve Goal 5: "(1) For each resource site, local governments shall adopt comprehensive plan provisions and land use regulations to implement the decisions made pursuant to OAR 660-023-0040(5). The plan shall describe the degree of protection intended for each significant resource site. The plan and implementing ordinances shall clearly identify those conflicting uses that are allowed and the specific standards or limitations that apply to the allowed uses. A program to achieve Goal 5 may include zoning measures that partially or fully allow conflicting uses (see OAR 660-023-0040(5)(b) and (c))."

Purpose and Background

The purpose of this 2013 Plan is to update the 1997 Florence Wetland and Riparian Area Inventory and to adopt protection measures, as required by state law. This inventory involves only freshwater wetland and riparian corridors; it does not include the estuary or estuarine wetlands. Specific objectives are to:

- update the 1997 biological and functional assessment;
- change the study area, as discussed below;
- include delineations made since 1997;
- adopt policies and measures to protect the unique functions and values of the resources; and
- conduct preliminary work to assess the potential for restoration of riparian corridors and wetlands on City-owned property.

This 2013 Plan provides a comprehensive functional assessment of, and protection program for, wetlands and riparian corridors. This is especially important in this watershed because this 2013 Plan, once adopted, will ensure: retention of the capacity of existing natural wetlands and riparian corridors to store and slow the velocity of stormwater prior to discharge to area creeks and the estuary; critical water quality benefits for the North Florence Sole Source Dunal Aquifer, the source of the City's drinking water; and protection of the quality of area surface waters, habitat to numerous fish and wildlife. The protection measures in this 2013 Plan will enhance the carrying capacity of the land to fully address the anticipated impacts from planned urbanization. The functional assessment thus provides critical information to help guide future urbanization policy and stormwater management policy and capital programs.

Why are wetlands and riparian corridors important?

Wetlands and riparian corridors are a very important part of the environment. Wetlands provide functions and values for water quality protection, hydrologic control (flood control), and habitat for fish, aquatic, and terrestrial creatures. The significant wetlands in Florence's UGB all play a critical role in water quality protection and flood control, essential functions in the North Florence Sole Source Dunal Aquifer, the only sole source aquifer in the State of Oregon. Florence area wetlands also play a key role in protecting fish and wildlife habitat. This is especially important in this watershed where Munsel Creek and the Siuslaw River provide critical habitat for coho salmon, a federally-listed threatened species, and where these and other creeks and wetlands provide a home for numerous species of fish and wildlife.

Florence area wetlands and riparian corridors lie within the lower Siuslaw River Watershed, a significant natural area that provides critical habitat for endangered and threatened animal species. In all, about 23 species of fish, almost 200 species of birds, and numerous species of marine mammals use the estuary and the surrounding wetlands, lakes, riparian and upland areas. The watershed supports spawning runs of fall Chinook, winter steelhead, coho, and sea-run cutthroat; and receives significant waterfowl use. The watershed is designated an Important Bird Area by the National Audubon Society.

Once the Oregon Coast's largest coho-producing system next to the Columbia, the Siuslaw River's salmon production is drastically diminished. The lower Siuslaw River watershed health is degraded and a significant amount of restoration action is needed to improve watershed conditions (Oregon Watershed Enhancement Board, 2007). The watershed is limited by all factors in aquatic/instream areas, tideland, riparian, freshwater wet-

lands, and upland areas. The Siuslaw River is classified as Water Quality Limited under the Clean Water Act and is included on the state's 303(d) list of Impaired Waterbodies by the Oregon Department of Environmental Quality. The River is failing in all these parameters: Dissolved Oxygen, Fecal Coliform, Habitat Modification, and Temperature, and potentially Alkalinity. Beneficial Uses impaired by these listed parameters include resident fish and aquatic life; salmonid fish spawning and rearing; anadromous fish passage; trout rearing and migration; and shellfish growing.

Wetlands and riparian corridors both play important roles in flood control and the protection of water quality and fish and wildlife habitat. Like a sponge, a wetland traps runoff water during a rainstorm. After being trapped by the wetland sponge, polluted water moves slowly through a wetland, finding its way around plants and through small spaces in the soil. While it moves, the nutrients are absorbed by the plant roots that poke through the soil spaces. Some spaces are very small and pollutants get trapped. Sometimes the pollutants just stick to the soil. By the time the water leaves the wetland, it is much cleaner than it was when it entered. This is why many people think of wetlands as nature's filter system. Wetlands are home to many types of fish, amphibians, birds, mammals, and reptiles. These animals rely on the plentiful food, water, and shelter that the wetland offers. While some animals spend their whole lives in a wetland, many use it only for a particular time in their lives, such as for hatching eggs and raising young. In cities, wetlands are threatened by development and active measures to protect them are needed.

Like wetlands, riparian corridors provide important functions and values for water quality protection, flood management, and wildlife habitat; and they play a critical role in thermal regulation, cooling surface waters for fish use. Vegetation and ground cover trap sediment and filter runoff before it reaches the water resource; and they bind the soil and prevent erosion of stream bank or lakeshore. To control floods, riparian vegetation and cover slow the rate of storm runoff to the stream or lake and increase the opportunity for ground water re-charge. These areas also provide thermal regulation: riparian trees and herbaceous layers provide shade and increase humidity, cooling the water resource; both protective shading and cooling are important for juvenile fish habitat. Finally, riparian trees, vegetation, ground cover, and woody debris all contribute valuable habitat for the many forms of wildlife that thrive near surface waters.

Scope and Study Area

The Study Area for the 2013 Florence Area Local Wetlands and Riparian Inventory is shown in Figure 1.1. The Study Area for land use measures is the Florence urban growth boundary (UGB), also shown in Figure 1.1. The Study Area boundaries for the Inventory are:

- Western and Southern Boundary: the outer boundary of Goal 16 Management Units as zoned on the City's zoning map and designated on the City's Comprehensive Plan map.
- Northern Boundary: the northern boundary of the "Area of Interest" map co-adopted by the City and Lane County, including the Collard Lake/Clear Lake watershed.
- Eastern Boundary: the N. Florence Dunal Aquifer eastern boundary

Siuslaw Estuary Partnership and Interdisciplinary Team

Community concern for the Siuslaw estuary, the North Florence Sole Source Dunal Aquifer, and the area's streams, lakes, and wetlands and is well-documented in existing poli-

cies and Code provisions, as set out in Appendix A. In response to this concern, in October, 2009, the City and its partners from 19 federal, state, tribal, and local agencies embarked on a multi-year project called the Siuslaw Estuary Partnership (EPA Cooperative Agreement #WC-00J04801-0). The mission of the Partnership is to protect and improve water quality and fish and wildlife habitat in the lower Siuslaw watershed. This project is funded by project partners and the US Environmental Protection Agency (EPA).

The Siuslaw Estuary Partnership Guiding Principles, endorsed by the City and its partners, provide guidance for this 2013 Plan and are included in Appendix A. These principles are incorporated into the Proposed Amendments to the Florence Realization 2020 Comprehensive Plan in Chapter V.

The Partnership is guided by an Inter-disciplinary Team. The Wetlands and Riparian Team, a sub-team of the Interdisciplinary Team, is comprised of representatives from the City staff, consultants, and volunteers; the Siuslaw Soil and Water Conservation District; Lane County; the Oregon Departments of State Lands, Land Conservation and Development, and Fish and Wildlife; and the US Environmental Protection Agency, Army Corps of Engineers, and National Oceanic and Atmospheric Administration National Marine Fisheries Service. Please see Acknowledgements for the names of the individuals who contributed to this 2013 Plan.

Public Involvement

Public involvement for the Wetlands and Riparian Areas project is set out in the approved Public Involvement Plan in Appendix B. Key public involvement consisted of three annual open houses; three annual newsletters distributed to all residents and/or property owners in the study area; targeted outreach; a Stakeholder process; media outreach; and public hearings before the Planning Commission and City Council. The individual Stakeholders in the Community and Elected Official Stakeholder Groups are listed in the Acknowledgements section of this 2013 Plan.

In addition, public involvement efforts were conducted specifically for wetlands and riparian areas. Prior to beginning the inventory field work, selected landowners (i.e. those suspected of having wetlands or waters of the state on their property) were mailed notices describing the project and asking permission to enter their property. Right of access was granted by landowner permission only. The properties of those not responding were not accessed. Access information was collected in a database and then transferred to a base map for use in the field.

The City of Florence held an open house meeting May 5, 2010 to inform the public about the wetland inventory process and answer questions from property owners deciding whether or not to grant access to their property. Following completion of initial fieldwork, a second public meeting was held to allow citizens to observe the location of mapped wetlands and comment as appropriate. This second meeting was held on September 22, 2010.

On March 6, 2012, the Wetlands and Riparian Area Team concurred with criteria and application of the criteria for determining the significance of, and measures to protect, wetlands and riparian corridors in the Florence urban growth boundary (UGB). At their meetings in March and April, the Stakeholder Groups forwarded this proposal to the public for comment. Then, the proposal was presented to the public at the April 30, 2012 Open House. The proposal, and all updates to the proposal, have been consistently posted to the project web site at www.SiuslawWaters.org with an invitation for public comment on

the home page. On January 31, 2013, the Wetland and Riparian Team reviewed and commented on the revised 2013 Plan and forwarded it for public review and adoption. On February 27, 2013, the City held a meeting with all owners of property in the 2013 Inventory; a letter was sent to the owners on February 8th inviting them to the meeting, informing them of the draft products, and instructing them on ways they can be involved (see Appendix B). Revisions to the draft will be made based on feedback from meetings with property owners and Stakeholders in February and March 2013 and the public adoption process to commence in April 2013.

Key Terms and Regulatory Processes

There are many technical terms used in the process of identifying and analyzing wetlands and riparian corridors. Key terms and phrases used in this 2013 Plan are explained below. The 2013 Inventory contains a complete list of terms and phrases and a full description of the methodology. The "Code Consistency Amendments" section of Chapter 4 of this 2013 Plan contains a full list of new and amended Code definitions.

Statewide Planning Goal 5

This project addresses the wetland and riparian corridor requirements of Statewide Planning Goal 5 (Natural Resources, Scenic and Historic Areas, and Open Spaces) Oregon Administrative Rule (OAR) Section 660, Division 23. The objective of Goal 5 is to "protect natural resources and conserve scenic, historic and open space resources for present and future generations."

On September 1, 1996, the Land Conservation and Development Commission adopted a revised Statewide Planning Goal 5. The Goal requires local jurisdictions to inventory the natural resources covered under the Goal, determine the significance of these resources, and develop plans to achieve the Goal. In other words, local jurisdictions must adopt land use ordinances regulating development in and around significant areas.

Statewide Planning Goal 17

This 2013 Plan addresses the significance of wetlands and riparian areas under Statewide Planning Goal 5. Wetlands that are regulated under Statewide Planning Goal 17, Coastal Shorelands, are not subject to Goal 5 significance or protection. In the Florence UGB, Goal 17 resources are identified in the Lane County Coastal Resources Inventory, the Management Unit descriptions in the Florence Comprehensive Plan, and in the Coastal Shorelands standards in Florence City Code Title 10 Chapter 19. As provided in Goal 5, this local wetland inventory and assessment (2013 LWI) will be used to update the general location and assessment of the South Heceta Junction Seasonal Lakes Goal 17 wetlands. This is necessary because the 2013 LWI is more current and precise and the general location of these wetlands in the 1978 Management Unit do not align with the general wetland location in the 2013 LWI (see "Statewide Planning Goals 5 and 17" section of Chapter 2 and "Consistency Code Amendments" in Chapter 4 for additional details.)

City of Florence
**Local Wetland and Riparian Area
 Inventory and Assessment Study Area Map**

Legend:

- Study Area
- Urban Growth Boundary
- City Limits
- Highways
- Arterial & Collector Streets
- Other Streets
- North Florence Dunal Aquifer
- Aquifer

Scale: 0 0.5 1 Miles

North Arrow: N

**City of Florence
 Community Development Department
 270 Hwy 101 N
 Florence, OR 97118
 (541) 967-8237
 January 27, 2010
 Data: City of Florence Community Development Department
 Department: Community Planning & Development
 Project: Local Wetland and Riparian Area Inventory and Assessment Study Area
 Project Manager: David J. Thompson
 Project Engineer: David J. Thompson
 Project Designer: David J. Thompson
 Project Checker: David J. Thompson
 Project Approver: David J. Thompson
 Project Date: 1/27/10**



Wetland

"Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." (Federal Register 1982). Based on this definition, three primary attributes identify a wetland: hydrology, vegetation, and soils.

Local Wetlands Inventory (LWI)

A Local Wetlands Inventory (LWI) is an inventory of all wetlands greater than 0.5 acres in size within a local jurisdiction using the standards and procedures of OAR 141-86-180 through 141-86-240.

In 1989, the Oregon State legislature authorized the Department of State Lands (DSL) to develop a statewide wetlands inventory for planning and regulatory purposes. Accordingly, DSL established Local Wetlands Inventory (LWI) standards and guidelines under ORS 196.674. An approved LWI replaces the National Wetlands Inventory map and is incorporated into the statewide wetlands inventory.

A LWI is conducted using color or color infrared aerial photographs taken within 5 years of the inventory initiation and at a minimum scale of 1 inch = 200 feet (1" = 200'). Wetlands are located using the on-site option where access to property is allowed or off-site where access is denied. Wetlands can be mapped off-site by using information such as topographic and National Wetlands Inventory maps, aerial photographs, and soils surveys.

The approximate location of wetlands is placed on a parcel-based map. The parcel-based map allows the property owner, the local jurisdiction, and DSL, to know which tax lots may contain wetlands. The maps and documents produced for the LWI are intended for planning purposes only. Mapped wetland boundaries are accurate to within 5 meters; however, there may be unmapped wetlands that are subject to regulation. In all cases, actual field conditions determine wetland boundaries.

Wetland Assessment

A wetland assessment is a scored determination of the relative effectiveness and relative values of various wetland functions. The methodology used for this LWI is the Oregon Rapid Wetland Assessment Protocol (ORWAP). (Adamus, et. al. 2010)

Oregon Rapid Wetland Assessment Protocol (ORWAP)

An assessment of the quality for each wetland identified through the inventory was conducted using the Oregon Rapid Wetland Assessment Protocol (ORWAP) (Adamus et al, 2010). [The full text of methodology is available at http://www.oregon.gov/DSL/WETLAND/docs/orwap_manual_v2.pdf]. The ORWAP is a standardized protocol for rapidly assessing 16 wetland functions and 21 values. The protocol was developed by DSL, with funding from the U.S Environmental Protection Agency. It uses 140 indicators assessed from on-site analysis, aerial photography, and information from several web sites. The answers are tabulated within ORWAP to provide a final score for each individual wetland function and value. These individual functions are further grouped to provide group scores.

The advantage of this method over other assessment methodologies is that it provides a standardized process for scoring indicators of wetland values and provides a score for the relative value of each function. Since the protocol baseline analyzed wetlands of diverse types throughout the state, it allows for a qualitative comparison of wetlands of any type anywhere in Oregon.

Wetland Function

A characteristic action or behavior associated with a wetland that contributes to a larger ecological condition such as wildlife habitat, water quality and/or flood control. (Roth, et. al. 1996)

Wetland Value

Importance or worth of a wetland function to societal needs. Includes public attitudes and the wetland's opportunity to provide a given function based on its location. ORWAP considers the land uses in both the "contributing" and down slope areas from the wetland when calculating value.

Significant Goal 5 Wetlands

Local jurisdictions determining significant wetlands must use the criteria adopted by the Oregon Department of State Lands (DSL) in ORS 197.279(3)(b) or other approved criteria. DSL has approved the use of the ORWAP criteria described in Chapter 2 for this inventory (see Appendix E for the letter from DSL to the City of Florence approving the use of the significance criteria used in the 2013 Inventory and in this 2013 Plan).

The ORWAP method considers the ability of a wetland to support the following functions:

- Water Storage and Delay
- Sediment Retention and Stabilization
- Phosphorus Retention
- Nitrate Removal and Retention
- Thermoregulation
- Carbon Sequestration
- Organic Matter Export
- Pollinator Habitat
- Aquatic Invertebrate Habitat
- Anadromous Fish Habitat
- Nonanadromous Fish Habitat
- Amphibian & Reptile Habitat
- Waterbird Feeding Habitat
- Waterbird Nesting Habitat
- Songbird, Raptor and Mammal Habitat, and
- Native Plant Diversity

In addition the following are also scored:

- Ecological Condition - *the integrity or health of the wetland as defined primarily by its vegetation composition*
- Provisioning Services - *the passive and sustainable providing of tangible natural items of potential commercial value*

- **Public Use and Recognition** - *the potential and actual capacity of a wetland to sustain low-intensity human uses such as hiking, nature photography, education, and research*
- **Sensitivity** - *the lack of intrinsic resistance and resilience of the wetland to human and natural stressors*
- **Stressors** - *the degree to which the wetland is or has recently been altered by, or exposed to risk from, human and natural factors*

Riparian Area "is the area adjacent to a river, lake, or stream, consisting of the area of transition from an aquatic ecosystem to a terrestrial ecosystem" according to Goal 5.

Riparian Corridor "is a Goal 5 resource that includes the water areas, fish habitat, adjacent riparian areas, and wetlands within the riparian area boundary," according to Goal 5.

Stream "is a channel such as a river or creek that carries flowing surface water, including perennial streams and intermittent streams with defined channels, and excluding man-made irrigation and drainage channels," according to Goal 5.

Significant Goal 5 Riparian Corridors

OAR 660-023-0090 provides that "Local governments shall inventory and determine significant riparian corridors by following either the safe harbor methodology described in section (5) of this rule or the standard inventory process described in OAR 660-023-0030 as modified by the requirements in section (4) of this rule. The local government may divide the riparian corridor into a series of stream sections (or reaches) and regard these as individual resource sites."

ESEE

The "ESEE Decision Process" in OAR 660-023-0040 states: "(1) Local governments shall develop a program to achieve Goal 5 for all significant resource sites based on an analysis of the economic, social, environmental, and energy (ESEE) consequences that could result from a decision to allow, limit, or prohibit a conflicting use..." "ESEE consequences" are the positive and negative economic, social, environmental, and energy (ESEE) consequences that could result from a decision to allow, limit, or prohibit a conflicting use."

Safe Harbor

OAR 660-023-0020 defines "safe harbor" as follows:

"Safe Harbor" consists of an optional course of action that satisfies certain requirements under the standard process. Local governments may follow safe harbor requirements rather than addressing certain requirements in the standard Goal 5 process. For example, a jurisdiction may choose to identify "significant" riparian corridors using the safe harbor criteria under OAR 660-023-0090(5) rather than follow the general requirements for determining "significance" in the standard Goal 5 process under OAR 660-023-0030(4). Similarly, a jurisdiction may adopt a wetlands ordinance that meets the requirements of OAR 660-023-0100(4)(b) in lieu of following the ESEE decision process in OAR 660-023-0040."

This 2013 Plan and the 2013 Inventory for wetlands rely on the Safe Harbor provisions of Goal 5 for the Comprehensive Plan and Code amendments (with an ESEE Analysis that

results in an exception for public infrastructure). Safe Harbor is also used to identify "significant" riparian corridor and width for the Munsel Creek Reaches (50 feet from top of bank), including the Munsel Creek side channel. In the case of RMC-C, the riparian corridor includes a major wetland where the riparian width is set at 50 feet from the wetland boundary, and two minor wetlands of < ½ acre each where the width is 25 feet consistent with prior DSL approvals. The "standard" inventory approach was used to identify significant riparian widths for the remainder of the riparian inventory and the ESEE results in Chapter 3 support the Limited Protection Program in Chapter 4 of this 2013 Plan for public infrastructure in wetlands and to address conflicts with existing development in the Munsel Creek side channel.

Limited Protection Program

Goal 5 requires local governments to "Develop a program to achieve Goal 5. Local governments shall determine whether to allow, limit, or prohibit identified conflicting uses for significant resource sites." The "Limited Protection Program" results when "a local government [may] decide[s] that both the resource site and the conflicting uses are important compared to each other, and, based on the ESEE analysis, the conflicting uses should be allowed in a limited way that protects the resource site to a desired extent."

Chapter 2: 2013 Florence Area Wetlands and Riparian Inventory, Significance, and Protection Measures

This Chapter provides key findings from the 2013 Florence Area Local Wetlands and Riparian Inventory, Pacific Habitat Services, Inc. (2013 Inventory); presents the significant wetlands and riparian corridors in the Florence urban growth boundary (UGB) and the significance criteria; and discusses the basis for the proposed protection measures in Chapter 4. The 2013 Inventory and the lists and maps of significant wetlands and riparian corridors in this Chapter are adopted as part of the Comprehensive Plan.

2013 Florence Area Local Wetlands Inventory, Significance, and Protection Measures

Table 2.1 presents all of the wetlands in the 2013 Inventory, their assessment, and the list of "Significant Goal 5 Wetlands." The protection measures adopted as part of this project apply to the Goal 5 Significant Wetlands in Table 2.1 and Significant Wetlands shown in the Map of Significant Wetlands on the following page.

Some of the wetlands in the 2013 LWI are outside the Florence UGB and some wetlands are Goal 17 Coastal Shorelands (Table 2.1). Wetlands outside the UGB are not subject to the Florence Comprehensive Plan; and no regulations are proposed in this study for wetlands outside the Florence city limits. Goal 17 wetlands are not regulated by Goal 5 and are thus not Goal 5 significant wetlands. Table 2.1 is explained in the sections below.

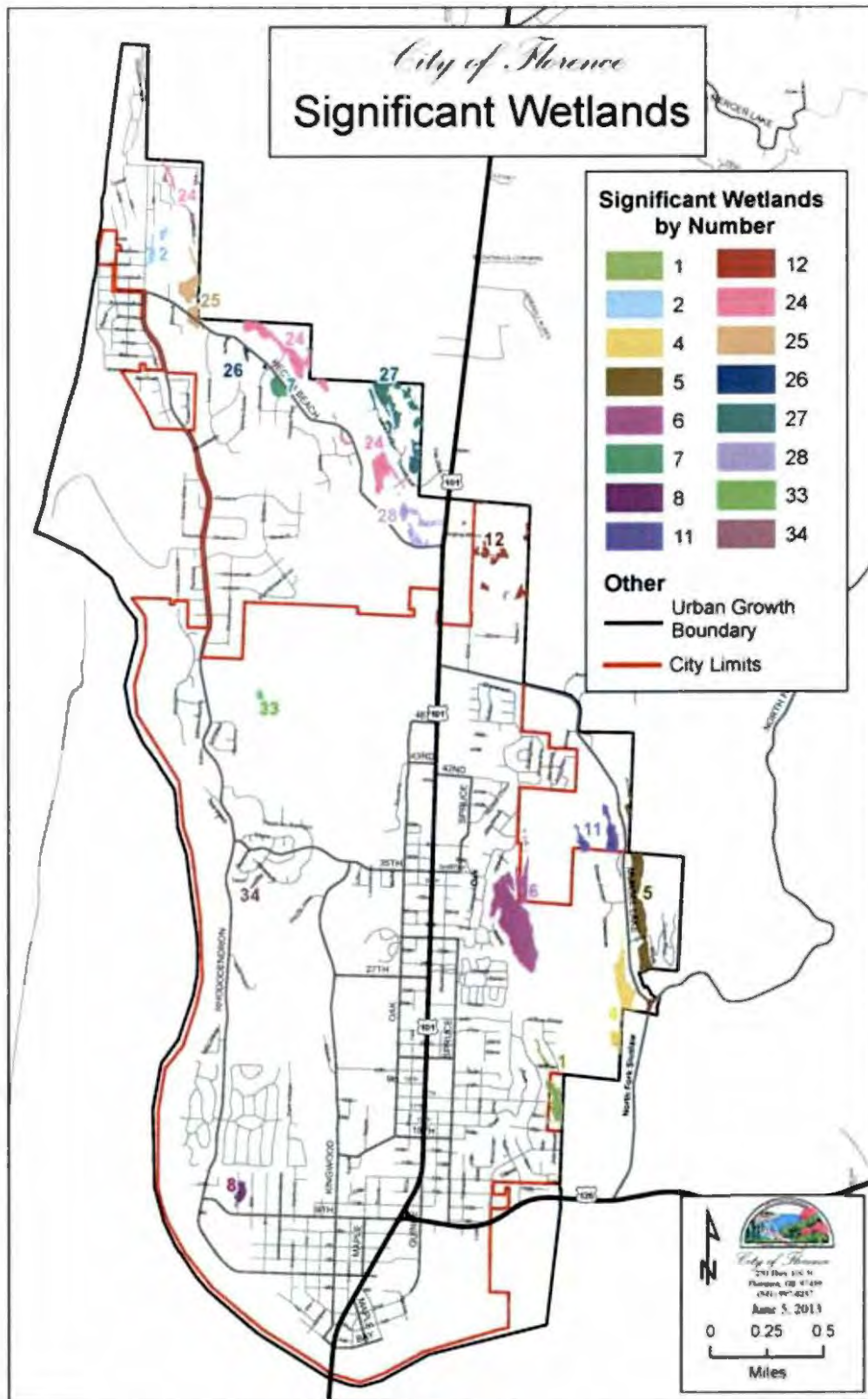
The 2013 Inventory updates the "City of Florence Local Wetlands and Riparian Area Inventory," prepared on December 30, 1996 by Pacific Habitat Services, Inc. and approved by DSL in 1997 (1997 Inventory). The 1997 Local Wetland Inventory (1997 LWI) used the Oregon Freshwater Wetland Assessment Methodology (OFWAM). For this project, an alternative wetland assessment, the Oregon Rapid Wetland Assessment Protocol (ORWAP; 2009), was used. The ORWAP provides much more detailed data on wetland functions, values and condition.

The 1997 LWI identified 270 wetlands, totaling 572 acres, and about 315 acres of riparian area. All of the wetlands within the UGB were considered "significant" under Goal 5. The majority of the wetlands are of high quality, due to the proximity of a number of freshwater lakes, and the large areas of undeveloped land in the northern portion of the UGB. Plant communities with a high priority for conservation include three palustrine scrub-shrub assemblages and one palustrine forested assemblage. The majority of the riparian areas were found to have high or moderate functional values for thermal regulation, erosion control, flood control/water quality, and wildlife habitat function. In the northern part of the UGB, there are large wetlands, bogs, and flooded forests; if left undeveloped, they would help regulate stream flows and reduce flood waters.

The improved inventories and assessment information in the 2013 LWI will assist in complying with Statewide Land Use Planning Goal 5 and will help the City and the County to make more informed land use decisions within the city and unincorporated lands within the study area.

**Table 2.1 ORWAP Scores for Functions (F) and Values (V) for All Wetlands and
List of Goal 5 Locally Significant Wetlands**

Wet- land #	Hydrologic Control		Water Quality		Fish Habitat		Aquatic Habitat		Terrestrial Habitat		Notes and Significance			
	F	V	F	V	F	V	F	V	F	V	Outside UGB	Goal 17 Resource	In City Limits	Goal 5 Signifi- cant
1	5.75	3.67	10	7.19	5.87	10	4.88	6.67	5.94	6.67	Part Out		In part	yes
2	3.5	3.08	10	6.07	3.69	4.2	6.37	7.33	6.63	6.67			Outside	yes
3	7	4.72	10	6.19	2.16	6.67	6.89	6.67	6.55	6.67	Outside			
4	2.31	7.64	6.17	7.5	6.56	10	6.11	10	7.61	7.51	Part Out		Inside	yes
5	3.09	7.22	7.39	7.5	7.89	10	6.52	7.33	8.79	10	Part Out	Outside UGB=G17	In part	yes
6	1.77	2.17	4.84	7.5	6.95	10	7.39	7.33	7.51	7.43			Mostly in	yes
7	6.0	3.17	10	6.03	2.21	6.67	6.41	7.33	5.23	6.67			Outside	yes
8	3.5	3.08	10	6.03	0.67	6.67	6.72	6.67	5.99	6.67			Inside	yes
9	3.46	2.17	7.37	5.28	2.3	6.67	7.12	4.0	7.9	6.67	Outside			
10	4.5	2.17	10	5.43	3.69	6.67	7.87	4.0	7.39	6.67	Outside			
11	2.67	6.81	6.93	5.59	2.83	6.67	5.86	7.33	9.01	7.72			Mostly Outside	yes
12	3.25	2.17	10	4.94	3.33	6.67	8.39	7.33	7.76	7.77	Part Out		Mostly Outside	yes
13	5.75	2.17	10	5.82	2.32	6.67	7.01	6.67	5.9	6.67	Outside			
14	4.25	2.17	10	5.07	3.52	6.67	8.04	6.67	6.94	6.67	Outside			
15	2.63	2.33	5.09	6.67	6.68	10	7.14	6.67	7.84	6.67	Outside			
16	3.25	2.17	10	5.07	0.74	6.67	7.67	7.33	6.68	6.7	Outside			
17	3.25	2.17	10	5.57	2.05	6.67	7.87	7.33	7.09	6.99	Outside			
18	3.85	2.33	6.46	5.78	1.59	6.67	6.92	7.33	7.71	6.67	Outside			
19	3.25	2.17	10	5.36	2.64	5.11	7.31	6.67	6.53	6.67	Outside			
20	3.25	2.17	10	5.36	0.83	6.67	7.34	7.33	6.06	6.67	Outside			
21	4.5	3.58	10	6.49	2.95	6.67	7.84	7.33	6.99	7.22	Outside			
22	3.13	2.67	4.21	6.67	7.06	10	6.97	6.67	6.34	6.67	Outside	G17		
23	4.5	2.17	10	5.45	4.26	5.47	8.28	7.33	6.72	7.21	Outside			
24	5.75	2.17	10	5.61	3.54	6.67	7.82	7.33	7.08	7.09	Part Out	Part G17	Outside	yes
25	3	2.17	5.52	5.28	2.59	5.41	7.23	7.33	5.83	6.7	Part Out		Outside	yes
26	3.25	2.42	10	5.57	2.89	6.67	5.98	6.67	5.95	6.67			Outside	yes
27	3.5	2.67	10	6.28	3.22	4.73	6.78	7.33	5.35	6.67	Part Out		Outside	yes
28	2.25	2.17	10	5.28	3.9	6.67	6.38	7.33	5.85	6.67			Outside	yes
29	4.5	2.17	10	5.36	3.33	6.67	6.41	7.33	5.43	6.67		G17	In part	
30	3.5	1.67	10	5.11	3.97	6.67	7.42	7.33	6.16	6.67		G17	Inside	
31	2.71	2.92	6.17	7.5	7.93	10	5.89	7.33	6.3	7.03		G17	Inside	
32	2.26	2.0	5.56	6.67	6.64	10	6.90	7.33	8.73	7.96	Outside	G17		
33	4.5	1.67	10	4.77	1.22	7.13	7.36	7.33	7.09	6.97			Inside	yes
34	1.64	1.67	5.03	6.64	2.57	6.67	6.06	6.67	4.66	6.67		Part G17	Inside	yes
75%	4.50	3.04	10.00	6.60	4.19	7.02	7.50	7.33	7.48	7.08	Goal 5 Significance Threshold			



2013 Local Wetlands Inventory and Assessment (2013 LWI)

Florence Freshwater Wetlands Process:

1. Inventory wetlands greater than ½ acre in size for Local Wetland Inventory
2. Assess grouped wetlands for functions and values.
3. Determine significance
4. Adopt protection measures

The 2013 Wetland Inventory and Assessment (2013 LWI) used the Oregon Rapid Wetlands Assessment Protocol (ORWAP). This project is one of three pilots using ORWAP for planning purposes. ORWAP is considered a more effective assessment tool than other tools. No administrative rules for the ORWAP significance determination have been adopted statewide. For this Florence project, DSL has approved the use of ORWAP and the significance criteria in this 2013 Plan (DSL letters, Appendix E).

The 2013 LWI resulted in 34 grouped wetlands greater than one-half acre in 654.54 total acres. These wetlands are by type: 60% forested wetlands, 21% scrub shrub wetlands; 10% emergent wetlands; 8% unconsolidated bottom wetlands; 1% lacustrine aquatic bed wetlands; and 1.4 acres of aquatic bed. Please see the 2013 Inventory Report for a description of these wetland classifications.

The updated wetland information in the 2013 LWI provides better data for land owners and public agencies to use in determining the *general* location of wetlands in the study area. The specific location is determined as part of local and state permit processes. The 2013 Florence Area Local Wetlands Inventory (2013 LWI), once approved by DSL, will replace the 1997 LWI in the State Wetland Inventory (SWI), both within and outside the UGB.⁵ The SWI is used by cities and counties to notify DSL of potential wetlands that are part of local development permit applications.⁶

In addition, updated wetland inventories done under Goal 5 can be used to clarify Goal 17 wetland resources.⁷ In Florence's case, the Coastal Shoreland Management Units were identified in 1978 using Natural Resources Conservation Service Maps; and the 2013 wetland data are more precise and current. There is one location where the 2013 LWI will be used to clarify a Goal 17 Coastal Shoreland: the South Heceta Junction Seasonal Lakes. Florence City Code amendments are proposed to reference the 2013 LWI for the *general* location of, and assessment data for, South Heceta Junction Sea-

⁵ In accordance with **OAR 141-086-0185**, "Once approved by the Department of State Lands (DSL), the Local Wetland Inventory (LWI) must be used in place of the National Wetlands Inventory (NWI) and is incorporated into the "State Wetland Inventory" (SWI). The SWI is an inventory which contains the location, wetlands types, and approximate boundaries of wetlands in the State of Oregon. This inventory is continually revised as additional information is received or obtained by the Division of State Lands. The approved LWI must be used by cities and counties in lieu of the NWI for notifying the Department of land use applications affecting mapped wetlands and other waters (ORS 215.418 and 227.350).

⁶ **OAR 660-023-0100 Wetlands** "(7) All local governments shall adopt land use regulations that require notification of DSL concerning applications for development permits or other land use decisions affecting wetlands on the inventory, as per **ORS 227.350** and **215.418**, or on the SWI as provided in section (5) of this rule.

⁷ **OAR 660-023-0240. Relationship of Goal 5 to Other Goals**

"(2) The requirements of Goals 15, 16, 17, and 19 shall supersede requirements of this division for natural resources that are also subject to and regulated under one or more of those goals. However, local governments may rely on a Goal 5 inventory produced under **OAR 660-023-0030** and other applicable inventory requirements of this division to satisfy the inventory requirements under Goal 17 for resource sites subject to Goal 17."

sonal Lakes for purposes of applying City Code requirements in FCC 10-19 inside the Florence city limits. The entire area affected by this change today is publicly owned parkland (County and State). The specific "Consistency Code Amendments" are included in Chapter 4 of this 2013 Plan. See the section, "Statewide Planning Goals 5 and 17," below for additional discussion of this topic.

The assessment of the wetlands was based on the following grouped functions:

- Hydrologic Function (Flood Control): water storage and delay
- Water quality: sediment retention and stabilization, phosphorous retention, nitrate removal and retention, thermoregulation
- Fish support: anadromous and non-anadromous fish habitat
- Aquatic habitat: organic matter export and habitat for: aquatic invertebrate, amphibian and reptiles, waterbird feeding, and waterbird nesting
- Terrestrial habitat: songbird, raptor, mammal, and pollinator habitat; and native plant diversity

Statewide Planning Goals 5 and 17

The significant wetlands in Table 2.1 are either Goal 5 or Goal 17 significant resources (see map: Coastal Shorelands & Wetland Areas). This project addresses the significance of Goal 5 resources; and the protection measures in Chapter 4 apply only to the Goal 5 significant wetlands in Table 2.1 within Florence city limits. Wetlands that are significant through the application of Statewide Planning Goal 17, Coastal Shorelands, are identified in the Lane County Coastal Resources Inventory, the Management Unit descriptions in Florence Comprehensive Plan Chapter 17, and in the Coastal Shoreland Overlay Zone map and standards in Florence City Code Title 10 Chapter 19.

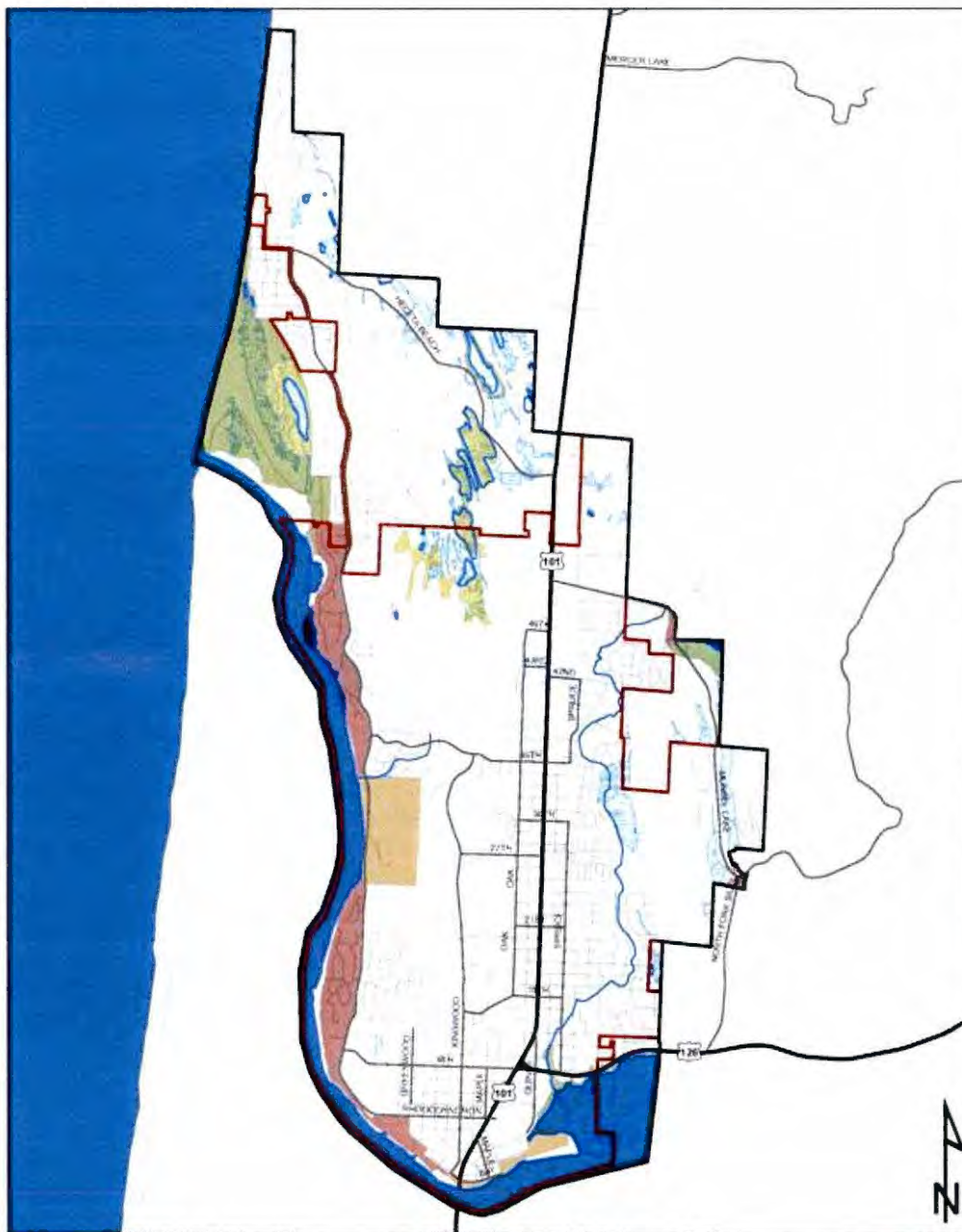
Goal 5 provides that updated wetland inventories done under Goal 5 can be used to clarify or update Goal 17 resources.⁸ In Florence's case, the Coastal Shoreland Management Units were identified in 1978; and the 2013 wetland data are more accurate and current. The 2013 LWI data are not substantially different from the 1978 data for Goal 17 resources, except for one location: the South Heceta Junction Seasonal Lakes (see map). For this reason, "Florence City Code Consistency Amendments" in Chapter 4 reference the 2013 LWI for the *general* location of the South Heceta Junction Seasonal Lakes and reference the 2013 Inventory Report for purposes of assessing the functions and values of this resource inside the Florence city limits. The entire area affected by this change today is publicly owned parkland (County and State). The specific Code amendments are included in the "Consistency Code Amendments" in Chapter 4 of this 2013 Plan.

Wetlands Significance Criteria and Locally Significant Wetlands

In this section, the significance criteria are presented and applied to the wetlands and assessment, using the Oregon Rapid Wetland Assessment Protocol (ORWAP) in the 2013 Inventory (Table 2.1). The legal basis for the Protection Measures is also discussed.

⁸ OAR 660-023-0240. Relationship of Goal 5 to Other Goals

"(2) The requirements of Goals 15, 16, 17, and 19 shall supersede requirements of this division for natural resources that are also subject to and regulated under one or more of those goals. However, local governments may rely on a Goal 5 inventory produced under OAR 660-023-0030 and other applicable inventory requirements of this division to satisfy the inventory requirements under Goal 17 for resource sites subject to Goal 17."



Wetland Significance Criterion:

1. The DSL-approved criterion⁹ for determining significance of non-Goal 17 wetlands in the Florence urban growth boundary (UGB) is wetlands that score at or above the 75th percentile in either Function or Value for one or more of the following Grouped Functions, as defined in the Oregon Rapid Wetlands Assessment Protocol (ORWAP):
 - a. Hydrologic Control (water storage and delay or “flood control”); or
 - b. Water Quality (sediment retention and stabilization, phosphorus retention, nitrate removal and retention, and thermoregulation); or
 - c. Habitat for fish, aquatic, or terrestrial species.
2. The results of the analysis are presented in Table 2.1, ORWAP Scores for Functions (F) and Values (V) of all Wetlands and List of Locally Significant Wetlands and the map: Significant Goal 5 Wetlands.

Results:

In applying the significance criterion to the 2013 LWI, the sixteen non-Goal 17 wetlands in the Florence UGB are significant, as shown in Table 2.1 and the map: Significant Wetlands. This is almost exclusively due to their high Function or Value in providing flood control and water quality protection. All of the wetlands, except Wetland 25, meet the criteria for Hydrologic Control or Water Quality; and Wetland 25 meets the criteria for Aquatic Habitat and is also at the head of a significant riparian corridor. In addition, all of the wetlands except 8, 26, and 34 meet the criteria for providing habitat for fish, aquatic, and/or terrestrial species.

Analysis:

1. The proposed approach to determining significance for the 2013 Inventory bases significance on the ORWAP scores separately for relative effectiveness of the Function and Value of the wetland. The proposed criteria do not require high scores in both Function and Value.

Grouped Functions in ORWAP	
Grouped Functions	Component Functions
Hydrologic Function	Water Storage and Delay (WS)
Water Quality Support Group	Sediment Retention and Stabilization (SR) Phosphorus Retention (PR) Nitrate Removal & Retention (NR) Thermoregulation (T)
Fish Support Group	Anadromous Fish Habitat (FA) Non-anadromous Fish Habitat (FR)
Aquatic Habitat Support Group	Organic Matter Export (OE) Aquatic Invertebrate Habitat (INV) Amphibian and Reptile Habitat (AM)

⁹ See Appendix E for letter from the Department of State Lands approving the criteria.

Grouped Functions in ORWAP	
Grouped Functions	Component Functions
	Waterbird Feeding Habitat (WBF) Waterbird Nesting Habitat (WBN)
Terrestrial Habitat Support Group	Songbird, Raptor, and Mammal Habitat (SBM) Pollinator Habitat (POL) Native Plant Diversity (PD)

The Florence Wetlands Project is a pilot and, as such, is one of the first attempts to use the ORWAP method for planning purposes. The Wetlands and Riparian Area Team worked together to come to a mutual understanding of how best to use the ORWAP tool and to agree to criterion for significance that makes sense in a planning context (see Appendix E).

2. The "service area" for the Florence Comprehensive Plan is the urban growth boundary (UGB). Flood control and water quality are critical issues for the North Florence Dunal Aquifer, both inside and outside the City limits. Wetlands that provide flood control or water quality protection, today or in the future, are of critical importance in providing these two services. For this reason, the proposed criteria take both the Function and the Value of the wetlands into consideration in determining significance.
3. The proposed significance criteria recognize the critical role that wetlands play in controlling floods and protecting water quality in the North Florence Sole Source Dunal Aquifer. All wetlands in the UGB play a role, or will play a role in the future, in Hydrologic Control and/or Water Quality Protection. All but one of the "significant" wetlands met the criteria for these functions or values, and are thus recommended for protection. The proposed criteria also recognize the importance of wetlands for providing Habitat for fish, aquatic, and terrestrial species. All of the wetlands except 8, 26, and 34 meet the criteria for providing habitat for fish, aquatic, and/or terrestrial species.

Wetland Protection Measures

Statewide Planning Goal 5 protection measures apply to non-Goal 17 significant wetlands within Florence city limits. The proposed protection measures, below, are implemented through the Comprehensive Plan and City Code amendments presented in Chapter 4.

1. The proposed protection measures are to:
 - a. apply the Safe Harbor approach in Statewide Planning Goal 5 to protect significant wetlands in the city limits;
 - b. include procedures for setback adjustments and Variance procedures that recognize the rights of a property owner to develop property that would otherwise be unbuildable (avoids unconstitutional "taking" of private property without just compensation);¹⁰ and

¹⁰ **660-023-0100 Wetlands** "(4) For significant wetlands inside UGBs and UUCs, a local government shall: (a) Complete the Goal 5 process and adopt a program to achieve the goal following the requirements of OAR 660-023-0040 and 660-023-0050; or (b) Adopt a safe harbor ordinance to protect significant wetlands consistent with this subsection, as follows:

(A) The protection ordinance shall place restrictions on grading, excavation, placement of fill, and vegetation removal other than perimeter mowing and other cutting necessary for hazard prevention; and (B) The ordinance shall include a variance procedure to consider hardship vari-

- c. use the ESEE (Economic, Social, Environmental, and Energy) Analysis prescribed in Statewide Planning Goal 5 to address conflicts between construction of planned infrastructure projects and resource conservation. The ESEE analysis for public facilities, presented in Chapter 3, evaluates these conflicts within the urban growth boundary and proposes the appropriate level of resource protection.

2. Analysis:

"OAR 660-023-0100 Wetlands (4) For significant wetlands inside UGBs and UUCs, a local government shall:

- (a) Complete the Goal 5 process and adopt a program to achieve the goal following the requirements of OAR 660-023-0040 and 660-023-0050; or
- (b) Adopt a safe harbor ordinance to protect significant wetlands consistent with this subsection, as follows:

- (A) The protection ordinance shall place restrictions on grading, excavation, placement of fill, and vegetation removal other than perimeter mowing and other cutting necessary for hazard prevention; and
- (B) The ordinance shall include a variance procedure to consider hardship variances, claims of map error verified by DSL, and reduction or removal of the restrictions under paragraph (A) of this subsection for any lands demonstrated to have been rendered not buildable by application of the ordinance."

For wetland protection measures, the amendments in Chapter 4 apply the provisions of the Safe Harbor approach in Statewide Planning Goal 5, including the hardship setback adjustment and Variance procedure, to protect locally significant wetlands in the Florence City limits, while using the ESEE analysis process in Chapter 3 to address conflicts with public infrastructure projects. This would mean that the significant wetlands would be protected, with adjustments and a Variance procedure available that recognizes the rights of a property owner to develop property (avoids unconstitutional "taking" of private property without just compensation); and that planned public improvements can be constructed as long as the needed state and federal permits are obtained.

The proposed protection measures combine the approaches available under State law, i.e., safe harbor and ESEE analysis, in a manner that ensures all properties will retain some development potential. The ESEE analysis is also used as a tool to ensure that planned infrastructure and public improvements, such as roads, stormwater systems, water and wastewater systems, can be constructed as planned, without requiring the variance process, although any such development will nevertheless be subject to any required state and federal permit processes.

ances, claims of map error verified by DSL, and reduction or removal of the restrictions under paragraph (A) of this subsection for any lands demonstrated to have been rendered not buildable by application of the ordinance."

2013 Florence Riparian Inventory, Significance, and Protection Measures

Table 2.2 presents all of the Riparian Corridors in the 2013 Inventory, their assessment, and the list of "Significant Goal 5 Riparian Corridors and Widths." The protection measures adopted as part of this project apply to the significant riparian widths in Table 2.2 and the Significant Goal 5 Riparian Corridors shown in the 2013 Map of Significant Riparian Reaches on the following page.

Some of the riparian areas in the 2013 Inventory are outside the Florence UGB and some riparian areas are Goal 17 Coastal Shorelands (Table 2.2). Riparian areas outside the UGB are not subject to the Florence Comprehensive Plan; and no regulations are proposed in this study for riparian areas outside the Florence city limits. Goal 17 riparian areas are not regulated by Goal 5 and are thus not Goal 5 significant riparian areas. Table 2.2 is explained in the sections below.

The 2013 Inventory updates the "City of Florence Local Wetlands and Riparian Area Inventory," prepared on December 30, 1996 by Pacific Habitat Services, Inc. and approved by DSL in 1997 (1997 Inventory).

2013 Riparian Inventory and Assessment

The Goal 5 Administrative Rules require local governments to inventory and determine significant riparian corridors by following either a "safe harbor" process or a "standard" methodology. A plan for protection is required for those riparian resources judged to be significant. The determination of riparian width and significance for this process used a combination of the safe harbor and standard processes, as discussed below.

OAR 660-023-0090 Riparian Corridors "3) Local governments shall inventory and determine significant riparian corridors by following either the safe harbor methodology described in section (5) of this rule or the standard inventory process described in OAR 660-023-0030 as modified by the requirements in section (4) of this rule. The local government may divide the riparian corridor into a series of stream sections (or reaches) and regard these as individual resource sites."

The riparian corridors in the Florence UGB were divided into 17 riparian reaches in the following 5 basins:

- Munsel Creek
- Rhododendron Drive
- Airport
- Heceta Beach
- North Fork Siuslaw

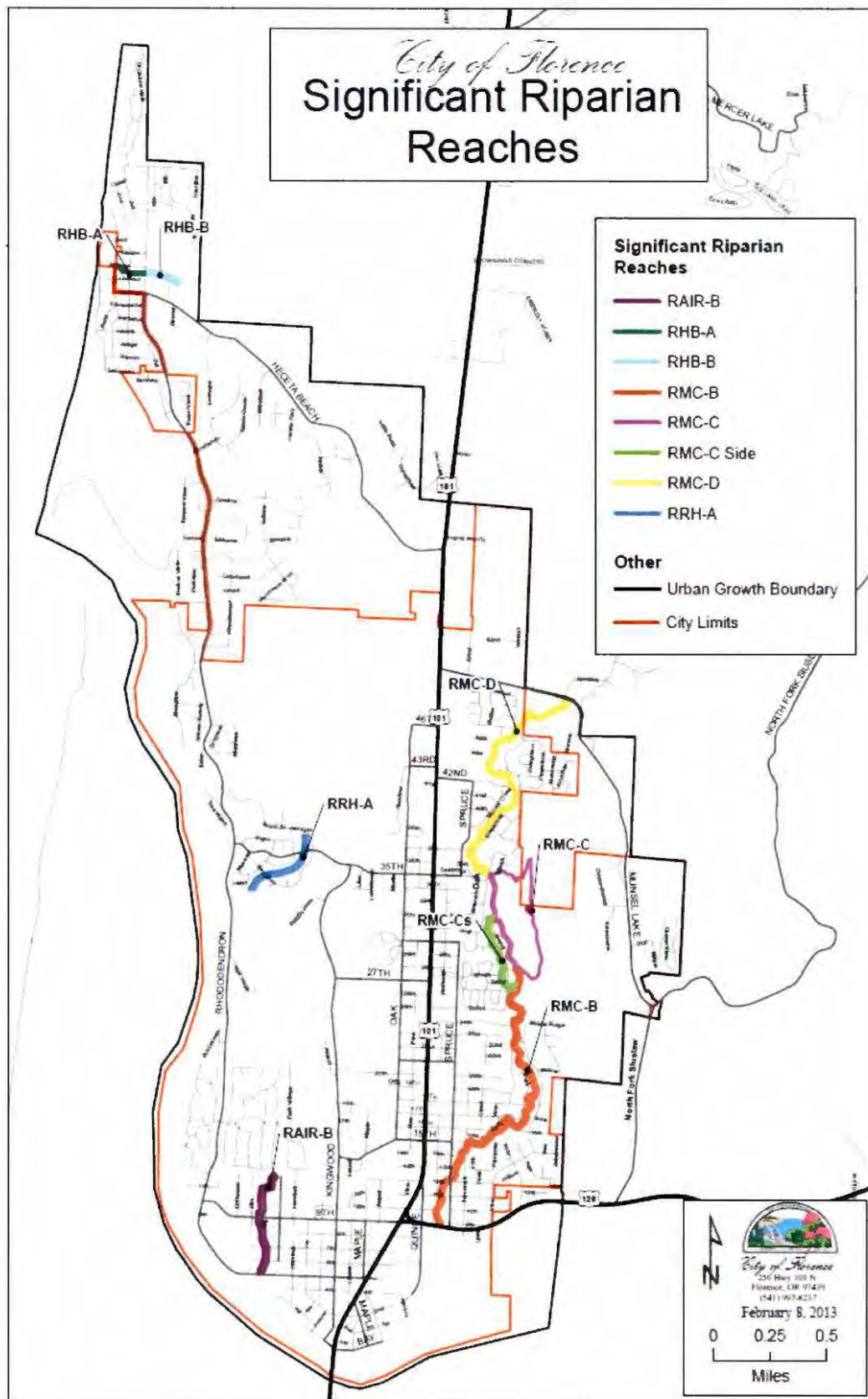
As shown in Table 2.2, Goal 5 Safe Harbor was used to identify the significant riparian corridor and width for the Munsel Creek Reaches (50 feet from top of bank), including the Munsel Creek Side Channel. In the case of RMC-C, the riparian corridor includes a major wetland where the standard width is set at 50 feet from the wetland boundary, and two minor wetlands of < ½ acre each where the width is 25 feet consistent with prior DSL approvals. Field data sheets and maps were completed for Munsel Creek, including the Munsel Creek side channel, even though the safe harbor option was used to determine the riparian corridor boundaries of these corridors. The standard inventory maps and Reach Summaries for Munsel Creek are included in the 2013 Inventory as background

information; they are not intended for use in, and are not referenced in, any local planning or land use context.

Table 2.2 Significant Florence Riparian Corridors and Widths

Basin and Reach ¹	Riparian Width, ² ft	Functional Assessment				Goal 5 Significant	Notes		
		Water Quality	Flood Mgmt	Thermal Regulation	Wildlife Habitat		Goal 17?	Out-side UGB?	In City Limits?
Munsel Creek Basin									
RMC-A	50/50-G17	H ³	H	M	H	--	Goal 17		Yes
RMC-B	50/50-SH	H	M	H	H	Yes			Yes
RMC-C	50/50-SH ⁴	H	H	H	H	Yes			Yes, Mostly
RMC-Cs	50/50-SH	H	M	H	M	Yes			Yes
RMC-D	50/50-SH	H	M	H	H	Yes			Yes, in part
RMC-D1	50/50-PTH	H	M	M	M	--		Outside	
RMC-EI	120-PTH	H	M	M	H	--	Goal 17		No
RMC-Er	15 - PTH	M	M	L	M	--		Outside	
RMC-FI	50 - Topo	H	M	M	M	--		Outside	
RMC-Fr	120-PTH	H	M	M	H	--		Outside	
Airport Basin									
RAIR-A	20/20Topo	M	M	L	L	No			Yes
RAIR-B	65/65-PTH	H	M	H	H	Yes	Goal 17, in part		Yes
RAIR-C	30/30Topo	M	M	M	M	No			Yes
Rhododendron Drive Basin									
RRH-A	50/50-PTH	M	M	H	M	Yes	Goal 17, in part		Yes
Heceta Beach Basin									
RHB-A	20/20Topo	H	M	H	M	Yes			No
RHB-B	50/50-PTH	H	H	H	H	Yes			No
North Fork Siuslaw Basin									
RNS-A	40/40Topo	M	M	H	M	--		Outside	

1. See Map "City of Florence Significant Riparian Reaches 2013" for Significant Riparian Corridor locations. The 2013 Inventory contains information and maps for riparian areas not deemed significant.
2. Left and Right values looking downstream, measured horizontally from top of bank for streams. Basis for width:
G17 = Goal 17 setback; SH = Goal 5 Safe Harbor
PTH = Potential Tree Height; Topo = Top of bank to topographical break
3. Functional assessment ratings based on Urban Riparian Assessment Guide (URIAG) Scoring: L = Low, M = Medium, H = High
4. Where RMC-C includes a wetland, the riparian boundary shall be measured from, and include, the upland edge of the wetland [OAR 660-023-0090 (5)(c)]; and the riparian corridor boundary for two minor wetlands (< ½ acre each) is set at 25 feet consistent with the approved PUD plat for Florentine Estates.



Safe Harbor Riparian Inventory:

OAR 660-023-0020 defines "safe harbor" as follows:

"Safe Harbor" consists of an optional course of action that satisfies certain requirements under the standard process. Local governments may follow safe harbor requirements rather than addressing certain requirements in the standard Goal 5 process. For example, a jurisdiction may choose to identify "significant" riparian corridors using the safe harbor criteria under OAR 660-023-0090(5) rather than follow the general requirements for determining "significance" in the standard Goal 5 process under OAR 660-023-0030(4). Similarly, a jurisdiction may adopt a wetlands ordinance that meets the requirements of OAR 660-023-0100(4)(b) in lieu of following the ESEE decision process in OAR 660-023-0040."

The safe harbor inventory approach is only available in Goal 5 for fish bearing streams:

"(5) As a safe harbor in order to address the requirements under OAR 660-023-0030, a local government may determine the boundaries of significant riparian corridors within its jurisdiction using a standard setback distance from all fish-bearing lakes and streams shown on the documents listed in subsections (a) through (f) of section (4) of this rule, as follows:..."

Munsel Creek is the only fish bearing stream in the Florence UGB and the annual stream flow is less than 1,000 cubic feet per second; so, in accordance with Goal 5, below, the Goal 5 safe harbor riparian corridor boundary for Munsel Creek shall be 50 feet from the top of bank:

"(b) Along all lakes, and fish-bearing streams with average annual stream flow less than 1,000 cfs, the riparian corridor boundary shall be 50 feet from the top of bank."

There is a section of the main channel of Munsel Creek (Reach RMC-C) where the riparian corridor includes portions of a significant wetland. In accordance with Goal 5, below, the standard distance to the riparian corridor boundary in this area shall be measured from, and include, the upland edge of the wetland; the riparian corridor boundary for two minor wetlands (< ½ acre each) is set at 25 feet consistent with the approved PUD plat for Florentine Estates.

"(c) Where the riparian corridor includes all or portions of a significant wetland as set out in OAR 660-023-0100, the standard distance to the riparian corridor boundary shall be measured from, and include, the upland edge of the wetland."

Standard Riparian Inventory:

The "standard" inventory approach was used to identify riparian widths for the remainder of the riparian inventory, as follows:

1. Inventory: determine stream characteristics and riparian widths – typical tree height or topographic break, using the Urban Riparian Inventory and Assessment Guide, Oregon Department of State Lands, 1998
2. Assess riparian functions – water quality, flood management, thermal regulation, and wildlife habitat
3. Determine significance
4. Adopt protection measures

The assessment of the riparian corridors was based on the following functions:

- Water quality: riparian vegetation traps sediment, filters runoff, and binds soil to prevent erosion
- Flood management: vegetation slows the rate of storm runoff and increases groundwater recharge
- Thermal regulation: trees and herbaceous layers provide shade and add humidity, cooling the water and providing important habitat for juvenile fish
- Wildlife habitat: riparian trees, vegetation, ground cover, and woody debris provide habitat for wildlife that thrive near a water resource.

Goal 5 OAR 660-023-0090 provides that, “Local governments are encouraged, but not required, to conduct field investigations to verify the location, quality, and quantity of resources within the riparian corridor:”

“(4) When following the standard inventory process in OAR 660-023-0030, local governments shall collect information regarding all water areas, fish habitat, riparian areas, and wetlands within riparian corridors. Local governments may postpone determination of the precise location of the riparian area on lands designated for farm or forest use until receipt of applications for local permits for uses that would conflict with these resources. Local governments are encouraged, but not required, to conduct field investigations to verify the location, quality, and quantity of resources within the riparian corridor.”

The City of Florence elected to use the Oregon DSL “Urban Riparian Inventory and Assessment Guide” (URIAG). Using this method, all water resources are inventoried, riparian widths and characteristics are determined by field evaluation, and riparian quality is determined by a functional assessment scoring system. The URIAG methodology is comprised of a riparian inventory and a riparian assessment. For the inventory, hydrologic basins are identified and the riparian corridors within each basin are mapped and broken into “reaches” with similar characteristics such as water body (stream vs. lake), vegetation patterns, and/or land use. For each reach, the riparian area was characterized by a combination of field observations at accessible locations, aerial photographs, GIS maps, and the recently available Light Detection and Ranging (LIDAR) topography. Each riparian reach has a right (R) and left (L) side, looking downstream.

The riparian inventory requires determination of the riparian width. Width of the riparian area is measured horizontally out from the edge of the water resource, typically either the top of a streambank (TOB) or the high water line of a lake or wetland. In order to capture the riparian functions of stream shading and delivery of organic debris, the URIAG sets the width value as the Potential Tree Height (PTH) at maturity for the dominant tree species in the area.

The inventory has used the PTH criteria wherever it provides a reasonable and credible result. However, several of the stream reaches within the urban City limits are favored with stands of Douglas fir, Western hemlock, and/or Sitka spruce; thus the PTH is 120 feet — which would extend the riparian area well into the established residential structures and facilities. These reaches typically have a topographical break at the top of the riparian slope, which also sets the usual boundary with the adjacent residential or commercial development. For such reaches, the inventory has chosen to recognize “realities on the ground” by defining the riparian width as “TOB to topographical break” — the horizontal dimension of the slope which runs from the streambank up to where the ground is

roughly level or slopes away from the water resource; this slope has the primary potential for positive or negative contributions to water quality and flood management. Further, for water resources in the urban area, this slope also seems to support the heaviest and most consistent vegetation — trees, shrubs and woody debris — which is the primary source of shading for thermal regulation as well as organic material for wildlife habitat.

Riparian Assessment Results:

The riparian area assessment is completed by “scoring” each reach with respect to beneficial riparian functions using URIAG parameters. The inventory field observations answered a series of questions which describe the characteristics of the riparian area. Those answers are weighted and summed to quantify riparian potential regarding water quality, flood management, thermal regulation, and wildlife habitat. The scored results for the reach indicate whether the potential for each function is High, Medium, or Low. The ratings provide a basis for local authorities to identify significant riparian reaches and to adopt protection measures required by Goal 5.

The riparian field assessments were conducted at 51 locations on the drainages and lakes in the project area. At many locations, separate information was recorded for the left and right sides of the water resource. Each assessment location was assigned a code based on a project defined drainage basin and a number (e.g. RMC-1). A data sheet was completed during the visit at each location which documents the existing channel, topography, and vegetation conditions and estimates riparian measurements. In a few cases, the assessments were based on aerial photographs and LIDAR data due to the lack of project access.

Based on the URIAG scoring, most of the inventoried riparian reaches (70%) rate HIGH for water quality functioning, because they filter the runoff from nearby land. In the flood management category, 80% of the riparian reaches rated MEDIUM; and the three with associated wetlands rated HIGH. For the important thermal regulation function, 50% rated HIGH while 12% rated LOW due to lack of effective vegetation coverage. Valuable wildlife habitat is characterized by multi-layered vegetation near the streams; for this function 47% of the reaches rated HIGH and 47% rated MEDIUM.

In general, Munsel Creek and the undeveloped lakeshores were judged to have excellent riparian functional value. In addition, RAIR-B and the Heceta Beach (RHB) reaches also had superior ratings.

Riparian Significance Criteria and Locally Significant Riparian Corridors and Widths

The Significant Riparian Corridors and Widths are presented in Table 2.2 and the 2013 Map: “City of Florence Significant Riparian Reaches.” The protection measures in Chapter 4 and adopted as part of this project apply to the significant riparian widths in Table 2.2 and shown in this map.

Significance Criteria for Riparian Corridors and Widths:

Statewide Planning Goal 5 criteria apply to non-Statewide Planning Goal 17¹¹ riparian corridors in the 2013 Riparian Inventory within the Florence Urban Growth Boundary (UGB). The significance and width determination for each reach and riparian corridor is documented in the 2013 Inventory and the results are summarized in Table 2.2, Significant Florence Riparian Corridors and Widths.

The significance criteria for non-Goal 17 riparian corridors in the Florence urban growth boundary (UGB) are as follows:

1. **Munsel Creek:** Use the "Safe Harbor" provisions of Statewide Planning Goal 5 to determine as a "significant riparian resource" the riparian corridor with boundaries 50 feet from the top of bank along each side of Munsel Creek, the only fish-bearing stream in the Inventory. This safe harbor width includes the side channel of Munsel Creek (RMC-Cs). For the Munsel Creek Reach RMC-C (main channel where wetlands are), the standard 50' distance to the riparian corridor boundary shall be measured from, and include, the upland edge of the wetland,¹² except that the riparian corridor boundary for two minor wetlands (< ½ acre each) is set at 25 feet consistent with the approved PUD plat for Florentine Estates.
2. **Riparian corridors other than Munsel Creek:** Determine as "significant riparian corridors" the inventoried widths of all Riparian Reaches that scored at least one High Value in the Riparian Functional Assessment in Table 2.2.

Results:

As shown in Table 2.2, the only two non-Goal 17 Reaches in the UGB that do not meet this threshold, and thus will not be deemed "significant," are RAIR-A and RAIR-C. RAIR-A is cleared and channeled via Siuslaw High School, the airport runway, and Greentrees to 12th Street. RAIR-C runs from the south airport fence to 9th Street; and restoration of this reach is questionable. The significant riparian reaches are shown in the 2013 City of Florence Significant Riparian Reaches Map.

Analysis:

Goal 5 provides that a 50 foot "Safe Harbor" significant riparian width can be used for fish bearing streams. Munsel Creek is the only fish bearing stream in the Inventory. As such, the Safe Harbor provisions in Goal 5 are used to establish significance with a riparian width of 50 feet from top of bank; and for the wetland area of the main channel section of RMC-C, the 50' riparian corridor boundary is measured from, and includes, the upland edge of the wetland, except that the riparian corridor boundary for two minor wetlands (<

¹¹ **OAR 660-023-0240. Relationship of Goal 5 to Other Goals**

"(2) The requirements of Goals 15, 16, 17, and 19 shall supersede requirements of this division for natural resources that are also subject to and regulated under one or more of those goals. However, local governments may rely on a Goal 5 inventory produced under OAR 660-023-0030 and other applicable inventory requirements of this division to satisfy the inventory requirements under Goal 17 for resource sites subject to Goal 17."

¹² In accordance with OAR 660-023-0090(5): "Where the riparian corridor includes all or portions of a significant wetland as set out in OAR 660-023-0100, the standard distance to the riparian corridor boundary shall be measured from, and include, the upland edge of the wetland."

½ acre each) is set at 25 feet consistent with the approved PUD plat for Florentine Estates.

For those streams within the Florence UGB that are not fish-bearing, the standard inventory approach was used, consistent with Statewide Planning Goal 5 which provides that, when Safe Harbor is not an option, the determination of significance shall be based on:

- (a) The quality, quantity, and location information;
- (b) Supplemental or superseding significance criteria set out in OAR 660-023-0090 through 660-023-0230; and
- (c) Any additional criteria adopted by the local government, provided these criteria do not conflict with the requirements of OAR 660-023-0090 through 660-023-0230.

Munsel Creek and Munsel Creek Side Channel

OAR 660-023-0090 requires the local government to consult specific sources in completing the standard inventory:

“At a minimum, local governments shall consult the following sources, where available, in order to inventory riparian corridors along rivers, lakes, and streams within the jurisdiction:

- (a) Oregon Department of Forestry stream classification maps;
- (b) United States Geological Service (USGS) 7.5-minute quadrangle maps;
- (c) National Wetlands Inventory maps;
- (d) Oregon Department of Fish and Wildlife (ODFW) maps indicating fish habitat;
- (e) Federal Emergency Management Agency (FEMA) flood maps; and
- (f) Aerial photographs.”

The 50 foot safe harbor significant riparian width for Munsel Creek and the Munsel Creek Side Channel is shown on the April 17, 2012 “RMC-C” Map on the following page. The 50-foot safe harbor width was applied to Munsel Creek non-Goal 17 riparian reaches within the UGB, including the Munsel Creek side channel, based on the conclusions from consultation with ODFW, the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS), and the Florence Salmon and Trout Enhancement Program (STEP) at-large Director. Representatives from these agencies visited the side channel with the Community Stakeholder who volunteered to conduct the inventory and the representatives were united in their conclusion that Munsel Creek and this side channel reach and its riparian area be declared as significant and protected with a 50-foot safe harbor riparian width. They concluded: “Munsel Creek and the side channel are both considered as critical habitat for Oregon Coast coho salmon (a federally listed threatened species) and are important to the conservation and recovery of this species.”

Fish biologists from ODFW, NMFS, and one of the at-large Directors of the STEP agreed in written communications to the City that “When Oregon Coast coho salmon were listed under Endangered Species Act, NMFS also designated critical habitat and Munsel Creek was included in this designation. Therefore, Munsel Creek and the side channel are both considered by NMFS as critical habitat for Oregon Coast coho salmon and are important to the conservation and recovery of this species. Munsel Creek and the side channel are also designated as essential fish habitat (EFH) for coho salmon under the Magnuson-Stevens Fishery and Conservation Management Act.” “Therefore, I recommend that this side channel reach and its riparian be declared as significant and protected with a 50-foot riparian setback.” The representatives from the other agencies concurred with this statement in writing.

Riparian Protection Measures

The *current* Florence Realization 2020 Comprehensive Plan, Chapter 5, contains policy adopting the Safe Harbor protections for all riparian corridors in the adopted 1997 Inventory. The amendments in Chapter 4 of this 2013 Plan replace this policy with policy requiring the City to protect significant wetland and riparian areas in City Code and to adopt, into the Comprehensive Plan, the results of the ESEE Analysis in Chapter 3 that addresses conflicts along the Munsel Creek Side Channel (RMC-Cs) to address conflicts between existing development and full protection of the resource, as allowed in Goal 5 (see Chapters 3 and 4).

The applicable OAR for Safe Harbor Riparian protection is as follows:

“OAR 660-023-0090 Riparian Corridors (8) As a safe harbor in lieu of following the ESEE process requirements of OAR 660-023-0040 and 660-023-0050, a local government may adopt an ordinance to protect a significant riparian corridor as follows:

- (a) The ordinance shall prevent permanent alteration of the riparian area by grading or by the placement of structures or impervious surfaces, except for the following uses, provided they are designed and constructed to minimize intrusion into the riparian area:
 - (A) Streets, roads, and paths;
 - (B) Drainage facilities, utilities, and irrigation pumps;
 - (C) Water-related and water-dependent uses; and
 - (D) Replacement of existing structures with structures in the same location that do not disturb additional riparian surface area.
- (b) The ordinance shall contain provisions to control the removal of riparian vegetation, except that the ordinance shall allow:
 - (A) Removal of non-native vegetation and replacement with native plant species; and
 - (B) Removal of vegetation necessary for the development of water-related or water-dependent uses;
- (d) The ordinance shall include a procedure to consider hardship variances, claims of map error, and reduction or removal of the restrictions under subsections (a) and (b) of this section for any existing lot or parcel demonstrated to have been rendered not buildable by application of the ordinance;..”

Statewide Planning Goal 5 protection measures apply to significant non-Statewide Planning Goal 17 riparian corridors in the 2013 Riparian Inventory within the Florence city limits.¹³ The proposed protection measures, below, are implemented through the Comprehensive Plan and Code amendments presented in Chapter 4.

¹³ **OAR 660-023-0240. Relationship of Goal 5 to Other Goals**

“(2) The requirements of Goals 15, 16, 17, and 19 shall supersede requirements of this division for natural resources that are also subject to and regulated under one or more of those goals. However, local governments may rely on a Goal 5 inventory produced under OAR 660-023-0030 and other applicable inventory requirements of this division to satisfy the inventory requirements under Goal 17 for resource sites subject to Goal 17.”

The protection measures in Chapter 4 of this 2013 Plan for significant riparian corridors are:

1. **For all significant Riparian Corridors in Table 2.2, except RMC-Cs (Munsel Creek side channel):** Use the Safe Harbor protection measures in Goal 5 OAR 660-023-0090(8), above, by adopting an Ordinance that contains these provisions. **Note: The specific Code language is presented in Chapter 4.**
2. **For Munsel Creek Side Channel (RMC-Cs):** Use the ESEE (Economic, Social, Environmental, and Energy) Analysis prescribed in Statewide Planning Goal 5 to address conflicts between existing land uses and full protection of coho salmon, a federally-listed threatened species (Chapter 3). The ESEE analysis evaluates these conflicts within this Reach and results in a setback adjustment allowance in exchange for replanting displaced native plants. Two residential developments are affected by these measures: Florentine Estates and Coast Village. All but one of the lots in Florentine Estates was granted a setback reduction by the Planning Commission and the Conditions of Approval make these lots compliant with the Limited Protection Program. The remaining lot and Coast Village owners may apply for the setback reduction. In addition, other allowances are provided in Code for the special circumstances in Coast Village (see Chapters 3 and 4).

City Stormwater Buffer Zones and Proposed Incentives

Stormwater Buffer Zones

Chapter 11 Stormwater Management Policy #2 calls for protection of wetlands and riparian corridors to protect stormwater quality and quantity. Currently adopted City Code applies a 50 foot Stormwater buffer zone of native vegetation to wetlands and 50 feet or more for riparian areas in the city; and cross references Code Chapter 10, Land Use, Chapter 7, Special Development Standards.

FCC 9-5-3-3-F applies the Stormwater Buffer Zones to sensitive areas, defined in Code as:

“SENSITIVE AREAS Natural streams (perennial or intermittent), rivers, lakes, or wetlands hydraulically connected by surface water to streams, rivers, or lakes and areas defined by the City of Florence’s Local Wetlands and Riparian Inventory. Also, includes all areas that are protected for species as per areas designated by Oregon Department of Fish and Wildlife, Oregon Division of State Lands, National Marine Fisheries Service, United States Fish and Wildlife Service and Oregon Department of Transportation”

In Chapter 4 of this 2013 Plan, “Consistency Amendments” to FCC 9-5-3-3-F and definitions clarify that the stormwater buffer applies to *significant* wetlands greater than ½ acre and *significant* riparian areas; and refer to FCC 10-7 for “significant wetland and riparian area standards,” and to FCC 10-19 for “standards implementing Statewide Goal 17.” The amendments provide further consistency by amending FCC 10-7, Special Development Standards to include the exact same standards that are in FCC 9-5-3-3-F, thereby eliminating any conflict between these Code Titles. FCC 10-7 then adds Goal 5 standards, exemptions, adjustments, variances, and ESEE results. In this way, the City can retain the standards it adopted for stormwater and avoid internal Code conflicts that could impair City Code administration.

Proposed Incentives

For this proposal, the required Goal 5 and Stormwater policy and Code requirements and standards will be supplemented by incentives to improve the continuity and quality of riparian corridors, wetlands, and wetland buffers in situations where lots would be rendered unbuildable by the setback and thereby qualify for a hardship variance. Such incentives include reducing the required front yard setback, alternative access, vacating right-of-way, property line adjustments, re-orientation of lots, transfer of development rights (if feasible), and density bonuses, among others. These incentives also apply to properties that are severely impacted by the setback. In all cases, the required riparian setback and wetland and wetland buffer zone standards apply to all properties with significant wetlands and significant streams, unless the property is rendered "unbuildable," as that term is defined in the Code amendments in Chapter 4 or conflicts have been addressed in an ESEE Analysis, i.e., the Munsel Creek Side Channel and public infrastructure in significant wetlands.

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Chapter 3: ESEE Analysis for Public Facilities and Munsel Creek Side Channel

Purpose and Background

The purpose of this analysis of Economic, Social, Environmental, and Energy consequences (ESEE Analysis) is to address conflicts between full protection of locally significant wetlands and public facilities (transportation, water, wastewater, and stormwater); and between full protection of the locally significant riparian corridor and residential development along the Munsel Creek side channel (RMC-Cs).

Consistent with Goal 5 requirements, this analysis is adopted by the City of Florence as part of the City's Comprehensive Plan, along with the specific Comprehensive Plan and City Code amendments in Chapter 4. The ESEE does not require co-adoption by Lane County because the Limited Protection Program will be implemented entirely within City limits, i.e., through City Code amendments.

Goal 5 Rule Requirements Pertaining to the ESEE

The Goal 5 administrative rule (OAR Chapter 660, Division 023) requires that local governments:

- "1. Conduct an inventory of Goal 5 resource sites (for this analysis, riparian corridors and wetlands);
2. Determine the significance of each resource site;
3. Identify land uses and activities that conflict (i.e., could adversely impact) with the resource site;
4. Consider the economic, social, environmental and energy consequences of the program options:
 - a. Full protection of the resource site (allow no conflicting uses);
 - b. Limited protection of the resource site (balance development and conservation objectives); and
 - c. No local protection for the resource site (allow conflicting uses fully).
5. Based on the ESEE analysis, adopt a local protection program to protect significant Goal 5 resources."

This five step process outlined above is called the "standard" Goal 5 process.

Safe Harbor Provisions of Goal 5

The drafters of the Goal 5 rule recognized that steps necessary to achieve Goal 5 compliance are complex and expensive. The Goal 5 rule includes "safe harbor" provisions that are available to local governments to reduce the complexity and cost of the standard Goal 5 process. As defined in the Goal 5 rule:

(2) A "safe harbor" consists of an optional course of action that satisfies certain requirements under the standard process. Local governments may follow safe harbor requirements rather than addressing certain requirements in the standard Goal 5 process. For example, a jurisdiction may choose to identify "significant" riparian corridors using the safe harbor criteria under OAR 660-023-0090(5) rather than fol-

low the general requirements for determining "significance" in the standard Goal 5 process under OAR 660-023-0030(4). Similarly, a jurisdiction may adopt a wetlands ordinance that meets the requirements of OAR 660-023-0100(4)(b) in lieu of following the ESEE decision process in OAR 660-023-0040.

Specific Goal 5 safe harbor protection measures for riparian are in OAR 660-023-0090, as follows:

- (8) *As a safe harbor in lieu of following the ESEE process requirements of OAR 660-023-0040 and 660-023-0050, a local government may adopt an ordinance to protect a significant riparian corridor as follows:*
 - (a) *The ordinance shall prevent permanent alteration of the riparian area by grading or by the placement of structures or impervious surfaces, except for the following uses, provided they are designed and constructed to minimize intrusion into the riparian area:*
 - (A) *Streets, roads, and paths;*
 - (B) *Drainage facilities, utilities, and irrigation pumps;*
 - (C) *Water-related and water-dependent uses; and*
 - (D) *Replacement of existing structures with structures in the same location that do not disturb additional riparian surface area.*
 - (b) *The ordinance shall contain provisions to control the removal of riparian vegetation, except that the ordinance shall allow:*
 - (A) *Removal of non-native vegetation and replacement with native plant species; and*
 - (B) *Removal of vegetation necessary for the development of water-related or water-dependent uses;*
 - (c) *Notwithstanding subsection (b) of this section, the ordinance need not regulate the removal of vegetation in areas zoned for farm or forest uses pursuant to statewide Goals 3 or 4;*
 - (d) *The ordinance shall include a procedure to consider hardship variances, claims of map error, and reduction or removal of the restrictions under subsections (a) and (b) of this section for any existing lot or parcel demonstrated to have been rendered not buildable by application of the ordinance;*

The above provisions in OAR 660-023-0090 allow the ordinance to exempt public and private facilities and utilities from the safe harbor protection provisions for significant riparian corridors. The Limited Protection Program in Chapter 4 Comprehensive Plan and Code amendments include this exemption with the incumbent requirement that the facilities and utilities meet any applicable state and federal permit requirements and provided they are designed and constructed to minimize intrusion into the riparian corridor. For this reason, this ESEE for public facilities applies only to significant wetlands.

The side channel of Munsel Creek has known conflicts with existing development and the full protection of the resource, i.e., the full 50 foot significant riparian corridor. This ESEE also addresses conflicts for this riparian reach (RMC-Cs).

City of Florence Approach

As explained in Chapter 2, Florence proposes to take advantage of three safe harbor provisions in the Goal 5 rule, with the modifications discussed below:

1. The safe harbor for determining the width and significance of the Munsel Creek riparian corridor;
2. The safe harbor for protecting significant wetlands (which spells out a regulatory program for wetlands that does not require identification of conflicting uses or conduct of an ESEE analysis); and
3. The safe harbor for regulating riparian corridors (which spells out a regulatory program for streams, associated wetlands and specified setback areas that does not require identification of conflicting uses or conduct of an ESEE analysis), except for Reach RMC-Cs.

The City decided that the economic and social consequences resulting from strict adherence to the wetland and riparian corridor safe harbor protection programs (items 2 and 3 above) would be adverse and not in the public interest. Consistent with the results of this ESEE analysis, the City has chosen to adopt a modified version of the safe harbor protection program, i.e., the "Limited Protection Program" allowed under Goal 5, that better meets the needs of the community.

Goal 5 requires that the economic, social, environmental, and energy (ESEE) consequences of three decision options be considered prior to adoption of a formal natural resource protection program. Goal 5 and the other Statewide Planning Goals are implemented city wide. As a result, different decision options for Goal 5 may represent conflicts with other statewide planning goals. Therefore, Florence believes it is critical to balance the needs of the community and City policies under the Statewide Planning Goals, for the entire UGB area. A balance between the necessary public infrastructure to serve a municipality and encourage growth within the UGB (rather than outside the UGB) and protection of significant wetlands within the UGB must be struck in order to meet the collective needs of the community and natural resources. As a result, this ESEE analysis considers required public infrastructure as called for under Statewide Planning Goals 11 and 12 and the protection of significant wetlands within the entire Florence UGB. The analysis also addresses conflicting uses along the Munsel Creek side channel and proposes modifications to the safe harbor riparian protections for this stream reach.

Meaning of the Term "Protect"

The term "protect" as used in the Goal 5 rule has an inclusive definition (OAR 660-023-010):

*(7) "Protect," when applied to an individual resource site, means to limit or prohibit uses that conflict with a significant resource site. * * *. When applied to a resource category, "protect" means to develop a program consistent with this division.*

Consistent with this definition, the local government must adopt a local program that (a) fully protects the resource site, (b) limits development of the resource site, or (c) provides no local protection:

(6) "Program" or "program to achieve the goal" is a plan or course of proceedings and action either to prohibit, limit, or allow uses that conflict with significant Goal

5 resources, adopted as part of the comprehensive plan and land use regulations (e.g., zoning standards, easements, cluster developments, preferential assessments, or acquisition of land or development rights).

Locally Significant Wetlands and Riparian Corridors

This ESEE analysis applies to the Goal 5 locally significant wetlands and significant riparian corridors in the 2013 Inventory (see Chapter 2 and Appendix D of this 2013 Plan).

Identification of Conflicting Uses and Impact Area

The Goal 5 rule explains how conflicting uses generally are determined (OAR 660-023-040):

(2) Identify conflicting uses. Local governments shall identify conflicting uses that exist, or could occur, with regard to significant Goal 5 resource sites. To identify these uses, local governments shall examine land uses allowed outright or conditionally within the zones applied to the resource site and in its impact area. * * *

The Goal 5 rule is more specific when it comes to identifying conflicting uses for riparian corridors in OAR 660-023-0090 using the standard process:

(7) When following the standard ESEE process in OAR 660-023-0040 and 660-023-0050, a local government shall comply with Goal 5 if it identifies at least the following activities as conflicting uses in riparian corridors:

- (a) The permanent alteration of the riparian corridor by placement of structures or impervious surfaces, except for: (A) Water-dependent or water-related uses; and (B) Replacement of existing structures with structures in the same location that do not disturb additional riparian surface area; and
- (b) Removal of vegetation in the riparian area, except: (A) As necessary for restoration activities, such as replacement of vegetation with native riparian species; (B) As necessary for the development of water-related or water-dependent uses.

Thus, conflicting uses are uses allowed in the underlying zoning district that involve (1) placement of structures or impervious surfaces or (2) removal of vegetation in the riparian area.

Applicable Zoning Districts

The applicable zoning districts for significant wetlands and the Munsel Creek side channel are shown in Table 3.1 and the Map on the following page.

Public infrastructure projects and facilities are generally allowed in all zoning districts. Uses and activities envisioned by the purpose statement and allowed through zoning provisions of each zoning district were examined to identify potential conflicts with full protection of significant wetlands and riparian areas. A general characterization of conflicting uses by City zoning district follows.

City of Florence Zoning and Significant Wetland & Riparian Areas

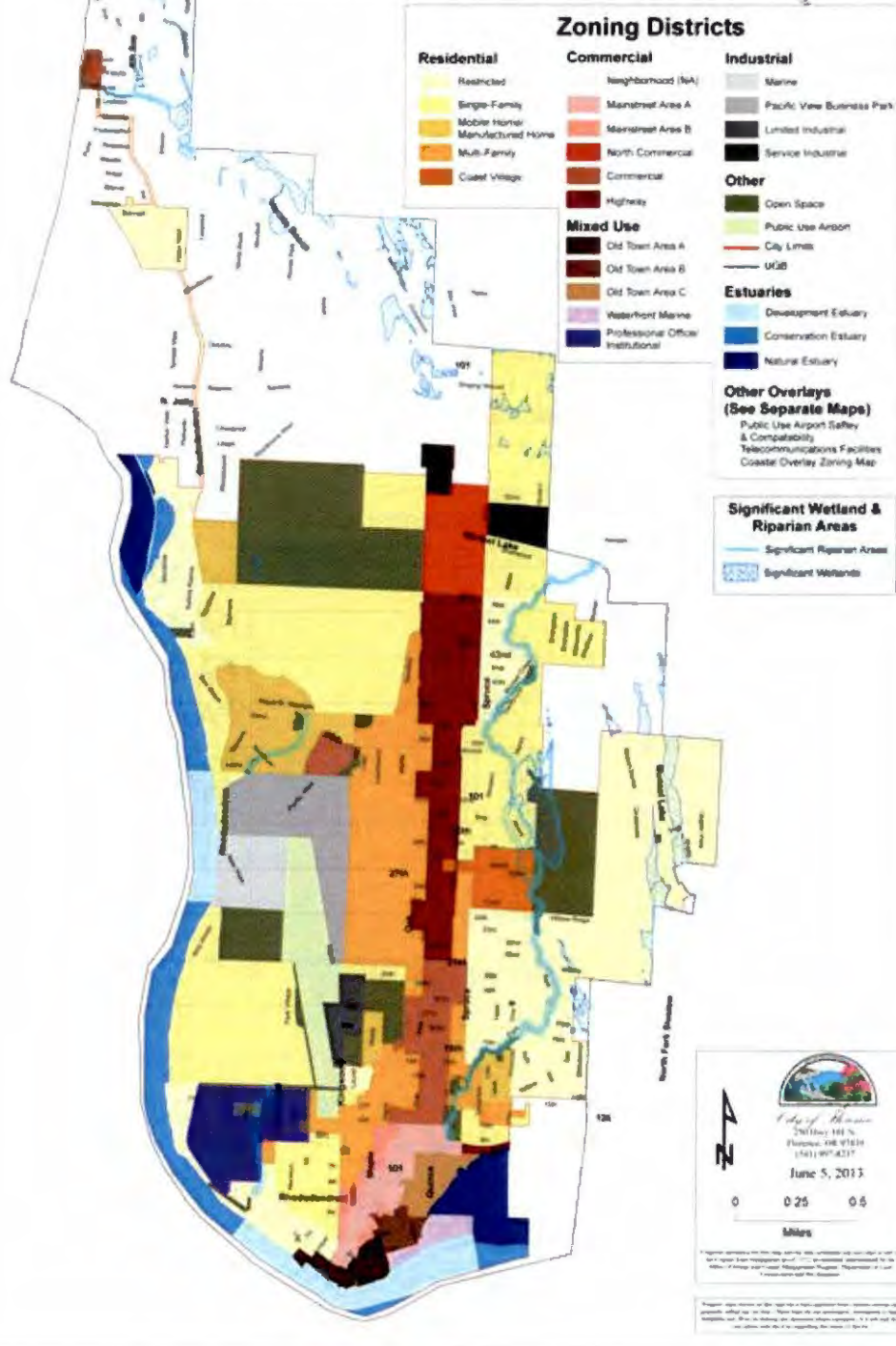


Table 3.1. Significant Goal 5 Wetlands and Riparian Corridors and Underlying Zoning Districts for ESEE Analysis

Wetland No.	Applicable zones in city limits	Urban Fringe Zones
1	Restricted Residential (RR)	Forest Land (F2)
2		Suburban Residential/Mobile Home (RA/MH)
4	RR	
5	RR	F2/RA
6	RR, Open Space (OS)	RA
7		RA
8	Mobile Home/Manufactured Home (MH), Professional Office/Institutional (PO)	
11	RR	RA
12	Single-family Residential (SFR)	Tourist Commercial (CT)/RA
24		RA, RA/MH
25		RA/MH
26		RA, RA/MH
27		RA
28		Neighborhood Commercial (C2), RA, RA/MH
33	OS	
34	MH	
Riparian Reach		
RMC-Cs	SFR, Coastal Village (CV)	

Table 3.2 City Zoning districts by conflicting uses.

City Districts	Dwellings/ Structures	Accessory Structures	Garden Greenhouses	Home Occu- pations
Restricted Residen- tial	X	X	X	X
Single-family Resi- dential	X	X	X	X
Mobile Home/Manufactured Home	X	X	X	X
Multi-family Resi- dential	X	X	X	X
Coast Village	X	X	X	X
Professional Of- fice/Institutional	X	X		
Open Space			X	
LC-NR		X		
LC-F2	X	X		
LC-RA	X	X	X	

Conditional Uses and Planned Unit Developments require Planning Commission review and approval, and will be approved only with minimal negative impact on wetland or riparian resources.

Public Transportation, Water, Wastewater, and Stormwater Facilities¹⁴ as Conflicting Uses

Public facilities often conflict with the full protection of significant Goal 5 resource areas. Construction of public facilities usually requires vegetation removal and grading and often results in construction of impervious surface area. As urban development occurs, an urban level of public facilities and services is required. Such services often must pass through significant resource areas to serve buildable land outside of such areas.

Florence City Code specifically exempts projects in the right-of-way from land use approvals, although projects that may impact natural resources are not exempt from the land use approval process, as stated in Florence City Code:

“FCC 10-2-12: USES AND ACTIVITIES PERMITTED IN ALL ZONES: The following uses and activities are permitted in all zones without review unless specifically required otherwise:

- A. Operation, maintenance, repair or preservation of public roads and highway facilities, including, but not limited to sewer, water line, electrical power, or telephone or television cable system, with the following exceptions:
 4. Development or activities involving reconstruction or modernization in a location identified as environmentally or culturally sensitive,

¹⁴ Public and private facilities and utilities are exempted from safe harbor riparian protections by Goal 5. The ESEE for infrastructure related to transportation applies only to significant wetlands.

such as floodplains, estuarine areas, wetlands, and archeological sites.”

FCC 10-2-12, and other sections of the Florence City Code, will be amended, as needed, for consistency with the Limited Protection Program Comprehensive Plan and Code amendments in Chapter 4. These amendments will be identified and included in the adopting ordinance prior to submitting it for adoption.

In addition, it is not always possible to locate public utilities within the street right-of-way. Sanitary sewer and stormwater management facilities function most efficiently under gravity-flow conditions and benefit from location in or adjacent to natural drainage ways. Similarly, major water transmission lines necessary to move large supplies of water from one part of town to the other may not be located within the ROW.

The City of Florence recently adopted a new Transportation System Plan (TSP). This plan identifies the general location of existing and proposed major street projects. Several of these required projects are located within or cross Goal 5 resources. Street construction and expansion often conflict with resource conservation in urban areas. The City of Florence ESEE analysis for public facilities evaluates these conflicts within the urban growth boundary.

The City's 5-year capital improvements program sets priorities, refines costs estimates, and identifies funding sources for planned public facilities. It is the short-term element of each of the public facilities plans. Facility plans by nature show connectivity requirements and conceptually required alignments, but they do not include detailed engineering design, which considers additional competing priorities and topographical conditions. As projects move from the facility planning stage to the Capital Improvement Program (CIP) they are looked at more closely to determine if any modifications are required. The CIP will often include high priority projects with a community wide benefit that may conflict with identified Goal 5 resources. The City of Florence ESEE analysis for public facilities evaluates these conflicts within the urban growth boundary.

Florence has detailed facility plans for wastewater, public water, and stormwater management and has recently adopted a new Transportation System Plan. These facility plans comprise the Florence Public Facility Plan for compliance with Statewide Planning Goal 11. As stated in Comprehensive Plan Public Facility Plan Policy #1 in Chapter 11 :

1. *The following plans, in addition to the Transportation System Plan in Chapter 12, comprise the Florence Public Facility Plan, adopted as a supporting document to this Comprehensive Plan:*
 - a. *City of Florence Wastewater Facilities Plan, Brown and Caldwell, October, 1997, as amended*
 - b. *City of Florence Water System Master Plan Update, January, 2011, as amended*
 - c. *City of Florence Wellfield and Water Treatment Expansion Project, February, 2001*
 - d. *City of Florence Stormwater Management Plan, October 2000, as amended*

In addition, the Comprehensive Plan and the TSP call for a Siuslaw Estuary Trail and the preferred option is to locate a portion of the trail adjacent to Munsel Creek. The trail is allowed by Goal 5 and the proposed Florence Limited Protection Program.

These facilities are most likely to conflict directly with full natural resource protection because often there is no reasonable alternative to routing these facilities through significant wetlands to serve nearby buildable land. The specific locations of these conflicts are found throughout the UGB. Appendix F provides a list of planned transportation, water, wastewater, and stormwater projects that could conflict with full protection of locally significant wetlands; these plans will be modified over time and the Limited Protection Program will apply to these amended plans.

Table 3.3 TSP* Project Conflicting Uses with Significant Wetlands

Wetland No.	TSP Project No.	Project Description
25, 26, 7, 24, 28	B-1	Heceta Beach Road Bike Lanes; construct 6-ft bike lanes along Heceta Beach Road.
12	PRJ-8	Construct a new section of Spruce St north from Munsel Lake Rd to Heceta Beach Rd

*TSP: Florence Transportation System Plan

Table 3.4 Public Stormwater Projects Conflicting Uses with Significant Wetlands

Wetland No.	SW Project No.	Project Description
6	NE-D	Drainage along Hwy 101: Munsel Lake Rd to 42nd
34	CEN-A	Rhododendron Diversion

Conflicting Uses for the Munsel Creek Side Channel



The riparian width which exists along the side channel is mostly heavily vegetated.. Areas immediately beyond the topographical break, typically about 25 feet from the top of bank, are often developed with residential structures, streets, and/or parking spaces. North of the Florentine Estates –Coast Village border, there is heavy native vegetation, tall trees, and downed logs/woody debris and the stream is well shaded by woody and

herbaceous vegetation at the top of bank (right photo). Immediately south of the Florentine-Coast Village border trail, the stream is channeled through a wooden "flume" with limited riparian vegetation and nearby parking/structures in a residential yard. (left photo) There are culverts at all Coast Village street crossings and they are low and passable by fish.

Fish biologists from ODFW, NMFS, and one of the at-large Directors of the Florence Salmon and Trout Enhancement Program (STEP) agreed in written email communications that "Munsel Creek and the side channel are both considered as critical habitat for Oregon Coast coho salmon (a federally listed threatened species) and are important to the conservation and recovery of this species;" and they concurred with the NMF's recommendation that this side channel reach and its riparian be declared as significant and protected with a 50-foot riparian setback." They determined that Munsel Creek side channel is important rearing habitat for coho salmon. Available information about the Munsel Creek side channel is from field visits and inventory assessments at several locations plus statements submitted by Jeff Young, National Marine Fisheries Service Fish Biologist; John Spangler, Oregon Department of Fish and Wildlife Fish Biologist; and Bill Hennig, Salmon and Trout Enhancement Program (STEP), community stakeholder, below.

Comments by Bill Hennig, Florence STEP Group:

"Adult coho will enter Munsel Creek in the fall, usually in October when rainfall is enough to provide access to the stream from the estuary. The adult migration period will extend into early January if there are late rains or very cold stream temperatures. There are several artificial gravel placement sites in Munsel Creek and Ackerley Creek where coho will spawn and produce some juveniles. Juvenile coho will spend their first summer and following winter in freshwater habitats rearing before becoming smolts and migrating to the ocean in their second spring. Juveniles in the lake habitats will spend the same time period in fresh water but will not need to seek out slow water habitat for winter rearing as those in Munsel Creek will need to do. Beginning in early May coho juveniles will smolt and migrate to the estuary for several weeks of rearing before entering the open ocean. The smolt migration period lasts for a couple months.

We have captured a couple of non-fin-clipped coho juveniles in Munsel Creek so there is confirmed production occurring from the spawning channels but the level of production is unknown. We also have a fair number of non-fin-clipped adults moving into the system. I would expect these adults to be a combination of production from the spawning channels in the Munsel system and strays from other streams.

The steelhead follow much the same pattern but are several months later."

Comments by Jeff Young, Fishery Biologist, National Marine Fisheries Service
Habitat Conservation Division, Oregon Coast Branch:

"Yesterday (3/13/12), Clarence and I visited Munsel Creek and the RMC side channel. Based on what I saw of the side channel and the information that we gathered, it is rearing habitat for ESA-listed Oregon Coast coho salmon and juvenile coho salmon are using it for rearing purposes. This side channel riparian corridor provides cover and food for coho salmon and contributes to habitat complexity, which is important for coho salmon. This side channel and its riparian area are important to the growth and survival of coho salmon (as well as other fish and wildlife species) in the Munsel Creek drainage. Therefore, I recommend that this side

channel reach and its riparian be declared as significant and protected with a 50-foot riparian setback.

While I did not specify the type of rearing habitat (winter or summer) for Oregon Coast coho salmon, I am in agreement with everything that John said. I do have a little to add to my earlier e-mail. When Oregon Coast coho salmon were listed under Endangered Species Act, NMFS also designated critical habitat and Munsel Creek was included in this designation. Therefore, Munsel Creek and the side channel are both considered by NMFS as critical habitat for Oregon Coast coho salmon and are important to the conservation and recovery of this species. Munsel Creek and the side channel are also designated as essential fish habitat (EFH) for coho salmon under the Magnuson-Stevens Fishery and Conservation Management Act."

Comments by John Spangler, Assistant District Fish Biologist
ODFW Midcoast Fish District, Florence Field Office:

"The side channel is likely not summer habitat for juvenile coho given low stream levels but rather winter rearing habitat. This type of habitat is in short supply for coho so it makes the side channel an important habitat feature within the Munsel Cr. system. The limiting factors for Oregon Coastal Coho is primarily stream complexity and winter habitat. From a fish habitat perspective this habitat type needs protection so it can function as winter rearing habitat for coho and cutthroat. The rest of the wetlands and riparian corridor are also important for other species of wildlife, amphibians and food production for fish."

As discussed in Chapter 2 and shown in the Florentine Estates Map in Appendix G, the side channel at Florentine Estates is in a dedicated common area; adjacent lots are built-out with single family homes, except for one lot. The lots in Coast Village are also almost completely developed; they were platted in the early 1970's in a manner that conflicts with full protection of the resource, as shown in Figure 3.1. As discussed in the ESEE analysis below, many of the Coast Village lots would be rendered unbuildable with a 50 foot setback (full protection).

Existing Requirements, Proposed Goal 5 Limited Protection Program, and Net Impacts

Existing policies and Code that apply to significant wetlands and riparian corridors are described in detail in Appendix A and summarized below, followed by a summary of the Limited Protection Program and Table 3.5 that presents the net impact of the proposed Limited Protection Program.

Existing Requirements

In general, today:

- Existing development is "grandfathered." Legally constructed structures are allowed to remain as legal non-conforming lots and uses (per FCC 10-8).
- Future development must proceed in accordance with adopted City policy and code.
- Comprehensive Plan policy and code apply within city limits.
- Comprehensive Plan policies apply in the UGB, if they have been co-adopted by Lane County.

- Today, inventoried riparian corridors and locally significant wetlands are adopted in the Florence Comprehensive Plan.

Existing Comprehensive Plan policies applicable to wetlands and riparian corridors are:

- Chapter 5 Riparian Areas Policy #2 protects riparian corridors from development in accordance with Statewide Planning Goal 5.
- Chapter 5 does not protect wetlands from development in compliance with Goal 5 because the City was not required to do so at the time of periodic review.
- Chapter 11 Stormwater Management Policy #2 calls for protection of wetlands and riparian corridors to protect stormwater quality and quantity.
- Chapter 17 protects wetlands and riparian corridors subject to Statewide Planning Goal 17, Coastal Shorelands. Goal 5 requirements cannot be applied to these areas.

Existing Florence City Code provisions applicable to wetlands and riparian corridors are:

- Title 10 Chapter 7 Special Development Standards protect Munsel Creek "and other drainageways" with a 50 foot setback.
- Title 10 Chapter 19 Coastal Shorelands Overlay Zone applies to all wetlands and riparian corridors in those zones. Goal 5 requirements cannot be applied to these corridors.
- Title 10 Chapter 21 regulates wetlands in Airport Impact Boundaries.
- Title 9 Chapter 5, Stormwater Requirements, protect all wetlands and riparian corridors in the Wetland and Riparian Inventory with a vegetated buffer.

Limited Protection Program Summary

The Limited Protection Program that results from the ESEE Analysis in Chapter 3 is implemented in the Comprehensive Plan and Code amendments in Chapter 4.

The principle changes made by these amendments are:

- The Guiding Principles related to wetlands and riparian corridors are incorporated into the Comprehensive Plan policy. These were endorsed by the City and its partners and are intended to guide the development of future policies and regulations for wetland and riparian protection.
- Significant wetlands are now protected from development in order to comply with Statewide Planning Goal 5, except that public infrastructure in the City's Public Facilities Plan are exempt (see ESEE Analysis).
- Significant riparian corridors continue to be protected from development, with special setback adjustments and provisions pertaining to the Munsel Creek Side Channel and Coast Village (see ESEE Analysis and special provisions in Code amendments).
- All existing lawfully created structures can be replaced in the same location that do not disturb additional riparian corridor or wetland buffer zone surface area provided they are designed and constructed to minimize intrusion into the riparian corridor or wetland buffer zone. No land use permit is needed and all existing Coast Village structures are grandfathered.
- Setback adjustments and variances are allowed for significant wetlands and streams to ensure that no property is rendered unbuildable by the requirements. These adjustments are granted through Administrative Review (at the counter) for proposals 20 feet or more from the significant stream or wetland; the Variance process is required for proposals within 20 feet. The Variance fee is waived for Coast Village residents.

- Processes are provided for establishing wetland and riparian boundaries, claims of map error, updating the inventory, a Plan amendment option, and incentives to encourage restoration and maintenance of the resources.
- Consistency amendments are made to existing City Code and Comprehensive Plan policies for Stormwater and Coastal Shorelands (Goal 17) to make them consistent with the Limited Protection Program. (See "Consistency Amendments" in Chapter 4).
- Housekeeping amendments are made to Code for consistency with Goal 16 and to Comprehensive Plan for consistency with state law regarding notice to DLCD.

Net Impact of Limited Protection Program

Table 3.5 presents a summary of the net impact of the proposed Limited Protection Program. A "Frequently Asked Questions Sheet" was prepared, posted to the web site, and distributed to facilitate public discussion about the proposal and to clarify the federal and state legal framework that the Comprehensive Plan and Code amendments must comply with.

Table 3.5 Net Impact of the Proposed Goal 5 Limited Protection Program

Today	Limited Protection Program
<ul style="list-style-type: none"> ■ Existing development is "grand-fathered." Legally constructed structures are allowed to remain as legal non-conforming lots and uses (per FCC 10-8). 	<ul style="list-style-type: none"> ■ Allows replacement of existing lawfully created structures in the same location that do not disturb additional riparian corridors or wetland buffer zone surface area provided they are designed and constructed to minimize intrusion into the riparian corridor or wetland buffer zone. ■ No land use permit will be required to replace the existing structures above. ■ A federal/state removal fill permit will not be required to replace existing structures if no wetland or waterway impacts are proposed. ■ Contains special provisions related to existing structures and other aspects of the Code for affected properties in Coast Village and Florentine Estates, along the Munsel Creek side channel (see Chapter 4 Code).
<ul style="list-style-type: none"> ■ Future development must proceed in accordance with adopted City policy and code. 	<ul style="list-style-type: none"> ■ Allows an adjustment or variance to required minimum setback distance for all properties subject to significant riparian or wetland standards and requirements in City Code where the property is rendered unbuildable by the standard or requirement. ■ Provides a process to address map errors and identification of wetland and riparian setback boundaries. ■ Provides a "Plan Amendment Option" for property owners to submit a site-specific "ESEE" analysis for their prop-

Table 3.5 Net Impact of the Proposed Goal 5 Limited Protection Program

Today	Limited Protection Program
	erty.
<ul style="list-style-type: none"> Comprehensive Plan policy and code apply within city limits. 	<ul style="list-style-type: none"> Same applicability as today.
<ul style="list-style-type: none"> Comprehensive Plan policies apply outside city limits, in the UGB, if they have been co-adopted by Lane County. 	<ul style="list-style-type: none"> Same applicability as today. The 2013 Florence Area Local Wetlands and Riparian Inventory ("2013 Inventory") for the area within the UGB will be submitted to Lane County for co-adoption.
<ul style="list-style-type: none"> Today, riparian areas and locally significant wetlands are adopted in the Florence Comprehensive Plan via the 1997 Inventory and adopted list of significant wetlands. 	<ul style="list-style-type: none"> Replaces these inventories with the 2013 Inventory, including locally significant wetlands and riparian corridors lists and maps. Includes the Munsel Creek side channel in the riparian inventory with special Code provisions, setback reductions, and other special provisions in accordance with the ESEE Analysis adopted as part of the Comprehensive Plan (see Chapter 3 of this 2013 Plan).
<ul style="list-style-type: none"> Comprehensive Plan Chapter 5 Riparian Areas Policy #2 protects riparian areas from development in accordance with Statewide Planning Goal 5. 	<ul style="list-style-type: none"> Replaces this policy with policies to protect significant resources through Florence City Code and adds policies for adjustments and hardship variances, claims of map error, and Plan Amendment Option. Adds policies to this chapter consistent with the Guiding Principles.
<ul style="list-style-type: none"> Chapter 5 does not protect wetlands from development in compliance with Goal 5 because the City was not required to do so at the time of periodic review. 	<ul style="list-style-type: none"> Includes Comprehensive Plan Chapter 5 policy to protect significant wetlands in the City from development in accordance with Goal 5, negating the City's need to accomplish this in the future. Policy is implemented through City Code amendments.
<ul style="list-style-type: none"> Chapter 11 Stormwater Management Policy #2 calls for protection of wetlands and riparian areas. 	<ul style="list-style-type: none"> "Consistency amendments" clarify this policy applies to "significant" wetlands and riparian corridors; not all wetlands and riparian areas.
<ul style="list-style-type: none"> Chapter 17 protects wetlands and riparian areas subject to Statewide Planning Goal 17, Coastal Shorelands. Goal 5 requirements cannot be applied to these areas. 	<ul style="list-style-type: none"> Makes no change to the Goal 17 Management Units in the Comprehensive Plan.
<ul style="list-style-type: none"> Title 9 Chapter 5 (FCC 9-5-3-3-F), Stormwater Requirements protect "sensitive areas" including wetlands and ri- 	<p>"Consistency Amendments" to FCC 9-5-3-3-F and definitions clarify that the stormwater buffer applies to <i>significant</i> wetlands</p>

Table 3.5 Net Impact of the Proposed Goal 5 Limited Protection Program

Today	Limited Protection Program
<p>parian areas in the Wetland and Riparian Inventory with a 50 foot vegetated buffer.</p> <ul style="list-style-type: none"> ■ FCC 9-5-3-3-F cross references FCC 10-7, which is where the Significant Wetland and Riparian Standards are located in the Limited Protection Program. 	<p>greater than ½ acre and <i>significant</i> riparian areas; and refer to FCC 10-7 for “significant wetland and riparian area standards,” and to FCC 10-19 for standards implementing Statewide Goal 17.</p> <p>Amends FCC 10-7, Special Development Standards to:</p> <ul style="list-style-type: none"> ■ Incorporate the standards in FCC 9-5-3-3-F and add Goal 5 standards, exemptions, adjustments, variances, and ESEE results. ■ Allow an adjustment or variance to requirements or standards for properties rendered unbuildable by the setback requirement. ■ Apply the standards only to “significant” wetlands and riparian corridors; non-significant wetlands and riparian areas will no longer be subject to the 50 foot setback. ■ Exempt public and private facilities from the riparian and wetland setback requirements, and public facilities from wetland requirements and standards, in accordance with the Department of State Lands and Army Corps of Engineers permits and with minimum impacts in setback corridor. ■ Allow up-to a 25 foot setback reduction in the Munsel Creek side channel (RMC-Cs) in exchange for maintaining the riparian corridor. Note: Almost all Florentine Estates lots already meet these standards through prior Planning Commission approval and Conditions of Approval of the PUD. ■ See Chapter 4 Code amendments for details.
<ul style="list-style-type: none"> ■ Title 10 Chapter 7 Special Development Standards protect Munsel Creek “and other drainageways” with a 50 foot setback. 	<ul style="list-style-type: none"> ■ Allows an adjustment or variance to required setback distance for properties rendered unbuildable by the setback requirement. ■ Measures the 50 foot setback for Munsel Creek from top of bank. ■ Allows setback reduction up to 25 feet from the Munsel Creek side channel in exchange for restoring and maintaining the riparian corridor.

Table 3.5 Net Impact of the Proposed Goal 5 Limited Protection Program

Today	Limited Protection Program
<ul style="list-style-type: none"> Title 10 Chapter 19 Coastal Shorelands Overlay Zone applies to all wetlands and riparian areas in those zones. Goal 5 requirements cannot be applied to these areas. 	<ul style="list-style-type: none"> "Consistency amendments" amend City Coastal Shoreland Overlay Zone for Prime Wildlife to also reference the 2013 Florence Area Local Wetlands and Riparian Inventory in determining the general location of and assessment data for the South Heceta Junction Seasonal Lakes inside city limits. Today, this area inside the city is publicly owned parkland. Makes housekeeping amendments to FCC 10-19 consistent with Goal 17.
<ul style="list-style-type: none"> Title 10 Chapter 21 regulates wetlands in Airport Impact Boundaries. 	<ul style="list-style-type: none"> No modifications are proposed to Chapter 21 for consistency with this 2013 Plan.

Florence's Proposed Wetland and Riparian "Limited Protection" Program: Comprehensive Plan Policies and Special Development Standards for Significant Wetlands and Riparian Areas

If a local government adopts the wetland safe harbor protection or the riparian corridor protection safe harbor specified in OAR 660-023-0090(8), an ESEE analysis is not required. However, Florence is required to conduct an ESEE analysis *because* the City proposes to adopt a Limited Protection Program that varies in some respects from the safe harbor.

Florence's "limited protection" wetland and riparian corridor protection program has been adapted from the "safe harbor" protection program in OAR with the following modifications:¹⁵

1. Like the riparian corridor safe harbor, Florence's proposed Limited Protection Program applies to a riparian setback area from the stream top-of-bank, or the edge of any LSW that is "associated" with the stream (*i.e.*, is located within the streambank setback area).
2. Like the wetland safe harbor, Florence's proposed Limited Protection Program prohibits development of all locally significant wetlands and includes a variance procedure to consider hardship variances, claims of map error verified by DSL, and reduction or removal of the restrictions of this subsection for any lands demonstrated to have been rendered not buildable by application of the ordinance. In addition, Florence's Limited Protection Program allows public transportation, water, wastewater, and stormwater facilities to locate in the wetland, subject to DSL and ACE approvals, and ensures that

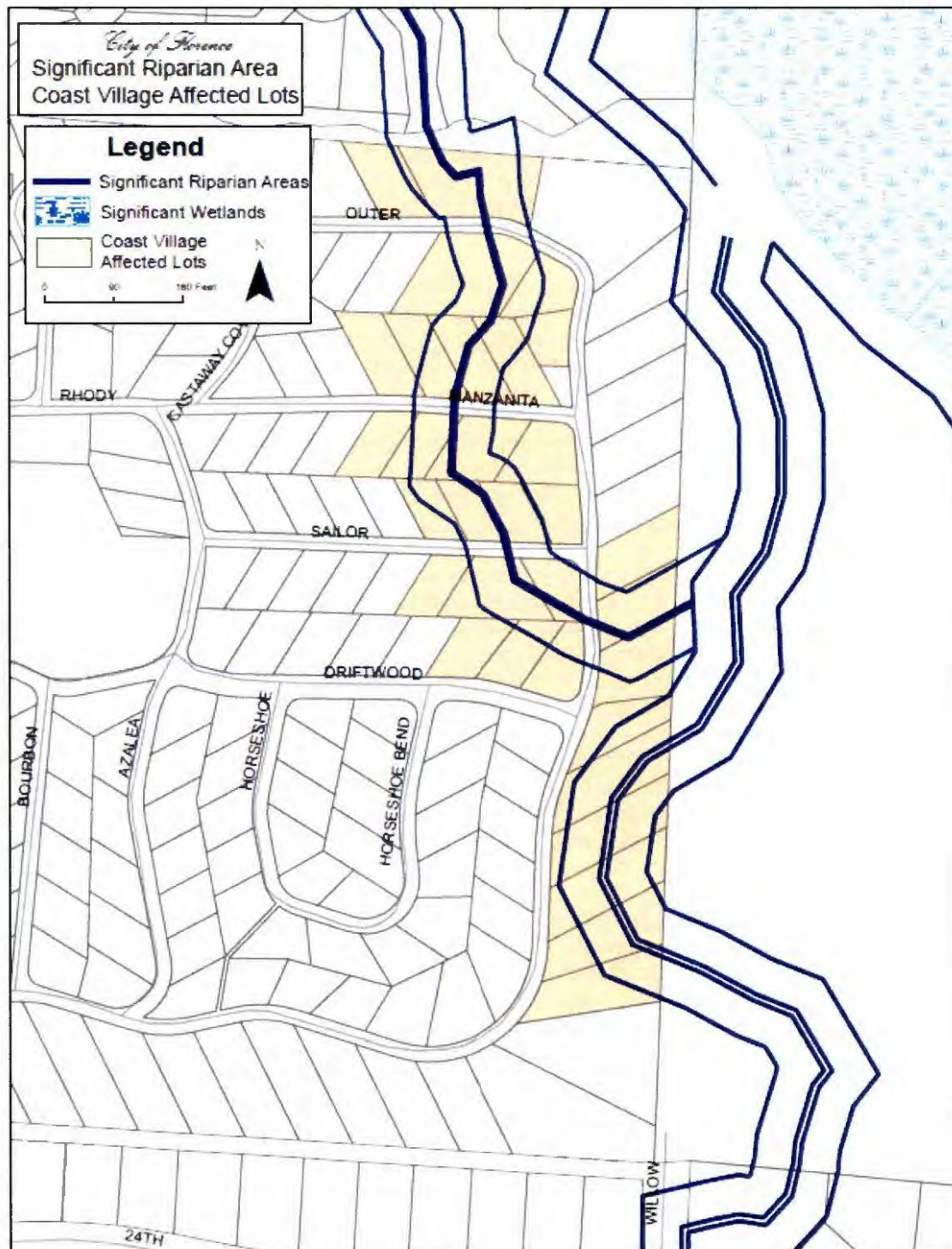
¹⁵ (4) For significant wetlands inside UGBs and UUCs, a local government shall:
(a) Complete the Goal 5 process and adopt a program to achieve the goal following the requirements of OAR 660-023-0040 and 660-023-0050; or
(b) Adopt a safe harbor ordinance to protect significant wetlands consistent with this subsection, as follows: (A) The protection ordinance shall place restrictions on grading, excavation, placement of fill, and vegetation removal other than perimeter mowing and other cutting necessary for hazard prevention; and (B) The ordinance shall include a variance procedure to consider hardship variances, claims of map error verified by DSL, and reduction or removal of the restrictions under paragraph (A) of this subsection for any lands demonstrated to have been rendered not buildable by application of the ordinance.

permitted uses are designed and constructed to minimize intrusion into the riparian area and that disturbed areas are replanted with native vegetation.

3. Like the riparian corridor safe harbor, Florence's proposed Limited Protection Program prevents permanent alteration of the riparian area by grading or placement of structures for uses that would otherwise be allowed in the underlying zoning district, except for uses specifically exempted by Goal 5. The Limited Protection Program also allows up to a 25 foot reduction in the RMC-Cs riparian width in exchange for riparian restoration and maintenance activities, and provided that permitted uses are designed and constructed to minimize intrusion into the riparian area and that disturbed areas are replanted with native vegetation.
4. Like the riparian corridor safe harbor, Florence's proposed Limited Protection Program contains provisions to control the removal of riparian vegetation while allowing removal of non-native vegetation and replacement with native plant species; and removal of vegetation necessary for the development of water-related or water-dependent uses.
5. Like the riparian corridor safe harbor, Florence's proposed Limited Protection Program includes a procedure to consider hardship variances, claims of map error, and reduction or removal of the land use restrictions for any existing lot or parcel demonstrated to have been rendered not buildable by application of the program.
6. Like the riparian corridor safe harbor, Florence's proposed Limited Protection Program includes local standards to ensure that permitted uses are designed and constructed to minimize intrusion into the riparian area and that disturbed areas are replanted with native vegetation. Consistent with Goal 5, Florence's proposed Limited Protection Program permits public and private facilities and utilities to be constructed in significant riparian areas and, based on this ESEE analysis, allows public transportation, water, wastewater, and stormwater facilities to be constructed within significant wetlands, subject to meeting state and federal permitting requirements. Florence will rely on Department of State Lands (DSL) and US Army Corps of Engineers (ACE) to ensure that permitted transportation, drainage and utility impacts are avoided or minimized and mitigated within streams and wetlands under the jurisdiction of these agencies.
7. The Munsel Creek side channel was not included in the 1996 Riparian Inventory. As a result, the City's long-standing 50 foot setback requirement for Munsel Creek was not applied uniformly to this channel; and historic development patterns are now present that, for all practical purposes, preclude the application of a 50 foot setback with full safe harbor protections.

As discussed below, the City granted the Florentine Estates PUD a 25 foot setback from the side channel in return for performance of specific riparian and wetland maintenance and protection activities. The PUD is built out adjacent to the side channel with the exception of one lot and these riparian preservation activities have been conducted in accordance with the prior conditions of approval. As stated below, the ESEE analysis clearly demonstrates that this Limited Protection Program is more advantageous in this instance than trying to impose a full 50 foot setback with safe harbor protections in this area.

Figure 3.1 Coast Village conflicting uses



The Florentine Estates PUD is already in compliance with the Limited Protection Program, as demonstrated in the Appendices to this ESEE and CC&Rs and summarized as follows:

- The RMC-Cs riparian corridor through Florentine Estates is in excellent condition -- multi-layered vegetation over the 25-foot allowed riparian setback width and entire length. The stream is generally well-shaded, and the riparian slopes are favorable with no erosion and some woody debris. The structures at the Island Drive bridge and the south boundary trail are fish-passable. (Source - site visits for 2010 Riparian Inventory and Assessment)
- The Side Channel riparian corridor at Florentine Estates lies within a 50-ft wide Common Area owned by the HOA. The northern end of the corridor includes a narrow 1/2 acre minor wetland bordering the stream. (Source - 6th and 9th Addition Plats, and DSL letters)
- No access (trails, shortcuts) are permitted through wetland areas. (CC&R's, Plats)
- Lots abutting wetlands are not permitted to use harmful fertilizers, herbicides, or pesticides. (CC&R's, Plats)
- A 5-ft vegetated greenbelt shall be maintained on the private property side of lot lines abutting Common Areas. (CC&R's)
- Non-native invasive vegetation (specifically Gorse, European Beach Grass, Eastern Beach Grass) is not permitted to be planted within the platted property. (CC&R's)
- The Florentine Homeowners Association (HOA) is committed to maintaining the major wetland by annual evaluation and removal of harmful beaver dams. (HOA Board Action, June 27, 2002)
- Florentine common property includes a substantial elevated viewing platform at the edge of the major wetland, with access for all residents. (6th Addition Plat and site visit)

The remainder of the Munsel Creek side channel is built out in the Coast Village development, a former RV campground. This area has built up over time with many structures in the 50 foot setback width. Protections based on a 25 foot reduction in setback in this portion of the side channel are also indicated by the ESEE analysis, below, with similar provisions for preservation of the creek as those required of the Florentine Estates PUD. Incentives for restoration are included in the Limited Protection Program for all significant wetland and riparian areas as a means to help improve riparian function and value; and the Program includes a requirement for RMC-Cs, in exchange for the reduced setback of 50%, up to 25 feet from the creek, to replant displaced native vegetation. The City will make available a guide to wetland restoration and protection (Appendix H) and the Siuslaw Watershed Council and Siuslaw Soil and Water Conservation District have agreed to provide technical assistance to property owners in native plant identification.

The allowed encroachment into this specific riparian corridor is designed to minimize adverse social impacts from regulating existing residential structures and back yards. Construction of new impervious surface area and native vegetation removal are prohibited within the significant riparian areas, unless a property is rendered unbuildable by a required minimum setback. The definition of "unbuildable" is included in the Code amendments in Chapter 4.

8. The City will encourage voluntary compliance with the Goal 5 provisions. In addition, the Limited Protection Program provides incentives to encourage property owners to maximize riparian and wetland protection in return for variances from other restrictions, such as front yard setbacks, building heights, and other requirements (see Chapter 4).

ESEE Analysis for Locally Significant Wetlands (LSW) and Riparian Corridors

This ESEE analysis is based on Florence's "Limited Protection Program" outlined above and set forth in the amendments to Comprehensive Plan policy and Code in Chapter 4.

This section considers the ESEE consequences of three alternatives for protecting LSW and riparian corridors:

- A. **Full local protection:** allowing no conflicting land uses, excavation or vegetation removal within significant riparian corridors or wetlands;
- B. **No local protection:** allowing full development without restriction within the riparian corridors and wetlands; and
- C. **Limited local protection:** relying on the proposed Limited Protection Program which balances economic, social, environmental and energy conservation values.
 - The Limited Protection Program is intended to protect the significant riparian corridors and wetlands consistent with the Goal 5 Administrative Rule (OAR Chapter 660, Division 23).
 - In most respects, the Limited Protection Program is similar to the riparian corridor safe harbor allowance for large streams (with 1000 cfs and greater) for up to a maximum reduction in setback of 50% for hardship cases. Although the safe harbor provisions for smaller streams with 50-foot setbacks do not include this allowance, the allowance provides a reference threshold for this ESEE, with the following specific requirements and allowances:
 - First, the backyards of existing developed residential lots along the Munsel Creek side channel (Reach RMC-Cs) are allowed up-to a 50% (25 feet from the creek) setback reduction, consistent with existing development patterns, in exchange for the performance of specific riparian and wetland restoration and preservation activities;
 - Second, public transportation, water, wastewater, and stormwater facilities necessary to serve planned urban development are permitted within LSW subject to state and federal review.

Economic Consequences

Munsel Creek, the only fish-bearing stream within the Florence UGB, provides a number of economic benefits by:

- Serving as support and breeding areas for salmon and steelhead and supporting the Siuslaw River and ocean fisheries;

- Providing critical habitat for Coast coho salmon, a federally-listed threatened species.
- Supporting Florence locally accessible passive recreational opportunities that reduce travel costs for community residents;
- Increasing adjacent residential property values that benefit from preserved open space and views;
- Improving the work environment for nearby commercial, industrial and public employees; and
- Providing natural drainage channels, rather than artificial conveyance systems, for urban runoff.

The locally significant wetlands provide economic benefits as well:

- Providing natural water storage and delay, rather than expensive constructed wetlands, that protects properties from flooding and its associated costs;
- Providing water quality benefits that protect the North Florence Sole Source Dunal Aquifer, the city's sole drinking water source, which is critical to the economic well being of the community;
- Supporting Florence locally accessible passive recreational opportunities that reduce travel costs for community residents;
- Increasing adjacent residential property values that benefit from preserved open space and views;
- Improving the work environment for nearby commercial, industrial and public employees; and

Full Local Protection Option (No Conflicting Land Uses Allowed)

The economic consequences of full local protection (protecting the entire 50-foot setback area of RMC-Cs, regardless of existing development) would be mixed. On the one hand, full protection of the 50-foot riparian corridor would support the economic benefits identified above by prohibiting additional development within the 50-foot setback area. The full protection option would have at least one significant but frequently overlooked economic benefit. Riparian Corridors and associated LSWs provide substantial stormwater management benefits because they intercept or detain rainfall and reduce stormwater runoff. Unrestricted removal of trees to allow development would reduce the City's "green" stormwater infrastructure, necessitating the construction of extensive new facilities to address the increased storm flows. However, as described below, these benefits can derive from the Limited Protection Program as well.

On the other hand, from the point of view of individual property owners, the economic consequences of full local protection would be adverse, because the developed riparian corridor along the Munsel Creek side channel has improvements within 50 feet of the streambank. Under the full protection option, existing development would become "non-conforming" making expansion difficult and expensive while reducing property market value. Restrictions would also be placed on lawns, gardens and accessory structures within the 50-foot setback area that would be burdensome to property owners in these developed residential neighborhoods.

In addition to prohibiting residential, commercial, industrial and public uses allowed by the base zone, full wetland protection in all areas would make it impossible to extend trans-

portation and other public facilities necessary to allow for access and full utilization of underdeveloped properties. Efficient and effective management of Florence's growth depends primarily on ensuring that the full range of public facilities and services is available to support planned urban development. This program has substantial social and economic benefits to Florence citizens and businesses by helping to ensure an adequate supply of serviced industrial, commercial, residential, and public lands (with associated job opportunities). Growth management ensures that local shopping and services are available to residential areas, as are quality housing in well-designed neighborhoods, good and accessible schools, potable water, and adequate sanitation. By managing the direction and timing of growth, the public costs of providing public facilities and services are reduced.

The full protection option would make efficient growth management in Florence difficult to achieve. This option would mean that no public facilities construction or maintenance could occur within protected significant natural resource areas. Since significant natural resource areas comprise a substantial portion of the land within the UGB, avoiding such areas would preclude the efficient provision of public facilities that are necessary to support planned urban development. The economic and social costs to the public resulting from a different form of "leap-frog" development would be extremely high. For example, sanitary sewer and water services would be required to be routed around wetlands, regardless of public expense. This option would severely restrict future development patterns, both public and private, as roads and utilities could not be extended through resource areas. Florence's quality-of-life and its appeal as a place to locate business would suffer substantially. The City would also incur significant additional construction and long-term operating costs associated with the additional lift stations.

In conclusion, fully protecting all significant natural resource areas would severely restrict urban growth and urban design options. Housing costs would increase substantially and job opportunities would be lost, with attendant adverse social and economic impacts. Conversely, allowing unrestricted development of the sites would mean the loss or degradation of many of the economic benefits described previously. Finally, the full protection option provides no incentive for property owners or developers to restore riparian vegetation or to minimize stream bank degradation (when compared with the "limited protection" option described below).

No Local Protection Option

The no local protection option would mean that the economic benefits provided by intact riparian corridors and wetlands would be compromised. Importantly, providing no local protection is not a realistic option from a state and federal regulatory perspective. No local protection would mean that stream temperatures and sedimentation would increase as riparian vegetation continues to be removed to make room for development, in violation of state and federal environmental regulations – with attendant economic consequences. No local protection would also result in economic costs to the city in constructing wetlands and other stormwater retention facilities to replace the water quality and flood storage functions these wetlands and riparian areas provide.

Limited Protection Option (Application of the Limited Protection Program)

The City's Limited Protection Program offers limited riparian corridor protection in exchange for riparian corridor mitigation. The Limited Protection Program prohibits most types of residential, commercial, industrial and public development within the required setback, and allows a 50% setback reduction up to 25 feet from the creek for the devel-

oped area along the Munsel Creek side channel which is already almost completely built out, provided that riparian vegetation is restored by planting of native vegetation and the riparian area is maintained and protected. In this manner, the economic benefits associated with intact riparian corridors are enhanced without placing an undue burden on individual property owners and without restricting the ability of the city to provide public facilities, consistent with Statewide Planning Goals 11 and 12, to support planned population and employment growth.

Allowing Riparian Corridor Setback Reduction

Florence's proposed Limited Protection Program allows encroachment into the riparian setback up to 25 feet only for the Munsel Creek side channel, which is already almost completely built out, with replacement of displaced native vegetation.

The economic consequences of this approach are positive for individual property owners and developers, because more of the land they own can be developed for uses permitted by the Florence Comprehensive Plan and code. The geographic information system (GIS) was used to analyze Coast Village lots to determine which lots are likely to require a Variance process as opposed to administrative review, or no process, under the Limited Protection Program. The analysis results show that of the 26 lots adjacent to the side channel, about 30% could build a 50' X 27' size primary dwelling outside the 50 foot setback; and these owners can, if they desire, apply for Administrative Review for a reduction in setback to 25 feet from the channel. The remaining 70% of the properties would need to build within the 50 foot setback and would need to apply for either Administrative Review or a Variance. Of those, no more than eleven properties would require a Variance in order to build a 50 x 27 feet size primary dwelling on their lot. The estimate of lots requiring a Variance is a maximum number because the analysis does not take into account existing dwellings.

The economic consequences are also positive for the City as a whole, because land is used – and public facilities can be provided – more efficiently. By using land within the UGB efficiently, less pressure is put on adjacent farm land for development, which supports Lane County's agricultural and forest economy.

Importantly, this approach also creates an economic incentive for restoration of degraded riparian habitat that will increase the economic benefits associated with this intact stream corridor. The City and property owners would incur substantial regulatory costs by not allowing some flexibility for existing residential lots within the RMC-Cs riparian area, with little environmental benefit. These developed residential lots all have rear yards with lawns and gardens. Another important consideration in these areas is that these subdivisions were built prior to the proposed Goal 5 ordinance and therefore did not take Goal 5 resources into account when they were designed. Under the new regulations, they would have been designed differently so there would be adequate backyards outside the significant riparian area.

Permitting Transportation and Other Public Facilities

As documented in the economic analysis above, permitting public facilities to cross wetlands is often necessary to efficiently serve planned urban development. The economic consequences of avoiding associated LSW in all cases are substantial. Moreover, there are substantial local costs involved in regulating the location of needed public facilities resulting from uncertainty, delay, consultant and application fees. To minimize these adverse economic impacts, the Limited Protection Program defers the determination of

whether and under what conditions a public facility may impact an LSW or stream to DSL and ACE. The Limited Protection Program includes standards to ensure that impacts to the riparian corridor and wetland are mitigated through replanting of disturbed areas with native plants.

Social Consequences

Riparian corridors and wetlands provide aesthetic and functional benefits for a community. For example, a stream can add value and enjoyment in a residential setting, or provide places to relax and enjoy scenic views in a work setting. Urban fish and wildlife habitat also provide social values in terms of connecting city dwellers to outdoor recreational opportunities. Wetlands and streams can also provide educational value when they are relatively high quality and accessible to schools and parks. At the same time, the social value of wetlands and riparian corridors is enhanced when they are accessible by the public.

Full Local Protection Option (No Conflicting Land Uses Allowed)

The social consequences of full local protection are mixed. On the one hand, protecting wetlands and riparian corridors contributes to urban aesthetics and provide a direct connection to nature for existing residential, commercial and industrial development. On the other hand, protecting wetland and riparian corridors could limit development options for commercial, industrial and residential property owners, and the transportation and public utilities that serve such development, with corresponding adverse social impacts (e.g. increasing housing costs or decreasing job opportunities). Moreover, full protection would mean that people would not have access – via trails along or streets across wetlands.

No Local Protection Option (Reliance on State Regulations)

The social consequences of the no local protection for riparian corridors are negative: the aesthetic, natural and educational values of existing wetland and riparian corridors would continue to be diminished for the community as a whole, for individual property owners, and for their neighbors.

Limited Protection Option (Application of the Limited Protection Program)

The social consequences of a limited protection option (application of the City's Limited Protection Program) would have positive social consequences, because individual property owners would be able to use and expand development on most of their property (minimizing potential impacts to jobs and housing costs), while maintaining and restoring critical vegetation along riparian corridors (thereby maintaining and restoring aesthetic, natural and educational values associated with riparian corridors).

Environmental Consequences

Intact wetlands and riparian corridors provide a wide array of environmental benefits¹⁶:

- **Stream flow moderation and flood storage:** Streams and wetlands provide conveyance and storage of stream flows, floodwaters and groundwater discharge. Trees and vegetation intercept precipitation and promote infiltration which tempers the stream flow fluctuations and short-term flooding events. Microclimate and shade: Wetlands, streams and adjacent trees and woody vegetation are as-

¹⁶ Much of the information regarding this ESEE analysis is provided by the Albany ESEE Analysis for Riparian Corridors and Locally Significant Wetlands, September 2011

sociated with localized air cooling, increased humidity, and soil moisture. Shading from riparian vegetation also helps keep stream water cool which is critical to fish (especially salmonids) and other aquatic species.

- Bank stabilization and control of sediments, nutrients and pollutants: Trees, vegetation, rocks and leaf litter intercept precipitation, hold soils, banks and steep slopes in place, slow surface water runoff, take up nutrients, and filter sediments and pollutants found in surface water. In more developed locations, fish-bearing streams are more likely experience slumping and erosion. Existing riparian vegetation helps to reduce stormwater runoff. Upland soil may also contain legacy pollutants (e.g., DDT) which can be transported to the stream when vegetation is cleared, the soil is disturbed and stormwater picks up soil particles. Vegetation also filters other urban pollutants (e.g., oils and brake dust from car) from stormwater.
- Organic inputs, food web and nutrient cycling: Streams, associated wetlands and riparian vegetation provide food and nutrients for aquatic and terrestrial species (e.g., plants, leaves, twigs, woody debris, seeds, berries, and insects) and are part of an ongoing chemical, physical and biological nutrient cycling system. The streams and riparian areas within the Florence UGB contribute organic inputs to the Siuslaw River and nearby wetlands, and to food and nutrient recycling in the watershed.
- Wildlife habitat/corridors: Vegetated riparian corridors and associated features (e.g., downed trees) provide wildlife habitat functions such as food, cover, breeding and nesting opportunities, and migration corridors. Native and non-native vegetation patches and corridors support local native wildlife and migratory species, which in some cases (as documented in Florence Local Wetland Inventory) are listed by federal and/or state wildlife agencies. Vegetated riparian corridors allow wildlife to migrate and disperse among different habitat areas while providing access to water. Vegetation creates a buffer between human activities and wildlife. Noise, light, pollution, people and domestic animals can adversely impact wildlife and riparian vegetation can reduce these impacts.

Full Local Protection Option (No Conflicting Land Uses Allowed)

The environmental consequences of full protection would be positive, because these riparian corridors and wetlands offer fish and wildlife habitat, water quality and flood control values that would not be further diminished by development. However, prohibiting residential development within 50 feet of the stream bank in this built out area would do little to encourage *restoration* of native vegetation that cools stream temperatures and stabilizes stream banks.

Moreover, depending on topographical and soil conditions, prohibition of stormwater management and sanitary sewer facilities within riparian corridors could impair the functionality of these urban facilities, with corresponding environmental problems. Pump stations and extensive excavation outside of natural areas might also be required, which could impair water quality and increase energy consumption and attendant pollution.

No Local Protection Option

Under the no local protection option, development would be allowed within riparian setback areas, wetlands and streams without local restriction, which would have extremely adverse environmental consequences. State and federal regulations focus on wetlands and streams, but do not ensure protection of adjacent riparian areas.

Limited Protection Option (Application of the Limited Protection Program)

The environmental consequences of a limited protection option (the City's proposed Limited Protection Program) would be mixed, but generally positive, since much stream vegetation within the 25 foot setback area would eventually be restored, supporting the environmental benefits described above. Intrusion of permitted uses within the riparian corridor would be minimized and disturbed areas resulting from construction would be re-planted with native vegetation. Limited impacts from construction of transportation and public utilities within wetlands and streams would be addressed and mitigated by state and federal environmental regulations. As discussed previously, the City's local programs for erosion prevention sediment control, post construction stormwater quality, and other water quality programs will also provide a level of protection to Florence's riparian corridors and significant wetlands.

In many cases, the environmental consequences of potential public improvement projects are initially considered at the master planning stage as potential projects are first identified. For example, Florence's recently adopted Transportation System Plan (TSP) minimized creek crossings and avoid wetlands whenever possible. As projects move forward into the 5-year Capital Improvement Plan, projects are evaluated further from a resource and project design perspective. At this point, if a viable alternate alignment exists that further avoids wetlands or creeks, modifications are made. In this manner, many of the adverse environmental, social, and economic consequences of the full and no protection scenarios (described above) have been, or will be further, avoided or minimized.

Energy Consequences

In Florence, vegetated riparian corridors provide shade and windbreaks which can modify high temperatures during the summer months and the effects of cold winds during the winter months. The use of existing riparian corridors for storm water storage and conveyance reduces energy that would otherwise be used for construction and maintenance of stormwater culverts and storage ponds. Full protection would restrict connectivity, increase out-of-direction travel, and impair bicycle and pedestrian activity – all of which increase energy consumption.

Full Local Protection Option (No Conflicting Land Uses Allowed)

The energy consequences of full local protection would be positive. Existing riparian vegetation would continue to provide shade during the summer months and a windbreak during the winter months. Fish-bearing streams would continue to provide stormwater conveyance and storage functions. On the other hand, full local protection would increase energy consumption because land development patterns would be somewhat less efficient and vehicular, bicycle and pedestrian connectivity would be limited. Moreover, energy costs would increase if the city were required to rely on pump stations rather than gravity for wastewater or stormwater conveyance.

No Local Protection Option

Providing no local protection means that development would be allowed to the edge of the stream bank. The lack of streamside vegetation would increase stormwater flows and

increase sedimentation in streams, thus reducing the effectiveness of a stream's storm-water retention and conveyance function. The lack of streamside vegetation would also mean that riparian corridors would no longer provide effective shading and windbreak functions. No local protection would also allow development of the significant wetlands which serve a critical function in protecting the city's sole source aquifer; the energy costs incurred in alternative water source distribution and collection would be extremely high.

Limited Protection Option (Application of the Limited Protection Program)

The energy consequences of applying the Limited Protection Program to wetlands and riparian corridors would also be positive, because streamside vegetation would be restored over time, maintaining and improving the shading, windbreak and stormwater functions of fish-bearing streams within Florence UGB. The limited protection option provides all of the energy benefits of the full protection option while allowing existing neighborhoods along the Munsel Creek side channel to continue to exist with extra protection measures for the resources.

Recommendation for Significant Wetlands and Riparian Corridors

On balance, the ESEE consequences analysis supports implementation of the Limited Protection Program (rather than the full or no protection options) by balancing economic, social, environmental, and energy conservation values. The Limited Protection Program mirrors the Goal 5 wetland and riparian corridor safe harbor protection in most respects, but provides more local flexibility by:

- Allowing encroachment up to 25 feet from the Munsel Creek side channel (RMC-Cs) significant riparian setback in exchange for riparian restoration and preservation within the remaining 25-foot setback area;
- Permitting public facilities necessary to serve planned urban development within LSW, subject to state and federal review and mitigation.

On June 27, 2012, the following comments on the Limited Protection Program were submitted by Jeff Young, Fishery Biologist, National Marine Fisheries Service and concurred with by John Spangler, Oregon Department of Fish and Wildlife:

"Per our phone conversation this morning, it is my understanding that the recommendation resulting from the ESEE analysis is a 50-foot setback with the option of allowing encroachment up to 25 feet into the Munsel Creek side channel (RMC-C-s) significant riparian setback in exchange for riparian restoration and preservation within the remaining 25-foot setback area. I have a couple comments regarding this recommendation.

First, I do not prefer encroachment into a 50-foot riparian setback along the Munsel Creek side channel.

Second, if encroachment of the 50-foot setback in exchange for riparian restoration and preservation is allowed, we need to ensure that successful restoration and preservation of the remaining 25 feet of riparian occurs. One way to do this is by monitoring and reporting on restoration efforts and conducting maintenance activities (removal of invasive species, removal and replanting of dead or dying plants, etc.) in the remaining riparian area. Also, restoration and preservation should be a requirement when encroachment into the 50-foot setback is desired."

The "Limited Protection Program" in Chapter 4 requirements for RMC-Cs are:

- a) A setback reduction of up to 50% for this side channel, i.e., a minimum setback from the top of bank of 25 feet, shall be allowed when property owners agree to replant displaced native vegetation within the remaining setback area. The adjustment will be granted through the City's Administrative Review process (planning counter). The Siuslaw Watershed Council and Siuslaw Soil and Water Conservation District have agreed to provide technical assistance to property owners at no cost.

Chapter 4: Florence Limited Protection Program Comprehensive Plan and City Code Amendments

The following amendments will be made to the Florence Realization 2020 Comprehensive Plan and Florence Development Code Title 10 Chapter 7, Special Development Standards, in order to comply with the requirements of Statewide Planning Goal 5. Together, these amendments represent the "Limited Protection Program" for significant wetlands and riparian areas described in this 2013 Plan, adopted as a supporting document to the Florence Realization 2020 Comprehensive Plan, and physically located in Appendix 5 of the Comprehensive Plan. In addition, "Consistency Amendments" are proposed to the Comprehensive Plan and Code to ensure internal consistency of these documents and housekeeping Code amendments are proposed that are timely and related to this process.

When substantial consensus among the community leaders, the general public, property owners, and state and federal regulatory agencies has been reached, the final draft version of the standards will be submitted to the City and County for adoption and the adopted amendments will be incorporated into this Chapter and the Comprehensive Plan and Code along with other amendments to the Comprehensive Plan and Code for internal consistency.

The Comprehensive Plan and Code amendments will be submitted to the Florence City Council for adoption. Only the Comprehensive Plan amendments in this chapter that pertain to the area outside city limits will be submitted to Lane County for co-adoption.

Proposed additions are shown in double underline and deletions in strike-out.

FLORENCE COMPREHENSIVE PLAN AMENDMENTS

Chapter 5: Open Spaces and Scenic, Historic, and Natural Resources

Florence's 20-year plan focuses on existing natural resources and their protection, which Oregon law now requires. This plan presents inventories of those selected resources, an understanding of each resource's environmental role in defining Florence's future, the identification of ways in which to protect those resources and to develop a local implementation program.

This chapter provides policy direction for the following specific resources:

- Wetlands and Riparian Areas
- Groundwater Resources
- Rare, Threatened, Endangered, and Sensitive Species
- Native Vegetation
- Mineral and Aggregate Resources
- Scenic Resources and Visual Quality
- Historic Resources

Goal

To conserve natural resources such as wetlands, riparian areas, groundwater supplies, air and water, and fish and wildlife habitat in recognition of their important environmental, social, cultural, historic and economic value to the Florence area and the central Oregon Coast.

Wetlands and Riparian Areas

Objectives

(Note: the following combine the objectives in the adopted Comprehensive Plan for wetlands and riparian areas and propose no changes.)

1. To maintain an accurate inventory of significant wetlands and riparian areas for use in land use planning and development review.
2. To protect significant wetlands and riparian areas for their critical functions and values in protecting surface and groundwater quality, flood control, habitat for fish, and terrestrial creatures, and for enhancing the visual character of the Florence community.

Policies

(Note: the following edits combine redundant policies in the adopted Comprehensive Plan for wetlands and riparian areas and propose amendments.)

1. For the purpose of land planning and initial wetland and riparian identification within the Florence Urban Growth Boundary (UGB), the City and Lane County shall rely on the 2013 1997 Florence Area Local Wetland and Riparian Area Inventory (2013 Inventory), approved by the Oregon Department of State Lands, and as amended hereafter. The 2013 Inventory within the Florence UGB, as amended, is adopted as part of this Comprehensive Plan and is physically located in Appendix 5.
2. Disturbance of significant¹⁷ wetlands for land development activities shall be permitted within the Florence UGB only as determined by the permitted provisions of permits issued by the Department ~~Division~~ of State Lands (DSL) and/or the Army Corps of Engineers.
3. In accordance with ORS 215.418, the City and County shall notify DSL when wetlands are present on a property that is subject to a local land use or building permit approval. The City shall notify DSL when riparian areas are present on a property that is subject to a local land use or building permit approval.
4. The City and County shall consider formal wetland delineation reports approved by the Oregon ~~Division~~ Department of State Lands as a valid source of wetland information specific to a land use action or limited land use action. Such reports, if approved by DSL, will be incorporated by reference into the City's ~~1997~~ 2013 Florence Area Local Wetlands and Riparian Area Inventory.

¹⁷ Significant wetlands and riparian corridors as identified by the ~~1997~~ 2013 Florence Area Local Wetlands and Riparian Area Inventory, Pacific Habitat Service, Inc. Comprehensive Plan Appendix 5.

5. No significant wetland or riparian corridor as defined by the 2013-1997 Florence Area Local Wetlands and Riparian Inventory shall be drained by re-routing of natural drainage ways.

6. The City shall protect the functions and values of significant¹⁸ Goal 5 riparian corridors and wetlands for flood control, water quality, and fish and wildlife habitat through Code provisions that protect these resources from development in accordance with Statewide Planning Goal 5 administrative rules (OAR 660 Division 23) and the Economic, Social, Environmental, and Energy (ESEE) Analysis and Limited Protection Program.

The ESEE Analysis is included, and significant wetlands and riparian corridors are listed and mapped, in the ¹⁹“2013 City of Florence Significant Wetlands and Riparian Corridors Plan” adopted by reference into this Comprehensive Plan. The Program exempts public infrastructure, as defined in the ESEE Analysis, from local wetland protection measures, and allows special setback reductions and other allowances for development along the Munsel Creek Side Channel (Reach RMC-Cs in the 2013 Riparian Inventory).

- ~~2. Riparian areas shall be prevented from permanent alteration by grading or the placement of structures or impervious surfaces, except for the following uses provided they are designed to minimize intrusion into the riparian area:~~

~~a. streets, roads and paths;
b. drainage facilities;
c. utilities and irrigation pumps;
d. water related (outside of coastal shoreland areas) and water dependent uses;
e. replacement of existing structures in the same location that do not disturb additional riparian surface area.~~

7. The City shall include a procedure in the Code to consider hardship variances, claims of map error, and reduction or removal of the restrictions for any existing lot or parcel demonstrated to have been rendered unbuildable²⁰ by application of the significant wetlands and riparian areas standards in the Code.

8. The City shall encourage restoration and protection of privately-owned wetlands and riparian areas through Code incentives, and, as resources allow, through education in partnership with the Siuslaw Watershed Council and the Siuslaw Soil and Water Conservation District.

- ~~3. While not required to adopt safe harbor policies and ordinances under the requirement of this periodic review, the City has chosen to modify the riparian setback on Munsel Creek to require a 50 foot minimum setback from the thread of the creek, which must include at least 15 feet from the top of the bank. The minimum must be increased as necessary to meet the 15 foot requirement.~~

4. The riparian setback from the Siuslaw River shall be 50 feet from the top of the cut bank.

¹⁸ “Significant” means wetlands that meet the definition of significant in Statewide Planning Goal 5.

¹⁹ The ESEE and Limited Protection Program are contained in the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan in Appendix 5 of the Comprehensive Plan.

²⁰ The term “unbuildable” is defined in the definitions section of Chapter 1 of the Comprehensive Plan and in FCC 10-1. See Consistency Amendments, below.

5. ~~The retention of native vegetation in riparian areas is critical to their function. Therefore, the City shall adopt effective regulations ensuring the retention, or if necessary, the replanting of native species in riparian areas and may include conditions regarding fertilizer and pesticide runoff. The regulations will address the following:~~
- A. ~~Control the removal of riparian vegetation, except for:~~
- ~~(1) removal of non-native vegetation and replacement with native plant species; and~~
 - ~~(2) removal of vegetation necessary for the development of water-related or water-dependent uses;~~

9. Plan Amendment Option: Any owner of property affected by the Significant Wetlands and Riparian Areas Standards in City Code may apply for a quasi-judicial comprehensive plan amendment. This amendment must be based on a specific development proposal. The effect of the amendment would be to remove the requirement to comply with these standards from all or a portion of the property. The applicant shall demonstrate that such an amendment is justified by completing an Environmental, Social, Economic and Energy (ESEE) consequences analysis prepared in accordance with OAR 660-23-040. If the application is approved, then the ESEE analysis shall be incorporated by reference into the Florence Comprehensive Plan, and the Florence Significant Goal 5 Wetlands and Riparian Areas Maps shall be amended to remove the wetland or riparian area from the inventory.

The ESEE analysis shall adhere to the following requirements:

- A. The ESEE analysis must demonstrate to the ultimate satisfaction of the Florence City Council that the adverse economic consequences of not allowing the conflicting use are sufficient to justify the loss, or partial loss, of the resource. The City will confer with the Department of Land Conservation and Development (DLCDD) prior to making their ultimate decision.
- B. The ESEE analysis must demonstrate why the use cannot be located on buildable land outside of the significant wetland or riparian area and that there are no other sites within the City that can meet the specific needs of the proposed use.
- C. The ESEE analysis shall be prepared by a qualified professional experienced in the preparation of Goal 5 ESEE analyses, with review by DLCDD.

Recommendations

1. ~~As the City's buildable lands begin to fill in and prior to moving the UGB limit outward, the City should consider conducting an analysis of the economic, social, environmental, and energy (ESEE) consequences that could result from a decision to allow, limit, or prohibit a conflicting use for each of the locally identified significant wetlands. From this analysis, lesser quality wetlands may be found eligible for partial or full development.~~
2. ~~The City should coordinate with the Oregon Division of State Lands (DSL), the U.S. Army Corps of Engineers (ACE), and other appropriate state and federal agencies~~

~~in the identification, protection and, where appropriate, mitigation of impacts to local wetland resources.~~

- ~~1. The City should consider restoring and protecting City-owned wetlands and riparian areas, using the preliminary assessment in the 2013 *City of Florence Significant Wetlands and Riparian Corridors Plan* in Comprehensive Plan Appendix 5.~~

Background

Note: Replace the separate Background sections for wetlands and riparian areas in the adopted Comprehensive Plan (shown in strike out below) with the following Background section:

The Wetland and Riparian Areas section of Chapter 5 of the Comprehensive Plan is based on the inventories, assessments, significance, and protection measures set out in the 2013 Florence Area Local Wetlands and Riparian Inventory (2013 Inventory) and the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan (2013 Plan), both located in Appendix 5 of the Comprehensive Plan. The 2013 Inventory and the 2013 Plan and ESEE Analysis and Limited Protection Program are adopted as part of this Comprehensive Plan.

Community concern for the Siuslaw estuary, the North Florence Sole Source Dunal Aquifer, and the area's streams, lakes, and wetlands is well-documented in Comprehensive Plan policies and Code provisions. In response to this concern, in October, 2009, the City and its partners from 19 federal, state, tribal, and local agencies embarked on a multi-year project called the Siuslaw Estuary Partnership (EPA Cooperative Agreement #WC-00J04801-0). The mission of the Partnership is to protect and improve water quality and fish and wildlife habitat in the lower Siuslaw watershed. This project is funded by project partners and the US Environmental Protection Agency (EPA). The Siuslaw Estuary Partnership Guiding Principles, endorsed by the City and its partners, provided guidance for the policies in this chapter of the Comprehensive Plan.

The 2013 Local Wetlands and Riparian Inventory updated the "City of Florence Local Wetlands and Riparian Area Inventory," prepared on December 30, 1996 by Pacific Habitat Services, Inc. and approved by DSL in 1997 (1997 Inventory). That inventory used the Oregon Freshwater Wetland Assessment Methodology (OFWAM). For the 2013 Inventory, an alternative wetland assessment, the Oregon Rapid Wetland Assessment Protocol (ORWAP; 2009), was used. The ORWAP provides much more detailed data on wetland functions, values and condition. The 1997 Inventory identified 270 wetlands, totaling 572 acres, and about 315 acres of riparian area. In the 2013 Plan, all of the 16 wetlands that are not subject to Goal 17 within the UGB were considered "significant" under Goal 5.

The improved inventories and assessment information in the 2013 Inventory assist the City in complying with Statewide Land Use Planning Goal 5 and will help the City and the County to make more informed land use decisions within the city and unincorporated lands within the study area.

On September 1, 1996, the Land Conservation and Development Commission adopted a revised Statewide Planning Goal 5. The Goal requires local jurisdictions to inventory the natural resources covered under the Goal, determine the significance of these resources, and develop plans to achieve the Goal. In other words, local jurisdictions must adopt land use ordinances regulating development in and around significant resource areas.

The purpose of the 2013 Inventory and Plan was to update the 1997 Inventory and to adopt protection measures, as required by state law. This inventory involves only fresh-water wetland and riparian areas; it does not include the estuary or estuarine wetlands. Specific objectives were to:

- update the 1997 biological and functional assessment;
- assess omitted wetlands;
- include delineations made since 1997;
- adopt policies and measures to protect the unique functions and values of the resources; and
- conduct preliminary work to assess the potential for restoration of riparian areas and wetlands on City-owned property. This preliminary work is set out in Chapter 5 of the 2013 Plan in Appendix 5.

The 2013 Inventory provides a comprehensive functional assessment of wetlands and riparian areas. This is especially important in this watershed because this 2013 Plan, once adopted, will ensure: retention of the capacity of existing natural wetlands and riparian areas to store and slow the velocity of stormwater prior to discharge to area creeks and the estuary; critical water quality benefits for the North Florence Sole Source Dunal Aquifer, the source of the City's drinking water; and protection of the quality of area surface waters, habitat to numerous fish and wildlife. The protection measures in this 2013 Plan will enhance the carrying capacity of the land to fully address the anticipated impacts from planned urbanization. The functional assessment thus provides critical information to help guide future urbanization policy and stormwater management policy and capital programs.

Public involvement for the Wetlands and Riparian Areas project consisted of three annual open houses; three annual newsletters distributed to all residents and/or property owners in the study area; targeted outreach; a Stakeholder process; media outreach; and public hearings before the Planning Commission and City Council. In addition, public involvement efforts were conducted specifically for wetlands and riparian areas. Prior to beginning the inventory field work, selected landowners (i.e. those suspected of having wetlands or waters of the state on their property) were mailed notices describing the project and asking permission to enter their property. Right of access was granted by landowner permission only. The properties of those not responding were not accessed. Access information was collected in a database and then transferred to a base map for use in the field.

The City of Florence held an open house meeting May 5, 2010 to inform the public and property owners about the wetland inventory process and answer questions from property owners deciding whether or not to grant access to their property. Following completion of initial fieldwork, a second public meeting was held on September 22, 2010 to allow property owners to observe the location of mapped wetlands and comment as appropriate. A third meeting with property owners was held on February 27, 2013 to present the draft Comprehensive Plan and Code amendments and to address comments and concerns. The Wetlands and Riparian Area Team met from 2010 through January 2013 and concurred with the proposal for determining the significance of, and measures to protect, wetlands and riparian areas in the Florence urban growth boundary (UGB). At their meetings in March, April, and July 2012 and February and March 2013, the Stakeholder Groups reviewed and commented on the draft products and amendments. The draft products were also presented to the public at Open Houses in 2011 and 2012 and summarized in newsletters distributed throughout the study area in 2011 and 2012. The proposal, and all

updates to the proposal, have been consistently posted to the project web site at www.SiuslawWaters.org with an invitation for public comment on the home page.

Background

In 1996, Florence's local wetland inventory was conducted and included all UGB land and some land outside where UGB expansion was anticipated. In January 1997, the Division of State Lands officially accepted the Florence Local Wetland Inventory (LWI), replacing the National Wetlands Inventory (NWI) prepared many years ago for identifying such resources in the Florence area. The Florence inventory is helpful for at least two reasons:

It helps determine for planning purposes what land is "buildable" and what was not due to the anticipated presence of wetlands.

It will help the City and County review development proposals and identify when a wetland might possibly be impacted as a result of such development.

The LWI will also help the City's and County's required DSL notification when a land use action is proposed near an identified wetland.

After the City's Periodic Review work program was approved in November 1995, the State adopted amendments to Statewide Planning Goal 5. Goal 5 requires conservation of a variety of natural resources, including wetlands and riparian areas. The amendments included the LWI requirement, a requirement for the City to make determinations of local significance for identified wetland resources, and a requirement that the City and County protect these significant wetland resources.

The analysis and results of the City's determination of local significance for Florence's wetlands are included in Appendix 5, City of Florence Local Wetlands and Riparian Area Inventory, 1997.

Once local wetlands are identified and evaluated as to their significance, the Statewide Planning Goal 5 provides local jurisdictions with two planning options for mandated protection of wetlands. This protection must occur in addition to that protection provided by current State and federal regulations.

Under option one, Florence can use the "safe harbors" provisions of Oregon law. By adopting a safe harbors ordinance, restrictions are placed on grading, excavation, placement of fill and removal of vegetation within all locally significant wetlands within the Florence UGB.

Or, under option two, by conducting an economic, social, environmental and energy (ESEE) analysis, Florence may further refine its wetland protection program by allowing, limiting, or prohibiting conflicting uses of wetland resources depending on that analysis. The ESEE process is relatively intensive, especially in Florence's case, where 270 wetlands totaling 572.25 acres are identified by the LWI.

While it may be desirable for Florence to conduct an ESEE analysis for its significant wetland resources in the future, staff has identified sufficient "buildable lands" within the existing UGB to meet the City's residential, commercial, and industrial land needs. As such, the most expedient and effective path at this point to comply with Goal 5 and protect significant wetlands is adoption of a safe harbor ordinance by the City and Lane County.

~~However, since adoption of a safe harbor ordinance is not required of this periodic review, the City has chosen not to adopt such an ordinance at this time, but to continue to rely on DSL/ACE permits for wetland protection.~~

Background

~~The City's LWI also included a riparian area inventory. A riparian area can be best defined as a buffer of variable width between an aquatic resource and an upland area. The buffer is typically vegetated, and provides several beneficial functions to the lake or stream.~~

~~Those functions are:~~

~~Acts as a natural filter of stormwater, limiting pollution of streams and waterways.
Cools stream temperatures in summer and traps heat in winter when canopy is sufficient to screen all or part of the stream channel.
Holds the stream bank in place and therefore reduces erosion.
Adds controls to flood velocities of streams and drainage ways.
Provides valuable wildlife habitat.
When properly integrated into a development design or recreational greenway, riparian buffers yield aesthetic benefits as well.~~

~~To some extent, Florence has been protecting its riparian areas within City limits prior to 1988, through the Munsel Creek and drainage way setback restrictions found in Florence City Code, Title 10, Chapter 7, Special Development Standards.~~

~~While not required by periodic review, the City realizes the importance of riparian buffers and has chosen to increase the protection of the riparian area on Munsel Creek which has been classified as a salmon stream and which is a teaching/management area for the Salmon and Trout Enhancement Program (STEP).~~

~~On the Siuslaw River, the riparian setback will remain at 50 feet from the top of the bank. Existing development is grandfathered. Expansions of existing development and new development must provide for the required setback, or request a variance and include provisions to mitigate the proposed intrusion into the setback.~~

Consistency and Housekeeping Comprehensive Plan Amendments

Note: The following amendment makes the Comprehensive Plan consistent with state law which changed from 45 to 35 days.

Chapter 1: Introduction

Amendments to the Plan may be initiated by citizens, citizen groups, the Citizen Advisory Committee, the Planning Commission or the City Council. In any amendment proceedings, the City Council shall obtain the recommendation of the Planning Commission and the Citizen Advisory Committee before taking action on a proposed major amendment. Minor changes which do not have significant effects beyond the immediate area of the change require the recommendation of the Planning Commission. Minor changes may be initiated at any time. Notice to the Oregon Department of Land Con-

servation and Development (DLCD) of a public hearing for a proposed plan amendment shall be required at least ~~45~~³⁵ days prior to the first Planning Commission hearing.

Definitions

Note: Delete the following definition from the Comprehensive Plan because this term is not used in the Comprehensive Plan.

~~**SENSITIVE AREA.** Natural streams (perennial or intermittent), rivers (including the estuary portion of the river), lakes, or wetlands hydraulically connected by surface water to streams, rivers, or lakes and areas defined by the City of Florence's Local Wetlands and Riparian Inventory. Also, includes all areas that are protected for species as per areas designated by Oregon Department of Fish and Wildlife, Oregon Division of State Lands, National Marine Fisheries Service, United States Fish and Wildlife Service and Oregon Department of Transportation.~~

Note: Add this definition of unbuildable to the Comprehensive Plan definitions:

UNBUILDABLE. Lots that are rendered "unbuildable" by the required setback for significant wetlands and riparian areas.

- a) For single family housing, lots are considered unbuildable if the required setback for the significant wetland or riparian area is such that no contiguous space exists outside the setback that allows for a dwelling unit at least 50 feet by 27 feet.²¹
- b) For all affected properties, lots are deemed unbuildable if strict adherence to the applicable setback standards and conditions would effectively preclude a use of the parcel that could be reasonably expected to occur in the zone and that the property owner would be precluded a substantial property right enjoyed by the majority of landowners in the vicinity.
- c) For the Munsel Creek side channel (Reach RMC-Cs in the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan in Appendix 5 of the Comprehensive Plan), the "required setback" for the purpose of the unbuildable definition, is the reduced setback allowed through the ESEE Analysis adopted into this Comprehensive Plan Appendix 5.

Chapter 11: Utilities, Facilities, and Services

Stormwater Management

Policies

Note: The following amendment makes this policy consistent with the Limited Protection Program.

Water Quality

²¹ Note: A 50 foot by 27 foot area allows the siting of a typical double-wide manufactured home, a form of affordable housing.

2. Protect the quality of water in surface waters, i.e., the estuary, significant wetlands and riparian corridors, creeks, lakes, wetlands, and ocean/beach, from contamination threats that could impair the quality of the water for fish and wildlife habitat and human recreation.

FLORENCE CITY CODE AMENDMENTS

Note: Unless noted otherwise, additions are shown in double underline and deletions in strike-out.

Title 10 Chapter 7: Special Development Standards

SECTION:

10-7-1: Purpose

10-7-2: Identification of Wetlands and Riparian Areas and Potential Problem Areas

10-7-3: Development Standards for Potential Problem Areas

10-7-4: Development Standards for Wetlands and Riparian Areas

10-7-45 Site Investigation

10-7-56: Review and Use of Site Investigation Reports (Amended Ord. 10, Series 2009)

10-7-1: PURPOSE: The purpose of this Chapter is to apply additional development standards to areas with wetlands or riparian areas and potential problem areas, such as natural hazards or soils which are particularly subject to erosion, landslide or seasonal surface water. Compliance with these standards is required in order to obtain a Special Use Permit. The standards are intended to: eliminate the danger to the health, safety or property of those who would live in potential problem areas and the general public; and to protect areas of critical environmental concern; areas having scenic, scientific, cultural, or biological importance; and significant fish and wildlife habitat as identified through Goal 5: Open Spaces and Scenic, Historic, and Natural Resources, and Goal 17: Coastal Shorelands. (Amended Ord. No. 10, Series 2009).

10-7-2: IDENTIFICATION OF WETLANDS AND RIPARIAN AREAS AND POTENTIAL PROBLEM AREAS: At minimum, the following maps shall be used to identify wetlands and riparian areas and potential problem areas:

A. "Hazards Map", Florence Comprehensive Plan Appendix 7.

B. "Soils Map", Florence Comprehensive Plan Appendix 7. (Ord. 625, 6-30-80)

C. "Beaches and Dunes Overlay Zone." See Chapter 19 for overlay zone requirements. Where conflicts exist between that chapter and this one, the more restrictive requirements shall apply.

D. 2013 City of Florence Significant Wetlands Map and 2013 City of Florence Significant Riparian Reaches Map in Appendix A of the 2013 Florence Area Local Wetlands and Riparian Inventory (2013 Inventory) and in the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan (2013 Plan), in Comprehensive Plan Appendix 5.

D. E. Other information contained in the plan or adopted by reference into the plan, or more detailed inventory data made available after adoption of the plan may also be used to identify potential problem areas. (Amended Ord. No. 10, Series 2009)

NOTE: Delete 10-7-3 B, below, and renumber sequentially; and amend section H, as shown.

10-7-3: DEVELOPMENT STANDARDS FOR POTENTIAL PROBLEM AREAS: The following standards shall be applied to development in potential problem areas unless an approved Phase I Site Investigation Report or an on-site examination shows that the condition which was identified in the Comprehensive Plan or Overlay Zoning Map does not in fact exist on the subject property. These standards shall be applied in addition to any standards required in the Zoning Districts, Comprehensive Plan, and to any requirements shown to be necessary as a result of site investigation. Where conflicts or inconsistencies exist between these Development Standards, City Code, and the Comprehensive Plan, the strictest provisions shall apply unless stated otherwise.

A. Special Flood Hazard Area: All uses proposed in the flood area shall conform to the provisions of the National Flood Insurance Programs.

~~B. Munsel Creek and Other Drainageways: A fifty foot (50') setback shall be required for all buildings from the creek channel, except by Planning Commission approval where it can be shown by accepted engineering practices or treatment that no erosion hazards, slide potential, or possible flood damage are likely to occur, and that riparian vegetation will be protected.~~

~~H. Yaquina Soils and Wet Areas(except significant wetlands and riparian areas identified in the 2013 Wetland and Riparian Inventory, as amended):~~ In areas with seasonal standing water, construction of a drainage system and/or placement of fill material shall be required according to plans prepared by a registered engineer and approved by the City. (Ord. 625, 6-30-80; amd. Ord. 669, 5-17-82) (Amended Ord. 10, Series 2009)

NOTE: Insert new code section 10-7-4:

10-7-4: DEVELOPMENT STANDARDS FOR WETLANDS AND RIPARIAN AREAS

A. Purpose: Significant wetlands, and their related wetland buffer zones, and significant riparian corridors provide hydrologic control of floodwaters; protect groundwater and surface water quality; provide valuable fish and wildlife habitat, including habitat for anadromous salmonids; improve water quality by regulating stream temperatures, trapping sediment, and stabilizing streambanks and shorelines; and provide educational and recreational opportunities. It is recognized that not all resources will exhibit all of these functions and conditions.

The purpose of this Subsection (FCC 10-7-4) is to protect significant wetlands, wetland buffer zones, and significant riparian corridors in order to:

1. Implement the goals and policies of the Comprehensive Plan;
2. Satisfy the requirements of Statewide Planning Goal 5 and ensure consistency with adopted City Stormwater requirements in Florence City Code Title 9 Chapter 5;
3. Safeguard the City's locally significant wetland and riparian areas, especially the flood control and water quality functions these areas provide for the community;
4. Safeguard fish and wildlife habitat;
5. Safeguard water quality and natural hydrology, to control erosion and sedimentation, and to reduce the adverse effects of flooding;
6. Safeguard the amenity values and educational opportunities for City's wetlands and riparian areas for the community; and

7. Improve and promote coordination among Federal, State, and local agencies regarding development activities near wetlands and riparian areas.

B. Applicability.

1. **Affected Property:** The procedures and requirements of the Significant Wetland and Riparian Area Standards:
 - a. Apply to any parcel designated as having a Significant Goal 5 Wetland or Significant Goal 5 Riparian Corridor, and Significant Wetland Buffer Zones, as defined in FCC Title 9 Chapter 5 and FCC Title 10 Chapter 1. Significant Goal 5 wetlands and significant riparian corridors are mapped in Appendix A of the 2013 Inventory and Tables 2.1 and 2.2 and the Significant Wetland and Riparian Reaches Maps in the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan (2013 Plan), as amended, in Comprehensive Plan Appendix 5, which is adopted into this Code by reference.
 - b. Apply in addition to the stormwater standards in FCC 9-5-3-3-F (incorporated herein) and the standards of the property's zoning district, except that the required setbacks in this subsection are not in addition to the required setbacks in the underlying zone. Where conflicts exist between this subsection and the underlying zoning district, this subsection shall apply.
2. **Applicability to properties adjacent to the side channel of Munsel Creek (Reach RMC-Cs in the 2013 Inventory).** These properties are subject to special setback reductions and provisions, as set out below, due to the unique development patterns and history of the area. These special provisions are supported by, and explained in, the Economic, Social, Environmental, and Energy (ESEE) Analysis and Limited Protection Program (ESEE Analysis) in Chapter 3 of the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan in Appendix 5 of the Comprehensive Plan. The ESEE Analysis is adopted as part of the Comprehensive Plan and is incorporated herein by reference.
3. **Applicability to public facilities in significant wetlands.** Public facilities (transportation, water, wastewater, and stormwater) that are included in the City's Public Facility Plan, as amended, are exempt from the requirements of this subsection provided that permitted uses are designed and constructed to minimize intrusion into the riparian area; disturbed areas are replanted with native vegetation; and all required federal and state permits are obtained. This exemption is authorized by the ESEE Analysis in Appendix 5 of the Comprehensive Plan. See Section, "Exemptions," below.

C. Activities Subject To Standards and Requirements: Activities subject to the Special Development Standards in this subsection shall include the following, unless specifically exempted by Code:

1. Partitioning and subdividing of land;
2. New structural development;
3. Exterior expansion of any building or structure, or increase in impervious surfaces or storage areas;
4. Site modifications including grading, excavation or fill (as regulated by the Oregon Department of State Lands and the Army Corps of Engineers), installation of new above or below ground utilities, construction of roads, driveways, or paths, except as specifically exempted in the section "exemptions" below;

5. The cutting of trees and the clearing of any native vegetation within a Significant Wetland, Wetland Buffer Zone, or Riparian Corridor beyond that required to maintain landscaping on individual lots existing on the effective date of this title;

D. Exemptions:

1. Only the following uses and activities in significant riparian corridors or wetland buffer zones are exempt from these Significant Wetland and Riparian Area Standards, provided: the uses and activities are designed and constructed to minimize intrusion into the buffer zone; disturbed areas are replanted with native vegetation; and all required federal and state permits are obtained:
 - a) Replacement of lawfully created existing structures with structures in the same location that do not disturb additional wetland buffer zone or significant riparian surface area. All Coast Village structures existing on (insert date ordinance is adopted) are grandfathered and qualify as "lawfully created existing structures" for purposes of this subsection. This provision supersedes the provisions for non-conforming structures in FCC 10-8.
 - b) Installation or maintenance of public and private facilities and utilities (such as transportation, water, wastewater, and stormwater, electric, gas, etc.) in riparian areas.
 - c) The sale of property.
 - d) Temporary emergency procedures necessary for the safety or protection of property.
 - e) All water-related and water-dependent uses as defined in the Definitions in the Florence Code Title 10.
 - f) Removal of non-native vegetation and replacement with native plant species.
 - g) Removal of vegetation necessary for the development of water-related or water-dependent uses.
 - h) Public facilities identified in the City's Public Facility Plan, in Appendix 11 of the Comprehensive Plan, as amended, that are installed in significant wetlands, provided that the facilities are designed and constructed to minimize intrusion into the wetland; disturbed areas are replanted with native vegetation; and all required federal and state permits are obtained.

E. Agency Review: Decisions made by the City of Florence under this title do not supersede the authority of the state or federal agencies which may regulate or have an interest in the activity in question. It is the responsibility of the landowner to ensure that any other necessary state or federal permits or clearances are obtained. In particular, state and federal mitigation requirements for impacts associated with approved water-related or water-dependent uses may still be required.

F. General Development Standards and Requirements: When development is proposed that is subject to these standards, the property owner is responsible for the following. Figure 1 below is a cross section illustrating terms used in the discussion of wetland and riparian setbacks as defined by Oregon Statewide Planning Goal 5.

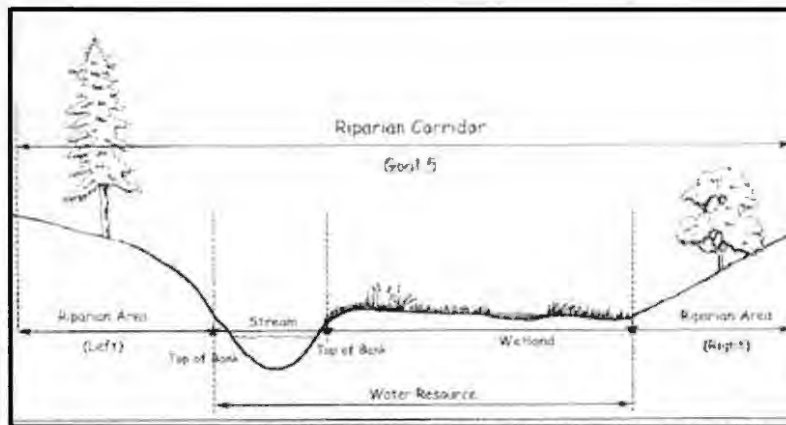


Figure 1: Downstream cross section illustrating terms used in Statewide Planning Goal 5. Source: Urban Riparian Inventory and Assessment Guide. Oregon Department of State Lands, 1998.

1. Determination of Significant Wetland and Riparian Area Boundaries.
 - a. For the purpose of showing the boundary of a significant wetland on a site plan, property owners may choose one of the following options:
 - 1) hire a Qualified Professional to do the delineation and have the delineation approved by the Oregon Department of State Lands (DSL); or
 - 2) hire a Qualified Professional to do the delineation but do not request DSL approval of the delineation. The Qualified Professional must have performed prior wetland delineations that were approved by DSL; or
 - 3) If the site plan shows the proposed development is outside the 50 foot Stormwater Buffer Zone, the wetland boundaries shown on the adopted Local Wetland Inventory (LWI) Map can be used to determine the wetland boundary for this purpose.
 - b. For significant riparian corridors, the width of the corridor boundary is the "significant riparian width" in Table 2.2 of the 2013 City of Florence Significant Wetlands and Riparian Corridor Plan in Comprehensive Appendix 5.
 - c. For significant riparian corridors, the boundaries of the riparian corridor will be measured and shown on an approved site plan. The City shall maintain maps of regulated riparian areas, and make them available to the public. These maps will be used to identify the extent of the riparian area unless the applicant can demonstrate through detailed inventory information (including maps, photos, and Lane County aerial photos showing the location and species of vegetation growing in the disputed area) that the city's maps are in error. For purposes of making these measurements, the following shall apply:
 - 1) Riparian buffer zones are measured horizontally from the top of bank. The top of the bank is the highest point at which the bank meets the grade of the surrounding topography, characterized by an abrupt or noticeable change from a steeper grade to a less steep grade, and, where natural conditions prevail, by a noticeable change from topography or vegetation primarily shaped by the presence and/or movement of the water to topography not primarily shaped by the presence of water. Where there is more than one such break in the grade, the uppermost shall be considered the top of bank.
 - 2) If the top of the bank is not identifiable, the riparian buffer zones are measured horizontally from the line of ordinary high water. In a given stream, the line of ordinary high water is the line on the bank or shore to which seasonal high water rises annually and identified in the field by physical characteristics that include one or more of the following:

1. A clear, natural line impressed on the bank
2. Changes in the characteristics of soils
3. The presence of water-borne litter and debris
4. Destruction of terrestrial vegetation

If reliable water level data are available for 3 or more consecutive previous years, the line of ordinary high water can be considered the mean of the highest water level for all years for which data are available.

2. Preparation and submission of a site plan (vegetation clearing permits are also subject to the submission requirements in FCC Title 4 Chapter 6) that shows:
 - a. the wetland boundary or the top of bank of the riparian corridor,
 - b. the significant riparian corridor width or the wetland buffer zone,
 - c. the footprint of the proposed structure measured from the riparian corridor boundary or wetland buffer zone edges,
 - d. any requested setback adjustments as measured from the edge of the wetland or riparian corridor boundary,
 - e. the type and location of dominant existing native plants that would be displaced, and
 - f. the type of native plants to be planted and the location where they will be re-planted.
3. It is prohibited to permanently alter a significant wetland by: the placement of structures or impervious surfaces; or by the removal of native vegetation; or by grading, excavation, placement of fill, or vegetation removal (other than perimeter mowing and other cutting necessary for hazard prevention), except as follows:
 - a) where full protection of the Significant Wetland renders a property unbuildable, as defined in the definitions in Title 10 Chapter 1 of this Code; or
 - b) public facilities identified in the City's Public Facility Plan, Appendix 11 of the Comprehensive Plan, as amended, may be installed in significant wetlands or riparian areas, provided that the facilities are designed and constructed to minimize intrusion into the wetland or riparian area; disturbed areas are re-planted with native vegetation; and all required federal and state permits are obtained.

G. Stormwater Quality: As provided in FCC 9-5-5-3-F and the Code Definitions in FCC-10-1, significant wetlands over ½ acre and significant streams are “sensitive areas” that shall be protected by a buffer zone of native, undisturbed vegetation. The outer boundary of the buffer shall be determined by a minimum 50-foot setback from the edge of the significant wetland; for significant riparian areas, the buffer zone shall be the significant riparian width identified in the 2013 Inventory and 2013 City of Florence Significant Wetlands and Riparian Corridors Plan. The width and nature of protection required within the buffer may change as the Endangered Species Act and other state and federal regulations are promulgated. The City requires that the buffer width meet all state and federal requirements.

No land disturbing activities, structures, development and construction activities, gardens, lawns, application of chemicals, pet wastes, dumping of any kind of materials shall be permitted within the buffer zone, except as noted below:

1. Roads, pedestrian, or bike paths crossing the buffer from one side to the other in order to provide access to or across the sensitive area.

2. A pedestrian or bike path constructed within a buffer and parallel to a sensitive area shall have the buffer widened by the width of the path if the path is constructed of impervious material.
3. Pedestrian or bike paths shall not exceed 10-feet in width.
4. Utility/service infrastructure construction (i.e., storm, sanitary sewer, water, phone, gas, cable, etc.) If approved by the City Manager or his/her designee.
5. Measures to remove or abate hazards, nuisance, or fire and life safety violations as approved by the City.
6. Enhancement of the riparian corridor for water quality or quantity benefits, fish, or wildlife habitat as approved by the City and other appropriate regulatory authorities.
7. Water quality facilities planted with appropriate native vegetation may encroach into the buffer area as approved by the City and other appropriate authorities.

H. Additional Statewide Planning Goal 5 exceptions: The following exceptions are in addition to the exceptions in G, above. Consistent with Statewide Planning Goal 5 [OAR 660-023-0090 (8) (a)], the permanent alteration of significant riparian areas by grading or the placement of structures or impervious surfaces is prohibited, except for the following uses, provided they are designed and constructed to minimize intrusion into the riparian area:

1. Water-related and water-dependent uses and removal of vegetation necessary for the development of water-related or water-dependent uses;
2. Replacement of existing structures with structures in the same location that do not disturb additional riparian surface area; and
3. Removal of non-native vegetation and replacement with native plant species.

I. Removal of native vegetation: In accordance with Goal 5, removal of vegetation from a significant riparian corridor is prohibited, except as otherwise provided in these Wetland and Riparian Standards and in FCC 4-6-3 and for the following:

1. Removal of non-native vegetation and replacement with native plant species. The replacement vegetation shall cover, at a minimum, the area from which vegetation was removed, shall maintain or exceed the density of the removed vegetation, and shall maintain or improve the shade provided by the vegetation.
2. Removal of vegetation necessary for the development of approved water-related or water-dependent uses or for the continued maintenance of dikes, drainage ditches, or other stormwater or flood control facilities. Vegetation removal shall be kept to the minimum necessary.
3. Trees in danger of falling and thereby posing a hazard to life or property may be removed, following consultation and approval from the Planning Director. If no hazard will be created, the department may require these trees, once felled, to be left in place in the Significant Wetland or Riparian Area.
4. The control or removal of nuisance plants should primarily be by mechanical means (e.g. hand-pulling). If mechanical means fail to adequately control nuisance plant populations, a federally approved herbicide technology for use in or near open water is the only type of herbicide that can be used in a Significant Riparian Corridor. Pre-emergent herbicides or auxin herbicides that pose a risk of contaminating water shall not be used. Herbicide applications are preferred to be made early in the morning or during windless periods at least 4 hours before probable rainfall. Any herbicide use must follow the label restrictions, especially the cautions against use in or near open water.

J. Special provisions for the Munsel Creek Side Channel: The following special provisions apply to properties in the significant riparian corridor of the Munsel Creek side channel (Reach RMC-Cs in Table 2.2 of the 2013 City of Florence Significant Wet-

lands and Riparian Corridors Plan). These provisions are in addition to, or provide relief from, the other standards in this subsection, and, where conflicts exist, this section shall prevail.

1. In addition to the other setback adjustments and Variances allowed by this subsection, a 50% setback adjustment to the required 50-foot significant riparian width for properties along the Munsel Creek side channel will be permitted in order to allow new or expanded development to build up to 25 feet from the top of bank of the creek, as long as any native plants disturbed by the development are replaced elsewhere in the buffer zone, subject to the following exceptions and procedures:
 - a. Properties in Florentine Estates PUD that were granted a reduced setback by the Planning Commission prior to the (inset date of this ordinance) are deemed to comply with the standards in this subsection and do not need to apply for this setback adjustment.
 - b. The setback adjustment for other affected properties shall be granted through the Administrative Review process in 10-1-1-6.
 - c. The applicant shall be granted the setback reduction upon demonstration that any native vegetation displaced by the development shall be replanted in the remaining buffer zone (shrub for shrub, tree for tree, etc.).
 - d. The applicant is not required to retain a professional for this application but a qualified professional may help a property owner identify displaced native plants and show how they will be replanted. To provide technical assistance, the City will provide the applicant with a native plant guide. Staff from the Siuslaw Watershed Council and Soil and Water Conservation District are available to provide property owners with technical assistance with native plant identification and guidance on replanting.

K. Setback Adjustments: The following reductions in setbacks shall be allowed for properties affected by the significant wetland and riparian area standards as set out below.

1. Eligibility for setback adjustment. Property owners affected by these significant wetland and riparian corridor standards shall be eligible for setback adjustments as follows:
 - a. Single family dwellings: when the significant wetland or significant riparian corridor standard or requirement is such that no contiguous space exists outside the setback that allows for a dwelling unit at least 50 feet by 27 feet.
 - b. For the Munsel Creek side channel: the "required setback" for the purpose of eligibility for the setback adjustment is the reduced setback allowed in subsection "J" above.
2. If the required setback or standard for the significant wetland or riparian corridor is such that no contiguous space exists outside the setback that allows for a dwelling unit at least 50 feet by 27 feet, then a primary dwelling, this size or less, shall be permitted to intrude into the setback area in accordance with the standards of this subsection. Any Code requirements of the applicable zoning district (such as required garages) that would necessitate intrusion into additional riparian area shall not apply.
3. If the proposed primary dwelling will be more than 20 feet from a significant or wetland or stream, the adjustment application shall use the Administrative Review process in FCC 10-1-1-6.
4. If a proposed primary dwelling will be built within 20 feet of a significant wetland or stream, a Hardship Variance from the Planning Commission shall be required in accordance with Florence City Code Title 10 Chapter 4.

L. Hardship Variances: A variance to the provisions of this subsection shall be granted by the Planning Commission in accordance with the procedures in Florence City Code Title 10 Chapter 4 only as a last resort and is only considered necessary to allow reasonable economic use of the subject property. The property must be owned by the applicant and not created after the effective date of this title.

1. Eligibility. An application for a hardship variance from the provisions of this subsection shall be available upon demonstration of the following conditions:
 - a. Siting of a primary dwelling 50 feet by 27 feet or less requires intrusion into the significant wetland buffer zone or significant riparian corridor within 20 feet of a significant wetland or stream; or
 - b. Strict adherence to the applicable standards or requirements of this subsection would effectively preclude a use of the parcel that could be reasonably expected to occur in the zone and that the property owner would be precluded a substantial property right enjoyed by the majority of landowners in the vicinity.
 - c. Due to unique circumstances and historic development patterns outside the control of the property owners, the Variance fee for this application shall be waived for affected Coast Village properties.
2. The following additional standards shall apply:
 - a. Demonstration that the intrusion into the setback must be the minimum necessary;
 - b. Demonstration that any native vegetation displaced by the development will be replanted in the remaining significant wetland buffer zone or riparian corridor. The applicant is not required to retain a professional for this application but a qualified professional may help a property owner identify displaced native plants and show how they will be replanted. To provide technical assistance, the City will provide the applicant with a native plant guide; staff from the Siuslaw Watershed Council and Soil and Water Conservation Service are available to provide property owners with technical assistance with native plant identification and guidance on replanting.
 - c. Permanent alteration of the Significant Wetland or Riparian Area by an action requiring a variance is subject any mitigation requirements imposed by federal and state permitting authorities.
 - d. In granting a Variance, the Planning Commission shall impose conditions of approval that address all of the following criteria:
 - 1) The site plan and application shall document the location of the impact, the existing conditions of the resource prior to the impact, a detailed planting plan for the approved setback area with dominant native plant species and density, and a narrative describing how the impacted resource will be replaced and approved setback area restored.
 - 2) Invasive vegetation shall be removed from, and native vegetation planted in, the approved setback area, with a minimum replacement ratio of 1:1 for the impacted area.
 - 3) Herbicides and pesticides not approved for use in buffer zones or riparian areas is prohibited in the approved setback area.
 - 4) All vegetation planted within the approved setback area shall be native to the region. In general, species to be planted shall replace those impacted by the development activity, i.e., trees must replace trees, brush must replace brush, and, within reason, like plants must replace like plants (i.e., dominant plant species).
 - 5) Trees shall be planted at a density not less than the density in place prior to development.
 - 6) The property owners will work with available federal, state, and local agencies, such as the Siuslaw Watershed Council, the Siuslaw Soil and Water

Conservation District, ODFW, DSL, STEP to implement practices and programs to restore and protect the riparian area.

M. Significant wetland and riparian corridor enhancement incentives:

1. Enhancement of Significant Wetland Buffer Zones or Riparian Corridors is encouraged, including: riparian or in-channel habitat improvements, non-native plant control, and similar projects which propose to improve or maintain the quality of a Significant Wetland or Riparian Area; however, no enhancement activity requiring the excavation or filling of material in a wetland or jurisdictional stream shall be allowed unless all applicable State and Federal permits have been granted.
2. Incentives shall be provided to improve the continuity of Significant Riparian Corridors in situations where lots would be rendered unbuildable by the setback, as defined in the Definitions in FCC Title 10 Chapter 1. Such incentives may include: reducing the required front yard setback, alternative access, vacating right-of-way, property line adjustments, re-orientation of lots, transfer of development rights (if feasible), and density bonuses, among others. The resulting development will conform, to the maximum extent practical, to the general development patterns in the vicinity of the affected lot.
3. These incentives may also be provided to properties that are severely impacted by the setback when doing so will result in enhancement of the significant wetland, wetland buffer zone, or significant riparian corridor.

- L. Inventory map corrections:** The Planning Director may correct the location of a wetland or riparian boundary shown on the Local Wetland and Riparian Areas Inventory Maps when it has been demonstrated by a property owner or applicant that a mapping error has occurred and the error has been verified by DSL. Wetland delineations verified by DSL shall be used to automatically update and replace the City's Local Wetland Inventory mapping. No variance application shall be required for map corrections where approved delineations are provided.

CONSISTENCY CODE AMENDMENTS

The following Code amendments are proposed for consistency with the Comprehensive Plan and Code amendments in this Limited Protection Program or are otherwise for consistency with state law.

FCC TITLE 9, CHAPTER 5

STORMWATER MANAGEMENT UTILITY, USER FEE SYSTEM AND STORMWATER MANAGEMENT REQUIREMENTS

9-5-1-2: DEFINITIONS

SENSITIVE AREAS Significant wetlands greater than ½ acre and significant streams identified in the 2013 Florence Area Local Wetlands and Riparian Inventory, as amended. Natural streams (perennial or intermittent), rivers, including the estuary, and lakes, or wetlands hydraulically connected by surface water to streams, rivers, or lakes and areas defined by the City of Florence's Local Wetlands and Riparian Inventory. Also, includes all areas that are protected for species as per areas designated by Oregon Department of Fish and Wildlife, Oregon ~~Division~~Department of State Lands, National Marine Fisheries

9-5-3-3: STORM WATER QUALITY

- F. Sensitive areas shall be protected by a buffer zone of native, undisturbed vegetation. The outer boundary of the buffer shall be determined by a minimum 50-foot setback from the edge of the sensitive area, or as wider if required by other City Code provisions~~requirements.~~ (See additional standards and requirements for significant wetlands and significant riparian corridors in Florence City Code Title 10, Chapter 7; and for the Estuary, Coastal Shorelands, and Beaches and Dunes in Title 10 Chapter 19.) The width and nature of protection required within the buffer may change as the Endangered Species Act and other state and federal regulations are promulgated. The City requires that the buffer width meet all state and federal requirements. No land disturbing activities, structures, development and construction activities, gardens, lawns, application of chemicals, pet wastes, dumping of any kind of materials shall be permitted within the buffer zone, except as noted below:
1. Roads, pedestrian, or bike paths crossing the buffer from one side to the other in order to provide access to or across the sensitive area.
 2. A pedestrian or bike path constructed within a buffer and parallel to a sensitive area shall have the buffer widened by the width of the path if the path is constructed of impervious material.
 3. Pedestrian or bike paths shall not exceed 10-feet in width.
 4. Utility/service infrastructure construction (i.e., storm, sanitary sewer, water, phone, gas, cable, etc.) If approved by the City Manager or his/her designee.
 5. Measures to remove or abate hazards, nuisance, or fire and life safety violations as approved by the City.
 6. Enhancement of the riparian corridor for water quality or quantity benefits, fish, or wildlife habitat as approved by the City and other appropriate regulatory authorities.
 7. Water quality facilities planted with appropriate native vegetation may encroach into the buffer area as approved by the City and other appropriate authorities.

FCC Title 10, Chapter 1

FCC 10-1-4: DEFINITIONS

Insert the following definitions in alphabetical order into FCC 10-1-4. Where an existing definition is proposed to be modified, additions are shown in double underline and deletions in strike-out.

BANKFULL STAGE	Means the elevation at which water overflows the natural banks of the stream.
BIOENGINEERING	Means a method of erosion control and landscape restoration using live plants, such as willows.
BUFFER ZONE	A physical setback from a sensitive area used to protect the <u>flood storage capacity</u> , water quality, the aquatic and riparian wildlife communities, and the habitat value within the sensitive area. The start of the buffer starts at the edge of the defined channel (bank full stage) for streams/rivers, delineated wetland boundary, delineated spring boundary, or average high water for lakes.

BUILDING	Any temporary or permanent structure constructed and maintained for the support, shelter, or enclosure of people, motor vehicles, animals, chattels or personal or real property of any kind. The words "building" and "structure" shall be synonymous.
DELINEATION	Means a wetland delineation report that contains the methods, data, conclusions and maps used to determine if wetlands and/or other waters of the state are present on a land parcel and, if so, describes and maps their location and geographic extent. A wetland determination report documenting wetland presence or absence is included within this definition.
ENHANCEMENT	An action which results in a long-term improvement of existing functional characteristics and processes that is not the result of a creation or restoration action. <u>Enhancement is a modification of a wetland or riparian area to improve its condition. Enhancement is conducted only on degraded features, results in a net gain in functions and values, and does not replace or diminish existing functions and values with different ones unless justified as ecologically preferable.</u>
EXCAVATION	Means removal of organic or inorganic material (e.g. soil, sand, sediment, muck) by human action.
IMPERVIOUS SURFACE	Means any material (e.g. rooftops, asphalt, concrete) which reduces or prevents absorption of water into soil.
INVASIVE VEGETATION	Includes plants that appear on the current Oregon Department of Agriculture Noxious Weed List, plus known problem species including <i>Phalaris arundinacea</i> , <i>Holcus lanatus</i> , and <i>Anthoxanthum odoratum</i> . In addition, any non-native plant species may be considered invasive if it comprises more than 15% of the total plant cover and appears to be increasing in cover or frequency over time.
LAWN	Means grass or similar materials usually maintained as a ground cover of less than 6 inches in height. For purposes of this title, lawn is not considered native vegetation regardless of the species used.
MITIGATION	The creation, restoration, or enhancement of an estuarine area to maintain the functional characteristics and processes of the estuary, such as its natural biological productivity, habitats, and species diversity, unique features and water quality. <u>For wetlands and riparian areas, "mitigation" is a means of compensating for impacts to a Wetland or and Riparian Area or its buffer including: restoration, creation, or enhancement. Some examples of mitigation actions are construction of new wetlands to replace an existing wetland that has been filled, replanting trees, removal of nuisance plants, and restoring streamside vegetation where it is disturbed.</u>
NATIVE VEGETATION	Means plants identified as naturally occurring and historically found within the City of Florence.
QUALIFIED PROFESSIONAL	Means an individual who has proven expertise and vocational experience in a given natural resource field. A qualified professional conducting a wetland delineation must have had a delineation approved by the Oregon Department of State Lands.

REVIEW AUTHORITY	Means the City of Florence.
RIPARIAN AREA	Means the area adjacent to a river, lake, or stream, consisting of the area of transition from an aquatic ecosystem to a terrestrial ecosystem. For purposes of this title, riparian areas are identified on the Significant Wetlands and Riparian Areas Map in the Comprehensive Plan.
RIPARIAN CORRIDOR	Means a Goal 5 Resource that includes the water areas, adjacent riparian areas, and wetlands within the riparian area boundary. For purposes of this title, riparian corridors are identified on the Significant Wetlands and Riparian Areas Map in the Comprehensive Plan.
SENSITIVE AREA	<u>Significant wetlands greater than ½ acre and significant streams identified in the 2013 Florence Area Local Wetlands and Riparian Inventory, as amended, Natural streams (perennial or intermittent), rivers, including the estuary, and lakes, or wetlands hydraulically connected by surface water to streams, rivers, or lakes and areas defined by the City of Florence's Local Wetlands and Riparian Inventory.</u> Also, includes all areas that are protected for species as per areas designated by Oregon Department of Fish and Wildlife, Oregon Division <u>Department</u> of State Lands, National Marine Fisheries Service, United States Fish and Wildlife Service and Oregon Department of Transportation.
SHRUBS	Consists of woody plants less than 3 inches in diameter at breast height, regardless of height.
SIGNIFICANT WETLANDS AND RIPARIAN AREAS	Wetlands and riparian corridors identified as significant by the 2013 Florence Area Local Wetlands and Riparian Inventory and the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan, as amended, and designated significant by the local government.
SIGNIFICANT WETLAND BUFFER ZONE	The 50 foot buffer zone required by the stormwater management requirements of FCC 9-5-3-3-F, measured on accordance with the boundary determinations in FCC 10-7 standards and requirements for wetlands and riparian corridors.
STATE AND FEDERAL NATURAL RESOURCE AGENCY	The Oregon Department of State Lands, Oregon Department of Fish and Wildlife, U.S. Army Corps of Engineers, U.S. Department of Agriculture Natural Resources Conservation Service, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, and Department of Environmental Quality.
STREAM	A channel such as a river or creek that carries flowing surface water, including perennial streams and intermittent streams with defined channels, and excluding man-made irrigation and drainage channels. A perennial stream is one that flows continuously. An intermittent or seasonal stream is one that flows only at certain times of the year. ²²

²² Department of State Lands (DSL) and U.S. Geological Survey (USGS) definitions.

STRUCTURE	See "Building." For the purposes of administering Code Chapters 7, 18, 19, and 24, the definition shall also mean Anything constructed, installed, or portable, and the use of which requires a location on <u>a parcel of land or on the ground</u> , either above or below water.
SUBSTANTIAL IMPROVEMENT	<p>Any repair, reconstruction, or improvement of a structure, the cost of which equals or exceed 50 percent of the market value of the structure either:</p> <ul style="list-style-type: none"> (a) Before the improvement or repair is started, or (b) If the structure has been damaged and is being restored, before the damage occurred. For the purposes of this definition "substantial improvement" is considered to occur when the first alteration of any wall, ceiling, floor, or other structural part of the building commences, whether or not that alteration affects the external dimensions of the structure. The term does not, however, include either: <ul style="list-style-type: none"> (1) Any project for improvement of a structure to comply with existing state or local health, sanitary, or safety code specifications which are solely necessary to assure safe living conditions, or (2) Any alteration of a structure listed on the National Register of Historic Places or a State Inventory of Historic Places.
TREE	Consists of woody plants 3 inches or more in diameter at breast height, regardless of height.
TOP OF BANK	Refers to the location where the rising ground bordering a stream intersects the side of the stream channel. The stream channel is typically non-vegetated, and the top of bank normally corresponds with the bankfull stage. In the absence of physical evidence, the two-year recurrence interval flood elevation may be used to delineate the top of bank.
UNBUILDABLE.	<p>Lots that are rendered "unbuildable" by the required setback for significant wetlands and riparian areas.</p> <ul style="list-style-type: none"> a) For single family housing, lots are considered unbuildable if the required setback for the significant wetland or riparian area is such that no contiguous space exists outside the setback that allows for a dwelling unit at least 50 feet by 27 feet.²³ b) For all properties, lots are deemed unbuildable if strict adherence to the applicable setback standards and conditions would effectively preclude a use of the parcel that could be reasonably expected to occur in the zone and that the property owner would be precluded a substantial property right enjoyed by the majority of landowners in the vicinity. c) For the Munsel Creek side channel (Reach RMC-Cs in the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan in Appendix 5 of the Comprehensive Plan), the "required setback" for the purpose of the un-

²³ Note: A 50 foot by 27 foot area allows the siting of a typical double-wide manufactured home, a form of affordable housing.

	buildable definition, is the reduced setback allowed in FCC Title 10 Chapter 7.
WETLANDS	Land areas where water is the dominant factor determining the nature of soil development and the types of plant and animal communities living at the soil surface. Wetland soils retain sufficient moisture to support aquatic or semi-aquatic plant life. In marine and estuarine areas, wetlands are bounded at the lower extreme by extreme low water; in freshwater areas, by a depth of six feet. The areas below wetlands are submerged lands. Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Based on the above definition, three major factors characterize a wetland: hydrology, soils, and plants.
WETLAND BOUNDARY	The edges of a wetland as delineated by a qualified professional or as determined through the standards in FCC Title 10 Chapter 7.

FCC 10-19-9: PRIME WILDLIFE OVERLAY DISTRICT /PW

A. Purpose and Application:

Purpose: The purpose of the /PW District is to protect areas in and adjacent to the North Jetty Lake and the South Heceta Junction Seasonal Lakes that have native vegetation and habitats of specific species of concern and to protect wildlife habitat, water quality, bank stability and provide flood control. The requirements imposed by the /PW District shall be in addition to those imposed by the base zoning district. Where the requirements of the /PW District conflict with the requirements of the base zoning district or the Comprehensive Plan, the more restrictive requirements shall apply.

Application: The Prime Wildlife Overlay District (/PW) is applied within the Florence city limits to Coastal Lake Shorelands identified in inventory information and designated in the Comprehensive Plan as possessing areas of unique biological assemblages, habitats of rare or endangered species, or a diversity of wildlife species. The /PW Overlay applies to the North Jetty Lake Shorelands as shown on the Florence Coastal Overlay Zoning Map. The extent of the /PW Overlay application for the South Heceta Junction Seasonal Lakes shall be determined through a Preliminary Investigation as specified below.

Preliminary Investigation: Any land use or building permit application within the /PW District as it applies to the South Heceta Junction Seasonal Lakes shall require a preliminary investigation by the Planning Director to determine the specific area to which the requirements of the district shall apply. The requirements of the district shall apply in an area generally identified on the Florence Coastal Overlay Zoning Map and the 2013 Local Wetland Inventory, as amended, and, specifically, in the site-specific information submitted by an applicant to determine whether the site possesses areas of unique biological assemblages, habitats of rare or endangered species, or a diversity of wildlife species ~~identified in the Coastal Resources Inventory~~, or function to provide or affect water quality, bank stability or flood control, as identified in the Lane County Coastal Resources Inventory or the wetland functions and values in the 2013 Florence Area Local Wetlands and Riparian Inventory, as amended.

Note: The following housekeeping Code amendment makes the Code consistent with Statewide Planning Goal 16. See discussion, below, for rationale.

FCC 10-19-4: DEVELOPMENT ESTUARY DISTRICT (DE):

F. Conditional Uses: Outside of Areas Managed for Water Dependent Activities, the following uses and activities are allowed in the estuary with a Conditional Use Permit, subject to the applicable criteria....

10. Water-related uses, non-water-dependent uses, and non-water-related uses, provided no dredge or fill is involved, ~~and it is not possible to locate the use on an upland site. In approving these uses, the City shall consider the potential for using upland sites to reduce or limit the commitment of the estuarine surface area for surface uses.~~ Nonwater-dependent and non-water-related uses that existed as of July 7, 2009 will retain their non-conforming status for five years from the date the use is abandoned or the structure is destroyed; and the existing structure for the same use may be replaced; the provisions of non-conforming uses in the Florence City Code not withstanding.

Discussion:

The amendment is more consistent with the direction in Goal 16:

“Oregon’s Statewide Planning Goals & Guidelines, GOAL 16: ESTUARINE RESOURCES, OAR 660-015-0010(1)Management Units As a minimum, the following kinds of management units shall be established:... 3. Development: ... As appropriate the following uses shall also be permissible in development management units: ... Where consistent with the purposes of this management unit and adjacent shorelands designated especially suited for water-dependent uses or designated for waterfront redevelopment, water-related and nondependent, nonrelated uses not requiring dredge or fill; mining and mineral extraction; and activities identified in (1) and (2) above shall also be appropriate. In designating areas for these uses, local governments shall consider the potential for using upland sites to reduce or limit the commitment of the estuarine surface area for surface uses.”

FCC 4-6-3: VEGETATION CLEARING PERMIT REQUIRED:

A. A vegetation clearing permit shall be required in any of the following circumstances:...

1. Clearing native vegetation from... areas which have been designated by the City as a significant riparian corridor, significant wetland buffer zone, greenbelt, or view corridor.

FCC 4-6-4: PROCEDURE FOR OBTAINING A VEGETATION CLEARING PERMIT:

A. ~~A~~ no vegetation clearing permit application ~~is required~~ will be accepted unless the application ~~also~~ includes a concurrent application for a building permit or Conditional Use Permit, except that the criteria in FCC 4-6-4 C shall also apply to any removal of native vegetation from a significant riparian or wetland buffer zone requested as part of a setback adjustment granted under FCC 10-7-4.

- B. All requests for a Vegetation Clearing Permit shall be submitted to the ~~Community Development~~Planning Department on a form available from that department, and containing the following minimum information. (See FCC 10-7-4 for additional submission requirements for areas within significant wetland or riparian buffer zones):...
- C. The ~~Planning~~Community Development Department shall process the Vegetation Removal Permit application through the Administrative Review procedures in FCC Title 10 Chapter 1 ~~and forward a report to the Design Review Board~~ within thirty (30) days of filing a complete application. Review and approval ~~by the Design Review Board~~ shall be based on the following criteria, as applicable to the request:
1. The necessity to remove native vegetation in order to construct proposed improvements or otherwise utilize the property in a reasonable manner consistent with the City Code and policies;
 2. The environmental and physical impacts such clearing may have, including visual drainage, wind erosion, protection of adjoining property and structures, and impacts on significant riparian corridors or wetland buffer zones. , and impacts on any affected significant wetland or riparian buffer zones shall be supported by a qualified professional or through consultation with staff from the Soil and Water Conservation District, Siuslaw Watershed Council, ODFW, OSU, or another person or agency with knowledge or experience with the affected resource;
 3. The adequacy of the applicant's proposed landscaping or revegetation plan, including plant selection, staking, irrigation, and other maintenance provisions.

Chapter 5: Restoration of Wetlands and Riparian Areas on City-owned Property

This chapter was prepared by Shawn Eisner, Pacific Habitat Services, Inc. It presents suggestions for restoration of wetlands and riparian areas on city-owned property. This chapter applies to all wetlands and riparian areas owned by the City, not just significant ones.

The map "City-owned Wetland and Riparian Areas," on the following page, cross-references the results of the wetland and riparian inventories with a map of City-owned properties. It is clear from this map that, despite the large acreages of wetlands and riparian areas within the inventory limits, most of these natural resources are located on private property or public property not under the management of the City of Florence. As such, opportunities for enhancement are limited. In order to exercise other opportunities for wetland or riparian enhancement, partnerships with private, County, State, and Federal interests would need to be investigated. Specific opportunities in light of such partnerships have not been investigated as part of this Chapter.

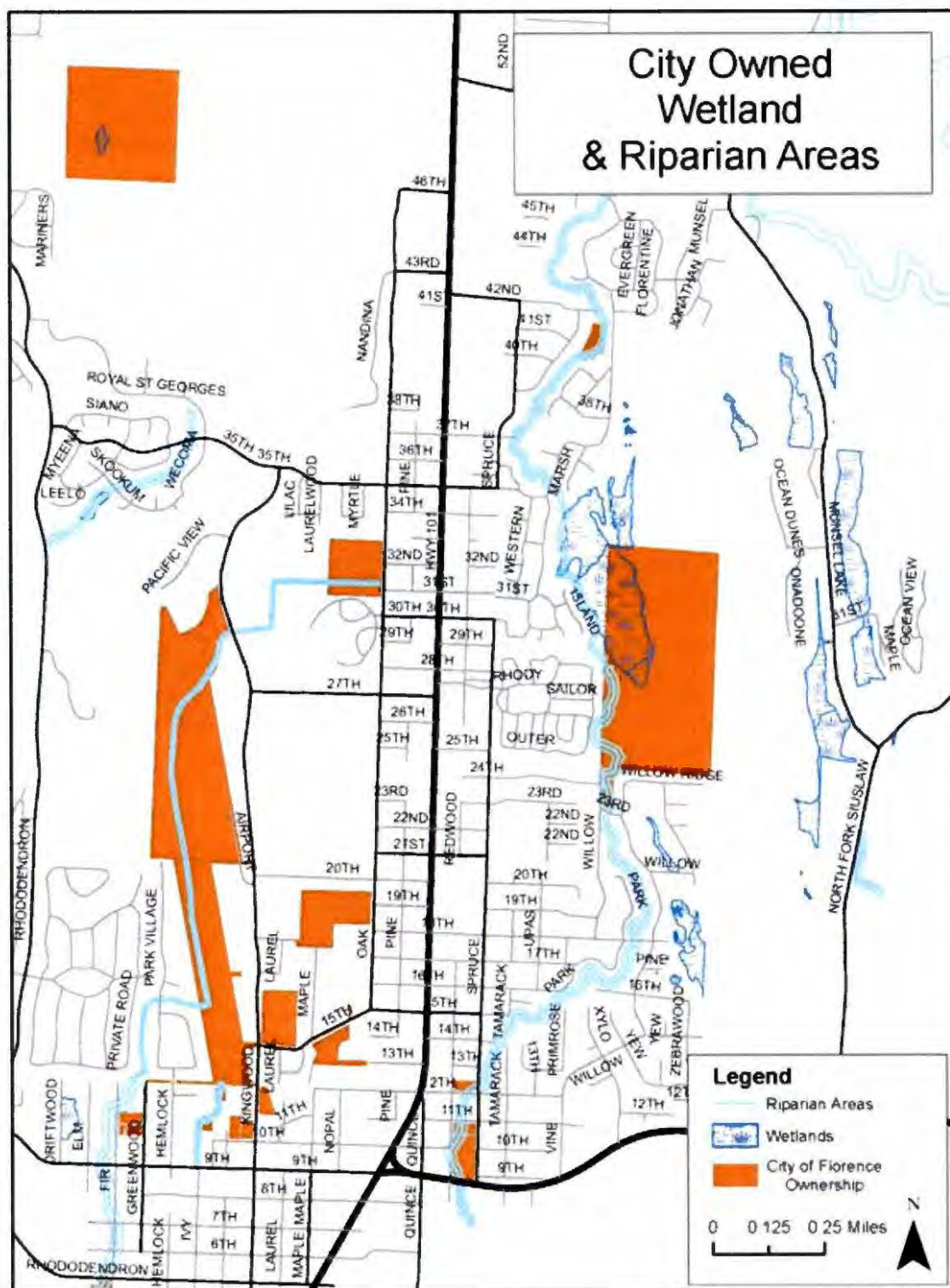
For the purposes of this review, "restoration" included an investigation into opportunities to: restore habitat functions that were previously present but are now lost or severely degraded; create (or expand) a resource where none now exists; or enhance resources where one or more ecological functions could be improved. Enhancement could include any number of opportunities that positively affect the resource, such as: improvements to vegetative diversity and structure; surface or subsurface hydrology; water quality; wildlife habitat; etc. In general, restoration opportunities were not identified to respond to or offset the impacts of a specific problem or concern, but rather to identify opportunities to restore a tributary reach or wetland to a more naturally functioning state. This review should not be considered exhaustive, but rather a cursory assessment of whether restoration opportunities exist on City-owned property.

Wetland Restoration

Of the thirty-four wetlands that were inventoried and assessed, only two are located on City-owned property. These include Wetland 6, an approximately 30 acre, mixed forest and emergent wetland that is bordered on much of its west side by Munsel Creek; and Wetland 33, a 0.6 acre forested depression amongst undeveloped forest land north of Sandpines Golf Links.

As both Wetlands 6 and 33 are located in areas that have not recently been disturbed, and there is no reason to believe that the historic boundaries of these wetlands have been modified to any significant effect by human activity or natural processes, wetland restoration would not be applicable for these wetlands. As both are dominated by native vegetation and have good vegetative structure, restoration opportunities in the vicinity of either of these resources would be limited to the enhancement of hydrologic conditions, or the creation of additional wetlands in the vicinity, while making sure that invasive species do not establish themselves in the intact wetlands. However, as vegetation in upland areas adjoining these wetlands is also in good condition, or, in the case of Wetland 6, is largely lacking due to the proximity of an adjacent sand dune, the creation of additional

wetland in these areas would not be recommended as it would require the loss (or alteration) of existing natural habitats.



Riparian Restoration

The review investigated opportunities to maintain or restore hydraulic and/or riparian connectivity along the creek channels on City-owned property. Despite the fact that over half of the City-owned parcels identified include riparian resources, land ownership by the City is unevenly distributed throughout the study area. This dispersion limits opportunities because it does not allow for a larger, strategic plan for restoration. It limits restoration efforts to those types of projects that are localized in scope and effect. The one exception to the dispersed ownership of properties with riparian resources is the central reach of Airport Creek. Limitations to restoration on those parcels are the result of safety requirements beyond the influence of the City (namely Federal Aviation Administration rules regarding airport hazards).

Potential restoration opportunities would include the following: 1) remove invasive, non-native plants; 2) plant native trees, shrubs, and forbs; 3) install in-channel velocity reduction structures [rock or boulders could be utilized but wood is generally preferred over rock in these types of systems]; 4) re-contour stream banks to improve channel morphology; 5) stabilize stream banks using bioengineering techniques; 6) excavate and/or grade areas adjacent to the creek where there are incised banks to create terraces and wetlands, reconnect the creek with its floodplain, and/or create high-water refugia for fish; 7) add large wood to the channel to improve habitat; 8) install general erosion control measures; and 9) install stormwater treatment facilities to retrofit residential runoff with water quality treatment.

Though one or more of the above opportunities may be appropriate along a given reach of creek managed by the City, other than the removal of non-native plants and/or addition of native plants, most of the above would be most effective if implemented as part of a larger, comprehensive project.

Despite the limitations of dispersed ownership, and limitations to the one large reach of Airport Creek that is in definite need of restoration, it should be noted that riparian corridors in the inventory area are in generally good condition, as the results of the riparian inventory indicate. Munsel Creek, and the reach of Airport Creek south of the airport consistently rate high for riparian functions investigated using the Urban Riparian Inventory and Assessment Guide" (URIAG).

As riparian areas in the inventory remain predominantly vegetated by native plants, associated riparian functions such as bank stability, wildlife habitat, and resource shading remain in good condition. Based upon a review of the results of riparian assessments on City-owned parcels, specifically details regarding channel cross sections, it seems the most common lost function is the connection between the creek channel and adjoining floodplain. This is not common on those reaches of Munsel Creek on City-owned property, but is common along Airport Creek upstream from the airport. Despite this lost function, the extent of excavation and temporary loss of vegetation along the creek necessary to restore floodplain connection may not be an acceptable alternative. Furthermore, despite the general lack of adjoining development, increasing floodwater retention may not be advisable near Oak Street or the airport. Should local or downstream flooding become a greater concern in the future, the entire reach from Oak Street upstream from the airport could be an opportunity to offset the lack of riparian functions along the approximately 4,000 linear feet of creek within the airport where enhancement is not possible. In general, it is preferable to restore natural water storage/flood mitigation functions, where possible, and avoid the typical engineered approach for "floodwater retention" in response to other problems.

Appendix A: Existing Policies and Code for Wetlands and Riparian Areas

This Appendix presents existing policy guidance in locally adopted or endorsed documents to help frame the discussion of wetland and riparian protection measures in the Florence urban growth boundary (UGB). Proposed modification to the existing policy framework is presented in Chapters 5 and 6 of this plan that implement the proposed protection measures for the significant wetlands and riparian areas identified in the *2010 Florence Area Wetland and Riparian Area Inventory*.

Existing Policy Guidance

Existing policy guidance for wetlands, wetland buffers, and riparian areas in the Florence UGB is found in the following documents that have been endorsed or adopted by the Florence City Council and, in some cases, Lane County Board of Commissioners:

- Siuslaw Estuary Partnership Guiding Principles, endorsed by the City and the County in September and October, 2010, respectively
- Florence Realization 2020 Comprehensive Plan Policies, adopted by both the City and the County
- Florence City Code Title 9 (City-adopted)
- Florence City Code Title 10 (City-adopted)

■ Siuslaw Estuary Partnership Guiding Principles

In the fall of 2010, the Florence City Council and Lane County Board of Commissioners unanimously endorsed Guiding Principles for the five project elements of the Siuslaw Estuary Partnership. Principles relevant to wetlands and riparian areas are as follows, with the relevant project element is shown in the subheadings:

Water Quality and Quantity:

2. Protect the quality of water in surface waters, i.e., the estuary, creeks, lakes, wetlands, and ocean/beach, from contamination threats that could impair the quality of the water for fish and wildlife habitat and human recreation.
3. Protect water quality in ground and surface waters from the effects of urbanization through land use and development policies and procedures.
5. Protect the water storage function of wetlands and water flow in creeks and the estuary through water management planning and practices that maintain groundwater levels and surface water flows so that they do not impair water quality or impact fish and wildlife habitat.
6. Prevent adverse flooding conditions through natural storage and slow release of surface water and runoff.

Wetlands and Riparian Area Protection:

1. Protect the functions and values of significant¹ wetlands for water quality, water storage, fish and wildlife habitat, public recreation and use, and education.
2. Protect the functions and values of significant riparian areas² for water quality, flood management, thermal regulation, and fish and wildlife habitat.
3. Restore and protect publicly-owned wetlands and riparian areas.
4. Encourage restoration and protection of privately-owned wetlands and riparian areas through education and incentives.
5. Retain and restore native shoreline and riparian vegetation cover, manage invasive plants, monitor significant streamsides, and protect streamsides from erosion.

Ecological Growth Planning:

1. Use Guiding Principles to guide environmental policies, products and processes.
2. Work toward achieving long-term outcomes for land use and water management policies and practices that:
 - maintain and protect rearing, migrating, and spawning habitat for resident and anadromous fish, and habitat for birds, mammals, amphibians and reptiles;
 - ensure that water quality and healthy stream conditions are maintained as rural lands are converted to urban densities;
 - protect and restore the functions and values of wetlands and riparian areas;
 - promote the benefits to the economy of recreational and scenic resources;
 - support commercial fishing;
 - provide jobs through environmental restoration;
 - incite an appreciation for the area's rich and complex ecosystem, creating an attraction for residents and visitors; and
 - promote local environmental programs, such as STEP, as a model for other small coastal cities.
3. Develop protection measures such as low impact development requirements, revised stormwater management Best Management Practices (BMPs), green spaces and riparian buffer Plan designations and zoning, and requirements to protect unique wetland features (such as forested wetlands, darlingtonia patches, and blueberry bogs), and unique riparian areas (such as gravel beds for salmon spawning).
- 4.³ Recognize private property rights by requiring due process and thus avoid the unconstitutional "taking" of private property.

¹ "Significant" means wetlands that meet the definition of significant in Statewide Planning Goal 5.

² Id.

³ The Florence City Council added this Principle after the Guiding Principles were endorsed by the Siuslaw Watershed Council, the Siuslaw Soil and Water Conservation District, and the Heceta Water District.

Florence Realization 2020 Comprehensive Plan

CHAPTER 1: INTRODUCTION

Definitions

BUFFER ZONE. A physical setback from a sensitive area used to protect the water quality, the aquatic and riparian wildlife communities, and the habitat value within the sensitive area. The buffer starts at the edge of the defined channel (bank full stage) for streams/ivers, delineated wetland boundary, delineated spring boundary, or average high water for lakes.

DRAINAGEWAY. The bed and banks of a waterway used to discharge surface waters from a given area. It also includes adjacent areas necessary to preserve and maintain the drainage channel.

NATURAL HAZARDS. Natural events that are known to result in death or endanger the works of man, such as stream flooding, ocean flooding, groundwater, erosion and deposition, landslides, earthquakes, weak foundation soils and other hazards unique to local or regional areas.

OPEN SPACE. Any publicly or privately owned land that is retained in a substantially natural condition and incorporates an adjacent parkland improved for recreational uses such as, picnicking, nature interpretive trails or multi-use paths. Open spaces may also include seasonal lakes, lands protected as important natural resources such as wetlands or riverine areas, and lands used as buffers when such lands incorporate areas for the design features mentioned above. Open space does not include residential lots or yards, streets or parking areas.

RIPARIAN. Of, pertaining to, or situated on the edge of the bank of a river or other body of water.

SENSITIVE AREA. Natural streams (perennial or intermittent), rivers (including the estuary portion of the river), lakes, or wetlands hydraulically connected by surface water to streams, rivers, or lakes and areas defined by the City of Florence's Local Wetlands and Riparian Inventory. Also, includes all areas that are protected for species as per areas designated by Oregon Department of Fish and Wildlife, Oregon Division of State Lands, National Marine Fisheries Service, United States Fish and Wildlife Service and Oregon Department of Transportation.

SHORELINE. The boundary line between a body of water and the land, measured on tidal waters at mean higher high water, and on non-tidal waterways at the ordinary high-water mark.

WETLANDS. Land areas where water is the dominant factor determining the nature of soil development and the types of plant and animal communities living at the soil surface. Wetland soils retain sufficient moisture to support aquatic or semi-aquatic plant life. In marine and estuarine areas, wetlands are bounded at the lower extreme by extreme low water; in freshwater areas, by a depth of six feet. The areas below wetlands are submerged lands.

CHAPTER 2: LAND USE

Residential

Policies

1. The City shall encourage the use of residential planned unit development subdivisions and may trade off some conventional zoning requirements and density limitations in order to achieve:
 - high quality, innovative residential lot and building design,
 - incorporation of unique land forms into the final subdivision design,
 - significant open space,
 - on-site amenities reflecting the value for both active and passive recreational facilities,
 - natural resource protection, where identified as part of a preliminary site investigation report,
 - a mix of dwelling unit types and densities, and a mix of residential, commercial, and recreational uses, where appropriate.
2. The City shall initiate an evaluation of its residential ordinances following adoption and acknowledgment of this Plan with respect to increasing residential densities through the use of smaller lot sizes, encouraging cluster developments, and providing developers with density bonus options based on public benefit criteria.

Other Plan Designation Categories and Background

The following Comprehensive Plan designation categories are shown in the Plan Map and described below: Public; Private Open Space; West 9th Street Area; and Downtown.

West 9th Street Area (*Note: see maps at end of Appendix*)

The West 9th Street Area Plan designation applies to the area bordered by Ivy Street on the east and Rhododendron Drive on the west, and its boundary is shown on the Realization 2020 Comprehensive Plan Map 2-1 and Maps 2-3 and 2-4. Lands within the West 9th Street Area are zoned Professional Office/Institutional, except for the two areas that are zoned Open Space. A Plan designation of Public applies to these two Open Space areas....

...A significant drainage way enters the West 9th Street Area at the southern boundary of the City airport between Greenwood Street right-of-way and Fir Street right-of-way. It continues south through the planning area and, after leaving the area, eventually outfalls to the Siuslaw River. A second drainage way, a smaller tributary of the above described drainage way, borders this planning area at the southern airport boundary between Juniper and Ivy Street rights-of-way and continues south to 9th Street. At 9th Street, this natural drainageway is culverted, and a pipe conveys this drainage west under 9th Street to its outfall with the larger drainage way. A small wetland where this tributary enters the culvert at 9th Street is reflected in the City's 1997 Local Wetlands and Riparian Inventory. Both of these drainage ways are also shown as riparian areas on this inventory.

These drainage corridors create challenges for street improvements based on the platted right-of-way, and a street network, which avoids impacting these features, is necessary. These corridors have evolved into environmental features worth protection, and shall be incorporated as greenways in the overall build-out plan, rather than being piped or paved over....

Specific Plans

Several key Planning Areas within city limits require additional study and guidance for their development over the 20-year planning period. The first three of these are designated in the Comprehensive Plan Map as a Plan designation. The fourth, the Pacific View Business Park, is a zoning district:

- North Commercial Node
- West 9th Street Area
- Downtown
- Pacific View Business Park

West 9th Street Planning Area

The West 9th Street Planning Area of Florence is shown as a Plan designation on the Comprehensive Plan Map. The policies guiding development of this area are described in this section and in the Plan designation section of this chapter...

West 9th Street Subarea Recommendations (See Subareas in Map 2-3):

Subarea 1

This L-shaped area lies west of the City's property reserved for the airport landing glide path, and northeast of the Justice Center. It is bounded on the east by Ivy Street, contains four full blocks, is currently undeveloped and is suitable for medium and high density residential development....Ivy Street shall remain unopened due to environmental impacts if this street was constructed. 10th Street and 11th Street should not be built to cross the eastern drainage way, nor should they be extended west across the western drainage way. A suitable buffer should be maintained between this and the industrially planned and zoned property to the north opposite 12th Street. The drainage ways bordering the west side, and also the east side, of this area, are to be protected with undisturbed buffers of 50' and 25' respectively.

Subarea 2

This rectangular shaped area lies between the 11th and 12th streets rights-of-way on the northwest corner of the West 9th Street Planning Area. It contains approximately four full blocks and is currently undeveloped....11th Street shall not cross the drainage way.... The drainage way bordering the east side of this subarea is to be protected with an undisturbed buffer of 50'.

Subarea 4

This area lies south of 9th Street and immediately east of the Peace Health medical complex. Its eastern boundary is formed by the eastern edge of the greenway, and its southern boundary is 6th Street. The 3.5 block subarea is bordered by the major north-south drainage way....

...Fir Street will be left unopened due to environmental impacts of constructing that portion. It may be vacated, provided the drainage way is placed in a protective easement or dedicated to the City as park land. 8th Street will intersect with Greenwood Street, but shall remain unopened from Greenwood to Elm Street.

The drainage way is to be protected with an undisturbed buffer of 50 feet....

CHAPTER 5: OPEN SPACES AND SCENIC, HISTORIC, AND NATURAL RESOURCES

Goal

To conserve natural resources such as wetlands, riparian areas, groundwater supplies, air and water, and fish and wildlife habitat in recognition of their important environmental, social, cultural, historic and economic value to the Florence area and the central Oregon Coast.

Wetlands

Objectives

1. To maintain an accurate inventory of wetlands for use in land use planning and development review.
2. To protect significant wetlands for their critical value in maintaining surface and groundwater quality and quantity, providing wildlife habitat, performing flood control, and enhancing the visual character of the Florence community.

Policies

1. For the purpose of land planning and initial wetland identification, the City and Lane County shall rely on the 1997 Florence Local Wetland and Riparian Area Inventory, approved by the Oregon Division of State Lands, and as amended hereafter.
2. Disturbance of significant⁴ wetlands for land development activities shall be permitted within the Florence UGB only as determined by the permitted provisions of permits issued by the Division of State Lands and/or the Army Corps of Engineers.
3. The City shall consider formal wetland delineation reports approved by the Oregon Division of State lands as a valid source of wetland information specific to a land use action or limited land use action. Such reports, if approved by DSL, will be incorporated by reference into the City's 1997 Local Wetland and Riparian Area Inventory.
4. No significant wetland as defined by the 1997 Florence Local Wetland and Riparian Area Inventory shall be drained by re-routing of natural drainage ways.

Recommendations

1. As the City's buildable lands begin to fill-in and prior to moving the UGB limit outward, the City should consider conducting an analysis of the economic, social, environmental, and energy (ESEE) consequences that could result from a decision to allow, limit, or prohibit a conflicting use for each of the locally identified significant wetlands. From this analysis, lesser quality wetlands may be found eligible for partial or full development.

⁴ Significant wetlands as identified by the 1997 Florence Local Wetland and Riparian Area Inventory.

2. The City should coordinate with the Oregon Division of State Lands (DSL), the U.S. Army Corps of Engineers (ACE), and other appropriate state and federal agencies in the identification, protection and, where appropriate, mitigation of impacts to local wetland resources.

Background

In 1996, Florence's local wetland inventory was conducted and included all UGB land and some land outside where UGB expansion was anticipated. In January 1997, the Division of State Lands officially accepted the Florence Local Wetland Inventory (LWI), replacing the National Wetlands Inventory (NWI) prepared many years ago for identifying such resources in the Florence area. The Florence inventory is helpful for at least two reasons:

1. It helps determine for planning purposes what land is "buildable" and what was not due to the anticipated presence of wetlands.
2. It will help the City and County review development proposals and identify when a wetland might possibly be impacted as a result of such development.

The LWI will also help the City's and County's required DSL notification when a land use action is proposed near an identified wetland.

After the City's Periodic Review work program was approved in November 1995, the State adopted amendments to Statewide Planning Goal 5. Goal 5 requires conservation of a variety of natural resources, including wetlands and riparian areas. The amendments included the LWI requirement, a requirement for the City to make determinations of local significance for identified wetland resources, and a requirement that the City and County protect those significant wetland resources.

The analysis and results of the City's determination of local significance for Florence's wetlands are included in Appendix 5, City of Florence Local Wetlands and Riparian Area Inventory, 1997.

Once local wetlands are identified and evaluated as to their significance, the Statewide Planning Goal 5 provides local jurisdictions with two planning options for mandated protection of wetlands. This protection must occur in addition to that protection provided by current State and federal regulations.

Under option one, Florence can use the "safe harbors" provisions of Oregon law. By adopting a safe harbors ordinance, restrictions are placed on grading, excavation, placement of fill and removal of vegetation within all locally significant wetlands within the Florence UGB.

Or, under option two, by conducting an economic, social, environmental and energy (ESEE) analysis, Florence may further refine its wetland protection program by allowing, limiting, or prohibiting conflicting uses of wetland resources depending on that analysis. The ESEE process is relatively intensive, especially in Florence's case, where 270 wetlands totaling 572.25 acres are identified by the LWI.

While it may be desirable for Florence to conduct an ESEE analysis for its significant wetland resources in the future, staff has identified sufficient "buildable lands" within the existing UGB to meet the City's residential, commercial, and industrial land needs. As such, the most expedient and effective path at this point to comply with Goal 5 and protect significant wetlands is adoption of a safe harbor ordinance by the City and Lane County.

However, since adoption of a safe harbor ordinance is not required of this periodic review, the City has chosen not to adopt such an ordinance at this time, but to continue to rely on DSL/ACE permits for wetland protection.

Riparian Areas

Objectives

1. To maintain an accurate inventory of riparian corridors for use in land use planning and development review.
2. To protect significant riparian corridors for their critical value in maintaining surface and groundwater quality and quantity, for providing wildlife habitat, for performing flood control, and for enhancing the visual character of the Florence community.

Policies

1. For the purpose of riparian area identification, the 1997 Florence Local Wetland and Riparian Area Inventory shall serve the needs of the City and Lane County in land use planning and riparian area identification.
2. Riparian areas shall be prevented from permanent alteration by grading or the placement of structures or impervious surfaces, except for the following uses provided they are designed to minimize intrusion into the riparian area:
 - a. streets, roads and paths,
 - b. drainage facilities,
 - c. utilities and irrigation pumps,
 - d. water-related (outside of coastal shoreland areas) and water-dependent uses,
 - e. replacement of existing structures in the same location that do not disturb additional riparian surface area.
3. While not required to adopt safe harbor policies and ordinances under the requirement of this periodic review, the City has chosen to modify the riparian setback on Munsel Creek to require a 50 foot minimum setback from the thread of the creek, which must include at least 15 feet from the top of the bank. The minimum must be increased as necessary to meet the 15 foot requirement.
4. The riparian setback from the Siuslaw River shall be 50 feet from the top of the cut bank.
5. The retention of native vegetation in riparian areas is critical to their function. Therefore, the City shall adopt effective regulations ensuring the retention, or if necessary, the replanting of native species in riparian areas and may include conditions regarding fertilizer and pesticide runoff.

Background

The City's LWI also included a riparian area inventory. A riparian area can be best defined as a buffer of variable width between an aquatic resource and an upland area. The buffer is typically vegetated, and provides several beneficial functions to the lake or stream.

Those functions are:

1. Acts as a natural filter of stormwater, limiting pollution of streams and waterways.
2. Cools stream temperatures in summer and traps heat in winter when canopy is sufficient to screen all or part of the stream channel.
3. Holds the stream bank in place and therefore reduces erosion.
4. Adds controls to flood velocities of streams and drainage ways.
5. Provides valuable wildlife habitat.
6. When properly integrated into a development design or recreational greenway, riparian buffers yield aesthetic benefits as well.

To some extent, Florence has been protecting its riparian areas within City limits prior to 1988, through the Munsel Creek and drainage way setback restrictions found in Florence City Code, Title 10, Chapter 7, Special Development Standards.

While not required by periodic review, the City realizes the importance of riparian buffers and has chosen to increase the protection of the riparian area on Munsel Creek which has been classified as a salmon stream and which is a teaching/management area for the Salmon and Trout Enhancement Program (STEP).

On the Siuslaw River, the riparian setback will remain at 50 feet from the top of the bank. Existing development is grandfathered. Expansions of existing development and new development must provide for the required setback, or request a variance and include provisions to mitigate the proposed intrusion into the setback.

Rare, Threatened, Endangered and Sensitive Species (RTESS)

Goal

To identify and protect known sites and/or habitat of rare, endangered and sensitive species within the City and the UGB.

Policies

1. The City shall work with appropriate state agencies to maintain a current listing and location of RTESS resources.
2. The City shall work with the media, the school system, the Siuslaw Watershed Council, the Salmon and Trout Enhancement Program (STEP) and other resources to provide education about the importance of these resources.
3. The City shall provide potential developments with information about retention of such sites early in discussions about development plans, in order to ensure that site designs provide for retention of the RTESS resource, or mitigation if that should be appropriate as determined in consultation with the appropriate state agencies.

4. The City shall investigate the use of conservation easements and Transfer of Development Rights programs as mechanisms to protect RTESS resources.
5. Where sufficient information is available to determine the location, quality and quantity of habitat areas, the City shall protect the sites through the standard Goal 5 process under OAR 660-23-040/050.⁵

Methods of Protecting Species and Habitat

The first step in protection is identifying the location of the species, and the extent of its habitat needs. Once this information is known on a site-specific basis, then landowners and City officials can evaluate future uses of the land. Where sufficient information is available to determine the location, quality and quantity of habitat areas, the sites must be protected through the standard Goal 5 process under OAR-23-040/050....

In many cases, species/habitat are located in an already protected resource such as a significant wetland, an estuary or a stream corridor. Protection of that resource also provides protection of the RTESS. In cases where the identified site is not in a protected resource area, then other methods of protection must be investigated.

If essential habitat such as trails to food or water sources, or nesting sites are identified, sometimes the site can be developed as a PUD by including the protected habitat within the open space of the PUD, and including in the CC&Rs, specific restrictions about the use of the area. This is similar to the approach used by the Wild Winds PUD to protect the riverbank above the riprap from loss of vegetation and erosion. For example, wetlands and their required buffer can be included as part of the open space requirement as long as the CC&Rs have clear provisions for protection of the resource.

Another technique not currently used in Florence is the transfer of development rights. This technique can be used on sites, which are severely restricted by the extent of the physical location of the resource, or the restrictions placed on the habitat to ensure the survival of the RTESS species. In these cases, an evaluation can be made of reasonable development expectations under current zoning, and then that development actually transferred to another site usually within the same ownership. This technique requires education of the public in understanding that protection of a RTESS resource may cause increased density of development on another site.

A variation of this method is purchase of development rights. This technique has been used for years by states, communities, and resource conservation organizations in the eastern United States to save farmland, open space and RTESS species. This technique involves an appraisal of the property to establish the value of the development rights, which are then purchased from the landowner, leaving the land undeveloped. Sometimes limited development, such as homesites for an owner and immediate family, is negotiated as part of the agreement, and the value of the development rights adjusted accordingly. In some cases, once the value of the development rights is established, the development rights are donated, and the landowner receives a tax break for the donation.

Where information about location, quality or quantity of habitat is lacking, the Comprehensive Plan must include policies indicating that the Goal 5 process will be conducted when adequate information is available.

CHAPTER 6: AIR, WATER, AND LAND QUALITY

⁵ Note: This reference refers to the ESEE Analysis process in Goal 5 Administrative Rules.

Policies

2. Water recharge areas, lakes, and streams which have a direct bearing on the quality of the water resources shall be protected to insure the continuous quality and quantity of public water supplies.

CHAPTER 7: DEVELOPMENT HAZARDS AND CONSTRAINTS

Policies

1. The City shall restrict or prohibit development in known areas of natural hazard or disaster in order to minimize risk to citizens, reduce the hazard of loss of life and economic investments, the costs of expensive protection works, and public and private expenditures for disaster relief.

Background

...A Site Investigation Report may be required if the Hazards Maps or Natural Resources Conservation Services Soils maps show potential for landslide or coastal erosion/sloughing. The Hazards Map from the 1988 Comprehensive Plan is included in Appendix 7 of this Plan as the indicator of need for a Site Investigation Report. *(Note: The Comprehensive Plan Hazards Map is attached at the end of this document.)*

CHAPTER 11: UTILITIES, FACILITIES, AND SERVICES

STORMWATER MANAGEMENT

Goal

To provide a stormwater system that enhances and maintains livability through balanced, cost-effective solutions to stormwater management.

Policies

Water Quality

1. Protect water quality in ground and surface waters from the effects of urbanization through land use and development policies and procedures.
2. Protect the quality of water in surface waters, i.e., the estuary, creeks, lakes, wetlands, and ocean/beach, from contamination threats that could impair the quality of the water for fish and wildlife habitat and human recreation.
3. Manage or enhance waterways and open stormwater systems to reduce water quality impacts from runoff and to improve stormwater conveyance.
4. Include measures in local land development regulations that minimize the amount of impervious surface in new development in a manner that reduces stormwater pollution, reduces the negative affects from increases in runoff, and is compatible with Comprehensive Plan policies.

Water Quantity (Flow Control)

10. Prevent adverse flooding conditions through natural storage and slow release of surface water and runoff.
13. Maintain flood storage capacity within the floodplain, to the maximum extent practical, through measures that may include reducing impervious surface in the floodplain and adjacent areas.
21. Increase storage and retention and natural filtration of storm runoff to lower and delay peak storm flows and to settle out pollutants prior to discharge into waterways.

CHAPTER 12: TRANSPORTATION

Policies

23. Design and construction of transportation facilities shall be responsive to topography and should minimize impacts on natural resources such as streams, wetlands and wildlife corridors.

Florence City Code

FCC TITLE 9 CHAPTER 5: STORMWATER MANAGEMENT UTILITY, USER FEE SYSTEM AND STORMWATER MANAGEMENT REQUIREMENTS

FCC 9-5-3: STORMWATER DESIGN CRITERIA:

9-5-3-3: STORMWATER QUALITY:

- F. Sensitive areas⁶ shall be protected by a buffer zone⁷ of native, undisturbed vegetation. The outer boundary of the buffer shall be determined by a minimum 50-foot setback from the edge of the sensitive area, or wider if required by other City requirements (See Florence City Code Title 10, Chapter 7.) The width and nature of protection required within the buffer may change as the Endangered Species Act and other state and federal regulations are promulgated. The City requires that the buffer width meet all state and federal requirements. No land disturbing activities, structures, development and construction activities, gardens, lawns, application of chemicals, pet wastes, dumping of any kind of materials shall be permitted within the buffer zone, except as noted below:

⁶ **SENSITIVE AREA.** Natural streams (perennial or intermittent), rivers (including the estuary portion of the river), lakes, or wetlands hydraulically connected by surface water to streams, rivers, or lakes and areas defined by the City of Florence's Local Wetlands and Riparian Inventory. Also, includes all areas that are protected for species as per areas designated by Oregon Department of Fish and Wildlife, Oregon Division of State Lands, National Marine Fisheries Service, United States Fish and Wildlife Service and Oregon Department of Transportation.

⁷ **BUFFER ZONE.** A physical setback from a sensitive area used to protect the water quality, the aquatic and riparian wildlife communities, and the habitat value within the sensitive area. The buffer starts at the edge of the defined channel (bank full stage) for streams/rivers, delineated wetland boundary, delineated spring boundary, or average high water for lakes.

1. Roads, pedestrian, or bike paths crossing the buffer from one side to the other in order to provide access to or across the sensitive area.
2. A pedestrian or bike path constructed within a buffer and parallel to a sensitive area shall have the buffer widened by the width of the path if the path is constructed of impervious material.
3. Pedestrian or bike paths shall not exceed 10-feet in width.
4. Utility/service infrastructure construction (i.e., storm, sanitary sewer, water, phone, gas, cable, etc.) If approved by the City Manager or his/her designee.
5. Measures to remove or abate hazards, nuisance, or fire and life safety violations as approved by the City.
6. Enhancement of the riparian corridor for water quality or quantity benefits, fish, or wildlife habitat as approved by the City and other appropriate regulatory authorities.
7. Water quality facilities planted with appropriate native vegetation may encroach into the buffer area as approved by the City and other appropriate authorities.

FCC TITLE 10 CHAPTER 5: ZONING VARIANCES

SECTION:

10-5-1: Purpose

10-5-2: Limitations

10-5-3: Application

10-5-4: Conditions

10-5-5: Public Hearing

10-5-6: Effective Date

10-5-7: Expiration of Variance

10-5-1: PURPOSE: The purpose of a variance shall be to prevent or to lessen such practical difficulties and unnecessary physical hardships which are inconsistent with the objectives of this Title. A practical difficulty or unnecessary physical hardship may result from the size, shape or dimensions of a site or the location of existing structures thereon, from geographic, topographic or other physical conditions on the site or in the immediate vicinity.

10-5-2: LIMITATIONS: A variance shall not be granted as a substitute for, or in lieu of, a change in zone. A variance does not apply to use regulations. The Planning Commission may grant a variance to a regulation prescribed by this Title with respect to the following:

- A. Fences, hedges, walls or landscaping.
- B. Site area, width, depth, square footage, frontage and building coverage.
- C. Front, side or rear yards.
- D. Height of structures.
- E. Distance between structures.
- F. Accessory buildings.
- G. Parking requirements.
- H. Width of rights of way and roadways.
- I. Grant only the minimum variance necessary to meet the hardship or practical difficulties.
- J. Attach such conditions to the granting of all or a portion of any variance as necessary to achieve the purpose of this chapter.

10-5-3: APPLICATION: The application for variance shall be made in writing to the Planning Commission by the owner(s) of the land in consideration or their agent(s), duly authorized in writing. The applicant shall set forth in detail:

- A. The practical difficulties and physical hardships involved.
- B. Existing conditions on the site.
- C. Reasons for a variance being the most practicable solution to the problem.
- D. Any other pertinent information requested by the Planning Commission.

FCC TITLE 10 CHAPTER 7: SPECIAL DEVELOPMENT STANDARDS

FCC 10-7-1: PURPOSE:

The purpose of this Chapter is to apply additional development standards to areas with potential natural hazards or soils which are particularly subject to erosion, landslide or seasonal surface water. Compliance with these standards is required in order to obtain a Special Use Permit. The standards are intended to eliminate the danger to the health, safety or property of those who would live in potential problem areas and the general public and to protect areas of critical environmental concern; areas having scenic, scientific, cultural, or biological importance; and significant fish and wildlife habitat as identified through Goal 5: Open Spaces and Scenic, Historic, and Natural Resources, and Goal 17: Coastal Shorelands. (Amended Ord. No. 10, Series 2009)

10-7-2: IDENTIFICATION OF POTENTIAL PROBLEM AREAS: At minimum, the following maps shall be used to identify potential problem areas:

- A. "Hazards Map", Florence Comprehensive Plan Appendix 7....
- D. Other information contained in the plan or adopted by reference into the plan, or more detailed inventory data made available after adoption of the plan may also be used to identify potential problem areas. (Amended Ord. No. 10, Series 2009)

10-7-3: DEVELOPMENT STANDARDS:

The following standards shall be applied to development in potential problem areas unless an approved Phase I Site Investigation Report or an on-site examination shows that the condition which was identified in the Comprehensive Plan or Overlay Zoning Map does not in fact exist on the subject property. These standards shall be applied in addition to any standards required in the Zoning Districts, Comprehensive Plan, and to any requirements shown to be necessary as a result of site investigation. Where conflicts or inconsistencies exist between these Development Standards, City Code, and the Comprehensive Plan, the strictest provisions shall apply unless stated otherwise.

- B. Munsel Creek and Other Drainageways: A fifty foot (50') setback shall be required for all buildings from the creek channel, except by Planning Commission approval where it can be shown by accepted engineering practices or treatment that no erosion hazards, slide potential, or possible flood damage are likely to occur, and that riparian vegetation will be protected.

10-7-5: REVIEW AND USE OF SITE INVESTIGATION REPORTS

- A. The Phase I Site Investigation Report shall be reviewed administratively. If it is found that the condition identified on the "Hazards Map" or "Soils Map" or "Beaches and Dunes Overlay Zone" or other identified problem area does not

exist on the subject property; no Phase II report is required and the Site Investigation process is terminated. If hazards are found to exist, a Phase II report and a Conditional Use Permit shall be required. If a Phase II Site Investigation Report is required, the Phase II conclusions shall be submitted for Planning Commission review.

- D. Approval: The property owner shall record a Covenant of Release which outlines the hazard, restrictions and/or conditions that apply to the property and shall state, "The applicant recognizes and accepts that this approval is strictly limited to a determination that the project as described and conditioned herein meets the land use provisions and development standards of the City Code and Comprehensive Plan current as of this date. This approval makes no judgment or guarantee as to the functional or structural adequacy, suitability for purpose, safety, maintainability, or useful service life of the project.

FCC TITLE 10 CHAPTER 8: NONCONFORMING LOTS AND USES

10-8-1: PURPOSE: There were lots, structures and uses that were lawful before the effective date hereof, or amendment hereto, but which have become either prohibited, regulated or restricted under the new terms and conditions of this Title. They shall hereafter be referred to as pre-existing, nonconforming uses or buildings.

It is recognized that significant expenditures of personal and financial energy may have been invested in the development of such uses and structures and that to dismiss these expenditures as no longer relevant would be harmful to the public welfare, both in regards to the community harmony and with respect to support that will be needed to improve the quality, esthetics and functional aspects of the community.

It is therefore the intent of this Chapter to allow these structures and uses that existed prior to the effective date hereof to continue, including normal maintenance, repair or replacement in case of damage due to fire or other disaster.

10-8-2: EXPANSION OF PRE-EXISTING, NONCONFORMING USE: A pre-existing nonconforming use may make a normal expansion of the existing structure for the same use up to twenty five percent (25%) of the existing square footage of floor area. Expansions larger than twenty five percent (25%) require a conditional use permit issued by the Planning Commission under the terms and conditions of Chapter 4 of this Title. Any expansion of a pre-existing, nonconforming use shall be subject to design review under the provisions of Chapter 6 of this Title.

10-8-3: UNDERSIZED LOTS OF RECORD:

- A. Any lot having an area or dimension less than the minimum shall be designated a building site, provided the following criteria are met:
1. The lot is shown on an officially approved and recorded subdivision map.
 2. A deed or a valid contract of sale is recorded with the Lane County Clerk.
 3. The lot was of legal area and dimension for a building site at the time the sale was recorded.
- B. No lot or combination of contiguous lots, either vacant or containing a single-family or multiple-family dwelling, shall be replatted so that an undersized lot is created,

nor shall a lot be replatted if setbacks or dimensions less than the minimum would result.

10-8-4: DESTRUCTION OF NONCONFORMING BUILDINGS: In the event of damage or destruction, a nonconforming building or structure may be restored in accordance with the Uniform Building Code and use which existed at the time of such damage or destruction may continue unless the Planning Commission determines that the continuation of the use would be detrimental to the health, safety or welfare of the community.

Restoration shall be commenced within six (6) months from the date of destruction and shall be diligently followed to completion. The Planning Commission, with a written request of the applicant, may extend the period an additional six (6) months.

10-8-5: ABANDONMENT OF NONCONFORMING USE: The discontinuance of a nonconforming use for any six (6) months out of any twelve (12) consecutive months shall constitute abandonment and the pre-existing use shall be deemed to have been terminated and every building, structure and use occupying the premises thereafter shall conform to the regulations of the zoning district in which is located.

10-8-6: CHANGE OF NONCONFORMING USES: A change from one nonconforming use to another nonconforming use requires a conditional use permit issued by the Planning Commission subject to the procedures and conditions in Chapter 4 of this Title.

10-8-7: REMOVAL OF NONCONFORMING USES: If, after holding public hearings, the Planning Commission determines that the continuance of a nonconforming use is detrimental to the health, safety or welfare of a neighborhood, the nonconforming use shall be completely removed or converted to a conforming use within an amortization period prescribed by the City Council. The Planning Commission shall establish conditions for the operation of the nonconforming use during the amortization period (not less than 5 years nor more than 40 years, depending upon the impact the nonconforming use has on the surrounding neighborhood). The Planning Commission shall then grant a conditional use permit subject to the procedures set forth in Chapter 4 of this Title.

10-8-8: REPAIRS AND MAINTENANCE: Nothing in this Title shall be deemed to prevent the strengthening or restoring to a safe condition of any building or part thereof declared to be unsafe by any official charged with protecting the public safety. (Ord. 625, 6-30-80).

FCC TITLE 10 CHAPTER 21: PUBLIC USE AIRPORT ZONE

10-21-2-9: WETLAND MITIGATION, CREATION, ENHANCEMENT AND RESTORATION WITHIN APPROACH SURFACES AND AIRPORT DIRECT AND SECONDARY IMPACT BOUNDARIES:

- A. Notwithstanding the requirements of Section 10-21-3-8, wetland mitigation, creation, enhancement or restoration projects located within areas regulated under Section 10-21-3-8 shall be allowed upon demonstration of compliance with the requirements of this Section.
- B. Wetland mitigation, creation, enhancement or restoration projects existing or approved on the effective date of this ordinance and located within areas regulated under Section 10-21-3-8 are recognized as lawfully existing uses.

- C. To help avoid increasing safety hazards to air navigation near public use airports, the establishment of wetland mitigation banks in the vicinity of such airports but outside approach surfaces
- D. Applications to expand wetland mitigation projects in existence as of the effective date of this ordinance, and new wetland mitigation projects, that are proposed within areas regulated under Section 10-21-3-8 shall be considered utilizing the review process applied to applications for conditional use permits and shall be permitted upon demonstration that:
 - 1. It is not practicable to provide off-site mitigation; or
 - 2. The affected wetlands provide unique ecological functions, such as critical habitat for threatened or endangered species or ground water discharge, and the area proposed for mitigation is located outside an approach surface.
- E. Wetland mitigation permitted under subsection D. of this Section shall be designed and located to avoid creating a wildlife hazard or increasing hazardous movements of birds across runways or approach surfaces.
- F. Applications to create, enhance or restore wetlands that are proposed to be located within approach surfaces or within areas regulated under Section 10-21-3-8, and that would result in the creation of a new water impoundment or the expansion of an existing water impoundment, shall be considered utilizing the review process applied to applications for conditional use permits and shall be permitted upon demonstration that:
 - 1. The affected wetlands provide unique ecological functions, such as critical habitat for threatened or endangered species or ground water discharge; and
 - 2. The wetland creation, enhancement or restoration is designed and will be in a manner that will not increase hazardous movements of birds feeding, watering or roosting in areas across runways or approach surfaces.
- G. Proposals for new or expanded wetland mitigation, creation, enhancement or restoration projects regulated under this Section shall be coordinated with the airport sponsor, the Department of Aviation, the FAA and FAA's technical representative, the Oregon Department of Fish & Wildlife (ODFW), the Oregon Division of State Lands (DSL), the US Fish & Wildlife Service (USFWS), and the US Army Corps of Engineers (Corps) as part of the permit application.
- H. A decision approving an application under this Section shall require, as conditions of approval, measures and conditions deemed appropriate and necessary to prevent in perpetuity an increase in hazardous bird movements across runways and approach surfaces.

FCC TITLE 10 CHAPTER 22: OPEN SPACE DISTRICT (OS)

10-22-1: PURPOSE: The Open Space District is intended to protect urban open space buffers, park and recreation lands, natural resource lands and lands reserved for later development. This District is intended to be used in conjunction with the Comprehensive Plan. Where, for example, the Plan designates an area for urban development, the application of this District would be interim; when the land became available for development, a rezoning could be considered. Where this Open Space District is consistent with the Plan's land use designation, it is intended that this District would preserve such land permanently in open space use.

10-22-2: PERMITTED BUILDINGS AND USES:

- Parks for low intensity recreation.
- Open space.
- Wildlife habitat.
- Forestry.
- Agriculture.
- Aquaculture.
- Any structures which are necessary to the functioning of the above uses.

FCC TITLE 10 CHAPTER 23: PLANNED UNIT DEVELOPMENT (PUD)

10-23-5: DEVELOPMENT STANDARDS: To insure that a PUD fulfills the intent of this Chapter, the following standards and those of FCC 10-36 shall apply.

- G. Open Space: A minimum of 20% of the net development area shall be open space and must be platted for that purpose. (Easements are not acceptable). At least 25% of the 20% shall include an area designated and intended for recreation use and enjoyment. The required recreation area may be provided as:...
4. The following areas are not acceptable for recreation area required as part of a PUD: (Ord. No. 2, Series 2011)
- a. Hillsides over twenty-five (25) percent slope;
 - b. Land in the floodway, floodplain, or required riparian or wetland buffer, unless trails, benches, picnic tables and similar above are incorporated;
 - c. Roadside ditches;
 - d. Monument entry areas and central landscaped boulevards;
 - e. Stormwater retention or detention ponds that are designed to hold stormwater runoff from less than one hundred (100) year events;
 - f. Parking areas and road rights-of-way that are located within the parkland, open space, or common area, except for parking that is required specifically for use of the parkland;
 - g. Yards, court areas, setbacks, or other open areas required by the zoning and building ordinances and regulations shall not be included in the computation.

FCC TITLE 10 CHAPTER 34:

TITLE 10 CHAPTER 34

LANDSCAPING

SECTION:

- 10-34-1: Purpose
- 10-34-2: Landscape Conservation
- 10-34-2-1: Applicability
- 10-34-2-2: Native Vegetation
- 10-34-2-3: Significant Vegetation
- 10-34-2-4: Preservation Credit

10-34-3:	Landscaping
10-34-3-1:	Applicability
10-34-3-2:	Landscaping Plan Required
10-34-3-3:	Landscape Area and Planting Standards
10-34-3-4:	Landscape Materials
10-34-3-5:	Irrigation
10-34-3-6:	Parking Lot Landscape Standards
10-34-3-7:	Buffering and Screening
10-34-3-8:	Maintenance
10-34-4:	Street Trees
10-34-5:	Fences and Walls

10-34-1: PURPOSE: The purpose of Chapter 34 is to promote community health, safety, and welfare by protecting natural vegetation and setting development standards for landscaping, street trees, fences, and walls. Together, these elements of the natural and built environment contribute to the visual quality, environmental health, and character of the community. Landscaping plants and materials are intended to conserve, enhance and be compatible with the coastal village character of Florence, with liberal use of evergreens and native species. The Chapter is organized into the following sections:

10-34-2: Landscape Conservation encourages the incorporation of existing native vegetation in landscaping and provides incentives for the preservation or replacement of particularly significant vegetation.

10-34-3: Landscaping sets standards for and requires landscaping of all development sites. This section also requires buffering for parking and maneuvering areas, and between different land use districts. Note that other relevant standards are provided in each land use district for specific types of development.

10-34-2: LANDSCAPE CONSERVATION

10-34-2-1: Applicability. Except for single family homes and duplexes the provisions of this Section are applicable to all development sites which contain stands of Native Vegetation or specific Significant Vegetation, as defined below. "Development sites" do not include any street, alley, or public right-of-way.

10-34-2-2: Native Vegetation. "Native vegetation" means those plant species native to the Florence region that are listed as native on the suggested *Tree and Plant List for the City of Florence*, such as Shore Pine, Fir, Hemlock, Spruce, Native Rhododendron, Wax Myrtle, Kinnikinnick, Huckleberry and Salal. Preservation of existing native vegetation is strongly encouraged and preferred over removal of vegetation and re-planting. Existing native vegetation may be credited toward the landscape requirements of Section 10-34-3-3 if it is preserved in accordance with the following standards:

- A. Living plant material covers a minimum of 70 percent of the area proposed for preservation;
- B. Preservation area(s) are a minimum of 30 square feet for any one area with dimensions a minimum of 5 feet on any side to ensure adequate space for healthy plant growth;
- C. Preservation area(s) are setback from new construction areas a minimum of 10 feet from new structures, and a minimum of 5 feet from new hard-surface areas (e.g. parking lot, walkways), and replanted with native vegetation if damaged during construction;

- D. The preservation area is clearly marked and identified for protection on the landscaping plan as well as on-site (e.g. construction fencing) prior to site disturbance.
- E. Existing noxious weeds⁸ within the preservation area are removed prior to approval of the installed landscaping; and
- F. Preservation areas with grade changes around the perimeter are addressed with appropriate transition or stabilization measures (e.g. retaining wall) to avoid erosion.

10-34-2-3: Significant Vegetation. "Significant vegetation" means:

- A. Native vegetation, or
- B. Plants within designated sensitive land areas such as wetlands, riparian areas, and slopes steeper than 40%, or
- C. Trees having a DBH of four (4) inches or larger measured 4½ feet above ground.

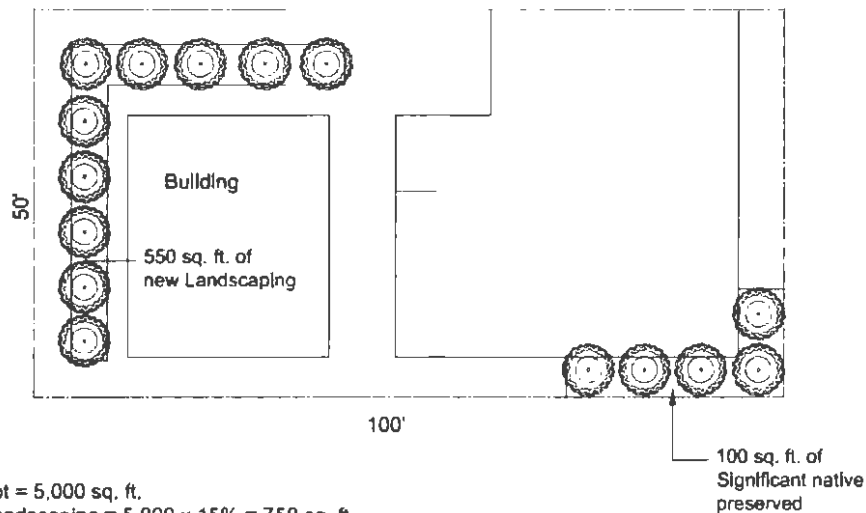
10-34-2-4: Preservation Credit. The City may grant a "Preservation Credit" if existing significant vegetation on the site is preserved, in the form of a reduction of the overall landscape area and planting requirements of Sections 10-34-3-3. The City may authorize credits which effectively reduce the required landscaping if the following standards are met:

- A. Significant vegetation species and areas to be preserved shall be mapped and flagged in support of the site development application. Significant trees shall be mapped individually and identified by species and diameter. Wetland resources shall have a current delineation approved by the Department of State Lands. Appropriate protection from construction damage shall be in place prior to site disturbance. For a "Burn to Learn" site, significant vegetation that can be saved shall be protected.
- B. Native vegetation, wetland, riparian, and steep slope vegetation shall meet the standards set forth in Section 10-34-2-2 subsections A through F above.
- C. Dead or diseased vegetation and split, leaning, or unstable trees shall not qualify as preserved vegetation.
- D. Mature vegetation shall be trimmed and pruned as appropriate by qualified personnel to form a long-term element of the site landscaping.
- E. Landscape credit for preserved significant vegetation areas shall be granted at the ratio of 2 to 1 (e.g. every one square foot of preserved significant vegetation shall be counted as two square feet in meeting the total specified landscape area for a site). However, in no case shall the requirement for actual landscaped area be reduced below 2/3 of the area that would be required with no credit.
- F. Landscape credit for preserved trees shall be granted at the ratio of one less new tree planting for every two (2) inches diameter of preserved significant trees (e.g. a preserved tree of six inch diameter counts as three newly planted trees). This

⁸ Noxious and invasive weeds are those identified by the current Lane County Public Works "Noxious and Invasive Weed Management List," with additional City of Florence footnotes. If a current county list is not available, the list in the current Oregon Department of Agriculture in "Noxious Weed Policy and Classification System" will be used. Noxious weeds common to the area are Scotch Broom, English Ivy, Gorse, and Himalayan (Armenian) Blackberry.

credit can be applied against required front yard, parking island, buffer, and/or street trees. However in no case shall this credit reduce the requirement for newly planted trees below 2/3 of the number that would be required with no credit. All preserved trees shall be protected from construction compaction or grade changes of more than six inches on the surface area in relation to the crown of the tree canopy.

G. **Figure 10-34(1): Native Preservation Credit Trade-off**



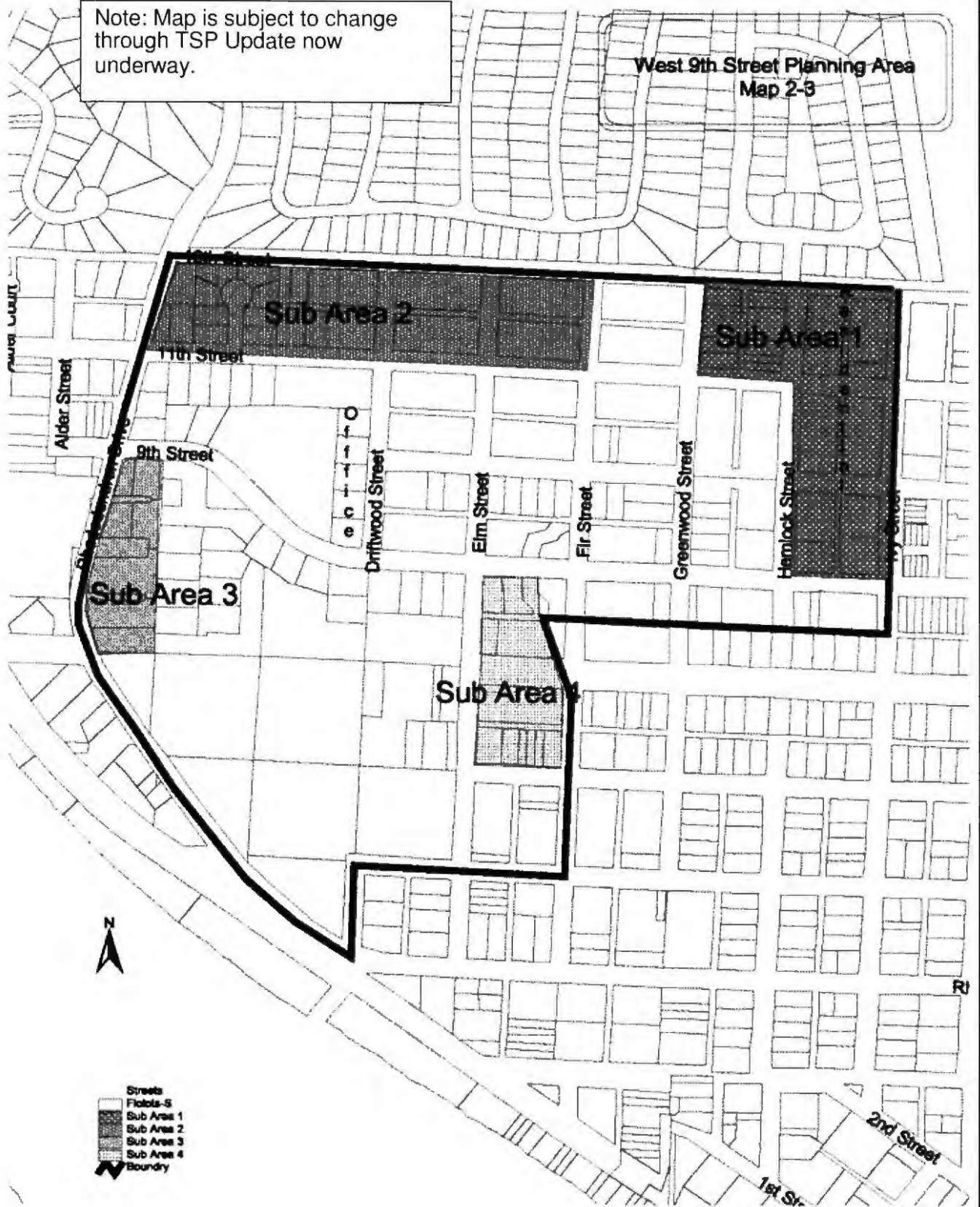
Lot = 5,000 sq. ft.
 Landscaping = 5,000 x 15% = 750 sq. ft.
 100 sq. ft. of significant native preserved = 200 sq. ft. Landscaping
 New Planting = 750 sq. ft. - 200 sq. ft. = 550 sq. ft. new Plantings.
 Actual landscaped area coverage = 650 sq. ft./5,000 sq. ft. = 13%

10-34-3-4: Landscape Materials. Permitted landscape materials include trees, shrubs, ground cover plants, non-plant ground covers, existing native vegetation, outdoor hardscape features and storm water features, as described below.

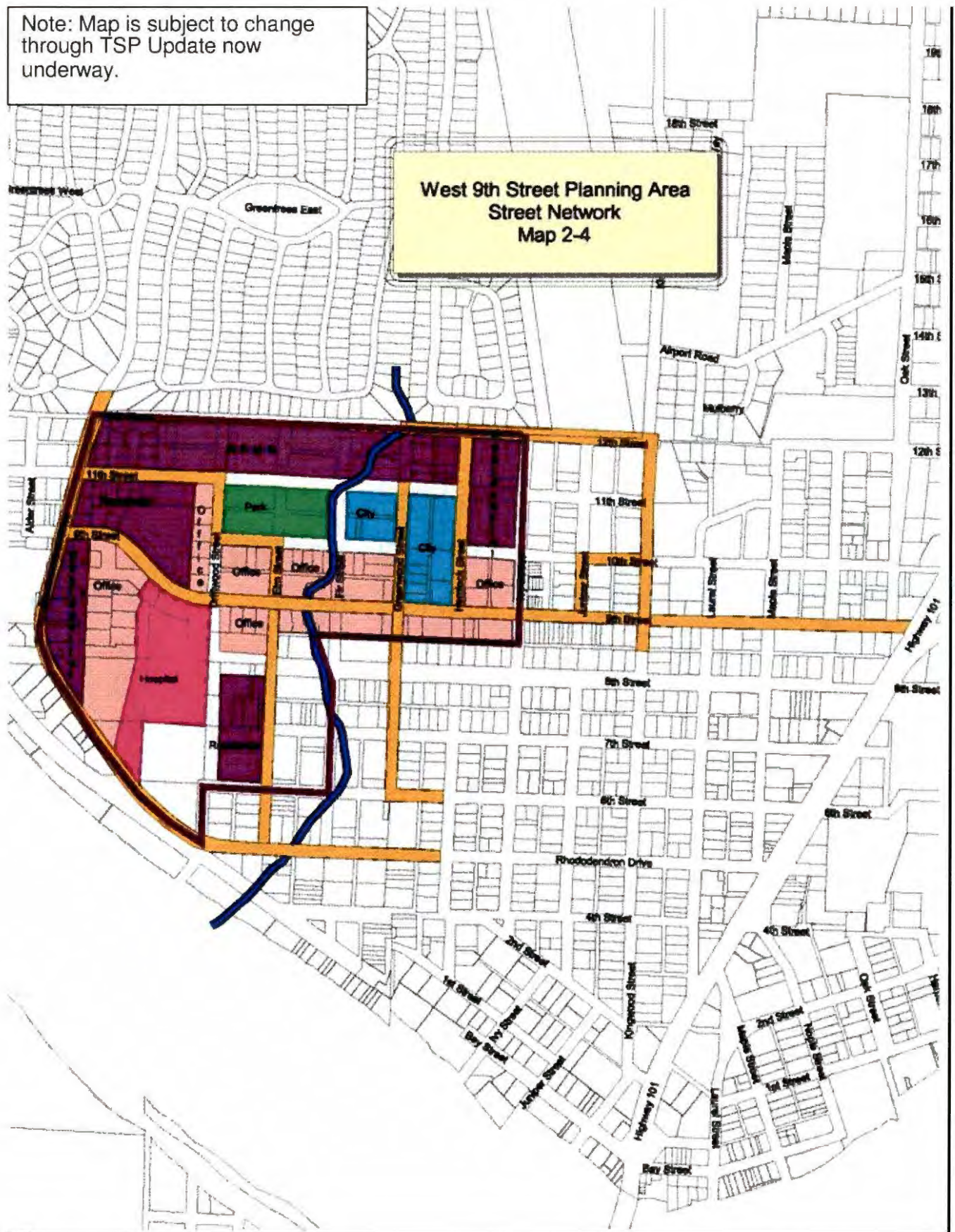
- B. Existing Native Vegetation. Preservation of existing native vegetation is encouraged and preservation credits in accordance with Section 10-34-2-4 may be used to meet the landscape requirements of this Chapter.

Note: Map is subject to change through TSP Update now underway.

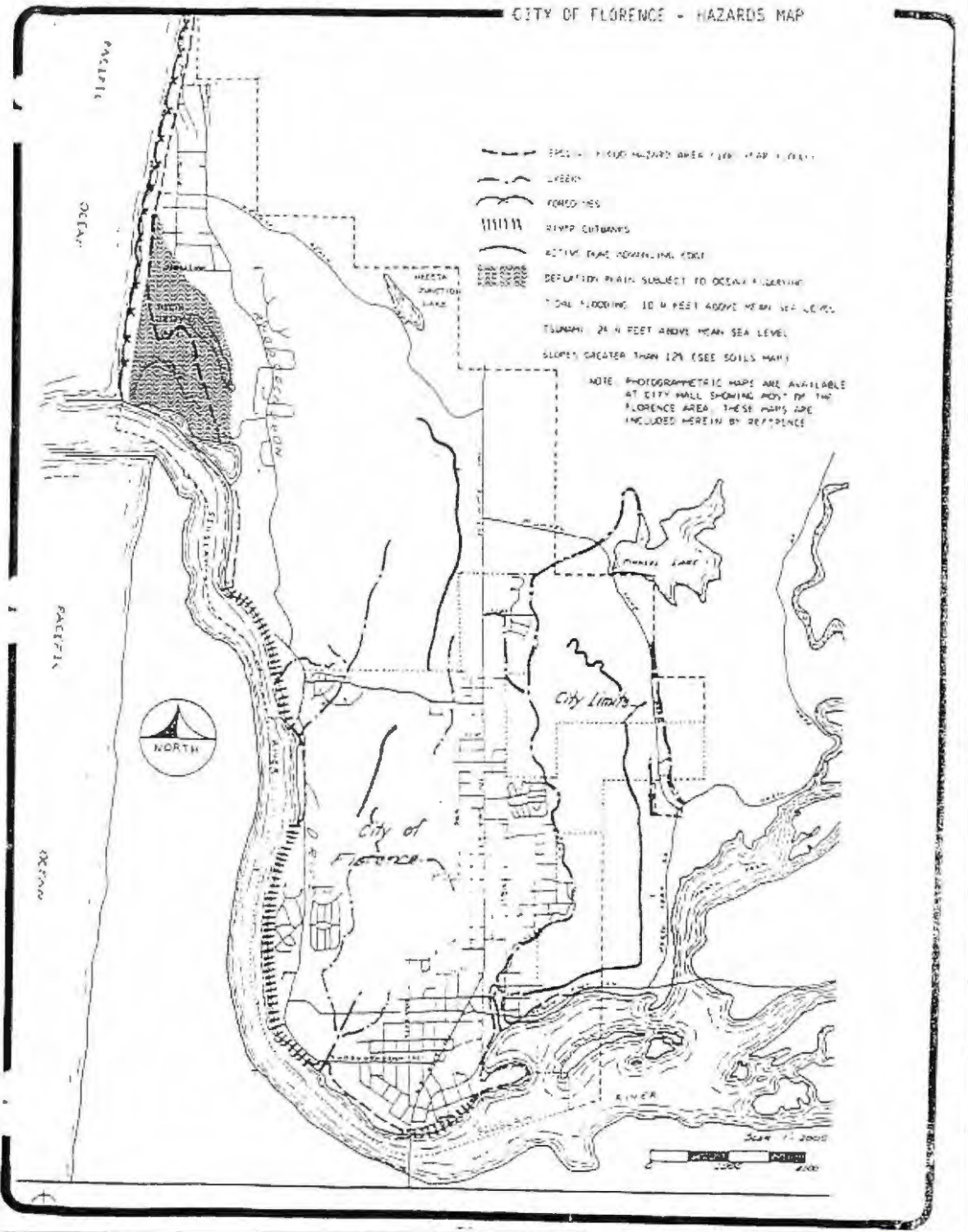
West 9th Street Planning Area
Map 2-3



Note: Map is subject to change through TSP Update now underway.



CITY OF FLORENCE - HAZARDS MAP



Appendix B: Public Involvement Plan and Letters to Property Owners

Siuslaw Estuary Partnership

*An Integrated Multiple Objective Approach To Watershed
Protection and Restoration*

Public Involvement Plan

Approved by the Florence Planning Commission, January 12, 2010

Current Status of this Plan

On January 12, 2010, this Public Involvement Plan (PIP) was approved by the Florence Planning Commission, the City's Committee for Citizen Involvement. A draft PIP was prepared with the guidance of the Public Education and Stewardship Staff Team, a sub-team of the Inter-disciplinary Team for the Siuslaw Estuary Partnership Project. The Siuslaw Estuary Partnership Project is funded by the Environmental Protection Agency's West Coast Estuaries Initiative for Coastal Watersheds Program and project partners to protect and restore water quality and wildlife habitat in the Siuslaw River Watershed.

Introduction

Public Education and Stewardship is one of the key objectives of the Siuslaw Estuary Partnership Project. It is intended to provide broad policy guidance on the structure and content of the public involvement program for the project. The detailed implementation of this PIP will be documented in a more detailed "Key Messages and Strategies" document that will be developed, updated and revised throughout the project as needed and appropriate to implement this PIP.

This PIP is further defined in the following sections:

- Purpose
- Target Populations
- Tools and Methods
- Key Messages and Strategies
- Guiding Principles
- Stakeholders Groups

Purpose

The purpose of this Public Involvement Plan (PIP) is to establish a framework for public involvement in the Siuslaw Estuary Partnership Project, consistent with the following Citizen Involvement Goal, Objectives, and Policies stated in the adopted Florence Realization 2020 Comprehensive Plan:

"Goal

To develop a citizen involvement program that insures the opportunity for citizens to be involved in all phases of the planning process.

Objectives

1. To encourage citizen input in the preparation of plans, implementation measures and plan revisions.
2. To take into account the desires, recommendations and needs of citizens during the planning process.

Policies

1. The Planning Commission shall act as the City's Committee for Citizen Involvement. (Approved by LCDC, March 1, 1976.)
2. A Citizen Advisory Committee, appointed by the City Council, shall serve in an advisory capacity to the Florence Planning Commission to assure the broadest input during periodic review and post acknowledgment Plan and zoning amendments.
3. The City Council shall ensure that a cross-section of Florence citizens is involved in the planning process, primarily through their appointments to the Planning Commission, Design Review Board, Citizen Advisory Committee and other special committees.
4. Official City meetings shall be well publicized and held at regular times. Agendas will provide the opportunity for citizen comment.
5. Records of all meetings where official action is taken shall be kept at City Hall and made available on request to the public.
6. Planning documents and background data shall be available to interested citizens.
7. The Citizen Involvement Program shall be reviewed annually.
8. Citizen involvement shall be assured in the review and update of the Comprehensive Plan."

Target Populations

The Siuslaw Estuary Partnership Project will impact specific population groups. The tools and methods described below will be used to ensure outreach and opportunities for involvement and stewardship by these groups and individuals. The following Target Populations have been identified:

- City of Florence Residents
- Heceta Water District Residents
- Rural Residents with private water source
- Property Owners with wetland, riparian, or upland resources
- Local Officials
- Youth
- Business Owners
- Development Community
- Tourists

Tools and Methods

The project will use the following tools and methods to foster Public Education and Stewardship in the Siuslaw Estuary Partnership project.

- **Web site**

Consultants will be hired to create a web site for the project. It will be maintained by Project Staff team members.

- **Newsletters**

Consultants will assist in the development and distribution of three newsletters for distribution throughout the Study Area. Distribution outside City limits will be conducted by Heceta Water District and other partners, as willing and able.

- **Media Outreach**

Efforts will be made to engage newspaper, radio and televised media in the project. In addition to newspaper notices, press releases will be prepared at key junctions and milestones; meetings will be held with media representatives to provide detailed background and respond to questions; and the media will be notified and invited to participate in all public events.

- **Signage around Clear Lake**

Five educational signs will be installed around Clear Lake, informing the public of lake water importance and risks.

- **Interested Parties List**

An Interested Parties List will be developed and maintained throughout the project. The list will be circulated at meetings, including open houses, Stakeholder Group meetings, and other meetings so that those interested in staying informed about the project can provide contact information. This list will be maintained and updated over time and direct mailings to this group will be sent notifying them of scheduled events, i.e., open houses, stakeholder meetings, and local official meetings where products are reviewed.

- **Targeted Outreach**

Targeted outreach to key groups will be conducted, including presentations to groups upon request. The Interdisciplinary Team and the Stakeholder Group will be invited to participate in this targeted outreach effort.

- **Estuary Trail Vision**

A vision for an Estuary Interpretive Trail system will be prepared that will, when it is implemented, be an important environmental education tool.

- **Public Open Houses**

The public will be invited to three open houses, one each year of the project. The purpose of the open houses is to provide an opportunity for all interested citizens to learn about the project and its outcomes and to provide comments on draft products, when they are available.

- **Local Official Public Meetings and Hearings**

City Planning Commission and Council will receive monthly reports on the project, including the Public Education and Stewardship Element; and will hold public hearings on the final products to be adopted by the City. Reports to other local

officials, including the Lane County Planning Commission and Board and Heceta Water District Board, will be coordinated by the Interdisciplinary Team member from the respective organization.

➤ **Stewardship Programs**

Several Stewardship Programs are planned and others will be developed during the course of the project. The Stormwater Demonstration Project in Old Town is an example of an opportunity to both educate and involve interested citizens in hands-on caretaking and monitoring of water quality in the estuary. Another opportunity will be promoting efforts to protect and restore wetlands on private property and public participation in protection and restoration of wetlands on City-owned properties. Other efforts are coordination with the Stream Team, to further foster stewardship of Munsel Creek, the estuary, and the North Fork; and involving youth and retirees in projects to clean up and remove invasive and noxious vegetation.

➤ **Coordination**

Coordination is a critical aspect of the Siuslaw Estuary Project. The Interdisciplinary Team provides an exceptional opportunity to pool resources and create a knowledge base and library for staff and the general public. For example, the Interdisciplinary Team will communicate via an intranet site in addition to team meetings. The web site for the project will include links to the partner agencies' web sites and the Team itself is an excellent resource for knowledge and expertise for this project. In addition, the project will coordinate with related public outreach efforts by the City and the partner agencies, e.g., Salmon and Trout Enhancement Program (STEP), Green Building Fair in April 2010, Lane County Extension Service, and others; and with all Stakeholder Group outreach, e.g., articles in the groups' newsletters and other coordination.

➤ **Stakeholder Groups**

The Stakeholder Groups will be a key element of the outreach program. This group list was approved by the Florence City Council on December 21, 2009, consistent with the City protocols, and will be modified by the Council over time as need and interest dictates.

The Council decided to form two groups: a general Stakeholder Group and an Elected Officials Stakeholder Group (see Stakeholder Group List for structure and membership).

Stakeholder Group:

The Stakeholder Group consists of representatives of key interests that will be affected by, or potentially affected by, the outcomes of the project. The Stakeholder Group will meet about ten times throughout the three year project; plus, they will be invited to participate in a nine week focus group in the last year of the project to review and comment on all final products. The mission of the Stakeholder Group is to:

- act as a spokesperson for the project
- help plan and implement the public outreach for their respective group
- review and comment on key products
- provide an effective liaison to his/her group, as applicable
- in Phase I, provide comment on the draft the Guiding Principles
- in Phase III, participate in a 9-week focus group to provide detailed feedback on all draft outcomes and products

Elected Officials Stakeholder Group

The Elected Officials Stakeholder Group will be comprised of representatives of elected bodies that will have a role in accepting, endorsing, and/or adopting some or all of the final products. These Stakeholders will be involved in the project more intensively than their respective elected bodies in terms of outreach, education, and stewardship. In this way, they will be positioned to facilitate acceptance of the final products by their respective agencies or organizations.

The Elected Officials Stakeholder Group will meet once or twice each year of the project; and they will meet as needed in Phase III to ensure the final products are consistent with the vision and mission of their respective agency or organization.

The mission of the Elected Officials Stakeholder Group is to:

- act as a spokesperson for the project
- review informational and educational materials
- provide an effective liaison to their elected body
- in Phase I, recommend the Guiding Principles
- in Phase III, meet as needed to ensure the final products are consistent with the vision and mission of their respective agency or organization.

Key Messages and Strategies

Key Messages

Key Messages convey both basic facts revealed in the research tasks, such as the results of the literature search and the water quality and quantity assessment and monitoring program, as well as the response to these facts, including any resulting policy options, recommendations, and conclusions. Key Messages also seek to portray the true purpose and intent of the project and, where indicated, to dispel myths and rumor which can sometimes lead to less than optimal courses of action.

Strategies

Strategies seek to link the Key Messages with the Target Populations, using the agreed-upon tools and methods (see above). Strategies evolve during the course of the project as need and interest demand. The Public Education and Stewardship Committee, Stakeholder Group, and the Interdisciplinary Team will work together to develop and modify public education and stewardship strategies to best fulfill the public involvement Goal, Objectives, and Policies identified in this PIP. When fully developed, Strategies identify timelines, products, and key staff/participants.

Guiding Principles

One of the primary products of the PIP, in concert with the Team Process, is consensus on Guiding Principles. The Guiding Principles will be the formally recognized vision for environmental protection in these watersheds. They will set environmental targets and measurable outcomes that will be used in the evaluation of each of the five work elements:

1. Foster Public Education and Stewardship
2. Protect Water Quality and Quantity
3. Protect and Restore Wetlands, Riparian and Upland Areas

4. Protect and Restore Key Estuary Wetlands
5. Plan for Ecological Growth

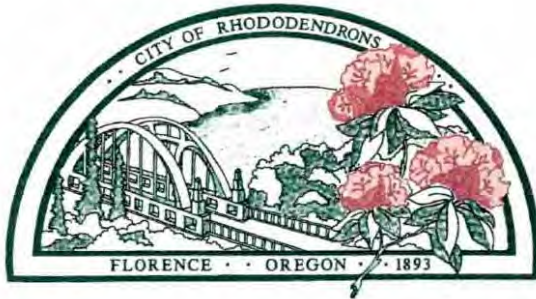
The Guiding Principles will evolve from a collaborative process of the Public Education and Stewardship Staff Team, the Interdisciplinary Team (aka the "Full Team") and the Stakeholders, with input invited by all groups and interests. Team members are encouraged to seek input from others in their respective organizations in every step in this process. The revised Draft Guiding Principles Paper will be the subject of input from Stakeholders (at the first Stakeholders Meeting), Elected Officials Stakeholders Group, and the general public via posting on the Project Web Site.

The environmental database for these watersheds is not sufficiently detailed or comprehensive to establish these targets and measures at this time. In addition, consensus among key partners is critical if the standards are to be accepted and administered effectively. For these reasons, it is important that the process, including the public education component of the project, be used to obtain this level of information, comprehension, and commitment.

Environmental targets and measurable outcomes will be established in the Guiding Principles that will guide all products and processes, as discussed above. Long-term outcomes are land use and water management policies and practices that maintain and protect rearing, migrating, and spawning habitat for resident and anadromous fish, and habitat for birds, mammals, amphibians and reptiles; conversion of rural lands to urban densities that do not impair water quality or result in dysfunctional stream conditions; enhanced floodplain functions and inter-connected wetlands and floodplain; and on-going surface and ground water quality monitoring and remedial action to prevent contamination. Ultimately, the natural resource economy will be re-invigorated. People will be drawn to the area with a renewed appreciation for its rich and complex ecosystem; and the area will be a model for other small coastal cities faced with growth pressures.

This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement WC-00J04801-0 to City of Florence. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

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City of Florence

Community Services
Planning, Building Inspection and Economic Development

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PH: (541) 997-8237
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February 8, 2013

Dear Property Owner:

You are receiving this letter because you own property with a riparian area (along a creek or other waterway) and the City is drafting regulations that may apply to you. The City will initiate amendments to the Comprehensive Plan and Code in 2013 and wants your input upfront before the formal adoption process begins. The draft amendments are in Chapter 4 of the "DRAFT City of Florence Significant Wetlands and Riparian Corridors Plan" posted on the Comprehensive Plan and Code Amendments page of the web site: www.Siuslawwaters.org.

How can I ask questions and make comments?

- Attend the property owners meeting on **Wednesday, February 27, 5:30 p.m. at Florence Events Center**; or
- Call Katya Reyna at 541-902-2587 on or before **February 15**, to set up a time for a telephone meeting with Carol Heinkel, Project Coordinator; or
- Email Carol directly at cheinkel@g.com; and
- Visit the web site www.Siuslawwaters.org for more information including Frequently Asked Questions and draft plans and amendments.

Will the local regulations affect me?

As you may already know, your riparian area is included in the "Inventory and Assessment" of riparian areas, proposed for adoption as part of the Florence Comprehensive Plan. Oregon State Law requires protection of "significant riparian areas." The City will adopt Comprehensive Plan and Code amendments to meet these state requirements.

(see back)




If your property is:

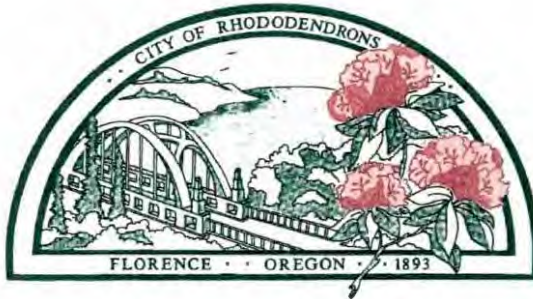
- Inside city limits: the local regulations may affect you. You are encouraged to participate and provide comment **on or by February 27**.
- Outside city limits and inside the Florence UGB: The local regulations will not affect you. The regulations will apply only inside city limits. However, the "2013 Florence Area Local Wetlands and Riparian Inventory" (2013 Inventory) is proposed for adoption as part of the Comprehensive Plan, which does apply within the UGB. You are welcome to attend the meeting and to contact staff regarding the 2013 Inventory (posted to the web site above) that involves your property and to learn about applicable existing local, state and federal requirements.

I look forward to meeting you at the property owners meeting or communicating with you via phone or email. If you have any questions about the process, please don't hesitate to call Katya at 541-902-2587.

Sincerely,



Carol Heinkel, Florence Planning Consultant
Siuslaw Estuary Partnership Project Coordinator



City of Florence

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February 8, 2013

Dear Property Owner:

You are receiving this letter because you own property with a wetland in the Florence urban growth boundary (UGB) and the City is drafting regulations that may apply to you. The City will initiate amendments to the Comprehensive Plan and Code in 2013 and wants your input upfront before the formal adoption process begins. The draft amendments are in Chapter 4 of the "DRAFT City of Florence Significant Wetlands and Riparian Corridors Plan" posted on the Comprehensive Plan and Code Amendments page of the web site: www.Siuslawwaters.org.

How can I ask questions and make comments?

- Attend the property owners meeting on **Wednesday, February 27, 5:30 p.m. at Florence Events Center**; or
- Call Katya Reyna at 541-902-2587 on or before **February 15**, to set up a time for a telephone meeting with Carol Heinkel, Project Coordinator; or c
- Email Carol directly at cheinkel@g.com; and
- Visit the web site www.Siuslawwaters.org for more information including Frequently Asked Questions and draft plans and amendments.

Will the local regulations affect me?

As you may already know, your wetland is included in the "Local Wetland Inventory" (LWI), proposed for adoption as part of the Florence Comprehensive Plan. Oregon State Law requires protection of "significant wetlands." The City will adopt Comprehensive Plan and Code amendments to meet these state requirements.

(see back)



If your property is:

- Inside city limits: the local regulations may affect you. You are encouraged to participate and provide comment **on or by February 27**.
- Outside city limits and inside the Florence UGB: The local regulations will not affect you. The regulations will apply only inside city limits. However, the updated LWI is proposed for adoption as part of the Comprehensive Plan, which does apply within the UGB. You are welcome to attend the meeting and to contact staff regarding the "2013 Florence Area Local Wetlands and Riparian Inventory" (posted to the web site above) that involves your property and to learn about applicable existing local, state and federal requirements.

I look forward to meeting you at the property owners meeting or communicating with you via phone or email. If you have any questions about the process, please don't hesitate to call Katya at 541-902-2587.

Sincerely,



Carol Heinkel, Florence Planning Consultant
Siuslaw Estuary Partnership Project Coordinator

Appendix C: Statewide Planning Goal 5 Administrative Rules Related to Wetlands and Riparian Areas

Goal 5 Administrative Rules: Wetlands

OAR 660-023-0100

(1) For purposes of this rule, a "wetland" is an area that is inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

(2) Local governments shall amend acknowledged plans and land use regulations prior to or at periodic review to address the requirements of this division, as set out in OAR 660-023-0250(5) through (7). The standard inventory process requirements in OAR 660-023-0030 do not apply to wetlands. Instead, local governments shall follow the requirements of section (3) of this rule in order to inventory and determine significant wetlands.

(3) For areas inside urban growth boundaries (UGBs) and urban unincorporated communities (UUCs), local governments shall:

- (a) Conduct a local wetlands inventory (LWI) using the standards and procedures of OAR 141-086-0110 through 141-086-0240 and adopt the LWI as part of the comprehensive plan or as a land use regulation; and
- (b) Determine which wetlands on the LWI are "significant wetlands" using the criteria adopted by the Division of State Lands (DSL) pursuant to ORS 197.279(3)(b) and adopt the list of significant wetlands as part of the comprehensive plan or as a land use regulation.

(4) For significant wetlands inside UGBs and UUCs, a local government shall:

- (a) Complete the Goal 5 process and adopt a program to achieve the goal following the requirements of OAR 660-023-0040 and 660-023-0050; or
- (b) Adopt a safe harbor ordinance to protect significant wetlands consistent with this subsection, as follows:
 - (A) The protection ordinance shall place restrictions on grading, excavation, placement of fill, and vegetation removal other than perimeter mowing and other cutting necessary for hazard prevention; and
 - (B) The ordinance shall include a variance procedure to consider hardship variances, claims of map error verified by DSL, and reduction or removal of the restrictions under paragraph (A) of this subsection for any lands demonstrated to have been rendered not buildable by application of the ordinance.

(5) For areas outside UGBs and UUCs, local governments shall either adopt the statewide wetland inventory (SWI; see ORS 196.674) as part of the local comprehensive plan or as a land use regulation, or shall use a current version for the purpose of section (7) of this rule.

(6) For areas outside UGBs and UUCs, local governments are not required to amend acknowledged plans and land use regulations in order to determine significant wetlands and complete the Goal 5 process. Local governments that choose to amend acknowledged plans for areas outside UGBs and UUCs in order to inventory and protect significant wetlands shall follow the requirements of sections (3) and (4) of this rule.

(7) All local governments shall adopt land use regulations that require notification of DSL concerning applications for development permits or other land use decisions affecting wetlands on the inventory, as per ORS 227.350 and 215.418, or on the SWI as provided in section (5) of this rule.

(8) All jurisdictions may inventory and protect wetlands under the procedures and requirements for wetland conservation plans adopted pursuant to ORS 196.668 et seq. A wetlands conservation plan approved by the director of DSL shall be deemed to comply with Goal 5 (ORS 197.279(1)).

Stat. Auth.: ORS 183 & ORS 197

Stats. Implemented: ORS 197.040 & ORS 197.225 - ORS 197.245

Hist.: LCDL 2-1996, f. 8-30-96, cert. ef. 9-1-96

Goal 5 Administrative Rules: ESEE Analysis

OAR 660-023-0010

Definitions

(2) "ESEE consequences" are the positive and negative economic, social, environmental, and energy (ESEE) consequences that could result from a decision to allow, limit, or prohibit a conflicting use.

(7) "Protect," when applied to an individual resource site, means to limit or prohibit uses that conflict with a significant resource site (except as provided in OAR 660-023-0140, 660-023-0180, and 660-023-0190). When applied to a resource category, "protect" means to develop a program consistent with this division.

660-023-0040

ESEE Decision Process

(1) Local governments shall develop a program to achieve Goal 5 for all significant resource sites based on an analysis of the economic, social, environmental, and energy (ESEE) consequences that could result from a decision to allow, limit, or prohibit a conflicting use. This rule describes four steps to be followed in conducting an ESEE analysis, as set out in detail in sections (2) through (5) of this rule. Local governments are not required to follow these steps sequentially, and some steps anticipate a return to a previous step. However, findings shall demonstrate that requirements under each of the steps have been met, regardless of the sequence followed by the local government. The ESEE analysis need not be lengthy or complex, but should enable reviewers to gain a clear understanding of the conflicts and the consequences to be expected. The steps in the standard ESEE process are as follows:

- (a) Identify conflicting uses;
- (b) Determine the impact area;
- (c) Analyze the ESEE consequences; and

(d) Develop a program to achieve Goal 5.

(2) Identify conflicting uses. Local governments shall identify conflicting uses that exist, or could occur, with regard to significant Goal 5 resource sites. To identify these uses, local governments shall examine land uses allowed outright or conditionally within the zones applied to the resource site and in its impact area. Local governments are not required to consider allowed uses that would be unlikely to occur in the impact area because existing permanent uses occupy the site. The following shall also apply in the identification of conflicting uses:

(a) If no uses conflict with a significant resource site, acknowledged policies and land use regulations may be considered sufficient to protect the resource site. The determination that there are no conflicting uses must be based on the applicable zoning rather than ownership of the site. (Therefore, public ownership of a site does not by itself support a conclusion that there are no conflicting uses.)

(b) A local government may determine that one or more significant Goal 5 resource sites are conflicting uses with another significant resource site. The local government shall determine the level of protection for each significant site using the ESEE process and/or the requirements in OAR 660-023-0090 through 660-023-0230 (see OAR 660-023-0020(1)).

(3) Determine the impact area. Local governments shall determine an impact area for each significant resource site. The impact area shall be drawn to include only the area in which allowed uses could adversely affect the identified resource. The impact area defines the geographic limits within which to conduct an ESEE analysis for the identified significant resource site.

(4) Analyze the ESEE consequences. Local governments shall analyze the ESEE consequences that could result from decisions to allow, limit, or prohibit a conflicting use. The analysis may address each of the identified conflicting uses, or it may address a group of similar conflicting uses. A local government may conduct a single analysis for two or more resource sites that are within the same area or that are similarly situated and subject to the same zoning. The local government may establish a matrix of commonly occurring conflicting uses and apply the matrix to particular resource sites in order to facilitate the analysis. A local government may conduct a single analysis for a site containing more than one significant Goal 5 resource. The ESEE analysis must consider any applicable statewide goal or acknowledged plan requirements, including the requirements of Goal 5. The analyses of the ESEE consequences shall be adopted either as part of the plan or as a land use regulation.

(5) Develop a program to achieve Goal 5. Local governments shall determine whether to allow, limit, or prohibit identified conflicting uses for significant resource sites. This decision shall be based upon and supported by the ESEE analysis. A decision to prohibit or limit conflicting uses protects a resource site. A decision to allow some or all conflicting uses for a particular site may also be consistent with Goal 5, provided it is supported by the ESEE analysis. One of the following determinations shall be reached with regard to conflicting uses for a significant resource site:

(a) A local government may decide that a significant resource site is of such importance compared to the conflicting uses, and the ESEE consequences of

allowing the conflicting uses are so detrimental to the resource, that the conflicting uses should be prohibited.

(b) A local government may decide that both the resource site and the conflicting uses are important compared to each other, and, based on the ESEE analysis, the conflicting uses should be allowed in a limited way that protects the resource site to a desired extent.

(c) A local government may decide that the conflicting use should be allowed fully, notwithstanding the possible impacts on the resource site. The ESEE analysis must demonstrate that the conflicting use is of sufficient importance relative to the resource site, and must indicate why measures to protect the resource to some extent should not be provided, as per subsection (b) of this section.

Stat. Auth.: ORS 183 & ORS 197

Stats. Implemented: ORS 197.040 & ORS 197.225 - ORS 197.245

Hist.: LCDL 2-1996, f. 8-30-96, cert. ef. 9-1-96

Goal 5 Administrative Rule for Riparian Areas

OAR 660-023-0020

Standard and Specific Rules and Safe Harbors

- (1) The standard Goal 5 process, OAR 660-023-0030 through 660-023-0050, consists of procedures and requirements to guide local planning for all Goal 5 resource categories. This division also provides specific rules for each of the fifteen Goal 5 resource categories (see OAR 660-023-0090 through 660-023-0230). In some cases this division indicates that both the standard and the specific rules apply to Goal 5 decisions. In other cases, this division indicates that the specific rules supersede parts or all of the standard process rules (i.e., local governments must follow the specific rules rather than the standard Goal 5 process). In case of conflict, the resource-specific rules set forth in OAR 660-023-0090 through 660-023-0230 shall supersede the standard provisions in OAR 660-023-0030 through 660-023-0050.
- (2) A "safe harbor" consists of an optional course of action that satisfies certain requirements under the standard process. Local governments may follow safe harbor requirements rather than addressing certain requirements in the standard Goal 5 process. For example, a jurisdiction may choose to identify "significant" riparian corridors using the safe harbor criteria under OAR 660-023-0090(5) rather than follow the general requirements for determining "significance" in the standard Goal 5 process under OAR 660-023-0030(4). Similarly, a jurisdiction may adopt a wetlands ordinance that meets the requirements of OAR 660-023-0100(4)(b) in lieu of following the ESEE decision process in OAR 660-023-0040.

Stat. Auth.: ORS 183 & ORS 197

Stats. Implemented: ORS 197.040 & ORS 197.225 - ORS 197.245

Hist.: LCDL 2-1996, f. 8-30-96, cert. ef. 9-1-96

OAR 660-023-0090
Riparian Corridors

- (1) For the purposes of this rule, the following definitions apply:
 - (a) "Fish habitat" means those areas upon which fish depend in order to meet their requirements for spawning, rearing, food supply, and migration.
 - (b) "Riparian area" is the area adjacent to a river, lake, or stream, consisting of the area of transition from an aquatic ecosystem to a terrestrial ecosystem.
 - (c) "Riparian corridor" is a Goal 5 resource that includes the water areas, fish habitat, adjacent riparian areas, and wetlands within the riparian area boundary.
 - (d) "Riparian corridor boundary" is an imaginary line that is a certain distance upland from the top bank, for example, as specified in section (5) of this rule.
 - (e) "Stream" is a channel such as a river or creek that carries flowing surface water, including perennial streams and intermittent streams with defined channels, and excluding man-made irrigation and drainage channels.
 - (f) "Structure" is a building or other major improvement that is built, constructed, or installed, not including minor improvements, such as fences, utility poles, flagpoles, or irrigation system components, that are not customarily regulated through zoning ordinances.
 - (g) "Top of bank" shall have the same meaning as "bankfull stage" defined in OAR 141-085-0010(12).
 - (h) "Water area" is the area between the banks of a lake, pond, river, perennial or fish-bearing intermittent stream, excluding manmade farm ponds.
- (2) Local governments shall amend acknowledged plans in order to inventory riparian corridors and provide programs to achieve Goal 5 prior to or at the first periodic review following the effective date of this rule, except as provided in OAR 660-023-0250(5).
- (3) Local governments shall inventory and determine significant riparian corridors by following either the safe harbor methodology described in section (5) of this rule or the standard inventory process described in OAR 660-023-0030 as modified by the requirements in section (4) of this rule. The local government may divide the riparian corridor into a series of stream sections (or reaches) and regard these as individual resource sites.
- (4) When following the standard inventory process in OAR 660-023-0030, local governments shall collect information regarding all water areas, fish habitat, riparian areas, and wetlands within riparian corridors. Local governments may postpone determination of the precise location of the riparian area on lands designated for farm or forest use until receipt of applications for local permits for uses that would conflict with these resources. Local governments are encouraged, but not required, to conduct field investigations to verify the location, quality, and quantity of resources within the riparian corridor. At a minimum, local governments

shall consult the following sources, where available, in order to inventory riparian corridors along rivers, lakes, and streams within the jurisdiction:

- (a) Oregon Department of Forestry stream classification maps;
 - (b) United States Geological Service (USGS) 7.5-minute quadrangle maps;
 - (c) National Wetlands Inventory maps;
 - (d) Oregon Department of Fish and Wildlife (ODFW) maps indicating fish habitat;
 - (e) Federal Emergency Management Agency (FEMA) flood maps; and
 - (f) Aerial photographs.
- (5) As a safe harbor in order to address the requirements under OAR 660-023-0030, a local government may determine the boundaries of significant riparian corridors within its jurisdiction using a standard setback distance from all fish-bearing lakes and streams shown on the documents listed in subsections (a) through (f) of section (4) of this rule, as follows:
- (a) Along all streams with average annual stream flow greater than 1,000 cubic feet per second (cfs) the riparian corridor boundary shall be 75 feet upland from the top of each bank.
 - (b) Along all lakes, and fish-bearing streams with average annual stream flow less than 1,000 cfs, the riparian corridor boundary shall be 50 feet from the top of bank.
 - (c) Where the riparian corridor includes all or portions of a significant wetland as set out in OAR 660-023-0100, the standard distance to the riparian corridor boundary shall be measured from, and include, the upland edge of the wetland.
 - (d) In areas where the top of each bank is not clearly defined, or where the predominant terrain consists of steep cliffs, local governments shall apply OAR 660-023-0030 rather than apply the safe harbor provisions of this section.
- (6) Local governments shall develop a program to achieve Goal 5 using either the safe harbor described in section (8) of this rule or the standard Goal 5 ESEE process in OAR 660-023-0040 and 660-023-0050 as modified by section (7) of this rule.
- (7) When following the standard ESEE process in OAR 660-023-0040 and 660-023-0050, a local government shall comply with Goal 5 if it identifies at least the following activities as conflicting uses in riparian corridors:
- (a) The permanent alteration of the riparian corridor by placement of structures or impervious surfaces, except for:
 - (A) Water-dependent or water-related uses; and
 - (B) Replacement of existing structures with structures in the same location that do not disturb additional riparian surface area; and
 - (b) Removal of vegetation in the riparian area, except:
 - (A) As necessary for restoration activities, such as replacement of vegetation with native riparian species;
 - (B) As necessary for the development of water-related or water-dependent uses; and
 - (C) On lands designated for agricultural or forest use outside UGBs.

- (8) As a safe harbor in lieu of following the ESEE process requirements of OAR 660-023-0040 and 660-023-0050, a local government may adopt an ordinance to protect a significant riparian corridor as follows:
- (a) The ordinance shall prevent permanent alteration of the riparian area by grading or by the placement of structures or impervious surfaces, except for the following uses, provided they are designed and constructed to minimize intrusion into the riparian area:
 - (A) Streets, roads, and paths;
 - (B) Drainage facilities, utilities, and irrigation pumps;
 - (C) Water-related and water-dependent uses; and
 - (D) Replacement of existing structures with structures in the same location that do not disturb additional riparian surface area.
 - (b) The ordinance shall contain provisions to control the removal of riparian vegetation, except that the ordinance shall allow:
 - (A) Removal of non-native vegetation and replacement with native plant species; and
 - (B) Removal of vegetation necessary for the development of water-related or water-dependent uses;
 - (c) Notwithstanding subsection (b) of this section, the ordinance need not regulate the removal of vegetation in areas zoned for farm or forest uses pursuant to statewide Goals 3 or 4;
 - (d) The ordinance shall include a procedure to consider hardship variances, claims of map error, and reduction or removal of the restrictions under subsections (a) and (b) of this section for any existing lot or parcel demonstrated to have been rendered not buildable by application of the ordinance; and
 - (e) The ordinance may authorize the permanent alteration of the riparian area by placement of structures or impervious surfaces within the riparian corridor boundary established under subsection (5)(a) of this rule upon a demonstration that equal or better protection for identified resources will be ensured through restoration of riparian areas, enhanced buffer treatment, or similar measures. In no case shall such alterations occupy more than 50 percent of the width of the riparian area measured from the upland edge of the corridor.

Stat. Auth.: ORS 183 & 197

Stats. Implemented: ORS 197.040 & 197.225 - 197.245

Hist.: LCDC 2-1996, f. 8-30-96, cert. ef. 9-1-96; LCDD 3-2004, f. & cert. ef. 5-7-04



Oregon

Theodore R. Kulongoski, Governor

Department of State Lands

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March 29, 2010

State Land Board

Sandra Belson
Community Development Director
City of Florence
250 Highway 101
Florence, OR 97439

Theodore R. Kulongoski
Governor

Kate Brown
Secretary of State

Re: Approval to Use ORWAP for Identifying Locally Significant Wetlands

Ted Wheeler
State Treasurer

Dear Ms. Belson:

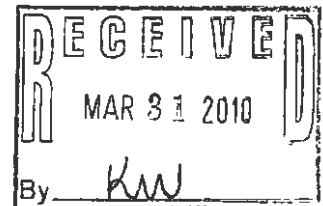
The City of Florence has requested using the *Oregon Rapid Wetland Assessment Protocol* (ORWAP) to assess wetlands as part of the Siuslaw Estuary Partnership project. As allowed by Oregon administrative rules governing Local Wetlands Inventories (141-086-0185) and by way of this letter, the Department of State Lands (DSL) approves of the City of Florence using ORWAP rather than the *Oregon Freshwater Wetland Assessment Methodology* (OFWAM) for your Local Wetlands Inventory and Goal 5/Goal 17 planning.

ORWAP, completed and published by DSL in 2009, represents a significant advancement over OFWAM (last revised in 1996) and will provide the city and partners with more complete and accurate information about your wetland resources. However, although ORWAP has been implemented for use in administering the state Removal-Fill Law, DSL wetlands program staff will be working with local governments and other interested parties in the coming months to incorporate ORWAP into the administrative rules for identifying Locally Significant Wetlands (OAR 141-86-300 through 350). Because Florence will be one of three local jurisdictions piloting the use of ORWAP for this purpose before administrative rule changes are made, I understand that you will continue to work closely with DSL's wetlands planning staff to crosswalk ORWAP results into the existing rules.

We appreciate your interest in using ORWAP for your project. This effort will be very informative for DSL's work on rule revisions as well.

Sincerely,

Louise Solliday
Director



cc: Amanda Punton, DLCD
Matt Spangler, DLCD, Newport Office



Oregon

John A. Kitzhaber, MD, Governor

Department of State Lands

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June 21, 2012

Sandra Belson
Community Development Director
City of Florence
250 Highway 101
Florence, OR 97439

State Land Board

John A. Kitzhaber, MD
Governor

Kate Brown
Secretary of State

Ted Wheeler
State Treasurer

Re: Approval of Significance Criteria for Identifying Locally Significant Wetlands

Dear Ms. Belson:

In a letter dated March 29, 2010, the Department of State Lands (DSL) granted permission to the City of Florence to use the *Oregon Rapid Wetland Assessment Protocol* (ORWAP) to assess wetlands as part of the Siuslaw Estuary Partnership project, as allowed by Oregon administrative rules governing Local Wetlands Inventories (141-086-0185) for your Local Wetlands Inventory and Goal 5/Goal 17 planning.

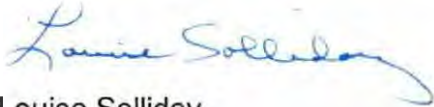
ORWAP has not yet been incorporated into the administrative rules for identifying Locally Significant Wetlands (OAR 141-86-300 through 350). Because Florence piloted the use of ORWAP for this purpose before administrative rule changes were made, you have worked closely with DSL's wetlands planning staff and stakeholders of the Siuslaw Estuary Partnership project to develop significance criteria based upon the ORWAP results.

In lieu of the administrative rules for identifying Locally Significant Wetlands (OAR 141-86-300 through 350), the criteria that will be used for determining significance of non-Goal 17 wetlands in the Florence urban growth boundary (UGB), as outlined in the April 30, 2012 Siuslaw Estuary Partnership document entitled "Proposed Florence Wetlands Significance Criteria and Protection Measures" (enclosed), are wetlands that score at or above the 75th percentile in either Function or Value for one or more of the following Grouped Functions, as defined in the Oregon Rapid Wetlands Assessment Protocol (ORWAP):

- a. Hydrologic Control (water storage and delay or "flood control"); or
- b. Water Quality (sediment retention and stabilization, phosphorus retention, nitrate removal and retention, and thermoregulation); or
- c. Habitat for fish, aquatic, or terrestrial species.

By way of this letter, DSL grants approval of the aforementioned criteria for determining locally significant wetlands for your Goal 5 planning. We appreciate your interest in using ORWAP for your project. This effort has been very informative for DSL's work on future rule revisions.

Sincerely,

A handwritten signature in blue ink, appearing to read "Louise Solliday". The signature is fluid and cursive, with a long, sweeping tail on the last name.

Louise Solliday
Director

cc: Amanda Punton, DLCD
Dave Perry, DLCD, Newport Office
Peter Ryan, DSL

Siuslaw Estuary Partnership

An Integrated Multiple Objective Approach To Watershed Protection and Restoration

Proposed Florence Wetlands Significance Criteria and Protection Measures April 30, 2012

The Wetlands and Riparian Area Team met on March 6, 2012 and concurred with this proposal for determining the significance of, and measures to protect, wetlands in the Florence urban growth boundary (UGB). The Stakeholder Groups forwarded this proposal to the public for comment at their meetings in March and April. Then, the public provided comment on the proposal at the April 30, 2012 Open House.

In this paper, the significance criteria are applied to the wetlands and assessment, using the Oregon Rapid Wetland Assessment Protocol (ORWAP) in the 2010 Draft Florence Area Wetland and Riparian Inventory (Draft Inventory), prepared by Pacific Habitat Services for the Siuslaw Estuary Partnership (Partnership). The application of the significance criteria in this paper is based on the Draft Inventory; thus, the findings are subject to change based on the results of the Department of State Lands' (DSL) review. Any modifications made to the inventory or assessment as a result of DSL's review will be incorporated into the final analysis of wetlands and their significance.

Scope and Study Area

Statewide Planning Goal 5 criteria and protection measures apply to non-Statewide Planning Goal 17 wetlands in the Florence Area Inventory within the Florence Urban Growth Boundary (UGB) which is where Florence's land use measures would apply.¹

The 2010 Florence Area Wetlands Inventory, once approved by DSL, will replace the 1996 Florence Wetlands Inventory in the State Wetland Inventory (SWI), both within and outside the UGB.² In addition, if Lane County elects to determine significance of non-Goal 17 wetlands outside the UGB, the criteria ultimately selected for the Florence UGB may help guide that effort. At their meeting on March 22, the Elected Official Stakeholders will be asked to provide guidance on the question of whether or not to apply Goal 5 protection measures to wetlands outside the UGB.

¹ **OAR 660-023-0240. Relationship of Goal 5 to Other Goals**

"(2) The requirements of Goals 15, 16, 17, and 19 shall supersede requirements of this division for natural resources that are also subject to and regulated under one or more of those goals. However, local governments may rely on a Goal 5 inventory produced under OAR 660-023-0030 and other applicable inventory requirements of this division to satisfy the inventory requirements under Goal 17 for resource sites subject to Goal 17."

² In accordance with OAR 141-086-0185, "once approved by the Department of State Lands (DSL), the Local Wetland Inventory (LWI) must be used in place of the National Wetlands Inventory (NWI) and is incorporated into the "State Wetland Inventory" (SWI). The SWI is an inventory which contains the location, wetlands types, and approximate boundaries of wetlands in the State of Oregon. This inventory is continually revised as additional information is received or obtained by the Division of State Lands. The approved LWI must be used by cities and counties in lieu of the NWI for notifying the Department of land use applications affecting mapped wetlands and other waters (ORS 215.418 and 227.350).

Significance

1. The criterion for determining significance of non-Goal 17 wetlands in the Florence urban growth boundary (UGB) is wetlands that score at or above the 75th percentile in either Function or Value for one or more of the following Grouped Functions, as defined in the Oregon Rapid Wetlands Assessment Protocol (ORWAP):
 - a. Hydrologic Control (water storage and delay or "flood control"); or
 - b. Water Quality (sediment retention and stabilization, phosphorus retention, nitrate removal and retention, and thermoregulation); or
 - c. Habitat for fish, aquatic, or terrestrial species.
2. The results of the analysis are presented in Table 1, ORWAP Summary for Florence LWI Functions and Values of Grouped Functions, attached. In applying the significance criterion to the Draft Florence Area Inventory, the sixteen non-Goal 17 wetlands in the Florence UGB are significant, as shown in Table 1. This is almost exclusively due to their high Function or Value in providing flood control and water quality protection. All of the wetlands, except Wetland 25, meet the criteria for Hydrologic Control or Water Quality; and Wetland 25 meets the criteria for Aquatic Habitat and is also at the head of a significant riparian corridor. In addition, all of the wetlands except 8, 26, and 34 meet the criteria for providing habitat for fish, aquatic, and/or terrestrial species.

Protection

1. The proposed protection measures are to:
 - a. apply the Safe Harbor approach in Statewide Planning Goal 5, attached, to protect significant wetlands in the UGB;
 - b. include a Variance procedure that recognizes the rights of a property owner to develop property that would otherwise be unbuildable (avoids unconstitutional "taking" of private property without just compensation); and
 - c. Use the ESEE (Economic, Social, Environmental, and Energy) Analysis prescribed in Statewide Planning Goal 5 to address conflicts between construction of planned infrastructure projects and resource conservation in the Florence UGB. The ESEE analysis for public utilities and transportation facilities will evaluate these conflicts within the urban growth boundary and propose the appropriate level of resource protection in these areas. Note: The Goal 5 Administrative Rules for ESEE Analysis are attached.

Analysis

1. The proposed approach to determining significance for the Florence Area Inventory bases significance on the ORWAP scores separately for relative effectiveness of the Function and Value of the wetland. The proposed criteria do not require high scores in both the Functions and Values.

Grouped Functions in ORWAP	
Grouped Functions	Component Functions
Hydrologic Function	Water Storage and Delay (WS)
Water Quality Support Group	Sediment Retention and Stabilization (SR) Phosphorus Retention (PR)

Grouped Functions in ORWAP	
Grouped Functions	Component Functions
	Nitrate Removal & Retention (NR) Thermoregulation (T)
Fish Support Group	Anadromous Fish Habitat (FA) Non-anadromous Fish Habitat (FR)
Aquatic Habitat Support Group	Organic Matter Export (OE) Aquatic Invertebrate Habitat (INV) Amphibian and Reptile Habitat (AM) Waterbird Feeding Habitat (WBF) Waterbird Nesting Habitat (WBN)
Terrestrial Habitat Support Group	Songbird, Raptor, and Mammal Habitat (SBM) Pollinator Habitat (POL) Native Plant Diversity (PD)

The Florence Wetlands Project is a pilot and, as such, is one of the first attempts to use the ORWAP method for planning purposes. The Wetlands and Riparian Area Protection Team worked together to come to a mutual understanding of how best to use the ORWAP tool and to agree to criterion for significance that makes sense in a planning context.

2. The "service area" for the Florence Comprehensive Plan is the urban growth boundary (UGB). Flood control and water quality are critical issues for the North Florence Dunal Aquifer, both inside and outside the City limits. Wetlands that provide flood control or water quality protection, today or in the future, are of critical importance in providing these two services. For this reason, the proposed criteria take both the Function and the Value of the wetlands into consideration in determining significance.
3. The proposed significance criteria recognize the critical role that wetlands play in controlling floods and protecting water quality in the North Florence Sole Source Dunal Aquifer. All wetlands in the UGB play a role, or will play a role in the future, in Hydrologic Control and/or Water Quality Protection. All but one of the "significant" wetlands meet the criteria for these functions or values, and are thus recommended for protection. The proposed criteria also recognize the importance of wetlands for providing Habitat for fish, aquatic, and terrestrial species. All of the wetlands except 8, 26, and 34 meet the criteria for providing habitat for fish, aquatic, and/or terrestrial species.
4. For wetland protection measures, the proposal is to apply the Safe Harbor approach in Statewide Planning Goal 5, including the Variance procedure, to protect locally significant wetlands in the UGB, and exempt planned infrastructure and public improvement projects using the ESEE Analysis approach in Goal 5. This would mean that the significant wetlands would be protected, with a Variance procedure available that recognizes the rights of a property owner to develop property (avoids unconstitutional "taking" of private property without just compensation); and that planned public improvements can be constructed as long as the needed state and federal permits are obtained.

The proposed protection measures combine the approaches available under State law, i.e., safe harbor and ESEE analysis, in a manner that ensures all properties

will retain some development potential while at the same time allowing planned infrastructure and public improvement projects to proceed as planned. The ESEE analysis is a tool that can be used to ensure that planned infrastructure and public improvements, such as roads, stormwater systems, wastewater systems, and parks, can be constructed as planned, without being subject to the variance process, although any such development will nevertheless be subject to any required state and federal permit processes.

Table 1. Significant Florence Wetlands and ORWAP Scores for Functions (F) and Values (V)

Wet-land #	Hydrologic Control		Water Quality		Fish Habitat		Aquatic Habitat		Terrestrial Habitat		Notes and Significance			
	F	V	F	V	F	V	F	V	F	V	Outside UGB	Goal 17	In City Limits	Significant?
1	5.75	3.67	10	7.19	5.87	10	4.88	6.67	5.94	6.67	Part Out		In part	yes
2	3.5	3.08	10	6.07	3.69	4.2	6.37	7.33	6.63	6.67			Outside	yes
3	7	4.72	10	6.19	2.16	6.67	6.89	6.67	6.55	6.67	Outside			
4	2.31	7.64	6.17	7.5	6.56	10	6.11	10	7.61	7.51	Part Out		In part	yes
5	3.09	7.22	7.39	7.5	7.89	10	6.52	7.33	8.79	10	Part Out	Outside UGB=G17	In part	yes
6	1.77	2.17	4.84	7.5	6.95	10	7.39	7.33	7.51	7.43			Mostly in	yes
7	6.0	3.17	10	6.03	2.21	6.67	6.41	7.33	5.23	6.67			Outside	yes
8	3.5	3.08	10	6.03	0.67	6.67	6.72	6.67	5.99	6.67			In	yes
9	3.46	2.17	7.37	5.28	2.3	6.67	7.12	4.0	7.9	6.67	Outside			
10	4.5	2.17	10	5.43	3.69	6.67	7.87	4.0	7.39	6.67	Outside			
11	2.45	6.39	6.2	4.34	3.01	6.67	8.31	5.67	9.01	7.68			Outside	yes
12	3.25	2.17	10	4.94	3.33	6.67	8.39	7.33	7.76	7.77	Part Out		Mostly Outside	yes
13	5.75	2.17	10	5.82	2.32	6.67	7.01	6.67	5.9	6.67	Outside			
14	4.25	2.17	10	5.07	3.52	6.67	8.04	6.67	6.94	6.67	Outside			
15	2.63	2.33	5.09	6.67	6.68	10	7.14	6.67	7.84	6.67	Outside			
16	3.25	2.17	10	5.07	0.74	6.67	7.67	7.33	6.68	6.7	Outside			
17	3.25	2.17	10	5.57	2.05	6.67	7.87	7.33	7.09	6.99	Outside			
18	3.85	2.33	6.46	5.78	1.59	6.67	6.92	7.33	7.71	6.67	Outside			
19	3.25	2.17	10	5.36	2.64	5.11	7.31	6.67	6.53	6.67	Outside			
20	3.25	2.17	10	5.36	0.83	6.67	7.34	7.33	6.06	6.67	Outside			
21	4.5	3.58	10	6.49	2.95	6.67	7.84	7.33	6.99	7.22	Outside			
22	3.13	2.67	4.21	6.67	7.06	10	6.97	6.67	6.34	6.67	Outside	G17		
23	4.5	2.17	10	5.45	4.26	5.47	8.28	7.33	6.72	7.21	Outside			
24	5.75	2.17	10	5.61	3.54	6.67	7.82	7.33	7.08	7.09	Part Out	Part G17	Outside	yes
25	3	2.17	5.52	5.28	2.59	5.41	7.23	7.33	5.83	6.7	Part Out		Outside	yes
26	3.25	2.42	10	5.57	2.89	6.67	5.98	6.67	5.95	6.67			Outside	yes
27	3.5	2.67	10	6.28	3.22	4.73	6.78	7.33	5.35	6.67	Part Out		Outside	yes
28	2.25	2.17	10	5.28	3.9	6.67	6.38	7.33	5.85	6.67			Outside	yes
29	4.5	2.17	10	5.36	3.33	6.67	6.41	7.33	5.43	6.67		G17		
30	3.5	1.67	10	5.11	3.97	6.67	7.42	7.33	6.16	6.67		G17		
31	2.71	2.92	6.17	7.5	7.93	10	5.89	7.33	6.3	7.03		G17		
32	2.09	2.0	5.08	6.67	6.3	10	7.08	7.33	7.48	7.35	Outside	G17		
33	4.5	1.67	10	4.77	1.22	7.13	7.36	7.33	7.09	6.97			Inside	yes
34	1.64	1.67	5.03	6.64	2.57	6.67	6.06	6.67	4.66	6.67		Part G17	Inside	yes
Mean	3.58	2.87	8.52	5.92	3.66	7.22	7.05	6.97	6.71	6.97				
Median	3.36	2.17	10.00	5.70	3.28	6.67	7.10	7.33	6.66	6.67				
75%	4.50	3.04	10.00	6.60	4.19	7.02	7.61	7.33	7.46	7.08	Significance Threshold			

GOAL 5 ADMINISTRATIVE RULES: WETLANDS

OAR 660-023-0100 Wetlands

(1) For purposes of this rule, a "wetland" is an area that is inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

(2) Local governments shall amend acknowledged plans and land use regulations prior to or at periodic review to address the requirements of this division, as set out in OAR 660-023-0250(5) through (7). The standard inventory process requirements in OAR 660-023-0030 do not apply to wetlands. Instead, local governments shall follow the requirements of section (3) of this rule in order to inventory and determine significant wetlands.

(3) For areas inside urban growth boundaries (UGBs) and urban unincorporated communities (UUCs), local governments shall:

- (a) Conduct a local wetlands inventory (LWI) using the standards and procedures of OAR 141-086-0110 through 141-086-0240 and adopt the LWI as part of the comprehensive plan or as a land use regulation; and
- (b) Determine which wetlands on the LWI are "significant wetlands" using the criteria adopted by the Division of State Lands (DSL) pursuant to ORS 197.279(3)(b) and adopt the list of significant wetlands as part of the comprehensive plan or as a land use regulation.

(4) For significant wetlands inside UGBs and UUCs, a local government shall:

- (a) Complete the Goal 5 process and adopt a program to achieve the goal following the requirements of OAR 660-023-0040 and 660-023-0050; or
- (b) Adopt a safe harbor ordinance to protect significant wetlands consistent with this subsection, as follows:
 - (A) The protection ordinance shall place restrictions on grading, excavation, placement of fill, and vegetation removal other than perimeter mowing and other cutting necessary for hazard prevention; and
 - (B) The ordinance shall include a variance procedure to consider hardship variances, claims of map error verified by DSL, and reduction or removal of the restrictions under paragraph (A) of this subsection for any lands demonstrated to have been rendered not buildable by application of the ordinance.

(5) For areas outside UGBs and UUCs, local governments shall either adopt the statewide wetland inventory (SWI; see ORS 196.674) as part of the local comprehensive plan or as a land use regulation, or shall use a current version for the purpose of section (7) of this rule.

(6) For areas outside UGBs and UUCs, local governments are not required to amend acknowledged plans and land use regulations in order to determine significant wetlands and complete the Goal 5 process. Local governments that choose to amend acknowledged plans for areas outside UGBs and UUCs in order to inventory and protect significant wetlands shall follow the requirements of sections (3) and (4) of this rule.

(7) All local governments shall adopt land use regulations that require notification of DSL concerning applications for development permits or other land use decisions affecting

wetlands on the inventory, as per ORS 227 .350 and 215.418, or on the SWI as provided in section (5) of this rule.

(8) All jurisdictions may inventory and protect wetlands under the procedures and requirements for wetland conservation plans adopted pursuant to ORS 196.668 et seq. A wetlands conservation plan approved by the director of DSL shall be deemed to comply with Goal 5 (ORS 197.279(1)).

Stat. Auth.: ORS 183 & ORS 197

Stats. Implemented: ORS 197.040 & ORS 197.225 - ORS 197.245

Hist.: LCDRC 2-1996, f. 8-30-96, cert. ef. 9-1-96

GOAL 5 ADMINISTRATIVE RULES: ESEE ANALYSIS

OAR 660-023-0010

Definitions

(2) "ESEE consequences" are the positive and negative economic, social, environmental, and energy (ESEE) consequences that could result from a decision to allow, limit, or prohibit a conflicting use.

(7) "Protect," when applied to an individual resource site, means to limit or prohibit uses that conflict with a significant resource site (except as provided in OAR 660-023-0140, 660-023-0180, and 660-023-0190). When applied to a resource category, "protect" means to develop a program consistent with this division.

660-023-0040

ESEE Decision Process

(1) Local governments shall develop a program to achieve Goal 5 for all significant resource sites based on an analysis of the economic, social, environmental, and energy (ESEE) consequences that could result from a decision to allow, limit, or prohibit a conflicting use. This rule describes four steps to be followed in conducting an ESEE analysis, as set out in detail in sections (2) through (5) of this rule. Local governments are not required to follow these steps sequentially, and some steps anticipate a return to a previous step. However, findings shall demonstrate that requirements under each of the steps have been met, regardless of the sequence followed by the local government. The ESEE analysis need not be lengthy or complex, but should enable reviewers to gain a clear understanding of the conflicts and the consequences to be expected. The steps in the standard ESEE process are as follows:

- (a) Identify conflicting uses;
- (b) Determine the impact area;
- (c) Analyze the ESEE consequences; and
- (d) Develop a program to achieve Goal 5.

(2) Identify conflicting uses. Local governments shall identify conflicting uses that exist, or could occur, with regard to significant Goal 5 resource sites. To identify these uses, local governments shall examine land uses allowed outright or conditionally within the zones applied to the resource site and in its impact area. Local governments are not required to consider allowed uses that would be unlikely to occur in the impact area because existing permanent uses occupy the site. The following shall also apply in the identification of conflicting uses:

(a) If no uses conflict with a significant resource site, acknowledged policies and land use regulations may be considered sufficient to protect the resource site. The determination that there are no conflicting uses must be based on the applicable zoning rather than ownership of the site. (Therefore, public ownership of a site does not by itself support a conclusion that there are no conflicting uses.)

(b) A local government may determine that one or more significant Goal 5 resource sites are conflicting uses with another significant resource site. The local government shall determine the level of protection for each significant site using the ESEE process and/or the requirements in OAR 660-023-0090 through 660-023-0230 (see OAR 660-023-0020(1)).

(3) Determine the impact area. Local governments shall determine an impact area for each significant resource site. The impact area shall be drawn to include only the area in which allowed uses could adversely affect the identified resource. The impact area defines the geographic limits within which to conduct an ESEE analysis for the identified significant resource site.

(4) Analyze the ESEE consequences. Local governments shall analyze the ESEE consequences that could result from decisions to allow, limit, or prohibit a conflicting use. The analysis may address each of the identified conflicting uses, or it may address a group of similar conflicting uses. A local government may conduct a single analysis for two or more resource sites that are within the same area or that are similarly situated and subject to the same zoning. The local government may establish a matrix of commonly occurring conflicting uses and apply the matrix to particular resource sites in order to facilitate the analysis. A local government may conduct a single analysis for a site containing more than one significant Goal 5 resource. The ESEE analysis must consider any applicable statewide goal or acknowledged plan requirements, including the requirements of Goal 5. The analyses of the ESEE consequences shall be adopted either as part of the plan or as a land use regulation.

(5) Develop a program to achieve Goal 5. Local governments shall determine whether to allow, limit, or prohibit identified conflicting uses for significant resource sites. This decision shall be based upon and supported by the ESEE analysis. A decision to prohibit or limit conflicting uses protects a resource site. A decision to allow some or all conflicting uses for a particular site may also be consistent with Goal 5, provided it is supported by the ESEE analysis. One of the following determinations shall be reached with regard to conflicting uses for a significant resource site:

(a) A local government may decide that a significant resource site is of such importance compared to the conflicting uses, and the ESEE consequences of allowing the conflicting uses are so detrimental to the resource, that the conflicting uses should be prohibited.

(b) A local government may decide that both the resource site and the conflicting uses are important compared to each other, and, based on the ESEE analysis, the conflicting uses should be allowed in a limited way that protects the resource site to a desired extent.

(c) A local government may decide that the conflicting use should be allowed fully, notwithstanding the possible impacts on the resource site. The ESEE analysis must demonstrate that the conflicting use is of sufficient importance relative to

the resource site, and must indicate why measures to protect the resource to some extent should not be provided, as per subsection (b) of this section.

Stat. Auth.: ORS 183 & ORS 197

Stats. Implemented: ORS 197.040 & ORS 197.225 - ORS 197.245

Hist.: LCDC 2-1996, f. 8-30-96, cert. ef. 9-1-96



City of Florence

Community Development Department

Planning, Building Inspection and Economic Development

250 Highway 101

PO Box 340

Florence, OR 97439-0340

TDD: 503/997-3437

PH: 503/997-8237

FAX: 503/997-4109

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June 24, 1998

Del Phelps
Florentine Enterprises
P.O. Box 2867
Florence, OR 97439

RE: Amendment to development plan

Dear Mr. Phelps:

Enclosed is a signed copy of Resolution 98-6-23-33 setting forth the decision of the Planning Commission/Design Review Board at their meeting of June 23, 1998 to grant approval of the application for amendments to the development plan approval to reduce the required 50' building setback from a wetland and a request for modification of the required 50 foot building setback from a drainage way between the 8th and 9th additions of the south phase of Florentine Estates PUD.

Please be advised that decisions of the Planning Commission or Design Review Board may be appealed to the City Council pursuant to Florence City Code, Section 10-1-1-6. Such appeal may be initiated by the applicant, persons mailed notice of the hearing, or any party who testified in writing or verbally at the hearing. A notice of intent to appeal must be filed with the City Recorder within fifteen (15) calendar days after the decision was rendered by the Planning Commission or Design Review Board, otherwise the decision shall be final.

If you have any questions, please contact this office at 997-8237.

Sincerely,

Anne M. Rhodes
Planning Technician

Enclosure



**PLANNING COMMISSION
RESOLUTION NO. 98-5-23-33**

**IN THE MATTER OF AMENDMENT TO DEVELOPMENT PLAN APPROVAL
TO REDUCE THE REQUIRED 50 FOOT BUILDING SETBACK FROM A
WETLAND AND A REQUEST FOR MODIFICATION OF THE REQUIRED 50
FOOT BUILDING SETBACK FROM A DRAINAGEWAY BETWEEN THE 8TH
AND 9TH ADDITIONS OF THE SOUTH PHASE OF FLORENTINE ESTATES
PLANNED UNIT DEVELOPMENT (PUD)**

WHEREAS, application was made by Florentine Enterprises, Inc. for an amendment to development plan approval to reduce the required 50 foot building setback from a wetland and a request for modification of the required 50 foot building setback from a drainageway between the 8th and 9th Additions of the south phase of Florentine Estates Planned Unit Development (PUD) affecting Lots 919, 923, 925, 927, and 929 located in the RS (Residential Single Family) District; and

WHEREAS, such request requires review by the City of Florence Planning Commission, City Code Section, 10-7 and 10-23; and

WHEREAS, the Planning Commission met in public hearing on June 23, 1998 to consider the request and after consideration of evidence in the record and testimony presented, determined that the request should be granted.

THE PLANNING COMMISSION finds, based on the attached Findings of Fact and staff recommendation that the development plan for the south phase of Florentine Estates PUD shall be amended and that the required 50 foot building setback from a drainageway shall be reduced subject to the following conditions of approval:

1. This approval reduces the building setback from the drainageway adjacent to Lots 919, 923, 925, 927, and 929 to 25 feet from the drainageway channel.
2. This approval reduces the building setback from minor delineated wetlands adjacent to Lots 919 and 929 to 25 feet.
3. This approval does not apply to or reduce the required building setback from the major delineated wetland adjacent to the northerly portion of Lot 919.
4. The recorded plats for Lots 919, 923, 925, 927, and 929 shall be amended to show a 10 foot "Vegetation Preservation Zone" along their westerly property lines, except for the northerly portion of Lot 919 where said zone shall be shown 50 feet from the major wetland. Vegetation

removal shall not be permitted within any required wetland or drainageway setback.

NOW, THEREFORE, BE IT RESOLVED, that the proposal is approved and that the Findings of Fact attached as Exhibit "A" are hereby incorporated by reference and adopted in support of this decision.

PASSED BY THE FLORENCE PLANNING COMMISSION, this 22nd day of June, 1998.



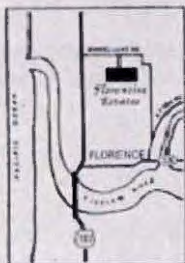
Arolf Salo, VICE CHAIRMAN
FLORENCE PLANNING COMMISSION



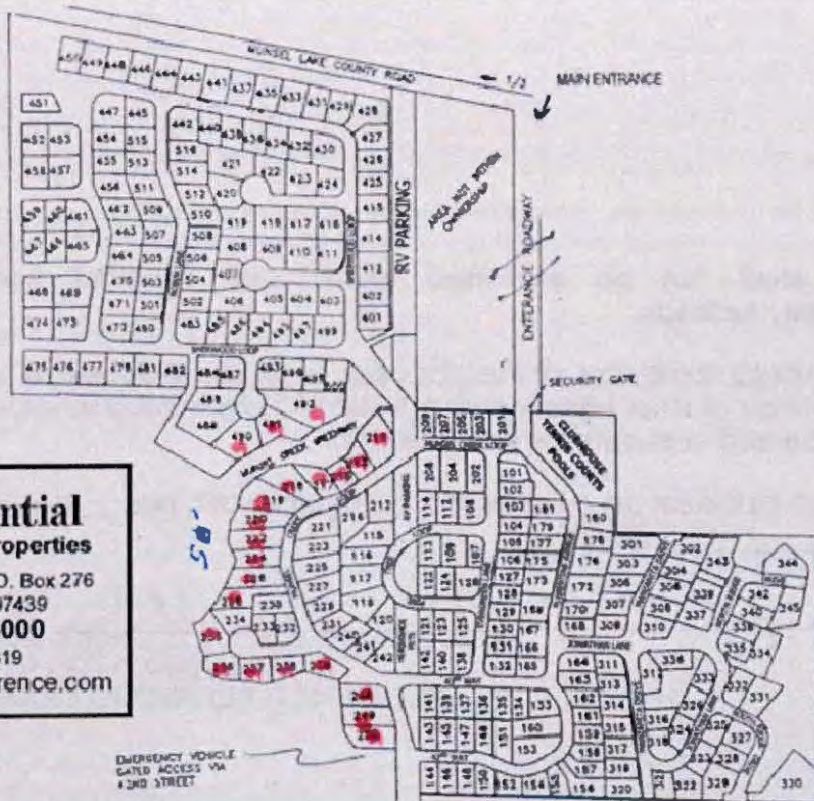
Prudential Pacific Properties

1875 Hwy 101 • P.O. Box 276
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(541) 997-6000
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www.realestateflorence.com

This map is made for the sole purpose of assisting in locating the premises herein described. Prudential Pacific Properties assumes no liability for variations, if any, in dimensions and locations ascertainable by actual survey.



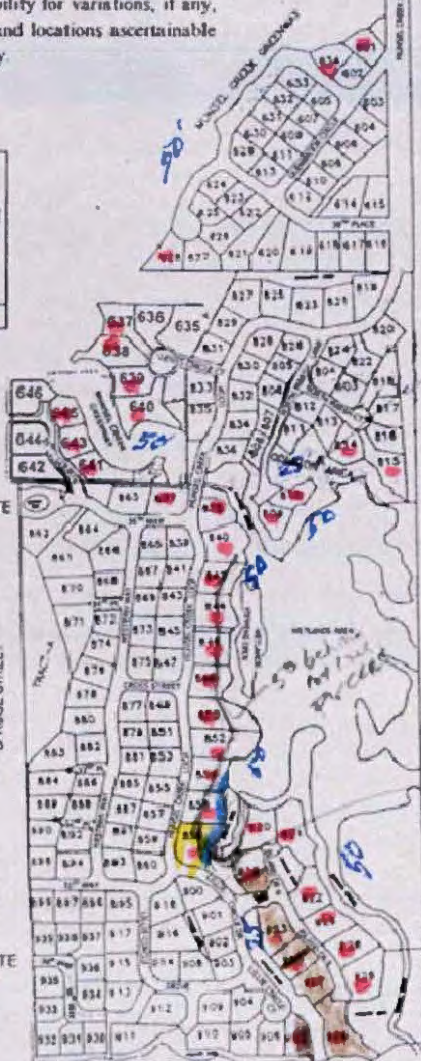
"SMART PASS" ONLY GATE



Abott munsel Creek
RMC-C and 18 Ave
wetland

65
lots
1 undeveloped
858

RMC-C =
9 lots



Del 2/11/95
20
Approved



7/10/95
25
500

BUILT 1/21/95

An Introduction and User's Guide to Wetland Restoration, Creation, and Enhancement

A Guide for the Public Containing:

- Background on wetlands and restoration
- Information on project planning, implementation, and monitoring
- Lists of resources, contacts, and funding sources

Developed by the Interagency Workgroup on Wetland Restoration:

**National Oceanic and Atmospheric Administration, Environmental Protection Agency,
Army Corps of Engineers, Fish and Wildlife Service, and
Natural Resources Conservation Service**

2003

ACKNOWLEDGMENTS

This guide would not have been possible without the contributions of many individuals. The members of the Interagency Workgroup on Wetland Restoration were critical to the document's development from start to finish: Susan-Marie Stedman, National Oceanic and Atmospheric Administration (NOAA) Fisheries; John McShane, Lynne Trulio, Doreen Vetter, Mary Kentula, and , U.S. Environmental Protection Agency (EPA); Jack Arnold, U.S. Fish and Wildlife Service (FWS); Jeanne Christie, Natural Resources Conservation Service (NRCS) and now with the Association of State Wetland Managers; and Colleen Charles, US Army Corps of Engineers (Corps) and now with the US Geological Survey.

The Workgroup would like to acknowledge the members of the Expert/User Review Panel for their practical knowledge and valuable input: Alan P. Ammann, NRCS; Robert P. Brooks, Pennsylvania State University's Cooperative Wetlands Center; Andre F. Clewell, Society for Ecological Restoration (SER); Donald Falk, SER; Susan Galatowitsch, University of Minnesota; Curtis Hopkins, Ducks Unlimited; Mike Houck, Audubon Society; Michael Josselyn, Tiburon Center for Environmental Studies; Jon Kusler, Association of State Wetland Managers; Julie Middleton and Leah Miller-Graff, Izaak Walton League; Steve Moran, Nebraska Rainwater Basin Coordinator; Richard P. Novitski, RP Novitzki and Associates; Duncan T. Patton, Arizona State University; John Rieger, California Department of Transportation; Frederick T. Short, University of New Hampshire; William Streever, BP Exploration (Alaska) Inc.; Jim Stutzman, FWS; Billy Teels, the Wetland Science Institute; Gordon Thayer, NOAA Fisheries; Ronald Thom, Battelle Pacific Northwest Laboratories; Pat Wiley, NRCS; and Joy Zedler, University of Wisconsin-Madison.

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LETTER TO THE READER

Over the past 200 years, more than 50 percent of the wetlands in the coterminous U.S. have been lost and many of the remaining wetlands are degraded. These losses and alterations compromise the important benefits provided by wetlands including protecting water quality, providing habitat for a wide variety of plants and animals, and reducing flood damage. While *preserving* remaining wetland resources is critical to our nation's environmental health, *restoring* wetlands also is essential to ensuring the quality of aquatic systems. Because wetlands are so important to the earth's ecosystems and human society, the National Oceanic and Atmospheric Administration (NOAA), Environmental Protection Agency (EPA), Fish and Wildlife Service (FWS), Natural Resources Conservation Service (NRCS), and Army Corps of Engineers (Corps) worked together to develop this document designed for people wishing to support or undertake wetland recovery projects.

Many documents about restoration and related activities are technical or scientific in nature and are designed for experts. This document, however, is not a scientific paper. It is designed specifically for individuals, community groups, municipalities, or others who have little or no experience in the restoration field. We have written to a general audience for a number of reasons:

- Most land in the U.S. is in private ownership; significant increases in wetland quality and quantity can be achieved if private landowners restore wetlands on their property.
- Many EPA, NOAA, FWS, and NRCS programs support public involvement in wetland recovery efforts: information on wetland restoration for the general public may enhance those programs.
- Restoration is an important, growing environmental field. The general public can benefit from access to basic information about restoration, and may become encouraged to become involved in and support restoration projects.

Developing a guide on wetland restoration, creation, and enhancement applicable across the nation is difficult for a number of reasons. First, the terms "restoration," "creation," and "enhancement" encompass a wide range of activities related to establishing or re-establishing wetlands. Second, climate, region, wetland type and local conditions determine the type of wetland project that is most appropriate. Third, the goals of people undertaking wetland projects vary widely and these goals influence what kind of activities are best suited to a particular site. Given the broad scope of the subject matter, this document is designed to achieve two goals:

- Introduce non-technical readers to the basics of wetland projects including planning, implementing, and monitoring,
and
- Direct interested persons to documents and resources specific to a particular region or wetland type.

The document is organized around these two goals. The text gives information on wetlands, background on the practice of restoration, and information on the process involved in undertaking a wetland project. The appendices provide documents, web sites, agencies, and other resources for finding additional information and advice on restoration, creation, and enhancement projects.

As you read this document, it will become clear that wetland projects vary considerably in size and complexity. In some cases, one person's efforts (fencing out cows, mowing instead of tilling, or eliminating the use of pesticides) can substantially improve a degraded site. On the other hand, teamwork and the help of specialists is usually required for creating new wetlands or restoring sites with extensive damage. In her book *Restoring Streams in Cities*, Ann Riley (1998) states that most restoration projects require teams of people with expertise in areas such as ecology, hydrology, engineering, and planning, among others.

Many landowners enroll in federal or state programs in which the public agency puts together a team of specialists who help with the restoration work. Other landowners or citizen groups may not be eligible for these programs or simply may want to organize the project themselves. Whether you are enrolled in a wetland restoration program or are organizing a wetland project yourself, this guide will help you understand what types of people and resources to consult in order to plan, implement, and monitor your wetland project.

The agencies who have worked on this informational document want it to be as useful as possible. Please give us your thoughts and comments on the information provided here. Write us or e-mail us care of:

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Silver Spring, MD 20910

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PART 1. INTRODUCTION

Why Restore Wetlands?

The public's interest in the renewal of natural ecosystems has grown steadily during the past few decades. While preservation of habitat is a key to environmental health, there is a growing awareness that restoration is essential to recover ecosystems that have been degraded or destroyed. Wetland habitats are the focus of many restoration efforts because, over the past 200 years, the area and health of wetlands has declined significantly. Less than 46 percent of the 215 million acres of wetlands estimated to exist in the contiguous U.S. when Europeans arrived remain. Prior to the mid-1970s, the draining and destruction of wetlands were accepted practices. Many wetlands altered by humans were drained to support agricultural uses, while others were filled for urban development, diked for water impoundments or to diminish flooding, or dredged for marinas and ports. Indirect impacts from pollutants, urban runoff, and invasion by non-native species continue to degrade and destroy wetlands.

Scientists and policy makers also recognize the value of wetland restoration. In 1992, scientists completed a study for the National Research Council that called for the development of a national wetlands restoration strategy. Since then, federal agencies have been working with partners to achieve a net increase of 100,000 acres of wetlands per year by 2005. This goal will be reached only through carefully planned and implemented restoration, creation, and enhancement projects that add ecologically valuable wetlands to the landscape. States and the federal government are funding and conducting large-scale ecosystem restorations, such as the South Florida/Everglades Ecosystem Restoration, which are contributing to this goal. However, without the support of citizens and local groups around the country the 100,000 acre per year goal cannot be reached.

For many decades, citizens have been restoring wetland habitats through local non-profit organizations. In addition, citizens have become involved in restoration through government programs. Despite these efforts, the nation is still losing more wetlands than it gains each year. This document is designed to support and further encourage landowner and community-based wetland restoration.

What are Wetlands?

Wetland Characteristics. Wetlands are unique ecosystems that often occur at the edge of aquatic (water, fresh to salty) or terrestrial (upland) systems. They may be wet year-round, wet during certain seasons, or wet during part of the day. Corps regulations for implementing the federal Clean Water Act define wetlands as:

"those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."

In addition to bogs and swamps, wetlands include tidal marshes, prairie potholes, seagrass beds, forested wetlands, and seasonally ponded sites, such as vernal pools. Some of these wetland types, such as seasonal wetlands that are dry much of the year, may not always appear to be wetlands.

The National Research Council's 1995 report entitled "Wetlands: Characteristics and Boundaries" lists several major classes of U.S. wetlands and some plants associated with each:

- Freshwater Marsh--grasses, sedges, herbs;
- Tidal Salt and Brackish Marsh--salt tolerant grasses, rushes;
- Prairie Potholes--grasses, sedges, herbs;
- Fens--sedges, grasses, shrubs;
- Bogs--sphagnum moss, shrubs, trees;
- Swamp Bottomland--cypress, gum, red maple; and
- Mangrove Forest--black, red, white mangroves.

Although wetland types are diverse, they all possess several ecological characteristics that distinguish them from upland or other aquatic ecosystems. Specifically, wetlands are characterized by unique hydrologic, soil (substrate), and biotic conditions. The hydrological regime, which is determined by the duration, flow, amount, and frequency of water on a site, is typically the *primary factor* driving the other ecological elements of the system. A site has wetland hydrology when it is wet enough to produce soils that can support hydrophytic vegetation (plants that are adapted to waterlogged environments). Wetland substrates are called hydric soils, meaning they are saturated with water for part or all of the year. Saturated soils become anaerobic (without oxygen) as water stimulates the growth of micro-organisms, which use up the oxygen in the spaces between soil particles. When soils become anaerobic, they change significantly in structure and chemistry. These factors all make wetland soils stressful to terrestrial plants.

As a result of waterlogged, anaerobic conditions, wetlands are dominated by hydrophytic plants that are *specifically adapted* to withstand these demanding conditions. The wide diversity of wetland plant species includes emergent plants (those with leaves that grow through the water column, such as cattails, sedges, and rushes), submerged plants (pondweeds, eelgrass), and floating-leaved plants (such as water lilies and duckweed). Wetland plants also include trees (such as cypress, red maple, and swamp oak), shrubs (such as willows and bayberry), moss, and many other vegetation types.

Because they exist where land and water meet, wetlands are often used by animals from both wet and dry environments. A number of invertebrate, fish, reptile, and amphibian species depend on wetland water cycles to survive or complete their lifecycles. For example, nearly all amphibians and at least 50 percent of migratory birds use wetlands regularly. Approximately 75 percent of all commercial marine fish species depend on estuaries, which in turn depend on their wetlands to maintain these productive ecosystems. See Technical Appendix T-II for more information on these attributes of wetlands.

Wetland Classification. Scientists have classified wetlands into various types. A well-known scheme, developed by Cowardin *et al.* (1979) for the FWS, has become the federally-accepted standard (see Box 1). Cowardin *et al.* state "Wetlands are defined by plants (hydrophytes), soils (hydric soils), and frequent flooding. Ecologically related areas of deep water, traditionally not considered wetlands, are included in the classification as deepwater habitats." For the complete national wetlands classification standard see http://wetlands.fws.gov/Pubs_Reports/pubs.html.

BOX 1: Definitions of Wetland Systems from Cowardin, *et al.* (1979)

Marine:

Open ocean overlying the continental shelf and associated high-energy coast line. Examples of wetland types within this system are subtidal and intertidal aquatic beds, reefs, and rocky shores.

Estuarine:

Deepwater tidal habitats and adjacent tidal wetlands that are usually semi-enclosed by land but have open, partially obstructed, or sporadic access to the ocean and in which ocean water is at least occasionally diluted by freshwater runoff from the land. Examples of estuarine classes include subtidal and intertidal emergent wetlands, forested wetlands, and rock bottom.

Riverine:

Wetland and deepwater habitats contained within a channel with two exceptions: 1) wetlands dominated by trees, shrubs, persistent emergent plants, emergent mosses, or lichens, and 2) habitat with water containing ocean-derived salts in excess of 5 ppt (parts per thousand). Rivers and streams fall within this system and subsystems include tidal, perennial, and intermittent watercourses.

Lacustrine:

Wetlands and deepwater habitats with all of the following characteristics: 1) situated in a topographic depression or a dammed river channel, 2) less than 30 percent areal coverage by trees, shrubs, persistent emergent vegetation, emergent mosses, or lichens, and 3) total area exceeds 8 hectares (20 acres). Lakes typify lacustrine wetland systems.

Palustrine:

All nontidal wetlands dominated by trees, shrubs, persistent emergent vegetation, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 5 ppt. This system also includes wetlands lacking such vegetation if they are less than 8 hectares, lack wave-action or bedrock shoreline features, and are no deeper than 2 meters at low water in their deepest spot. Examples include ponds, bogs, and prairie potholes.

The Importance of Wetlands

The loss and degradation of wetlands in the U.S. has resulted in a decline in the important benefits that wetlands provide to society. These benefits or functions usually link to goods and services important to society. Some of the benefits wetlands provide include:

- Healthy fisheries. A 1991 study by James R. Chambers determined that approximately 75 percent (by weight) of commercially harvested fish and shellfish are dependent on estuaries and their wetlands. Nationally, commercial fisheries were valued at \$3.5 billion in 2000. In California alone, the seafood industry generates approximately \$800 million in sales annually. Virtually all freshwater species of fish are dependent to some degree on wetlands, often spawning in marshes adjacent to lakes or in riparian forests during spring flooding. These species are sought by recreational anglers, who spent \$38 billion in 1996 to pursue their sport.
- Support for birds and other wildlife. Wetlands are probably best known for their value to waterfowl. The freshwater wetlands in the prairie pothole region of North America support an estimated 50 to 80 percent of the continental waterfowl production each year. The loss of wetlands in this region, which is estimated to be more than 50 percent of the original wetland acreage occurring at the time of settlement, has been considered a major factor in the decline in nesting success of duck populations in North America. Wetlands also support a wide diversity of other birds. Eighty percent of America's breeding bird population and more than 50 percent of the 800 species of protected migratory birds rely on wetlands. In addition to birds, other wildlife makes its home in wetlands. Reptiles and amphibians are common wetland residents. Nearly all of the approximately 190 species of amphibians in North America depend on wetlands for breeding. Other wildlife associated with wetlands includes muskrat, beaver, mink, raccoon, marsh and swamp rabbits, numerous mice, voles, shrews, lemmings, and other small mammals. Large mammals also rely on wetlands. For example, moose often depend on wetlands such as white cedar swamps and other forested wetlands for winter shelter and food.
- High biological productivity. Many wetlands are highly productive ecosystems in large part because they are rich in organic matter and nutrients. These nutrients support organisms within the marsh, but in many instances the nutrients are also transferred to nearby aquatic systems (lakes, rivers, and estuaries), enhancing the productivity of these systems and supporting human uses such as offshore commercial fisheries.
- Biodiversity protection. Wetlands support a great diversity of species and many of the species are unique and rare. Among this vast diversity are many plant species used for food, drugs, and other commodities. There are most likely other beneficial organisms yet to be discovered. Of the 1,082 U.S. plant and animal species listed as threatened and endangered as of May 31, 1997, 499 species (46 percent) are wetland-associated. These organisms are important to ecosystem function and, ultimately, for the health of the environment upon which humans depend.

- Erosion control. By dissipating wave energy and stabilizing shorelines, wetland vegetation buffers the adjacent upland from wave action and intensive erosion.
- Flood damage reduction. Wetlands intercept runoff and store stormwater, thereby changing rapid and high peak flows to slower and smaller discharges over longer periods of time. Because it is usually the peak flows that cause flood damage, the effect of wetlands is to reduce the danger of flooding. A classic study by the Corps in the Charles River Basin in Massachusetts estimated that the loss of 3,400 hectares (approximately 8,100 acres) of forested wetlands would increase downstream flood damage, costing millions of dollars annually.
- Good water quality. Wetlands are known for their ability to capture sediments and filter pollutants, which improves water quality. For example, spring floods often carry very turbid water which, if not for the filtering that occurs in downstream wetlands, could deposit sediment that would smother plants and fish eggs. In addition, wetlands constructed to treat municipal runoff require only a fraction of the construction and operation budget of a conventional system.
- Aesthetics and recreation. Many recreational activities take place in and around wetlands. Hunting and fishing are popular activities associated with wetlands. Other recreational activities in wetlands include hiking, nature observation and photography, canoeing, and other boating. Many people simply enjoy the beauty and sounds of nature and spend their leisure time near wetlands observing plant and animal life. Wetlands are also important places for outdoor study and for gaining an appreciation of natural history and ecology. Properties bordering wetlands often have higher property values than those that do not. Urban wetlands are typically some of the last remaining pieces of "natural habitat" providing residents some sense of wildness and open space.

A primary goal of wetland recovery projects is to preserve and restore wetland benefits by re-establishing *natural ecological processes*. Some wetland functions can be mimicked with engineered structures, but engineered methods typically do not provide the maximum ecological benefit. For example, instead of re-establishing native vegetation on wetland edges to control erosion, a cement wall could be used to armor the bank. A cement wall could limit erosion for a time, but it does not provide the other ecosystem benefits of wetlands, such as filtering pollutants and providing fish habitat. For a more detailed list of wetland functions, see Technical Appendix T-I.

PART 2. WHAT IS RESTORATION?

Definitions

The terms “restoration”, “creation”, and “enhancement” have been defined a variety of ways. The following commonly-accepted definitions for these terms, based on Lewis (1990), will be used in this document:

- **Restoration** - Returning a degraded wetland or former wetland to a pre-existing condition or as close to that condition as is possible.
- **Creation** - Converting a non-wetland (either dry land or unvegetated water) to a wetland.
- **Enhancement** - Increasing one or more of the functions performed by an existing wetland beyond what currently or previously existed in the wetland. There is often an accompanying decrease in other functions.

A similar set of definitions was adopted by a number of federal agencies in 2000 to keep track of federal wetland conservation projects. This set of definitions distinguishes between two types of restoration - “rehabilitation” (restoration in an existing wetland) and “reestablishment” (restoration in a former wetland). These definitions are in Appendix T-V.

Restoration and enhancement projects may be difficult to distinguish from each other, because both can encompass activities in existing degraded wetlands. According to the definitions above, restoration entails returning a wetland to a former state (e.g., filling a ditch so that a drained wetland becomes flooded again), while enhancement means changing the wetland so that one or more functions are increased beyond their original state. An example would be diverting a small stream into a wetland so that the area has deeper water.

Enhancing a wetland in one way often degrades it in another way. For example, adding more water to a wetland may create better habitat for fish, but it will decrease the ability of the wetland to hold flood waters. This trade-off is particularly true for enhancement in relatively undisturbed wetlands. Some common examples of the trade-offs that can occur with wetland enhancement include loss of fish habitat when salt marshes are impounded to provide waterfowl habitat, decreased water storage when seasonal wetlands are flooded to increase aquatic habitat, and loss of colonial waterbird habitat when mangroves are removed to provide shorebird habitat. When wetland enhancement is undertaken, the project goals should include minimizing any decrease in existing wetland functions.

Wetland creation - putting a wetland where it did not exist before - is usually a difficult undertaking. The primary challenges in creation projects are bringing water to a site where it does not naturally occur and establishing vegetation on soils that are not hydric. While creation is possible, it typically requires significantly more planning and effort than restoration projects, and the outcome of the effort is difficult to predict. Many attempts to convert uplands to wetlands result in ecosystems that do not closely resemble natural wetlands and that provide limited wetland functions (valuable upland habitat might be lost in the process as well). Creating wetlands from open water is less difficult with respect to establishing a water source, but it often requires placing dirt or other fill into existing aquatic habitats, which means destroying one kind of aquatic habitat to create another. While this trade-off

sometimes can be justified ecologically, the engineering and regulatory challenges of these projects are so complicated that professional expertise and oversight are almost always required.

The outcome of a creation and enhancement project is often difficult to predict because these projects essentially try to produce a new ecosystem. With restoration projects, outcomes are more predictable, although there may still be uncertainty depending on the type of wetland, extent of degradation, and many other factors. Under certain circumstances, creation or enhancement may be the best option (see Box 2 for an example) but for the most part, restoration is more likely to have a positive outcome in terms of improving wetland resources.

BOX 2: Created Wetlands to Treat Urban Runoff

Created treatment wetlands can control the increased runoff and pollutants generated by development in watersheds. In the Sligo Creek Watershed of Montgomery County Maryland, the Metropolitan Washington Council of Governments (COG) worked with many groups and agencies to create wetlands to capture stormwater runoff from local urban development. The created wetlands control the amount of water reaching Sligo Creek and allow the sediment and other pollutants to settle out before the water reaches the Creek. Because the created wetlands helped improve water quality and establish more natural flows to Sligo Creek, COG and local groups were able to complete stream restoration in the Creek itself. They have restored the natural channel shape, replanted native tree species, and reintroduced native fish and amphibians.

One additional term common in discussions about wetland restoration, creation, and enhancement is **mitigation**. In a general sense, mitigation means reducing environmental damage by avoiding, minimizing, and compensating for activities that damage or destroy protected resources. In a wetland context, “mitigation” is often short for “compensatory mitigation” and means wetland restoration, creation, enhancement, or some other action undertaken for the specific purpose of compensating for the damage or destruction to another wetland area. When wetland restoration or a related activity is undertaken as mitigation, there are usually a number of requirements that must be met to ensure that the wetland activity provides adequate compensation for the associated wetland loss.

Discussing the regulatory requirements of compensatory mitigation is beyond the scope of this document. More information on topics specific to compensatory mitigation can be obtained from agencies involved in wetland regulation, especially the Environmental Protection Agency (EPA) and the Army Corps of Engineers (Corps) (see Federal agency web sites in Resource Appendix R-III).

Planning, monitoring, and long-term management, which are important for all wetland restoration, creation, and enhancement activities, **are especially important for wetland mitigation projects.**

Approaches to Restoration

Restoration practitioners typically implement only the actions necessary to re-establish natural wetland processes on a site. The first method to consider for renewing functions is to remove the factors causing wetland degradation or loss and let nature do the work of restoration. This method is often called the **passive approach**. For example, if wetland vegetation and water quality are degraded primarily as a result of cattle grazing, then removing the cows may be the only activity needed to restore the wetland system. Passive methods allow natural regeneration of wetland plant communities, natural re-colonization by animals, and re-establishment of wetland hydrology and soils. Passive approaches are most appropriate when the degraded site still retains basic wetland characteristics and the source of the degradation is an action that can be stopped. The success of passive methods usually depends on an accessible source of water, the close proximity of wetland plants and animals, and a mechanism for bringing species to the restoration site. The benefits of passive methods include low cost and a high degree of certainty that the resulting wetland will be compatible with the surrounding landscape.

For many sites, passive methods are not enough to restore the natural system and an **active approach** is necessary. Active approaches involve physical intervention in which humans directly control site processes to restore, create, or enhance wetland systems. The active approach is most appropriate when a wetland is severely degraded or when goals cannot be achieved in any other way, as is the case with wetland creation and most enhancements. Active methods include re-contouring a site to the desired topography, changing the water flow with water control structures (i.e., weirs or culverts), intensive planting and seeding, intensive non-native species control, and bringing soils to the site to provide the proper substrate for native species. The design, engineering, construction, and costs for such work can be significant.

PART 3. TACKLING THE RESTORATION PROJECT

Enroll In a Restoration Program

There are a number of federal wetland restoration programs, in which landowners can enroll for help with a wetland recovery project. Federal programs provide technical and financial assistance to landowners, communities, and local governments interested in restoring native fish and wildlife habitats, including wetlands, uplands, riparian, and in-stream habitats. Many people take this route to restoration. Information on federal programs is given in Resource Appendix R-II. Several states, non-profit organizations, and local governments have similar programs. Check with your state department of natural resources to determine whether local restoration programs exist.

Hire a Project Manager

If you don't qualify for a federal or state program, another project approach is to hire someone with experience in wetland restoration to put together a plan and a team for you. There are consulting firms and some non-profit groups around the country who have the expertise in-house or can act as a

wetland restoration contractor to find those with the right kind of expertise. Check the Association of State Wetland Managers' "Directory of Wetland Professionals" at <http://www.aswm.org> or the Professional Certification section of the Society of Wetland Scientists' site at <http://www.sws.org> for lists of professional restorationists (and see Resource Appendix R-III).

Be Your Own Project Manager

If you (as an individual or citizen's group) choose to do the project yourself, you will want to assemble the people necessary to complete your wetland work. The type of technical advice and amount of physical help needed will depend on the project goals, the extent of degradation of the site, and the type of wetland; in short, it will depend on the complexity of the project. An example of a community-based project requiring moderate effort is described in Box 3, the Decker Lake Wetlands Project.

BOX 3: Decker Lake Wetlands Project—A Multi-Partner Effort

In Salt Lake County, Utah, non-native species were contributing to the degradation of Decker Lake. Youth Force, part of the Salt Lake County Service and Conservation Corps, decided to do something to help the Lake. The Salt Lake County Job Training Partnership Act and the EPA's Five-Star Restoration Program helped fund the effort. EPA's Region 8 office provided funding for a local naturalist who gave presentations on local ecology to the Youth Force crew and the community. With technical assistance from a Fish and Wildlife Service staff member, the Youth Force team pruned non-native tamarisk and removed *Phragmites* and other invasive plants from a 15 foot by 500 foot bank area next to Decker Lake. In addition to improving lake-side conditions, the Youth Force educated visiting groups about non-native species and attracted many other volunteers to help at the site.

For many projects, to accomplish the changes in hydrology, soils, and biota necessary to create or restore a functioning system, you will need assistance from local experts on wetland restoration. Resource Appendix R-I contains potential sources of information. You will most likely need funding for your project, too. See Resource Appendix R-II for a start on where to look for funding. Some sources of information, technical help, and funding include:

On-Line Resources. There are numerous on-line sources of wetland restoration experts and expertise. Resource Appendix R-III contains internet addresses for directories of wetland and ecological restoration professionals, training opportunities, documents, and other sources of information. New information is constantly added to the world wide web, so internet searches on wetland topics will result in additional on-line information.

Agencies. Talk with public agencies to see if they have staff who can help you. You might begin with your local office of the U.S. Geological Survey (USGS), US Fish and Wildlife Service (FWS), NMFS, Environmental Protection Agency (EPA), or the Corps. In agricultural areas, check with the NRCS for restoration expertise. Your state or local natural resource agencies, conservation

districts, or state departments of natural resources may have staff with experience in wetland restoration. Ask for help in developing your restoration plan, reviewing it, or in providing specific information on the ecology of the wetland type you want to establish. If the agencies you contact do not have enough time or expertise to help you, ask for other contacts they would recommend. Some agencies have programs for funding restoration projects (see Resource Appendix R-II).

Local Experts. Solicit restoration expertise from the local community. Post or send out flyers asking for volunteer experts in the community to help you. Many people with wetland restoration expertise are involved in wetland restoration efforts in their off hours. Not everyone who volunteers will have the expertise you need, so ask questions about what projects they've worked on, and look at the projects to see if they are meeting their goals.

Universities and Non-Profits. Check with the biology or environmental studies departments of local colleges and universities. They may offer ecological restoration courses or programs that could provide you with more background. The course instructors may be willing to help you with your project by providing technical advice and/or student volunteers. Local non-profit organizations may have restoration programs as well as access to advisors and volunteers. If local non-profits don't yet have a restoration program, you might convince them to team up with you to plan and undertake your project. Consider such organizations as the Izaak Walton League of America, the local Sierra Club or Audubon Society, native plant societies, and watershed protection groups.

Several large non-profit groups are significant supporters of restoration work. The National Fish and Wildlife Foundation helps groups find money to finance environmental projects, Ducks Unlimited provides funds and expertise to protect and restore wetland habitat, and The Nature Conservancy is a valuable source of information on restoration, creation, and enhancement projects. Find contact information for these and other groups in Resource Appendix R-III.

Corporations. Many corporations sponsor wetland restoration, sometimes in partnership with government agencies and non-profits. For example, the National Corporate Wetlands Restoration Partnership, sponsored by the National Association of Manufacturers, the Gillette Company, and Coastal America, is a public-private partnership between the federal government, state governments and private corporations to restore wetlands and other aquatic habitats (see <http://www.coastalamerica.gov/text/cwrp.html>).

The remainder of this document describes the four phases of a restoration project: planning, implementation, monitoring, and long-term management. If you are having someone conduct the restoration project for you, you will not be using this information yourself, but knowing the process will help you ask the right questions and understand the work. For those doing their own projects, the following information gives a basic overview of the restoration process and provides some resources. This document cannot provide the specific information on local wetland types, site conditions, watershed land uses, or implementation that is necessary to accomplish a project. That information must be obtained from sources with specific local knowledge. Some of these sources are listed in the Bibliography (Resource Appendix R-I) and in Resource Appendices R-II and R-III.

PART 4. PLANNING

Why Plan?

Good planning is a critical, but often overlooked, stage of the restoration process. Inadequate planning is often cited as a major reason projects fail to restore self-sustaining, naturally-functioning systems. Here are just a few reasons thoughtful planning is so important:

- Planning requires collecting information about the local area, potential restoration, creation, or enhancement sites, historical trends, and other topics that will help you understand the project you are initiating.
- Planning will help you choose the best site to achieve your goals, or, if you already have a site in mind, planning will help you determine the most reasonable goals for your site.
- Planning will help you establish clear and feasible objectives given the factors that may constrain the project.
- Planning identifies the materials, labor, and activities that will be needed to achieve the project's goals.
- Objectives and target criteria established during planning direct the type of monitoring that will be needed.
- Clear goals and objectives will help you explain to other people, including potential funders, partners, and the local community, what you are trying to accomplish.

Not every project will require all of the planning steps described in this section, nor will everything in each step be needed. The extent of the planning required will depend on the condition of the project site and your goals. More complex projects require more planning.

Know Your Landscape

To plan a wetland project that will be compatible with adjacent ecosystems, you will need to understand the local landscape. If you have already chosen a project site, understanding the landscape will help you determine what is ecologically possible on your site. If you are looking for a site, understanding the landscape will help you choose the site most likely to achieve your goals.

All wetlands exist in a landscape that has an enormous influence on how the wetland develops and functions. As you begin planning a wetland project, look at the landscape and identify the major natural features and any patterns in the way these natural features occur. For example, is the area fairly flat, hilly, or sloped? These factors affect surface and groundwater drainage and ponding patterns. Are land uses in the surrounding landscape changing rapidly, as is often the case near eroding coastlines or in urbanizing areas? Rapidly changing land forms or land uses may have future negative effects on project sites. Do the wetlands occur throughout the landscape or are they concentrated in one place? The distribution of wetlands is influenced by natural features of watersheds, such as topography (elevation, aspect, and slope), climate, precipitation patterns, soil types, groundwater, surface waters, floodplains, and vegetation communities. You will want to collect current information on the hydrology, soils, and vegetation communities in the watershed.

Maps with local topography and existing aerial photography can provide essential information on the primary sources of water in the watershed and the way wetlands are associated with them. Rivers, streams, lakes, bays, and the ocean are obvious sources of water that may have wetlands associated with them. Some wetlands are sustained by less obvious sources of water such as groundwater (springs, seeps, high water table) or rainfall and surface runoff. Obtain topography, drainage, and runoff information from the NRCS Field Office Technical Guides. Local water quality control districts, water management districts, or flood control districts (states often use different names) will have rainfall data and water level data for local water bodies. Look for data on the groundwater levels. The Federal Emergency Management Agency (FEMA) and local flood control districts have maps on the location and elevations of floodplains. These agencies can help you find out the frequency and magnitude of the flood events that occur in your community.

Soil maps for your watershed are available from the NRCS and are invaluable in locating where wetland soils exist or used to exist. Soil maps also often contain information about the location of springs, ponds, streams, and drainage ditches. Aerial photographs from the USGS or local aerial photography firms may provide data on some watershed features including the presence of wetlands and the amount and type of vegetation cover in an area. Information on local vegetation communities also may come from recent biological reports completed for planning agencies, Environmental Impact Statements, or other documents available from local planning agencies. Table 1 gives sources of information on soils, floodplains, and other watershed features.

Aerial photos are a valuable and commonly used source of data on watershed features such as topography, drainage and ponding patterns, land uses, vegetation communities and coverage, and habitat fragmentation and loss. Aerial photos cannot provide all of the information needed to evaluate watershed conditions; you will need to check with other sources to fully evaluate your watershed. Consult local agencies and other sources of information to get a full picture of current watershed conditions.

In addition to information about present conditions, collect information on the history of the watershed for valuable insight into the ecosystems that used to be there and what factors have caused loss or degradation to wetlands in the area. There may be aerial photographs for the past several decades or other records of past watershed conditions that could provide some of this information. Reviewing aerial photos from several years probably will show that some features, such as topography, have not changed much but others, such as land use, drainage ditches, roads and other structures, and vegetation communities, have changed significantly.

After considering natural conditions, identify human influences and constructed features. Roads, ditches, dams, and large areas of impervious surfaces such as parking lots are all features of the landscape that could affect existing wetlands and proposed wetland projects. Adjacent or regional land uses may or may not be compatible with re-establishing a former wetland or with the goals of a wetland creation or enhancement. Typical land uses include urbanized lands (residential, industrial, commercial), agriculture, grazing, mining, forest harvesting, streams, lakes, wetlands, non-harvested forest, open grassland, or park/recreational open space.

Urban and industrial areas may be sources of excess sediment and pollutants, such as oil and heavy metals, that wash off paved areas into streams and wetlands. Agriculture is often a source of

pesticides and fertilizers that may harm wetlands. These land uses may impair the health of newly established wetlands. On the other hand, farms are capable of providing valuable adjacent upland habitat if there are uncultivated buffer areas between the wetland and the fields. Consider not only existing land uses, but also future changes to the landscape such as encroaching development. Local zoning and planning documents from cities and counties can be examined to identify proposed conservation areas and future development areas.

Two land use questions to address as you plan your project are:

- How might changes in land uses, roads, ditches, and other human-constructed features have affected water quality, surface water runoff, and drainage/ponding patterns?
- How might these changes in land use, and the presence of roads, buildings, and other human-constructed features affect your ability to restore, create, or enhance a wetland?

For more information on watershed features, check the data available on your watershed at the EPA website, <http://www.epa.gov/surf>. For another information source, check the USGS 7.5 minute quadrangle maps for your area; these maps have many relevant landscape features. Also, National Wetlands Inventory (NWI) maps from the FWS for your region will show the location of some (but not all) of the wetlands. Visit their web site at <http://www.nwi.fws.gov/>.

Table 1. Where to Find Information on Your Watershed/Landscape and Site

Information Resource	Where to Find Information Resources
Aerial Photography	Local Geological Survey (USGS) office, NASA (satellite photos such as those from the Thematic Mapper); Farm Services Agency (FSA); local aerial photography companies; state natural resource agencies.
Flood elevations and floodplains	County, city, or town zoning and planning offices; Federal Emergency Management Agency (FEMA) Flood Hazard Maps; District offices of the Army Corps of Engineers; state natural resource agencies.
National Wetlands Inventory (NWI) Maps	For map status and free desktop printing of areas and acreage status (42% of US available) use the Wetland Interactive Mapper at http://wetlands.fws.gov . To purchase paper maps (90% of US available) call the USGS Earth Science Information Center at 1-888-ASK-USGS or contact a state distribution center from the list at http://wetlands.fws.gov/state_distribution_centers.htm .
Soil Survey Information	Local office of NRCS; find the field office directory at: http://www.nrcg.nrcs.usda.gov/perdir.html .

Topographic Maps	Local USGS office or USGS's "Map Finder" at: http://edcwww.cr.usgs.gov/Webglis/glisbin/finder_main.pl?dataset_name=MAPS_LARGE or call 1-800-ASK-USGS; local map or sporting goods stores.
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Choosing the Project Site

Some people decide to do a wetland restoration project with a site already in mind—one they own or have a special interest in—but, for many people, site selection is part of the planning process. All restoration, creation, and enhancement projects must be carefully placed in the watershed to meet hydrologic, soil, and biotic requirements. Site selection is a process of setting goals and then looking for sites with characteristics that will support achieving your goals. In the early stages of planning, you may select one site and then switch to another as your goals are refined. The best approach to site selection is to be flexible.

The first place to start when looking for a project site is a local, regional, or state list of priority wetland restoration sites. By choosing a site from such as list, you will be taking advantage of local wetland restoration expertise. The contacts listed in Appendix R-III, as well as local and state wetland contacts, can help you find out if there is a list of priority restoration sites for your area. Talking to the people who created the list can help you pick the site that best fits your goals and resources.

When there are a number of potential project sites, you will need to evaluate them carefully. Hammer (1992) lists these six factors to consider when choosing a restoration, creation, or enhancement site:

- hydrology;
- topography and geology;
- soils;
- biotics;
- land ownership; and
- agency requirements.

Information on the first four factors may be provided when you conduct the landscape/watershed evaluation described in the previous section. When choosing a project site, specifically consider how to achieve the necessary amount and duration of water for your wetland type. Look for potential locations with the hydrology, topography, and geology typical of the type of wetland you want to restore. Look also for the presence of wetland soils (hydric soils) or drained wetland soils, which indicate places that would be appropriate for wetland restoration. Choosing a site that is close to an area with native wetland species or finding a site that already has native species might aid natural colonization of the site. The best sites are likely to be near wetlands similar to your target type.

If you are buying a site, determining the ownership of a potential project site is a critical step. Find out if there are easements, liens, covenants, water-rights issues, or other aspects of the parcel that may restrict its use for your project. Agency requirements also determine the suitability of a site for the intended project. Find out from local, state, and federal agencies what permits or authorizations may

be necessary to undertake your project. For more information on this topic, see the section below, “Government and Agency Requirements.”

Successful site selection produces locations that will support your wetland project goals. You may need to revise your project goals to reflect the constraints of current conditions if available sites do not meet your original purposes.

Know Your Project Site

Before designing a project, you will want to learn about the past and current conditions of your project site by conducting a site assessment. The goals of a site assessment are to:

- understand former conditions on the site;
- determine whether or not a wetland ever existed on the site;
- determine what factors resulted in wetland degradation or loss, if a wetland did exist; and
- determine the current condition of the site.

Before visiting the site and collecting samples or other information, make sure you have permission from the owner or own the site yourself.

The site assessment is a more focused version of the landscape evaluation and it may tap some of the same information sources. Examine historical photos (including aerials), historical maps of the area, talk to long-time residents, or hire a wetland professional to determine the locations and types of former wetlands. Past conditions can provide valuable information on impacts to the site that may affect restoration outcomes. For example, if the site history reveals that the area was once a dumping ground for potentially toxic materials, you should contact experts on toxic substances to determine how to proceed. A range of toxic materials can occur in polluted sites, and while some pollutants may be serious problems, others may not. Expert advice is essential for determining whether a polluted site is suitable for your project or whether you should seek another project location.

You will also need to characterize the *current* conditions of the restoration, creation or enhancement site. Information on the site’s current hydrology, soils, and vegetation will help you understand the site’s potential wetland restoration, creation, or enhancement. Visual inspection of the site and the sources listed in Table 1 can provide qualitative (general) information on the following characteristics:

- topography;
- evidence of erosion;
- evidence of drainage and water movement patterns;
- major vegetation types;
- human structures and land use; and
- adjacent land uses.

In addition to qualitative information, collecting site-specific, quantitative (numerical) data is often necessary to determine the causes and cures for wetland loss or degradation. Quantitative site measurements may be required to obtain permits or to design the project. Collecting quantitative data typically requires the help of local experts familiar with conducting biological assessments and wetland delineations, and who are knowledgeable about the local natural communities. Several quantitative parameters that are often measured in the field include:

- exact elevations and topography of features;
- levels of soil nutrients, organic matter, and moisture;
- water flow rates and timing;
- location of wetland soils, wetland plants, and wetland hydrology; and
- diversity and cover of native and invasive or non-native plant species.

You also should look for site conditions that could limit the project goals. Modifications to the project design or maintenance plan may be needed to address problems such as:

- poor water quality or lack of sufficient water;
- local pollutants;
- improper sun exposure for plantings;
- lack of native species nearby;
- invasive and non-native species on adjacent lands;
- herbivores that could decimate new plants (Canada geese, muskrats, etc.);
- human uses (of the site and adjacent sites) that are incompatible with restoration;
- future land uses (in and around the site) that are incompatible with restoration; and
- presence of cultural resources.

As noted earlier, watershed conditions play a major role in achieving restoration, creation, or enhancement goals. It is important to realize that it may be harder to reach your goals at an isolated site than at a site located near or adjacent to comparable wetlands. Isolated habitats may be more vulnerable to invasion by non-native species and are more difficult for native plants and animals to colonize. However, some wetland types such as prairie potholes and vernal pools are naturally separated from similar habitats. For these types of wetlands, it is appropriate to restore or create them where they typically occur in the landscape and in numbers typical to the watershed.

Setting Goals and Objectives

As you selected the project site and evaluated its condition, you did so with ideas of what you want to achieve. These **goals**, which are general statements about the desired project results, reflect your motivations for undertaking the project. Do you want to see your site support a diversity of native plant and animal species? Are you interested in improving the water quality in local streams? Do you hope to return the site to a condition you remember from years before? Examples of goals for wetland restoration projects might include “repair damage to seagrass beds from boat traffic” or “restore the native plant species and seasonal water cycle to a drained prairie pothole.”

Goals provide an overall framework. The next step is to develop **objectives** that provide specific targets focused on hydrology, soils, topography, and/or biological factors that must be changed

on the project site to establish or restore a wetland. For the goal “restore the natural hydrology and vegetation of a degraded Atlantic coast salt marsh” the following objectives would be appropriate:

- Restore the natural tidal regime;
- Ensure the mudflat is returned to a level appropriate for vegetation;
- Re-establish dominance of the native plant community, e.g., *Spartina* and *Salicornia* species; and
- Limit the presence of non-native or invasive plant species.

Progress is determined by measuring performance standards or **target criteria** that are linked to each objective. Target criteria often include a numerical end-point and a time line to reach that end-point. For example, the objective “Restore the natural tidal regime” might be linked to this target criterion: “Remove enough of the dike so that within one year the tidal range upstream of the dike is equal to the tidal range downstream of the dike.” Such numerical targets are measurable and will allow you to know if the site is progressing toward your goals. You should set target criteria that are: (1) measurable and objective; (2) collectable with simple methods that generate comparable data each time they are used; and (3) produce repeatable results. Include incremental targets that reflect how the site is likely to change as it moves from its initial condition toward a more established community.

Box 4 provides information on the target criteria set for the West Eugene Wetlands Project in Oregon. This project also illustrates another important point: even if you have a very specific goal, such as providing additional wetland habitat for a rare species, be sure that you focus not just on that one wetland function, but plan to restore as much of the wetland system as possible.

Here are other examples of target criteria:

- If your goal is to restore a seagrass bed, then one objective might be to re-establish native eelgrass. A target criterion for that objective could be to “establish eelgrass plants covering 60 percent of the original area at the end of 3 years.”
- If your goal is to restore a seasonal prairie pothole by re-establishing its natural hydrology, then one target criterion might be to “establish water depths between 1 and 2 feet on 75 percent of the site for the period of the year necessary to support native vegetation.”

BOX 4: West Eugene Wetlands Project Targets Rare Species Habitat

The Lane-Metro Youth Corps of Eugene, Oregon, undertook a 9-month wetland restoration project in the West Eugene Greenway, which is managed by the Army Corps of Engineers. The goal of the project was to complete work in endangered and threatened species habitat that would lead to natural re-colonization by the native species. The specific measurable target criteria to be achieved in nine-months included:

- Enhance and restore 5 acres of habitat to provide for the survival and reproduction of Bradshaw's lomatium and Willamette Valley daisies.
- Collect seeds from 40 acres of native wetlands.
- Construct 11 accessory water channels to enhance site hydrology to support rare daisies.
- Plant native species along 5,000 feet of levees to provide a diverse native plant community.

Using Reference Sites

How do restoration specialists determine what kind of hydrology, soil conditions, or specific organisms to establish at a project site? A standard method for setting restoration targets is to base them on the conditions of the wetland that existed on the site before it was altered. If hydrology, soil, and biotic data on the pre-damaged condition of the wetland are complete enough, this information can be used to set standards for partially or completely re-establishing the pre-disturbance conditions. Information collected from aerial photos and historical maps may show the former extent of vegetation and/or hydrology. Data from sources such as local water districts, universities, and citizens, may also provide the detail needed.

However, in most cases, there is not enough detailed background information on plant species and cover, animal species and abundance, soil conditions, or hydrology to set target criteria. Because historical information is often missing, most restorationists depend on local **“reference sites,”** which are sites that represent the least disturbed wetlands of the target type in the area. The ecological conditions at reference sites are usually indicative of the natural communities that can be supported under current conditions. Even if we wanted to restore to a “pristine” ecosystem such as the Europeans first saw when they arrived in North America, changes to land uses, water sources, or other aspects of the surrounding landscape in the last 300 years usually make it difficult or impossible to restore a wetland to its pre-disturbance ecological condition (see Box 5). Reference sites provide insight into what is possible now.

BOX 5: Restoration in “The Meadowlands” of Northern New Jersey

A good example of altered regional hydrology and its effect on wetland restoration exists in northern New Jersey in “The Meadowlands.” In colonial times, this area was an Atlantic white cedar swamp, but today the cedars are gone, replaced by fill, roads, buildings, some brackish marsh, and a tall reed known as *Phragmites*. There are numerous wetland restoration projects in The Meadowlands, but none of them have as their goal restoration of a white cedar swamp. In addition to all the other landscape changes, a dam on the Hackensack River has made the area too salty for cedars. Instead, wetland restoration efforts are focusing on establishing brackish water marsh, which is much more appropriate given the current regional ecological and hydrological conditions.

To collect reference site data, examine the least altered nearby wetlands that are in the same landscape position as your site (e.g., along a river, in an isolated depression) and appear to be similar to the pre-disturbance condition of the degraded wetland, if known. You may have already collected some information on similar wetlands when you were learning about the local watershed. Try to identify *several* reference wetlands, because wetlands of the same type can vary considerably in their characteristics. Looking at multiple wetlands of the type you hope to establish can help you understand the natural range of variation of the wetland type. Be sure you have the landowner’s permission to enter any property you examine.

Restorationists also look for data on different phases of recovery to understand how the system will change over time. Some states are currently developing sets of data from reference wetlands. Contact your state water quality agency or department of natural resources to find out if your state is gathering information on reference wetlands. The wetlands division of your regional EPA office may also have information on reference sites. Look also for other restoration, creation, or enhancement projects and talk to the people responsible about how well the project is progressing toward its goals. Understanding how other restoration projects are developing can help you determine whether your goals are appropriate.

You or someone on your team should collect basic information on the hydrology, soils, and plant community from the reference sites. General information can be collected from visual inspection of the sites and from the sources you consulted for general information on your project site. Reports and published literature may also be a source of general information on reference sites. The Community Profiles series published by the FWS provide basic information on a range of wetland types (see Resource Appendix R-I). Professional restorationists often collect specific, quantitative measurements on the characteristics of the reference sites. These characteristics are the same as those used to quantify conditions on the project site.

When using data from reference sites to set target criteria, remember that ecological systems are not static, so target criteria should include an acceptable range of natural variation. Also plan for typical disturbance regimes, such as 2-year to 100-year flood conditions. While natural disturbance regimes are essential to the long-term health of ecosystems, many projects have been damaged or lost soon after completion because planners did not consider the flood potential or natural disturbance regime of their site.

Below is a list of questions to ask your technical advisors and to keep in mind as you plan your wetland project. Don't be alarmed if the answer to many of these questions is "we don't know precisely and finding out would be too costly." Many of these questions do not have simple answers, but even partial answers can help you in your planning.

Ask about Hydrology:

- Where can regional baseline hydrologic data, including typical and extreme flood events and their potential, be found?
- What are the current hydrologic characteristics of the restoration site?
- What are the pre-disturbance hydrologic characteristics at the restoration site (if known)?
- What parameters should be measured at the restoration and reference sites?
- What has caused changes to the hydrologic characteristics of the site (what removed the water or prevents it from entering your site)?
- Where can reference sites for this wetland type be found in the watershed or nearby?
- Are there potential effects on downstream areas of changing the hydrologic characteristics of your site?
- What is the relationship between the elevation of the land surface and primary water sources (surface and ground water) for the wetland?

- What changes might restore hydrology and the correct relationship between soil and water levels?
- What design elements should be included to restore the typical hydrological regime and allow for extreme events?
- What soft engineering or bioengineering methods are available to rectify the problems?
- What factors might constrain restoring full hydrological functioning?
- What are likely reasons that the site might fail to reach its hydrological goals?
- What potential remediation or correction measures are available?
- Are the project goals reasonable, feasible, and likely to result in establishing the maximum ecological functioning possible for the site?
- What parameters should be monitored? How often should they be monitored and for how long?

Ask about Water Quality:

- Are there indications of pollution? What are the likely sources?
- What water quality tests are necessary?
- What are the best methods for testing water quality (field kits, lab testing)?
- What methods are available for fixing pollution problems?
- Are the project goals reasonable, feasible, and likely to result in establishing the maximum ecological functioning possible for the site?
- What parameters should be monitored? How often should they be monitored and for how long?

Ask about Wetland Soils and Substrates:

- Where can baseline information about local soils be found?
- Where can reference wetlands be found in the watershed or nearby watersheds?
- What are the typical characteristics of substrates in the wetland of interest? Levels of organic matter, nutrients, soil moisture? Particle sizes and soil structure?
- Are there impervious soil layers contributing to the wetland dynamics?
- What soil parameters should be sampled to characterize the site?
- What are typical substrate elevations and microtopographic features of this wetland type (including channels, islands, and mounding)?
- If toxic soils are found, can they be removed or remediated?
- What methods are available to bring the soil conditions and substrate elevation in line with observations from relatively undisturbed wetlands?
- What bioengineering or soft engineering implementation methods are available?
- Are the project goals reasonable, feasible, and likely to result in establishing the maximum ecological functioning possible for the site?
- What soil and elevation parameters should be monitored? How often should they be monitored and for how long?

Ask about Wetland Plant Communities:

- What native plant species are found in pioneer and mature stages of the target wetland type? What are the dominant and rare species?
- What special status, threatened, or endangered species are found in the target wetland type?
- What natural disturbances are typical of this wetland type?
- On the potential restoration site, what plant species are present, including special status and listed species, non-native invasives, and species native to the target wetland?
- What soil and hydrological conditions on the potential restoration site would constrain establishing the native community? How should these conditions be changed?
- How should the site be prepared (adding soil amendments, removing non-natives, etc.) for establishing native plants?
- What methods are available for eliminating the most damaging non-native species?
- Is it likely that native species will colonize the site quickly? If not, what methods should be used to establish native plants?
- What are the threats to newly established plants (herbivores, flooding, intense sun, etc.) and how should they be combated?
- Are the project goals reasonable, feasible, and likely to result in establishing the maximum ecological functioning possible for the site?
- What plant and plant community parameters should be monitored? How often should they be monitored and for how long?

Ask about Wetland Animal Communities:

- What native animal species are found in pioneer and mature stages of the target wetland type? What are the dominant and rare species?
- What special status, threatened, or endangered animal species are found in the target wetland type?
- What natural disturbances affect animal species in this wetland type?
- On the potential restoration site, what animal species are present, including special status and listed species, non-native invasives, and species native to the target wetland?
- What soil, hydrological and plant community conditions on the potential restoration site would constrain establishing the native community? How should these conditions be changed?
- What habitat conditions will attract the typical animal species and what specific habitat features can be added to attract specific valuable and/or rare species?
- What methods are available for eliminating the damaging non-native species?
- Is it likely that native species will colonize the site quickly? If not, what can be done?
- What are the threats to newly established animal populations on the site (predators, flooding, pollution, human impacts, etc.) and how should they be managed?
- Are the project goals reasonable, feasible, and likely to result in establishing the maximum ecological functioning possible for the site?
- What parameters should be monitored? How often should they be monitored and for how long?

Using Adaptive Management

Natural ecosystems are complex. Even if you start out with detailed information about a site, the way it responds to changes can be unpredictable. Unforeseen events may occur, such as an unexpected plant species colonizing the site, or new information may become available, such as the presence of a natural spring on the site. These unforeseen elements may be beneficial or detrimental to the project. In either case, you will need to make decisions about how to adapt your project to account for the new element.

Adaptive management is a technique that involves incorporating new information into all stages of a wetland project. Using adaptive management means you continuously evaluate your project in light of new information, generating ideas and making decisions about how to further refine the project. This process also can be thought of as a “feedback loop” in which information about what is happening with your project currently helps you determine how best to go forward with the next step of project. Monitoring (covered in detail in Part 6) provides the information, you and/or your project team provide the decisions. Adaptive management is a repeated process that should be applied through the lifetime of the project.

In the planning stage, adaptive management should be used to refine goals and objectives (see next section) and make changes to implementation plans as necessary. In the implementation stage, adaptive management should be used to evaluate the need for changes to any of the original plans for specific components of the project, e.g., the number and types of plants, the configuration of channels or grading, or the amount of new soil brought in. In the long-term management stage, adaptive management should be used to keep the project developing toward a positive outcome.

Refine Your Goals and Objectives

The initial goals and objectives for any project may change based on the ecological data collected about the landscape, current and past conditions on the potential restoration site, and the ecology of reference sites. In addition, non-ecological factors such as agency requirements and socioeconomic factors (financial resources, available labor, concerns of adjacent landowners) may alter what you can achieve. Therefore, you may need to revise your goals after considering the following factors.

Government and Agency Requirements. Discuss your project goals with agencies that regulate and manage natural resources. If you have asked these agencies for information or help with an earlier planning stage, you may already be aware of any regulatory requirements relevant to your project. Do not assume that wetland restoration, creation, or enhancement projects are exempt from needing a permit or other authorization—some are, but many are not. For complete information you should call the appropriate federal, state, or local regulatory agencies. If you want to work in a former or existing wetland, you may need a permit for your project. Begin with your local district of the Corps. This agency regulates discharges of dredged or fill material to wetlands under Section 404 of the Clean Water Act. Talk to the EPA about other applicable Clean Water Act regulations. If your site is on agricultural land, you may need to talk to the NRCS. Your project also may be subject to federal and state regulations that protect certain kinds of fish and wildlife. States often have “Natural

Heritage" or rare species programs that can tell you whether there are plants and animals protected by state or federal regulations on or near your site. Alternatively, you can contact state fish and wildlife agencies and/or local offices of the FWS and NMFS for information. See Resource Appendix R-II for contact information. In addition, you should talk to your city and county planning offices about local requirements or permits for your project.

Be sure to avoid or minimize adverse environmental impacts that may result from wetland project construction activities. For example, earth moving, which can be a part of more complex projects, can cause erosion, increases in particulate matter in the air, and potential disturbance to locally nesting bird species. Avoid impacts by following the requirements of regulating agencies and by implementing the Best Management Practices (BMPs) recommended by the agencies and local municipalities. BMPs to limit erosion may include using silt fences and hay bales to capture silt, avoiding work during rainy periods, and/or capturing runoff in a holding pond.

Socioeconomic Factors. For many projects, restoration potential is restricted by societal factors. Some of these include availability of funds, volunteer resources, local landowner concerns, community support, and legal issues (such as water rights). The relevant societal issues must be considered in your project design and implementation, with the hope that someday in the future some of the limitations to a more complete restoration may be removed.

A major limiting factor is, of course, money. Some projects are relatively inexpensive, but others can be major financial undertakings. Typically, the more engineering that is needed, the more expensive your project will be. To help finance your project, begin with the list of funding sources in Resource Appendix R-II. Other sources of money or information on funding are:

- local cities or counties;
- state programs, especially through parks and recreation, wildlife, or other resource agencies; and
- local corporations, some of which have philanthropy programs for local projects.

Other potential constraints on your project may arise from adjacent landowners and/or a lack of community support. Local communities should be involved if your project may result in controversial effects on public lands. Neighbors may feel that your project could damage their property through potential flooding or other effects. Ask your local experts and agencies if there appear to be any potential community or adjacent landowner issues. See Box 6 for information on an enhancement project that factored in these types of challenges.

BOX 6: Wetland Enhancement in Marshy Hope Creek, Maryland

On Maryland's eastern shore, Marshy Hope Creek winds its way to the Chesapeake Bay. Along most of its reaches it is a meandering stream with lush riparian vegetation. However, where it flows through the town of Fredericksburg, the Creek was straightened and channelized with levees. Much of the vegetation was removed and the historical floodplain had been filled. The levees containing the modified portion of the Creek prevented flooding of adjacent properties and local landowners did not want these embankments to be removed. The Maryland Department of Natural Resources (DNR) worked with the town to develop a plan that enhanced the Creek's ecological values while leaving the levees in place. DNR removed fill from the floodplain and created channels through the levee that allowed river water to flow to newly sculpted depressions on the floodplain. The channels also connected the river with existing deep ponds adjacent to the floodplain that were remnants of former mining operations. Soil excavated from the floodplain was used to fill part of the mining ponds to create shallow water habitat for fish. Native vegetation recolonized the floodplain and fish quickly began to use the channels and ponds. Although total restoration was not possible, enhancing the conditions adjacent to Marshy Hope Creek increased overall wetland values of the area.

Choose the Simple Approach

You now have a better idea of what your site conditions are like and what you want to achieve. What, then, will need to be done for your site to meet its restoration, creation, or enhancement goals? This question links goals with implementation. Methods for implementing projects are very diverse and should be developed with as much ecological, hydrological, and/or soils expertise as you can muster. In general, the best approach is to use the simplest methods possible, because the more complex a wetland project is, the greater the chance that something could go wrong. Implementation should be achieved through the least destructive means and the most ecologically sound solutions. Passive methods should be considered before more active interventions.

If natural processes cannot be initiated with passive methods, then implementation should focus on bioengineering or soft engineering solutions over traditional hard engineering solutions. Soft or bioengineering methods are based on working with natural processes. This approach is an alternative to the traditional, hard engineering solutions that often replace ecosystem functions with human-designed structures. For example, hard engineering solutions to controlling erosion along a stream bank such as rip rap or cementing the stream banks destroy natural wetland processes. Soft engineering uses physical solutions that reinstate ecological processes and allow the system to become as self-sustaining as possible. In addition to being ecologically preferable, bioengineering methods are often more economical than traditional techniques. Some researchers have found that hard engineering for erosion control can cost up to four times as much as soft engineering methods. Examples of soft engineering solutions to stream bank erosion include:

- planting native vegetation, especially fast growing species such as willows;
- shoring the banks with logs that will decompose in time; or

- stabilizing the bank with “geotextile materials” that do not decompose, but are covered with soil and allow root growth through the material.

Table 2 contains some of the most common and obvious examples of wetland damage and typical corrective measures. The table also lists some cautions. If the damage is severe or has been present for a long time, reversing the damage may not be as simple as it initially seemed. Some of these corrective measures are also applicable to implementing enhancement or creation projects. Technical Appendix T-III contains additional information on typical measures for restoring, creating, or enhancing wetlands.

Table 2. Common Wetland Problems and Corrective Methods

Wetland Damage	Reason for Damage	Suggested Correction	Considerations
<i>Hydrology</i>			
Water Quality Impairment	Excess sediment or nutrients in runoff from adjacent area	Work to change local land use practices; install vegetated buffers/swales/constructed treatment wetlands; install sediment traps.	Sediment traps will need periodic cleaning; an expert may be needed to design buffers and swales.
Water Quality Impairment	Excess sediments from eroding slopes	Stabilize slopes with vegetation/biodegradable structures.	Many corrective methods exist; look for most sustainable and effective methods.
Altered Hydrology (drained)	Ditching or tile drains	Fill or plug ditches or drains; break tiles.	Organic soil may have decomposed so that the elevation of the site is lower than it used to be.
Altered Hydrology (constrained)	Road crossing with undersized culvert	Replace with properly sized culvert or with a bridge.	Hydrologic expert needed to correct this.
Altered Hydrology (drained)	Former wetland diked off from its water sources	Remove/breach dikes or install water control structures.	Substrate elevation may not be correct for vegetation; add soil or control water level with low maintenance structures.

Wetland Damage	Reason for Damage	Suggested Correction	Considerations
<i>Soils</i>			
Raised Elevation	Soil dumping or fill	Remove material.	Fill may have compressed soil to lower than initial elevation; take steps to avoid erosion.
Subsidence	Soil removal; oxidation of organics; groundwater removal	Add fill; allow natural sedimentation.	Fill must support target wetland; test fill for toxic compounds.
Toxic Soils	By-product of on-site or off-site industrial process; dumping; leaching and concentration of natural compounds.	Treatment systems or methods appropriate to the soil / pollutants; remove material; cover with appropriate soil.	Work with experts to choose treatment methods that cause least amount of indirect damage; choose a different site to avoid serious toxin problems.
<i>Biota</i>			
Loss of Biodiversity	Change in original habitat	Restore native plant and animal community using natural processes.	Allow species to colonize naturally; import species as appropriate.
Loss of Native Plant Species	Invasive and/or non-native plants; change in hydrology; change in land use	Remove invasive, non-native plants (allow native plants to re-colonize); try to reverse changes in hydrology.	Pick lowest impact removal method; repeat removal as non-natives re-invade; alter conditions to discourage non-native species.

Prepare for Implementation

After determining what site changes are necessary, prepare to implement the changes by developing project designs such as field protocols or construction plans and specifications. Protocols are written guidelines for field crews on how to undertake the work. They should be as specific as possible, but in easy-to-understand language, especially if volunteers will be doing the work. Even with protocols, volunteers will need direction in the field.

Most projects will need some level of documentation to direct implementation; more complex projects will probably need construction plans. Good designs include at least these elements:

- specifications/diagrams for all installation/construction features;
- descriptions of site preparation needed;
- descriptions of how to install features, such as plants, etc.;
- plans to prevent construction impacts, such as erosion;
- lists of plant species, numbers of each to be planted, and planting locations;
- plans for site maintenance; and
- monitoring features, such as groundwater wells, staff gauges, or boardwalks.

The design of restoration, creation, or enhancement projects can be highly technical and may require hydrologists, ecologists, geotechnical experts, engineers, and/or landscape architects. Construction documents are usually prepared by engineers for use by contractors in the field for constructing a project. If construction documents are necessary, take the time to find engineering and construction firms that are flexible and willing to undertake non-traditional designs and soft engineering methods. Try to find firms that have done wetland restoration work in the past. Talk to their former clients to see what their work was like. Be sure your ecological advisors work with the engineers to produce plans that accurately reflect the methods you want used for the project. During construction, have the work inspected by your ecological experts to be sure that the plans are being followed accurately.

Publicize Your Project

After talking with your neighbors and the appropriate agencies, and after developing feasible goals and objectives, consider writing a small article for a local newsletter or newspaper describing your project and its benefits. Publicity at the end of the planning phase lets people know about the work and may turn up local issues you had not considered. More often, publicity builds public support and can help you find volunteers to help you install and monitor the project.

BOX 7: Steps in the Planning Process

- Collect past and present information on the local watershed.
- Choose a project site.
- Collect past and present information on the project site.
- Collect data on reference sites.
- Develop objectives and target criteria based on watershed, project site, and reference site information.
- Talk to the agencies about appropriate regulations. Talk to adjacent landowners and identify important social or economic factors that could affect the restoration.
- Refine goals and objectives.
- Decide on methods for implementing changes designed to rectify damage and meet planning goals and objectives.
- Prepare designs, such as protocols or construction documents, to direct implementation.
- Publicize your project.

PART 5. IMPLEMENTATION

Stages of Implementation

Implementation is the physical process of actually doing the restoration, creation, or enhancement project according to the design developed in the planning stage. This phase of the restoration process is popular with volunteers and it is the most visible phase to the public. Implementation may require a series of steps depending on the wetland type, your project goals and objectives, and the extent of the degradation. Steps in implementation typically include site preparation, plant preparation, installation, maintenance, and continuous adaptive management.

Site Preparation. During site preparation, the project site is altered either to allow natural processes to operate or to prepare it for additional human intervention. Common activities in this stage are:

- removing non-native species (See Box 6);
- removing piles of soil, debris and trash;
- amending soil with nutrients or other enhancements;
- removing polluted soils;
- bringing in appropriate soils or substrates;
- plugging or removing drains;
- fencing out cattle or other herbivores;
- breaching levees; and
- mowing or burning the site to reinstate the natural disturbance regime.

Plant Preparation. For many restoration projects you can rely on natural re-vegetation to re-establish native wetland vegetation. Native seed banks are present in most wetlands. As long as the soils have not been removed or filled over, native seeds will germinate and grow when suitable conditions have been restored. There also may be local sources of plants that can drive natural re-colonization. However, for many other projects, indigenous species must be brought to the site. If native plants must be grown for the site, plant preparation should begin during or before site preparation. Growing the number of plants needed may take 6 months to a year or even longer.

Always use native species and cuttings or seeds from local plants. Locally-adapted seeds and plants will have a better chance of surviving the conditions at your site than plants or seeds of the same species that come from another area. When collecting native plant material, take care not to damage the collection site and always check with the property owner (public or private) before collecting plant material. Plant preparation includes:

- collecting seeds;
- propagating plants;
- collecting cuttings; and
- collecting plugs (newly-grown whole plants with soil).

There are innumerable methods to collect and treat plants and seeds. Find out from local botanists, plant experts, or restorationists what methods are best for the species you need. Native plant nurseries and native plant societies may also have expertise with local native species and they may have seeds or plants appropriate for the area. They may also be able to grow particular species that are not available in nurseries.

BOX 8: Controlling Invasive Species—A Tale of Two Wetlands

Invasive species, especially plants, are a tremendous problem in the U.S. They degrade more habitat each year than urban growth. The FWS estimates that 4,600 acres of habitat are lost *each day* to invasive species. Consequently, removing these invaders is a major component of restoration work. Control methods and success rates vary widely, as the following examples show.

In Fairfield, Connecticut, impounded salt marshes that were once tidal were overrun by *Phragmites*, a tall invasive wetland plant. *Phragmites* had replaced the local plant species and, being prone to burning in the summer, the invader was threatening homes near the marsh. *Phragmites* is intolerant of high salt levels and the City was able to quickly reduce the infestation by installing tidal gates that allowed the return of salt water to the marsh. This project was expensive, but it was very effective.

At the Hayward Regional Shoreline along the San Francisco Bay, an insidious invader has taken root in the tidal salt marsh. *Spartina alterniflora* (smooth cordgrass), a species from the east coast of the U.S., is replacing its close relative, the native *Spartina foliosa*. Smooth cordgrass is a tough customer. It is tolerant of a wider range of conditions than its cousin and it has resisted all efforts to remove it. Biologists have tried digging it up, spraying it with herbicide, and cooking it under black plastic mats. None of these measures have worked well and the plant is spreading. The search is on for a biological control agent that will specifically target and destroy *S. alterniflora*.

Installation/Construction. A wide array of activities can occur during this phase including large earth-moving activities, such as grading. Minimize the temporary but destructive impacts that may occur at this stage. Limit the movement of heavy vehicles to the smallest footprint possible and use the methods that create the least disturbance possible. Implement appropriate Best Management Practices. Installation/construction may include:

- constructing water control structures;
- installing bank/edge stabilization structures;
- building habitat islands;
- grading existing soils;
- placing and grading new soil;
- planting plugs, seeds or newly-grown plants;
- installing plant protections (tubes, screens, etc.);
- placing irrigation systems;
- constructing and placing habitat structures.

As-Built Documentation. After the project is installed, conduct an “as-built” assessment, which is a detailed description of the site conditions immediately after the installation is completed. If you and your volunteers installed the site, document whether everything was installed as expected. If

the work was done by a contractor, the as-built assessment should be conducted by a site inspector who is not employed by the contractor to document whether the project plans and specifications were followed by the contractor. This also ensures that the site complies with any regulatory (e.g., permit) requirements.

It is likely that there will be some deviations from the site plan caused by human error or unanticipated characteristics of the site (e.g., a hidden spring in a corner of the site). Use adaptive management: any deviations should be documented and discussed with your technical team to determine whether they need to be corrected to ensure that the project meets its goals. If the installed project deviates in important ways from the plans, have the construction firm correct the problem--but only if the benefits of corrections outweigh the impacts from further disturbance. If corrections are needed, they should be made as soon as possible. The as-built assessment also provides a "baseline," or starting point, for measuring change during subsequent monitoring.

Maintenance. Implementation does not end with installation. Maintaining the site in good ecological condition is a critical part of implementing a project. Many factors can conspire to undo the hard work you put into the previous stages. Maintenance may require:

- controlling non-native and invasive species;
- controlling herbivores;
- repairing structures;
- maintaining monitoring and other equipment;
- replacing plants;
- mowing, burning, and/or other activity reinstating or mimicking the natural disturbance regime;
- reducing or preventing human intrusion; and
- controlling local pollutants.

Working with Volunteers

The implementation and monitoring phases are great times to involve volunteers and there are many good reasons to include volunteers in your project. Volunteers can help reduce the costs of implementation, provide community support, and bring a social dimension to the work. Working with volunteers may be one of the most rewarding aspects of your project. Among the volunteers, you may find experts, new friends, and dedicated helpers. Some helpers may be inspired to undertake a similar project of their own and you may find people who will want to continue stewarding your site by helping you with maintenance and monitoring.

Look for volunteers through non-profit environmental groups, schools, public community service groups, and private service groups organized by local corporations. If you decide to use volunteers, you will enjoy the vitality that they bring to the project. You will also have to carefully train and monitor those enthusiastic helpers. The more complex the task the more training volunteers will need. Generally, it is best to have volunteers do one or two simple but time-consuming tasks. Keep things interesting by rotating people among different tasks. Carefully observe volunteers to be sure they are following protocols. Encourage and reward your helpers' hard work.

Discuss your project with the volunteer coordinator for a local nonprofit group to determine any issues that may arise from using volunteers. While volunteers can be great additions to a project, weigh the benefits against these potential complications:

- the time and effort required for training;
- the potential need for compensation;
- oversight of volunteers' work; and
- potential liability issues.

Publicize Your Project

The implementation phase is a great time to get the local media (especially newspapers and television) interested in your project. People working outside on restoration projects provide great photo opportunities and these action shots are often popular with the local press. Find out if any of your volunteers have media contacts or call local TV and newspaper science, outdoors, and current events reporters. If reporters do cover your project, be sure that they come to the site on a day when there is some interesting people-oriented activity volunteers. For example, plan media events on days when volunteers are planting seedlings. You or another supervisor must be on site and the volunteers must be informed that the press will be there. Prepare what you or your spokesperson will say to the reporters. Tell them a little about the history of the project and always highlight the positive environmental and community benefits of the project.

BOX 9: Summary of Implementation Stages

- Prepare the site by making changes that allow natural processes to occur.
- Prepare plants by collecting materials from local stocks.
- Install the plants, structures, and major features of the project.
- Use adaptive management to adjust plans as needed
- Involve volunteers to keep costs down and develop community support.
- Publicize your project.

PART 6. MONITORING

What is Monitoring?

Monitoring is systematic data collection that provides information on changes that can indicate problems and/or progress towards target criteria or performance standards which, when met, indicate that established ecological goals have been reached. Thus, monitoring provides data on whether a site is developing in a way that will achieve the project goals.

A common misconception about wetland restoration, creation, and enhancement is that once a project is implemented, nature will just do the rest. In reality, many wetland projects need mid-course corrective actions such as re-planting seedlings that were washed away by a storm, digging more

channels to get water to remote parts of the site, or plugging ditches missed during the initial site survey. Monitoring provides the information for this adaptive management. Monitoring can also give information on routine maintenance that may be necessary to keep the site functioning well. Broken sprinkler heads, non-native weed growth, and holes in fences are just a few of the routine maintenance items that are easily observed during monitoring.

What Should I Monitor?

Monitoring consists of measuring a number of wetland attributes or parameters at regular intervals to record the changes in the wetland. The parameters to be measured at any particular site are based on the project objectives and target criteria. Monitoring efforts should be directly linked to the target criteria. An array of parameters is usually measured to assess hydrology, soils, and biological conditions on the site. After the project is completed, initial site conditions (including as-built conditions) should be documented to provide baseline information against which changes to the site can be evaluated. Typical parameters measured to evaluate wetland functions are listed in Technical Appendix T-IV.

How Should I Monitor?

Two basic approaches to monitoring are to collect qualitative (observational and general) information and to collect quantitative (numerical and specific) data. Qualitative methods can be used in conjunction with quantitative measures. Qualitative methods typically do not provide enough information to accurately determine how close the site conditions are to target criteria, but they do give a general view of whether change is occurring. Some typical methods for gathering qualitative information include:

- aerial photographs to show general hydrology, evidence of channelization and general substrate levels, and the extent of the site covered by plants;
- ground-level photographs for identification of some plant species, general level of plant growth, general substrate levels, general water levels; and
- general observations such as water clarity and scum, presence of trash, evidence of human use, bird species present, vegetation condition (stressed, blooming, healthy), presence of invasive plants, evidence of erosion, and the integrity of structures.

Quantitative methods are used to provide detailed information about how the wetland is developing with respect to target criteria and can also provide information important to long-term wetland research. A wide range of methods exist for collecting numerical data. With your technical advisors, develop the most appropriate methods for your project. Talk to local wetland experts and get their advice on what is needed for adequate monitoring and whether there are special circumstances (*e.g.*, rocky soils that make it difficult to install wells) or opportunities (such as a nearby school looking for a science project) that will affect how you monitor your wetland. Examples of some quantitative methods include:

- measuring water level changes with an automatic water level gauge;

- collecting and testing water samples periodically to evaluate changes in water quality;
- collecting a representative sample of sediment cores to test for organic matter and other soil characteristics;
- surveying surface elevations at permanent transects once a year;
- recording plant species and cover by species along randomly established transects across the site; and
- setting traps for small mammals at randomized locations to determine species diversity and abundance.

Quantitative monitoring is often carried out by experts in hydrology, soils, or biota. However, volunteers may be used to collect numerical data if they are supervised by an advisor who knows the protocols for data collection. With the right training and supervision, wetland quality can be monitored by citizens to provide useful information. Quantitative methods can be expensive and time consuming, but they do provide the most accurate information on site changes. See Technical Appendix T-IV for common quantitative methods and qualitative methods used to monitor ecological attributes. Box 10 gives an example of a monitoring plan that measures a range of parameters.

Even if you have very limited resources, monitor by observing your site and documenting the changes using basic qualitative methods. Take photographs of the site and write down general observations such as how wet the site is and for how long, what the soils are like, what kinds of plants are growing on the site, and what kinds of animals you see or hear. Repeat the photographs (from the same vantage point) and the written descriptions as often as you can. The result will be a chronicle of your wetland project for yourself, future owners of the land, and others interested in your site.

How Often Should I Monitor?

How often and when a particular attribute should be monitored depends on many factors including the attribute's natural variability, the rate of change of the site, and the goals of the project. Most characteristics should be monitored at least annually. Vegetation should be monitored during the growing season (monitoring in both the early and late growing season will make it easier to identify all plants), and animals should be monitored during breeding, nesting, and/or migration seasons. Depending on your project goals, you might want to monitor hydrology during both high and low water periods. Once the site has stabilized, some characteristics such as wetland size may be monitored less frequently, unless there are signs of change.

Consistent monitoring is very important, and you may need help doing it. Ideally, every stakeholder involved in the wetland project should help with the monitoring so they can see the benefits of their work and continue to support it. Monitoring is a good way to get the local community involved in your wetland project, and it's a great way to give people hands-on experience in learning how local ecosystems function. Talk to schools, clubs, and other community groups to see if they would be interested in helping you with the monitoring. Have training sessions for volunteer monitors. Many states have active volunteer monitoring groups or programs that monitor lakes and streams. Many are

also beginning wetland monitoring projects. Check out the EPA website for information on volunteer monitoring at <http://www.epa.gov/OWOW/wetlands/wqual.html#Volunteer>.

How Long Should I Monitor?

Like most ecosystems, wetlands change over many years. This is especially true for restored, created, or enhanced wetlands that may take decades to reach a condition close to that of a mature, naturally-occurring wetland. Research on wetlands created from dredged material in the Gulf of Mexico suggests that these wetlands are still changing and maturing 20 years after they were created. Consider monitoring to be a long-term activity, not just something you do for the first year or two. At a minimum, a site should be monitored until it meets all performance standards, which can take from several years to decades. Future managers of wetlands will thank you for monitoring for as long as you can. Even after it reaches maturity, your wetland will be a dynamic system that varies over time.

BOX 10: Monitoring in Mountain View, California

The Stevens Creek Tidal Marsh restoration project in the City of Mountain View is a compensatory mitigation site with the primary goal of providing vegetated tidal marsh habitat for rare species such as the salt marsh harvest mouse. The site began as a deep pit with ponded water. Project objectives included restoring tidal influence, building up the mudflat, and establishing native tidal salt marsh vegetation. Target criteria included:

- Re-establish tidal influence.
- Within 3 years, develop mudflat on 50 percent of the site at an elevation available to vegetation.
- Restore native salt marsh vegetation on 50 percent of the site within 5 years.

To assess progress, the City monitored the following parameters once a year:

- Amount of tidal exchange: measurements were taken by an automatic tide gauge and interpreted by a hydrologist.
- Elevation of the mudflat: measurements were taken by a qualified surveyor.
- Amount of vegetation on the mudflat: measurements were taken on the ground using transects and taken from aerial photographs, then interpreted by an ecologist.
- Extent of channel formation: measurements were taken from aerial photographs and interpreted by a hydrologist.

These quantitative methods were supplemented by qualitative observations on tidal flow, non-native

What Should I Do With the Monitoring Information?

Monitoring information can be used in several ways. First, monitoring data are essential for determining whether your project goals are being met. Organize, summarize, and graph (if possible) the monitoring data at least annually to show how the restoration site is developing. Monitoring information should be compared to the target standards to assess whether the site is developing as planned. If it is not, determine whether remedial measures should be taken or whether the original goals should be reevaluated (see section above on adaptive management).

Second, monitoring data can be used to determine whether the target criteria were good measures of the project goals you hoped to achieve. If you were to do this again, would you do anything differently? Third, use long-term monitoring to assist in maintaining structures and managing the site to keep it functioning well. See Part 7 for more on long-term management.

Finally, use your monitoring data to inform others. Provide copies of your findings to your local planning and wetland regulatory authority, and the local offices of the Corps, EPA, FWS, NMFS, or NRCS. Present your work to local groups and ecological societies or at professional meetings of the Society of Wetland Scientists, Society for Ecological Restoration, and others (see Appendices for contact information). Write an article for the local newspaper or a journal, such as *Ecological Restoration*, which publishes reports from landowners, community groups, and restoration practitioners. All too often, years of irreplaceable data are lost if they are not shared, archived, or published. Don't assume no one is interested in your project: every wetland restoration, creation, and enhancement project that is monitored provides wetland scientists and restorationists with additional knowledge about how wetlands function and develop over time. With this additional information, scientists, policy-makers, and landowners can make better decisions about wetland conservation, including the use of wetland restoration, creation, and enhancement.

BOX 11: Steps in the Monitoring Process

- Select the parameters you will monitor based on the target criteria established in the planning stage. Include observations to assist in site maintenance.
- Develop procedures for qualitative and quantitative monitoring methods.
- Collect data at intervals that will provide information necessary to monitor the progress of the site relative to the target criteria.
- If monitoring shows that site conditions are not meeting target criteria, use an adaptive process to identify corrective measures.
- Continue long-term monitoring and maintenance to ensure that the site continues to provide the maximum ecological value.
- Provide your monitoring data and results to local groups and publish in newsletters.

PART 7. LONG-TERM MANAGEMENT

In addition to providing data on whether a site is developing in a way that will achieve the project goals, monitoring is essential for the long-term management of wetland projects. A wetland is an ecosystem that evolves and changes in response to the surrounding environment. It is not realistic to expect that when the implementation stage is complete, the work is done. Long-term management is often required to keep the site functioning as it was designed to function and to keep human impacts to a minimum. For example, long-term management is often needed to:

- maintain existing structures such as berms, water control structures, or levees;
- maintain a specific desirable plant community by burning, mowing, or otherwise managing the vegetation on a periodic basis;
- address problems such as invasive species or excessive sediment deposition; or
- address unexpected events such as structural failure.

Adaptive Management, introduced in Part 4 as an iterative process of monitoring conditions and then taking appropriate action, should be an integral part of long-term management and stewardship of your site. If your site is not developing as anticipated, there are two basic options: make changes to the site to try to get it “back on track,” or allow the site to continue developing in the new direction. Which option to pick should be decided in consultation with your local experts.

Consider whether current progress at the site might achieve your overall goals in a different way than you originally intended. Also consider whether any deviation from the expected development is within the ecological norms for that wetland type and the region. Since natural systems are variable, sites may diverge from objectives, but this difference may not require significant changes to the site. For example, your site may be developing a native wetland community, but one that is different from what was expected. If this new community is within the norms of the wetland type and the watershed, it may not be necessary to change it.

If, however, your site is growing a crop of invasive or non-native species or otherwise falling far short of restoration objectives, then corrective action is probably necessary. Significant corrections to a site are called remedial measures. Work with local experts or your technical team to determine the source of the problems and the appropriate remedial actions. The remedial measures taken will depend on why the site is diverging from its expected path and what the costs and impacts of the changes would be. Always consider whether changing conditions on the site will be worth the cost of the disturbance that would be incurred. Typical problems with wetland sites include the hydrology not being properly restored, incorrect water-to-substrate elevations, nutrient problems with the soil, and rapid invasions by non-native species. Some typical remedial measures include:

- regrading the site to the correct substrate elevations;
- contouring channels or installing structures to redirect water flow;
- adding to or reworking water control structures or altering structure operations;
- removing invasive plants, planting native species, or installing a cover crop; and
- replanting.

Box 12 - Adaptive Management in Commencement Bay, Washington

The Middle Waterway Shore Restoration project is an attempt to re-establish some of the salt marsh that once covered thousands of acres of Commencement Bay. In a cooperative effort, federal, state, tribal, and private interests planned and implemented a restoration project that included re-grading fill material to intertidal elevations and planting salt marsh plants salvaged from the same area, as well as some provided by a nursery. One year after project implementation, monitoring showed that few of the plants had survived. A review of the planting procedures pointed to a number of possible causes for the low plant survival, including soil that was too sandy, nursery plants that weren't from the local area, and planting during the summer. The goal of the project (increasing the acreage of fringing marsh) could not be achieved without better plant growth, so a decision was made to replace some of the soil and re-plant. The top eighteen inches of the sandy fill was replaced with topsoil. A local nursery collected seeds from plants in the local area and grew them into seedlings, which were planted on the site in the spring. A year after this new planting, salt grass, seaside plantain, seaside arrowgrass, and other species were thriving. Monitoring will continue in case other remedial actions are needed, but for now the project seems to be on the right track.

Long-term management often is needed to compensate for changes in the surrounding landscape. In many cases, the surrounding land use, hydrology, or other features of the local watershed will change over time, possibly affecting your wetland site. Ideally, those changes were at least partially anticipated, and your site was designed to withstand or adapt to their effects. If something unanticipated happens, such as a substantial reduction of the water source or conversion of what had been an adjacent park area to development, you will need to reevaluate how your wetland site fits into the changed landscape, and whether the goals or management of the site will need to change. The overall goal of long-term management is a wetland that provides a maximum amount of wetland function and value within the context of the landscape and that requires a minimum amount of intervention by humans.

Finally, a plan for long-term management is needed to identify who will be responsible for the site and what kinds of activities should or should not occur there. The responsible party may be you, the landowner, or some combination of people. One approach to long-term management of a restoration site is to establish a stewardship program for the site. Local schools, scout groups, or citizen conservation groups may be willing to "adopt" the site and provide the kind of observation, care taking, and even remedial action that would be difficult for one person to provide. The kinds of activities you need to think about are recreational (do you want to allow hikers, campers, bird-watchers, or hunters on the property?) and possibly commercial (does the landowner want to allow grazing or tree-cutting on the property?). The answers to these questions should be included in a long-term management plan.

Long-term legal protection of a wetland site is also an important consideration. Do you want to take steps to ensure the wetland restoration will be permanently protected? One way might be to place a deed restriction on the site or establish a conservation easement. These arrangements should

effectively restrict harmful activities that might otherwise jeopardize achieving the goals of the wetland project. When needed, the acquisition and protection of water rights should be secured. One of the best ways to secure long-term protection is to donate or sell the land to a local, state, or federal natural resource agency or a non-profit organization such as a land trust.

PART 8. PUTTING IT ALL TOGETHER

Words to the Wise

While restoration, creation, or enhancement projects can be complex and time-consuming, most restorationists find their projects are very rewarding. As you undertake a project, keep in mind the following points:

- *Be patient.* Restoration is a process, not a product. Restoration is a creative activity and there is no cookbook for it.
- *Talk to many people.* There are many elements and phases to wetland projects and many different views on how to accomplish them. Talk to a range of people to collect as much information as possible and to get different perspectives on the process.
- *Be flexible.* Your ideas and goals may be clear at the outset, but for many reasons it may be best to change some, add some, and throw others out. As you go through the process, be flexible but keep your goals in mind.
- *Take your time.* Try not to rush the process. Get the technical help you need. Get the permits required. Develop a community support base, if necessary.
- *Plan well.* A well-considered and thorough plan will guide you through the project as directly as possible. A good plan will result in reasonable, measurable, and ecologically beneficial goals. A good plan will help you get money and help.
- *Let reference sites be your guide.* Reference sites are valuable models of what ecological conditions are achievable.
- *Use low impact implementation methods.* Use soft engineering and passive methods whenever possible. Consider the impact the project construction will have and minimize those impacts.
- *Monitor and manage your site.* Restoration does not end after the plants and structures are installed. All restoration projects must include monitoring to see if goals are being met and to direct the long-term management of the site.
- *Do your best to recover as much of the wetland system as possible.* Restoring, creating, or enhancing sites with the greatest ecological functioning possible, so that they are self-sustaining for the long-term, is the highest goal.

A Wetland Restoration/Creation/Enhancement Checklist

Use this checklist to help guide you through the wetland project process.

- ☐ Talk to local wetland experts. Visit local wetland restoration, creation, or enhancement sites as well as relatively undisturbed wetlands.
- ☐ Ask about getting help through programs that support wetland restoration with cost-sharing and technical assistance.
- ☐ Get to know the local landscape and watershed characteristics.
- ☐ Give first priority to restoring degraded wetlands.
- ☐ Set goals. Pick a site that is most appropriate for achieving your goals.
- ☐ Plan your entire project before you start. Include monitoring and long-term management in your planning.
- ☐ Clarify your goals with specific objectives. Quantify the objectives with measurable target criteria.
- ☐ Use adaptive management to refine your goals and implementation plan.
- ☐ Identify techniques for achieving your objectives.
- ☐ Develop written protocols or construction documents.
- ☐ Discuss your plans with local regulators, wetland experts, and adjacent landowners.
- ☐ Implement your plans. Have someone who understands the project on the site whenever work is occurring.
- ☐ Perform an "as-built" assessment after site work is completed.
- ☐ Involve local volunteer organizations in the project's implementation, monitoring, and long-term management.
- ☐ Publicize your project.
- ☐ Develop a written monitoring plan. Monitor your project's development. Apply the results to adaptive management of your site.
- ☐ Send monitoring results to local wetland experts and discuss the results with them.
- ☐ Develop a long-term management and stewardship plan.
- ☐ Investigate protecting the site in perpetuity.

RESOURCE APPENDICES

APPENDIX R-I: BIBLIOGRAPHY

Below is a list of sources of information on wetlands and wetland restoration. It is not a comprehensive list, just a way to introduce you to the wealth of information available.

ONLINE BIBLIOGRAPHIC RESOURCES:

- <http://www.npwrc.usgs.gov/resource/literatr/wetresto/wetresto.htm> - A searchable wetland restoration bibliography with over 3,000 entries, developed by the Northern Prairie Science Center and the Midcontinent Ecological Science Center.
- http://www.wetlands.agro.nl/wetl_publications.html - A 1996 compilation of over 1,000 wetland restoration and creation literature references is available for download from Wetlands International and the Association of State Wetland Managers.
- http://www.nwrc.gov/library_catalog.html - National Wetlands Research Center's Library (11,000 documents)

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APPENDIX R-II: FEDERAL FINANCIAL ASSISTANCE

Below is a list of some federal sources of money that may be applicable to wetland restoration projects. Be sure to contact your state environmental agencies for other sources of funding and check with some of the organizations listed in Appendix III for possible nonprofit assistance.

ENVIRONMENTAL PROTECTION AGENCY

Clean Water Act State Revolving Fund

Purpose:	Provides grant funds to states to help them establish state revolving fund (SRF) programs. States, in turn, offer loans and other types of financial assistance from their SRFs to municipalities, individuals, and others for high-priority water quality activities.
Projects:	While traditionally used to build or improve wastewater treatment plants, loans are also used increasingly for: agricultural, rural, and urban runoff control; wetland and estuary improvement projects; wet weather flow control (including stormwater and sewer overflows); and alternative treatment technologies.
Assistance:	States offer loan rates that are two to four percent below market rates. Some states offer even lower interest rates to small, economically disadvantaged communities.
Eligibility:	Municipalities, individuals, communities, citizen groups, and non-profit organizations, though each state ultimately determines eligibility.
Address:	U.S. EPA, Office of Wastewater Management, 1300 Pennsylvania Avenue, Washington, DC 20460
Phone:	(202) 260-7360 or (202) 260-2268
Facsimile:	(202) 260-1827
E-mail:	srfinfo.group@epa.gov
Web Site:	http://www.epa.gov/OWM

Five-Star Restoration Program

Purpose:	To promote community-based wetland and riparian restoration projects.
Projects:	The projects must have strong on-the-ground habitat restoration components that provides long term ecological, educational, and/or socio-economic benefits to the people and their community.
Assistance:	Each project would ideally involve at least five partners, who are expected to contribute funding, land, technical assistance, workforce support, or other in-kind services that match EPA's contribution which amounts to about \$10,000 on the average per project.
Eligibility:	Partners may include citizen volunteer organizations, corporations, private landowners, local conservation organizations, youth groups, charitable foundations, and other federal, state, tribal agencies and local governments.
Address:	Five-Star Restoration Program, US EPA, Wetlands Division (4502F), 100 Pennsylvania Ave., N.W., Washington, DC 20460
Phone:	(202) 260-8076

Facsimile: (202) 260-2356
E-mail: pai.john@epa.gov
Web Site: <http://www.epa.gov/owow/wetlands/restore/5star/>

Nonpoint Source Implementation Grants (319 Program)

Purpose: To help States, Territories, and Tribes develop and implement programs to prevent and control nonpoint source pollution, such as creating constructed wetlands to clean-up urban runoff and agricultural wastes.

Projects: State, Territories, and Tribes receive grant money (and may then provide funding and assistance to local groups) to support a wide variety of activities, such as technical assistance, financial assistance, technical programs, education, training, technology transfer, demonstration projects (e.g. best management practices), and monitoring specific to nonpoint source implementation.

Assistance: Grants are first awarded to state agencies. Local organizations can then apply for grants through the agencies, but they must provide 40 percent of the total project or program cost as non-federal dollars.

Eligibility: State, local, and tribal governments, nonprofit and local organizations, etc. (check with your state contact).

Address: U.S. EPA, Office of Wetlands, Oceans, and Watersheds, 1300 Pennsylvania Avenue, Washington, DC 20460

Phone: (202) 260-7100

Facsimile: (202) 260-7024

E-mail: ow-general@epa.gov

Web Site: <http://www.epa.gov/owow/NPS>

DEPARTMENT OF AGRICULTURE (USDA)
USDA - Forest Service

Taking Wing

Purpose: To create and enhance partnerships in the management of wetland ecosystems for waterfowl and wetland wildlife, while providing a variety of compatible recreational opportunities on National Forest System lands.

Projects: Focus towards on-the-ground wetland enhancement and restoration, although some projects include assessment and analysis components. Example: restoration of 100 acres in the Columbia River Scenic Area.

Assistance: Funds are allocated to Forest Service units through internal budget process.

Eligibility: Non-federal entities and individuals - projects must be on National Forest System lands or provide benefits to those lands.

Address: Cynthia Ragland, One Waterfowl Way, Memphis, TN 38120

Phone: (901) 758-3722

Facsimile: (901) 758-3850
E-mail: cragland@ducks.org
Web Site: <http://www.fs.fed.us/outdoors/wildlife>

USDA - Farm Service Agency

Conservation Reserve Program

Purpose: To establish long-term resource-conserving covers on eligible cropland to conserve soil, water, and wildlife.

Projects: Voluntary program where landowners receive rental payments or enter into a cost-share restoration agreement, while maintaining private ownership, to plant cover on marginal cropland.

Assistance: Three options: 1) receive annual rental payments of up to \$50,000/year; 2) receive payment of up to 50% of cost to establish cover; 3) receive payment of up to 25% of cost for wetland hydrology restoration. Contracts are typically 10-15 years in length.

Eligibility: Individuals, states, local governments, tribes, or any other entity who owns private land for at least 1 year that is: either cropland planted with a crop in 2 of the last 5 crop years or marginal cropland that is enrolled in the Water Bank program or suitable to be used as a riparian buffer. Also, the land must be either highly erodible land, a cropped wetland, be devoted to highly beneficial environmental practices, subject to scour erosion, located in a CRP priority area, or be a cropland associated with or surrounding non-cropped wetlands.

Address: Contact your local or state Farm Service Agency office (see "<http://www.fsa.usda.gov/dapdfo/>"); otherwise: Department of Agriculture, Farm Service Agency, Conservation Reserve Program Specialist, Stop 0513, Washington, D.C. 20250-0513

Phone: (202) 720-6221

Facsimile: n/a

E-mail: info@fsa.usda.gov

Web Site: <http://www.fsa.usda.gov/pas/publications/facts/pubfacts.htm>

USDA - Natural Resources Conservation Service

Conservation Technical Assistance

Purpose: To assist land-users, communities, units of state and local government, and other federal agencies in planning and implementing conservation systems.

Projects: Projects that reduce erosion, improve soil and water quality, improve and conserve wetlands, enhance fish and wildlife habitat, improve air quality, improve pasture and range condition, reduce upstream flooding, and improve woodlands

Assistance: Technical assistance available to land users who voluntarily applying conservation and to those who must comply with local or state laws and regulations, such as the wetland

(Swampbuster) provisions of the 1985 Food Security Act and the wetlands requirements of Section 404 of the Clean Water Act.

Eligibility: Individual landusers, communities, conservation districts, and other units of State and local government and Federal agencies.

Address: Contact your local or state National Resources Conservation Service office (see "<http://www.nrcs.usda.gov/perdir.html>";) otherwise: Department of Agriculture, National Resources Conservation Service, P.O. Box 2890, Washington, D.C. 20013

Phone: (202) 720-4527

Facsimile: n/a

E-mail: n/a

Web Site: <http://www.nrcs.usda.gov/NRCSProg.html>

Emergency Watershed Protection Program

Purpose: To protect lives and property threatened by natural disasters such as floods, hurricanes, tornados, and wildfires.

Projects: Examples: Clearing debris from clogged waterways, restoring vegetation, stabilizing river banks, restoring wetland flood retainers.

Assistance: Funds cover up to 75% of costs to restore the natural function of a watershed. Another option is to offer land for a floodplain easement that would permanently restore the hydrology of the natural floodplain as an alternative to traditional attempts to restore damaged levees, lands, and structures. Funds can cover up to 100% of the agricultural value of the land, costs associated with environmental measures taken, and costs associated with establishing the easement. A sponsor must assist you in applying for assistance. Sponsors can be any legal subdivision of state, local, or tribal governments, including soil conservation districts, U.S. Forest Service, and watershed authorities.

Eligibility: Owners, managers, and users of public, private, or tribal lands if their watershed area has been damaged by a natural disaster.

Address: Contact your local or state National Resources Conservation Service office (see "<http://www.nrcs.usda.gov/perdir.html>";) otherwise: Department of Agriculture, National Resources Conservation Service, Watersheds and Wetlands Division, P.O. Box 2890, Washington, D.C. 20013

Phone: See above

Facsimile: n/a

E-mail: n/a

Web Site: <http://www.nhq.nrcs.usda.gov/CCS/ewpFs.html>

Environmental Quality Incentives Program

Purpose: To install or implement structural, vegetative, and management practices in priority areas.

Projects: Conservation practices, such as grassed waterways, filter strips, manure management facilities, capping abandoned wells, and other practices important to improving and

maintaining water quality and the general health of natural resources in the area; and land management practices such as nutrient management, manure management, integrated pest management, irrigation water management, and wildlife habitat management.

- Assistance: Cost sharing may pay up to 75 percent of the costs of certain conservation practices. Incentive payments may also be made to encourage a producer to perform land management practices for up to three years. Offers 5-10 year contracts. Maximum of \$10,000 per person per year and \$50,000 for the length of the contract.
- Eligibility: Eligibility is limited to persons who are engaged in livestock or agricultural production, excluding most large confined livestock operations.
- Address: Contact your local or state National Resources Conservation Service office (see "<http://www.nrcs.usda.gov/perdir.html>"); otherwise: Department of Agriculture, National Resources Conservation Service, P.O. Box 2890, Washington, D.C. 20013
- Phone: (202) 720-1873 or (202) 720-1845
- Facsimile: n/a
- E-mail: n/a
- Web Site: <http://www.nhq.nrcs.usda.gov/OPA/FB96OPA/equipfact.html>

Watershed Protection and Flood Prevention

- Purpose: Works through local government sponsors to help participants voluntarily plan and install watershed-based projects on private lands.
- Projects: Projects include watershed protection, flood prevention, erosion and sediment control, water supply, water quality, fish and wildlife habitat enhancement, wetlands creation and restoration, and public recreation in watersheds of 250,000 or fewer acres.
- Assistance: Provides technical and financial assistance. Funds can cover 100% of flood prevention construction costs, 50% of costs associated with agricultural water management, recreation and fish and wildlife, and none of the costs for other municipal and industrial water management.
- Eligibility: Local or state agency, county, municipality, town or township, soil and water conservation district, flood prevention or flood control district, tribe or tribal organization, or nonprofit agency with authority to carry out, maintain, and operate watershed improvement works.
- Address: Contact your local or state National Resources Conservation Service office (see "<http://www.nrcs.usda.gov/perdir.html>"); otherwise: Department of Agriculture, National Resources Conservation Service, Watersheds and Wetlands Division, P.O. Box 2890, Washington, D.C. 20013
- Phone: (202) 720-3527
- Facsimile: n/a
- E-mail: n/a
- Web Site: <http://www.nrcs.usda.gov/NRCSProg.html>

Wetlands Reserve Program

Purpose: Protect and restore wetlands, riparian areas and buffer zones.

Projects: Voluntary program where landowners may sell a conservation easement or enter into a cost-share restoration agreement, while maintaining private ownership.

Assistance: Three options: 1) permanent easement - USDA purchases easement (payment will be the lesser of: the agricultural value of the land, an established payment cap, or an amount offered by the landowner) and pays 100% of restoration costs; 2) 30-year easement - USDA pays 75% of what would be paid for permanent easement and 75% of restoration costs; 3) restoration cost share agreement - 10-year minimum agreement to restore degraded habitat where USDA pays 75% of restoration costs.

Eligibility: Individuals, states, local governments, tribes, or any other entity who owns private land. The land must be owned for at least 1 year and be restorable and suitable for wildlife.

Address: Contact your local or state National Resources Conservation Service office (see "<http://www.nrcs.usda.gov/perdir.html>"); otherwise: Department of Agriculture, National Resources Conservation Service, Watersheds and Wetlands Division, P.O. Box 2890, Washington, D.C. 20013

Phone: (202) 690-0848

Facsimile: n/a

E-mail: RMisso@usda.gov

Web Site: <http://www.nhq.nrcs.usda.gov/OPA/FB96OPA/WetRule.html> or <http://www.nhq.nrcs.usda.gov/OPA/FB96OPA/WRPfact.html> (fact sheet)

Wildlife Habitat Incentives Program

Purpose: To develop and improve fish and wildlife habitat on private lands.

Projects: Participants prepare a wildlife habitat development plan in consultation with the local conservation district. The plan describes the landowner's goals for improving wildlife habitat, includes a list of practices and a schedule for installing them, and details the steps necessary to maintain the habitat for the life of the agreement.

Assistance: Technical assistance and cost-share agreements where NRCS pays up to 75% of cost of installing wildlife practices. Typically 5-10 year contracts.

Eligibility: Must own or have control of the land and cannot have it enrolled in other programs with a wildlife focus, such as the Wetlands Reserve Program, or use the land for mitigation. Other restrictions may apply.

Address: Contact your local or state National Resources Conservation Service office (see "<http://www.nrcs.usda.gov/perdir.html>"); otherwise: Department of Agriculture, National Resources Conservation Service, P.O. Box 2890, Washington, D.C. 20013

Phone: (202) 720-3534

E-mail: n/a

Web Site: <http://www.nhq.nrcs.usda.gov/OPA/FB96OPA/WhipFact.html>

DEPARTMENT OF INTERIOR (DOI)

DOI - Fish and Wildlife Service

Coastal Program

- Purpose: To conserve healthy coastal ecosystems for the benefit of fish, wildlife, and people.
- Projects: Examples of protection include use of conservation easements and fee title acquisition to protect relatively pristine coastal wetlands, salt marshes, prairies, dunes, bottomland hardwood forests, and riparian areas. Examples of coastal habitat restoration include: reintroduction of tidal flow to formerly-diked mud flat and salt marsh habitat, planting of native vegetation (including submerged aquatic grasses), control and monitoring of exotic invasive species, fencing to restore riparian salmon spawning habitat, and removal or retrofit of small dams and culverts to allow for passage of anadromous fish in coastal streams and estuaries.
- Assistance: Technical and financial assistance is available. The program focuses exclusively on coastal watersheds. It applies an ecosystem-level approach to resolving resource problems, and targets efforts for a strategic (rather than opportunistic) approach. The program is a non-regulatory, pro-active program that relies on voluntary partnership building. Partners include other federal and state agencies, local and tribal governments, businesses, conservation organizations, and private landowners. Matching grants are also awarded annually, on a competitive basis. States that border the Atlantic, the Gulf of Mexico, Pacific and Great Lakes are eligible to apply for grants. The one exception is the State of Louisiana, which has its own coastal wetlands program. Trust Territories and Commonwealths of the United States are also eligible for grants.
- Eligibility: The Coastal Program funds projects on private and public lands.
- Address: Department of Interior, U.S. Fish and Wildlife Service, Division of Fish and Wildlife Management Assistance and Habitat Restoration, 4401 N. Fairfax Drive, Room 400, Arlington, VA 22203. National, regional, and state contacts are listed at <http://www.fws.gov/cep/coastweb.html>
- Phone: 703/358-2201
- Fascimile: 703/358-2232
- Web Site: <http://www.fws.gov/cep/coastweb.html>

Jobs in the Woods Watershed Restoration Program

- Purpose: Provides funding to support watershed restoration projects in timber-dependent communities within the range of the northern spotted owl through the Northwest Forest Plan (NWFP). The NWFP was created to offset impacts of economic losses to communities in CA, OR and WA, resulting from reductions in timber harvest.
- Projects: Program funds are to support watershed restoration projects, including: instream habitat restoration, fish passage improvements, fish screen installation, riparian and wetland habitat restoration, and upland forest restoration, on non-federal lands, while employing

workers from timber dependent communities to conduct project work. Projects are focused on implementing habitat improvements to benefit federally listed, proposed or candidate species, under the ESA.

Assistance: The Service provides the grants and assists applicants with obtaining permits and complying with federal laws, including the ESA, NEPA, NHPA, and the Clean Water Act. Most funded projects involve grants of under \$100,000.

Eligibility: Projects must occur on non-federal lands. Non-profit organizations, individuals, private businesses, Native American tribes and state and local governments are eligible.

Address: U.S. Fish and Wildlife Service, Arcata FWO; Jobs in the Woods Watershed Restoration Program; 1125 16th Street, Room 209; Arcata, CA 95521.

Phone: (707) 822-7201

Facsimile: (707) 822-8136

Web Site: <http://www.ccfwo.r1.fws.gov/jitw>

North American Wetlands Conservation Act Grant Program

Purpose: To promote long-term conservation of North American wetland ecosystems and the wildlife that depend on them.

Projects: For on-the-ground wetland and wetland-associated acquisition, creation, enhancement, and/or restoration.

Assistance: Regular Grant Program (over \$50k) and Small Grant Program (\$50k or less)

Eligibility: Must form public-private sector partnerships and match grant funds 1:1 with U.S. non-Federal dollars.

Address: Department of Interior, U.S. Fish and Wildlife Service, North American Waterfowl and Wetlands Office, 4401 N. Fairfax Drive, Room 110, Arlington, VA 22203 (Attn: specify which grant program you are interested in)

Phone: (703)358-1784

Facsimile: (703)358-2282

E-mail: R9ARW_NAWWO@MAIL.FWS.GOV

Web Site: <http://www.fws.gov/r9nawwo/nawcahp.html>

Partners for Fish and Wildlife Program

Purpose: To conserve, protect, and enhance fish and wildlife and their habitats

Projects: Examples of voluntary habitat restoration: restoring wetland hydrology, planting native trees and shrubs, planting native grasslands, installing fencing and off-stream livestock watering facilities, removal of exotic plants and animals, prescribed burning, reconstruction of in-stream aquatic habitat.

Assistance: Financial and technical assistance available. The landowner may perform the restoration and be reimbursed directly for some or all of his or her expenses, the Service may hire a contractor to complete the work, or the Service may complete the work itself. While not a program requirement, a dollar-for-dollar cost share is sought on a project-by-project basis. In some states where the program is very popular,

however, a 50:50 cost share is required. Partners for Fish and Wildlife funds are not used to purchase or lease real property interest or to make rental or other incentive payments to landowners. Minimum 10-year contract.

Eligibility: Although the primary partners are private landowners, anyone interested in restoring and protecting wildlife habitat on private or tribal lands can get involved in the Partners for Fish and Wildlife Program, including other federal, state and local agencies, private organizations, corporations, and educational institutions.

Address: Contact your state office for assistance. National, regional and state contacts are listed at <http://www.fws.gov/r9dhcpfw/CONTACTS/altcont.html>; U.S. Fish and Wildlife Service, Division of Fish and Wildlife Management Assistance and Habitat Restoration, 4401 N. Fairfax Drive, Room 400, Arlington, VA 22203

Phone: (703) 358-2161

Facsimile: (703) 358-2232

Web Site: <http://www.fws.gov/r9dhcpfw/>

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)

NOAA - National Marine Fisheries Service

NOAA Community-Based Restoration Program

Purpose: To restore marine fish habitat by fostering partnerships with local communities

Projects: Community-based restoration efforts that benefit marine fish habitat (including coastal wetlands and anadromous fish streams)

Assistance: Small grants available - should be developed in partnership with local National Marine Fisheries Service office

Eligibility: non-profits, state and local agencies, tribes

Address: National Marine Fisheries Service, Office of Habitat Conservation, Restoration Division, 1315 East-West Highway, Silver Spring, MD 20910.

Phone: (301) 713-0174

Facsimile: (301) 713-0184

E-mail: chris.doley@noaa.gov or robin.bruckner@noaa.gov

Web Site: <http://www.nmfs.gov/habitat/restoration>

ARMY CORPS OF ENGINEERS (CORPS)

CORPS—Civil Works Directorate

Planning Assistance to States Program, Section 22 of the Water Resources Development Act

Purpose: To allow the Corps of Engineers to perform technical studies for management of water and related land resources to help states and Indian tribes deal with their water resources problems. The program is limited to a maximum of \$500,000 per state or tribe in any year.

Projects: Typical activities studied under this Program are flood damage reduction, water resources development, water supply, water conservation, water quality, erosion, wetlands evaluation, and navigation.

Assistance: This is not a grant program. The local sponsor of the study shares in the cost of the study.

Eligibility: Studies are initiated based on requests to the appropriate Corps of Engineers District office by the local sponsor.

Example: In Louisiana, Section 22 funds were used to cost-share in a study to plan and design a hiking/biking/recreation trail compatible with existing levee systems and other floodplain improvements. The local sponsor then implemented the trail design using non-Federal funding sources.

Address: Contact your local district office of the Army Corps of Engineers.

Phone: n/a

Facsimile: n/a

Email: n/a

Website: <http://www.usace.army.mil/>

Beneficial Uses of Dredged Material, Section 204 of the Water Resources Development Act

Purpose: To allow the Secretary of the Army to carry out projects for the protection, restoration, and creation of aquatic and ecologically related habitats, including wetlands, in connection with dredging for construction, operation, or maintenance by the Secretary of an authorized navigation project.

Projects: Work must be for the protection, restoration and creation of aquatic and ecologically related habitat, including wetlands. Examples include: placement in subsiding wetlands to re-establish necessary elevations for vegetation, additions to offshore islands to re-establish submerged areas and nesting habitat, filling deep holes to re-establish wetlands.

Assistance: This is not a grant program. A local sponsor, a governmental entity, must partner with the Corps. The non-federal share is 25% of the costs in excess of the costs necessary to carry out the dredging for the authorized navigation project.

Eligibility: Studies are initiated based on request to the appropriate Corps of Engineers District office by the local sponsor.

Example: Battery Island Bird Habitat Preservation, Cape Fear River, North Carolina. Battery Island is owned by the State of North Carolina and administered by the North Carolina Division of Parks and Recreation. The Ecosystem Restoration Project will protect 10 acres of upland nesting habitat for colonial waterbirds from further erosion. The project will also restore 5.5 acres of valuable colonial waterbird nesting habitat by placement of dredged material obtained from periodic dredging of the adjacent Wilmington Harbor navigation project.

Address: Contact your local district office of the Army Corps of Engineers.
Phone: n/a
Facsimile: n/a
Email: n/a
Website: <http://www.usace.army.mil/>

Aquatic Ecosystem Restoration, Section 206 of the Water Resources Development Act

Purpose: To allow the Corps to carry out aquatic ecosystem restoration projects that will improve the quality of the environment, are in the public interest and are cost-effective.

Projects: Work has to be related to aquatic restoration. Examples include reforestation of bottomland hardwoods, modification of stream channels to stabilize channels, while introducing complexity and fish habitat, riparian re-vegetation, improvement of fish passage, which may include dam removal, re-establishing submerged vegetation, restoration of reclaimed land, restoration of wetlands.

Assistance: A non-federal sponsor, a public entity, must partner with the Corps. The non-Federal share is 35% of the total project cost, including study phase cost. The non-Federal sponsor is also responsible for 100% of the operation, maintenance, repair and rehabilitation cost.

Eligibility: Studies are initiated based on request to the appropriate Corps District sponsor.

Example: At the Ladd Marsh Wildlife Area, 6 miles southeast of LaGrande, Oregon, the State of Oregon teamed with the Corps to restore the meandering pattern and riparian vegetation of an approximately 4,000-foot section of Ladd Creek and a 2,000-foot section of Barney Creek. This project enhances habitat for resident rainbow trout as well as the steelhead trout, which is listed under the Endangered Species Act for protection in the entire Snake River Basin.

Address: Contact your local district office of the Army Corps of Engineers.
Phone: n/a
Facsimile: n/a
Email: n/a
Website: <http://www.usace.army.mil/>

Other Funding Source Documents:

"Catalog of Federal Domestic Assistance". Published biannually by General Services Administration. <http://aspe.os.dhhs.gov/cfda>, (202) 708-5126.

"Catalog of Federal Funding Sources for Watershed Protection, 2nd Edition" (1999). EPA's Watershed Academy, Office of Water, Publication No. EPA 841-B-99-003. <http://www.epa.gov/OWOW/watershed/wacademy/fund.html>, National Center for Environmental Publications and Information (NCEPI), (800) 490-9198.

“Environmental Grantmaking Foundations”. Published annually by Resources for Global Sustainability, Inc. <http://home.eznet.net/~rgs>, (716) 473-3090.

“Exploring Wetlands Stewardship- A Reference Guide for Assisting Washington Landowners” (1996). Washington State Department of Ecology Publication No. 96-120. <http://www.wa.gov/ecology/sea/shorelan.html>, (360) 407-7472.

“Financing Clean Water Action Plan Activities” (1998). EPA Clean Water Act State Revolving Fund Branch, Office of Water. www.epa.gov/owm/finan.htm, (202) 260-2036.

“Funding for Habitat Restoration Projects” Citizen’s Guide: A Compendium of Current Federal Programs with Fiscal Year 1996–1998 Funding Levels”. Restore America’s Estuaries. <http://www.estuaries.org/funding.html> or e-mail: raecoalition@estuaries.org

“A Guidebook of Financial Tools” (1997). Environmental Finance Center Network and the Environmental Financial Advisory Board. <http://www.epa.gov/efinpage/guidebk/guindex.htm> or e-mail: mcprouty.timothy@epa.gov

“Landowners Guide to Voluntary Wetland Programs in Arkansas”. Arkansas Game and Fish Commission. http://www.mawpt.org/MAWPT_Products/ or (501) 223-6300.

“Landowning Colorado Style”, Colorado Association of Soil Conservation Districts, (303) 232-6242.

“Living with Michigan’s Wetlands: A Landowner’s Guide”. Tipp of the Mitt Watershed Council, (616) 347-1181.

“Ohio Wetlands”. National Audubon Society's Great Lakes Regional Office, (614) 224-3303.

“Options for Wetland Conservation: A Guide for California Landowners”. California Resources Agency. www.ceres.ca.gov/wetlands/introduction/opt_guide.html or (916) 653-5656.

“The Oregon Wetlands Conservation Guide: Voluntary Wetlands Stewardship Options for Oregon’s Private Landowners” (1995). Oregon Wetlands Conservation Alliance. Contact Oregon Department of Agriculture, Natural Resources Division at (503) 292-9451.

“Private Landowner’s Wetlands Assistance Guide: Voluntary Options for Wetlands Stewardship in Maryland” (1992). Contact EPA Region III at (215) 566-2718.

“A State and Local Government Guide to Environmental Program Funding Alternatives” (1994). EPA document #EPA 841-K-94-001, Office of Water.

“Wetland and Riparian Stewardship in Pennsylvania: A Guide to Voluntary Options for Landowners, Local Governments and Organizations” (1997). Alliance for the Chesapeake Bay. Contact the Bureau of Watershed Conservation, Pennsylvania Department of Environmental Protection, (717) 236-8825.

“Wetlands Assistance Guide for Landowners (in Texas)”. Texas Parks and Wildlife.
<http://www.tpwd.state.tx.us/conservation/wetlands/wetintro.htm> or (512) 389-4328.

APPENDIX R-III: ORGANIZATIONS, WEB SITES, AND TRAINING OPPORTUNITIES

Below is a list of sources of assistance and information on wetland restoration. It is not a comprehensive list, but is a good introduction to what is available.

Nonprofit Organizations:

NAME	CONTACT INFORMATION
Association of State Floodplain Managers	2809 Fish Hatchery Road, Suite 204 Madison, WI 53711, (608)274-0123, http://www.floods.org/ asfpm@floods.org
Association of State Wetland Managers	PO Box 269, Berne, NY 12023-9746 (518)872-1804, http://www.aswm.org/ aswm@aswm.org
Ducks Unlimited, Inc.	One Waterfowl Way, Memphis, Tennessee, USA 38120 1(800)45DUCKS, http://www.ducks.org/ conserv@ducks.org
Environmental Law Institute	1616 P St., NW, Suite 200 Washington, DC 20036, (202)939-3800 http://www.eli.org/ , widholm@eli.org
Estuarine Research Federation	http://www.erf.org/ , webmaster@edf.org
Izaak Walton League of America	707 Conservation Lane, Gaithersburg, MD 20878, (800)BUG-IWLA (284-4952), http://www.iwla.org/ general@iwla.org
Native American Fish and Wildlife Society	750 Burbank Street, Broomfield, CO 80020, (303) 466-1725, www.nafws.org/index/html
Soil and Water Conservation Society	7515 NE Ankeny Road, Ankeny, Iowa 50021, (515)289-2331, http://www.swcs.org
Society for Ecological Restoration	1207 Seminole Highway Madison WI 53711 USA, (608)262-9547, http://ser.org/ , ser@vms2.macc.wisc.edu

Society of Wetland Scientists	P.O. Box 1897, Lawrence, Kansas 66044-8897, 1(800)627-0629, http://www.sws.org/ , sws@allenpress.com
Terrene Institute	4 Herbert Street, Alexandria, VA 22305, (703)548-5473, http://www.e2b2.com/index.ht , terrinst@aol.com
Water Environment Federation	601 Wythe Street, Alexandria, VA 22314-1994 USA, 1(800)666-0206, http://www.wef.org/ , msc@wef.org

Federal Agency Web Sites:

AGENCY	INTERNET ADDRESS
Army Corps of Engineers	http://www.usace.army.mil/
Bureau of Reclamation	http://www.usbr.gov/
Bureau of Land Management	http://www.blm.gov/
Council on Environmental Quality	http://www.whitehouse.gov/CEQ/About.html
Department of Agriculture	http://www.usda.gov/
Environmental Protection Agency's Office of Wetlands, Oceans and Watersheds	http://www.epa.gov/OWOW/wetlands/restore
Farm Service Agency	http://www.fsa.usda.gov/pas/default.asp
Fish and Wildlife Service	http://www.fws.gov/
Forest Service	http://www.fs.fed.us/
Geological Survey	http://www.usgs.gov/
National Oceanic and Atmospheric Administration, National Marine Fisheries Service	http://www.nmfs.noaa.gov/habitat/habitatprotection/wetlands.htm http://www.nmfs.noaa.gov/habitat/restoration/

National Park Service	http://www.nps.gov/
Natural Resources Conservation Service	http://www.nrcs.usda.gov/
Office of Surface Mining	http://www.osmre.gov/osm.htm
State Department's Bureau of Oceans and International Environmental and Scientific Affairs	http://www.state.gov/www/global/oes/

Other Web Sites:

DESCRIPTION	INTERNET ADDRESS
Better Wetlands: More Than a Dozen Ideas to Improve Restored Wetlands for Wildlife and Personal Enjoyment (U.S. Natural Resources Conservation Service)	http://www.ia.nrcs.usda.gov/enhance/bwtoc.html
Do Created Wetlands Replace the Wetlands that are Destroyed? (U.S. Geological Survey)	http://www.dwindn.er.usgs.gov/widocs/wetlands/FS_246-96.html
Evaluation of Restored Wetlands in the Prairie Pothole Region	http://www.NPWRC.USGS.GOV/wetland/
Monitoring Water Quality Web Page: Resources for Volunteer Monitors (USEPA)	http://www.epa.gov/OWOW/monitoring/
"Riverine Wetlands: Succession and Restoration" - bibliography and abstracts of scientific articles, dissertations and books (University of Lyon, France)	http://limnologie.univ-lyon1.fr/htdocs_limno/publications.html
Stream Corridor Restoration: Principles, Practices, and Processes (Interagency)	http://www.usda.gov/stream_restoration/
Volunteer Estuary Monitoring (USEPA)	http://earth1.epa.gov/OWOW/monitoring/volunteer/estuary/index.html
Wetland Bioassessment Fact Sheets (USEPA)	http://www.epa.gov/owow/wetlands/wqual/bio_fact/
Wetland Creation and Restoration: The Status of the Science (USEPA)	http://www.epa.gov/OWOW/wetlands/kusler.html

Wetland Research: Restoring the Balance (LWRRDC)	http://www.ramsar.org/wure_library_research.html
WES Environmental Laboratory - Wetlands (US Army Corps of Engineers)	http://www.wes.army.mil/el/wetlands/wetlands.html#wrtc

Training Opportunities:

The following are training opportunities offered by nonprofit, government, and academic organizations. There are also many private firms not listed here that have wetland training courses available.

NAME/DESCRIPTION	CONTACT INFORMATION
Certified professional in erosion and sediment control (CPESC) - Certification training	Soil and Water Conservation Society 7515 NE Ankeny Road, Ankeny, IA 50021 (515) 289-2331 ext.17, http://www.swcs.org/cpesc.html , pamd@swcs.org
Desert research institute water resources center - Courses available	Water Resources Center, Desert Research Institute, P.O. Box 60220, Reno, NV 89506-0220, USA, (702)673-7300, http://www.dri.edu , www.wrc@dri.edu
Interagency training opportunities and non-government training partners - Internet training list (hot links to natural resources training web pages)	Bureau of Land Management National Training Center, 9828 N 31st Ave. Phoenix, AZ 85051, USA, (602)906-5500 http://www.ntc.blm.gov/partner.html
Izaak Walton League's Save Our Streams program training workshops - Short workshops (volunteer wetlands and streams monitoring, quality assurance, restoration)	Save Our Streams, Izaak Walton League of America, 707 Conservation Lane, Gaithersburg, MD 20878, USA, (301)548-0150, http://www.iwla.org/ , sos@iwla.org
Mid-Atlantic interagency wetland training - Free courses (delineation, plants, soils, hydrology)	(215)814-2718, spagnolo.ralph@epa.gov

NAME/DESCRIPTION	CONTACT INFORMATION
Society of Wetland Scientists professional certification program	SWS Professional Certification Program, P. O. Box 1897, 810 East 10th Street, Lawrence, KS 66044-8897 USA, 1(800)627-0629, http://www.wetlandcert.org/ , swscertif@allenpress.com
U.S. Department of Agriculture (Natural Resources Conservation Service) training workshops on water quality monitoring - Free	Bruce Newton, National Water and Climate Center, USDA Natural Resources Conservation Service, 101 SW Maine Street, Suite 1600, Portland, OR 97204-3224, USA, (503)414-3055, bnewton@wcc.nrcs.usda.gov
U.S. Fish and Wildlife Service's National Conservation Training Center (NCTC) Courses	NCTC, Rt.1, Box 166, Shepherdstown, West Virginia 25442, USA, (304)876-7445 http://www.fws.gov/r9nctc/nctc.html , dee_butler@mail.fws.gov
Watershed training opportunities through The Watershed Academy - Free	Watershed Academy, U.S. Environmental Protection Agency (4503F), 401 M Street, SW, Washington, DC 20460, USA, (202)260-5368, http://www.epa.gov/owow/watershed/wacademy.htm , wacademy@epamail.epa.gov
Wetland Biogeochemistry Institute (delineation training and biogeochemistry Symposia)	Wetland Biogeochemistry Institute, Louisiana State University, Baton Rouge, Louisiana 70803-7511, USA, (504)388-8810, http://www.leerlc.lsu.edu/ , wetlands@premier.net
WETLAND program short courses at Ohio State University (wastewater treatment, delineation, mitigation)	Wetlands Program c/o William J. Mitsch, The Ohio State University, School of Natural Resources, 2021 Coffey Road, Columbus, OH 43210, USA, (614)292-9773, http://swamp.ag.ohio-state.edu/ , mitsch.1@osu.edu

NAME/DESCRIPTION	CONTACT INFORMATION
Wetland-related academic programs and training courses - two internet listings	Society of Wetland Scientists Business Office, P.O. Box 1897, Lawrence, Kansas 66044-8897, USA, 1(800)627-0629. For academic programs - http://www.sws.org/colleges/ For training courses - http://www.sws.org/training/ , sws@allenpress.com or mingst@mail.modot.state.mo.us
U.S. Army Corps of Engineers Proponent-Sponsored Engineer Corps Training (PROSPECT) environmental training courses on wetlands and restoration	http://www.wes.army.mil/el/nrrdc/train.html

TECHNICAL APPENDICES

APPENDIX T-1: Societal Goals and Related Ecological Functions of Wetlands (adapted from NRC, 1995)

<i>Social Goal</i>	<i>Ecological Function</i>	<i>Ecological Effects</i>	<i>Physical Indicator*</i>	<i>Measurement Parameters</i>
Provide fish and shellfish habitat	Long-term surface water storage	Maintain base flows	Basin capacity; presence of water during fish lifecycle (hydrological regime); typical water quality; substrate to water level elevations allow water flow and retention	<ul style="list-style-type: none"> * Basin volume * Water level changes * Water quality measures (temp, salinity, etc.) * Substrate elevations * Channelization patterns
	Support typical communities	Food, cover abundance	Plant species diversity and richness	<ul style="list-style-type: none"> * Species number, abundance * Species height, cover, structure * Growth, reproductive rates
Support waterfowl and furbearers	Maintain typical plant communities	Food, nesting, cover for animals	Mature wetland vegetation; typical mosaic of plant community succession stages	<ul style="list-style-type: none"> * Species number, abundance * Population growth parameters: breeding pairs, offspring produced, mortality, immigration/emigration * Sources of mortality
Provide useful plants	Support typical plant communities	Maintain nutrient levels within wetland	Survival and reproduction of particular species	<ul style="list-style-type: none"> * Growth, reproduction rates * Sustainable crop yields

<i>Societal Value</i>	<i>Ecological Function</i>	<i>Ecological Effects</i>	<i>Physical Indicator</i>	<i>Measurement Parameters</i>
Maintain water quality	Retention, removal of dissolved materials	Reduced transport of nutrients	Nutrient outflow lower than inflow	<ul style="list-style-type: none"> * N and P levels in incoming versus outgoing waters; * N and P levels in wetland sediments
	Accumulation of peat (organic matter)	Retain pollutants, nutrients, metals	Increase in depth of peat; presence of pollutants in peat	<ul style="list-style-type: none"> * Change in depth of peat layer * Analysis of heavy metals and other pollutants in soil cores
	Accumulation of sediments (inorganic)	Retain sediments, some nutrients	Increase in depth of sediment	<ul style="list-style-type: none"> * Change in depth of sediment layer
Reduced shoreline erosion	Maintain vegetated wetland edges	Stable shoreline edges	Erosion and deposition rates typical of wetland type; lack of eroded or undercut shore; presence of stable vegetation	<ul style="list-style-type: none"> * Soil loss rates from edges * Undercutting and down cutting changes * Plant loss from edges
Reduced damage from floodwaters	Short-term surface water storage	Reduced down-stream flood peaks	Presence of floodplain along river corridor; wide vegetation buffer; basin capacity	<ul style="list-style-type: none"> * Width of floodplain and riparian vegetation * Basin volume
Maintain biodiversity	Maintain high water table	Support typical plant community	Presence of diverse native plant species	<ul style="list-style-type: none"> * Species number, abundance, richness * Complete food chain
	Maintain typical energy flow	Support for animal populations	High diversity of animal species	<ul style="list-style-type: none"> * Few to no non-native * Rare and dominant species * Species succession

* Physical Indicators include both measurable processes and structures of the system.

APPENDIX T-II: What makes a Wetland Unique?

Although they are varied in type and location, wetlands possess several ecological characteristics that distinguish them from upland or aquatic habitats. Wetlands are characterized by unique hydrologic, soil (substrate), and biotic conditions that set them apart from other systems. Each of these characteristics is described in detail below to provide you with a basic understanding of the ecological elements that wetland restoration, enhancement, or creation projects seek to establish.

Hydrology and Water Quality

Wetland hydrology generally exists when an area is wet enough to result in soils that are anaerobic (depleted of oxygen) and support hydrophytic vegetation (plants that are adapted to anaerobic, waterlogged environments). The hydrological regime is typically the primary factor driving the rest of the elements of the system.

Wetland hydrology may exist at sites that are obviously flooded or at sites that are never flooded but have soils that are saturated near the surface. A site's hydrologic characteristics are the most important factors in determining what kind of wetland will exist and what functions it will perform. The hydrologic characteristics of a wetland are commonly described in terms of water depths over time, flow patterns, and duration and frequency of flooding or saturation. Some systems, such as streams, have very dynamic hydrological regimes that can be difficult to re-create. Other wetlands, such as permanent ponds or bogs, have hydrological conditions that are more static.

The presence of water on a site can be measured and illustrated with a hydrograph. A hydrograph indicates the level of water or the depth of soil saturation over the year. Figure A-1 shows the water signatures for a tidal marsh and a prairie pothole. Some wetlands have fairly stable hydrographs; however, most fluctuate based on seasonal precipitation, temperature, and evaporation.

Hydrographs for wetlands in coastal areas will be heavily influenced by tidal cycles. Inland wetland hydrographs, such as those for prairie potholes, may show the strong influence of ground water levels.

Many wetlands are dynamic and fluctuate in size during the year and between years. These natural fluctuations are the wetland's disturbance regime and this regime needs to be included in the design for your wetland site. Sites may flood on regular 2, 10, or 50 year cycles and cause significant,

Figure A-1. Hydrographs of a tidal marsh and a prairie pothole

but predictable changes in wetland size and shape. Extreme events, such as hurricanes, may have less predictable effects.

If wetland hydrology can be established at your site, there is a good chance that other wetland characteristics will develop over time. When a wetland project does not develop as planned, or does not develop into a wetland at all, it is most often because the hydrologic characteristics of the site are not what they need to be to achieve the goals. The first step in trouble-shooting wetland projects is to check the hydrologic characteristics of the site.

For many sites, establishing the proper hydrology requires the services of a hydrologist who will assess current conditions on your site, evaluate the local disturbance regime, and determine what changes are necessary to achieve the hydrological regime typical of the wetland you wish to establish.

Water contains a number of dissolved and suspended materials including nutrients (e.g., nitrogen, phosphorus, dissolved carbon), contaminants (e.g., pesticides, petroleum hydrocarbons), and other constituents (e.g., dissolved oxygen, salts, metals, suspended sediments). Some chemicals (e.g., nutrients) can be either beneficial or toxic, depending on how much is present. Water quality usually refers to how “healthy” the water is for humans, animals and plants. An aquatic area with “good” water quality has the water chemistry typical of the ecosystem and region, including the levels of dissolved oxygen, contaminants, and other constituents (nutrients, suspended sediments) that result in healthy populations of native plants and animals.

Because wetland types vary, good water quality varies from one wetland type to another. For example, significant amounts of suspended sediments are typical of good conditions for some tidal marshes because, as sediments settle out, they help to build up the marsh surface, which allows the growth of marsh vegetation. Conversely, too much suspended sediment in coastal waters can be harmful to seagrass beds because it reduces the amount of light penetrating the water to the plants. If you suspect that the water quality might be a problem, you will need to compare the water condition at your site with those at reference wetlands, i.e., sites in your region that are relatively undisturbed examples of your wetland type. This work will almost always require the expertise of a water quality specialist.

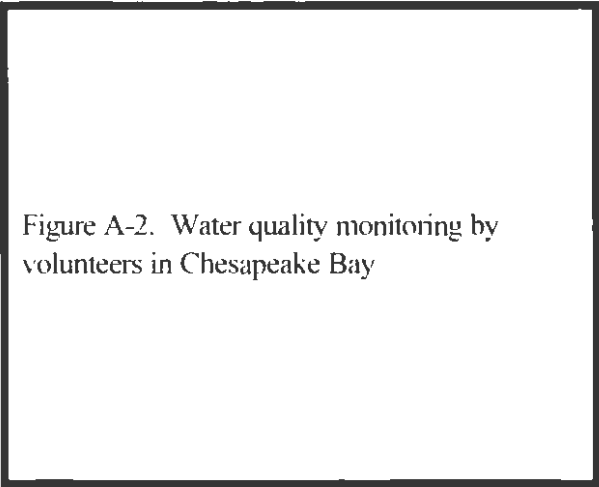


Figure A-2. Water quality monitoring by volunteers in Chesapeake Bay

Wetland Soils and their Qualities

Wetland soils or substrates are hydric soils, meaning they are waterlogged for all or part of the year which results in anaerobic conditions. In hydric soils, water fills the air spaces between soil particles and forces the oxygen out causing soils to become anaerobic (depleted in oxygen) in the zones closest to the surface. Waterlogged, anaerobic conditions are very hostile to terrestrial plants and these conditions will quickly kill most upland species. As a result, wetlands are dominated by plants that are specifically adapted to these tough, waterlogged.

anaerobic soil conditions. When soils lose their oxygen, they change significantly in structure and chemistry which also influences the plant and animal species able to survive there.

Wetland soils come in two major types—organic and mineral. Organic soils are made up primarily of plant material, either decomposed (the soil is then called “muck”) or undecomposed (called “peat”). Mineral soils are composed primarily of non-plant material such as quartz, biotite, or calcite. Depending on the size of the soil grains, mineral soils are generally described (from largest grain size to smallest) as sand, silt, and clay. Sandy wetland soils are the most permeable, allowing water to move easily between the wetland and the groundwater, depending on the depth of the water table. Less permeable clayey soils are more likely to maintain water in the wetland even if the water table is low. Some sites have “hard pan” layers underneath them, impermeable layers of clay or rock, essential to the ecology of the wetland. These hard subsurface layers may allow water to stay ponded for much longer than would occur otherwise, resulting in unique ecosystems, such as “vernal pool” habitats.

Many wetland soils, especially organic soils such as peat, are characterized by relatively high amounts of organic carbon and nutrients, which drive the significant biological productivity of wetlands. The organic material provides energy for soil microbes to recycle nutrients and to convert nitrogen to organic forms that encourage plant growth. Of course, not all soils are naturally high in organic material or nutrients. As with other wetland elements, soil characteristics vary with the system and the region. Reference sites can provide data on typical soil conditions of the region. Soil scientists can identify hydric soils by their color and structure. Often organic, anaerobic soils are dark grey to nearly black. In more mineral soils, the chemistry of hydric soils affects minerals such as iron and manganese causing distinctive color variations.

In addition to small scale soil qualities, two large scale features of substrates are critical to restoration projects: 1) soil or substrate elevation in relationship to water levels, and 2) networks of channels to move water in and out. These features are shaped by water and their relationship to water levels is critical. Incorrect elevations and topographies are some of the most common reasons wetland restoration projects fail to achieve their goals.

Soil maps produced by the USDA Natural Resources Conservation Service are a good place to start for local soil information. Soil maps are produced for each county and provide information on the presence of hydric soils, the permeability of these soils, and their suitability as wetland habitat. However, some county maps are decades old, and most do not contain enough detail to locate small hydric “inclusions” in non-hydric soils (or vice-versa). You may need to have a professional soil scientist examine the soils at the project site, particularly if the site has been altered, to determine whether the existing soil is hydric. Determining proper soil elevations and topography, if they have been altered, is the job of hydrologists or wetland experts who deal with sediments and their transport.

Wetland Plants

Wetland plants, or hydrophytic plants, are specifically adapted to waterlogged, anaerobic conditions. Some wetland plants grow exclusively in wetlands and are called “obligate” wetland species; others are “facultative” species as they may be found in both wetlands and drier areas. There are many types and categories of wetland plants, including emergent plants (such as rushes), submerged plants (eel grass), and floating plants (such as duckweed). Wetland plants also include trees (like

swamp oak), shrubs (like bayberry), moss, and many other types. The wetland's water source (fresh, saline (salty), or brackish) will affect the composition of the wetland plant community, as will the amount and duration of water in the wetland.

Plant species also can be regionally and locally specific: the dominant native plant in Atlantic coast tidal systems is smooth cordgrass (*Spartina alterniflora*) whereas the dominant native plant in central Pacific coast salt marshes is Pacific cordgrass (*Spartina foliosa*). Some wetlands may be degraded because they contain non-native species, that is, plants from other regions. These non-natives may be invasive and displace more typical wetland plants. Sometimes non-native species can completely replace the natural wetland plant community, which alters the ecological functioning of the site. Purple loosestrife, reed canary grass, and common reed are examples of non-native invasive wetland plants. Atlantic cordgrass becomes an invasive, exotic species when it occurs along the Pacific coast, outside its native range.

The spread of non-native species is a huge ecological problem in the U.S. The U.S. Fish and Wildlife Service estimates that approximately 4600 acres per day in public natural areas are lost to non-native plants and animals. For many restoration and enhancement projects, significant effort is devoted to removing the invaders so that the native species can re-establish.

Nutrient, turbidity, and salinity levels are key parameters determining the composition of wetland plant community. Another critical element is the relationship of water levels to substrate elevation. If water is too deep, emergent and sub-emergent vegetation will not establish. If the substrate elevation is too high, then what you may get is an upland. In some habitats, such as vernal pools, microtopographic changes must be re-created to establish the very sensitive endemic species that occur there.

Wetland Animals

Wetlands are inhabited by creatures large and small: water fleas and alligators; shrews and bears; minnows and salmon; wrens and herons. Because wetlands exist where land and water meet, they are often used by animals from both wet and dry environments. Many species depend on wetlands for all or part of their lives. For example, the salt marsh harvest mouse lives its entire life in the tidal salt marshes around the San Francisco Bay. It is so well adapted to this habitat that it has developed special kidney functions that allow it to eat salt marsh vegetation and survive the ingestion of sea water. Wetlands are very important in maintaining biodiversity; they are used by 43 percent of the species listed as endangered or threatened under the Endangered Species Act.

Some of the smallest wetland animals are invertebrates (animals without backbones) such as beetles, water fleas, crayfish, dragonflies, snails, and clams. Invertebrates are an important food source for other animals, both as adults and in their egg and larval forms. Amphibians and, to a lesser extent, reptiles, are very strongly tied to wetlands because many frogs, snakes, turtles, and salamanders need both water and drier environments to complete their life cycles. Fish are not found in all wetlands, but wherever there is permanent water fish are likely to occur. Even wetlands with only seasonal flooding may be temporary habitat for fish from adjacent permanent water. Many fish spawn in wetlands, and wetlands are particularly valuable as nursery areas where young fish can hide from hungry predators until they are big enough or fast enough to survive in open water.

Birds are some of the best-known inhabitants of wetlands. Ducks, in particular, are valuable to people who enjoy hunting or birding. However, wetlands are also important to shorebirds (plovers, sandpipers) that feed in mudflats, wading birds (herons, egrets, bitterns) that feed in shallow water, songbirds (red-winged blackbirds, rails, marsh wrens) that perch on or nest in tall grasses or shrubs, and other birds such as terns and hawks that are all common inhabitants of wetlands. Finally, mammals such as beavers, raccoons, shrews, mice, moose, and bear are common residents of wetlands, although their tracks are usually seen more often than the animals themselves.

While the ecological requirements for animals vary with the species, here are a few general requirements of major taxa using wetlands:

- Invertebrates process nutrients and organic matter and are important for supporting much of the wetland food chain. Invertebrate species are numerous and live in a range of ecological conditions. In general, like most aquatic animals, most invertebrates need well-oxygenated water. Temperature levels and food sources are essential to support invertebrate diversity. A reliable source of water, a diversity of typical plant species, and buffers around the wetland will support invertebrates by filtering out pollutants, moderating temperature, providing a variety of habitats, and providing food sources.
- Amphibians and reptiles (herptiles) require a range of habitats during their lifecycles. Plant structural diversity, such as brush, leaf litter, and small dense stands of grass or reeds, can give these species cover, foraging and nesting habitat. Larger debris like logs are attractive for basking. Areas of sandy soil with a warm, southern exposure encourage turtle reproduction. Deep water areas will support species that overwinter by burrowing in mud. Shallow water (usually with vegetation) is important for hiding egg masses and protecting tadpoles from predators. Gradual slopes from the wetland to the upland help animals move easily between habitats. Habitat requirements vary by species and restorations should be designed with the needs of local herptile species in mind.
- Fish need both shallow water to protect eggs and young fish, and deeper water for adults. Fish may move in and out of wetlands as water depths fluctuate. Some wetlands support no fish or only small fish because the wetland is shallow or temporary. Temperature, dissolved oxygen (DO), and salinity levels are parameters that will determine the species present. Shade, streambed/wetland structure, and food sources (such as invertebrates) will also determine the species richness. Trees for shade and large debris for hiding can be very beneficial. Some fish can provide insect control in the wetland. However, others, such as bottom-feeding fish can destroy submerged plant communities and thereby reduce light levels by stirring up sediment.
- Birds occupy a variety of habitats in and around wetlands and are important indicators of wetland functioning. Breeding or migratory waterfowl and shorebirds will be present in wetlands that offer adequate cover and food sources. Rare species can be indicators of specific habitat conditions. For example, clapper rail populations in west coast tidal salt marshes, are indicators of mature, healthy Pacific cordgrass marshes. A wide range of bird

species, including wrens, sparrows, and yellowthroats, live and nest in wetlands or where the wetlands interface with the upland. Adjacent uplands, especially grass, willow, and tree dominated zones, are important as high tide refuges for wetland birds and offer millions of migratory birds places to stop and forage. In developing wetland enhancement activities to attract particular species, carefully weigh the potential effects on other species that use the wetland. Restorationists have also found that some birds can be very destructive to newly installed plants; geese, for example, are able to denude acres of newly planted stems in one night and they can be one of the biggest challenges to new wetland restoration sites.

- Mammals generally need adjacent uplands or upland islands for escape during high-water periods. Therefore, undisturbed upland buffers and corridors connecting adjacent habitats are critical to these taxa. Nest boxes may attract bats, which can provide insect control in the wetlands. Muskrats can help to control vegetation, but can also “eat-out” the vegetation and be a nuisance with burrowing activities. Beavers, a keystone species of wetlands throughout North America, can aid wetland restoration by creating the very water control structures that are needed to keep water in a wetland, but they also can *redesign* your site by creating dams where you didn’t plan for them.

The conversion of wetland vegetation to non-native plants alters the habitat for native animals and results in the loss of species from local wetlands. In addition, non-native animals are as big a problem as non-native plants. Non-native animals are causing losses of wetland communities and biodiversity (see box on nutria).

Animal communities vary with wetland type and region, but in general, healthy wetlands are rich in wildlife and very productive biologically. For example, approximately three-quarters of the Nation’s commercially harvested fish and shellfish depend on bays and other estuarine habitats, of which wetlands are an integral part. According to some estimates, each year the production associated with

Nutria, Non-native Nightmare

Nutria are large (8-18 lb) beaver-like rodents native to South America. Accidentally introduced into Maryland’s eastern shore marshes in the 1940’s, nutria have been implicated in the loss of emergent brackish marsh.

First noticeable in the 1950s, marsh loss along the Blackwater River in Dorchester County, Maryland, has accelerated at an alarming rate as nutria populations have grown. What was once continuous marshland now appears as fragmented remnants.

Nutria forage directly on the vegetation root mat and cut the marsh into finer and finer fragments. Erosion by tidal and wave action lowers the unvegetated marsh bottom and prevents plants from recolonizing.

A recent study found that within the Blackwater National Wildlife Refuge alone, over 6 square miles of marsh have been lost to open water since 1938. Over 50 percent of the remaining marsh has significant damage and may likely be lost in the near future.

these wetlands accounts for more than \$100 billion dollars in sales of fish and shellfish and provides one and a half million jobs.

Each wetland has its own distinctive animal community. Relatively undisturbed wetlands in your region will give you an idea of what you can expect to inhabit your wetland, as long as your wetland project results in typical wetland hydrology and native plant communities. If you are interested in attracting a particular animal or animals to your wetland, a wetland biologist or ecologist may be able to help you pick specific plants or take other actions designed to accomplish that goal.

APPENDIX T-III: Activities Used to Restore or Change Wetland Characteristics

Typical Activities Used to Restore or Change Hydrology:

- Try to reverse the actions that caused the loss or alteration of a wetland's hydrologic characteristics. Some measures include:
 - * Remove dams or other water control structures
 - * Fill or plug ditches or drains
 - * Remove fill that has elevated the land surface
- Bring additional water to the site if the current water supply is inadequate. Methods include:
 - * Dig channels to bring water to additional areas
 - * Pumping water in from other sites
 - * Installing pipes to bring in water
- Control water levels by installing water control structures. Some structures include:
 - * Open culverts
 - * Culverts with manual or automatic gates
 - * Weirs
 - * Check dams
- Use the lowest maintenance water control structures possible. Seek structures that allow flexibility in use and are able to withstand extreme hydrological and climactic (e.g. winter ice) events
- Reinstall proper substrate to water level elevations. Some methods include:
 - * If the substrate elevation is too low, allow natural sedimentation to build up the elevation (a passive method).
 - * If the substrate elevation is too low, import appropriate sediment/soils (an active method). Soils may come from upland sites, dredged sites (dredged material), or other wetlands.
 - * If the substrate elevation is too high, excavate to the required level.
 - * Shape and contour your site to re-establish the right relationship between the hydrology of the site and its topography.
- If the primary water source is tidal or groundwater, you may need very precise grading because deviations of only inches can alter the habitat for plants.

Typical Approaches to Improving Water Quality:

- If contaminants are found in the water at the restoration site, check uses and inputs upstream or adjacent to the site for sewer outflows, other outfall pipes, ditches draining industrial or agricultural areas, landfills, or areas where junk and trash has been illegally dumped.
- If you find a potential source of pollution contact local authorities for help to determine whether it is the source of the contaminants and whether it can be cleaned up. Never attempt a clean-up yourself unless you know exactly what you are removing and you own the property or have the owner's permission. If a site contains contaminants in amounts that are toxic to wildlife or humans, have the toxic materials removed or remediated by professionals.
- If the source of the pollution can't be removed, lessen its impact by:

- * Implementing “Best Management Practices” (BMPs) to reduce pollution from stormwater runoff from developed areas adjacent to the site. BMPs include activities such as labeling storm drains, installing settling basins, etc.
- * Planting vegetated upland buffers to reduce the amount of contaminants, excess nutrients, or sediment coming into your site from adjacent or upstream areas.
- * Selecting plant species that can tolerate the existing conditions.
- * Routing the water through pools or other structures constructed to allow excess nutrients, sediments, or contaminants to settle out or become absorbed or converted to a less harmful form by natural processes.
- * Educating neighbors about pollutant effects on wetlands and asking them to reduce their use of fertilizers and pesticides.

Typical Activities for Restoring or Changing Soils/Substrates:

- If soils are degraded or are lacking nutrients, organic matter or other soil component (often the case when wetlands are created from excavated uplands):
 - * Do nothing, and see what plants grow at the site.
 - * Amend the soil with materials designed to address the soil nutrient deficiency. There are scores of amendment approaches. Talk to a specialist to determine the best one for the problems.
 - * Cover the site with wetland soils salvaged from wetlands that are being destroyed.
- If you need to raise the elevation of compacted or eroded sites:
 - * Let natural sedimentation build up the elevation, if the process is fast enough.
 - * Use dredged materials to build up the elevation.
- Provide controls against erosion and sedimentation during construction in or near the wetland or aquatic areas. Common erosion prevention techniques include:
 - * wheat straw (which is longer, thus more stable, than grass/hay straw)
 - * mulch or bales
 - * fiber blankets
 - * cover vegetation (temporary plantings or seeding)
 - * plastic sediment fences with hay bales (be sure they are ultimately removed and do not remain on site or wash downstream).
- Once construction is completed, you may want to delay flooding the site until the exposed soils have been stabilized with vegetation.
- Protect site against long-term erosion. Many methods exist to achieve this goal.

Typical Activities for Establishing a Healthy Wetland Plant Community:

- To establish native species for the target habitat type, after establishing hydrology and soil conditions:
 - * Wait a season or two and see what comes in naturally (assuming wetland hydrology has been established).

- * Plant wetland vegetation, using local plants or seeds from local nurseries and seed distributors (see USDA's Plant Materials Program for sources of seeds and plants at "<http://Plant-Materials.nrcs.usda.gov/>). If you are using seeds, ask for a germination test result before you buy.

- * Salvage plants that would otherwise have been destroyed from local land development, road building, or logging operations, and plant them at your site.

- Follow plant lifecycle needs, including:

- * Plant early in the species' growing season.

- * Control water, if possible, to help vegetation become established.

- * Provide irrigation until young plants are established.

- Control erosion, add nutrients, and establish cover quickly with a fast-growing "cover species" while slower-growing plants become established. Use a leguminous species to boost soil nitrogen, if needed. Never use an invasive or competitive native or non-native species.

- Remove non-native species. The wide range of methods falls into three categories:

- * Mechanical—pull by hand, use a pulaski or weed wrench, use a blade or backhoe, burn, graze, etc.

- * Chemical—use a pre-emergent or a herbicide for emergent plants.

- * Biological—use a biocontrol species, host-specific to the non-native exotic plant.

- Protect new plants from herbivores. Many methods exist, depending on the herbivore, including:

- * Fencing the planted area.

- * Putting wire cages around planted seeds, roots, and shoots.

- * Put seedlings in plastic tubes, which also keep in water.

- * Put up perching posts to attract birds of prey that feed on animals, such as gophers, which feed heavily on new plants.

Typical Activities for Establishing a Healthy Wetland Animal Community:

- Plant upland species around the wetland to enhance the habitat diversity and act as a buffer. Help with choosing species for wildlife cover and food, erosion control, etc. can be found on the Plant Materials Program website at "Plant-Materials.nrcs.usda.gov/", the National Plant Data Center website at "npdc.usda.gov/npdc/", and the Center for Plant Conservation website at "www.mobot.org/CPC/".

- Create a variety of habitats - different water depths, different vegetation types - to appeal to a variety of animals.

- Tailor nesting and foraging habitats to particular native species, especially rare species, based on information from wildlife specialists and reference wetlands. Typical structures include:

- * Nest boxes or nesting platforms,

- * Perches,

- * Logs and brush,

- * Islands,

- * Specific food sources.

- Create a variety of gentle slopes of 3:1 to 20:1 (3:1 means three feet of length for every one foot of rise) similar to those in the reference wetlands.
- Establish connections to other habitats (*e.g.*, channels connecting to larger water bodies, forested corridors connecting to wildlife refuges) unless those areas contain invasive species or other threats.

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APPENDIX T-IV: Wetland Parameters and Monitoring Methods

CHARACTERISTIC BEING MONITORED	AS-BUILT	QUALITATIVE METHOD	QUANTITATIVE METHOD
GENERAL			
Location	use existing map or create map with property boundaries, scale, north arrow, county, state, and landmarks		
Wetland Type	classify existing (if appropriate) and intended type(s) (Cowardin <i>et al.</i> , 1979)	classify actual type(s)	classify actual type(s)
Drainage area	identify USGS hydrologic unit from state maps or state watershed unit		map using GIS and appropriate base maps
Surrounding land use	estimate % surrounding land use and photograph major types w/in 1,000 feet of site (Anderson <i>et al.</i> 1976)	estimate % surrounding land use and photograph major types w/in 1,000 feet of site (Anderson <i>et al.</i> 1976)	estimate % surrounding land use and photograph major types w/in 1,000 feet of site (Anderson <i>et al.</i> 1976)
Wetland area	determine wetland boundary and use basic survey techniques to create a map of the site		delineate wetland boundary and use basic survey techniques to create a map of the site
Slope	measure slope at intervals along a transect		survey elevations

CHARACTERISTIC BEING MONITORED	AS-BUILT	QUALITATIVE METHOD	QUANTITATIVE METHOD
microtopography	survey elevations every foot or meter on transects traversing the wetland		survey elevations every foot or meter on transects traversing the wetland
HYDROLOGY			
Water depth	above ground: use staff gauge, below ground: use shallow well or 2-3" slotted PVC pipe	above ground: use staff gauge, below ground: use shallow well or 2-3" slotted PVC pipe and read on site	above ground: use automatic water level gauge, below ground: use shallow well or 2-3" slotted PVC pipe with automatic recorder
Flow patterns	direct observation to indicate major pathways and channels on map	direct observation to indicate major pathways and channels on map	regular direct observation or aerial photography to indicate major pathways/channels on map
Flow rates	measure inflow or outflow (if present) with flumes or weirs, measure interior flow with current meters	estimate flow based on rates typical for the area and estimated wetland size	measure inflow or outflow (if present) with flumes or weirs, measure interior flow with current meters
Indirect observations	record observations of high-water marks, drift lines, etc.	record observations of high-water marks, drift lines, etc.	
SOIL (sample using soil auger or pit)			
Soil depth	dig to compacted soil or at least 18 inches, observe changes in soil color and structure	dig to compacted soil or at least 18 inches, observe changes in soil color and structure	take soil core to at least 18 inches deep and have soil expert analyze the soil horizons and their composition

CHARACTERISTIC BEING MONITORED	AS-BUILT	QUALITATIVE METHOD	QUANTITATIVE METHOD
Soil color	use Munsell color chart to determine color of matrix (the dominant color) and any mottles or streaks		use Munsell color chart to determine color of matrix (the dominant color) and any mottles or streaks
Soil texture	use soil texture triangle to classify based on feel (Horner and Raedeke, 1989)	use soil texture triangle to classify based on feel (Horner and Raedeke, 1989)	take a soil core to soils lab for particle size analysis of the different soil horizons
Organic matter	lab analysis for percent organic matter in top layer; include soil moisture measurement		lab analysis for percent organic matter in top layer; include soil moisture measurement
Sedimentation	survey base elevations of completed project	read changes in sediment depth from a staff gauge	survey topography or bathymetry on a yearly basis; or, take sediment cores on a yearly basis for analysis by soils experts
VEGETATION			
Species diversity	identify species, document planting locations	identify common species and note number of unidentified species	identify all species, native and non-native
Coverage	estimate coverage to 10%, map plant communities	estimate coverage to 10%, map plant communities	collect plot data along transects, calculate coverage, map plant communities

CHARACTERISTIC BEING MONITORED	AS-BUILT	QUALITATIVE METHOD	QUANTITATIVE METHOD
Survivorship	count plants and determine % of plants alive	visually determine % of plants alive	count plants and determine % of plants alive
Height		measure heights of particular plants on a regular basis	measure heights of randomly chosen plants for a valid statistical comparison
Structure		count stems and branching of particular plants on a regular basis	count stems and branching of randomly chosen plants for a valid statistical comparison
Reproduction		of particular plants, determine the number blooming and setting seed each year	determine percentage of randomly chosen plants blooming and setting seed each year; count new seedlings in randomly chosen plots

CHARACTERISTIC BEING MONITORED	AS-BUILT	QUALITATIVE METHOD	QUANTITATIVE METHOD
ANIMALS			
Observations	record direct and indirect observations of wildlife, fish, and invertebrates	record direct and indirect observations of wildlife, fish, and invertebrates	
Habitat evaluations	Use Habitat Evaluation Procedures (FWS 1980) or comparable method for selected species		use Habitat Evaluation Procedures (FWS 1980) or comparable method for selected species
Species diversity and abundance	use trapping or point count methods as required to determine diversity and abundance of indicator species	count bird species and their abundances on a regular (at least quarterly) basis; ask local Audubon chapter for any data	use trapping, point count or other quantitative method as required to determine diversity and abundance of indicator spp
Species survivorship			mark and recapture study
Breeding success		record any species breeding on site and number of young	use point counts, surveys, or other protocols to determine percent of population breeding and numbers of young produced
Rare species			conduct studies as legally permitted by the jurisdictional wildlife or resource agency
WATER QUALITY			

CHARACTERISTIC BEING MONITORED	AS-BUILT	QUALITATIVE METHOD	QUANTITATIVE METHOD
Water samples (pH, salinity, nutrients, pollutants, heavy metals, etc.)	when construction is over, measure appropriate attributes based on project targets using field kits, meters, or lab analysis	on a regular basis, measure appropriate attributes based on project targets using field kits and/or field meters	on a set schedule designed to show seasonal differences, measure appropriate attributes based on project target using field meters or lab analysis
Sediment levels	use field meters or lab analysis	observe clarity and/or use a secchi disk	use field meters or lab analysis

APPENDIX T-V DEFINITIONS OF CATEGORIES OF WETLANDS* CONSERVATION ACTIVITIES

1. Establishment - the manipulation of the physical, chemical, or biological characteristics present to develop a wetland on an upland^b or deepwater^c site that did not previously exist. Establishment results in a gain in wetland acres.

2. Restoration - the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded wetland. For the purpose of tracking net gains in wetland acres, restoration is divided into:

Re-establishment - the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to former wetland^d. Re-establishment results in rebuilding a former wetland and results in a gain in wetland acres.

Rehabilitation - the manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions of degraded wetland^e. Rehabilitation results in a gain in wetland function but does not result in a gain in wetland acres.

3. Enhancement - the manipulation of the physical, chemical, or biological characteristics of a wetland (undisturbed or degraded) site to heighten, intensify, or improve specific function(s) or to change the growth stage or composition of the vegetation present. Enhancement is undertaken for a purpose such as water quality improvement, flood water retention or wildlife habitat. Enhancement results in a change in wetland function(s), and can lead to a decline in other wetland functions, but does not result in a gain in wetland acres. This term includes activities commonly associated with the terms enhancement, management, manipulation, directed alteration.

4. Protection/Maintenance - the removal of a threat to, or preventing decline of, wetland conditions by an action in or near a wetland. Includes purchase of land or easements, repairing water control structures or fences, or structural protection such as repairing a barrier island. This term also includes activities commonly associated with the term preservation. Protection/Maintenance does not result in a gain of wetland acres or function.

CURRENT CONDITION OF LAND, PRIOR TO WETLAND CONSERVATION ACTIVITY

a. Wetlands (non-agricultural lands): The COE (Federal Register 1982) and the EPA (Federal Register 1980) jointly define wetlands as: Those areas that are inundated or saturated by surface or

ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Wetlands (agricultural lands): 1985 Food Security Act. Wetland is defined as land that: 1. has a predominance of hydric soils **and** 2. is inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances does support, a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions. "Normal circumstances" refers to the soil and hydrologic conditions that are normally present, without regard to whether the vegetation has been removed. All three wetland criteria, hydric soils, hydrophytic vegetation, and wetland hydrology, normally must be met for an area to be identified as wetland.

Wetlands (non-jurisdictional wetlands): Conservation activities conducted on all wetlands that meet the national standard for classifying wetlands ("Classification of Wetlands and Deepwater Habitats of the United States"), will be reported even if they are not considered to be regulatory wetlands. The regulatory jurisdictional nature of a wetland is not relevant to its status for these accounting activities.

b. Uplands: Uplands are neither deepwater habitats nor wetlands. They are seldom or never inundated, or if frequently inundated, they have saturated soils for only brief periods during the growing season, and, if vegetated, they normally support a prevalence of vegetation typically adapted for life only in aerobic soil conditions.

c. Deepwater Habitat: Deepwater habitats are permanently flooded lands lying below the deepwater boundary of wetlands. The boundary between wetland and deepwater habitat in tidal areas is the elevation of the extreme low water of spring tides. The boundary between wetlands and the deepwater habitats of lakes and rivers lies at a depth of 2 meters (6.6 feet) below low water. If emergents, shrubs, or trees grow beyond this depth at any time, their deepwater edge is the boundary.

d. Former Wetland: An area that once was a wetland but it has been modified to the point it no longer has the hydrologic characteristics of a wetland. The area is considered to be upland. Formerly vegetated shallow coastal open water areas are also considered to be "former wetlands" because when they were converted from wetland marshes to open water areas, this conversion was considered to be a loss of wetland acreage both by the Fish and Wildlife Service's wetlands Status and Trends and Natural Resources Conservation Service's National Resources Inventory. Former wetlands include by definition Prior Converted Croplands (PC) and, by determination, other areas that no longer meet the jurisdictional criteria for wetlands.

Prior converted wetland (PC): Wetlands that before December 23, 1985, were drained, dredged, filled, leveled, or otherwise manipulated for the purpose of, or to have the effect of, making the production of an agricultural commodity possible. (National Food Security Act Manual)

c. Degraded Wetland: A wetland with one or more functions reduced, impaired, or damaged due to human activity. When determining whether or not a wetland is degraded, consider: physical alteration, including the conversion of a wetland from one system (e.g., estuarine or marine) to a different system; chemical contamination; and biological alteration, including the significant presence of non-indigenous invasive species.

Siuslaw Estuary Partnership
*An Integrated Multiple Objective Approach To
Watershed Protection and Restoration*



Florence Area Local Wetlands and Riparian Inventory



Prepared for

City of Florence
Florence, Oregon 97439
as part of the Siuslaw Estuary
Partnership

Prepared by

Pacific Habitat Services, Inc.
Wilsonville, Oregon



June 13, 2013



Oregon

John A. Kitzhaber, MD, Governor

Department of State Lands

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June 27, 2013

The Honorable Nola Xavier
Florence City Hall
250 Highway 101
Florence, OR 97439

State Land Board

John A. Kitzhaber, MD
Governor

Re: Approval of the City of Florence Local Wetlands Inventory and
Assessment

Kate Brown
Secretary of State

Dear Mayor Xavier:

Ted Wheeler
State Treasurer

I am pleased to notify you that the Department of State Lands (DSL) has approved your revised Local Wetlands Inventory (LWI) and assessment. We appreciate your planning staff and the wetland consultant, Pacific Habitat Services, Inc., working with our staff to ensure that the inventory meets state LWI requirements (OAR 141-86-0180 through -0240) and the city's needs. The DSL-approved report and maps can be viewed and downloaded from our website at http://www.oregon.gov/dsl/WETLAND/Pages/lwi_disclaimer_agree.aspx. The DSL-approved GIS datasets are available for download from the Department's ftp site at <ftp://rogue.dsl.state.or.us/>. Please contact DSL if you would like a paper copy of the approved-LWI. The final inventory requirement is for the city to notify property owners with wetlands mapped on their property within 120 days of this approval. Please provide us with a copy of the landowner notification, indicating the date of notification when notification has been completed.

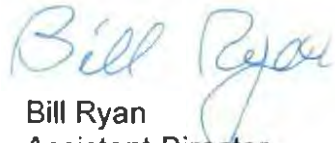
Approval by DSL means that the revised LWI replaces the 1997 inventory and becomes part of the Statewide Wetlands Inventory. The revised LWI must now be used by the city instead of the 1997 inventory for the Wetland Land Use Notification Process (ORS 227.350). The revised LWI and functional assessment also form the foundation for your wetland planning under Statewide Planning Goal 5, and the revised LWI must be adopted by the city per the Goal 5 requirements. Please note when significant wetlands are designated by the city, "non-significant" wetlands may be coded to distinguish them from "significant wetlands" but must not be removed from the approved LWI maps. These wetlands are still subject to state and federal permit requirements.

While considerable effort has been made to identify accurately most wetlands within the study area, DSL's approval does not guarantee that all regulated wetlands have been mapped. The mapped wetland boundaries are estimated boundaries, they have not been surveyed, and there are inherent limitations in mapping accuracy. DSL advises persons proposing land alteration on parcels containing mapped wetlands first to contact DSL, or to obtain a wetland boundary delineation by a qualified consultant and submit it to DSL for approval, prior to the land alteration.

It will be important to annotate your map and associated database as new wetland delineations are completed and approved by DSL in order to keep your revised LWI updated. A few additional delineations have been approved since the LWI revision process was initiated back in 2010. We will forward copies of those delineations to the city's planning department and recommend the DSL file number be noted on the affected tax lots. Future wetland delineation approvals will be provided to the city's planning department.

We are pleased that the City of Florence has conducted a thorough wetlands inventory and has made wetland planning a high priority. We look forward to working with you and your staff as you continue on the Goal 5 wetland planning effort. Please feel free to contact Peter Ryan at 503-986-5232 with any questions you may have about the LWI or its use.

Sincerely,



Bill Ryan
Assistant Director
Wetlands and Waterways Conservation Division

ec: Kelli Weese, City of Florence
Carol Heinkel, Florence Planning Consultant – Project Coordinator
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Pete Anderson, DEQ
John Bauer, Oregon Biodiversity Information Center
Bob Lobdell, DSL

Florence Area Local Wetlands and Riparian Inventory

Prepared for

City of Florence
250 Highway 101
Florence, Oregon 97439
as part of the Siuslaw Estuary Partnership

Prepared by

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June 13, 2013

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1.0 INTRODUCTION

The City of Florence (City) partnered with Pacific Habitat Services, Inc. (PHS) to conduct an update to the 1996 *City of Florence Local Wetlands and Riparian Area Inventory*. This update to the inventory was conducted as part of the Wetland and Riparian Areas Project Element of the Siuslaw Estuary Partnership. The Siuslaw Estuary Partnership (SEP) is a collaborative effort to protect and improve water quality and fish and wildlife habitat in the lower Siuslaw River Watershed. The Wetland and Riparian Project Element updates the Florence wetland and riparian areas inventory performed in 1996 and it includes the adoption of protection measures, as required by state law. The objectives of this project were to: update the 1996 biological and functional assessment; assess omitted wetlands; include delineations made since 1996; and adopt policies and measures to protect the unique functions and values of the resources. The City also did preliminary work to assess the potential for restoration of riparian areas and wetlands on City-owned property. This project resulted in the development of a "City of Florence Significant Wetlands and Riparian Corridors Plan". A comprehensive functional assessment is important in this watershed because the capacity of existing natural wetland systems, and potential future constructed wetlands, to store and slow the velocity of stormwater prior to discharge to area creeks and the estuary, is not currently established. It is also not known whether the carrying capacity of the land is sufficient for the environment to fully address the anticipated impacts from planned urbanization. The functional assessment of the wetlands within the Urban Growth Boundary will provide critical information to help guide future urbanization policy and stormwater management policy and capital programs.

The Siuslaw Estuary Partnership has been funded in part by the United States Environmental Protection Agency under assistance agreement WC-00J04801-0 to the City of Florence. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

This update to the Florence Local Wetlands Inventory (LWI) included a larger study area than the 1996 work. This inventory included areas not previously located with the Urban Growth Boundary (UGB), as well as adjoining areas of Lane County east and north of the UGB. The eastern boundary of the study area follows the ridge line of hills east of the City. The study area was confined to the south by the Siuslaw River and adjoining estuary and by the Pacific Ocean on the west. The approximate study area is shown on Figure 1. All figures are in Appendix A.

The goal of the study was to respond to an interest in establishing some local protections of wetlands and to meet the wetland and riparian requirements of Statewide Planning Goal 5 (*Natural Resources, Scenic and Historic Areas, and Open Spaces*) Oregon Administrative Rule (OAR) Section 660, Division 23. The objective of Goal 5 is to "protect natural resources and conserve scenic, historic and open space resources for present and future generations."

PHS determined the general location, approximate size, and quality/condition of wetlands throughout the study area. The quality/condition of wetlands was determined by applying the Oregon Rapid Wetland Assessment Protocol (ORWAP) where appropriate. This report presents the results of the wetland inventory and riparian assessment.

1.1 Report Format

This report begins with definitions used in the report and inventory (Section 2). Section 3 includes a discussion of the methodology used to conduct the field work for the LWI; the wetland assessment methodology; and the methodology used to produce the maps for the inventory. Section 4 is a brief discussion of project cartography. Section 5 describes general conditions within the study area, addressing climate, topography, soils and vegetation. Section 6 is a more detailed discussion of wetlands within the study area and addresses wetland distribution, acreage, and Cowardin classification. Section 7 discusses the results of the *Oregon Rapid Wetland Assessment Protocol* and Section 8 is the identification of Locally Significant Wetlands in the study area. Section 9 describes options for designating riparian corridors within the study area. Section 10 presents staff qualifications. Section 11 provides a list of the references used in the report.

There are six appendices to the report. Appendix A contains figures illustrating the study area boundary, mapped soils, and the National Wetland Inventory; as well as the Local Wetland Inventory and Riparian Inventory maps generated for the project.

Appendix B contains the wetland summary sheets for each wetland (or wetland grouping) of greater than one-half acre in size, organized by wetland code. The summary sheets note wetland location, tax lots, acreage, Cowardin classification, Hydrogeomorphic (HGM) classification, soil series, wetland and adjacent upland vegetation, and other unique or clarifying notes related to the wetland. If site access was granted, data was typically collected, and associated sample point numbers are noted. Upon completion of the significance determination, locally significant wetlands will also be noted on this sheet.

Appendix C contains the wetland determination data forms. These forms document wetland and upland conditions where data was collected for the inventory. Hydrology, soils, and dominant vegetation are recorded for each sample point where wetland or upland data was collected.

Appendix D includes the *Oregon Rapid Wetland Assessment Protocol* (ORWAP) answers for each wetland unit. Each wetland's functions were assessed according to an established state methodology.

Appendix E includes a letter from the Oregon Department of State Lands outlining and approving the use of ORWAP in identifying locally significant wetlands within the Florence urban growth boundary.

Appendix F includes the *Urban Riparian Inventory and Assessment Guide* Field Forms and Summary Tables for mapped riparian areas within the study area using the standard inventory method.

2.0 DEFINITIONS

These terms helped define the methodology used for the Florence Local Wetlands and Riparian Inventory and may be referred to in this report.

1987 Manual

The primary source documents for wetland delineations within Oregon is the *Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1* (Environmental Laboratory, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region, (Version 2.0)* (U.S Army Corps, 2010).

These manuals are used by the Army Corps of Engineers ("Corps") and the Oregon Department of State Lands ("DSL") to document the location of wetlands within the State of Oregon. The 1987 manual, along with regional supplement, provide technical criteria, field indicators, and recommended procedures to be used in determining whether an area is a jurisdictional wetland. Undisturbed areas require three criteria for them to be classified as wetland. These criteria are hydric soils, a dominance of hydrophytic vegetation, and wetland hydrology.

Cowardin Wetland Classification

The classification of wetlands as defined by plants, soils and the frequency of flooding is described in "*Classification of wetlands and deepwater habitats of the United States.*" (Cowardin, et. al. 1979) See also "Palustrine Wetlands".

Estuarine Wetlands

" Deepwater tidal habitats and adjacent tidal wetlands that are usually semi-enclosed by land but have open, partly obstructed, or sporadic access to the ocean, with ocean-derived water at least occasionally diluted by freshwater runoff from the land. The upstream and landward limit is where ocean-derived salts measure less than 0.5 ppt during the period of average annual low flow. The seaward limit is (1) an imaginary line closing the mouth of a river, bay, or sound; and (2) the seaward limit of wetland emergents, shrubs, or trees when not included in (1). "(Cowardin et. al. 1979)

Field verify

To walk over and/or visually check an area to make a wetland determination and map wetlands. This may or may not include on-site access or the collection of sample plot data. (OAR 141-086)

Goal 5

Goal 5 (OAR 660) is intended "to protect natural resources, and conserve scenic and historic areas and open spaces." (DLCD, 2010)

Goal 17

This Inventory addresses the significance of wetlands and riparian areas under Statewide Planning Goal 5. Wetlands that are regulated under Statewide Planning Goal 17, Coastal Shorelands, are not subject to Goal 5 significance or protection. In the Florence UGB, Goal 17 resources are identified in the Lane County Coastal Resources Inventory, the Management Unit descriptions in the Florence Comprehensive Plan, and in the Coastal Shorelands standards in Florence City Code Title 10 Chapter 19. As provided in Goal 5, this local wetland inventory and assessment (2013 LWI) will be used to update the general location and assessment of the South Heceta Junction Seasonal Lakes Goal 17 wetlands. This is necessary because the 2013 LWI is more current and precise and the general location of these wetlands in the 1978 Management Unit do not align with the general wetland location in the 2013 LWI (see "2013 City of Florence Significant Wetlands and Riparian Areas Plan" for additional details.)

Growing Season

The growing season has begun and is ongoing when either of the two following conditions is met:

- 1) Two or more non-evergreen vascular plant species growing in the wetland or surrounding areas exhibit one or more of a specific list of indicators of biological activity (such as leaf emergence; appearance of new growth; emergence or opening of flowers; etc.)
- 2) When soil temperature measured at a depth of 12 inches is 41°F (5°C) or higher

Hydric Soils

"Soils which are ponded, flooded, or saturated for long enough during the growing season to develop anaerobic conditions." (USDA, SCS, 1985)

Periodic saturation of soils causes alternation of reduced and oxidized conditions which leads to the formation of redoximorphic features (gleying and mottling). Mineral hydric soils will be either gleyed or will have bright mottles and/or low matrix chroma. The redoximorphic feature known as gley is a result of greatly reduced soil conditions, which result in a characteristic grayish, bluish or greenish soil color. The term mottling is used to describe areas of contrasting color within a soil matrix. The soil matrix is the portion of the soil layer that has the predominant color. Soils that have brightly colored mottles and a low matrix chroma are indicative of a fluctuating water table.

Hydric soil indicators include: organic content of greater than 50% by volume, sulfidic material or "rotten egg" smell, and/or presence of redoximorphic features and dark soil matrix, as determined by the use of a Munsell Soil Color Chart. This chart establishes the chroma, value and hue of soils based on comparison with color chips. Mineral hydric soils usually have a matrix chroma of 2 or less in mottled soils, or a matrix chroma of 1 or less in unmottled soils.

Hydrogeomorphic (HGM) Wetland Classification

A method of assessing wetlands using the physical, chemical, and biological functions of wetlands. It is based on the relationship of geomorphic setting, water source, and hydrodynamics. (Brinson, 1993)

Hydrophytic Vegetation

"Plant life growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content." (National Resource Council, 1995)

The U.S. Fish and Wildlife Service, in the *National List of Plant Species that Occur in Wetlands*, has established five basic groups of vegetation based on their frequency of occurrence in wetlands. These categories, referred to as the "wetland indicator status," are as follows: obligate wetland plants (OBL), facultative wetland (FACW), facultative (FAC), facultative upland (FACU), and obligate upland (UPL).

Local Wetlands Inventory (LWI)

An inventory of all wetlands greater than 0.5 acres in size within a local jurisdiction using the standards and procedures of OAR 141-86-180 through 141-86-240.

In 1989, the Oregon State legislature authorized DSL to develop a statewide wetlands inventory for planning and regulatory purposes. Accordingly, DSL established Local Wetlands Inventory (LWI) standards and guidelines under ORS 196.674. A DSL-approved LWI replaces the National Wetlands Inventory map (see Figure 3 in Appendix A) and is incorporated into the statewide wetlands inventory.

An LWI is conducted using color or color infrared aerial photographs taken within 5 years of the inventory initiation and at a minimum scale of 1 inch = 200 feet (1" = 200'). Wetlands are located using the on-site option where access to property is allowed or off-site where access is denied. Wetlands can be mapped off-site by using information such as topographic and National Wetlands Inventory maps, aerial photographs, and soils surveys.

The approximate location of wetlands is placed on a parcel-based map. The parcel-based map allows the property owner, the local jurisdiction, and DSL, to know which tax lots may contain wetlands.

The maps and documents produced for the LWI are intended for planning purposes only. Mapped wetland boundaries are accurate to within 5 meters; however, there may be unmapped wetlands that are subject to regulation. In all cases, actual field conditions determine wetland boundaries.

Palustrine Wetlands (e.g. PEM)

"All nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens and all such wetlands that occur in tidal areas where salinity is less than 0.5‰. This includes areas traditionally called swamps, marshes, fens, as well as shallow, permanent or intermittent water bodies called ponds." (Cowardin et. al. 1979)

- **Palustrine Unconsolidated Bottom (PUB)**

A wetland or deepwater habitat with at least 25% cover of particles smaller than stones, and a vegetative cover less than 30%.

- **Palustrine Emergent Wetland (PEM)**

These wetlands have rooted herbaceous vegetation that stand erect above the water or ground surface.

- **Palustrine Scrub-shrub Wetland (PSS)**

Wetlands dominated by shrubs and tree saplings that are less than 20 feet high.

- **Palustrine Forested Wetland (PFO)**

Wetlands dominated by trees that are greater than 20 feet high.

Probable Wetland (PW)

An area noted during the course of LWI field work that appears to meet, or does meet, wetland criteria but is less than one half of an acre in size; or is small and of undetermined size, and is mapped as a point rather than a polygon on the LWI maps. Probable wetlands are designated in the inventory through the use of the extension '-PW' at the end of the resource code.

Riparian Area

"The area immediately adjacent to a water resource, which affects or is affected by the water resource. Riparian areas do not include the water resource itself." (PHS, 1998)

Riverine System

"The riverine system includes all wetlands and deepwater habitats contained within a channel." (Cowardin, et. al. 1979)

Waters of the State

Natural waterways including all tidal and nontidal bays, intermittent streams, constantly flowing streams, lakes, wetlands and other bodies of water in this state, navigable and nonnavigable. Natural waterways are defined as: waterways created naturally by geological and hydrological processes and waterways that would be natural but for human-caused disturbances (e.g. channelized or culverted streams, impounded waters, partially drained wetlands or ponds created in wetlands). (ORS 196.800-196.990, 1995)

Water Resource

"An intermittent or perennial stream, pond, river, lake including their adjacent wetlands." (PHS, 1998)

Wetland

"Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." (Federal Register 1982).

Wetland Assessment

A scored determination of the relative effectiveness and relative values of various wetland functions. The methodology used for this LWI is the *Oregon Rapid Wetland Assessment Protocol (ORWAP)*. (Adamus, et. al. 2010)

Wetland Condition

"The integrity of a wetland's physical and biological structure. This determines the ability of the wetland to perform specific functions, as well as its resilience and enhancement opportunities." (Roth et al., 1996)

Wetland Function

"A characteristic action or behavior associated with a wetland that contributes to a larger ecological condition such as wildlife habitat, water quality and/or flood control." (Roth, et. al. 1996)

Wetland Hydrology

"Permanent or periodic inundation or prolonged soil saturation sufficient to create anaerobic conditions in the upper soil profile." (COE, 1987)

Wetland hydrology is related to duration of saturation, frequency of saturation, and critical depth of saturation. The Regional Supplement defines wetland hydrology as 14 or more consecutive days of flooding or ponding, or a water table 12 inches or less below the soil surface, during the growing season at a minimum frequency of 5 years in 10.

Wetlands Regulation

Wetlands in Oregon are regulated by the Department of State Lands (DSL) under the Removal-Fill Law (ORS 196.800-196.990) and by the U.S. Army Corps of Engineers (Corps) through Section 404 of the Clean Water Act.

Wetland Value

The value of a wetland is an estimate of the importance or worth of one or more of its functions to society. For example, a value can be determined by the revenue generated from the sale of fish that depend on the wetland, by the tourist dollars associated with the wetland, or by public support for protecting fish and wildlife. (USEPA, 2001)

3.0 PROJECT METHODOLOGY

3.1 Public Involvement

Public involvement for the Wetlands and Riparian Areas project is set out in the approved Public Involvement Plan. Key public involvement consisted of three annual open houses; three annual newsletters distributed to all residents and/or property owners in the study area; targeted outreach; a Stakeholder process; media outreach; and public hearings before the Planning Commission and City Council.

In addition, public involvement efforts were conducted specifically for wetlands and riparian areas. Prior to beginning the inventory field work, selected landowners (i.e. those suspected of having wetlands or waters of the state on their property) were mailed notices describing the project and asking permission to enter their property. Right of access was granted by landowner permission only. The properties of those not responding were not accessed. Access information was collected in a database and then transferred to a base map for use in the field.

The City of Florence held an open house meeting May 5, 2010 to inform the public about the wetland inventory process and answer questions from property owners deciding whether or not to grant access to their property. Following completion of initial fieldwork, a second public meeting was held to allow citizens to observe the location of mapped wetlands and comment as appropriate. This second meeting was held on September 22, 2010.

On March 6, 2012, the Wetlands and Riparian Area Team concurred with proposed criteria for determining the significance of wetlands and riparian corridors in the Florence urban growth boundary (UGB). At their meetings in March and April, 2012 the Stakeholder Groups forwarded this proposal to the public for comment. Then, the proposal was presented to the public at the April 30, 2012 Open House. The Stakeholders reviewed the criteria again at their meeting on July 11, 2012 and the proposal, and all updates to the proposal, have been consistently posted to the project web site at www.SiuslawWaters.org with an invitation for public comment on the home page. On January 31, 2013, the Team reviewed and concurred with the revised significance criteria and the results presented in this report.

3.2 Local Wetlands Inventory Methodology

Within the study area PHS determined the location of wetlands and assessed the quality/condition of each. The wetland location was determined by application of the required methodology outlined in the Regional Supplement of the 1987 Manual (see Section 3.2.1 & 3.2.2 for more details). The quality/condition of wetlands was determined by applying the Oregon Rapid Wetland Assessment Protocol (ORWAP; see Section 3.3) where appropriate.

3.2.1 Routine Off-site Determination

Prior to beginning field work, off-site mapping was reviewed to determine the approximate location of wetland boundaries based on available information. This information included the 1996 LWI mapping and report, Regional Land Information System (RLIS) geographic

information, the USGS topographic quadrangles, soil survey maps for Lane County (NRCS, 1982), the *National Wetlands Inventory* maps (USFWS, July 1989), and true color aerial photographs (1"=200'). The boundaries of wetlands that had been concurred with by DSL were utilized as well.

If access was allowed, the wetland boundaries were verified in the field (see Section 3.2.2). If access was not granted, the boundaries were based on the mapping conducted in the office (non-field verified), or on the observation of wetland boundaries from adjacent roads, right-of-ways, or properties, if possible (field verified). Some of the larger wetlands were only partially field verified, denoting access to and/or visual confirmation of a portion, but not all of the wetland. Due to limited time and resources for verification, wetlands on many of the large publicly owned parcels that could not be easily accessed were not field verified. Wetlands on the parcels were mapped and assessed using off-site assessment protocols.

3.2.2 Routine On-site Determination

On-site observation and inspection of soils, vegetation, and hydrology were made using the required methodology outlined in the Regional Supplement of the 1987 Manual. Soil pits were typically excavated to a depth of approximately 18-inches in selected locations. The soil profiles were examined for hydric soils and wetland hydrology field indicators.

A visual percent-cover estimate of the dominant species of the plant community for a maximum 30-foot radius was conducted at each sampling location. Sampling locations were chosen to document a change in the wetland boundary and a particular plant community. Data was recorded in the field and transferred to computer-generated wetland delineation data sheets (Appendix C).

Field work for the inventory was conducted between June and August 2010. Additional field work was conducted in March 2011 as a result of the September 2010 public meeting. Three property owners that attended this meeting granted PHS access to their properties to review the wetland boundaries. No wetland boundaries were staked or flagged in the field as part of this LWI.

3.3 Wetland Quality Assessment

3.3.1 The Oregon Rapid Wetland Assessment Protocol

An assessment of the quality for each wetland identified through the inventory was conducted using the *Oregon Rapid Wetland Assessment Protocol* (ORWAP) (Adamus et al, 2010). [The full text of methodology is available at http://www.oregon.gov/DSL/WETLAND/docs/orwap_manual_v2.pdf]. The ORWAP is a standardized protocol for rapidly assessing 16 wetland functions and 21 values. The protocol was developed by DSL, with funding from the U.S Environmental Protection Agency. It uses 140 indicators assessed from on-site analysis, aerial photography, and information from several web sites. The answers are tabulated within ORWAP spreadsheets to provide a final score for 16 individual wetland functions. These individual functions are further grouped to provide group scores (see Section 8.2.1 for a discussion of Grouped Functions).

The advantage of the ORWAP over other assessment methodologies is that it provides a standardized process for scoring indicators of wetland values and provides a score for the relative value of each function. Since the protocol baseline analyzed wetlands of diverse types throughout the state, it allows for a qualitative comparison of wetlands of any type anywhere in Oregon.

3.3.2 Functions and Values in ORWAP

A wetland's functions and values are independent of one another. For example, a wetland that is extremely effective for removing whatever nitrate enters it is not considered to be of high *value* for that *function* unless it is exposed to significant loads of nitrate and/or its watershed has been designated as "Water Quality Limited" as a result of ongoing problems with nitrate pollution. A high level of function does not alone make a wetland valuable. Likewise, even if a wetland's effectiveness for storing water is low, the *value* of that function may be considered potentially high if the wetland is situated above homes that are periodically flooded by heavy runoff. (Adamus et. al., 2010). In essence, the value of a particular function is linked to a specific wetland's opportunity to perform that function. The value of a wetland is determined in large part by adjoining land cover and land use.

Following is a brief description of each wetland function and value as defined for use in the ORWAP; this information and more can also be found in Appendix B of the ORWAP Manual (Adamus et.al., 2010).

Water Storage & Delay: The effectiveness of a wetland for storing water or delaying the downslope movement of surface water for long or short periods (but for longer than a tidal cycle), and in doing so to potentially influence the height, timing, duration, and frequency of inundation in downstream or downslope areas.

Sediment Retention & Stabilization: The effectiveness of a wetland for intercepting and filtering suspended inorganic sediments thus allowing their deposition, as well as reduce current velocity, resist erosion, and stabilize underlying sediments or soil. The performance of this function has both positive values (e.g., reduction in turbidity in downstream waters) and negative values (e.g., progressive sedimentation of productive wetlands, slowing of natural channel migration).

Phosphorus Retention: The effectiveness for retaining phosphorus for long periods (>1 growing season) as a result of chemical adsorption, or from translocation by plants to below ground zones with less potential for physically or chemically remobilizing phosphorus into the water column.

Nitrate Removal & Retention: The effectiveness for retaining particulate nitrate and convert soluble nitrate and ammonia to nitrogen gas, primarily through the microbial process of denitrification, *while generating little or no nitrous oxide (N₂O)*. Note that most published definitions of Nitrate Removal do not include the important restriction on N₂O emission.

Thermoregulation: The effectiveness of a wetland for maintaining or reducing summertime water temperature, and in some cases, for moderating winter water temperature.

Carbon Sequestration: The effectiveness of a wetland both for retaining incoming particulate and dissolved carbon, and through the photosynthetic process, converting carbon dioxide gas to organic matter (particulate or dissolved). And to then retain that organic matter on a net annual basis for long periods *while emitting little or no methane*. Note that most published definitions of Carbon Sequestration do not include the important limitation on methane emission.

Organic Matter Export: The effectiveness of a wetland for producing and subsequently exporting organic matter, either particulate or dissolved.

Aquatic Invertebrate Habitat: The capacity to support an abundance and diversity of marine and freshwater invertebrate animals which spend all or part of their life cycle underwater or in moist soil. Includes dragonflies, midges, crabs, clams, snails, crayfish, water beetles, shrimp, aquatic worms, and others. This function does not predict habitat suitability accurately for every species. See worksheet *WetInverts* in the *ORWAP_SupplInfo* file for list of freshwater aquatic invertebrates known or likely to occur in Oregon wetlands.

Fish Habitat – Anadromous: The capacity to support an abundance of native anadromous fish (chiefly salmonids) for functions other than spawning. This function does not predict habitat suitability accurately for every species, nor is it intended to assess the ability to restore fish access to a currently inaccessible wetland. See worksheet *WetVerts* in the *ORWAP_SupplInfo* file for the list of the species included in ORWAP.

Fish Habitat - Non-Anadromous: The capacity to support an abundance and diversity of *native* non-anadromous fish (both resident and visiting species). This function does not predict habitat suitability accurately for every species, nor is it intended to assess the ability to restore fish access to a currently inaccessible wetland. See worksheet *WetVerts* in the *ORWAP_SupplInfo* file for the list of the species included in ORWAP.

Amphibian & Reptile Habitat: The capacity of a wetland to support an abundance and diversity of native amphibians and native wetland-dependent reptiles. This function does not predict habitat suitability accurately for every species. See worksheet *WetVerts* in the *ORWAP_SupplInfo* file for the list of the species included in ORWAP.

Waterbird Habitat – Feeding: The capacity to support an abundance and diversity of feeding waterbirds, primarily outside of the usual nesting season. This function does not predict habitat suitability accurately for every species. See worksheet *WetVerts* in the *ORWAP_SupplInfo* file for the list of the species included in ORWAP.

Waterbird Habitat – Breeding: The capacity to support an abundance and diversity of nesting waterbirds. This function does not predict habitat suitability accurately for every species. See worksheet *WetVerts* in the *ORWAP_SupplInfo* file for the list of the species included in ORWAP.

Songbird, Raptor, & Mammal Habitat: The capacity to support an abundance and diversity of songbirds, raptors, and mammals, especially species that are most dependent on wetlands or water. This function does not predict habitat suitability accurately for every species. See worksheet *WetVerts* in the *ORWAP_SupplInfo* file for the list of the species included in ORWAP.

Pollinator Habitat: The capacity to support pollinating insects, such as bees, wasps, butterflies, moths, flies, and beetles.

Native Plant Habitat: The capacity to support an abundance and diversity of songbird, raptor, and mammal species and functional groups, especially those that are most dependent on wetlands or water. See worksheet *WetVerts* in the *ORWAP_SupplInfo* file for the list of the species included in ORWAP.

In addition to a value score for each of the functions above; except for carbon sequestration and organic matter export, which do not have value scores; ORWAP assesses five other values and attributes.

Public Use & Recognition: The potential and actual capacity of a wetland to sustain low-intensity human uses such as hiking, nature photography, education, and research. Considerations include (are assumed), wetlands designated officially as wetland priority areas, are in public ownership, have less restrictive access policies and a greater degree of visibility from roads, are physically accessible to a wider range of users, have more prior investment of funds for conservation or enhancement, and/or some history of scientific monitoring or use for compensatory mitigation.

Provisioning Services: The passive and sustainable providing of tangible natural items of potential commercial value (i.e. the harvesting of hay (crops), timber, other wild plants, fish, or wildlife).

Wetland Ecological Condition: The integrity or health of the wetland as defined primarily by its vegetation composition (because that is the only meaningful indicator that can be estimated rapidly). More broadly, the structure, composition, and functions of a wetland as compared to reference wetlands of the same type, operate within the bounds of natural or historic disturbance regimes. However, in the case of ORWAP, the model outputs were not scaled to reference wetlands.

Wetland Stressors (Risk): The degree to which the wetland is or has recently been altered by, or exposed to risk from, human and natural factors.

Wetland Sensitivity: The lack of intrinsic resistance and resilience of the wetland to human and natural stressors

3.3.3 Office Assessment

When possible, the ORWAP assessment begins in the office; where information on the wetland, its adjoining landscape, and contributing area are gathered. The office portion of ORWAP includes a series of 49 questions that are answered utilizing published databases available online, as well as resource mapping and air photo interpretation.

3.3.4 Field Methodology

The field component of the ORWAP involves visiting as much of the wetland as possible and filling out two field forms. Though the method suggests visiting during both the wettest and driest times of year, due to the limitations of time and resources for an LWI, these forms are generally completed during a single site visit (though multiple visits were made to several wetlands to get a local “feel” for changing hydrologic conditions over time).

As a result, the assessment relied on aerial imagery, maps and other office information, as well as field indicators. Information provided by landowners or other residents of Florence was also utilized when available.

If the wetland assessment was off-site or even office based (as was necessary for several of the wetlands located in the dunes, far from developed access), the assessment relied upon data and observations of wetlands that were presumed to be of similar condition, Cowardin class, and/or landscape position.

4.0 CARTOGRAPHY

Color aerial photographs were obtained for use in the field. These photos were taken in 2008, with a scale of approximately 1 inch = 200 feet. The boundaries of wetlands from the 1996 inventory were added to the field maps to assist with the field verification process. Wetland boundaries and data point locations were drawn directly onto field maps at the time of assessment. Wetland boundaries are intended to be accurate to within 5 meters. Separate maps were utilized for site access, hydric soils, and the National Wetland Inventory. Wetland boundaries as drawn onto the field maps were transferred into a digital format and inserted into a computer-based map derived from the City’s Geographic Information Systems (GIS) base.

Small potential wetlands that could not be accurately assessed, or known wetlands of less than one-half acre in size, are labeled on the maps with a designation of “PW” (“probable wetland”). The final digital maps include the location of all streams, wetlands, and PW’s, as well as artificially created wetlands such as golf course or water quality features. They also include the location of sample points, legend, north arrow, scale, and a DSL required disclaimer.

5.0 STUDY AREA CHARACTERISTICS AND EXISTING INVENTORY INFORMATION

5.1 Topography

Elevations within the Florence study area range from sea level to approximately 495 feet National Geodetic Vertical Datum (NGVD) 1929. Elevations in Florence increase gently from the ocean to the base of the bedrock ridges that form the edge of the dune sheet along the eastern study area boundary. The highest elevations in the study area are along a ridge east of Clear and Collard Lakes, which defines the eastern edge of the study area.

5.2 Hydrology

5.2.1 Hydrologic Features of the Florence Area

Hydrologic features of the Florence study area include: the Pacific Ocean; the Siuslaw River, which flows along the southern and western edges of the city; the North Fork Siuslaw River, which flows south along the eastern edge of the city; Collard, Clear, Ackerley, and Munsel Lakes, a series of hydrologically connected lakes along the eastern boundary of the study area; Munsel Creek, a perennial stream channel flowing south from Munsel Lake into the Siuslaw River; and relatively large shallow lakes and ponds formed in the dunes.

The origin of Collard, Clear, Ackerley, and Munsel Lakes is the same. The lakes formed along the eastern margin of the dune sheet, between the accumulation of sand to the west and the impermeable bedrock to the east. The energy of the wind transporting sand to the west is deflected upward into the surrounding hills. The sand being carried by the wind is dropped, creating a ridge near the base of the hills. Between the ridge of sand and the hills is a depression or series of troughs. Collard, Clear, Ackerley, and Munsel Lakes all formed in this depressional area.

Clear Lake is over 80 feet deep and Munsel Lake is 71 feet deep. Water flows out of Collard Lake into Clear Lake through a small drainage channel. Water flow is a relatively constant 1 to 2 cubic feet per second. Water continues south into Ackerley Lake and Munsel Lake and into Munsel Creek, which eventually drains into the Siuslaw River. The average annual discharge of Munsel Creek is 3,000 acre-feet.

The source of hydrology for the creeks and lakes of the Florence area is groundwater. The dune sand which underlies Florence is moderately permeable and allows infiltration of large amounts of rainfall. It is estimated that over 55 inches of the 65-inch average annual rainfall goes to groundwater recharge. Each square mile of the dune sand produces approximately 2.7 million gallons per day (Hampton, 1963). Consequently, the water supply for the Florence area is drawn from the dunal aquifer, which stretches approximately 50 miles along the coast. The Heceta Water District draws water for domestic uses from Clear Lake in the northeast corner of the study area. The quality of the water is generally good. The water is soft and weakly acidic, but can contain high amounts of iron. High iron content is especially noticeable beneath wetlands and other bodies of shallow water.

Groundwater movement in the Florence area flows downward toward the edges of the dune sheet. Water drains out of the dune sheet south into the Siuslaw River, east into the North Fork Siuslaw River, or west into the Pacific Ocean. There is relatively little overland flow due to the high permeability of the sand. Only during times when excess rainfall has completely saturated the sand does water flow over the surface. The lack of well-defined tributaries to the streams and lakes is an indication that much of the water reaching the channels is through groundwater flow and not through surface water.

The water table adjacent to Munsel Creek and four other unnamed creeks in the project area is generally higher than the stream levels. During periods of sufficient recharge, the water table discharges into the creeks. However, during the summer months when the precipitation levels are low, the water table falls below the level of some of the creeks and water ceases to flow.

5.2.2 Hydrologic Basin Designation

The study area was divided into three drainage basins based on the 7th field (sub-watershed) of the Hydrologic Unit (HUC-7). Sub-watersheds within the Florence LWI study area include Mercer Lake in north; Bernhardt Creek through the central and south portions; and the Lower North Fork Siuslaw River. These drainage basins and their size are listed in Table 1 below:

Table 1. Hydrologic Basin Areas for the City of Florence Local Wetlands Inventory

Hydrologic Basin (Sub-watershed)	Area (acres)
Bernhardt Creek	6,827
Lower North Fork Siuslaw River	624
Mercer Lake	694
Total Project Acreage	8,145

5.3 Soils

Table 2 lists the soils that have been mapped by the Natural Resources Conservation Service (NRCS; formerly the Soil Conservation Service) within the study area. Figure 2 shows the mapped location of these soils.

Table 2. Soils Mapped Within the Florence LWI Study Area

Symbol	Map Unit Name	Hydric?
10	Beaches	Yes
16D	Bohannon gravelly loam, 3 to 25 percent slopes	No
17	Brallier muck, drained	Yes
18	Brallier variant muck	Yes
21C	Bullards-Ferrello loams, 7 to 12 percent slopes	No
21E	Bullards-Ferrello loams, 12 to 30 percent slopes	No
21G	Bullards-Ferrello loams, 30 to 60 percent slopes	No
44	Dune land	No (Yes on marine terraces and interdunes)
47E	Fendall silt loam, 3 to 30 percent slopes	No
53	Heceta fine sand	Yes
74B	Lint silt loam, 0 to 7 percent slopes	No (Yes in depressions)
74C	Lint silt loam, 7 to 12 percent slopes	No (Yes in depressions)
74D	Lint silt loam, 12 to 20 percent slopes	No (Yes in depressions)
94C	Netarts fine sand, 3 to 12 percent slopes	No (Yes on marine terraces and interdunes)
94E	Netarts fine sand, 12 to 30 percent slopes	No (Yes on marine terraces)

Table 2, continued

Symbol	Map Unit Name	Hydric?
111D	Preacher loam, 0 to 25 percent slopes	No
112G	Preacher-Bohannon-Slickrock complex, 50 to 75 percent slopes	No
124D	Slickrock gravelly loam, 3 to 25 percent slopes	No
124F	Slickrock gravelly loam, 25 to 50 percent slopes	No
131C	Waldport fine sand, 0 to 12 percent slopes	No (Yes on marine terraces and interdunes)
131E	Waldport fine sand, 12 to 30 percent slopes	No (Yes on marine terraces and interdunes)
131G	Waldport fine sand, 30 to 70 percent slopes	No (Yes on marine terraces)
132E	Waldport fine sand, thin surface, 0 to 30 percent slopes	No (Yes in interdunes)
133C	Waldport-Urban land complex, 0 to 12 percent slopes	No on dunes and urban land Yes on marine terraces
140	Yaquina loamy fine sand	Yes
141	Yaquina-Urban land complex	Yes on dune slacks No on urban land

5.4 Vegetation

5.4.1 Vegetation Overview

The City of Florence is located within the Sitka Spruce (*Picea sitchensis*) Forest Zone (as characterized by Franklin and Dyrness, 1973). This vegetation zone occupies a low-elevation strip along the immediate coastline, often only a few miles wide, subject to a relatively wet and mild climate. The zone is essentially a variant of the western hemlock (*Tsuga heterophylla*) Zone, distinguished largely by the presence of Sitka spruce, frequent summer fogs, and proximity to the ocean. The climate provides nearly ideal growing conditions, accounting for the high productivity of forest stands, as well as prolific growth in shrub and herb-dominated communities.

Common trees found in this region include Sitka spruce, western hemlock, western red cedar (*Thuja plicata*), Douglas fir (*Pseudotsuga douglasii*), shore pine (*Pinus contorta*), and red alder (*Alnus rubra*). Sites disturbed through fire or logging may develop into stands of mixed conifers including spruce, hemlock and Douglas fir. However, red alder may overtop the regenerating conifers and develop into a nearly pure alder forest. Dense shrub communities may also form on disturbed sites, often in conjunction with red alder; the dense understory may delay conifer colonization almost indefinitely. Thicket-forming shrubs common in the region include salmonberry (*Rubus spectabilis*), salal (*Gaultheria shallon*), and evergreen huckleberry (*Vaccinium ovatum*). Further discussion of coastal plant communities within the Sitka Spruce Zone can be found in *Natural Vegetation of Oregon and Washington* (Franklin and Dyrness 1973).

A landform type especially significant to Florence area plant communities consists of the extensive active-to-stabilized dune system that extends for miles both north and south of the Siuslaw River mouth, as well as several miles inland (see Section 5.4.2 for more discussion of this landform type). The dynamic nature of these systems represents rapidly changing, and often times hostile, growing conditions for plants.

5.4.2 Local Vegetation Communities

Generalized plant communities encountered within the City of Florence study area include upland active dune complexes, upland broadleaf-scrub/shrub thicket, upland coniferous forest, upland mixed coniferous/deciduous forest, developed-urban, wetland, and riparian/ lacustrine. Wetland communities are further distinguished as freshwater, which includes deflation plains (palustrine unconsolidated bottom, palustrine emergent, palustrine scrub-shrub, and palustrine forested), and brackish (estuarine emergent, and estuarine scrub-shrub) following the Cowardin classification system developed for the US Fish and Wildlife Service (Cowardin et al., 1979). Each of the above communities is described in the sections below.

Upland Active Dune Complex

The upland dunal systems common in the Florence area are unconsolidated and dynamic, with large volumes of sand continually being brought ashore by wave action. The sand is highly mobile when subject to a sufficiently strong wind. Sand grains may be blown considerable distances unless held in place by surface tension when saturated (as within a deflation plain), protected from wind behind a ridge of accumulated sand, or in contact with stabilizing vegetation. Few plants are able to tolerate partial sand burial, let alone maintain a foothold in this shifting substrate. However, several grasses and forbs may persist for a time and eventually stabilize portions of the active dune. Species most commonly encountered include European beach grass (*Ammophila arenaria*) (widely introduced as a sand-binder), seashore bluegrass (*Poa macrantha*), beach silvertop (*Glehnia leiocarpa*), beach knotweed (*Polygonum paronychia*), American dune-grass (*Elymus mollis*), and beach pea (*Lathyrus japonicus*).

As larger areas of sand surface are protected from further wind action by these plants, other species less tolerant of sand burial are able to become established as well. Seedlings of such trees and shrubs as shore pine, Sitka spruce, Douglas fir, salal, and evergreen huckleberry establish more structured communities that protect ever-larger areas of sand, ultimately leading to the establishment of shrub and forest communities.

Upland Broadleaf-Scrub/Shrub Thicket

In addition to colonizing recently stabilized sand dunes, shrub communities are often associated with relatively recent disturbance (i.e. following logging, grading, or fire). Dominant species may include saplings of regenerating conifers such as Sitka spruce or Douglas fir, deciduous trees such as red alder, and shrubs such as salmonberry, thimbleberry (*Rubus parviflorus*), salal, evergreen huckleberry, rhododendron (*Rhododendron macrophyllum*), and blackberries (*Rubus* spp.). Introduced Scots' broom (*Cytisus scoparius*) and gorse (*Ulex europaeus*) are also rapid colonizers in disturbed areas. Herbaceous species are common in cleared openings, often being the first plants to colonize disturbed ground.

Upland Coniferous Forest

The dominant species in the coniferous overstory are Douglas fir, Sitka spruce, western hemlock, western red cedar, and shore pine. Sitka spruce and shore pine are more common closer to the ocean (especially within the dune systems) with the other species becoming more dominant inland, further from the effects of salt spray and shifting sands. Understory plants vary greatly with the density of the tree canopy. A closed canopy forest tends to suppress understory species diversity and density, though species such as false lily-of-the valley (*Maianthemum dilatatum*) and sword fern (*Polystichum munitum*) are commonly encountered. Openings in the canopy allow greater shrub development, with salmonberry, salal, rhododendron, and evergreen huckleberry often evident.

Upland Mixed Coniferous-Deciduous Forest

The conifer species mentioned above may be codominant with deciduous hardwoods such as red alder, bigleaf maple, and willows. Shrub understories are often well-developed given the more open tree overstory for much of the year. Common shrubs include salmonberry, red elderberry (*Sambucus racemosa*), evergreen huckleberry, salal, and Pacific wax myrtle (*Myrica californica*).

Developed-Urban

Plant communities in large portions of the City of Florence study area have been influenced by human activities for most of this century. The study area includes heavily developed commercial areas and single-family residential subdivisions, as well as widely dispersed residential to undisturbed natural areas. Residences, businesses, parking areas, roads, and sidewalks all represent unvegetated or landscaped areas. Vegetation is often of horticultural origin or weedy in these areas. The fringes of these developed areas may have been subject to disturbance as well, often allowed to regenerate as red alder, salmonberry, or blackberry thickets. More frequent disturbance may maintain areas as open spaces dominated by weedy grasses and forbs.

Riparian/Lacustrine

Riparian forests are often similar to the upland mixed evergreen-deciduous forests, though species preferring wetter sites may be more common. Sitka spruce and shore pine may codominate with red alder and western red cedar; Douglas fir and western hemlock may also be present. The shrub layer is often quite dense, especially within a red alder or otherwise more open stand, and may consist of such species as salmonberry, salal, and evergreen huckleberry. Herbaceous species may dominate the understory under a closed evergreen canopy, with lady fern, sword fern, or false lily-of-the-valley often present. Riparian communities are often transitional to or include wetland communities, especially along lake edges.

Lacustrine plant communities vary widely depending on water depths and the degree of stabilization of sideslopes. Many of the lakes in the study area are within interdunal depressions, with active dune movement into the lake edge from one or more directions. Consequently, slopes may be very steep with a short transition from unconsolidated sand into deep water. In these areas the riparian vegetation may be nonexistent or composed only of early successional dune species. In portions of the interdunal depression where wind is blowing sand away from the lake, nearly level sand flats may extend for hundreds of feet, with sufficient water to support a variety of palustrine emergent and scrub shrub species.

Wetlands

Wetland areas are generally transitional between upland or riparian areas and truly aquatic sites with permanently open water. Open water may or may not be present, in which case the wetland can occupy a position where the groundwater table comes close to the surface for an extended period at some time during the growing season. The Florence study area contains extensive areas of freshwater, or palustrine wetlands, often associated with lake margins within interdunal depressions. In addition, brackish, or estuarine wetlands are present along the tidally influenced banks of the Siuslaw River estuary, as well as along the North Fork Siuslaw River.

The composition of palustrine wetlands in the study area is largely determined by the stability of the dune system surrounding wet depressions. Newly formed deflation plains between unstabilized dunes support primarily emergent species that can survive in soils with minimal organic content. The more stable dunes provide better growing conditions for a variety of species, especially shrubs and trees. More mature palustrine forested wetlands in the area are dominated primarily by an overstory of Sitka spruce, shore pine, and red alder; an herb understory dominated by skunk cabbage (*Lysichitum americanum*) and slough sedge (*Carex ohnupta*) is often present as well. At earlier stages of dune stability, palustrine scrub/shrub wetlands often include saplings of the above tree species, along with such shrubs as Hooker's willow (*Salix hookeriana*), bog blueberry (*Vaccinium uliginosum*), Labrador tea, (*Ledum glandulosum*), Douglas' spiraea (*Spiraea douglasii*), and four-line honeysuckle (*Lonicera involucrata*). Palustrine emergent wetlands are generally dominated by herbaceous species such as slough sedge, water parsley (*Oenanthe sarmentosa*), soft-stem bulrush (*Scirpus validus*), rushes (*Juncus* spp.), and purple cinquefoil (*Potentilla palustris*). Some of these least disturbed emergent areas include small populations of uncommon or rare species, including California pitcher plant (*Darlingtonia californica*) or sundew (*Drosera* sp.).

There are also brackish or estuarine wetlands along the margins of the Siuslaw River and its North Fork. These wetlands are primarily composed of emergent species, though scrub/shrub or forest communities are often present at the upper limits of estuarine influence. These transitional woody communities primarily consist of Sitka spruce, Hooker willow, four-line honeysuckle, salmonberry, and occasionally red alder. At lower elevations, the combined influences of high salinity and daily tidal inundation produce pronounced zonation of species composition. Common herbaceous species in the high salt marsh areas include Lyngbye's sedge (*Carex lyngbyei*), tufted hairgrass (*Deschampsia cespitosa*), Puget Sound gumweed (*Grindelia integrifolia*), Baltic rush (*Juncus balticus*), and seacoast bulrush (*Scirpus maritimus*). At a somewhat lower elevation, and with a consequent increase in salinity and frequency of inundation, several halophytic species become dominant. These include pickleweed (*Salicornia virginica*), fleshy jaumea (*Jaumea carnosa*), and seashore saltgrass (*Distichlis spicata*). There are several estuarine wetlands along the banks of the Siuslaw River. These wetlands are recognized under Goal 16: *Estuarine Resources*. Though these wetlands are present, they have not been assessed or inventoried as part of the Goal 5 work for this inventory.

5.4.3 Wetland and Upland Indicator Species

Species lists of commonly encountered plants, along with their status as indicators of wetland conditions, have been prepared for all regions of the country by the USFWS (1988). The status of a particular plant, as identified on Table 3, is the probability of that plant occurring in a wetland.

Table 3. Wetland Indicator Codes and Status

Indicator Code	Status
OBL	Obligate wetland. Estimated to occur almost exclusively in wetlands (>99%)
FACW	Facultative wetland. Estimated to occur 67-99% of the time in wetlands.
FAC	Facultative. Occur equally in wetlands and non-wetlands (34-66%).
FACU	Facultative upland. Usually occur in non-wetlands (67-99%).
UPL	Obligate upland. Estimated to occur almost exclusively in non-wetlands (>99%). If a species is not assigned to one of the four groups described above it is assumed to be obligate upland.
NI	Has not yet received a wetland indicator status, but is probably not obligate upland.

Many plants are found in transitional areas between wetlands and uplands. These areas are usually characterized by flat to gradually sloping terrain where the species composition may not reflect true wetland boundaries. In such areas, a species with a status of FACU may extend into the wetland areas, just as FACW species may also be present in upland areas.

6.0 LWI DISCUSSION AND CONCLUSIONS

6.1 U.S. Fish & Wildlife Service National Wetland Inventory Areas

The U.S. Fish and Wildlife Service, as part of the National Wetlands Inventory (NWI) program, have mapped wetland in the study area (Figure 3). The NWI maps are generated primarily on the basis of interpretation of relatively small-scale color infrared aerial photographs (e.g., scale of 1:58,000) with limited "ground truthing" conducted to confirm the interpretations.

Since much of the LWI study area was included in the previous LWI work, NWI mapping was utilized primarily for areas outside the original study area. The NWI maps were useful in identifying the approximate location of wetlands, though additional ground truthing and/or additional air photo interpretation were utilized to "fine tune" the boundaries as suggested on the NWI maps.

Despite being generally accurate as to the presence of wetlands in a given area, we found that there were often significant differences between the mapped size and shape. In forested areas for example, the NWI is prone to identifying medium to large wetlands in areas that are in actuality a complex of smaller wetlands. These general inaccuracies can be attributed to canopy

cover (typically of shore pine) which creates difficulty in defining wetlands and uplands from air photo interpretation alone. Though development since the time of NWI mapping has no doubt contributed to small differences between NWI designated wetlands and those identified for the LWI, development in the Florence area has generally been limited to areas away from the large wetlands and forested tracts.

6.2 Local Wetlands Inventory Results

6.2.1 Wetland Acreage and Distribution

A total of 34 grouped wetlands of greater than one-half acre were identified during the LWI, with a total area of approximately 654.54 acres. Though some were isolated features and generally separated from other wetlands or water features, many were located in close proximity to other wetlands and as a result, formed larger wetland complexes that were grouped if they were similar in character and located in area of similar land use. The acreage total therefore does not include mapped PWs or exempt wetlands such as golf course ponds or stormwater facilities. It also does not include the acreage of other waters; including streams and lakes, or estuarine wetlands that border the study area along the Siuslaw River.

6.2.2 Wetland Classification

Each wetland was classified according to the Cowardin system. Forested (PFO) wetlands are the most dominant type within the study area at 60 percent, totaling 390.24 acres. Scrub shrub (PSS) wetlands were the second most common at 21 percent (138.71 acres). These were followed by emergent (PEM) wetlands at 10 percent (67.02 acres), unconsolidated bottom (PUB) at 8 percent (50.57 acres), lacustrine aquatic bed (L2AB) at approximately 1 percent (6.6 acres), and aquatic bed (PAB) at only 1.4 acres within the study area.

Table 4 includes the total acreage of each Cowardin wetland class for each wetland. It should be noted that Table 4 does not include the acreage of probable wetlands, other water features (such as golf ponds or ditches), or other waters of the State (including creeks and lakes). It also does not include any portion of a wetland that extends beyond the boundary of the LWI study area.

Table 4. Cowardin Classification of all Wetlands Identified in the Florence LWI

Wetland Code	USFWS Wetland Classification						Total Acreage
	PFO	PSS	PEM	PUB	PAB	L2AB	
1	3.18		4.93				8.11
2		2.59					2.59
3	4.59						4.59
4	12.93	6.27					19.2
5	38.01	6.61	5.31		0.43		50.36
6	0.21	29.32	1.19				30.72
7	2.75						2.75
8	1.78						1.78
9	0.69						0.69

Wetland Code	USFWS Wetland Classification						Total Acreage
	PFO	PSS	PEM	PUB	PAB	L2AB	
10		1.34					1.34
11	6.46			1.03			7.49
12	45.16	0.85	10.29				56.30
13	11.86	0.94	4.64				17.44
14	9.22		14.55				23.77
15	3.83						3.83
16	1.82		1.11				2.93
17	2.42		0.07				2.49
18	0.58						0.58
19	4.47						4.47
20	1.97						1.97
21	23.01						23.01
22						1.56	1.56
23	60.57						60.57
24	16.26	14.04		16.36			46.66
25	3.08	6.61					9.69
26	1.23						1.23
27	88.73		1.24				89.97
28	5.05			0.80			5.85
29	16.89	0.12	23.69	24.44			65.14
30	6.88						6.88
31	10.40	70.02		7.94	0.97		89.33
32	3.72					5.04	8.76
33	0.61						0.61
34	1.88						1.88
TOTAL	390.24	138.71	67.02	50.57	1.4	6.6	654.54

7.0 OREGON RAPID WETLAND ASSESSMENT PROTOCOL RESULTS

7.1 Wetland Quality Assessment

The ORWAP has been formulated to produce an objective analysis of wetland functions and values. "ORWAP is intended to provide consistent and accurate numeric estimates of the relative ability of a wetland to support a wide variety of functions and values important to society" (Adamus et. al. 2010). To obtain accurate and consistent results requires the observation and documentation of dozens of variables, or indicators. As is typical for an LWI, permission for right of access cannot be obtained for all wetlands. As a result, completing the ORWAP assessment via off-site methods increases the level of uncertainty for many variables. Subjectivity increases with the increase in off-site observations, aerial photo interpretation, the need for best professional judgment, or decisions based upon observations of wetland perceived to be similar in character. Nevertheless, an ORWAP assessment was completed for each

wetland identified by this inventory. Appendix D contains the ORWAP answers database; which includes all answers to all questions of the quality assessment conducted on each wetland (or wetland group) of greater than one-half acre in size.

As required by regulation, the LWI must inventory and assess the condition of all wetlands greater than one-half acre in size. Wetlands of less than one-half acre in size (a probable wetland or PW) were not assessed. When possible, individual wetlands of less than one-half acre were grouped with other wetlands. Wetlands were grouped when they were located in the same geomorphic position, were hydrologically connected or shared a hydrologic source, and had similar adjacent land use patterns. Though DSL protocol does allow for the identification of wetland mosaics; "a complex of several wetlands that are interspersed between areas of non-wetland each less than one half acre in size." PHS elected to use observations of onsite conditions and/or air photo interpretation to provide a more accurate representation of the general size and location of the relationship of wetlands and uplands for several wetlands in the northern portions of the study area (such as Wetlands 13, 14, 17 and 30).

The resultant scores generated in ORWAP for the functions and values of each wetland can be found in Appendix B (which shows all function scores for each wetland) and Table 6 (where the grouped function scores of all wetlands are shown in a single table). The characterization sheets in Appendix B include not only the scores produced by ORWAP, but also a summary sheet for each wetland that includes additional information such as the wetland's location, mapped soil type(s), Cowardin and hydrogeomorphic classes, dominant vegetation, and a general description of wetland characteristics and/or unique observations.

8.0 SIGNIFICANT WETLANDS DETERMINATION

8.1 Goal 5 Locally Significant Wetlands Criteria

On September 1, 1996, the Land Conservation and Development Commission adopted a revised Statewide Planning Goal 5. The goal requires local jurisdictions to inventory the natural resources covered under the goal, determine the significance of these resources, and develop plans to achieve the goal. In other words, local jurisdictions must adopt land use ordinances regulating development in and around significant areas.

The committee that created the Goal 5 significance criteria determined that even relatively small wetlands might provide an important (or major) function in their particular landscape position. For example, a small wetland in an urban area may provide habitat for a rare, threatened, or endangered species. However, as stated above, only wetland groups greater than one-half acre were assessed with ORWAP.

Local jurisdictions determining significant wetlands must use the criteria adopted by the Oregon Department of State Lands (ORS 197.279(3)(b)) or other approved criteria. For this inventory, the ORWAP scores for the relative effectiveness and value of each function group were analyzed statistically by identifying which wetlands scored above the 75th percentile for function or value. A percentile is the value of a variable below which a percent of observations fall. For example, the 75th percentile is the value below which 75 percent of the scores were located.

For the Florence LWI, the criterion for determining significance of non-Goal 17 wetlands in the Florence urban growth boundary (UGB) is wetlands that score at or above the 75th percentile in either Function or Value for one or more of the following Grouped Functions, as defined in ORWAP:

- a. Hydrologic Control (water storage and delay or “flood control”); or
- b. Water Quality (sediment retention and stabilization, phosphorus retention, nitrate removal and retention, and thermoregulation); or
- c. Habitat for fish, aquatic, or terrestrial species.

This criterion was developed through a joint effort between the City of Florence, EPA, DSL planning staff, and stakeholders of the Siuslaw Estuary Partnership project. See Appendix E for a letter from the Oregon Department of State Lands outlining and approving this criterion. The letter goes into greater detail regarding the use of ORWAP in identifying locally significant wetlands within the Florence urban growth boundary.

8.2 Applying Significant Wetland Criteria to the LWI Study Area

8.2.1 Goal 5 Significant Wetlands

Goal 5 significant wetlands are identified in Table 6 and the Significant Wetlands map. For the purpose of analyzing wetland functions and values for significance, the scores of “grouped services,” as established in ORWAP, were utilized. The score for each group is defined by the maximum score of several component functions or values. The grouped function and its component functions are identified below in Table 5.

Table 5. Grouped Functions in ORWAP

Grouped Function	Component Functions
Hydrologic Function (WS)	Water Storage & Delay (WS)
Water Quality Support Group (WQ)	Sediment Retention & Stabilization (SR) Phosphorus Retention (PR) Nitrate Removal & Retention (NR) Thermoregulation (T)
Aquatic Habitat Support Group (AQ)	Organic Matter Export (OE) Aquatic Invertebrate Habitat (INV) Amphibian & Reptile Habitat (AM) Waterbird Feeding Habitat (WBF) Waterbird Nesting Habitat (WBN)
Fish Support Group (FISH)	Anadromous Fish Habitat (FA) Non-anadromous Fish Habitat (FR)
Terrestrial Habitat Support Group (TERR)	Songbird, Raptor, & Mammal Habitat (SBM) Pollinator Habitat (POL) Native Plant Diversity (PD)

As mentioned above, the criterion for determining significance of non-Goal 17 wetlands in the Florence UGB for this inventory is wetlands that score at or above the 75th percentile in either Function or Value for one or more of the Grouped Functions outlined in Table 5.

Results

In applying the significance criterion to the 2013 LWI, the sixteen non-Goal 17 wetlands within the Florence UGB are significant, as shown in Table 6 and the map: Significant Wetlands. This is almost exclusively due to their high Function or Value in providing flood control or water quality protection. All of the wetlands, except Wetland 25, met the criterion for Hydrologic Control or Water Quality; and Wetland 25 met the criterion for Aquatic Habitat and is also at the head of a significant riparian corridor. In addition, all of the wetlands except 8, 26, and 34 met the criterion for providing habitat for fish, aquatic, and/or terrestrial species.

Analysis

1. The criterion for determining significance for the 2013 Inventory bases significance on the ORWAP scores separately for relative effectiveness of the Function and Value of the wetland. The proposed criteria do not require high scores in both Function and Value. The Florence Wetlands Project is a pilot and, as such, is one of the first attempts to use the ORWAP method for planning purposes. The Wetlands and Riparian Area Team worked together to come to a mutual understanding of how best to use the ORWAP tool and to agree to criterion for significance that makes sense in a planning context.
2. The “service area” for the Florence Comprehensive Plan is the urban growth boundary (UGB). Flood control and water quality are critical issues for the North Florence Dunal Aquifer, both inside and outside the City limits. Wetlands that provide flood control or water quality protection, today or in the future, are of critical importance in providing these two services. For this reason, the criterion takes both the Function and the Value of the wetlands into consideration in determining significance.
3. The significance criterion recognizes the critical role that wetlands play in controlling floods and protecting water quality in the North Florence Sole Source Dunal Aquifer. All wetlands in the UGB play a role, or will play a role in the future, in Hydrologic Control and/or Water Quality Protection. All but one of the “significant” wetlands met the criterion for these functions or values. The criterion also recognizes the importance of wetlands for providing Habitat for fish, aquatic, and terrestrial species. All of the wetlands except 8, 26, and 34 met the criterion for providing habitat for fish, aquatic, and/or terrestrial species.

8.3 Statewide Planning Goals 5 and 17

The significant wetlands in Table 6 are either Goal 5 or Goal 17 significant resources (see map: Coastal Shorelands & Wetland Areas). This project addresses the significance of Goal 5 resources. Wetlands and riparian areas that are significant through the application of Statewide Planning Goal 17, Coastal Shorelands, are identified in the Lane County Coastal Resources Inventory, the Management Unit descriptions in Florence Comprehensive Plan Chapter 17, and in the Coastal Shoreland Overlay Zone map and standards in Florence City Code Title 10 Chapter 19.

Updated wetland inventories done under Goal 5 can be used to clarify Goal 17 resources.¹ In Florence's case, the Coastal Shoreland Management Units were identified in 1978; and the 2013 wetland data are more accurate and current. The 2013 LWI data are not substantially different from the 1978 data for Goal 17 resources, except for one location: the South Heeceta Junction Seasonal Lakes (see map). For this reason, "Florence City Code Consistency Amendments" will reference the 2013 LWI for the *general* location of the South Heeceta Junction Seasonal Lakes and reference the 2013 Inventory Report for purposes of assessing the functions and values of this resource inside the Florence city limits. The entire area affected by this change today is publicly owned parkland (County and State).

¹ **OAR 660-023-0240. Relationship of Goal 5 to Other Goals**

"(2) The requirements of Goals 15, 16, 17, and 19 shall supersede requirements of this division for natural resources that are also subject to and regulated under one or more of those goals. However, local governments may rely on a Goal 5 inventory produced under OAR 660-023-0030 and other applicable inventory requirements of this division to satisfy the inventory requirements under Goal 17 for resource sites subject to Goal 17."

**Table 6. ORWAP Scores for All Wetlands' Functions (F) and Values (V) and
Identification of Goal 5 Significant Wetlands**

Wet- land #	Hydrologic Control		Water Quality		Fish Habitat		Aquatic Habitat		Terrestrial Habitat		Notes and Significance			
	F	V	F	V	F	V	F	V	F	V	Outside UGB	Goal 17 Resource	In City Limits	Goal 5 Significant- Wetland
1	5.75	3.67	10	7.19	5.87	10	4.88	6.67	5.94	6.67	Part Out		In part	yes
2	3.5	3.08	10	6.07	3.69	4.2	6.37	7.33	6.63	6.67			Outside	yes
3	7	4.72	10	6.19	2.16	6.67	6.89	6.67	6.55	6.67	Outside			
4	2.31	7.64	6.17	7.5	6.56	10	6.11	10	7.61	7.51	Part Out		Inside	yes
5	3.09	7.22	7.39	7.5	7.89	10	6.52	7.33	8.79	10	Part Out	Outside UGB=G17	In part	yes
6	1.77	2.17	4.84	7.5	6.95	10	7.39	7.33	7.51	7.43			Mostly in	yes
7	6.0	3.17	10	6.03	2.21	6.67	6.41	7.33	5.23	6.67			Outside	yes
8	3.5	3.08	10	6.03	0.67	6.67	6.72	6.67	5.99	6.67			Inside	yes
9	3.46	2.17	7.37	5.28	2.3	6.67	7.12	4.0	7.9	6.67	Outside			
10	4.5	2.17	10	5.43	3.69	6.67	7.87	4.0	7.39	6.67	Outside			
11	2.67	6.81	6.93	5.59	2.83	6.67	5.86	7.33	9.01	7.72			Mostly Outside	yes
12	3.25	2.17	10	4.94	3.33	6.67	8.39	7.33	7.76	7.77	Part Out		Mostly Outside	yes
13	5.75	2.17	10	5.82	2.32	6.67	7.01	6.67	5.9	6.67	Outside			
14	4.25	2.17	10	5.07	3.52	6.67	8.04	6.67	6.94	6.67	Outside			
15	2.63	2.33	5.09	6.67	6.68	10	7.14	6.67	7.84	6.67	Outside			
16	3.25	2.17	10	5.07	0.74	6.67	7.67	7.33	6.68	6.7	Outside			
17	3.25	2.17	10	5.57	2.05	6.67	7.87	7.33	7.09	6.99	Outside			
18	3.85	2.33	6.46	5.78	1.59	6.67	6.92	7.33	7.71	6.67	Outside			
19	3.25	2.17	10	5.36	2.64	5.11	7.31	6.67	6.53	6.67	Outside			
20	3.25	2.17	10	5.36	0.83	6.67	7.34	7.33	6.06	6.67	Outside			
21	4.5	3.58	10	6.49	2.95	6.67	7.84	7.33	6.99	7.22	Outside			
22	3.13	2.67	4.21	6.67	7.06	10	6.97	6.67	6.34	6.67	Outside	G17		
23	4.5	2.17	10	5.45	4.26	5.47	8.28	7.33	6.72	7.21	Outside			
24	5.75	2.17	10	5.61	3.54	6.67	7.82	7.33	7.08	7.09	Part Out	Part G17	Outside	yes
25	3	2.17	5.52	5.28	2.59	5.41	7.23	7.33	5.83	6.7	Part Out		Outside	yes
26	3.25	2.42	10	5.57	2.89	6.67	5.98	6.67	5.95	6.67			Outside	yes
27	3.5	2.67	10	6.28	3.22	4.73	6.78	7.33	5.35	6.67	Part Out		Outside	yes
28	2.25	2.17	10	5.28	3.9	6.67	6.38	7.33	5.85	6.67			Outside	yes
29	4.5	2.17	10	5.36	3.33	6.67	6.41	7.33	5.43	6.67		G17	In part	
30	3.5	1.67	10	5.11	3.97	6.67	7.42	7.33	6.16	6.67		G17	Inside	
31	2.71	2.92	6.17	7.5	7.93	10	5.89	7.33	6.3	7.03		G17	Inside	
32	2.26	2.0	5.56	6.67	6.64	10	6.90	7.33	8.73	7.96	Outside	G17		
33	4.5	1.67	10	4.77	1.22	7.13	7.36	7.33	7.09	6.97			Inside	yes
34	1.64	1.67	5.03	6.64	2.57	6.67	6.06	6.67	4.66	6.67		Part G17	Inside	yes
75%	4.50	3.04	10.00	6.60	4.19	7.02	7.50	7.33	7.48	7.08	Goal 5 Significance Threshold			

9.0 RIPARIAN AREAS AND CORRIDORS

A "riparian area" is defined as the area adjacent to a river, lake, or stream, consisting of the transition from an aquatic ecosystem to a terrestrial ecosystem. A "riparian corridor" is a Goal 5 resource that includes the water areas, fish habitat, adjacent riparian areas, and wetlands within the riparian boundary.

The riparian inventory for the Siuslaw Estuary Partnership (SEP) project includes several perennial and intermittent streams that flow directly to the Siuslaw River or Pacific Ocean, plus a chain of interconnected lakes lying northeast of Florence.

The Goal 5 Administrative Rules require local governments to inventory and determine significant riparian corridors by following either a "safe harbor" process or a "standard" methodology. This process used a combination of the safe harbor and standard processes, as discussed below.

9.1 Riparian Areas Inventory and Assessment

OAR 660-023-0090 provides that "Local governments shall inventory and determine significant riparian corridors by following either the safe harbor methodology described in section (5) of this rule or the standard inventory process described in OAR 660-023-0030 as modified by the requirements in section (4) of this rule. The local government may divide the riparian corridor into a series of stream sections (or reaches) and regard these as individual resource sites."

The riparian corridors in the Florence UGB were divided into 17 riparian reaches in the following 5 basins:

- Munsel Creek
- Rhododendron Drive
- Airport
- Heeceta Beach
- North Fork Siuslaw

Goal 5 allows for the riparian inventory and determination of widths to use either the standard process or a safe harbor process. Safe Harbor was used to identify the significant riparian corridor and width for the Munsel Creek Reaches (50 feet from top of bank). In the case of RMC-C, the riparian corridor includes a major wetland where the standard distance to the riparian corridor boundary shall be measured from, and include, the upland edge of the wetland; and two minor wetlands of < ½ acre each where the width is 25 feet consistent with prior DSL approvals.

Safe Harbor Riparian Inventory

OAR 660-023-0020 defines "safe harbor" as follows:

"Safe Harbor" consists of an optional course of action that satisfies certain requirements under the standard process. Local governments may follow safe harbor

requirements rather than addressing certain requirements in the standard Goal 5 process. For example, a jurisdiction may choose to identify "significant" riparian corridors using the safe harbor criteria under OAR 660-023-0090(5) rather than follow the general requirements for determining "significance" in the standard Goal 5 process under OAR 660-023-0030(4). Similarly, a jurisdiction may adopt a wetlands ordinance that meets the requirements of OAR 660-023-0100(4)(b) in lieu of following the FSEE decision process in OAR 660-023-0040."

The safe harbor inventory approach is only available in Goal 5 for fish bearing streams:

"(5) As a safe harbor in order to address the requirements under OAR 660-023-0030, a local government may determine the boundaries of significant riparian corridors within its jurisdiction using a standard setback distance from all fish-bearing lakes and streams shown on the documents listed in subsections (a) through (f) of section (4) of this rule, as follows:..."

Munsel Creek is the only fish bearing stream in the Florence UGB and the annual stream flow is less than 1,000 cubic feet per second; so, in accordance with Goal 5, below, the riparian corridor boundary for Munsel Creek shall be 50 feet from the top of bank:

"(b) Along all lakes, and fish-bearing streams with average annual stream flow less than 1,000 cfs, the riparian corridor boundary shall be 50 feet from the top of bank."

There is a section of the main channel of Munsel Creek (Reach RMC-C) where the riparian corridor includes portions of a significant wetland. In accordance with Goal 5, below, the standard distance to the riparian corridor boundary in this area shall be measured from, and include, the upland edge of the wetland and the riparian corridor boundary for two minor wetlands (< ½ acre each) is set at 25 feet consistent with the approved PUD plat for Florentine Estates.

"(c) Where the riparian corridor includes all or portions of a significant wetland as set out in OAR 660-023-0100, the standard distance to the riparian corridor boundary shall be measured from, and include, the upland edge of the wetland."

Standard Riparian Inventory

The "standard" inventory approach was used to identify riparian widths for the remainder of the riparian inventory.

Note that field data sheets and maps were completed for Munsel Creek, including the Munsel Creek side channel, even though the safe harbor option was used to determine the boundaries of these corridors. The standard inventory maps and reach summaries for Munsel Creek are included in the 2013 Inventory as background information; they are not intended for use in, and are not referenced in, any local planning or land use context.

The standard inventory involves the following steps:

1. Inventory: determine stream characteristics and riparian widths – typical tree height or topographic break, using the Urban Riparian Inventory and Assessment Guide, Oregon Department of State Lands, 1998
2. Assess riparian functions – water quality, flood management, thermal regulation, and wildlife habitat
3. Determine significance
4. Adopt protection measures

The assessment of the riparian corridors was based on the following functions:

- Water quality: riparian vegetation traps sediment, filters runoff, and binds soil to prevent erosion
- Flood management: vegetation slows the rate of storm runoff and increases groundwater recharge
- Thermal regulation: trees and herbaceous layers provide shade and add humidity, cooling the water and providing important habitat for juvenile fish
- Wildlife habitat: riparian trees, vegetation, ground cover, and woody debris provide habitat for wildlife that thrive near a water resource.

9.2 Urban Riparian Inventory and Assessment Guide (URIAG)

Goal 5 OAR 660-023-0090 provides that . “Local governments are encouraged, but not required, to conduct field investigations to verify the location, quality, and quantity of resources within the riparian corridor.”

“(4) When following the standard inventory process in OAR 660-023-0030, local governments shall collect information regarding all water areas, fish habitat, riparian areas, and wetlands within riparian corridors. Local governments may postpone determination of the precise location of the riparian area on lands designated for farm or forest use until receipt of applications for local permits for uses that would conflict with these resources. Local governments are encouraged, but not required, to conduct field investigations to verify the location, quality, and quantity of resources within the riparian corridor.”

For the SEP project, the City of Florence elected to use the Oregon DSL “Urban Riparian Inventory and Assessment Guide” (URIAG). Using this method, all water resources are inventoried, riparian widths and characteristics are determined by field evaluation, and riparian quality is determined by a functional assessment scoring system. This approach will assure that all riparian resources in the project area are identified, and that their location, extent, quality, and functional benefits are documented and made known to local officials, property owners, and residents.

The URIAG methodology is comprised of a riparian inventory and a riparian assessment. For the inventory, hydrologic basins are identified and the riparian corridors within each basin are mapped and broken into “reaches” with similar characteristics such as water body (stream vs. lake), vegetation patterns, and or land use. For each reach, the riparian area was characterized

by a combination of field observations at accessible locations, aerial photographs, GIS maps, and the recently available Light Detection and Ranging (LIDAR) topography. Each riparian reach has a right (R) and left (L) side, looking downstream. If the riparian information differs for the left and right sides, two forms may be used.

The riparian inventory requires determination of the riparian width. Width of the riparian area is measured horizontally out from the edge of the water resource, typically either the top of a streambank (TOB) or the high water line of a lake or wetland. In order to capture the riparian functions of stream shading and delivery of organic debris, the URIAG sets the width value as the Potential Tree Height (PTH) at maturity for the dominant tree species in the area.

The SEP inventory has used the PTH criteria wherever it provides a reasonable and credible result. However, several of the stream reaches within the urban City limits are favored with stands of Douglas fir, Western hemlock, and/or Sitka spruce; thus the PTH is 120 feet — which would extend the riparian area well into the established residential structures and facilities. These reaches typically have a topographical break at the top of the riparian slope, which also sets the usual boundary with the adjacent residential or commercial development. For such reaches, the SEP inventory has chosen to recognize “realities on the ground” by defining the riparian width as “TOB to topographical break” — the horizontal dimension of the slope which runs from the streambank up to where the ground is roughly level or slopes away from the water resource; this slope has the primary potential for positive or negative contributions to water quality and flood management. Further, for water resources in the urban area, this slope also seems to support the heaviest and most consistent vegetation — trees, shrubs and woody debris — which is the primary source of shading for thermal regulation as well as organic material for wildlife habitat.

9.3 URIAG Assessment and Results

The riparian area assessment is completed by “scoring” each reach with respect to beneficial riparian functions using URIAG parameters. The inventory field observations answered a series of questions which describe the characteristics of the riparian area. Those answers are weighted and summed to quantify riparian potential regarding water quality, flood management, thermal regulation, and wildlife habitat. The scored results for the reach indicate whether the potential for each function is High, Medium, or Low. The ratings provide a basis for local authorities to identify significant riparian resources, and to establish appropriate protection policies and land use trade-offs.

For the SEP project, riparian field assessments were conducted at 51 locations on the drainages and lakes in the project area. At many locations, separate information was recorded for the left and right sides of the water resource. Each assessment location was assigned a code based on a project defined drainage basin and a number (e.g. RMC-1). A data sheet was completed during the visit at each location which documents the existing channel, topography, and vegetation conditions and estimates riparian measurements. In a few cases, the assessments were based on aerial photographs and LIDAR data due to the lack of project access. All riparian field data sheets are included in Appendix F.

Based on these field observations, the streams and lakes in the SEP project area were divided into reaches with roughly uniform riparian qualities. Location of the reaches and the riparian areas are illustrated in the maps of Sheets E through H. A total of 12 stream reaches and 5 lake reaches were identified, with codes based on drainage basin and a letter (e.g. RMC-A). The riparian characteristics for each reach were set as a composite of the assessment site information. Reach summary sheets are included in Appendix G. These reach characteristics were scored as noted above to determine High, Medium, or Low functional quality of the reach.

Five tree species were determined to be the dominant native trees within riparian areas of the project. The most common tree species in the riparian areas included Douglas fir, Sitka spruce, western hemlock, shore pine, and red alder. Potential tree heights at maturity (PTH) for each are included in Table 7.

Table 7. Potential tree heights (PTH) of dominant species in the Florence area

Common Name	Botanical Name	Potential Tree Height/ Riparian Corridor Widths (feet)
Sitka spruce	<i>Picea sitchensis</i>	120
Shore pine	<i>Pinus contorta</i>	50
Douglas fir	<i>Pseudotsuga menziesii</i>	120
Western Hemlock	<i>Tsuga heterophylla</i>	120
Red alder	<i>Alnus rubra</i>	65

Riparian Acreage and Distribution Field Data

Table 8 summarizes the riparian area widths and resulting acreage for each reach in the SEP project area using the field data and URIAG. The bases used to determine riparian width are also indicated in each case. The bases in Table 8 reflect the field data, not the significant riparian widths which are presented and discussed in section 9.6. The protection measures adopted as part of this project apply to the significant riparian widths in Table 10.

Table 8. Field Data Acreage of Riparian Areas by Reach and Basin

Riparian Basin	Reach Code	Width L/R	Basis	Acreage	Basin Total
Munsel Creek	RMC-A	30/40	Topography	0.9	179.7
	RMC-B	50/50	Topography	19.6	
	RMC-C	50/50	PTH/Topo	33.5 (incl wetland)	
	RMC-Cs	25/25	Topography	2.2	
	RMC-D	40/40	Topography	15.4	
	RMC-D1	50/50	Topo/PTH	5.5	
	RMC-E	120/15 ¹	PTH/Topo	93.6	
	RMC-F	50/120	Topo/PTH	9.0	
Airport	RAIR-A	20/20	Topography	8.0	18.6
	RAIR-B	65/65	PTH	9.0	
	RAIR-C	30/30	Topography	1.6	

Riparian Basin	Reach Code	Width L/R	Basis	Acreage	Basin Total
Heceta Beach	RHB-A	20/20	Topography	0.6	2.6
	RHB-B	50/50	PTH	2.0	
North Fork Siuslaw	RNS-A	40/40	Topography	1.8	1.8
Rhododendron	RRH-A	50/50	PTH	5.8	5.8
Riparian Acreage Total					208.5

¹ West (right) of the northern lakes, sand dunes reach to the shoreline in many areas; thereby inhibiting the growth of vegetation and the establishment of a functional riparian area.

Table 9 summarizes the riparian assessment results for each reach in the SEP project area using URIAG.

Table 9. Summary of Riparian Functional Assessments Using URIAG

Riparian Reach	Water Quality	Flood Management	Thermal Regulation	Wildlife Habitat
RMC-A	H	H	M	H
RMC-B	H	M	H	H
RMC-C	H	H	H	H
RMC-Cs	H	M	H	M
RMC-D	H	M	H	H
RMC-D1	H	M	M	M
RMC-E Left	H	M	M	H
RMC-E Right	M	M	L	M
RMC-F Left	H	M	M	M
RMC-F Right	H	M	M	H
RAIR-A	M	M	L	L
RAIR-B	H	M	H	H
RAIR-C	M	M	M	M
RHB-A	H	M	H	M
RHB-B	H	H	H	H
RNS-A	M	M	H	M
RRH-A	M	M	H	M

H = High M = Medium L = Low

The quality of the SEP project riparian corridors using URIAG scoring indicate that most of the inventoried riparian reaches (70%) rate HIGH for water quality functioning, because they filter the runoff from nearby land. In the flood management category, 80% of the riparian areas rated MEDIUM; only the three with associated wetlands rated HIGH. For the important thermal regulation function, 50% rated HIGH while 12% rated LOW due to lack of effective vegetation coverage. Valuable wildlife habitat is characterized by multi-layered vegetation near the streams; for this function 47% of the SEP reaches rated HIGH and 47% rated MEDIUM.

In general, Munsel Creek and the undeveloped lakeshores were judged to have excellent riparian functional value. In addition, RAIR-B and the Heceta Beach (RHB) reaches also had superior ratings.

9.4 Significant Riparian Corridors and Widths

The Significant Riparian Corridors and Widths are presented in Table 10. The protection measures adopted as part of this project apply to the significant riparian widths in Table 10.

Table 10. Significant Florence Riparian Corridors, Widths, and Functional Assessment

Basin and Reach ¹	Riparian Width, ² ft	Functional Assessment				Goal 5 Significant?	Notes		
		Water Quality	Flood Mgmt	Thermal Regulation	Wildlife Habitat		Goal 17?	Outside UGB?	In City Limits?
Munsel Creek Basin									
RMC-A	50/50-G17	H ³	H	M	H	--	Goal 17		Yes
RMC-B	50/50-SH	H	M	H	H	Yes			Yes
RMC-C	50/50-SH ⁴	H	H	H	H	Yes			Yes
RMC-Cs	50/50-SH	H	M	H	M	Yes			Yes
RMC-D	50/50-SH	H	M	H	H	Yes			Yes, in part
RMC-D1	50/50-PTH	H	M	M	M	--		Outside	
RMC-E1	120-PTH	H	M	M	H	--	Goal 17		No
RMC-Er	15 - PTH	M	M	L	M	--		Outside	
RMC-F1	50 - Topo	H	M	M	M	--		Outside	
RMC-Fr	120-PTH	H	M	M	H	--		Outside	
Airport Basin									
RAIR-A	20/20 Topo	M	M	L	L	No			Yes
RAIR-B	65/65-PTH	H	M	H	H	Yes	Goal 17, in part		Yes
RAIR-C	30/30 Topo	M	M	M	M	No			Yes
Rhododendron Drive Basin									
RRH-A	50/50-PTH	M	M	H	M	Yes	Goal 17, in part		Yes
Heceta Beach Basin									
RHB-A	20/20Topo	H	M	H	M	Yes			No
RHB-B	50/50-PTH	H	H	H	H	Yes			No
North Fork Siuslaw Basin									
RNS-A	40/40 Topo	M	M	H	M	--		Outside	

1. See Map "City of Florence Significant Riparian Reaches 2013" for Significant Riparian Corridor locations. The Appendices of this Inventory contain information and maps for riparian areas not deemed significant.
2. Left and Right values, measured horizontally from top of bank for streams. Basis for width:
G17 = Goal 17 setback; SH = Goal 5 Safe Harbor;
PTH = Potential Tree Height; Topo = Top of bank to topographical break
3. Functional assessment ratings based on Urban Riparian Assessment Guide (URIAG) Scoring: L = Low, M = Medium, H = High
4. Where RMC-C includes a wetland, the riparian boundary shall be measured from, and include, the upland edge of the wetland [OAR 660-023-0090 (5)(c)]; and the riparian corridor boundary for two minor wetlands (< ½ acre each) is set at 25 feet consistent with the approved PUD plat for Florentine Estates.

Significance Criteria for Riparian Corridors and Widths

The significance criteria for non-Goal 17 riparian corridors in the Florence urban growth boundary (UGB) are as follows:

1. **Munsel Creek:** use the "Safe Harbor" provisions of Statewide Planning Goal 5 to determine as a "significant riparian resource" the riparian corridor with boundaries 50 feet from the top of bank along each side of Munsel Creek, the only fish-bearing stream in the Inventory. This safe harbor width includes the side channel of Munsel Creek (RMC-Cs). For RMC-C (main channel where there is a wetland), the riparian width is 50 feet measured from, and including, the upland edge of the wetland; and the riparian corridor boundary for two minor wetlands (< ½ acre each) is set at 25 feet consistent with the approved PUD plat for Florentine Estates.
2. **Riparian corridors other than Munsel Creek:** determine as "significant riparian corridors" the inventoried widths of all Riparian Reaches that scored at least one High Value in the Riparian Functional Assessment in Table 10.

Results

As shown in Table 10, the only two Reaches that do not meet this threshold, and thus will not be deemed "significant," are RAIR-A and RAIR-C. RAIR-A is cleared and channeled via Siuslaw High School, the airport runway, and Greentrees to 12th Street. RAIR-C runs from the south airport fence to 9th Street; and restoration of this reach is questionable. The significant riparian reaches are shown in the Significant Riparian Reaches map.

Analysis

Goal 5 provides that a 50 foot "Safe Harbor" significant riparian width can be used for fish bearing streams. Munsel Creek is the only fish bearing stream in the Inventory. As such, the Safe Harbor provisions in Goal 5 are used to establish significance with a riparian width of 50 feet from top of bank, with the exception of the wetland area of the main channel section of RMC-C where the riparian corridor boundary is 50 feet from the edge of the wetland; and the riparian corridor boundary for two minor wetlands (< ½ acre each) is set at 25 feet consistent with the approved PUD plat for Florentine Estates.

For those streams within the Florence UGB that are not fish-bearing, the standard inventory approach was used, consistent with Statewide Planning Goal 5 which provides that, when Safe Harbor is not an option, the determination of significance shall be based on:

- (a) The quality, quantity, and location information;
- (b) Supplemental or superseding significance criteria set out in OAR 660-023-0090 through 660-023-0230; and
- (c) Any additional criteria adopted by the local government, provided these criteria do not conflict with the requirements of OAR 660-023-0090 through 660-023-0230.

Munsel Creek and Munsel Creek Side Channel

OAR 660-023-0090 requires the local government to consult specific sources in completing the standard inventory:

At a minimum, local governments shall consult the following sources, where available, in order to inventory riparian corridors along rivers, lakes, and streams within the jurisdiction:

- (a) Oregon Department of Forestry stream classification maps;
- (b) United States Geological Service (USGS) 7.5-minute quadrangle maps;
- (c) National Wetlands Inventory maps;
- (d) Oregon Department of Fish and Wildlife (ODFW) maps indicating fish habitat;
- (e) Federal Emergency Management Agency (FEMA) flood maps; and
- (f) Aerial photographs.”

The 50 foot safe harbor significant riparian width was applied to Munsel Creek, including the Munsel Creek side channel, based on the conclusions from consultation with ODFW, the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS), and the Florence Salmon and Trout Enhancement Program (STEP) at-large Director. These agencies concluded that Munsel Creek and this side channel reach and its riparian area be declared as significant and protected with a 50-foot riparian setback. They concluded: “Munsel Creek and the side channel are both considered as critical habitat for Oregon Coast coho salmon (a federally listed threatened species) and are important to the conservation and recovery of this species.”

Fish biologists from ODFW, NMFS, and one of the at-large Directors of the STEP agreed in written communications that “When Oregon Coast coho salmon were listed under Endangered Species Act, NMFS also designated critical habitat and Munsel Creek was included in this designation. Therefore, Munsel Creek and the side channel are both considered by NMFS as critical habitat for Oregon Coast coho salmon and are important to the conservation and recovery of this species. Munsel Creek and the side channel are also designated as essential fish habitat (EFH) for coho salmon under the Magnuson-Stevens Fishery and Conservation Management Act.” “Therefore, I recommend that this side channel reach and its riparian be declared as significant and protected with a 50-foot riparian setback.”

10.0 STAFF QUALIFICATIONS

John van Staveren:	President; Senior Scientist; Professional Wetland Scientist
Project Role:	Project Manager
Project Responsibility:	Contract negotiations, monthly billing Public presentations Quality control Regulatory agency coordination

As President, Mr. van Staveren directs Pacific Habitat Services’ environmental projects throughout the Pacific Northwest. He has conducted over 1,000 wetland delineations, 30 Local Wetland Inventories and riparian inventories, designed and implemented dozens of freshwater

and estuarine wetland mitigation plans, provided expert witness testimony, and testified at numerous public hearings. John served on three state-appointed Technical Advisory Committees concerning wetland policy in the State of Oregon. He is principal author of the *Urban Riparian Inventory and Assessment Guide* prepared for the Oregon Department of State Lands and *Freshwater Wetland Restoration*, a chapter in *The Art and Science of Ecological Restoration in Cascadia. The Science and Practice of Ecological Restoration* (Island Press, 2006).

Shawn Eisner

Project Role: Wetland Scientist
Project Responsibility: Wetland inventory field work and assessment
Report writing
Quality control and editing
Data input

Shawn provides specialized support pertaining to wetland delineations, determinations, and monitoring; stream and natural resource assessments and environmental permit processing. He conducts field work and data collection for Local Wetland Inventories and is involved in data analysis and report preparation. He has played an integral role in the Arch Cape, North Bethany Planning Area, Bull Mountain Planning Area, Molalla, Bandon, North Plains, Corvallis, Depoe Bay, and Eugene LWIs.

Amy Hawkins

Project Role: Wetland Scientist
Project Responsibility: Wetland inventory field work and assessment

Amy is certified as a Professional Wetland Scientist and is certified by the Oregon Department of Transportation to prepare endangered species effects assessments. Amy has delineated numerous wetlands and prepared wetland mitigation plans. She conducts field work and data collection for Local Wetland Inventories as well as completion of functional assessments.

Caroline Rim

Project Role: Wetland Scientist
Project Responsibility: Wetland inventory field work

Caroline has over 14 years of experience as an environmental consultant. She conducts wetland delineations and wildlife habitat assessments, designs and monitors wetland mitigation areas, and assists environmental permit processing. She has worked on several local wetland inventories. She conducts field work and data collection.

Jane Le Blanc

Project Role: Technical Editor
Project Responsibility: Graphics
Report editing, formatting and layout
Data input

Jane is a technical editor and provides permitting support for PHS. Her duties include formatting and editing wetland reports, proposals, and letters as well as data input.

Solye Brown

Project Role: GIS Cartographer
Project Responsibility: Mapping
GIS database management

Solye's experience is in AutoCad and Geographic Information Systems (GIS) mapping. Her specialties include Geodatabase development and management, and data preparation. Her roles in this project include the database management and preparation of final maps.

Kelli Weese

Project Role: GIS analyst and Cartographer
Project Responsibility: Mapping
GIS database preparation

Kelli's experience includes work as a Geographic Information Systems (GIS) analysis for the City of Florence. Her roles in this project include the creation of field maps, GIS data from field collected and attribute data, and mapping of results.

Clarence Lysdale

Project Role: Riparian Inventory
Project Responsibility: Riparian inventory field work and assessment

Clarence is a registered professional engineer. His roles in this project included riparian fieldwork; development of the assessment protocol; oversight of riparian map preparation; and riparian report preparation.

Mark Tilton

Project Role: Riparian Inventory
Project Responsibility: Riparian inventory field work and assessment

Mark was a member of the Florence Planning Commission. His roles in this project included riparian fieldwork and development of the assessment protocol.

11.0 REFERENCES

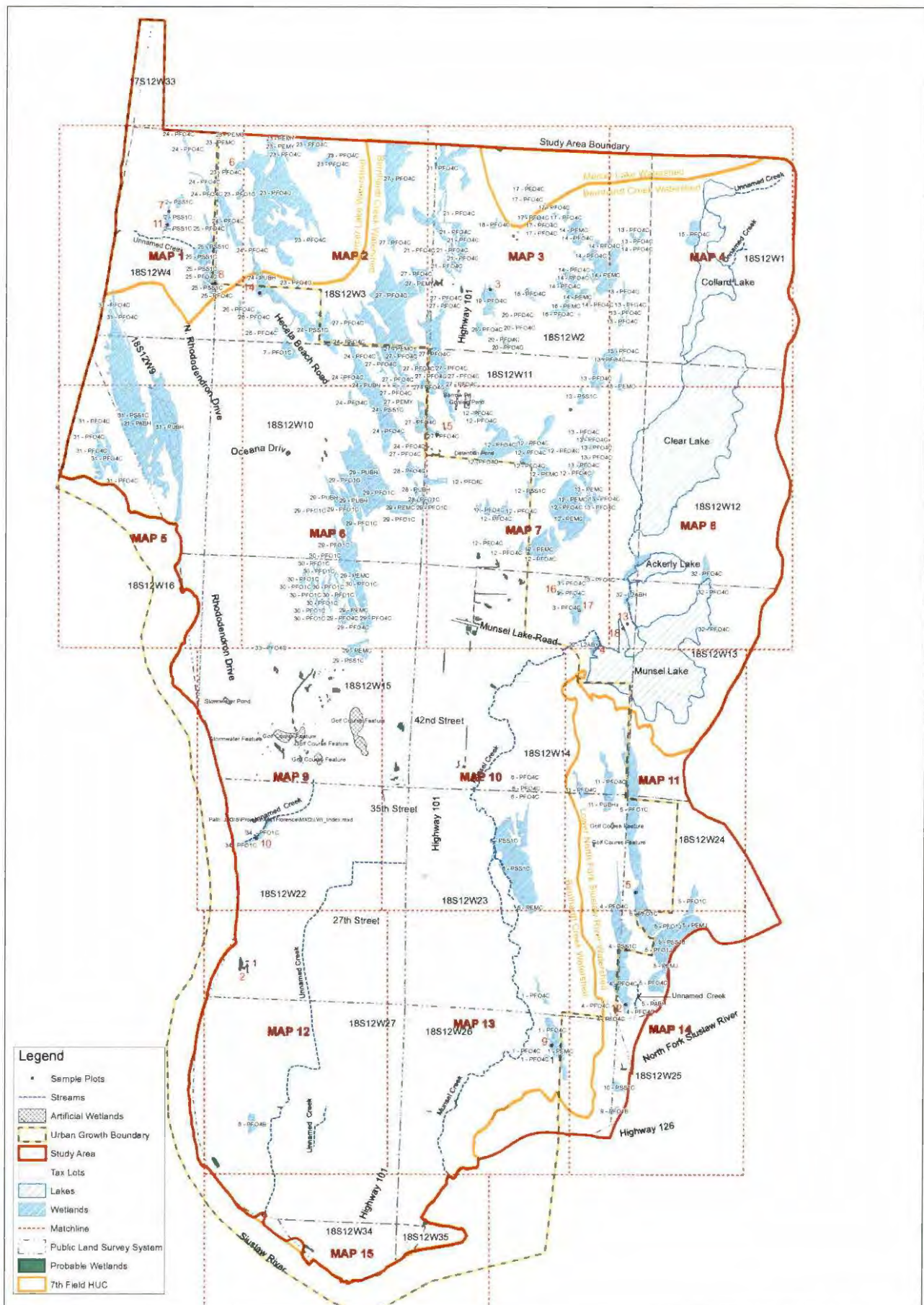
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Appendix A

Figures and Sheets

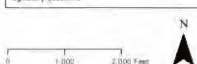






Information shown on this map is for planning purposes, represents the conditions that exist at the map date, and is subject to change. The location and extent of wetlands and other waters are approximate. There may be unapproved wetlands and other waters present that are subject to regulation. A current Oregon Department of State Lands approved wetland delineation is required for state removal. All permits. You are advised to contact the Department of State Lands and the U.S. Army Corps of Engineers with any regulatory questions.







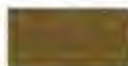









Map Date 06-13-2013





City of Florence Significant Wetlands

Significant Wetlands by Number

	1		12
	2		24
	4		25
	5		26
	6		27
	7		28
	8		33
	11		34

Other

 Urban Growth
Boundary

 City Limits

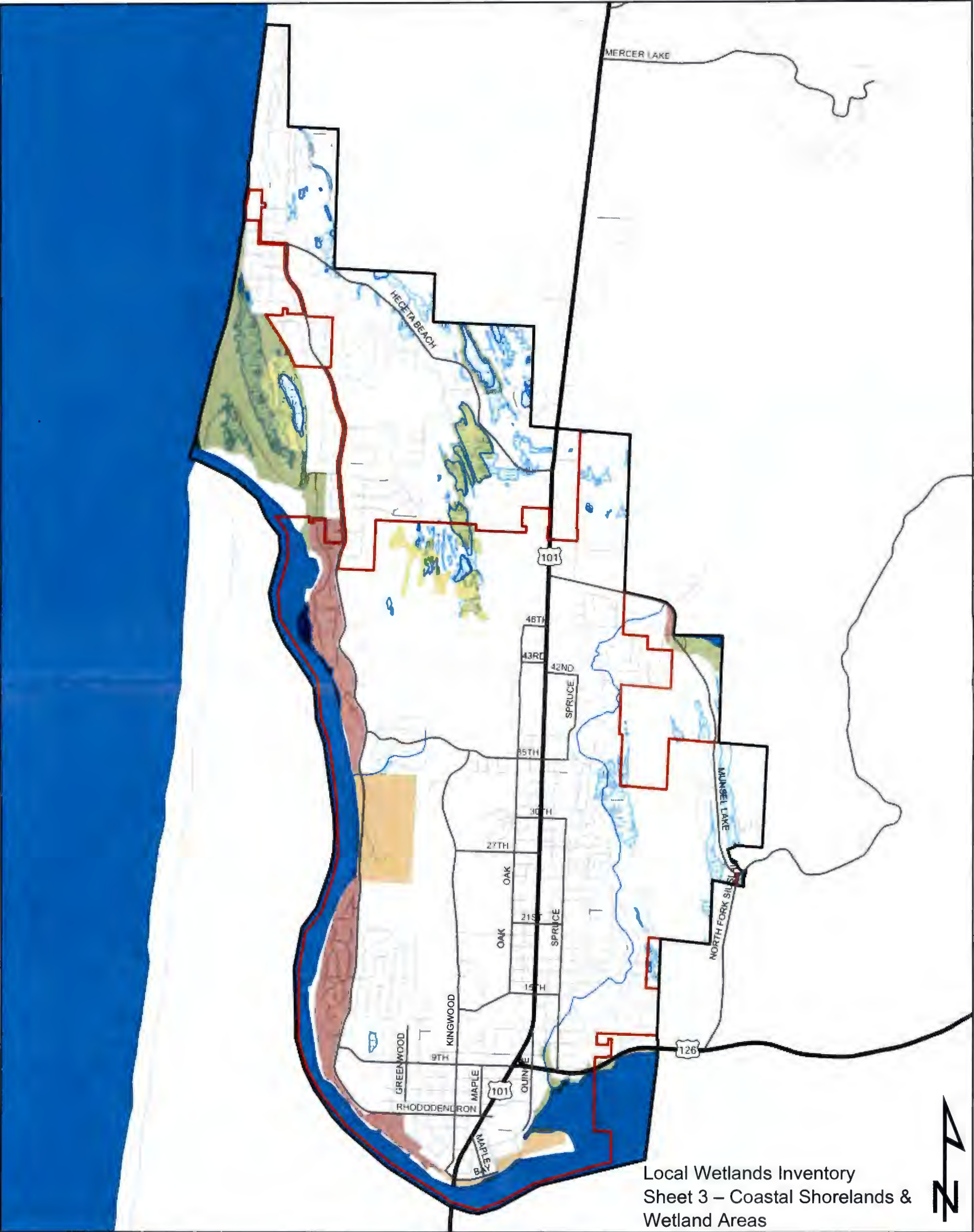


City of Florence
250 Hwy 101 N.
Florence, OR 97439
(541) 997-8237

June 5, 2013

0 0.25 0.5

Miles



Local Wetlands Inventory
Sheet 3 – Coastal Shorelands &
Wetland Areas

City of Florence
Florence Local Wetland Area Inventory
Coastal Shorelands & Wetland Areas



City of Florence
250 Hwy 101 N.
Florence, OR 97439
(541) 997-8237
June 5, 2013

Data: City of Florence GIS; Pacific Habitat Services;
Lane Council of Governments (LCOG); Lane County
Oregon; U.S. Environmental Protection Agency (EPA);
U.S. Geological Survey (USGS);
Oregon Department of Transportation (ODOT)

Wetland Inventory

 **Wetlands (2010)**

0 0.5 1 Miles

Shoreland Management Units

 Mixed Development	 Prime Wildlife
 Residential Development	 Natural Resource Conservation

 **City Limits**

 **UGB**

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 1
Date(s) of assessment:	July 16, 2010	Size (acres):	8.11
Data Sheet Number(s):	9	Cowardin Class(es):	PEMC, PFO4C
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	DCNP

TRS quarter section tax lot:	1812120000702, 1812141000113, 1812141000300
Street address or location:	East end of 18th Street and Willow
Latitude:	44.012201°
Longitude:	-124.090047°
Locally Significant?:	Yes
Hydrologic basin:	171002060804
Soil -- Mapped series:	Heceta fine sand, Dune land
Hydrologic Source:	Groundwater

Dominant Wetland Vegetation			
TREES / SHRUBS		VINES / HERBS	
<i>Pinus contorta</i>	Shore pine	<i>Juncus nevadensis</i>	Sierra Rush
<i>Spirea douglasii</i>	Douglas spirea	<i>Juncus ensifolius</i>	Dagger-Leaf Rush
<i>Salix hookeriana</i>	Hooker's willow	<i>Juncus falcatus</i>	Sickle-Leaf Rush
		<i>Carex sitchensis</i>	Sitka Sedge

Comments:
Complex of several depressional areas, inundated during the winter and spring. These wetlands were grouped because they are located in the same geomorphic position, are influenced by the local groundwater table, and have similar adjacent land use patterns. These wetlands are dominated by herbaceous vegetation, but with a scattered overstory of *Pinus contorta* at the north end of the wetland. Adjacent upland is mostly bare sand. Bordered to west by residential development and to the east by parking lots. Portions of this wetland obtained concurrence for a prior wetland delineation: WD1999-0356 & WD2003-0416. The boundary along the northwest extent was confirmed by DSL just prior to LWI approval: WD2013-0142.

COWARDIN CODES:	E2FO - estuarine forested	E2SS - estuarine scrub shrub	E2EM - estuarine emergent
PFO - palustrine forested	PSS - palustrine scrub-shrub	PEM - palustrine emergent	PUB - palustrine unconsolidated bottom
HGM CODES:	EFB - Estuarine Fringe Embayment	FR - Estuarine Fringe Riverine	RFT - Riverine Flow Through
RI - River Impounding	LFI - Lacustrine Fringe Headwater	LFV - Lacustrine Fringe Valley	DB - Depressional Bog
DA - Depressional Alkaline	DO - Depressional Outflow	DCP - Depressional Closed Permanent	DCNP - Depressional Nonpermanent
	S - Slope	FL - Flats	

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 1

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	5.75	3.67
Sediment Retention & Stabilization (SR)	10.00	5.29
Phosphorus Retention (PR)	10.00	7.19
Nitrate Removal & Retention (NR)	10.00	4.76
Thermoregulation (T)	0.00	0.00
Carbon Sequestration (CS)	1.25	
Organic Matter Export (OE)	0.00	
Aquatic Invertebrate Habitat (INV)	4.13	6.00
Anadromous Fish Habitat (FA)	0.00	4.88
Non-anadromous Fish Habitat (FR)	5.87	10.00
Amphibian & Reptile Habitat (AM)	1.74	6.67
Waterbird Feeding Habitat (WBF)	4.88	4.00
Waterbird Nesting Habitat (WBN)	0.00	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	3.21	6.67
Pollinator Habitat (POL)	2.71	3.06
Native Plant Diversity (PD)	5.94	6.67

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	5.75	3.67
Water Quality Group (WQ)	10.00	7.19
Carbon Sequestration (CS)	1.25	
Fish Support Group (FISH)	5.87	10.00
Aquatic Support Group (AQ)	4.88	6.67
Terrestrial Support Group (TERR)	5.94	6.67
Public Use & Recognition (PU)		2.38
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		6.54
Wetland Stressors		5.54
Wetland Sensitivity		10.00

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	0.00
Slope	0.00
Flat	0.00
Depressional	0.00
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

	Wetland Code:	Wetland 2
Date(s) of assessment: July 16 & August 11, 2010	Size (acres):	2.59
Data Sheet Number(s): 7, 11	Cowardin Class(es):	PSS1C
Investigator(s): A. Hawkins / S. Eisner	HGM Class(es):	Slope

TRS quarter section tax lot:	1812040000117, 1812041300077, 1812041402100, 1812041402200, 1812041402301, 1812041402303, 1812044200077
Street address or location:	East of 4th Avenue; north of Heceta Beach Road
Latitude:	44.036084°
Longitude:	-124.128587°
Locally Significant?:	Yes
Hydrologic basin:	171002050704
Soil -- Mapped series:	Yaquina loamy fine sand, Waldport fine sand
Hydrologic Source:	Groundwater, Surface

Dominant Wetland Vegetation			
TREES / SHRUBS		VINES / HERBS	
<i>Spiraea douglasii</i>	Douglas' Spirea	<i>Carex obnupta</i>	Slough Sedge
<i>Salix hookeriana</i>	Hooker willow	<i>Nuphar luteum</i>	Yellow Cow-Lily
<i>Malus fusca</i>	Pacific Crabapple		
<i>Lonicera involucrata</i>	Bearberry honeysuckle		

Comments:

The northern wetland boundaries are generally defined by steep banks. The western portion includes a small pond on its north end. High quality wetland; including numerous snags and dense emergent vegetation in the understory. The wetland is crossed by two driveways off of Rhododendron Drive/4th Avenue. Adjacent upland species include: *Vaccinium ovatum*, *Gaultheria shallon*, *Pinus contorta*, *Myrica californica*, *Picea sitchensis*.

COWARDIN CODES:	E2FO = estuarine forested	E2SS = estuarine scrub shrub	E2EM = estuarine emergent
PFO = palustrine forested	PSS = palustrine scrub-shrub	PEM = palustrine emergent	PUB = palustrine unconsolidated bottom
HGM CODES:	EFB = Estuarine Fringe Embayment	EFR = Estuarine Fringe Riverine	RFT = Riverine Flow Through
RI = River Impounding	LFH = Lacustrine Fringe Headwater	LFV = Lacustrine Fringe Valley	DB = Depressional Bog
DA = Depressional Alkaline	DO = Depressional Outflow	DCP = Depressional Closed Permanent	DCNP = Depressional Nonpermanent
	S = Slope	FL = Flats	

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 2

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	2.67	3.08
Sediment Retention & Stabilization (SR)	5.43	5.34
Phosphorus Retention (PR)	2.89	6.07
Nitrate Removal & Retention (NR)	5.12	5.25
Thermoregulation (T)	3.89	3.33
Carbon Sequestration (CS)	2.18	
Organic Matter Export (OE)	5.42	
Aquatic Invertebrate Habitat (INV)	4.82	6.37
Anadromous Fish Habitat (FA)	0.00	4.20
Non-anadromous Fish Habitat (FR)	3.91	3.33
Amphibian & Reptile Habitat (AM)	6.37	7.33
Waterbird Feeding Habitat (WBF)	4.20	4.00
Waterbird Nesting Habitat (WBN)	0.00	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	4.42	6.67
Pollinator Habitat (POL)	3.96	5.00
Native Plant Diversity (PD)	6.63	6.67

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	2.67	3.08
Water Quality Group (WQ)	5.43	6.07
Carbon Sequestration (CS)	2.18	
Fish Support Group (FISH)	3.91	4.20
Aquatic Support Group (AQ)	6.37	7.33
Terrestrial Support Group (TERR)	6.63	6.67
Public Use & Recognition (PU)		0.71
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		4.43
Wetland Stressors		3.14
Wetland Sensitivity		5.71

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	1.50
Slope	2.44
Flat	0.00
Depressional	0.00
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 3
Date(s) of assessment:	August 12, 2010	Size (acres):	4.59
Data Sheet Number(s):	16, 17	Cowardin Class(es):	PFO4C
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Slope / Flats

TRS quarter section tax lot:	1812120000702, 1812141000113, 1812141000300
Street address or location:	Northwest of Munsel Lake Road
Latitude:	44.012201°
Longitude:	-124.090047°
Locally Significant?:	No
Hydrologic basin:	171002060804
Soil -- Mapped series:	Heceta fine sand, Dune land
Hydrologic Source:	Precipitation

Dominant Wetland Vegetation

TREES / SHRUBS		VINES / HERBS	
<i>Pinus contorta</i>	Shore pine	<i>Carex obnupta</i>	Slough sedge
<i>Vaccinium uliginosum</i>	Bog bilberry	<i>Juncus falcatus</i>	Sickle-leaved rush
<i>Spiraea douglasii</i>	Douglas spirea	<i>Juncus nevadensis</i>	Sierra rush

Comments:

Complex of forested and emergent wetlands west of an advancing dune and northwest of Munsel Lake. Several of these wetlands are seasonally inundated, but dry out in the early spring and summer. Most are depressional and lack a surface connection though adjacent features may be tied to the same groundwater table. These wetlands were grouped because of their geomorphic similarities and proximity.

COWARDIN CODES:

PFO = palustrine forested

HGM CODES:

RI = River Impounding

DA = Depressional Alkaline

E2FO = estuarine forested

PSS = palustrine scrub-shrub

EFB = Estuarine Fringe Embayment

LFH = Lacustrine Fringe Headwater

DO = Depressional Outflow

S = Slope

E2SS = estuarine scrub shrub

PEM = palustrine emergent

EFR = Estuarine Fringe Riverine

LFV = Lacustrine Fringe Valley

DCP = Depressional Closed Permanent

FL = Flats

E2EM = estuarine emergent

PUB = palustrine unconsolidated bottom

RFT = Riverine Flow Through

DB = Depressional Bog

DCNP = Depressional Nonpermanent

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 3

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	7.00	4.72
Sediment Retention & Stabilization (SR)	10.00	5.29
Phosphorus Retention (PR)	10.00	6.19
Nitrate Removal & Retention (NR)	10.00	4.76
Thermoregulation (T)	0.00	0.00
Carbon Sequestration (CS)	1.20	
Organic Matter Export (OE)	0.00	
Aquatic Invertebrate Habitat (INV)	6.37	6.89
Anadromous Fish Habitat (FA)	0.00	4.85
Non-anadromous Fish Habitat (FR)	2.16	6.67
Amphibian & Reptile Habitat (AM)	6.89	6.67
Waterbird Feeding Habitat (WBF)	4.85	4.00
Waterbird Nesting Habitat (WBN)	5.24	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	5.26	6.67
Pollinator Habitat (POL)	6.55	0.00
Native Plant Diversity (PD)	5.27	6.67

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	7.00	4.72
Water Quality Group (WQ)	10.00	6.19
Carbon Sequestration (CS)	1.20	
Fish Support Group (FISH)	2.16	6.67
Aquatic Support Group (AQ)	6.89	6.67
Terrestrial Support Group (TERR)	6.55	6.67
Public Use & Recognition (PU)		1.55
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		6.68
Wetland Stressors		3.75
Wetland Sensitivity		10.00

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	2.50
Slope	1.81
Flat	0.00
Depressional	0.00
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 4
Date(s) of assessment:	August 11, 2010	Size (acres):	19.20
Data Sheet Number(s):	12	Cowardin Class(es):	PFO4C, PSS1C
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Riverine; Slope

TRS quarter section tax lot:	1812230000400, 1812230000900, 1812231400100, 1812240000077, 1812240000088, 1812240001100, 1812240001101, 1812240001102, 1812240001200, 1812242302000, 1812242302001, 1812242302002, 1812242302100, 1812243201300, 1812242301400, 1812243201500, 1812243201600, 1812243201700, 1812243202200, 1812243202300		
Street address or location:	West of N. Fork Siuslaw Rd.		
Latitude:	43.9869		
Longitude:	-124.0838		
Locally Significant?:	Yes		
Hydrologic basin:	171002060702		
Soil -- Mapped series:	Waldport fine sand, Yaquina loamy fine sand		
Hydrologic Source:	Surface, Groundwater		

Dominant Wetland Vegetation

TREES / SHRUBS		VINES / HERBS	
<i>Thuja plicata</i>	Western Red Cedar	<i>Lysichitum americanum</i>	American Skunk-Cabbage
<i>Myrica californica</i>	Pacific Wax-Myrtle	<i>Blechnum spicant</i>	Deer Fern
<i>Pinus contorta</i>	Shore Pine	<i>Darlingtonia californica</i>	California Pitcher-Plant
<i>Rubus spectabilis</i>	Salmonberry	<i>Drosera rotundifolia</i>	Round-Leaf Sundew
<i>Vaccinium ovatum</i>	Evergreen Huckleberry	<i>Sphagnum sp.</i>	Moss
<i>Gaultheria shallon</i>	Salal		
<i>Ledum glandulosum</i>	Smooth Labrador-Tea		

Comments:

Part of large forested wetland. Water drains to the south eventually flowing into the North Fork Siuslaw beneath N. Fork Siuslaw Road. Upland vegetation is *Acer macrophyllum*, *Polystichum munitum*, *Rubus spectabilis*. Southern portion of wetland is mature forested wetland. The 1996 inventory noted that this wetland includes an uncommon plant community of *Ledum* and *Sphagnum*; as well as sundew and *Darlingtonia*. Portions of this wetland obtained concurrence for a prior wetland delineation: WD2007-0746.

COWARDIN CODES:

PFO = palustrine forested

HGM CODES:

RI = River Impounding

DA = Depressional Alkaline

E2FO = estuarine forested

PSS = palustrine scrub-shrub

EFB = Estuarine Fringe Embayment

LFB = Lacustrine Fringe Headwater

DO = Depressional Outflow

S = Slope

E2SS = estuarine scrub shrub

PEM = palustrine emergent

EFR = Estuarine Fringe Riverine

LFB = Lacustrine Fringe Valley

DCP = Depressional Closed Permanent

FI = Flats

E2EM = estuarine emergent

PUB = palustrine unconsolidated bottom

RFI = Riverine Flow Through

DB = Depressional Bog

DCNP = Depressional Nonpermanent

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 4

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	2.31	7.64
Sediment Retention & Stabilization (SR)	5.48	6.44
Phosphorus Retention (PR)	6.05	6.18
Nitrate Removal & Retention (NR)	6.17	5.23
Thermoregulation (T)	3.78	7.50
Carbon Sequestration (CS)	3.48	
Organic Matter Export (OE)	6.11	
Aquatic Invertebrate Habitat (INV)	5.47	6.78
Anadromous Fish Habitat (FA)	6.56	10.00
Non-anadromous Fish Habitat (FR)	3.21	6.67
Amphibian & Reptile Habitat (AM)	4.38	7.33
Waterbird Feeding Habitat (WBF)	5.63	10.00
Waterbird Nesting Habitat (WBN)	5.42	7.17
Songbird, Raptor, & Mammal Habitat (SBM)	6.78	7.33
Pollinator Habitat (POL)	7.61	5.00
Native Plant Diversity (PD)	7.46	7.51

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	2.31	7.64
Water Quality Group (WQ)	6.17	7.50
Carbon Sequestration (CS)	3.48	
Fish Support Group (FISH)	6.56	10.00
Aquatic Support Group (AQ)	6.11	10.00
Terrestrial Support Group (TERR)	7.61	7.51
Public Use & Recognition (PU)		0.00
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		5.07
Wetland Stressors		4.36
Wetland Sensitivity		10.00

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	5.50
Slope	3.69
Flat	0.00
Depressional	0.00
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 5
Date(s) of assessment:	Fall 2010	Size (acres):	50.36
Data Sheet Number(s):	5	Cowardin Class(es):	PABH, PEMJ, PFO1C, PFO1J, PFO4C, PSS1J
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Riverine; Slope

TRS quarter section tax lot: 1812130001700, 1812144000200, 1812240000077, 1812240000406, 1812240000614, 1812240000619, 1812240000700, 1812240000900, 1812240000902, 1812240001100, 1812242300077, 1812242300102, 1812242300104, 1812242300105, 1812242301200, 1812242301300, 1812242301900, 1812242302300, 1812242302400, 1812242302500, 1812242302600, 1812242302700, 1812242302800, 1812242302900, 1812242303000, 1812243200077, 1812243200100, 1812243200200, 1812243200300, 1812243202100

Street address or location: East of Munsel Lake Rd.

Latitude: 43.9972

Longitude: -124.083

Locally Significant?: Yes

Hydrologic basin: 171002060702

Soil -- Mapped series: Yaquina loamy fine sand, Brallier variant muck, Waldport fine sand

Hydrologic Source: Surface, Groundwater

Dominant Wetland Vegetation

TREES / SHRUBS

VINES / HERBS

<i>Alnus rubra</i>	Red Alder	<i>Carex obnupta</i>	Slough sedge
<i>Thuja plicata</i>	Wester red cedar	<i>Athyrium filix-femina</i>	Subarctic Lady Fern
		<i>Lysichitum americanum</i>	American Skunk-Cabbage
		<i>Oenanthe sarmentosa</i>	Water-Parsley
		<i>Deschampsia cespitosa</i>	Tufted Hairgrass
		<i>Potentilla anserina</i>	Silverweed
		<i>Agrostis alba</i>	Redtop

Comments:

Large forested wetland east of Munsel Lake Road. Southern limits extend to the edge of the study area, to the limits of estuarine influence. Except for the extreme north end, north of North Fork Siuslaw River Road, the wetland is bordered to the west by residential development; as is a portion of its east side. Red alder is the dominant tree cover, with western red cedar and spruce. Adjacent upland vegetation includes Douglas fir, big leaf maple, salmonberry and sword fern. Portions of this wetland obtained concurrence for a prior wetland delineation: WD1996-0268.

COWARDIN CODES:

PFO = palustrine forested

HGM CODES:

RI = River Impounding

DA = Depressional Alkaline

E2FO = estuarine forested

PSS = palustrine scrub-shrub

EFB = Estuarine Fringe Embayment

LFH = Lacustrine Fringe Headwater

DO = Depressional Outflow

S = Slope

E2SS = estuarine scrub shrub

PEM = palustrine emergent

EFR = Estuarine Fringe Riverine

LFV = Lacustrine Fringe Valley

DGP = Depressional Closed Permanent

FI = Flats

E2EM = estuarine emergent

PUB = palustrine unconsolidated bottom

RFT = Riverine Flow Through

DB = Depressional Bog

DCNP = Depressional Nonpermanent

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 5

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	3.09	7.22
Sediment Retention & Stabilization (SR)	5.27	6.66
Phosphorus Retention (PR)	4.55	6.18
Nitrate Removal & Retention (NR)	5.09	6.06
Thermoregulation (T)	7.39	7.50
Carbon Sequestration (CS)	2.42	
Organic Matter Export (OE)	7.52	
Aquatic Invertebrate Habitat (INV)	6.13	7.89
Anadromous Fish Habitat (FA)	7.89	10.00
Non-anadromous Fish Habitat (FR)	3.50	6.67
Amphibian & Reptile Habitat (AM)	4.75	7.33
Waterbird Feeding Habitat (WBF)	6.56	7.33
Waterbird Nesting Habitat (WBN)	5.59	5.50
Songbird, Raptor, & Mammal Habitat (SBM)	7.36	6.67
Pollinator Habitat (POL)	8.79	5.00
Native Plant Diversity (PD)	8.10	10.00

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	3.09	7.22
Water Quality Group (WQ)	7.39	7.50
Carbon Sequestration (CS)	2.42	
Fish Support Group (FISH)	7.89	10.00
Aquatic Support Group (AQ)	7.52	7.33
Terrestrial Support Group (TERR)	8.79	10.00
Public Use & Recognition (PU)		0.00
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		7.29
Wetland Stressors		2.85
Wetland Sensitivity		10.00

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	4.50
Slope	10.00
Flat	0.00
Depressional	0.00
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 6
Date(s) of assessment:	August 2010	Size (acres):	30.72
Data Sheet Number(s):	None	Cowardin Class(es):	PSS1C, PEMC, PFO4C
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Riverine, Slope

TRS quarter section tax lot:	1812144000200, 1812230000100, 1812230000102, 1812232105608, 1812232105619, 1812232105700, 1812232107300, 1812232107400, 1812232107500, 1812232402800, 1812232402900, 1812232407600		
Street address or location:	Munsell Creek County Park (and north)		
Latitude:	43.9936		
Longitude:	-124.0939		
Locally Significant?:	Yes		
Hydrologic basin:	171002060804		
Soil -- Mapped series:	Yaquina loamy fine sand, Waldport fine sand, Dune land		
Hydrologic Source:	Groundwater, Precipitation		

Dominant Wetland Vegetation

TREES / SHRUBS		VINES / HERBS	
<i>Pinus contorta</i>	Shore pine	<i>Carex obnupta</i>	Slough sedge
<i>Vaccinium uliginosum</i>	Bog bilberry		
<i>Spiraea douglasii</i>	Douglas spirea		
<i>Salix sp.</i>	Willow		

Comments:

The southern extent of this wetland is located in Munsell Creek County Park and continues northward into undeveloped shrub land to the north. Munsell Creek flows southward through the western portion of the wetland. The greater wetland area is bounded by residential development along its west side with sand dunes to the east. Portions of this wetland obtained concurrence for a prior wetland delineation: WD2009-0011.

COWARDIN CODES:

PFO = palustrine forested

HGM CODES:

R1 = River Impounding

DA = Depressional Alkaline

E2FO = estuarine forested

PSS = palustrine scrub-shrub

EFB = Estuarine Fringe Embayment

LFH = Lacustrine Fringe Headwater

DO = Depressional Outflow

S = Slope

E2SS = estuarine scrub shrub

PEM = palustrine emergent

EFR = Estuarine Fringe Riverine

LFV = Lacustrine Fringe Valley

DCP = Depressional Closed Permanent

FI = Flats

E2EM = estuarine emergent

PUB = palustrine unconsolidated bottom

RFT = Riverine Flow Through

DB = Depressional Bog

DCNP = Depressional Nonpermanent

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 6

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	1.77	2.17
Sediment Retention & Stabilization (SR)	4.77	6.51
Phosphorus Retention (PR)	2.59	5.68
Nitrate Removal & Retention (NR)	4.84	5.39
Thermoregulation (T)	3.39	7.50
Carbon Sequestration (CS)	2.77	
Organic Matter Export (OE)	7.39	
Aquatic Invertebrate Habitat (INV)	5.39	6.95
Anadromous Fish Habitat (FA)	6.95	10.00
Non-anadromous Fish Habitat (FR)	3.38	6.67
Amphibian & Reptile Habitat (AM)	4.03	7.33
Waterbird Feeding Habitat (WBF)	5.66	4.00
Waterbird Nesting Habitat (WBN)	5.63	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	6.54	6.67
Pollinator Habitat (POL)	7.51	5.00
Native Plant Diversity (PD)	6.94	7.43

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	1.77	2.17
Water Quality Group (WQ)	4.84	7.50
Carbon Sequestration (CS)	2.77	
Fish Support Group (FISH)	6.95	10.00
Aquatic Support Group (AQ)	7.39	7.33
Terrestrial Support Group (TERR)	7.51	7.43
Public Use & Recognition (PU)		0.00
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		5.70
Wetland Stressors		4.41
Wetland Sensitivity		10.00

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	3.50
Slope	2.19
Flat	0.00
Depressional	0.00
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 7
Date(s) of assessment:	August 2010	Size (acres):	2.75
Data Sheet Number(s):	None	Cowardin Class(es):	PFO1C
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Flat

TRS quarter section tax lot:	1812033400077, 1812033400900, 1812102100077, 1812102104700, 1812402104800, 1812102105700, 1812102105800, 1812102106100
Street address or location:	South of Heceta Beach Road
Latitude:	44.027360°
Longitude:	-124.117013°
Locally Significant?:	Yes
Hydrologic basin:	171002060804
Soil -- Mapped series:	140 Yaquina loamy fine sand
Hydrologic Source:	Groundwater

Dominant Wetland Vegetation

TREES / SHRUBS		VINES / HERBS	
<i>Salix sp.</i>	Willow		

Comments:

South of Heceta Beach Road, between Windleaf and Heceta Park Roads. Isolated forested wetland dominated by willows.

COWARDIN CODES:

PFO = palustrine forested

HGM CODES:

R1 = River Impounding

DA = Depressional Alkaline

E2FO = estuarine forested

PSS = palustrine scrub-shrub

EFB = Estuarine Fringe Embayment

LFH = Lacustrine Fringe Headwater

DO = Depressional Outflow

S = Slope

E2SS = estuarine scrub shrub

PEM = palustrine emergent

EFR = Estuarine Fringe Riverine

LFV = Lacustrine Fringe Valley

DCP = Depressional Closed Permanent

FL = Flats

E2EM = estuarine emergent

PUB = palustrine unconsolidated bottom

RFT = Riverine Flow Through

DB = Depressional Bog

DCNP = Depressional Nonpermanent

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 7

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	6.00	3.17
Sediment Retention & Stabilization (SR)	10.00	4.73
Phosphorus Retention (PR)	10.00	6.03
Nitrate Removal & Retention (NR)	10.00	4.13
Thermoregulation (T)	0.00	0.00
Carbon Sequestration (CS)	2.15	
Organic Matter Export (OE)	0.00	
Aquatic Invertebrate Habitat (INV)	4.95	6.41
Anadromous Fish Habitat (FA)	0.00	4.58
Non-anadromous Fish Habitat (FR)	2.21	6.67
Amphibian & Reptile Habitat (AM)	6.41	7.33
Waterbird Feeding Habitat (WBF)	4.58	4.00
Waterbird Nesting Habitat (WBN)	0.00	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	4.23	6.67
Pollinator Habitat (POL)	5.23	5.00
Native Plant Diversity (PD)	4.63	6.67

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	6.00	3.17
Water Quality Group (WQ)	10.00	6.03
Carbon Sequestration (CS)	2.15	
Fish Support Group (FISH)	2.21	6.67
Aquatic Support Group (AQ)	6.41	7.33
Terrestrial Support Group (TERR)	5.23	6.67
Public Use & Recognition (PU)		10.00
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		3.72
Wetland Stressors		4.50
Wetland Sensitivity		10.00

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	0.50
Slope	2.38
Flat	6.46
Depressional	5.28
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 8
Date(s) of assessment:	August 2010	Size (acres):	1.78
Data Sheet Number(s):	None	Cowardin Class(es):	PFO4B
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Flat

TRS quarter section tax lot:	1812273100055, 1812273100077, 1812273100300, 1812273100900, 1812273101902
Street address or location:	North of 9th Street
Latitude:	43.9761
Longitude:	-124.1171
Locally Significant?:	Yes
Hydrologic basin:	171002060804
Soil -- Mapped series:	Waldport fine sand
Hydrologic Source:	Groundwater

Dominant Wetland Vegetation			
TREES / SHRUBS		VINES / HERBS	
<i>Pinus contorta</i>	Shore pine		

Comments:

This wetland is identified on the National Wetland Inventory and the 1996 inventory. Its presence or absence could not be confirmed from off-site observations. The limits of this feature as identified for the inventory are based on air photo interpretation.

COWARDIN CODES:	E2FO = estuarine forested	E2SS = estuarine scrub shrub	E2EM = estuarine emergent
PFO = palustrine forested	PSS = palustrine scrub-shrub	PEM = palustrine emergent	PUB = palustrine unconsolidated bottom
HGM CODES:	EFB = Estuarine Fringe Embayment	EFR = Estuarine Fringe Riverine	RFT = Riverine Flow Through
RI = River Impounding	LFB = Lacustrine Fringe Headwater	LJV = Lacustrine Fringe Valley	DB = Depressional Bog
DA = Depressional Alkaline	DO = Depressional Outflow	DCP = Depressional Closed Permanent	DCNP = Depressional Nonpermanent
	S = Slope	FL = Flats	

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 8

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	3.50	3.08
Sediment Retention & Stabilization (SR)	10.00	5.15
Phosphorus Retention (PR)	10.00	6.03
Nitrate Removal & Retention (NR)	10.00	4.33
Thermoregulation (T)	0.00	0.00
Carbon Sequestration (CS)	2.58	
Organic Matter Export (OE)	0.00	
Aquatic Invertebrate Habitat (INV)	6.72	6.66
Anadromous Fish Habitat (FA)	0.00	4.26
Non-anadromous Fish Habitat (FR)	0.67	6.67
Amphibian & Reptile Habitat (AM)	6.66	6.67
Waterbird Feeding Habitat (WBF)	4.26	4.00
Waterbird Nesting Habitat (WBN)	0.00	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	5.76	6.67
Pollinator Habitat (POL)	5.99	0.83
Native Plant Diversity (PD)	5.11	6.67

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	3.50	3.08
Water Quality Group (WQ)	10.00	6.03
Carbon Sequestration (CS)	2.58	
Fish Support Group (FISH)	0.67	6.67
Aquatic Support Group (AQ)	6.72	6.67
Terrestrial Support Group (TERR)	5.99	6.67
Public Use & Recognition (PU)		0.00
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		7.46
Wetland Stressors		3.06
Wetland Sensitivity		10.00

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	0.50
Slope	2.38
Flat	6.67
Depressional	3.06
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 9
Date(s) of assessment:	August 2010	Size (acres):	0.69
Data Sheet Number(s):	None	Cowardin Class(es):	PFO1B
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Slope

TRS quarter section tax lot:	1812260000077, 1812260000100
Street address or location:	W. of N. Fork Siuslaw River Rd.
Latitude:	43.9781
Longitude:	-124.0833
Locally Significant?:	No
Hydrologic basin:	171002060702
Soil -- Mapped series:	Waldport fine sand
Hydrologic Source:	Groundwater

Dominant Wetland Vegetation			
TREES / SHRUBS		VINES / HERBS	
<i>Malus fusca</i>	Pacific Crabapple	<i>Phalaris arundinacea</i>	Reed Canary Grass
<i>Salix hookeriana</i>	Hooker Willow	<i>Rubus ursinus</i>	Californian Dewberry
<i>Spiraea douglasii</i>	Douglas' Spirea	<i>Carex obnupta</i>	Sough Sedge
<i>Lonicera involucrata</i>	Bearberry Honeysuckle	<i>Oenanthе sarmentosa</i>	Water-Parsley

Comments:

Scrub shrub (willow) dominated wetland west of North Fork Siuslaw River Road. Wetland drains beneath the road through a small culvert. Adjacent upland species include *Picea sitchensis*, *Gaultheria shallon*, *Vaccinium ovatum*, *Myrica californica*.

COWARDIN CODES:

PFO = palustrine forested

HGM CODES:

RI = River Impounding

DA = Depressional Alkaline

E2FO = estuarine forested

PSS = palustrine scrub-shrub

EFB = Estuarine Fringe Embayment

LFH = Lacustrine Fringe Headwater

DO = Depressional Outflow

S = Slope

E2SS = estuarine scrub shrub

PEM = palustrine emergent

EFR = Estuarine Fringe Riverine

LFV = Lacustrine Fringe Valley

DCP = Depressional Closed Permanent

FL = Flats

E2EM = estuarine emergent

PUB = palustrine unconsolidated bottom

RFT = Riverine Flow Through

DB = Depressional Bog

DCNP = Depressional Nonpermanent

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 9

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	3.46	2.17
Sediment Retention & Stabilization (SR)	7.37	4.95
Phosphorus Retention (PR)	5.40	5.28
Nitrate Removal & Retention (NR)	5.70	4.38
Thermoregulation (T)	0.42	1.25
Carbon Sequestration (CS)	2.99	
Organic Matter Export (OE)	5.47	
Aquatic Invertebrate Habitat (INV)	6.69	7.12
Anadromous Fish Habitat (FA)	0.00	4.55
Non-anadromous Fish Habitat (FR)	2.30	6.67
Amphibian & Reptile Habitat (AM)	7.12	4.00
Waterbird Feeding Habitat (WBF)	4.55	4.00
Waterbird Nesting Habitat (WBN)	0.00	3.00
Songbird, Raptor, & Mammal Habitat (SBM)	5.67	6.67
Pollinator Habitat (POL)	7.01	1.67
Native Plant Diversity (PD)	7.90	6.67

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	3.46	2.17
Water Quality Group (WQ)	7.37	5.28
Carbon Sequestration (CS)	2.99	
Fish Support Group (FISH)	2.30	6.67
Aquatic Support Group (AQ)	7.12	4.00
Terrestrial Support Group (TERR)	7.90	6.67
Public Use & Recognition (PU)		0.71
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		6.19
Wetland Stressors		3.52
Wetland Sensitivity		5.12

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	0.90
Slope	2.69
Flat	0.00
Depressional	0.00
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 10
Date(s) of assessment:	August 2010	Size (acres):	1.34
Data Sheet Number(s):	None	Cowardin Class(es):	PSS1C
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Slope

TRS quarter section tax lot:	1812260000077, 1812260000100
Street address or location:	West of North Fork Siuslaw River Road and Munsel Lake Rd.
Latitude:	43.9795
Longitude:	-124.0833
Locally Significant?:	No
Hydrologic basin:	171002060702
Soil -- Mapped series:	Waldport fine sand
Hydrologic Source:	Groundwater

Dominant Wetland Vegetation

TREES / SHRUBS		VINES / HERBS	
<i>Ledum glandulosum</i>	Smooth Labrador-Tea	<i>Sphagnum sp.</i>	Moss
<i>Spiraea douglasii</i>	Douglas' Spirea	<i>Drosera rotundifolia</i>	Round-Leaf Sundew
<i>Salix hookeriana</i>	Hooker Willow		

Comments:

Wetland on tribal property west of North Fork Siuslaw River. Dominated by a variety of native shrub and emergent vegetation.

COWARDIN CODES:	E2FO = estuarine forested	E2SS = estuarine scrub shrub	E2EM = estuarine emergent
PFO = palustrine forested	PSS = palustrine scrub-shrub	PEM = palustrine emergent	PUB = palustrine unconsolidated bottom
HGM CODES:	EFB = Estuarine Fringe Embayment	EFR = Estuarine Fringe Riverine	RFT = Riverine Flow Through
RI = River Impounding	LFH = Lacustrine Fringe Headwater	LFV = Lacustrine Fringe Valley	DB = Depressional Bog
DA = Depressional Alkaline	DO = Depressional Outflow	DCP = Depressional Closed Permanent	DCNP = Depressional Nonpermanent
	S = Slope	FL = Flats	

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 10

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	4.50	2.17
Sediment Retention & Stabilization (SR)	10.00	5.43
Phosphorus Retention (PR)	10.00	5.40
Nitrate Removal & Retention (NR)	10.00	4.50
Thermoregulation (T)	0.00	0.00
Carbon Sequestration (CS)	2.56	
Organic Matter Export (OE)	0.00	
Aquatic Invertebrate Habitat (INV)	7.40	7.87
Anadromous Fish Habitat (FA)	0.00	6.23
Non-anadromous Fish Habitat (FR)	3.69	6.67
Amphibian & Reptile Habitat (AM)	7.87	4.00
Waterbird Feeding Habitat (WBF)	6.23	4.00
Waterbird Nesting Habitat (WBN)	5.56	3.00
Songbird, Raptor, & Mammal Habitat (SBM)	5.90	6.67
Pollinator Habitat (POL)	7.39	1.67
Native Plant Diversity (PD)	5.98	6.67

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	4.50	2.17
Water Quality Group (WQ)	10.00	5.43
Carbon Sequestration (CS)	2.56	
Fish Support Group (FISH)	3.69	6.67
Aquatic Support Group (AQ)	7.87	4.00
Terrestrial Support Group (TERR)	7.39	6.67
Public Use & Recognition (PU)		10.00
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		6.94
Wetland Stressors		3.40
Wetland Sensitivity		10.00

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	0.00
Slope	3.75
Flat	0.00
Depressional	0.00
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 11
Date(s) of assessment:	August 2010	Size (acres):	7.49
Data Sheet Number(s):	None	Cowardin Class(es):	PFO4C, PUBHx
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Slope

TRS quarter section tax lot:	1812144000200, 1812231100100, 1812231100101		
Street address or location:	West of Munsel Lake Road north of Rhodo Dunes Golf Course		
Latitude:	43.9994		
Longitude:	-124.0865		
Locally Significant?:	Yes		
Hydrologic basin:	171002060702		
Soil -- Mapped series:	Yaquina loamy fine sand, Waldport fine sand, Netarts fine sand, Dune land		
Hydrologic Source:	Surface, Groundwater		

Dominant Wetland Vegetation

TREES / SHRUBS		VINES / HERBS	
<i>Pinus contorta</i>	Shore pine	<i>Carex obnupta</i>	Slough sedge
<i>Alnus rubra</i>	Red alder		
<i>Rubus spectabilis</i>	Salmonberry		

Comments:

Offsite assessment performed utilizing air photos. This wetland adjoins residential development at the north end of Ocean Dunes Golf Links. The two forested portions are undeveloped, but the ponded portion is bordered to the east by a residential subdivision. One of the golf course's tees is located west of the pond, with its associated fairway to the south. Portions of this wetland obtained concurrence for prior wetland delineations; the most recent being WD2009-0011.

COWARDIN CODES:

PFO = palustrine forested

HGM CODES:

RI = River Impounding

DA= Depressional Alkaline

E2FO estuarine forested

PSS palustrine scrub-shrub

E1B Estuarine Fringe Embayment

E1H Lacustrine Fringe Headwater

DO Depressional Outflow

S = Slope

E2SS estuarine scrub shrub

PEM palustrine emergent

EFR Estuarine Fringe Riverine

LFV Lacustrine Fringe Valley

DCP Depressional Closed Permanent

FI Flats

E2FM estuarine emergent

PUB palustrine unconsolidated bottom

RFT Riverine Flow Through

DB Depressional Bog

DCNP Depressional Nonpermanent

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 11

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	2.76	6.81
Sediment Retention & Stabilization (SR)	6.93	5.59
Phosphorus Retention (PR)	5.15	5.51
Nitrate Removal & Retention (NR)	6.58	5.26
Thermoregulation (T)	2.78	2.50
Carbon Sequestration (CS)	2.50	
Organic Matter Export (OE)	4.86	
Aquatic Invertebrate Habitat (INV)	5.86	7.35
Anadromous Fish Habitat (FA)	0.00	4.52
Non-anadromous Fish Habitat (FR)	2.83	6.67
Amphibian & Reptile Habitat (AM)	4.86	7.33
Waterbird Feeding Habitat (WBF)	4.52	4.00
Waterbird Nesting Habitat (WBN)	4.36	3.00
Songbird, Raptor, & Mammal Habitat (SBM)	7.35	6.67
Pollinator Habitat (POL)	9.01	5.00
Native Plant Diversity (PD)	7.40	7.72

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	2.76	6.81
Water Quality Group (WQ)	6.93	5.59
Carbon Sequestration (CS)	2.50	
Fish Support Group (FISH)	2.83	6.67
Aquatic Support Group (AQ)	5.86	7.33
Terrestrial Support Group (TERR)	9.01	7.72
Public Use & Recognition (PU)		0.95
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		5.32
Wetland Stressors		3.16
Wetland Sensitivity		10.00

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	0.00
Slope	0.00
Flat	0.00
Depressional	1.31
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 12
Date(s) of assessment:	Fall 2010	Size (acres):	56.30
Data Sheet Number(s):	None	Cowardin Class(es):	PEMC, PFO4C, PSS1C
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Depressional, Flats

TRS quarter section tax lot: **1812110000077, 1812110000100, 1812110000200, 1812110000201, 1812110000202, 1812110001300, 1812110001302, 1812110001800, 1812110002000, 1812110002300, 1812110002300, 1812110002400, 1812110002500, 1812113200300, 1812113200400, 1812113201600, 1812113300100, 1812120000702**

Street address or location: **South of Taylor Road.**

Latitude: **44.0181**

Longitude: **-124.0942**

Locally Significant?: **Yes**

Hydrologic basin: **171002060804**

Soil -- Mapped series: **Yaquina loamy fine sand, Netarts fine sand, Dune land**

Hydrologic Source: **Groundwater**

Dominant Wetland Vegetation

TREES / SHRUBS

VINES / HERBS

<i>Pinus contorta</i>	Shore Pine	<i>Carex obnupta</i>	Slough Sedge
<i>Vaccinium uliginosum</i>	Bog Blueberry	<i>Juncus falcatus</i>	Sickle-Leaf Rush
<i>Spiraea douglasii</i>	Douglas' Spirea	<i>Claytonia sibirica</i>	Western Springbeauty
<i>Salix hookeriana</i>	Hooker Willow	<i>Carex viridula</i>	Little Green Sedge
		<i>Deschampsia cespitosa</i>	Tufted Hairgrass

Comments:

Complex of primarily forested wetlands located in largely undeveloped areas east of Hwy 101. Includes areas of open water. Areas without a shore pine overstory are often dominated by bog blueberry and sedges and rushes. Seasonally inundated by a shallow groundwater table. Portions of this wetland obtained concurrence for a prior wetland delineation: WD2001-0264, WD2002-0108 & WD2009-0009.

COWARDIN CODES:

E2FO estuarine forested

E2SS estuarine scrub shrub

I21M estuarine emergent

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 12

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	3.25	2.17
Sediment Retention & Stabilization (SR)	10.00	4.92
Phosphorus Retention (PR)	10.00	4.94
Nitrate Removal & Retention (NR)	10.00	4.44
Thermoregulation (T)	0.00	0.00
Carbon Sequestration (CS)	2.34	
Organic Matter Export (OE)	0.00	
Aquatic Invertebrate Habitat (INV)	7.48	8.39
Anadromous Fish Habitat (FA)	0.00	5.79
Non-anadromous Fish Habitat (FR)	3.33	6.67
Amphibian & Reptile Habitat (AM)	8.39	7.33
Waterbird Feeding Habitat (WBF)	5.79	4.00
Waterbird Nesting Habitat (WBN)	6.17	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	7.53	6.67
Pollinator Habitat (POL)	7.76	5.00
Native Plant Diversity (PD)	7.50	7.77

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	3.25	2.17
Water Quality Group (WQ)	10.00	4.94
Carbon Sequestration (CS)	2.34	
Fish Support Group (FISH)	3.33	6.67
Aquatic Support Group (AQ)	8.39	7.33
Terrestrial Support Group (TERR)	7.76	7.77
Public Use & Recognition (PU)		0.00
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		6.70
Wetland Stressors		3.44
Wetland Sensitivity		10.00

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	0.50
Slope	1.50
Flat	5.52
Depressional	6.11
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 13
Date(s) of assessment:	August 2010	Size (acres):	17.44
Data Sheet Number(s):	None	Cowardin Class(es):	PEMC, PFO4C, PSS1C
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Flat

TRS quarter section tax lot:	1812020000204, 1812020000205, 1812020000403, 1812110000100, 1812110000202, 1812110002200		
Street address or location:	North of Munsel Lake Road, south of Taylor Road		
Latitude:	44.0255		
Longitude:	-124.0885		
Locally Significant?:	No		
Hydrologic basin:	171002060804		
Soil -- Mapped series:	Waldport fine sand, Dune land		
Hydrologic Source:	Groundwater		

Dominant Wetland Vegetation

TREES / SHRUBS		VINES / HERBS	
<i>Spiraea douglasii</i>	Douglas' Spirea	<i>Carex viridula</i>	Little Green Sedge
		<i>Juncus falcatus</i>	Sickle-Leaf Rush
		<i>Eleocharis ovata</i>	Ovate Spikerush
		<i>Ranunculus flammula</i>	Spearwort Butter-Cup
		<i>Potentilla anserina</i>	Silverweed

Comments:

Complex of wetlands isolated hydrologically from each other. These wetlands are shallow depressions in the sand, seasonally inundated and dominated by low growing herbaceous vegetation. They have been grouped because they are similar in character, being located at the eastern edge of the forested west portion of the large dunal area west of Collard and Clear Lakes. Portions of this wetland obtained concurrence for a prior wetland delineation: WD2001-0264.

COWARDIN CODES:

PFO = palustrine forested

HGM CODES:

RI = River Impounding

DA = Depressional Alkaline

E2FO = estuarine forested

PSS = palustrine scrub-shrub

EFB = Estuarine Fringe Embayment

LFH = Lacustrine Fringe Headwater

DO = Depressional Outflow

S = Slope

E2SS = estuarine scrub shrub

PEM = palustrine emergent

EFR = Estuarine Fringe Riverine

LFV = Lacustrine Fringe Valley

DCP = Depressional Closed Permanent

FI = Flats

E2EM = estuarine emergent

PUB = palustrine unconsolidated bottom

RFT = Riverine Flow Through

DB = Depressional Bog

DCNP = Depressional Nonpermanent

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 13

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	5.75	2.17
Sediment Retention & Stabilization (SR)	10.00	5.35
Phosphorus Retention (PR)	10.00	5.82
Nitrate Removal & Retention (NR)	10.00	4.49
Thermoregulation (T)	0.00	0.00
Carbon Sequestration (CS)	1.70	
Organic Matter Export (OE)	0.00	
Aquatic Invertebrate Habitat (INV)	5.25	7.01
Anadromous Fish Habitat (FA)	0.00	5.36
Non-anadromous Fish Habitat (FR)	2.32	6.67
Amphibian & Reptile Habitat (AM)	7.01	6.67
Waterbird Feeding Habitat (WBF)	5.36	4.00
Waterbird Nesting Habitat (WBN)	5.45	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	5.35	6.67
Pollinator Habitat (POL)	4.59	0.00
Native Plant Diversity (PD)	5.90	6.67

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	5.75	2.17
Water Quality Group (WQ)	10.00	5.82
Carbon Sequestration (CS)	1.70	
Fish Support Group (FISH)	2.32	6.67
Aquatic Support Group (AQ)	7.01	6.67
Terrestrial Support Group (TERR)	5.90	6.67
Public Use & Recognition (PU)		0.48
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		7.46
Wetland Stressors		5.27
Wetland Sensitivity		10.00

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	0.00
Slope	0.00
Flat	10.00
Depressional	0.00
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 14
Date(s) of assessment:	August 2010	Size (acres):	23.78
Data Sheet Number(s):	None	Cowardin Class(es):	PEMC, PFO4C
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Depressional, Flats

TRS quarter section tax lot:	1812020000200, 1812020000205, 1812020000400, 1812020000402, 1812020000403, 1812020000601, 1812110000100		
Street address or location:	Confined by east end of Friendly Acres and dune complex west of Clear Lake		
Latitude:	44.0341		
Longitude:	-124.0899		
Locally Significant?:	No		
Hydrologic basin:	171002060804		
Soil -- Mapped series:	Waldport fine sand, Yaquina loamy fine sand		
Hydrologic Source:	Groundwater		

Dominant Wetland Vegetation

TREES / SHRUBS		VINES / HERBS	
<i>Vaccinium uliginosum</i>	Bog Blueberry	<i>Carex obnupta</i>	Slough Sedge
<i>Spiraea douglasii</i>	Douglas Spirea	<i>Deschampsia cespitosa</i>	Tufted Hairgrass
<i>Pinus contorta</i>	Shore Pine	<i>Juncus balticus</i>	Baltic Rush
		<i>Juncus acuminatus</i>	Taper-Tip Rush
		<i>Juncus effusus</i>	Soft Rush
		<i>Juncus falcatus</i>	Sickle-Leaf Rush

Comments:

Complex of isolated wetlands dominated by bog blueberry and Douglas spirea with an overstory of Pinus contorta. Seasonally inundated. These wetlands were grouped because they are located in the same geomorphic position, are influenced by the local groundwater table, and have similar adjacent land use patterns.

COWARDIN CODES:

PFO = palustrine forested

HGM CODES:

RI = River Impounding

DA = Depressional Alkaline

E2FO = estuarine forested

PSS = palustrine scrub-shrub

EFB = Estuarine Fringe Embayment

LFB = Lacustrine Fringe Headwater

DO = Depressional Outflow

S = Slope

E2SS = estuarine scrub shrub

PEM = palustrine emergent

EFR = Estuarine Fringe Riverine

LFV = Lacustrine Fringe Valley

DCP = Depressional Closed Permanent

FL = Flats

E2EM = estuarine emergent

PUB = palustrine unconsolidated bottom

RFT = Riverine Flow Through

DB = Depressional Bog

DCNP = Depressional Nonpermanent

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 14

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	4.25	2.17
Sediment Retention & Stabilization (SR)	10.00	5.07
Phosphorus Retention (PR)	10.00	4.94
Nitrate Removal & Retention (NR)	10.00	4.11
Thermoregulation (T)	0.00	0.00
Carbon Sequestration (CS)	1.97	
Organic Matter Export (OE)	0.00	
Aquatic Invertebrate Habitat (INV)	7.29	8.04
Anadromous Fish Habitat (FA)	0.00	5.04
Non-anadromous Fish Habitat (FR)	3.52	6.67
Amphibian & Reptile Habitat (AM)	8.04	6.67
Waterbird Feeding Habitat (WBF)	5.04	4.00
Waterbird Nesting Habitat (WBN)	5.44	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	6.66	6.67
Pollinator Habitat (POL)	6.94	0.00
Native Plant Diversity (PD)	6.16	6.67

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	4.25	2.17
Water Quality Group (WQ)	10.00	5.07
Carbon Sequestration (CS)	1.97	
Fish Support Group (FISH)	3.52	6.67
Aquatic Support Group (AQ)	8.04	6.67
Terrestrial Support Group (TERR)	6.94	6.67
Public Use & Recognition (PU)		0.00
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		7.46
Wetland Stressors		1.56
Wetland Sensitivity		10.00

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	1.00
Slope	1.25
Flat	4.74
Depressional	10.28
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 15
Date(s) of assessment:	August 2010	Size (acres):	3.83
Data Sheet Number(s):	None	Cowardin Class(es):	PFO4C
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Lacustrine

TRS quarter section tax lot:	1812010000200, 1812010000206
Street address or location:	West edge of Collard Lake
Latitude:	44.0363
Longitude:	-124.0799
Locally Significant?:	No
Hydrologic basin:	171002060804
Soil -- Mapped series:	Bullards-Ferrelo loams
Hydrologic Source:	Groundwater

Dominant Wetland Vegetation			
TREES / SHRUBS		VINES / HERBS	
<i>Pinus contorta</i>	Shore pine		
<i>Tsuga heterophylla</i>	Western hemlock		

Comments:
 Forested wetland along the west edge of Collard Lake. Likely dominated by spruce and shore pine. Wetland assessment was completed entirely from offsite; mostly from aerial photo interpretation.

COWARDIN CODES:	E2FO = estuarine forested	E2SS = estuarine scrub shrub	E2EM = estuarine emergent
PFO = palustrine forested	PSS = palustrine scrub-shrub	PEM = palustrine emergent	PUB = palustrine unconsolidated bottom
HGM CODES:	EFB = Estuarine Fringe Embayment	EFR = Estuarine Fringe Riverine	RFT = Riverine Flow Through
RI = River Impounding	LFH = Lacustrine Fringe Headwater	LFV = Lacustrine Fringe Valley	DB = Depressional Bog
DA = Depressional Alkaline	DO = Depressional Outflow	DCP = Depressional Closed Permanent	DCNP = Depressional Nonpermanent
	S = Slope	FL = Flats	

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 15

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	2.63	2.33
Sediment Retention & Stabilization (SR)	5.09	4.85
Phosphorus Retention (PR)	2.55	5.33
Nitrate Removal & Retention (NR)	4.66	4.69
Thermoregulation (T)	3.28	6.67
Carbon Sequestration (CS)	2.38	
Organic Matter Export (OE)	7.14	
Aquatic Invertebrate Habitat (INV)	5.54	6.99
Anadromous Fish Habitat (FA)	6.68	10.00
Non-anadromous Fish Habitat (FR)	3.80	6.67
Amphibian & Reptile Habitat (AM)	4.47	6.67
Waterbird Feeding Habitat (WBF)	5.46	4.00
Waterbird Nesting Habitat (WBN)	5.21	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	6.99	6.67
Pollinator Habitat (POL)	7.02	0.00
Native Plant Diversity (PD)	7.84	6.67

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	2.63	2.33
Water Quality Group (WQ)	5.09	6.67
Carbon Sequestration (CS)	2.38	
Fish Support Group (FISH)	6.68	10.00
Aquatic Support Group (AQ)	7.14	6.67
Terrestrial Support Group (TERR)	7.84	6.67
Public Use & Recognition (PU)		0.48
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		6.18
Wetland Stressors		1.10
Wetland Sensitivity		10.00

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	0.00
Slope	0.00
Flat	0.00
Depressional	0.00
Lacustrine	10.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 16
Date(s) of assessment:	August 2010	Size (acres):	2.93
Data Sheet Number(s):	None	Cowardin Class(es):	PEMC, PFO4C
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Flat

TRS quarter section tax lot: **1812020000400, 1812020000402, 1812020000601, 1812023005602**

Street address or location: **End of Friendly Acres Road**

Latitude: **44.0317**

Longitude: **-124.0936**

Locally Significant?: **No**

Hydrologic basin: **171002060804**

Soil -- Mapped series: **Yaquina loamy fine sand, Waldport fine sand**

Hydrologic Source: **Groundwater**

Dominant Wetland Vegetation

TREES / SHRUBS

VINES / HERBS

<i>Pinus contorta</i>	Shore pine	<i>Carex obnupta</i>	Slough Sedge
<i>Spiraea douglasii</i>	Douglas' Spirea	<i>Juncus sp.</i>	Rush
<i>Vaccinium uliginosum</i>	Bog Blueberry		

Comments:

Isolated wetland dominated by bog blueberry and Douglas' spirea with an overstory of *Pinus contorta*. These wetlands are seasonally inundated.

COWARDIN CODES:

PFO = palustrine forested

HGM CODES:

RI = River Impounding

DA = Depressional Alkaline

E2FO = estuarine forested

PSS = palustrine scrub-shrub

EFB = Estuarine Fringe Embayment

LFH = Lacustrine Fringe Headwater

DO = Depressional Outflow

S = Slope

E2SS = estuarine scrub shrub

PEM = palustrine emergent

EFR = Estuarine Fringe Riverine

LFV = Lacustrine Fringe Valley

DCP = Depressional Closed Permanent

FL = Flats

E2EM = estuarine emergent

PUB = palustrine unconsolidated bottom

RFT = Riverine Flow Through

DB = Depressional Bog

DCNP = Depressional Nonpermanent

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 16

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	3.25	2.17
Sediment Retention & Stabilization (SR)	10.00	4.85
Phosphorus Retention (PR)	10.00	5.07
Nitrate Removal & Retention (NR)	10.00	4.57
Thermoregulation (T)	0.00	0.00
Carbon Sequestration (CS)	2.26	
Organic Matter Export (OE)	0.00	
Aquatic Invertebrate Habitat (INV)	6.00	7.67
Anadromous Fish Habitat (FA)	0.00	4.35
Non-anadromous Fish Habitat (FR)	0.74	6.67
Amphibian & Reptile Habitat (AM)	7.67	7.33
Waterbird Feeding Habitat (WBF)	4.35	4.00
Waterbird Nesting Habitat (WBN)	0.00	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	6.31	6.67
Pollinator Habitat (POL)	6.15	5.00
Native Plant Diversity (PD)	6.68	6.70

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	3.25	2.17
Water Quality Group (WQ)	10.00	5.07
Carbon Sequestration (CS)	2.26	
Fish Support Group (FISH)	0.74	6.67
Aquatic Support Group (AQ)	7.67	7.33
Terrestrial Support Group (TERR)	6.68	6.70
Public Use & Recognition (PU)		0.00
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		6.30
Wetland Stressors		3.08
Wetland Sensitivity		10.00

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	0.50
Slope	1.75
Flat	6.46
Depressional	1.94
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 17
Date(s) of assessment:	August 2010	Size (acres):	2.49
Data Sheet Number(s):	None	Cowardin Class(es):	PFO4C, PEMY
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Flat

TRS quarter section tax lot:	1812020000200, 1812022000402, 1812022402300, 181202402400, 1812022402500, 1812022402600, 1812022402700		
Street address or location:	North of Brownings Corner		
Latitude:	44.0374		
Longitude:	-124.0938		
Locally Significant?:	No		
Hydrologic basin:	171002060804		
Soil -- Mapped series:	Yaquina loamy fine sand, Waldport fine sand, Dune land		
Hydrologic Source:	Groundwater		

Dominant Wetland Vegetation

TREES / SHRUBS		VINES / HERBS	
<i>Pinus contorta</i>	Shore Pine	<i>Carex obnupta</i>	Slough Sedge
<i>Vaccinium uliginosum</i>	Bog Blueberry	<i>Juncus effusus</i>	Soft Rush
		<i>Juncus falcatus</i>	Sickle-Leaf Rush
		<i>Polytrichum sp.</i>	Moss

Comments:

Isolated wetlands dominated by *Pinus contorta* in the overstory. These wetlands were grouped because they are located in the same geomorphic position, are influenced by the local groundwater table, and have similar adjacent land use patterns. North of the road in an interdunal area. Portions of this wetland obtained concurrence for a prior wetland delineation: WD2000-0275

COWARDIN CODES:

PFO = palustrine forested

HGM CODES:

RI = River Impounding

DA = Depressional Alkaline

E2FO = estuarine forested

PSS = palustrine scrub-shrub

EFB = Estuarine Fringe Embayment

LFH = Lacustrine Fringe Headwater

DO = Depressional Outflow

S = Slope

E2SS = estuarine scrub shrub

PEM = palustrine emergent

EFR = Estuarine Fringe Riverine

LFV = Lacustrine Fringe Valley

DCP = Depressional Closed Permanent

FI = Flats

E2EM = estuarine emergent

PUB = palustrine unconsolidated bottom

RFT = Riverine Flow Through

DB = Depressional Bog

DCNP = Depressional Nonpermanant

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 17

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	3.25	2.17
Sediment Retention & Stabilization (SR)	10.00	5.33
Phosphorus Retention (PR)	10.00	5.57
Nitrate Removal & Retention (NR)	10.00	4.90
Thermoregulation (T)	0.00	0.00
Carbon Sequestration (CS)	2.59	0.00
Organic Matter Export (OE)	0.00	0.00
Aquatic Invertebrate Habitat (INV)	6.06	7.87
Anadromous Fish Habitat (FA)	0.00	4.61
Non-anadromous Fish Habitat (FR)	2.05	6.67
Amphibian & Reptile Habitat (AM)	7.87	7.33
Waterbird Feeding Habitat (WBF)	4.61	4.00
Waterbird Nesting Habitat (WBN)	0.00	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	6.67	6.67
Pollinator Habitat (POL)	6.67	5.00
Native Plant Diversity (PD)	7.09	6.99

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	3.25	2.17
Water Quality Group (WQ)	10.00	5.57
Carbon Sequestration (CS)	2.59	0.00
Fish Support Group (FISH)	2.05	6.67
Aquatic Support Group (AQ)	7.87	7.33
Terrestrial Support Group (TERR)	7.09	6.99
Public Use & Recognition (PU)	0.00	0.00
Provisioning Services (PS)	0.00	0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		5.30
Wetland Stressors		5.01
Wetland Sensitivity		10.00

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	0.50
Slope	1.75
Flat	5.83
Depressional	5.28
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 18
Date(s) of assessment:	August 2010	Size (acres):	0.58
Data Sheet Number(s):	None	Cowardin Class(es):	PFO4C
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Depressional outflow

TRS quarter section tax lot:	1812022400100, 1812022400500, 1812022402001
Street address or location:	North of Brownings Corner, east of Hwy 101
Latitude:	44.0366
Longitude:	-124.0983
Locally Significant?:	No
Hydrologic basin:	171002060804
Soil -- Mapped series:	Yaquina loamy fine sand
Hydrologic Source:	Groundwater

Dominant Wetland Vegetation			
TREES / SHRUBS		VINES / HERBS	
<i>Malus fusca</i>	Pacific Crabapple	<i>Carex obnupta</i>	Slough Sedge
<i>Spiraea douglasii</i>	Douglas' Spirea		
<i>Lonicera involucrata</i>	Bearberry Honeysuckle		

Comments:			
Dunal depressions with seasonal ponded water. Culverted under Brownings Corner, drains to south.			

COWARDIN CODES:	E2FO = estuarine forested	E2SS = estuarine scrub shrub	E2EM = estuarine emergent
PFO = palustrine forested	PSS = palustrine scrub-shrub	PEM = palustrine emergent	PUB = palustrine unconsolidated bottom
HGM CODES:	EFB = Estuarine Fringe Embayment	EFR = Estuarine Fringe Riverine	RFT = Riverine Flow Through
RI = River Impounding	LFH = Lacustrine Fringe Headwater	LFV = Lacustrine Fringe Valley	DB = Depressional Bog
DA = Depressional Alkaline	DO = Depressional Outflow	DCP = Depressional Closed Permanent	DCNP = Depressional Nonpermanent
	S = Slope	FL = Flats	

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 18

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	3.85	2.33
Sediment Retention & Stabilization (SR)	6.46	5.31
Phosphorus Retention (PR)	4.78	5.78
Nitrate Removal & Retention (NR)	5.16	4.83
Thermoregulation (T)	0.83	1.67
Carbon Sequestration (CS)	3.08	
Organic Matter Export (OE)	5.81	
Aquatic Invertebrate Habitat (INV)	5.56	6.92
Anadromous Fish Habitat (FA)	0.00	3.89
Non-anadromous Fish Habitat (FR)	1.59	6.67
Amphibian & Reptile Habitat (AM)	6.92	7.33
Waterbird Feeding Habitat (WBF)	3.89	4.00
Waterbird Nesting Habitat (WBN)	0.00	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	5.85	6.67
Pollinator Habitat (POL)	6.25	5.00
Native Plant Diversity (PD)	7.71	6.67

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	3.85	2.33
Water Quality Group (WQ)	6.46	5.78
Carbon Sequestration (CS)	3.08	
Fish Support Group (FISH)	1.59	6.67
Aquatic Support Group (AQ)	6.92	7.33
Terrestrial Support Group (TERR)	7.71	6.67
Public Use & Recognition (PU)		1.19
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		5.18
Wetland Stressors		2.93
Wetland Sensitivity		5.08

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	0.90
Slope	2.38
Flat	5.42
Depressional	3.06
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 19
Date(s) of assessment:	July 15, 2010	Size (acres):	4.47
Data Sheet Number(s):	3	Cowardin Class(es):	PFO4C
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Depressional

TRS quarter section tax lot:	1812023002000, 1812023002100, 1812023005300, 1812023005400, 1812023005500
Street address or location:	South of Friendly Acres, east of Hwy. 101
Latitude:	44.0318
Longitude:	-124.0983
Locally Significant?:	No
Hydrologic basin:	171002060804
Soil -- Mapped series:	Waldport fine sand, Yaquina loamy fine sand
Hydrologic Source:	Groundwater, Precipitation

Dominant Wetland Vegetation

TREES / SHRUBS		VINES / HERBS	
<i>Pinus contorta</i>	Shore Pine		
<i>Ledum glandulosum</i>	Smooth Labrador-Tea		
<i>Vaccinium uliginosum</i>	Bog Blueberry		
<i>Salix hookeriana</i>	Hooker Willow		

Comments:

Forested shrub wetland in depression east of Hwy 101. Wetland is bordered on all sides by residential development. Adjacent upland species include *Pinus contorta*, *Vaccinium ovatum*, *Rhododendron macrophyllum*. All or a portion of this wetland obtained concurrence for a prior wetland delineation: WD2005-0281.

COWARDIN CODES:	E2FO = estuarine forested	E2SS = estuarine scrub shrub	E2EM = estuarine emergent
PFO = palustrine forested	PSS = palustrine scrub-shrub	PEM = palustrine emergent	PUB = palustrine unconsolidated bottom
HGM CODES:	EFB = Estuarine Fringe Embayment	EFR = Estuarine Fringe Riverine	RFT = Riverine Flow Through
RI = River Impounding	LFH = Lacustrine Fringe Headwater	LFV = Lacustrine Fringe Valley	DB = Depressional Bog
DA = Depressional Alkaline	DO = Depressional Outflow	DCP = Depressional Closed Permanent	DCNP = Depressional Nonpermanent
	S = Slope	FL = Flats	

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 19

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	3.25	2.17
Sediment Retention & Stabilization (SR)	10.00	5.04
Phosphorus Retention (PR)	10.00	5.36
Nitrate Removal & Retention (NR)	10.00	4.49
Thermoregulation (T)	0.00	0.00
Carbon Sequestration (CS)	2.14	
Organic Matter Export (OE)	0.00	
Aquatic Invertebrate Habitat (INV)	6.32	7.31
Anadromous Fish Habitat (FA)	0.00	5.11
Non-anadromous Fish Habitat (FR)	2.64	3.33
Amphibian & Reptile Habitat (AM)	7.31	6.67
Waterbird Feeding Habitat (WBF)	5.11	4.00
Waterbird Nesting Habitat (WBN)	5.19	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	5.89	6.67
Pollinator Habitat (POL)	6.53	0.00
Native Plant Diversity (PD)	6.17	6.67

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	3.25	2.17
Water Quality Group (WQ)	10.00	5.36
Carbon Sequestration (CS)	2.14	
Fish Support Group (FISH)	2.64	5.11
Aquatic Support Group (AQ)	7.31	6.67
Terrestrial Support Group (TERR)	6.53	6.67
Public Use & Recognition (PU)		0.71
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		6.16
Wetland Stressors		2.65
Wetland Sensitivity		10.00

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	0.50
Slope	1.25
Flat	5.36
Depressional	6.94
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 20
Date(s) of assessment:	August 2010	Size (acres):	1.97
Data Sheet Number(s):	None	Cowardin Class(es):	PFO4C
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Flat

TRS quarter section tax lot:	1812023002500, 1812023002501, 1812023002700, 1812023005601, 1812023005602
Street address or location:	South of Friendly Acres, east of Hwy. 101
Latitude:	44.03
Longitude:	-124.0967
Locally Significant?:	No
Hydrologic basin:	171002060804
Soil -- Mapped series:	Waldport fine sand
Hydrologic Source:	Groundwater, Precipitation

Dominant Wetland Vegetation

TREES / SHRUBS		VINES / HERBS	
<i>Ledum glandulosum</i>	Smooth Labrador-Tea	<i>Deschampsia cespitosa</i>	Tufted Hairgrass
<i>Vaccinium uliginosum</i>	Bog Blueberry	<i>Juncus acuminatus</i>	Taper-Tip Rush
<i>Spiraea douglasii</i>	Douglas' Spirea		

Comments:

Includes isolated wetland with seasonal inundation just east of Hwy 101, as well as smaller, apparently isolated wetlands to the east. Residential development common in the vicinity of these wetlands. Adjacent upland species include: *Pinus contorta*, *Vaccinium ovatum*, *Rhododendron macrophyllum*. These wetlands were grouped because they are located in the same geomorphic position, have similar vegetation communities and have similar adjoining land use patterns.

COWARDIN CODES:	E2FO = estuarine forested	E2SS = estuarine scrub shrub	E2EM = estuarine emergent
PFO = palustrine forested	PSS = palustrine scrub-shrub	PEM = palustrine emergent	PUB = palustrine unconsolidated bottom
HGM CODES:	EFB = Estuarine Fringe Embayment	EFR = Estuarine Fringe Riverine	RFT = Riverine Flow Through
RI = River Impounding	LFH = Lacustrine Fringe Headwater	LFV = Lacustrine Fringe Valley	DB = Depressional Bog
DA = Depressional Alkaline	DO = Depressional Outflow	DCP = Depressional Closed Permanent	DCNP = Depressional Nonpermanent
	S = Slope	FL = Flats	

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 20

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	3.25	2.17
Sediment Retention & Stabilization (SR)	10.00	5.02
Phosphorus Retention (PR)	10.00	5.36
Nitrate Removal & Retention (NR)	10.00	4.49
Thermoregulation (T)	0.00	0.00
Carbon Sequestration (CS)	2.41	
Organic Matter Export (OE)	0.00	
Aquatic Invertebrate Habitat (INV)	5.80	7.34
Anadromous Fish Habitat (FA)	0.00	4.37
Non-anadromous Fish Habitat (FR)	0.83	6.67
Amphibian & Reptile Habitat (AM)	7.34	7.33
Waterbird Feeding Habitat (WBF)	4.37	4.00
Waterbird Nesting Habitat (WBN)	0.00	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	6.06	6.67
Pollinator Habitat (POL)	6.01	5.00
Native Plant Diversity (PD)	6.05	6.67

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	3.25	2.17
Water Quality Group (WQ)	10.00	5.36
Carbon Sequestration (CS)	2.41	
Fish Support Group (FISH)	0.83	6.67
Aquatic Support Group (AQ)	7.34	7.33
Terrestrial Support Group (TERR)	6.06	6.67
Public Use & Recognition (PU)		1.19
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		4.68
Wetland Stressors		3.46
Wetland Sensitivity		10.00

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	0.50
Slope	1.75
Flat	6.46
Depressional	1.94
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 21
Date(s) of assessment:	August 2010	Size (acres):	23.01
Data Sheet Number(s):	None	Cowardin Class(es):	PFO4C
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Slope

TRS quarter section tax lot:	1712350003400, 1712350003500, 1812022001901, 1812022003600, 1812022003700, 1812022003800, 1812022003900, 1812023005700, 1812023005800, 1812023005900, 1812023006000, 1812030000100		
Street address or location:	West of Brownings Corner, west of Hwy 101		
Latitude:	44.0368		
Longitude:	-124.1025		
Locally Significant?:	No		
Hydrologic basin:	171002060804		
Soil -- Mapped series:	Waldport fine sand, Yaquina loamy fine sand, Netarts fine sand		
Hydrologic Source:	Groundwater, Precipitation		

Dominant Wetland Vegetation			
TREES / SHRUBS		VINES / HERBS	
<i>Pinus contorta</i>	Shore pine	<i>Carex obnupta</i>	Slough sedge
<i>Salix spp.</i>	Willow		

Comments:
Area to north of old horseradish nursery. These wetlands were grouped because they are located in the same geomorphic position and have similar adjacent land use patterns. Northern end is mostly undisturbed; southern portion less so due to proximity to nursery and other development. Large high quality wetland which extends north, flanked by dune on the west. Wetland boundaries determined primarily through air photo interpretation. Portions of this wetland obtained concurrence for a prior wetland delineation: WD2007-0674 & WD2007-0255.

COWARDIN CODES:	E2FO = estuarine forested	E2SS = estuarine scrub shrub	E2EM = estuarine emergent
PFO = palustrine forested	PSS = palustrine scrub-shrub	PEM = palustrine emergent	PUB = palustrine unconsolidated bottom
HGM CODES:	EFB = Estuarine Fringe Embayment	EFR = Estuarine Fringe Riverine	RFT = Riverine Flow Through
RI = River Impounding	LFH = Lacustrine Fringe Headwater	LFV = Lacustrine Fringe Valley	DB = Depressional Bog
DA = Depressional Alkaline	DO = Depressional Outflow	DCP = Depressional Closed Permanent	DCNP = Depressional Nonpermanent
	S = Slope	FL = Flats	

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 21

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	4.50	3.58
Sediment Retention & Stabilization (SR)	10.00	5.50
Phosphorus Retention (PR)	10.00	6.49
Nitrate Removal & Retention (NR)	10.00	4.97
Thermoregulation (T)	0.00	0.00
Carbon Sequestration (CS)	2.05	0.00
Organic Matter Export (OE)	0.00	0.00
Aquatic Invertebrate Habitat (INV)	5.93	7.84
Anadromous Fish Habitat (FA)	0.00	4.91
Non-anadromous Fish Habitat (FR)	2.95	6.67
Amphibian & Reptile Habitat (AM)	7.84	7.33
Waterbird Feeding Habitat (WBF)	4.91	4.00
Waterbird Nesting Habitat (WBN)	0.00	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	6.99	6.67
Pollinator Habitat (POL)	6.97	5.00
Native Plant Diversity (PD)	6.30	7.22

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	4.50	3.58
Water Quality Group (WQ)	10.00	6.49
Carbon Sequestration (CS)	2.05	0.00
Fish Support Group (FISH)	2.95	6.67
Aquatic Support Group (AQ)	7.84	7.33
Terrestrial Support Group (TERR)	6.99	7.22
Public Use & Recognition (PU)	0.00	0.00
Provisioning Services (PS)	0.00	0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		3.68
Wetland Stressors		4.60
Wetland Sensitivity		10.00

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	0.50
Slope	1.81
Flat	0.00
Depressional	0.00
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 22
Date(s) of assessment:	7/15/2010	Size (acres):	1.56
Data Sheet Number(s):	4	Cowardin Class(es):	L2ABY
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Lacustrine

TRS quarter section tax lot:	1812141000113, 1812141000114, 1812141001200, 1812141001300, 1812141001400, 1812141001500, 1812141001500, 1812141001600
Street address or location:	Northwest end of Munsel Lake
Latitude:	44.00888
Longitude:	-124.08714
Locally Significant?:	No
Hydrologic basin:	171002060804
Soil -- Mapped series:	Waldport fine sand
Hydrologic Source:	Surface

Dominant Wetland Vegetation			
TREES / SHRUBS		VINES / HERBS	
<i>Alnus rubra</i>	red alder	<i>Scirpus micrpercarpus</i>	Small fruited bulrush
<i>Salix sp.</i>	willow	<i>Carex obnupta</i>	slough sedge
<i>Thuja plicata</i>	western red cedar		

Comments:

Northwest end of Munsel Lake. Begins near 48-inch culvert beneath Martin Road. This wetland is the littoral area of the lake. Banks are relatively steep. Area is inundated year-round.

COWARDIN CODES:

PFO = palustrine forested

HGM CODES:

RI = River Impounding

DA = Depressional Alkaline

E2FO = estuarine forested

PSS = palustrine scrub-shrub

EFB = Estuarine Fringe Embayment

LFH = Lacustrine Fringe Headwater

DO = Depressional Outflow

S = Slope

E2SS = estuarine scrub shrub

PEM = palustrine emergent

EFR = Estuarine Fringe Riverine

LFV = Lacustrine Fringe Valley

DCP = Depressional Closed Permanent

FL = Flats

E2EM = estuarine emergent

PUB = palustrine unconsolidated bottom

RFT = Riverine Flow Through

DB = Depressional Bog

DCNP = Depressional Nonpermanent

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 22

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	3.13	2.67
Sediment Retention & Stabilization (SR)	4.21	4.60
Phosphorus Retention (PR)	1.58	6.11
Nitrate Removal & Retention (NR)	4.05	4.52
Thermoregulation (T)	3.67	6.67
Carbon Sequestration (CS)	1.40	
Organic Matter Export (OE)	6.97	
Aquatic Invertebrate Habitat (INV)	5.25	7.06
Anadromous Fish Habitat (FA)	7.06	10.00
Non-anadromous Fish Habitat (FR)	5.45	7.86
Amphibian & Reptile Habitat (AM)	3.51	6.67
Waterbird Feeding Habitat (WBF)	5.71	4.00
Waterbird Nesting Habitat (WBN)	5.92	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	4.12	6.67
Pollinator Habitat (POL)	3.63	0.83
Native Plant Diversity (PD)	6.34	6.67

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	3.13	2.67
Water Quality Group (WQ)	4.21	6.67
Carbon Sequestration (CS)	1.40	
Fish Support Group (FISH)	7.06	10.00
Aquatic Support Group (AQ)	6.97	6.67
Terrestrial Support Group (TERR)	6.34	6.67
Public Use & Recognition (PU)		1.19
Provisioning Services (PS)		2.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		7.79
Wetland Stressors		3.65
Wetland Sensitivity		3.75

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	0.00
Slope	0.00
Flat	0.00
Depressional	0.00
Lacustrine	10.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 23
Date(s) of assessment:	Fall 2010	Size (acres):	60.57
Data Sheet Number(s):	6	Cowardin Class(es):	PEMC, PEMY, PFO1C, PFO4C
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	DCNP, DCP, Slope

TRS quarter section tax lot:	1712340000400, 1812030000100, 1812030000200, 1812033400402
Street address or location:	North of Heceta Beach Road
Latitude:	44.0378
Longitude:	-124.112
Locally Significant?:	No
Hydrologic basin:	171002050704
Soil -- Mapped series:	Waldport fine sand, Yaquina loamy fine sand, Dune land
Hydrologic Source:	Groundwater, Precipitation

Dominant Wetland Vegetation

TREES / SHRUBS		VINES / HERBS	
<i>Pinus contorta</i>	Shore pine	<i>Carex obnupta</i>	Slough sedge
<i>Salix spp</i>	Willows	<i>Scirpus microcarpus</i>	Smallfruit bulrush

Comments:

Large high quality wetland north of Heceta Beach Road. Margins defined by active to partially stabilized dunes. Lots of snags, structurally diverse vegetation dominated by shore pine, though lowlands are dominated by willow. Extensive seasonal, and in some depressions annual, ponding.

COWARDIN CODES:

PFO = palustrine forested

HGM CODES:

RI = River Impounding

DA = Depressional Alkaline

E2FO = estuarine forested

PSS = palustrine scrub-shrub

EFB = Estuarine Fringe Embayment

LFH = Lacustrine Fringe Headwater

DO = Depressional Outflow

S = Slope

E2SS = estuarine scrub shrub

PEM = palustrine emergent

EFR = Estuarine Fringe Riverine

LFV = Lacustrine Fringe Valley

DCP = Depressional Closed Permanent

FL = Flats

E2EM = estuarine emergent

PUB = palustrine unconsolidated bottom

RFT = Riverine Flow Through

DB = Depressional Bog

DCNP = Depressional Nonpermanent

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 23

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	4.50	2.17
Sediment Retention & Stabilization (SR)	10.00	5.45
Phosphorus Retention (PR)	10.00	5.44
Nitrate Removal & Retention (NR)	10.00	4.11
Thermoregulation (T)	0.00	0.00
Carbon Sequestration (CS)	1.67	0.00
Organic Matter Export (OE)	0.00	0.00
Aquatic Invertebrate Habitat (INV)	5.88	8.28
Anadromous Fish Habitat (FA)	0.00	5.47
Non-anadromous Fish Habitat (FR)	4.26	3.33
Amphibian & Reptile Habitat (AM)	8.28	7.33
Waterbird Feeding Habitat (WBF)	5.47	5.11
Waterbird Nesting Habitat (WBN)	5.48	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	6.66	6.67
Pollinator Habitat (POL)	6.72	5.00
Native Plant Diversity (PD)	6.38	7.21

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	4.50	2.17
Water Quality Group (WQ)	10.00	5.45
Carbon Sequestration (CS)	1.67	0.00
Fish Support Group (FISH)	4.26	5.47
Aquatic Support Group (AQ)	8.28	7.33
Terrestrial Support Group (TERR)	6.72	7.21
Public Use & Recognition (PU)	0.00	10.00
Provisioning Services (PS)	0.00	0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		5.93
Wetland Stressors		4.23
Wetland Sensitivity		10.00

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	0.00
Slope	0.00
Flat	0.00
Depressional	0.00
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 24
Date(s) of assessment:	August 12, 2010	Size (acres):	46.66
Data Sheet Number(s):	14	Cowardin Class(es):	PFO4C, PSS1C, PUBH
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	DCP

TRS quarter section tax lot:	1812030000200, 1812030000300, 1812030000300, 1812033300100, 1812033300200, 1812033300300, 1812033300400, 1812033400077, 1812033400200, 1812033400300, 1812033400401, 1812033400402, 1812033400405, 1812033400503, 1812041100077, 1812041100600, 1812041100700, 1812041104701, 1812041104705, 1812041104710, 1812041402302, 1812041402304, 1812100000102, 1812100000104, 1812100000106, 1812100000120, 1812100000121, 1812101000077, 1812101000700, 1812101000800, 1812101001300, 1812101001400, 1812101001500, 1812101001600, 1812101001700, 1812101001800, 1812101001900, 1812101002000, 1812101010400, 1812101010400, 1812101200077, 1812101200100, 1812101200200, 1812101200300, 1812101200400, 1812101200500, 1812101201100, 1812101201200, 1812101201600, 1812101300100, 1812101300200, 1812101300500, 1812102100300, 1812102100400, 1812104000200		
Street address or location:	North of Heceta Beach Road, Heceta Lake		
Latitude:	44.0312		
Longitude:	-124.1188		
Locally Significant?:	Yes		
Hydrologic basin:	171002050704		
Soil -- Mapped series:	Waldport fine sand, Yaquina loamy fine sand, Dune land		
Hydrologic Source:	Groundwater, Precipitation		

Dominant Wetland Vegetation			
TREES / SHRUBS		VINES / HERBS	
<i>Pinus contorta</i>	Shore pine	<i>Carex obnupta</i>	Slough sedge
<i>Salix hookeriana</i>	Hookers willow		
<i>Spiraea douglasii</i>	Douglas spirea		
<i>Alnus rubra</i>	Red alder		

Comments:			
A grouping of wetlands in the bottom of interdunal swales. These wetlands were grouped because they are located in the same geomorphic position and have similar adjacent land use patterns. This is a large, high quality wetland with perennial open water through the deepest depressions. The remaining areas are generally only seasonally inundated. Residential development to south. Largely forested or shrubby, except where inundation is common, this wetland has an abundance of snags. Portions of this wetland obtained concurrence for a prior wetland delineation: WD2001-0297 & WD2001-0401.			

COWARDIN CODES:	I2FO estuarine forested	E2SS estuarine scrub shrub	E2EM estuarine emergent
PFO palustrine forested	PSS palustrine scrub-shrub	PEM palustrine emergent	PUB palustrine unconsolidated bottom
HGM CODES:	FFB Estuarine Fringe Embayment	EFR Estuarine Fringe Riverine	RFT Riverine Flow Through
RI River Impounding	LFI Lacustrine Fringe Headwater	LFV Lacustrine Fringe Valley	DB Depressional Bog
DA Depressional Alkaline	DO Depressional Outflow	DCP Depressional Closed Permanent	DCNP Depressional Nonpermanent
	S Slope	FL Flats	

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 24

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	5.75	2.17
Sediment Retention & Stabilization (SR)	10.00	5.31
Phosphorus Retention (PR)	10.00	5.61
Nitrate Removal & Retention (NR)	10.00	4.24
Thermoregulation (T)	0.00	0.00
Carbon Sequestration (CS)	1.47	0.00
Organic Matter Export (OE)	0.00	0.00
Aquatic Invertebrate Habitat (INV)	6.29	7.82
Anadromous Fish Habitat (FA)	0.00	4.95
Non-anadromous Fish Habitat (FR)	3.54	6.67
Amphibian & Reptile Habitat (AM)	7.82	7.33
Waterbird Feeding Habitat (WBF)	4.95	4.00
Waterbird Nesting Habitat (WBN)	4.44	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	6.34	6.67
Pollinator Habitat (POL)	7.08	5.00
Native Plant Diversity (PD)	5.72	7.09

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	5.75	2.17
Water Quality Group (WQ)	10.00	5.61
Carbon Sequestration (CS)	1.47	0.00
Fish Support Group (FISH)	3.54	6.67
Aquatic Support Group (AQ)	7.82	7.33
Terrestrial Support Group (TERR)	7.08	7.09
Public Use & Recognition (PU)	0.00	0.48
Provisioning Services (PS)	0.00	0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		6.05
Wetland Stressors		2.23
Wetland Sensitivity		10.00

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	0.00
Slope	0.00
Flat	0.00
Depressional	0.00
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 25
Date(s) of assessment:	Fall 2010	Size (acres):	9.69
Data Sheet Number(s):	8	Cowardin Class(es):	PSS1C, PFO4C
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Slope

TRS quarter section tax lot:	1812030000200, 1812033300500, 1812033300600, 1812040000102, 1812040000110, 1812040000120, 1812040000121, 1812041402305, 1812044404300, 1812044404400		
Street address or location:	North of Heceta Beach Road		
Latitude:	44.0333		
Longitude:	-124.1251		
Locally Significant?:	Yes		
Hydrologic basin:	171002050704		
Soil -- Mapped series:	Waldport fine sand, Yaquina loamy fine sand		
Hydrologic Source:	Groundwater, Precipitation		

Dominant Wetland Vegetation

TREES / SHRUBS		VINES / HERBS	
<i>Pinus contorta</i>	Shore Pine	<i>Carex obnupta</i>	Slough Sedge
<i>Malus fusca</i>	Pacific Crabapple	<i>Potentilla palustris</i>	Marsh cinquefoil
<i>Ledum glandulosum</i>	Smooth Labrador-Tea	<i>Carex sitchensis</i>	Sitka Sedge
<i>Myrica californica</i>	Pacific Wax-Myrtle	<i>Eleocharis sp.</i>	Spikerush
<i>Salix hookeriana</i>	Hooker Willow	<i>Juncus sp.</i>	Rush
<i>Lonicera involucrata</i>	Bearberry honeysuckle	<i>Lysichitum americanum</i>	American Skunk-Cabbage
<i>Spiraea douglasii</i>	Douglas' Spirea		

Comments:

Predominantly forest and scrub shrub wetland, with open water and emergent components. Drains west in channel that is culverted under 4th Street, drains to ocean. Upland species: *Vaccinium ovatum*, *Gaultheria shallon*, *Pinus contorta*.

COWARDIN CODES:	E2FO = estuarine forested	E2SS = estuarine scrub shrub	E2EM = estuarine emergent
PFO = palustrine forested	PSS = palustrine scrub-shrub	PEM = palustrine emergent	PUB = palustrine unconsolidated bottom
HGM CODES:	EFB = Estuarine Fringe Embayment	EFR = Estuarine Fringe Riverine	RF1 = Riverine Flow Through
RI = River Impounding	LFH = Lacustrine Fringe Headwater	LFV = Lacustrine Fringe Valley	DB = Depressional Bog
DA = Depressional Alkaline	DO = Depressional Outflow	DCP = Depressional Closed Permanent	DCNP = Depressional Nonpermanent
	S = Slope	FL = Flats	

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 25

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	3.00	2.17
Sediment Retention & Stabilization (SR)	5.52	5.02
Phosphorus Retention (PR)	2.59	5.28
Nitrate Removal & Retention (NR)	5.11	4.38
Thermoregulation (T)	1.39	3.33
Carbon Sequestration (CS)	1.56	
Organic Matter Export (OE)	7.23	
Aquatic Invertebrate Habitat (INV)	5.90	6.98
Anadromous Fish Habitat (FA)	0.00	5.41
Non-anadromous Fish Habitat (FR)	2.59	3.33
Amphibian & Reptile Habitat (AM)	6.98	7.33
Waterbird Feeding Habitat (WBF)	5.41	4.00
Waterbird Nesting Habitat (WBN)	5.09	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	5.55	6.67
Pollinator Habitat (POL)	5.83	5.00
Native Plant Diversity (PD)	3.50	6.70

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	3.00	2.17
Water Quality Group (WQ)	5.52	5.28
Carbon Sequestration (CS)	1.56	
Fish Support Group (FISH)	2.59	5.41
Aquatic Support Group (AQ)	7.23	7.33
Terrestrial Support Group (TERR)	5.83	6.70
Public Use & Recognition (PU)		1.19
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		5.18
Wetland Stressors		3.73
Wetland Sensitivity		3.45

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	1.50
Slope	1.81
Flat	0.00
Depressional	0.00
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 26
Date(s) of assessment:	August 2010	Size (acres):	1.23
Data Sheet Number(s):	None	Cowardin Class(es):	PFO4C
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Slope

TRS quarter section tax lot:	1812033300077, 1812033302201, 1812033302300, 1812033302400, 1812033302500, 1812033302600, 1812033400077, 1812033400600, 1812033401000		
Street address or location:	South of Heceta Beach Road		
Latitude:	44.0296		
Longitude:	-124.1201		
Locally Significant?:	Yes		
Hydrologic basin:	171002060804		
Soil -- Mapped series:	Yaquina loamy fine sand, Waldport fine sand, Netarts fine sand		
Hydrologic Source:	Groundwater		

Dominant Wetland Vegetation			
TREES / SHRUBS		VINES / HERBS	
<i>Pinus contorta</i>	Shore Pine	<i>Carex obnupta</i>	Slough Sedge
<i>Salix hookeriana</i>	Hooker Willow		

Comments:

Series of small, apparently isolated forested wetlands south of Heceta Beach Road. Dominated by willows. Adjacent upland species: *Myrica californica*, *Gaultheria shallon*, *Rhamnus purshiana*, *Spiraea douglasii*.

COWARDIN CODES:

PFO = palustrine forested

HGM CODES:

RI = River Impounding

DA = Depressional Alkaline

E2FO = estuarine forested

PSS = palustrine scrub-shrub

EFB = Estuarine Fringe Embayment

LEH = Lacustrine Fringe Headwater

DO = Depressional Outflow

S = Slope

E2SS = estuarine scrub shrub

PEM = palustrine emergent

EFR = Estuarine Fringe Riverine

LFV = Lacustrine Fringe Valley

DCP = Depressional Closed Permanent

FL = Flats

E2EM = estuarine emergent

PUB = palustrine unconsolidated bottom

RFT = Riverine Flow Through

DB = Depressional Bog

DCNP = Depressional Nonpermanent

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 26

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	3.25	2.42
Sediment Retention & Stabilization (SR)	10.00	5.03
Phosphorus Retention (PR)	10.00	5.57
Nitrate Removal & Retention (NR)	10.00	3.99
Thermoregulation (T)	0.00	0.00
Carbon Sequestration (CS)	1.64	
Organic Matter Export (OE)	0.00	
Aquatic Invertebrate Habitat (INV)	5.11	6.00
Anadromous Fish Habitat (FA)	0.00	4.19
Non-anadromous Fish Habitat (FR)	2.89	6.67
Amphibian & Reptile Habitat (AM)	5.98	6.67
Waterbird Feeding Habitat (WBF)	4.19	4.00
Waterbird Nesting Habitat (WBN)	0.00	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	4.04	6.67
Pollinator Habitat (POL)	4.36	0.00
Native Plant Diversity (PD)	5.95	6.67

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	3.25	2.42
Water Quality Group (WQ)	10.00	5.57
Carbon Sequestration (CS)	1.64	
Fish Support Group (FISH)	2.89	6.67
Aquatic Support Group (AQ)	5.98	6.67
Terrestrial Support Group (TERR)	5.95	6.67
Public Use & Recognition (PU)		1.19
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		4.35
Wetland Stressors		3.36
Wetland Sensitivity		10.00

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	0.50
Slope	1.81
Flat	0.00
Depressional	0.00
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 27
Date(s) of assessment:	August 12, 2010	Size (acres):	89.97
Data Sheet Number(s):	15	Cowardin Class(es):	PEMC, PEMY, PFO4C
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Flat

TRS quarter section tax lot:

1812023002901, 1812023003000, 1812023003100, 1812023003300, 1812023003400, 1812023003500, 1812023003700, 1812023003800, 1812023003805, 1812030000300, 1812030000500, 1812101000077, 1812101000200, 1812101000900, 1812101002300, 1812101002400, 1812101002500, 1812101003000, 1812101003300, 1812101003400, 1812101003500, 1812101003600, 1812101003700, 1812101003800, 1812101004600, 1812101004700, 1812101004900, 1812101005000, 1812101005100, 1812101005200, 1812101005300, 1812101005400, 1812101005500, 1812101005600, 1812101005700, 1812101005800, 1812101005900, 1812101006000, 1812101006900, 1812101007100, 1812101007200, 1812101007300, 1812101007400, 1812101007500, 1812101007600, 1812101007700, 1812101008100, 1812101008200, 1812101008300, 1812101008400, 1812101008500, 1812101008600, 1812101008700, 1812101008800, 1812101008900, 1812101009000, 1812101009100, 1812101009200, 1812101009300, 1812101009500, 1812101009600, 1812101009800, 1812101009900, 1812101010000, 1812101010200, 1812101010300, 1812104000101, 1812110000077, 1812110000600, 1812110001500, 1812110002600, 1812110002700, 1812110002800, 1812110002900, 1812110003000

Street address or location: **West of Hwy 101 North of Heceta Beach Road**

Latitude: **44.0277**

Longitude: **-124.1062**

Locally Significant?: **Yes**

Hydrologic basin: **171002060804**

Soil -- Mapped series: **Dune land, Yaquina loamy fine sand, Netarts fine sand, Waldport fine sand**

Hydrologic Source: **Groundwater, Precipitation**

Dominant Wetland Vegetation

TREES / SHRUBS		VINES / HERBS	
<i>Spiraea douglasii</i>	Douglas' Spirea	<i>Carex obnupta</i>	Slough Sedge
<i>Ledum glandulosum</i>	Smooth Labrador-Tea	<i>Juncus ensifolius</i>	Dagger-Leaf Rush
<i>Vaccinium uliginosum</i>	Bog Blueberry	<i>Lysichitum americanum</i>	American Skunk-Cabbage
<i>Salix hookeriana</i>	Hooker Willow	<i>Blechnum spicant</i>	Deer Fern
<i>Pinus contorta</i>	Shore pine	<i>Deschampsia cespitosa</i>	Tufted Hairgrass

Comments:

Large high quality wetland. These wetlands were grouped because they are located in the same geomorphic position, are influenced by the local groundwater table, and have similar adjacent land use patterns. Northern portion is located on BLM land; the southern portion is surrounded by a developing residential area. A 0.6 acre wetland mitigation site is located in the southern portion of the wetland, north of the development. Dunes border the wetland on all sides across its northern extent. Adjacent upland species include: *Pinus contorta*, *Gaultheria shallon*, *Vaccinium ovatum*, *Rhododendron*, *Rhamnus*. Portions of this wetland obtained concurrence for a prior wetland delineation: WD1997-0286 & WD2001-0401.

COWARDIN CODES:

PFO - palustrine forested

HGM CODES:

RI - River Impounding

DA - Depressional Alkaline

F2FO - estuarine forested

PSS - palustrine scrub-shrub

EFB - Estuarine Fringe Embayment

LFH - Lacustrine Fringe Headwater

DO - Depressional Outflow

S - Slope

F2SS - estuarine scrub shrub

PEM - palustrine emergent

EFR - Estuarine Fringe Riverine

LFV - Lacustrine Fringe Valley

DCP - Depressional Closed Permanent

FI - Flats

F2FM - estuarine emergent

PUB - palustrine unconsolidated bottom

RFI - Riverine Flow Through

DB - Depressional Bog

DCNP - Depressional Nonpermanent

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 27

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	3.50	2.67
Sediment Retention & Stabilization (SR)	10.00	5.50
Phosphorus Retention (PR)	10.00	6.28
Nitrate Removal & Retention (NR)	10.00	4.88
Thermoregulation (T)	0.00	0.00
Carbon Sequestration (CS)	1.93	
Organic Matter Export (OE)	0.00	
Aquatic Invertebrate Habitat (INV)	5.00	6.78
Anadromous Fish Habitat (FA)	0.00	4.73
Non-anadromous Fish Habitat (FR)	3.22	2.36
Amphibian & Reptile Habitat (AM)	6.78	7.33
Waterbird Feeding Habitat (WBF)	4.73	7.33
Waterbird Nesting Habitat (WBN)	4.84	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	5.23	6.67
Pollinator Habitat (POL)	5.35	5.00
Native Plant Diversity (PD)	5.34	6.67

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	3.50	2.67
Water Quality Group (WQ)	10.00	6.28
Carbon Sequestration (CS)	1.93	
Fish Support Group (FISH)	3.22	4.73
Aquatic Support Group (AQ)	6.78	7.33
Terrestrial Support Group (TERR)	5.35	6.67
Public Use & Recognition (PU)		1.90
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		4.85
Wetland Stressors		3.33
Wetland Sensitivity		10.00

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	0.00
Slope	0.00
Flat	10.00
Depressional	0.00
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 28
Date(s) of assessment:	August 2010	Size (acres):	5.85
Data Sheet Number(s):	None	Cowardin Class(es):	PFO1C, PFO4C, PUBH
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Slope

TRS quarter section tax lot:	1812104000077, 1812104000101, 1812104000605, 1812104000702, 1812104000703, 1812113200077, 1812113200200, 1812113200900, 1812113201000, 1812113201400, 1812113201500, 1812113202100		
Street address or location:	North of Heceta Beach Road, west of Hwy 101		
Latitude:	44.0191		
Longitude:	-124.1046		
Locally Significant?:	Yes		
Hydrologic basin:	171002060804		
Soil -- Mapped series:	Netarts fine sand, Yaquina loamy fine sand, Waldport find sand		
Hydrologic Source:	Groundwater, Precipitation		

Dominant Wetland Vegetation

TREES / SHRUBS		VINES / HERBS	
<i>Spiraea douglasii</i>	Douglas' Spirea	<i>Carex sp.</i>	Sedge
<i>Vaccinium uliginosum</i>	Bog Blueberry	<i>Juncus effusus</i>	Soft Rush
<i>Ledum glandulosum</i>	Smooth Labrador-Tea	<i>Juncus acuminatus</i>	Taper-Tip Rush
<i>Pinus contorta</i>	Shore Pine	<i>Juncus ensifolius</i>	Dagger-Leaf Rush
<i>Salix hookeriana</i>	Hooker Willow		
<i>Salix lasiandra</i>	Pacific Willow		

Comments:

Series of scrub shrub wetlands. Some evidence of ponded water, but no outlet. These wetlands were grouped because they are located in the same geomorphic position and have similar adjacent land use patterns. Adjacent upland includes *Vaccinium ovatum*, *Gaultheria shallon*, *Cytisus scoparius*, *Pinus contorta*, and *Rhododendron macrophyllum*. Portions of this wetland obtained concurrence for a prior wetland delineation: WD2006-0116.

COWARDIN CODES:	E2FO = estuarine forested	E2SS = estuarine scrub shrub	E2EM = estuarine emergent
PFO = palustrine forested	PSS = palustrine scrub-shrub	PEM = palustrine emergent	PUB = palustrine unconsolidated bottom
HGM CODES:	EFB = Estuarine Fringe Embayment	EFR = Estuarine Fringe Riverine	RFI = Riverine Flow Through
RI = River Impounding	LFH = Lacustrine Fringe Headwater	LFV = Lacustrine Fringe Valley	DB = Depressional Bog
DA = Depressional Alkaline	DO = Depressional Outflow	DCP = Depressional Closed Permanent	DCNP = Depressional Nonpermanent
	S = Slope	FL = Flats	

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 28

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	2.25	2.17
Sediment Retention & Stabilization (SR)	10.00	5.04
Phosphorus Retention (PR)	10.00	5.28
Nitrate Removal & Retention (NR)	10.00	4.71
Thermoregulation (T)	0.00	0.00
Carbon Sequestration (CS)	1.84	
Organic Matter Export (OE)	0.00	
Aquatic Invertebrate Habitat (INV)	5.97	6.38
Anadromous Fish Habitat (FA)	0.00	3.63
Non-anadromous Fish Habitat (FR)	3.90	6.67
Amphibian & Reptile Habitat (AM)	6.38	7.33
Waterbird Feeding Habitat (WBF)	3.63	4.00
Waterbird Nesting Habitat (WBN)	4.77	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	4.37	6.67
Pollinator Habitat (POL)	5.72	5.00
Native Plant Diversity (PD)	5.85	6.67

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	2.25	2.17
Water Quality Group (WQ)	10.00	5.28
Carbon Sequestration (CS)	1.84	
Fish Support Group (FISH)	3.90	6.67
Aquatic Support Group (AQ)	6.38	7.33
Terrestrial Support Group (TERR)	5.85	6.67
Public Use & Recognition (PU)		1.19
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		4.97
Wetland Stressors		3.19
Wetland Sensitivity		10.00

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	0.50
Slope	2.19
Flat	0.00
Depressional	0.00
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 29
Date(s) of assessment:	August 2010	Size (acres):	65.14
Data Sheet Number(s):	None	Cowardin Class(es):	PEMC, PFO1C, PFO4C, PSS1C, PUBH
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Depressional, Slope

TRS quarter section tax lot:	1812101301400, 1812104000077, 1812104000100, 1812104000400, 1812104000500, 1812104000800, 1812104000900, 1812104001000, 1812104001100, 1812104001300, 1812104001402, 1812104001500, 1812104001600, 1812104001701, 1812104001800, 1812113200077, 1812150000200, 1812150000300, 1812150001700		
Street address or location:	South of Heceta Beach Road, west of Hwy 101		
Latitude:	44.0166		
Longitude:	-124.1109		
Locally Significant?:	No		
Hydrologic basin:	171002060804		
Soil -- Mapped series:	Yaquina loamy fine sand, Waldport find sand, Dune land, Netarts fine sand		
Hydrologic Source:	Groundwater, Precipitation		

Dominant Wetland Vegetation			
TREES / SHRUBS		VINES / HERBS	
<i>Vaccinium uliginosum</i>	Bog Blueberry	<i>Carex obnupta</i>	Slough Sedge
<i>Salix hookeriana</i>	Hooker Willow	<i>Festuca rubra</i>	Red Fescue
		<i>Juncus sp.</i>	Rush
		<i>Carex viridula</i>	Little Green Sedge
		<i>Juncus lescurei</i>	Salt Rush
		<i>Eleocharis palustris</i>	Common Spikerush
		<i>Ranunculus flammula</i>	Spearwort Butter-Cup
		<i>Carex sitchensis</i>	Sitka Sedge

Comments:			
Large, high quality wetland with a variety of open water, scrub shrub and emergent communities. These wetlands were grouped because they are located in the same geomorphic position, are influenced by the local groundwater table, and have similar adjacent land use patterns. Northern portion is located on private property; the central and southern portions are located on County property. The southern wetlands are generally defined topographically by stabilized and advancing sand dunes. Adjacent upland species: <i>Pinus contorta</i> , <i>Myrica californica</i> , <i>Gaultheria shallon</i> , <i>Vaccinium ovatum</i> , <i>Spiraea douglasii</i> . Portions of this wetland obtained concurrence for a prior wetland delineation: WD2007-0745 & WD2007-0747.			

COWARDIN CODES:	E2FO = estuarine forested	E2SS = estuarine scrub shrub	E2EM = estuarine emergent
PFO = palustrine forested	PSS = palustrine scrub-shrub	PEM = palustrine emergent	PUB = palustrine unconsolidated bottom
HGM CODES:	EFB = Estuarine Fringe Embayment	EFR = Estuarine Fringe Riverine	RFT = Riverine Flow Through
RI = River Impounding	LFH = Lacustrine Fringe Headwater	LFV = Lacustrine Fringe Valley	DB = Depressional Bog
DA = Depressional Alkaline	DO = Depressional Outflow	DCP = Depressional Closed Permanent	DCNP = Depressional Nonpermanent
	S = Slope	FL = Flats	

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 29

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	4.50	2.17
Sediment Retention & Stabilization (SR)	10.00	5.13
Phosphorus Retention (PR)	10.00	5.36
Nitrate Removal & Retention (NR)	10.00	4.83
Thermoregulation (T)	0.00	0.00
Carbon Sequestration (CS)	1.53	
Organic Matter Export (OE)	0.00	
Aquatic Invertebrate Habitat (INV)	5.22	6.41
Anadromous Fish Habitat (FA)	0.00	4.33
Non-anadromous Fish Habitat (FR)	3.33	6.67
Amphibian & Reptile Habitat (AM)	6.41	7.33
Waterbird Feeding Habitat (WBF)	4.33	4.00
Waterbird Nesting Habitat (WBN)	4.32	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	4.71	6.67
Pollinator Habitat (POL)	4.31	5.00
Native Plant Diversity (PD)	5.43	6.67

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	4.50	2.17
Water Quality Group (WQ)	10.00	5.36
Carbon Sequestration (CS)	1.53	
Fish Support Group (FISH)	3.33	6.67
Aquatic Support Group (AQ)	6.41	7.33
Terrestrial Support Group (TERR)	5.43	6.67
Public Use & Recognition (PU)		1.90
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		6.07
Wetland Stressors		2.59
Wetland Sensitivity		10.00

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	0.00
Slope	0.00
Flat	0.00
Depressional	0.00
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 30
Date(s) of assessment:	August 2010	Size (acres):	6.88
Data Sheet Number(s):	None	Cowardin Class(es):	PFO1C
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Depressional

TRS quarter section tax lot:	1812104001600, 1812150001700
Street address or location:	On County property between Hwy 101 and Shelter Cove Subdivision
Latitude:	44.0117
Longitude:	-124.1129
Locally Significant?:	No
Hydrologic basin:	171002060804
Soil -- Mapped series:	Waldport fine sand, Yaquina loamy fine sand
Hydrologic Source:	Groundwater

Dominant Wetland Vegetation			
TREES / SHRUBS		VINES / HERBS	
<i>Pinus contorta</i>	Shore Pine	<i>Rubus ursinus</i>	California Dewberry
<i>Spiraea douglasii</i>	Douglas' spirea	<i>Rubus discolor</i>	Himalayan Blackberry
<i>Vaccinium uliginosum</i>	Bog Blueberry	<i>Deschampsia cespitosa</i>	Tufted Hairgrass
<i>Alnus rubra</i>	Red Alder	<i>Carex obnupta</i>	Slough Sedge
<i>Salix hookeriana</i>	Hooker Willow	<i>Juncus effusus</i>	Soft Rush
<i>Rubus spectabilis</i>	Salmonberry	<i>Juncus sp.</i>	Rush

Comments:			
Series of interdunal swales surrounded by Pinus and Gaultheria dominated upland. Dominant groundcover includes Deschampsia and Vaccinium. Wetland fringes are dominated by willows. These wetlands were grouped because they are located in the same geomorphic position and have similar vegetation communities.			

COWARDIN CODES:	E2FO = estuarine forested	E2SS = estuarine scrub shrub	E2EM = estuarine emergent
PFO = palustrine forested	PSS = palustrine scrub-shrub	PEM = palustrine emergent	PUB = palustrine unconsolidated bottom
HGM CODES:	EFB = Estuarine Fringe Embayment	EFR = Estuarine Fringe Riverine	RFT = Riverine Flow Through
RI = River Impounding	LFH = Lacustrine Fringe Headwater	LJV = Lacustrine Fringe Valley	DB = Depressional Bog
DA = Depressional Alkaline	DO = Depressional Outflow	DCP = Depressional Closed Permanent	DCNP = Depressional Nonpermanent
	S = Slope	FL = Flats	

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 30

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	3.50	1.67
Sediment Retention & Stabilization (SR)	10.00	5.00
Phosphorus Retention (PR)	10.00	5.11
Nitrate Removal & Retention (NR)	10.00	4.33
Thermoregulation (T)	0.00	0.00
Carbon Sequestration (CS)	1.93	
Organic Matter Export (OE)	0.00	
Aquatic Invertebrate Habitat (INV)	5.70	7.42
Anadromous Fish Habitat (FA)	0.00	4.75
Non-anadromous Fish Habitat (FR)	3.97	6.67
Amphibian & Reptile Habitat (AM)	7.42	7.33
Waterbird Feeding Habitat (WBF)	4.75	4.00
Waterbird Nesting Habitat (WBN)	5.32	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	5.10	6.67
Pollinator Habitat (POL)	5.40	5.00
Native Plant Diversity (PD)	6.16	6.67

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	3.50	1.67
Water Quality Group (WQ)	10.00	5.11
Carbon Sequestration (CS)	1.93	
Fish Support Group (FISH)	3.97	6.67
Aquatic Support Group (AQ)	7.42	7.33
Terrestrial Support Group (TERR)	6.16	6.67
Public Use & Recognition (PU)		0.00
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		4.43
Wetland Stressors		2.75
Wetland Sensitivity		10.00

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	0.50
Slope	1.88
Flat	5.36
Depressional	13.61
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 31
Date(s) of assessment:	August 2010	Size (acres):	89.33
Data Sheet Number(s):	None	Cowardin Class(es):	PABH, PFO4C, PSS1C, PUBH
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Depressional open, Slope

TRS quarter section tax lot:	1812040000200, 1812044300077, 1812044302600, 1812044303500, 1812090000240, 1812090000241, 1812090000242, 1812090000243, 1812090000244, 1812090000246, 1812090000247, 1812090000250, 1812090000251, 1812090000500, 1812090000602		
Street address or location:	Either side of N Jetty Road; east to base of terrace (below Rhododendron Drive)		
Latitude:	44.0233		
Longitude:	-124.1312		
Locally Significant?:	No		
Hydrologic basin:	171002060804		
Soil -- Mapped series:	Heceta fine sand, Waldport fine sand, Dune land		
Hydrologic Source:	Groundwater, Precipitation		

Dominant Wetland Vegetation			
TREES / SHRUBS		VINES / HERBS	
<i>Pinus contorta</i>	Shore pine		
<i>Salix spp.</i>	Willow		

Comments:
 Large wetland complex on State property; located primarily east of N Jetty Road. Wetland maintains a seasonal hydrologic connection to the Siuslaw River via culverts under Jetty Road. These wetlands were grouped because they are located in the similar geomorphic positions and are hydrologically connected.

COWARDIN CODES:	E2FO = estuarine forested	E2SS = estuarine scrub shrub	E2EM = estuarine emergent
PFO = palustrine forested	PSS = palustrine scrub-shrub	PEM = palustrine emergent	PUB = palustrine unconsolidated bottom
HGM CODES:	EFB = Estuarine Fringe Embayment	EFR = Estuarine Fringe Riverine	RFT = Riverine Flow Through
R1 = River Impounding	LFH = Lacustrine Fringe Headwater	LIV = Lacustrine Fringe Valley	DB = Depressional Bog
DA = Depressional Alkaline	DO = Depressional Outflow	DCP = Depressional Closed Permanent	DCNP = Depressional Nonpermanent
	S = Slope	FL = Flats	

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 31

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	2.71	2.92
Sediment Retention & Stabilization (SR)	5.89	5.24
Phosphorus Retention (PR)	2.48	5.78
Nitrate Removal & Retention (NR)	6.17	4.13
Thermoregulation (T)	5.44	7.50
Carbon Sequestration (CS)	2.55	
Organic Matter Export (OE)	5.70	
Aquatic Invertebrate Habitat (INV)	5.89	7.93
Anadromous Fish Habitat (FA)	7.93	10.00
Non-anadromous Fish Habitat (FR)	6.98	6.67
Amphibian & Reptile Habitat (AM)	4.40	7.33
Waterbird Feeding Habitat (WBF)	5.74	7.33
Waterbird Nesting Habitat (WBN)	4.63	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	6.30	6.67
Pollinator Habitat (POL)	6.06	5.00
Native Plant Diversity (PD)	5.64	7.03

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	2.71	2.92
Water Quality Group (WQ)	6.17	7.50
Carbon Sequestration (CS)	2.55	
Fish Support Group (FISH)	7.93	10.00
Aquatic Support Group (AQ)	5.89	7.33
Terrestrial Support Group (TERR)	6.30	7.03
Public Use & Recognition (PU)		0.95
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		6.02
Wetland Stressors		2.80
Wetland Sensitivity		10.00

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	0.00
Slope	0.00
Flat	0.00
Depressional	0.00
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 32
Date(s) of assessment:	August 2010	Size (acres):	8.76
Data Sheet Number(s):	None	Cowardin Class(es):	L2ABH, PFO4C
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Lacustrine

TRS quarter section tax lot:	1812120000701, 1812120000702, 1812130001000, 1812130001800, 1812141000104, 1812141000113, 1812141000202		
Street address or location:	Ackerley Lake		
Latitude:	44.0116		
Longitude:	-124.0849		
Locally Significant?:	No		
Hydrologic basin:	171002060804		
Soil -- Mapped series:	Netarts fine sand, Bullards-Ferrelo loams		
Hydrologic Source:	Surface		

Dominant Wetland Vegetation

TREES / SHRUBS		VINES / HERBS	
<i>Pinus contorta</i>	Shore pine	<i>Carex obnupta</i>	Slough sedge
<i>Alnus rubra</i>	Red alder		

Comments:

This wetland includes an aquatic and forested area along the west side of Ackerley Lake south to Munsel Lake as well as three forested areas adjoining Munsel Lake. The lacustrine portion begins at the confluence of the Clear Lake drainage channel and Ackerley Lake. Vegetation identified above has not been confirmed but is presumed to be present based upon observation of similar habitats in the Florence area.

COWARDIN CODES:

PFO = palustrine forested

HGM CODES:

RI = River Impounding

DA = Depressional Alkaline

E2FO = estuarine forested

PSS = palustrine scrub-shrub

EFB = Estuarine Fringe Embayment

LFH = Lacustrine Fringe Headwater

DO = Depressional Outflow

S = Slope

E2SS = estuarine scrub shrub

PEM = palustrine emergent

EFR = Estuarine Fringe Riverine

LFV = Lacustrine Fringe Valley

DCP = Depressional Closed Permanent

FL = Flats

E2EM = estuarine emergent

PUB = palustrine unconsolidated bottom

RFT = Riverine Flow Through

DB = Depressional Bog

DCNP = Depressional Nonpermanent

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 32

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	2.26	2.00
Sediment Retention & Stabilization (SR)	4.46	4.88
Phosphorus Retention (PR)	5.56	5.92
Nitrate Removal & Retention (NR)	5.05	4.33
Thermoregulation (T)	3.61	6.67
Carbon Sequestration (CS)	2.18	
Organic Matter Export (OE)	6.90	
Aquatic Invertebrate Habitat (INV)	5.33	7.65
Anadromous Fish Habitat (FA)	6.64	10.00
Non-anadromous Fish Habitat (FR)	4.70	7.73
Amphibian & Reptile Habitat (AM)	5.52	7.33
Waterbird Feeding Habitat (WBF)	5.46	4.00
Waterbird Nesting Habitat (WBN)	5.26	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	7.65	6.67
Pollinator Habitat (POL)	8.73	5.00
Native Plant Diversity (PD)	6.59	7.96

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	2.26	2.00
Water Quality Group (WQ)	5.56	6.67
Carbon Sequestration (CS)	2.18	
Fish Support Group (FISH)	6.64	10.00
Aquatic Support Group (AQ)	6.90	7.33
Terrestrial Support Group (TERR)	8.73	7.96
Public Use & Recognition (PU)		2.22
Provisioning Services (PS)		2.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		6.77
Wetland Stressors		1.48
Wetland Sensitivity		3.37

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	0.00
Slope	0.00
Flat	0.00
Depressional	0.00
Lacustrine	10.00

Wetland Characterization Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 33
Date(s) of assessment:	August 2010	Size (acres):	0.61
Data Sheet Number(s):	None	Cowardin Class(es):	PFO4C
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Flat, depressional

TRS quarter section tax lot:	1812150001600
Street address or location:	Wetland between Hwy 101 and Shelter Cove Subdivision
Latitude:	44.0071
Longitude:	-124.1173
Locally Significant?:	Yes
Hydrologic basin:	171002060804
Soil -- Mapped series:	Yaquina loamy fine sand
Hydrologic Source:	Groundwater

Dominant Wetland Vegetation

TREES / SHRUBS		VINES / HERBS	
<i>Pinus contorta</i>	Shore Pine	<i>Deschampsia cespitosa</i>	Tufted Hairgrass
<i>Spiraea douglasii</i>	Douglas' Spirea	<i>Carex obnupta</i>	Slough Sedge
<i>Vaccinium uliginosum</i>	Bog Blueberry	<i>Juncus effusus</i>	Soft Rush
<i>Salix sp.</i>	Willow		

Comments:

Interdunal swale surrounded by Pinus and Gaultheria dominated upland. Wetland is dominated by tufted hairgrass and bog blueberry. Wetland fringe is dominated by shrubs (willows).

COWARDIN CODES:

PFO = palustrine forested

HGM CODES:

RI = River Impounding

DA = Depressional Alkaline

E2FO = estuarine forested

PSS = palustrine scrub-shrub

EFB = Estuarine Fringe Embayment

LFH = Lacustrine Fringe Headwater

DO = Depressional Outflow

S = Slope

E2SS = estuarine scrub shrub

PEM = palustrine emergent

EFR = Estuarine Fringe Riverine

LFV = Lacustrine Fringe Valley

DCP = Depressional Closed Permanent

FL = Flats

E2EM = estuarine emergent

PUB = palustrine unconsolidated bottom

RFT = Riverine Flow Through

DB = Depressional Bog

DCNP = Depressional Nonpermanent

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 33

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	4.50	1.67
Sediment Retention & Stabilization (SR)	10.00	4.77
Phosphorus Retention (PR)	10.00	4.69
Nitrate Removal & Retention (NR)	10.00	3.86
Thermoregulation (T)	0.00	0.00
Carbon Sequestration (CS)	1.99	
Organic Matter Export (OE)	0.00	
Aquatic Invertebrate Habitat (INV)	6.46	7.36
Anadromous Fish Habitat (FA)	0.00	4.27
Non-anadromous Fish Habitat (FR)	1.22	6.67
Amphibian & Reptile Habitat (AM)	7.36	7.33
Waterbird Feeding Habitat (WBF)	4.27	4.00
Waterbird Nesting Habitat (WBN)	0.00	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	6.55	6.67
Pollinator Habitat (POL)	7.09	5.00
Native Plant Diversity (PD)	5.99	6.97

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	4.50	1.67
Water Quality Group (WQ)	10.00	4.77
Carbon Sequestration (CS)	1.99	
Fish Support Group (FISH)	1.22	6.67
Aquatic Support Group (AQ)	7.36	7.33
Terrestrial Support Group (TERR)	7.09	6.97
Public Use & Recognition (PU)		10.00
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		6.64
Wetland Stressors		3.19
Wetland Sensitivity		10.00

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	0.50
Slope	1.50
Flat	6.15
Depressional	2.78
Lacustrine	0.00

Wetland Summary Sheet



Project Name: Florence LWI

		Wetland Code:	Wetland 34
Date(s) of assessment:	August 11, 2010	Size (acres):	1.88
Data Sheet Number(s):	10	Cowardin Class(es):	PFO1C
Investigator(s):	A. Hawkins / S. Eisner	HGM Class(es):	Riverine

TRS quarter section tax lot:	1812222302000, 1812222302100, 1812222301201, 1812223333703, 1812220000701, 1812222100066		
Street address or location:	East and west of Rhododendron Drive south of 35th		
Latitude:	43.9952		
Longitude:	-124.1176		
Locally Significant?:	Yes		
Hydrologic basin:	171002060804		
Soil -- Mapped series:	Yaquina-Urban land complex, Dune lands		
Hydrologic Source:	Groundwater, Surface		

Dominant Wetland Vegetation

TREES / SHRUBS		VINES / HERBS	
<i>Lonicera involucrata</i>	Bearberry Honeysuckle	<i>Rubus discolor</i>	Himalayan Blackberry
<i>Alnus rubra</i>	Red Alder	<i>Juncus effusus</i>	Soft Rush
<i>Salix hookeriana</i>	Hooker Willow	<i>Holcus lanatus</i>	Common Velvet Grass
		<i>Erechtites minima</i>	Burnweed
		<i>Equisetum arvense</i>	Field Horsetail
		<i>Epilobium watsonii</i>	Watson's Willow-Herb

Comments:

Wetland at valley bottom associated with stream east of Rhododendron Drive. Northern portion is confined by residential development on both sides. West of the wetland the stream enters a culvert which outlets into the Siuslaw River. Portions of this feature have been delineated and received concurrence from DSL (WD#'s 2006-0740 & 1999-0227).

COWARDIN CODES:	E2FO = estuarine forested	E2SS = estuarine scrub shrub	E2EM = estuarine emergent
PFO = palustrine forested	PSS = palustrine scrub-shrub	PEM = palustrine emergent	PUB = palustrine unconsolidated bottom
HGM CODES:	EFB = Estuarine Fringe Embayment	EFR = Estuarine Fringe Riverine	RFT = Riverine Flow Through
RI = River Impounding	LFH = Lacustrine Fringe Headwater	LFV = Lacustrine Fringe Valley	DB = Depressional Bog
DA = Depressional Alkaline	DO = Depressional Outflow	DCP = Depressional Closed Permanent	DCNP = Depressional Nonpermanent
	S = Slope	FL = Flats	

ORWAP SCORES SHEET (Version 2.0.2)

Florence Local Wetland Inventory

Wetland 34

SPECIFIC FUNCTIONS	Relative Effectiveness of the Function	Relative Values of the Function
Water Storage & Delay (WS)	1.64	1.67
Sediment Retention & Stabilization (SR)	5.03	6.64
Phosphorus Retention (PR)	2.60	5.76
Nitrate Removal & Retention (NR)	4.66	4.68
Thermoregulation (T)	4.94	5.00
Carbon Sequestration (CS)	3.15	
Organic Matter Export (OE)	6.06	
Aquatic Invertebrate Habitat (INV)	4.21	6.00
Anadromous Fish Habitat (FA)	0.00	4.16
Non-anadromous Fish Habitat (FR)	2.57	6.67
Amphibian & Reptile Habitat (AM)	2.88	6.67
Waterbird Feeding Habitat (WBF)	4.16	4.00
Waterbird Nesting Habitat (WBN)	0.00	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	4.55	6.67
Pollinator Habitat (POL)	4.66	0.83
Native Plant Diversity (PD)	4.53	6.67

GROUPED FUNCTIONS	Group Scores (functions)	Group Scores (values)
Hydrologic Function (WS)	1.64	1.67
Water Quality Group (WQ)	5.03	6.64
Carbon Sequestration (CS)	3.15	
Fish Support Group (FISH)	2.57	6.67
Aquatic Support Group (AQ)	6.06	6.67
Terrestrial Support Group (TERR)	4.66	6.67
Public Use & Recognition (PU)		0.00
Provisioning Services (PS)		0.00

OTHER ATTRIBUTES		
Wetland Ecological Condition		7.46
Wetland Stressors		3.79
Wetland Sensitivity		5.06

HGM Class - Relative Probabilities (select max)	
Estuarine	0.00
Riverine	3.50
Slope	1.44
Flat	0.00
Depressional	0.00
Lacustrine	0.00

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site Florence LWI City/County Florence/Lane Sampling Date 7/8/2010

Applicant/Owner City of Florence State OR Sampling Point 1

Investigator(s) CR/AH Section Township, Range Section 22, T 18 South, R 12 West

Landform (hillslope, terrace, etc.) swale Local relief (concave, convex, none) _____ Slope (%) _____

Subregion (LRR) LRR A Lat _____ Long _____ Datum _____

Soil Map Unit Name Waldport fine sand NWI Classification None

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)

Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y

Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Is Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present? Yes <u>X</u> No _____	
Wetland Hydrology Present? Yes <u>X</u> No _____	
Remarks	

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size <u>30</u>)			
1 <u><i>Pinus contorta</i></u>	<u>50</u>	<u>X</u>	<u>FAC</u>
2 _____	_____	_____	_____
3 _____	_____	_____	_____
4 _____	_____	_____	_____
	<u>50</u>	= Total Cover	
Sapling/Shrub Stratum (plot size <u>5</u>)			
1 <u><i>Salix sitchensis</i></u>	<u>3</u>	<u>X</u>	<u>FACW</u>
2 _____	_____	_____	_____
3 _____	_____	_____	_____
4 _____	_____	_____	_____
5 _____	_____	_____	_____
	<u>3</u>	= Total Cover	
Herb Stratum (plot size <u>30</u>)			
1 <u><i>Carex obnupta</i></u>	<u>95</u>	<u>X</u>	<u>OBL</u>
2 _____	_____	_____	_____
3 _____	_____	_____	_____
4 _____	_____	_____	_____
5 _____	_____	_____	_____
6 _____	_____	_____	_____
7 _____	_____	_____	_____
8 _____	_____	_____	_____
	<u>95</u>	= Total Cover	
Woody Vine Stratum (plot size _____)			
1 _____	_____	_____	_____
2 _____	_____	_____	_____
	<u>0</u>	= Total Cover	
% Bare Ground in Herb Stratum _____			
Remarks			

Dominance Test worksheet:

Number of Dominant Species _____

That are OBL, FACW, or FAC 3 (A)

Total Number of Dominant Species Across All Strata 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of	Multiply by	
OBL Species _____	x 1 =	<u>0</u>
FACW species _____	x 2 =	<u>0</u>
FAC Species _____	x 3 =	<u>0</u>
FACU Species _____	x 4 =	<u>0</u>
UPL Species _____	x 5 =	<u>0</u>
Column Totals <u>0</u> (A)		<u>0</u> (B)

Prevalence Index = B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

Morphological Adaptations¹ (provide supporting data in Remarks or on a separate sheet)

Wetland Non-Vascular Plants¹

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic

Hydrophytic Vegetation Present? Yes X No _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type	Loc ¹		
0-2	10YR 2/2	100					Sandy Loam	
2-18	2.5Y 5/3	95	10YR 4/6	5	C	M	Sand	organic streaking

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains¹Location: PL=Pore Lining M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input checked="" type="checkbox"/> Other (explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type None

Depth (inches) _____

Hydric Soil Present? Yes X No _____

Remarks

Sample site is a depressional area that meets hydrophytic vegetation and wetland hydrology indicators. Prominent concentrations in the form of streaks of organic material in a sandy soil were observed. Despite not meeting any of the criteria above, the observed soils are hydric.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (2 or more required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)	<input checked="" type="checkbox"/> Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)	<input checked="" type="checkbox"/> Fac-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches) _____

Water Table Present? Yes _____ No X Depth (inches) _____

Saturation Present? Yes _____ No X Depth (inches) _____
(includes capillary fringe)

Wetland Hydrology Present?

Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections) if available

None

Remarks

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site Florence LWI City/County Florence/Lane Sampling Date 7/8/2010

Applicant/Owner City of Florence State OR Sampling Point 2

Investigator(s) CR/AH Section, Township Range Section 22, T 18 South, R 12 West

Landform (hillslope, terrace, etc.) _____ Local relief (concave, convex, none) _____ Slope (%) _____

Subregion (LRR) LRR A Lat _____ Long _____ Datum _____

Soil Map Unit Name Waldport fine sand NWI Classification None

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)

Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y

Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is Sampled Area within a Wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>			
Wetland Hydrology Present?	Yes _____	No <u>X</u>			
Remarks:					

VEGETATION - Use scientific names of plants.

Tree Stratum	absolute % cover	Dominant Species?	Indicator Status
1 <u>Pinus contorta</u>	<u>95</u>	<u>X</u>	<u>FAC</u>
2 _____			
3 _____			
4 _____			
	<u>95</u>	= Total Cover	

Sapling/Shrub Stratum (plot size: _____)

1	2	3	4	5
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
	<u>0</u>	= Total Cover		

Herb Stratum (plot size: _____)

1	2	3	4	5	6	7	8
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
	<u>0</u>	= Total Cover					

Woody Vine Stratum (plot size: _____)

1	2
_____	_____
_____	_____
	<u>0</u>
	= Total Cover

% Bare Ground in Herb Stratum 100

Remarks: Dense overstory with no groundcover.

Dominance Test worksheet:

Number of Dominant Species

That are OBL, FACW, or FAC 1 (A)

Total Number of Dominant Species Across All Strata 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of	Multiply by	
OBL Species	x 1 =	<u>0</u>
FACW species	x 2 =	<u>0</u>
FAC Species	x 3 =	<u>0</u>
FACU Species	x 4 =	<u>0</u>
UPL Species	x 5 =	<u>0</u>
Column Totals	<u>0</u> (A)	<u>0</u> (B)

Prevalence Index = B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0 ¹

_____ Morphological Adaptations¹ (provide supporting data in Remarks or on a separate sheet)

_____ Wetland Non-Vascular Plants¹

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes X No _____

[illegible]

* Location. PL=Pore Lining. M=Matrix

Indicators for Problematic Hydric Soils³:

_____ Histosol (A1)	_____ Sandy Redox (S5)	_____ 2 cm Muck (A10)
_____ Histic Epipedon (A2)	_____ Stripped Matrix (S6)	_____ Red Parent Material (TF2)
_____ Black Histic (A3)	_____ Loamy Mucky Mineral (F1)(except MLRA 1)	_____ Other (explain in Remarks)
_____ Hydrogen Sulfide (A4)	_____ Loamy Gleyed Matrix (F2)	
_____ Depleted Below Dark Surface (A11)	_____ Depleted Matrix (F3)	
_____ Thick Dark Surface (A12)	_____ Redox Dark Surface (F6)	
_____ Sandy Mucky Mineral (S1)	_____ Depleted Dark Surface (F7)	
_____ Sandy Gleyed Matrix (S4)	_____ Redox Depressions (F8)	

Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Type: _____ None _____

Depth (inches) _____

Hydric Soil Present?	Yes	X	No
----------------------	-----	---	----

Remarks

Wetland Hydrology Indicators:

Secondary Indicators (2 or more required)

Surface Water (A1)	Water stained Leaves (B9) (Except MLRA	Water stained Leaves (B9)
High Water Table (A2)	1, 2, 4A, and 4B)	(MLRA1, 2, 4A, and 4B)
Saturation (A3)	Salt Crust (B11)	Drainage Patterns (B10)
Water Marks (B1)	Aquatic Invertebrates (B13)	Dry-Season Water Table (C2)
Sediment Deposits (B2)	Hydrogen Sulfide Odor (C1)	Saturation Visible on Aerial Imagery (C9)
Drift Deposits (B3)	Oxidized Rhizospheres along Living Roots (C3)	Geomorphic Position (D2)
Algal Mat or Crust (B4)	Presence of Reduced Iron (C4)	Shallow Aquitard (D3)
Iron Deposits (B5)	Recent Iron Reduction in Plowed Soils (C6)	Fac-Neutral Test (D5)
Surface Soil Cracks (B6)	Stunted or Stressed Plants (D1) (LRR A)	Raised Ant Mounds (D6) (LRR A)
Inundation Visible on Aerial Imagery (B7)	Other (Explain in Remarks)	Frost-Heave Hummocks (D7)
Sparsely Vegetated Concave Surface (B8)		

Surface Water Present?	Yes	<u> </u>	No	<u> X </u>	Depth (inches)	<u> </u>
Water Table Present?	Yes	<u> </u>	No	<u> X </u>	Depth (inches)	<u> </u>
Saturation Present? (includes capillary fringe)	Yes	<u> </u>	No	<u> X </u>	Depth (inches)	<u> </u>

Wetland Hydrology Present?

Yes	No	X
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections) if available

None

Remarks

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site Florence LWI City/County Florence/Lane Sampling Date 7/15/2010

Applicant/Owner City of Florence State OR Sampling Point 3

Investigator(s) AH/SE Section Township Range Section 2, T 18 South, R 12 West

Landform (hillslope terrace, etc.) _____ Local relief (concave, convex, none) _____ Slope (%) _____

Subregion (LRR) LRR A Lat _____ Long _____ Datum _____

Soil Map Unit Name Yaquina loamy fine sand NWI Classification PEMC

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)

Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y

Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Is Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present? Yes <u>X</u> No _____	
Wetland Hydrology Present? Yes <u>X</u> No _____	
Remarks	

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size _____)			
1 _____			
2 _____			
3 _____			
4 _____			
	<u>0</u>	= Total Cover	
Sapling/Shrub Stratum (plot size <u>5</u>)			
1 <u>Spiraea douglasii</u>	<u>30</u>	<u>X</u>	<u>FACW</u>
2 <u>Myrica californica</u>	<u>70</u>	<u>X</u>	<u>FACW</u>
3 _____			
4 _____			
5 _____			
	<u>100</u>	= Total Cover	
Herb Stratum (plot size _____)			
1 _____			
2 _____			
3 _____			
4 _____			
5 _____			
6 _____			
7 _____			
8 _____			
	<u>0</u>	= Total Cover	
Woody Vine Stratum (plot size _____)			
1 _____			
2 _____			
	<u>0</u>	= Total Cover	
% Bare Ground in Herb Stratum _____			
Remarks			

Dominance Test worksheet:

Number of Dominant Species _____

That are OBL, FACW, or FAC 2 (A)

Total Number of Dominant Species Across All Strata 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of	Multiply by	
OBL Species _____	x 1 =	<u>0</u>
FACW species _____	x 2 =	<u>0</u>
FAC Species _____	x 3 =	<u>0</u>
FACU Species _____	x 4 =	<u>0</u>
UPL Species _____	x 5 =	<u>0</u>
Column Totals <u>0</u> (A)		<u>0</u> (B)

Prevalence Index = B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

Morphological Adaptations¹ (provide supporting data in Remarks or on a separate sheet)

Wetland Non-Vascular Plants¹

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes X No _____

Additional wetland vegetation: Carex obnupta, Pinus contorta, some Vaccinium ovatum.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type	Loc ²		
3-0	Duff							
0-3	10YR 4/2	100					sand	
3-18	10YR 4/2	30	10YR 4/6	20	C	M	sand	soft masses
			10YR 4/4	50	C	M		soft masses

¹Type C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains²Location PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

<input checked="" type="checkbox"/> Histosol (A1)	<input checked="" type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1)(except MLRA 1)	<input type="checkbox"/> Other (explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present unless disturbed or problematic

Restrictive Layer (if present):

Type. NoneDepth (Inches) Hydric Soil Present? Yes ☒ No ☐

Remarks

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required, check all that apply)

Secondary Indicators (2 or more required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)	<input checked="" type="checkbox"/> Fac-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

Field Observations:

Surface Water Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches)	<u>7</u>
Water Table Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (inches)	<u>7</u>
Saturation Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (inches)	<u>0</u>

(includes capillary fringe)

Wetland Hydrology Present?

Yes ☒ No ☐

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections), if available:

None

Remarks

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site Florence LWI City/County Florence/Lane Sampling Date 7/15/2010

Applicant/Owner City of Florence State OR Sampling Point: 4

Investigator(s) AH/SE Section, Township, Range: Section 14, T 18 South, R 12 West

Landform (hillslope, terrace, etc.) _____ Local relief (concave, convex, none) _____ Slope (%): _____

Subregion (LRR): LRR A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name Waldport fine sand NWI Classification: L2ABH

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)

Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y

Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Is Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present? Yes <u>X</u> No _____	
Wetland Hydrology Present? Yes <u>X</u> No _____	
Remarks:	

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size: <u>30</u>)			
1 <u>Rhamnus purshiana</u>	<u>15</u>	<u>X</u>	<u>FAC</u>
2 <u>Thuja plicata</u>	<u>20</u>	<u>X</u>	<u>FAC</u>
3 _____	_____	_____	_____
4 _____	_____	_____	_____
	<u>35</u>	= Total Cover	
Sapling/Shrub Stratum (plot size: <u>5</u>)			
1 <u>Rubus spectabilis</u>	<u>2</u>	_____	<u>FAC</u>
2 <u>Spiraea douglasii</u>	<u>15</u>	<u>X</u>	<u>FACW</u>
3 <u>Malus fusca</u>	<u>15</u>	<u>X</u>	<u>FACW</u>
4 <u>Gaultheria shallon</u>	<u>3</u>	_____	<u>FACU</u>
5 _____	_____	_____	_____
	<u>35</u>	= Total Cover	
Herb Stratum (plot size: <u>5</u>)			
1 <u>Carex obnupta</u>	<u>93</u>	<u>X</u>	<u>OBL</u>
2 <u>Hedera helix</u>	<u>2</u>	_____	<u>UPL</u>
3 <u>Oenanthe sarmentosa</u>	<u>3</u>	_____	<u>OBL</u>
4 _____	_____	_____	_____
5 _____	_____	_____	_____
6 _____	_____	_____	_____
7 _____	_____	_____	_____
8 _____	_____	_____	_____
	<u>98</u>	= Total Cover	
Woody Vine Stratum (plot size: _____)			
1 _____	_____	_____	_____
2 _____	_____	_____	_____
	<u>0</u>	= Total Cover	
% Bare Ground in Herb Stratum _____			
Remarks:			
Additional wetland vegetation: <u>Salix sp., Lysichiton americanum, Juncus tenuis, Scirpus sp., Nuphar luteum.</u>			

Dominance Test worksheet:

Number of Dominant Species _____

That are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of	Multiply by	
OBL Species _____	x 1 =	<u>0</u>
FACW species _____	x 2 =	<u>0</u>
FAC Species _____	x 3 =	<u>0</u>
FACU Species _____	x 4 =	<u>0</u>
UPL Species _____	x 5 =	<u>0</u>
Column Totals <u>0</u> (A)		<u>0</u> (B)

Prevalence Index = B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

Prevalence Index is ≤ 3.0¹

Morphological Adaptations¹ (provide supporting data in Remarks or on a separate sheet)

Wetland Non-Vascular Plants²

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes X No _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type	Loc ¹		
0-8	7.5YR 2.5/1	100					Sand	fine, silty. High organic content.
8-12	2.5Y 4/1	100					Sand	fine.

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1)(except MLRA 1)	<input type="checkbox"/> Other (explain in Remarks)
<input checked="" type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: None

Depth (inches):

Hydric Soil Present? Yes X No

Remarks

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (2 or more required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)	<input type="checkbox"/> Fac-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

Field Observations:

Surface Water Present?	Yes <u></u> No <u>X</u>	Depth (inches)	<u></u>
Water Table Present?	Yes <u>X</u> No <u></u>	Depth (inches)	<u>3</u>
Saturation Present? (includes capillary fringe)	Yes <u>X</u> No <u></u>	Depth (inches)	<u>0</u>

Wetland Hydrology Present?

Yes X No

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

None

Remarks

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site Florence LWI City/County Florence/Lane Sampling Date 7/15/2010

Applicant/Owner City of Florence State OR Sampling Point 5

Investigator(s) AH/SE Section Township Range Section 24, T 18 South, R 12 West

Landform (hillslope terrace etc.) _____ Local relief (concave, convex, none) _____ Slope (%) _____

Subregion (LRR) LRR A Lat _____ Long _____ Datum _____

Soil Map Unit Name Yaquina loamy fine sand NW Classification None

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)

Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y

Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Is Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present? Yes <u>X</u> No _____	
Wetland Hydrology Present? Yes <u>X</u> No _____	
Remarks	

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size <u>30</u>)			
1 <u><i>Alnus rubra</i></u>	<u>60</u>	<u>X</u>	<u>FAC</u>
2 <u><i>Tsuga heterophylla</i></u>	<u>5</u>		<u>FACU</u>
3 _____			
4 _____			
	<u>65</u>	= Total Cover	
Sapling/Shrub Stratum (plot size <u>5</u>)			
1 <u><i>Rubus spectabilis</i></u>	<u>20</u>	<u>X</u>	<u>FAC</u>
2 _____			
3 _____			
4 _____			
5 _____			
	<u>20</u>	= Total Cover	
Herb Stratum (plot size <u>5</u>)			
1 <u><i>Equisetum arvense</i></u>	<u>5</u>	<u>X</u>	<u>FAC</u>
2 <u><i>Lysichiton americanum</i></u>	<u>10</u>	<u>X</u>	<u>OBL</u>
3 <u><i>Athyrium filix-femina</i></u>	<u>5</u>	<u>X</u>	<u>FAC</u>
4 <u><i>Polystichum munitum</i></u>	<u>3</u>		<u>FACU</u>
5 _____			
6 _____			
7 _____			
8 _____			
	<u>23</u>	= Total Cover	
Woody Vine Stratum (plot size _____)			
1 _____			
2 _____			
	<u>0</u>	= Total Cover	
% Bare Ground in Herb Stratum <u>20</u>			
Remarks			

Dominance Test worksheet:

Number of Dominant Species _____

That are OBL, FACW or FAC 5 (A)

Total Number of Dominant Species Across All Strata 5 (B)

Percent of Dominant Species That are OBL, FACW, or FAC 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of	Multiply by	
OBL Species _____	x 1 =	<u>0</u>
FACW species _____	x 2 =	<u>0</u>
FAC Species _____	x 3 =	<u>0</u>
FACU Species _____	x 4 =	<u>0</u>
UPL Species _____	x 5 =	<u>0</u>
Column Totals <u>0</u> (A)		<u>0</u> (B)

Prevalence Index = B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

Prevalence Index is $\leq 3.0^1$

Morphological Adaptations¹ (provide supporting data in Remarks or on a separate sheet)

Wetland Non-Vascular Plants¹

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes X No _____

Other wetland vegetation: Salix sp., Ribes sp., Tsuga heterophylla, Thuja plicata, Oenanthe sarmentosa, Polystichum munitum.

Remarks

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site Florence LWI City/County Florence/Lane Sampling Date 7/16/2010

Applicant/Owner City of Florence State OR Sampling Point 6

Investigator(s) AH/SE Section Township, Range Section 3, T 18 South, R 12 West

Landform (hillslope, terrace, etc.) _____ Local relief (concave, convex, none) _____ Slope (%): _____

Subregion (LRR) LRR A Lat _____ Long _____ Datum _____

Soil Map Unit Name Dune land NWI Classification PSSC

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)

Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y

Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Is Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present? Yes <u>X</u> No _____	
Wetland Hydrology Present? Yes <u>X</u> No _____	
Remarks _____	

VEGETATION - Use scientific names of plants.

Tree Stratum	absolute % cover	Dominant Species?	Indicator Status
1 <u>Pinus contorta</u>	<u>30</u>	<u>X</u>	<u>FAC</u>
2 _____			
3 _____			
4 _____			
	<u>30</u>	= Total Cover	

Tree Stratum (plot size: 30)

Sapling/Shrub Stratum	absolute % cover	Dominant Species?	Indicator Status
1 <u>Salix sp.</u>	<u>15</u>	<u>X</u>	<u>(FAC to FACW)</u>
2 _____			
3 _____			
4 _____			
5 _____			
	<u>15</u>	= Total Cover	

Sapling/Shrub Stratum (plot size: 5)

Herb Stratum	absolute % cover	Dominant Species?	Indicator Status
1 <u>Scirpus microcarpus</u>	<u>40</u>	<u>X</u>	<u>OBL</u>
2 _____			
3 _____			
4 _____			
5 _____			
6 _____			
7 _____			
8 _____			
	<u>40</u>	= Total Cover	

Herb Stratum (plot size: 5)

Woody Vine Stratum	absolute % cover	Dominant Species?	Indicator Status
1 _____			
2 _____			
	<u>0</u>	= Total Cover	

Woody Vine Stratum (plot size: _____)

% Bare Ground in Herb Stratum 60

Remarks _____

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC 3 (A)

Total Number of Dominant Species Across All Strata 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of	Multiply by	
OBL Species	x 1 =	<u>0</u>
FACW species	x 2 =	<u>0</u>
FAC Species	x 3 =	<u>0</u>
FACU Species	x 4 =	<u>0</u>
UPL Species	x 5 =	<u>0</u>
Column Totals	<u>0</u> (A)	<u>0</u> (B)

Prevalence Index = B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

Prevalence index is ≤ 3.0¹

Morphological Adaptations¹ (provide supporting data in Remarks or on a separate sheet)

Wetland Non-Vascular Plants¹

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic

Hydrophytic Vegetation Present? Yes X No _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type	Loc ¹		
1-0	Duff							
0-12	10YR 4/2	100					Sand	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains

²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/>	Histosol (A1)	<input type="checkbox"/>	Sandy Redox (S5)	<input type="checkbox"/>	2 cm Muck (A10)
<input type="checkbox"/>	Histic Epipedon (A2)	<input type="checkbox"/>	Stripped Matrix (S6)	<input type="checkbox"/>	Red Parent Material (TF2)
<input type="checkbox"/>	Black Histic (A3)	<input type="checkbox"/>	Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/>	Other (explain in Remarks)
<input checked="" type="checkbox"/>	Hydrogen Sulfide (A4)	<input type="checkbox"/>	Loamy Gleyed Matrix (F2)		
<input type="checkbox"/>	Depleted Below Dark Surface (A11)	<input type="checkbox"/>	Depleted Matrix (F3)		
<input type="checkbox"/>	Thick Dark Surface (A12)	<input type="checkbox"/>	Redox Dark Surface (F6)		
<input type="checkbox"/>	Sandy Mucky Mineral (S1)	<input type="checkbox"/>	Depleted Dark Surface (F7)		
<input type="checkbox"/>	Sandy Gleyed Matrix (S4)	<input type="checkbox"/>	Redox Depressions (F8)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present unless disturbed or problematic

Restrictive Layer (if present):

Type None

Depth (inches)

Hydric Soil Present? Yes X No

Remarks

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required, check all that apply)

Secondary Indicators (2 or more required)

<input checked="" type="checkbox"/>	Surface Water (A1)	<input type="checkbox"/>	Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/>	Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input checked="" type="checkbox"/>	High Water Table (A2)	<input type="checkbox"/>	Salt Crust (B11)	<input type="checkbox"/>	Drainage Patterns (B10)
<input checked="" type="checkbox"/>	Saturation (A3)	<input type="checkbox"/>	Aquatic Invertebrates (B13)	<input type="checkbox"/>	Dry-Season Water Table (C2)
<input type="checkbox"/>	Water Marks (B1)	<input checked="" type="checkbox"/>	Hydrogen Sulfide Odor (C1)	<input type="checkbox"/>	Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/>	Sediment Deposits (B2)	<input type="checkbox"/>	Oxidized Rhizospheres along Living Roots (C3)	<input checked="" type="checkbox"/>	Geomorphic Position (D2)
<input type="checkbox"/>	Drift Deposits (B3)	<input type="checkbox"/>	Presence of Reduced Iron (C4)	<input type="checkbox"/>	Shallow Aquitard (D3)
<input type="checkbox"/>	Algal Mat or Crust (B4)	<input type="checkbox"/>	Recent Iron Reduction in Plowed Soils (C6)	<input checked="" type="checkbox"/>	Fac-Neutral Test (D5)
<input type="checkbox"/>	Iron Deposits (B5)	<input type="checkbox"/>	Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/>	Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/>	Surface Soil Cracks (B6)	<input type="checkbox"/>	Other (Explain in Remarks)	<input type="checkbox"/>	Frost-Heave Hummocks (D7)
<input type="checkbox"/>	Inundation Visible on Aerial Imagery (B7)				
<input type="checkbox"/>	Sparsely Vegetated Concave Surface (B8)				

Field Observations:

Surface Water Present?	Yes <u></u>	No <u>X</u>	Depth (inches)	<u>3</u>
Water Table Present?	Yes <u>X</u>	No <u></u>	Depth (inches)	<u>0</u>
Saturation Present? (includes capillary fringe)	Yes <u>X</u>	No <u></u>	Depth (inches)	<u>0</u>

Wetland Hydrology Present?

Yes x No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections) if available

None

Remarks

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site Florence LWI City/County Florence/Lane Sampling Date 7/16/2010

Applicant/Owner City of Florence State OR Sampling Point 7

Investigator(s) AH/SE Section Township Range Section 4, T 18 South, R 12 West

Landform (hillslope terrace etc.) _____ Local relief (concave convex, none) _____ Slope (%) _____

Subregion (LRR) LRR A Lat _____ Long _____ Datum _____

Soil Map Unit Name Yaquina loamy fine sand NW Classification None

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)

Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y

Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Is Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present? Yes <u>X</u> No _____	
Wetland Hydrology Present? Yes <u>X</u> No _____	
Remarks	

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status	
Tree Stratum (plot size <u>30</u>)				Dominance Test worksheet:
1 <u>Salix sp.</u>	<u>70</u>	<u>X</u>	<u>(FAC to FACW)</u>	Number of Dominant Species
2 _____				That are OBL, FACW, or FAC <u>5</u> (A)
3 _____				Total Number of Dominant
4 _____				Species Across All Strata <u>5</u> (B)
	<u>70</u>	= Total Cover		Percent of Dominant Species
Sapling/Shrub Stratum (plot size <u>5</u>)				That are OBL, FACW, or FAC <u>100%</u> (A/B)
1 <u>Spiraea douglasii</u>	<u>3</u>		<u>FACW</u>	Prevalence Index Worksheet:
2 <u>Vaccinium ovatum</u>	<u>5</u>		<u>UPL</u>	
3 <u>Ledum glandulosum</u>	<u>30</u>	<u>X</u>	<u>FACW</u>	
4 <u>Lonicera involucrata</u>	<u>25</u>	<u>X</u>	<u>FAC</u>	
5 <u>Salix sp.</u>	<u>20</u>	<u>X</u>	<u>(FAC to FACW)</u>	
	<u>83</u>	= Total Cover		Total % Cover of _____ Multiply by _____
Herb Stratum (plot size <u>5</u>)				OBL Species _____ x 1 = <u>0</u>
1 <u>Carex obnupta</u>	<u>30</u>	<u>X</u>	<u>OBL</u>	FACW species _____ x 2 = <u>0</u>
2 _____				FAC Species _____ x 3 = <u>0</u>
3 _____				FACU Species _____ x 4 = <u>0</u>
4 _____				UPL Species _____ x 5 = <u>0</u>
5 _____				Column Totals <u>0</u> (A) <u>0</u> (B)
6 _____				Prevalence Index = B/A = <u>#DIV/0!</u>
7 _____				Hydrophytic Vegetation Indicators:
8 _____				
	<u>30</u>	= Total Cover		
Woody Vine Stratum (plot size _____)				
1 _____				
2 _____				
	<u>0</u>	= Total Cover		<u>X</u> Dominance Test is >50%
% Bare Ground in Herb Stratum <u>40</u>				Prevalence Index is ≤ 3.0 ¹
Remarks				Morphological Adaptations ¹ (provide supporting data in Remarks or on a separate sheet)
				Wetland Non-Vascular Plants ¹
				Problematic Hydrophytic Vegetation ¹ (Explain)
				¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic
				Hydrophytic Vegetation Present? Yes <u>X</u> No _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type	Loc ²		
0-5	7.5YR 3/3	100						muck; nearly all organic material
5-8	5Y 2.5/1	100					Sand	mucky
8-12	2.5Y 3/1	100					Sand	fine sand, no organics

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains

²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/>	Histosol (A1)	<input type="checkbox"/>	Sandy Redox (S5)	<input type="checkbox"/>	2 cm Muck (A10)
<input checked="" type="checkbox"/>	Histic Epipedon (A2)	<input type="checkbox"/>	Stripped Matrix (S6)	<input type="checkbox"/>	Red Parent Material (TF2)
<input type="checkbox"/>	Black Histic (A3)	<input type="checkbox"/>	Loamy Mucky Mineral (F1)(except MLRA 1)	<input type="checkbox"/>	Other (explain in Remarks)
<input checked="" type="checkbox"/>	Hydrogen Sulfide (A4)	<input type="checkbox"/>	Loamy Gleyed Matrix (F2)		
<input type="checkbox"/>	Depleted Below Dark Surface (A11)	<input type="checkbox"/>	Depleted Matrix (F3)		
<input type="checkbox"/>	Thick Dark Surface (A12)	<input type="checkbox"/>	Redox Dark Surface (F6)		
<input type="checkbox"/>	Sandy Mucky Mineral (S1)	<input type="checkbox"/>	Depleted Dark Surface (F7)		
<input type="checkbox"/>	Sandy Gleyed Matrix (S4)	<input type="checkbox"/>	Redox Depressions (F8)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: None

Depth (inches):

Hydric Soil Present? Yes X No

Remarks

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (2 or more required)

<input checked="" type="checkbox"/>	Surface Water (A1)	<input type="checkbox"/>	Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/>	Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input checked="" type="checkbox"/>	High Water Table (A2)	<input type="checkbox"/>	Salt Crust (B11)	<input type="checkbox"/>	Drainage Patterns (B10)
<input checked="" type="checkbox"/>	Saturation (A3)	<input type="checkbox"/>	Aquatic Invertebrates (B13)	<input type="checkbox"/>	Dry-Season Water Table (C2)
<input type="checkbox"/>	Water Marks (B1)	<input checked="" type="checkbox"/>	Hydrogen Sulfide Odor (C1)	<input type="checkbox"/>	Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/>	Sediment Deposits (B2)	<input type="checkbox"/>	Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/>	Geomorphic Position (D2)
<input type="checkbox"/>	Drift Deposits (B3)	<input type="checkbox"/>	Presence of Reduced Iron (C4)	<input type="checkbox"/>	Shallow Aquitard (D3)
<input type="checkbox"/>	Algal Mat or Crust (B4)	<input type="checkbox"/>	Recent Iron Reduction in Plowed Soils (C6)	<input checked="" type="checkbox"/>	Fac-Neutral Test (D5)
<input type="checkbox"/>	Iron Deposits (B5)	<input type="checkbox"/>	Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/>	Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/>	Surface Soil Cracks (B6)	<input type="checkbox"/>	Other (Explain in Remarks)	<input type="checkbox"/>	Frost-Heave Hummocks (D7)
<input type="checkbox"/>	Inundation Visible on Aerial Imagery (B7)				
<input type="checkbox"/>	Sparsely Vegetated Concave Surface (B8)				

Field Observations:

Surface Water Present?	Yes <u></u>	No <u>X</u>	Depth (inches)	<u>1</u>
Water Table Present?	Yes <u>X</u>	No <u></u>	Depth (inches)	<u>0</u>
Saturation Present?	Yes <u>X</u>	No <u></u>	Depth (inches)	<u>0</u>

includes capillary fringe

Wetland Hydrology Present?

Yes X No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections) if available

None

Remarks

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site Florence LWI City/County Florence/Lane Sampling Date 7/16/2010

Applicant/Owner City of Florence State: OR Sampling Point 8

Investigator(s) AH/SE Section, Township, Range: Section 4, T 18 South, R 12 West

Landform (hill/slope, terrace, etc.): _____ Local relief (concave, convex, none) _____ Slope (%) _____

Subregion (LRR) LRR A Lat _____ Long. _____ Datum _____

Soil Map Unit Name Yaquina loamy fine sand NWI Classification: None

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)

Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y

Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Is Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present? Yes <u>X</u> No _____	
Wetland Hydrology Present? Yes <u>X</u> No _____	
Remarks	

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size <u>30</u>)			
1 <u>Myrica californica</u>	<u>40</u>	<u>X</u>	<u>FACW</u>
2 <u>Picea sitchensis</u>	<u>20</u>	<u>X</u>	<u>FAC</u>
3 <u>Picea sp.</u>	<u>5</u>		<u>(FAC)</u>
4 _____			
	<u>65</u>	= Total Cover	
Sapling/Shrub Stratum (plot size: <u>5</u>)			
1 <u>Spiraea douglasii</u>	<u>15</u>	<u>X</u>	<u>FACW</u>
2 <u>Salix sp.</u>	<u>20</u>	<u>X</u>	<u>(FAC to FACW)</u>
3 <u>Myrica californica</u>	<u>20</u>	<u>X</u>	<u>FACW</u>
4 _____			
5 _____			
	<u>55</u>	= Total Cover	
Herb Stratum (plot size _____)			
1 _____			
2 _____			
3 _____			
4 _____			
5 _____			
6 _____			
7 _____			
8 _____			
	<u>0</u>	= Total Cover	
Woody Vine Stratum (plot size: _____)			
1 _____			
2 _____			
	<u>0</u>	= Total Cover	
% Bare Ground in Herb Stratum <u>70</u>			
Remarks			

Dominance Test worksheet:

Number of Dominant Species _____

That are OBL, FACW or FAC 5 (A)

Total Number of Dominant Species Across All Strata 5 (B)

Percent of Dominant Species That are OBL, FACW, or FAC 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of	Multiply by:	
OBL Species _____	x 1 =	<u>0</u>
FACW species _____	x 2 =	<u>0</u>
FAC Species _____	x 3 =	<u>0</u>
FACU Species _____	x 4 =	<u>0</u>
UPL Species _____	x 5 =	<u>0</u>
Column Totals <u>0</u> (A)		<u>0</u> (B)

Prevalence Index = B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

Prevalence Index is ≤ 3.0 ¹

Morphological Adaptations¹ (provide supporting data in Remarks or on a separate sheet)

Wetland Non-Vascular Plants¹

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes X No _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type	Loc		
8-0	Duff							
0-4	10YR 2/2	100					Sandy Loam	high organic content
4-10	2.5Y 3/2	95	7.5YR 2.5/3	5	C	M	Sand	

*Type C=Concentration, D=Depletion RM=Reduced Matrix, CS=Covered or Coated Sand Grains

*Location PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> Histosol (A1)	<input checked="" type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1)(except MLRA 1)	<input type="checkbox"/> Other (explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

Indicators of hydrophytic vegetation and wetland hydrology must be present unless disturbed or problematic

Restrictive Layer (if present):

Type None

Depth (inches)

Hydric Soil Present? Yes X No

Remarks

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (2 or more required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)	<input checked="" type="checkbox"/> Fac-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

Field Observations:

Surface Water Present?	Yes <u></u>	No <u>X</u>	Depth (inches)	<u></u>
Water Table Present?	Yes <u>X</u>	No <u></u>	Depth (inches)	<u>12</u>
Saturation Present?	Yes <u>X</u>	No <u></u>	Depth (inches)	<u>6</u>

(includes capillary fringe)

Wetland Hydrology Present?

Yes X No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections) if available

None

Remarks

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site Florence LWI City/County: Florence/Lane Sampling Date: 7/16/2010

Applicant/Owner: City of Florence State OR Sampling Point 9

Investigator(s) AH/SE Section, Township, Range Section 26 T 18 South, R 12 West

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none) convex Slope (%):

Subregion (LRR) LRR A Lat Long: Datum:

Soil Map Unit Name: Dune land NWI Classification PUSC

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No (if no, explain in Remarks)

Are vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y

Are vegetation Soil or Hydrology naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>	Is Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present? Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Remarks	

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size <u> </u>)			
1 <u> </u>	<u> </u>	<u> </u>	<u> </u>
2 <u> </u>	<u> </u>	<u> </u>	<u> </u>
3 <u> </u>	<u> </u>	<u> </u>	<u> </u>
4 <u> </u>	<u> </u>	<u> </u>	<u> </u>
	<u>0</u>	= Total Cover	
Sapling/Shrub Stratum (plot size <u> </u>)			
1 <u> </u>	<u> </u>	<u> </u>	<u> </u>
2 <u> </u>	<u> </u>	<u> </u>	<u> </u>
3 <u> </u>	<u> </u>	<u> </u>	<u> </u>
4 <u> </u>	<u> </u>	<u> </u>	<u> </u>
5 <u> </u>	<u> </u>	<u> </u>	<u> </u>
	<u>0</u>	= Total Cover	
Herb Stratum (plot size <u>5</u>)			
1 <u>Unidentified bunchgrass</u>	<u>13</u>	<u>X</u>	<u>unknown</u>
2 <u>Salix sp.</u>	<u>5</u>	<u>X</u>	<u>(FACW)</u>
3 <u>(presumably S. hookeriana)</u>	<u> </u>	<u> </u>	<u> </u>
4 <u> </u>	<u> </u>	<u> </u>	<u> </u>
5 <u> </u>	<u> </u>	<u> </u>	<u> </u>
6 <u> </u>	<u> </u>	<u> </u>	<u> </u>
7 <u> </u>	<u> </u>	<u> </u>	<u> </u>
8 <u> </u>	<u> </u>	<u> </u>	<u> </u>
	<u>18</u>	= Total Cover	
Woody Vine Stratum (plot size <u> </u>)			
1 <u> </u>	<u> </u>	<u> </u>	<u> </u>
2 <u> </u>	<u> </u>	<u> </u>	<u> </u>
	<u>0</u>	= Total Cover	
% Bare Ground in Herb Stratum <u>90 to 95</u>			
Remarks			

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC. 1 (A)

Total Number of Dominant Species Across All Strata 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC. 50% (A/B)

Prevalence Index Worksheet:

Total % Cover of	Multiply by	
OBL Species <u> </u>	x 1 =	<u>0</u>
FACW species <u> </u>	x 2 =	<u>0</u>
FAC Species <u> </u>	x 3 =	<u>0</u>
FACU Species <u> </u>	x 4 =	<u>0</u>
UPL Species <u> </u>	x 5 =	<u>0</u>
Column Totals <u>0</u> (A)		<u>0</u> (B)

Prevalence Index = B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

 Dominance Test is >50%

 Prevalence Index is ≤ 3.0¹

 Morphological Adaptations¹ (provide supporting data in Remarks or on a separate sheet)

 Wetland Non-Vascular Plants¹

X Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes X No

Though *Pinus contorta* is common along the edges of this wetland, the interior is sparsely vegetated. The apparent combined result of seasonal ponding and sandy soils. Other species in the vicinity: *S. hookeriana* shrubs, *Spiraea douglasii*, and several species of rushes.

Remarks

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site Florence LWI City/County: Florence/Lane Sampling Date: 8/11/2010

Applicant/Owner City of Florence State OR Sampling Point 10

Investigator(s) AH/SE Section, Township, Range Section 22, T 18 South, R 12 West

Landform (hillslope, terrace, etc.) _____ Local relief (concave, convex, none): _____ Slope (%) _____

Subregion (LRR) LRR A Lat _____ Long _____ Datum _____

Soil Map Unit Name Dune land NW Classification PFOC

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)

Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y

Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Is Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present? Yes <u>X</u> No _____	
Wetland Hydrology Present? Yes <u>X</u> No _____	
Remarks:	

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status	
Tree Stratum (plot size <u>30</u>)				Dominance Test worksheet:
1 <u><i>Alnus rubra</i></u>	<u>10</u>	<u>X</u>	<u>FAC</u>	Number of Dominant Species
2 <u><i>Salix sp.</i></u>	<u>40</u>	<u>X</u>	<u>(FAC to FACW)</u>	That are OBL, FACW, or FAC <u>5</u> (A)
3 _____	_____	_____	_____	Total Number of Dominant
4 _____	_____	_____	_____	Species Across All Strata <u>6</u> (B)
	<u>50</u>	= Total Cover		Percent of Dominant Species
Sapling/Shrub Stratum (plot size <u>5</u>)				That are OBL, FACW, or FAC <u>83%</u> (A/B)
1 <u><i>Rubus spectabilis</i></u>	<u>10</u>	<u>X</u>	<u>FAC</u>	Prevalence Index Worksheet:
2 <u><i>Rubus discolor</i></u>	<u>3</u>	<u>X</u>	<u>FACU</u>	Total % Cover of _____ Multiply by _____
3 _____	_____	_____	_____	OBL Species _____ x 1 = <u>0</u>
4 _____	_____	_____	_____	FACW species _____ x 2 = <u>0</u>
5 _____	_____	_____	_____	FAC Species _____ x 3 = <u>0</u>
	<u>13</u>	= Total Cover		FACU Species _____ x 4 = <u>0</u>
Herb Stratum (plot size <u>5</u>)				UPL Species _____ x 5 = <u>0</u>
1 <u><i>Equisetum arvense</i></u>	<u>35</u>	<u>X</u>	<u>FAC</u>	Column Totals <u>0</u> (A) <u>0</u> (B)
2 <u><i>Carex unilateralis</i></u>	<u>15</u>	<u>X</u>	<u>FACW</u>	Prevalence Index = B/A = <u>#DIV/0!</u>
3 <u><i>Carex obnupta</i></u>	<u>10</u>	_____	<u>OBL</u>	
4 _____	_____	_____	_____	Hydrophytic Vegetation Indicators:
5 _____	_____	_____	_____	<u>X</u> Dominance Test is >50%
6 _____	_____	_____	_____	Prevalence Index is ≤ 3.0 ¹
7 _____	_____	_____	_____	Morphological Adaptations ¹ (provide supporting data in Remarks or on a separate sheet)
8 _____	_____	_____	_____	Wetland Non-Vascular Plants ¹
	<u>60</u>	= Total Cover		Problematic Hydrophytic Vegetation ¹ (Explain)
Woody Vine Stratum (plot size _____)				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1 _____	_____	_____	_____	Hydrophytic
2 _____	_____	_____	_____	Vegetation
	<u>0</u>	= Total Cover		Present?
% Bare Ground in Herb Stratum <u>30</u>				Yes <u>X</u> No _____
Remarks:				
Additional wetland vegetation: 2 <i>Salix sp.</i> , <i>Gaultheria shallon</i> , <i>Polystichum munitum</i> , <i>Cytisus scoparius</i> , <i>Rubus ursinus</i> , <i>Lonicera involucrata</i> , <i>Pinus contorta</i> , <i>Lotus corniculatus</i> , <i>Myrica californica</i> .				

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type	Loc ²		
0-3	5YR 2.5/2	100					Sandy Loam	
3-12	5Y 5/3	98	10YR 4/6	2	C	M	Sand	fine

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains

²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1)(except MLRA 1)	<input checked="" type="checkbox"/> Other (explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: None

Depth (inches):

Hydric Soil Present? Yes X No

Remarks

Sample site fails to meet any specific hydric soil indicator. However, saturation into mid-summer indicates that extended periods of saturation can be presumed. Two weeks of saturation during the growing season is sufficient to develop anaerobic conditions and therefore meet the definition of a hydric soil.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required, check all that apply)

<input type="checkbox"/> Surface Water (A1)
<input checked="" type="checkbox"/> High Water Table (A2)
<input checked="" type="checkbox"/> Saturation (A3)
<input type="checkbox"/> Water Marks (B1)
<input type="checkbox"/> Sediment Deposits (B2)
<input type="checkbox"/> Drift Deposits (B3)
<input type="checkbox"/> Algal Mat or Crust (B4)
<input type="checkbox"/> Iron Deposits (B5)
<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)

<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> Salt Crust (B11)
<input type="checkbox"/> Aquatic Invertebrates (B13)
<input type="checkbox"/> Hydrogen Sulfide Odor (C1)
<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)
<input type="checkbox"/> Stunted or Stressed Plants (D1)(LRR A)
<input type="checkbox"/> Other (Explain in Remarks)

Secondary Indicators (2 or more required)

<input type="checkbox"/> Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Shallow Aquitard (D3)
<input checked="" type="checkbox"/> Fac-Neutral Test (D5)
<input type="checkbox"/> Raised Ant Mounds (D6)(LRR A)
<input type="checkbox"/> Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes <u></u> No <u>X</u>	Depth (inches)	<u></u>
Water Table Present?	Yes <u>X</u> No <u></u>	Depth (inches)	<u>12</u>
Saturation Present?	Yes <u>X</u> No <u></u>	Depth (inches)	<u>5</u>

(includes capillary fringe)

Wetland Hydrology Present?

Yes X No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available

None

Remarks

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site Florence LWI City/County Florence/Lane Sampling Date 8/11/2010

Applicant/Owner City of Florence State OR Sampling Point 11

Investigator(s) AH/SE Section Township Range Section 4, T 18 South, R 12 West

Landform (hillslope terrace etc.) _____ Local relief (concave, convex, none) _____ Slope (%) _____

Subregion (LRR) LRR A Lat _____ Long _____ Datum _____

Soil Map Unit Name Yaquina loamy fine sand NWI Classification None

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)

Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y

Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Is Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present? Yes <u>X</u> No _____	
Wetland Hydrology Present? Yes <u>X</u> No _____	
Remarks _____	

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size <u>30</u>)			
1 <u>Pinus contorta</u>	<u>10</u>	<u>X</u>	<u>FAC</u>
2 _____			
3 _____			
4 _____			
	<u>10</u>	= Total Cover	
Sapling/Shrub Stratum (plot size <u>5</u>)			
1 <u>Salix sp.</u>	<u>15</u>		(FAC to FACW)
2 <u>Ledum glandulosum</u>	<u>20</u>	<u>X</u>	<u>FACW</u>
3 <u>Spiraea douglasii</u>	<u>35</u>	<u>X</u>	<u>FACW</u>
4 <u>Vaccinium ovatum</u>	<u>15</u>		<u>UPL</u>
5 <u>Crataegus douglasii</u>	<u>5</u>		<u>FAC</u>
	<u>90</u>	= Total Cover	
Herb Stratum (plot size _____)			
1 <u>Festuca sp.</u>	<u>10</u>		(FAC)
2 <u>Juncus balticus</u>	<u>30</u>	<u>X</u>	<u>FACW</u>
3 <u>Carex obnupta</u>	<u>25</u>	<u>X</u>	<u>OBL</u>
4 _____			
5 _____			
6 _____			
7 _____			
8 _____			
	<u>65</u>	= Total Cover	
Woody Vine Stratum (plot size _____)			
1 _____			
2 _____			
	<u>0</u>	= Total Cover	
% Bare Ground in Herb Stratum <u>0</u>			
Remarks _____			

Dominance Test worksheet:

Number of Dominant Species _____

That are OBL, FACW or FAC 5 (A)

Total Number of Dominant Species Across All Strata 5 (B)

Percent of Dominant Species That are OBL, FACW, or FAC 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of	Multiply by	
OBL Species _____	x 1 =	<u>0</u>
FACW species _____	x 2 =	<u>0</u>
FAC Species _____	x 3 =	<u>0</u>
FACU Species _____	x 4 =	<u>0</u>
UPL Species _____	x 5 =	<u>0</u>
Column Totals <u>0</u> (A)		<u>0</u> (B)

Prevalence Index = B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

Prevalence index is ≥ 3.0 ¹

Morphological Adaptations¹ (provide supporting data in Remarks or on a separate sheet)

Wetland Non-Vascular Plants¹

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes X No _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3	10YR 2/1	100					Sandy Loam	
3-19	2.5Y 4/3	96	10YR 3/4	4	C	M	Sand	fine to coarse mottles

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains

²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input checked="" type="checkbox"/> Other (explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type None

Depth (inches):

Hydric Soil Present? Yes X No

Remarks

Sample site fails to meet any specific hydric soil indicator. However, evidence of a dry season water table indicates that extended periods of shallow saturation earlier in the growing season are likely. Two weeks of saturation during the growing season is sufficient to develop anaerobic conditions and therefore meet the definition of a hydric soil.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (2 or more required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)	<input checked="" type="checkbox"/> Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input checked="" type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input checked="" type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)	<input checked="" type="checkbox"/> Fac-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

Field Observations:

Surface Water Present?	Yes <u></u>	No <u>X</u>	Depth (inches)	<u></u>
Water Table Present?	Yes <u>X</u>	No <u></u>	Depth (inches)	<u>19</u>
Saturation Present? (includes capillary fringe)	Yes <u>X</u>	No <u></u>	Depth (inches)	<u>16</u>

Wetland Hydrology Present?

Yes X No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections) if available

None

Remarks

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site Florence LWI City/County Florence/Lane Sampling Date 8/11/2010

Applicant/Owner City of Florence State OR Sampling Point 12

Investigator(s) AH/SE Section, Township Range Section 24, T 18 South, R 12 West

Landform (hillslope terrace etc.) _____ Local relief (concave convex, none) _____ Slope (%) _____

Subregion (LRR) LRR A Lat _____ Long _____ Datum _____

Soil Map Unit Name Waldport fine sand NWI Classification None

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)

Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y

Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is Sampled Area within a Wetland?	Yes <u>X</u>	No _____
Hydric Soil Present?	Yes <u>X</u>	No _____			
Wetland Hydrology Present?	Yes <u>X</u>	No _____			
Remarks					

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size <u>30</u>)			
1 <u>Thuja plicata</u>	<u>45</u>	<u>X</u>	<u>FAC</u>
2 <u>Tsuga heterophylla</u>	<u>35</u>	<u>X</u>	<u>FACU</u>
3 <u>Pinus contorta</u>	<u>2</u>		<u>FAC</u>
4 <u>Myrica californica</u>	<u>20</u>		<u>FACW</u>
	<u>102</u>	= Total Cover	
Sapling/Shrub Stratum (plot size <u>5</u>)			
1 <u>Myrica californica</u>	<u>15</u>	<u>X</u>	<u>FACW</u>
2 <u>Gaultheria shallon</u>	<u>40</u>	<u>X</u>	<u>FACU</u>
3 _____			
4 _____			
5 _____			
	<u>55</u>	= Total Cover	
Herb Stratum (plot size <u>5</u>)			
1 <u>Lysichiton americanum</u>	<u>30</u>	<u>X</u>	<u>OBL</u>
2 <u>Gaultheria shallon</u>	<u>15</u>	<u>X</u>	<u>FACU</u>
3 <u>Blechnum spicant</u>	<u>20</u>	<u>X</u>	<u>FAC</u>
4 _____			
5 _____			
6 _____			
7 _____			
8 _____			
	<u>65</u>	= Total Cover	
Woody Vine Stratum (plot size _____)			
1 _____			
2 _____			
	<u>0</u>	= Total Cover	
% Bare Ground in Herb Stratum <u>10</u>			
Remarks Bryophytes 80%.			

Dominance Test worksheet:			
Number of Dominant Species			
That are OBL, FACW, or FAC	<u>4</u>	(A)	
Total Number of Dominant Species Across All Strata			
	<u>7</u>	(B)	
Percent of Dominant Species			
That are OBL, FACW, or FAC	<u>57%</u>	(A/B)	
Prevalence Index Worksheet:			
Total % Cover of	Multiply by		
OBL Species	x 1 =	<u>0</u>	
FACW species	x 2 =	<u>0</u>	
FAC Species	x 3 =	<u>0</u>	
FACU Species	x 4 =	<u>0</u>	
UPL Species	x 5 =	<u>0</u>	
Column Totals	<u>0</u> (A)	<u>0</u> (B)	
Prevalence Index = B/A = <u>#DIV/0!</u>			
Hydrophytic Vegetation Indicators:			
<u>X</u>	Dominance Test is >50%		
	Prevalence Index is ≤ 3.0 ¹		
	Morphological Adaptations ¹ (provide supporting data in Remarks or on a separate sheet)		
	Wetland Non-Vascular Plants ¹		
	Problematic Hydrophytic Vegetation ¹ (Explain)		
¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic			
Hydrophytic Vegetation Present?			
Yes	<u>X</u>	No	

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3	10YR 2/1	100					Loam	high organic
3-8	7.5YR 2.5/2	100						muck
8-15	10YR 4/1	100					Sand	fine

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains

²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input checked="" type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1)(except MLRA 1)	<input type="checkbox"/> Other (explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: None

Depth (inches):

Hydric Soil Present? Yes X No

Remarks

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

<input type="checkbox"/> Surface Water (A1)
<input checked="" type="checkbox"/> High Water Table (A2)
<input checked="" type="checkbox"/> Saturation (A3)
<input type="checkbox"/> Water Marks (B1)
<input type="checkbox"/> Sediment Deposits (B2)
<input type="checkbox"/> Drift Deposits (B3)
<input type="checkbox"/> Algal Mat or Crust (B4)
<input type="checkbox"/> Iron Deposits (B5)
<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)

<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> Salt Crust (B11)
<input type="checkbox"/> Aquatic Invertebrates (B13)
<input type="checkbox"/> Hydrogen Sulfide Odor (C1)
<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)
<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)
<input type="checkbox"/> Other (Explain in Remarks)

Secondary Indicators (2 or more required)

<input type="checkbox"/> Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Fac-Neutral Test (D5)
<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes <u></u>	No <u>X</u>	Depth (inches)	<u></u>
Water Table Present?	Yes <u>X</u>	No <u></u>	Depth (inches)	<u>9</u>
Saturation Present? (includes capillary fringe)	Yes <u>X</u>	No <u></u>	Depth (inches)	<u>3</u>

Wetland Hydrology Present?

Yes X No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections) if available

None

Remarks

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site Brandt Property City/County Florence/Lane Sampling Date 7/6/2010

Applicant/Owner Craig & Kathleen Brandt State OR Sampling Point 13

Investigator(s) AH/CR Section Township Range Section 14, T 18 South, R 12 West

Landform (hillslope, terrace, etc.) toe of slope Local relief (concave, convex, none) none Slope (%) < 20

Subregion (LRR) LRR A Lat 44.0098 Long 124.0865 Datum DD.DD

Soil Map Unit Name Netarts fine sand NWI Classification None

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No (if no, explain in Remarks)

Are vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y

Are vegetation Soil or Hydrology naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u> </u>	No <u>X</u>	Is Sampled Area within a Wetland?	Yes <u> </u>	No <u>X</u>
Hydric Soil Present?	Yes <u> </u>	No <u>X</u>			
Wetland Hydrology Present?	Yes <u> </u>	No <u>X</u>			
Remarks					

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
Tree Stratum (plot size <u>30</u>)				Number of Dominant Species	
1 <u><i>Pinus contorta</i></u>	<u>5</u>	<u>X</u>	<u>FAC</u>	That are OBL, FACW, or FAC <u>2</u> (A)	
2 <u> </u>	<u> </u>	<u> </u>	<u> </u>	Total Number of Dominant	
3 <u> </u>	<u> </u>	<u> </u>	<u> </u>	Species Across All Strata <u>5</u> (B)	
4 <u> </u>	<u>5</u>	<u> </u>	<u> </u>	Percent of Dominant Species	
<u>5</u> = Total Cover				That are OBL, FACW, or FAC <u>40%</u> (A/B)	
Sapling/Shrub Stratum (plot size <u>5</u>)				Prevalence Index Worksheet:	
1 <u><i>Gaultheria shallon</i></u>	<u>50</u>	<u>X</u>	<u>FACU</u>	Total % Cover of	Multiply by
2 <u><i>Rhamnus purshiana</i></u>	<u>20</u>	<u> </u>	<u>FAC</u>	OBL Species <u> </u>	x 1 = <u>0</u>
3 <u><i>Ledum glandulosum</i></u>	<u>30</u>	<u>X</u>	<u>FACW</u>	FACW species <u> </u>	x 2 = <u>0</u>
4 <u><i>Spiraea douglasii</i></u>	<u>3</u>	<u> </u>	<u>FACW</u>	FAC Species <u> </u>	x 3 = <u>0</u>
5 <u><i>Vaccinium ovatum</i></u>	<u>30</u>	<u>X</u>	<u>UPL</u>	FACU Species <u> </u>	x 4 = <u>0</u>
<u>133</u> = Total Cover				UPL Species <u> </u>	x 5 = <u>0</u>
Herb Stratum (plot size <u>5</u>)				Column Totals <u>0</u> (A)	<u>0</u> (B)
1 <u><i>Polystichum munitum</i></u>	<u>15</u>	<u>X</u>	<u>FACU</u>	Prevalence Index = B/A = <u>#DIV/0!</u>	
2 <u> </u>	<u> </u>	<u> </u>	<u> </u>	Hydrophytic Vegetation Indicators:	
3 <u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u> Dominance Test is >50%	
4 <u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u> Prevalence Index is ≤ 3.0	
5 <u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u> Morphological Adaptations ¹ (provide supporting data in Remarks or on a separate sheet)	
6 <u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u> Wetland Non-Vascular Plants ¹	
7 <u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u> Problematic Hydrophytic Vegetation ¹ (Explain)	
8 <u> </u>	<u> </u>	<u> </u>	<u> </u>	¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic	
<u>15</u> = Total Cover				Hydrophytic Vegetation Present?	
Woody Vine Stratum (plot size <u> </u>)				Yes <u> </u> No <u>X</u>	
1 <u> </u>	<u> </u>	<u> </u>	<u> </u>		
2 <u> </u>	<u>0</u>	<u> </u>	<u> </u>		
<u>0</u> = Total Cover					
% Bare Ground in Herb Stratum <u> </u>					
Remarks					

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type	Loc ¹		
0-10	10YR 2/1	100					loam	loamy duff
10-18	10YR 2/2	100					Sand	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains

²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Other (explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present unless disturbed or problematic

Restrictive Layer (if present):

Type: none

Depth (inches):

Hydric Soil Present? Yes No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	

Secondary Indicators (2 or more required)

<input type="checkbox"/> Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Fac-Neutral Test (D5)
<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	No	X	Depth (inches)	
Water Table Present?	Yes	No	X	Depth (inches)	
Saturation Present?	Yes	No	X	Depth (inches)	

(includes capillary fringe)

Wetland Hydrology Present?

Yes No X

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

none

Remarks

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site Florence LWI City/County Florence/Lane Sampling Date 8/12/2010

Applicant/Owner City of Florence State OR Sampling Point: 14

Investigator(s) AH/SE Section, Township, Range Section 3, T 18 South, R 12 West

Landform (hillslope terrace, etc.) swale Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): LRR A Lat _____ Long. _____ Datum _____

Soil Map Unit Name Yaquina loamy fine sand NWI Classification PUBH

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)

Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y

Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Is Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present? Yes <u>X</u> No _____	
Wetland Hydrology Present? Yes <u>X</u> No _____	
Remarks	

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size: _____)			
1 _____			
2 _____			
3 _____			
4 _____			
	<u>0</u>	= Total Cover	
Sapling/Shrub Stratum (plot size <u>5</u>)			
1 <u>Spiraea douglasii</u>	<u>100</u>	<u>X</u>	<u>FACW</u>
2 <u>Salix hookeriana</u>	<u>5</u>		<u>FACW</u>
3 _____			
4 _____			
5 _____			
	<u>105</u>	= Total Cover	
Herb Stratum (plot size: <u>5</u>)			
1 <u>Carex obnupta</u>	<u>20</u>	<u>X</u>	<u>OBL</u>
2 _____			
3 _____			
4 _____			
5 _____			
6 _____			
7 _____			
8 _____			
	<u>20</u>	= Total Cover	
Woody Vine Stratum (plot size _____)			
1 _____			
2 _____			
	<u>0</u>	= Total Cover	
% Bare Ground in Herb Stratum _____			
Remarks			

Dominance Test worksheet:

Number of Dominant Species
That are OBL FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species
That are OBL, FACW, or FAC 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of	Multiply by	
OBL Species	x 1 =	<u>0</u>
FACW species	x 2 =	<u>0</u>
FAC Species	x 3 =	<u>0</u>
FACU Species	x 4 =	<u>0</u>
UPL Species	x 5 =	<u>0</u>
Column Totals	<u>0</u> (A)	<u>0</u> (B)

Prevalence Index = B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

Prevalence Index is ≤ 3.0 ¹

Morphological Adaptations¹ (provide supporting data in Remarks or on a separate sheet)

Wetland Non-Vascular Plants¹

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Additional wetland vegetation: few small *Pinus contorta*.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type	Loc ²		
0-3	10YR 2/1	100						muck
3-13	7.5YR 3/2	100					Sand	fine

¹Type C=Concentration, D=Depletion RM=Reduced Matrix, CS=Covered or Coated Sand Grains

²Location PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1)(except MLRA 1)	<input type="checkbox"/> Other (explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input checked="" type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	Indicators of hydrophytic vegetation and wetland hydrology must be present unless disturbed or problematic
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

Restrictive Layer (if present):

Type: None

Depth (inches)

Hydric Soil Present? Yes X No

Remarks

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required, check all that apply)

<input type="checkbox"/> Surface Water (A1)
<input checked="" type="checkbox"/> High Water Table (A2)
<input checked="" type="checkbox"/> Saturation (A3)
<input checked="" type="checkbox"/> Water Marks (B1)
<input type="checkbox"/> Sediment Deposits (B2)
<input checked="" type="checkbox"/> Drift Deposits (B3)
<input type="checkbox"/> Algal Mat or Crust (B4)
<input type="checkbox"/> Iron Deposits (B5)
<input type="checkbox"/> Surface Soil Cracks (B6)
<input checked="" type="checkbox"/> Inundation Visible on Aerial Imagery (B7)
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)

<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> Salt Crust (B11)
<input type="checkbox"/> Aquatic Invertebrates (B13)
<input type="checkbox"/> Hydrogen Sulfide Odor (C1)
<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)
<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)
<input type="checkbox"/> Other (Explain in Remarks)

Secondary Indicators (2 or more required)

<input type="checkbox"/> Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Shallow Aquitard (D3)
<input checked="" type="checkbox"/> Fac-Neutral Test (D5)
<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches)	<u> </u>
Water Table Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Depth (inches)	<u>0</u>
Saturation Present? (includes capillary fringe)	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Depth (inches)	<u>3</u>

Wetland Hydrology Present?

Yes X No

Describe Recorded Data (stream gauge monitoring well aerial photos previous inspections) if available

None

Remarks

On prior visit on 6/17/10 there was three feet of water at this location. Property owner indicated that there has been significant ponding during the last two winters; two winters prior to that, little seasonal ponding.

PHS # 4611

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site Florence LWI City/County Florence/Lane Sampling Date 8/12/2010
 Applicant/Owner City of Florence State OR Sampling Point 15
 Investigator(s) AH/SE Section Township Range Section 11, T 18 South, R 12 West
 Landform (hillslope, terrace, etc.) _____ Local relief (concave, convex, none) _____ Slope (%) _____
 Subregion (LRR) LRR A Lat _____ Long _____ Datum _____
 Soil Map Unit Name Yaquina loamy fine sand NWI Classification PFOC
 Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)
 Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y
 Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Is Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present? Yes <u>X</u> No _____	
Wetland Hydrology Present? Yes <u>X</u> No _____	
Remarks	

VEGETATION - Use scientific names of plants.

Tree Stratum (plot size <u>30</u>)	absolute % cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1 <u><i>Pinus contorta</i></u>	10	X	FAC	Number of Dominant Species That are OBL, FACW, or FAC <u>3</u> (A) Total Number of Dominant Species Across All Strata <u>3</u> (B) Percent of Dominant Species That are OBL, FACW, or FAC <u>100%</u> (A/B)
2 _____				
3 _____				
4 _____				
	10	= Total Cover		
Sapling/Shrub Stratum (plot size <u>5</u>)				Prevalence Index Worksheet: Total % Cover of _____ Multiply by _____ OBL Species _____ x 1 = <u>0</u> FACW species _____ x 2 = <u>0</u> FAC Species _____ x 3 = <u>0</u> FACU Species _____ x 4 = <u>0</u> UPL Species _____ x 5 = <u>0</u> Column Totals <u>0</u> (A) <u>0</u> (B) Prevalence Index = B/A = <u>#DIV/0!</u>
1 <u><i>Ledum glandulosum</i></u>	10		FACW	
2 <u><i>Vaccinium uliginosum</i></u>	60	X	FACW	
3 <u><i>Spiraea douglasii</i></u>	15		FACW	
4 _____				
5 _____				
	85	= Total Cover		
Herb Stratum (plot size <u>5</u>)				Hydrophytic Vegetation Indicators: <u>X</u> Dominance Test is >50% _____ Prevalence Index is ≤ 3.0 ¹ _____ Morphological Adaptations ¹ (provide supporting data in Remarks or on a separate sheet) _____ Wetland Non-Vascular Plants ¹ _____ Problematic Hydrophytic Vegetation (Explain)
1 <u>Unidentified grass</u>	20	X	(FAC)	
2 <u><i>Juncus tenuis</i></u>	10		FACW	
3 <u><i>Carex obnupta</i></u>	10		OBL	
4 _____				
5 _____				
6 _____				
7 _____				
8 _____				
	40	= Total Cover		
Woody Vine Stratum (plot size _____)				
1 _____				
2 _____				
	0	= Total Cover		
% Bare Ground in Herb Stratum <u>30*</u>				

Remarks

*Groundcover included up to 30% cover by an unidentified Bryophyte.
 Additional wetland vegetation: *Myrica californica* shrub.

Remarks

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site Florence LWI City/County Florence/Lane Sampling Date 8/12/2010

Applicant/Owner City of Florence State OR Sampling Point 16

Investigator(s) AH/SE Section, Township, Range Section 14, T 18 South, R 12 West

Landform (hillslope, terrace, etc.) _____ Local relief (concave, convex, none) _____ Slope (%) _____

Subregion (LRR) LRR A Lat _____ Long _____ Datum _____

Soil Map Unit Name Dune land NWI Classification None

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)

Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y

Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Is Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present? Yes <u>X</u> No _____	
Wetland Hydrology Present? Yes <u>X</u> No _____	
Remarks	

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size <u>30</u>)			
1 <u><i>Pinus contorta</i></u>	<u>20</u>	<u>X</u>	<u>FAC</u>
2 _____	_____	_____	_____
3 _____	_____	_____	_____
4 _____	_____	_____	_____
	<u>20</u>	= Total Cover	
Sapling/Shrub Stratum (plot size _____)			
1 _____	_____	_____	_____
2 _____	_____	_____	_____
3 _____	_____	_____	_____
4 _____	_____	_____	_____
5 _____	_____	_____	_____
	<u>0</u>	= Total Cover	
Herb Stratum (plot size <u>5</u>)			
1 <u><i>Carex obnupta</i></u>	<u>10</u>	_____	<u>OBL</u>
2 <u><i>Juncus falcatus</i></u>	<u>35</u>	<u>X</u>	<u>FACW</u>
3 <u><i>Juncus nevadensis</i></u>	<u>35</u>	<u>X</u>	<u>FACW</u>
4 _____	_____	_____	_____
5 _____	_____	_____	_____
6 _____	_____	_____	_____
7 _____	_____	_____	_____
8 _____	_____	_____	_____
	<u>80</u>	= Total Cover	
Woody Vine Stratum (plot size _____)			
1 _____	_____	_____	_____
2 _____	_____	_____	_____
	<u>0</u>	= Total Cover	
% Bare Ground in Herb Stratum <u>20</u>			
Remarks			

Dominance Test worksheet:

Number of Dominant Species
That are OBL, FACW, or FAC 4 (A)

Total Number of Dominant Species Across All Strata 4 (B)

Percent of Dominant Species
That are OBL, FACW, or FAC 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of	Multiply by	
OBL Species	x 1 =	<u>0</u>
FACW species	x 2 =	<u>0</u>
FAC Species	x 3 =	<u>0</u>
FACU Species	x 4 =	<u>0</u>
UPL Species	x 5 =	<u>0</u>
Column Totals	<u>0</u> (A)	<u>0</u> (B)

Prevalence Index = B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

Prevalence Index is ≤ 3.0

Morphological Adaptations¹ (provide supporting data in Remarks or on a separate sheet)

Wetland Non-Vascular Plants¹

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	<u>X</u>	No	<u> </u>	Is Sampled Area within a Wetland? Yes <u> X </u> No <u> </u>
Hydric Soil Present?	Yes	<u>X</u>	No	<u> </u>	
Wetland Hydrology Present?	Yes	<u>X</u>	No	<u> </u>	
Remarks					

		absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size _____)				
1	_____	_____	_____	_____
2	_____	_____	_____	_____
3	_____	_____	_____	_____
4	_____	_____	_____	_____
		<u>0</u>	= Total Cover	
Sapling/Shrub Stratum (plot size <u>5</u>)				
1	<i>Vaccinium uliginosum</i>	<u>80</u>	X	FACW
2	<i>Spiraea douglasii</i>	<u>5</u>		FACW
3	_____	_____	_____	_____
4	_____	_____	_____	_____
5	_____	_____	_____	_____
		<u>85</u>	= Total Cover	
Herb Stratum (plot size <u>5</u>)				
1	<i>Juncus falcatus</i>	<u>10</u>	X	FACW
2	_____	_____	_____	_____
3	_____	_____	_____	_____
4	_____	_____	_____	_____
5	_____	_____	_____	_____
6	_____	_____	_____	_____
7	_____	_____	_____	_____
8	_____	_____	_____	_____
		<u>10</u>	= Total Cover	
Woody Vine Stratum (plot size _____)				
1	_____	_____	_____	_____
2	_____	_____	_____	_____
		<u>0</u>	= Total Cover	
% Bare Ground in Herb Stratum _____				
Remarks Additional wetland vegetation in the vicinity: <i>Pinus contorta</i>.				

Dominance Test worksheet:			
Number of Dominant Species			
That are OBL, FACW, or FAC	<u>2</u>	(A)	
Total Number of Dominant Species Across All Strata			
	<u>2</u>	(B)	
Percent of Dominant Species			
That are OBL, FACW, or FAC	<u>100%</u>	(A/B)	

Prevalence Index Worksheet:			
Total % Cover of	Multiply by:		
OBL Species _____	x 1 =	<u>0</u>	
FACW species _____	x 2 =	<u>0</u>	
FAC Species _____	x 3 =	<u>0</u>	
FACU Species _____	x 4 =	<u>0</u>	
UPL Species _____	x 5 =	<u>0</u>	
Column Totals <u>0</u>	(A)	<u>0</u>	(B)
Prevalence Index = B/A = <u>#DIV/0!</u>			

Hydrophytic Vegetation Indicators:	
<u>X</u>	Dominance Test is >50%
_____	Prevalence Index is ≤ 3.0 [†]
_____	Morphological Adaptations [†] (provide supporting data in Remarks or on a separate sheet)
_____	Wetland Non-Vascular Plants [†]
_____	Problematic Hydrophytic Vegetation [†] (Explain)

[†]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____
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[illegible]

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site Brandt Property City/County Florence/Lane Sampling Date 7/6/2010

Applicant/Owner Craig & Kathleen Brandt State OR Sampling Point 18

Investigator(s) AH/CR Section, Township Range Section 14, T 18 South, R 12 West

Landform (hillslope terrace etc.) wetland fringe Local relief (concave, convex, none) none Slope (%) 0

Subregion (LRR) LRR A Lat 44.0098 Long 124.0865 Datum DD.DD

Soil Map Unit Name Netarts fine sand NWI Classification L2ABH

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No (if no, explain in Remarks)

Are vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y

Are vegetation Soil or Hydrology naturally problematic? If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>	Is Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present? Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Remarks	

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size <u> </u>)			
1 <u> </u>	<u> </u>	<u> </u>	<u> </u>
2 <u> </u>	<u> </u>	<u> </u>	<u> </u>
3 <u> </u>	<u> </u>	<u> </u>	<u> </u>
4 <u> </u>	<u> </u>	<u> </u>	<u> </u>
	<u>0</u>	= Total Cover	
Sapling/Shrub Stratum (plot size <u> </u>)			
1 <u> </u>	<u> </u>	<u> </u>	<u> </u>
2 <u> </u>	<u> </u>	<u> </u>	<u> </u>
3 <u> </u>	<u> </u>	<u> </u>	<u> </u>
4 <u> </u>	<u> </u>	<u> </u>	<u> </u>
5 <u> </u>	<u> </u>	<u> </u>	<u> </u>
	<u>0</u>	= Total Cover	
Herb Stratum (plot size <u>5</u>)			
1 <u>Juncus falcatus</u>	<u>70</u>	<u>X</u>	<u>FACW</u>
2 <u>Juncus effusus</u>	<u>10</u>	<u> </u>	<u>FACW</u>
3 <u>Agrostis tenuis</u>	<u>20</u>	<u>X</u>	<u>FAC</u>
4 <u> </u>	<u> </u>	<u> </u>	<u> </u>
5 <u> </u>	<u> </u>	<u> </u>	<u> </u>
6 <u> </u>	<u> </u>	<u> </u>	<u> </u>
7 <u> </u>	<u> </u>	<u> </u>	<u> </u>
8 <u> </u>	<u> </u>	<u> </u>	<u> </u>
	<u>100</u>	= Total Cover	
Woody Vine Stratum (plot size <u> </u>)			
1 <u> </u>	<u> </u>	<u> </u>	<u> </u>
2 <u> </u>	<u> </u>	<u> </u>	<u> </u>
	<u>0</u>	= Total Cover	
% Bare Ground in Herb Stratum <u> </u>			
Remarks			

Dominance Test worksheet:

Number of Dominant Species
That are OBL, FACW, or FAC 2 (A)

Total Number of Dominant Species Across All Strata 2 (B)

Percent of Dominant Species
That are OBL, FACW, or FAC 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of	Multiply by	
OBL Species <u> </u>	x 1 =	<u>0</u>
FACW species <u> </u>	x 2 =	<u>0</u>
FAC Species <u> </u>	x 3 =	<u>0</u>
FACU Species <u> </u>	x 4 =	<u>0</u>
UPL Species <u> </u>	x 5 =	<u>0</u>
Column Totals <u>0</u> (A)		<u>0</u> (B)

Prevalence Index = B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

 Prevalence Index is ≤ 3.0¹

 Morphological Adaptations¹ (provide supporting data in Remarks or on a separate sheet)

 Wetland Non-Vascular Plants¹

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes X No

SOIL	PHS #	4680	Sampling Point:	18
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Sampling Point: 18

[illegible]

⁻Location PL=Pore Lining, M=Matrix

Indicators for Problematic Hydric Soils³:

<u> </u> Histosol (A1)	<u> X </u> Sandy Redox (S5)	<u> </u> 2 cm Muck (A10)
<u> </u> Histic Epipedon (A2)	<u> </u> Stripped Matrix (S6)	<u> </u> Red Parent Material (TF2)
<u> </u> Black Histic (A3)	<u> </u> Loamy Mucky Mineral (F1){except MLRA 1}	<u> </u> Other (explain in Remarks)
<u> </u> Hydrogen Sulfide (A4)	<u> </u> Loamy Gleyed Matrix (F2)	
<u> </u> Depleted Below Dark Surface (A11)	<u> </u> Depleted Matrix (F3)	
<u> </u> Thick Dark Surface (A12)	<u> </u> Redox Dark Surface (F6)	
<u> </u> Sandy Mucky Mineral (S1)	<u> </u> Depleted Dark Surface (F7)	
<u> </u> Sandy Gleyed Matrix (S4)	<u> </u> Redox Depressions (F8)	

Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Type: none

Depth (inches): _____

Hydric Soil Present?	Yes	X	No
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Remarks

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required check all that apply)

<input type="checkbox"/>	Surface Water (A1)	<input type="checkbox"/>	Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/>	Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input checked="" type="checkbox"/>	High Water Table (A2)	<input type="checkbox"/>		<input type="checkbox"/>	
<input checked="" type="checkbox"/>	Saturation (A3)	<input type="checkbox"/>	Salt Crust (B11)	<input type="checkbox"/>	Drainage Patterns (B10)
<input type="checkbox"/>	Water Marks (B1)	<input type="checkbox"/>	Aquatic Invertebrates (B13)	<input type="checkbox"/>	Dry-Season Water Table (C2)
<input type="checkbox"/>	Sediment Deposits (B2)	<input type="checkbox"/>	Hydrogen Sulfide Odor (C1)	<input type="checkbox"/>	Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/>	Drift Deposits (B3)	<input type="checkbox"/>	Oxidized Rhizospheres along Living Roots (C3)	<input checked="" type="checkbox"/>	Geomorphic Position (D2)
<input type="checkbox"/>	Algal Mat or Crust (B4)	<input type="checkbox"/>	Presence of Reduced Iron (C4)	<input type="checkbox"/>	Shallow Aquitard (D3)
<input type="checkbox"/>	Iron Deposits (B5)	<input type="checkbox"/>	Recent Iron Reduction in Plowed Soils (C6)	<input checked="" type="checkbox"/>	Fac-Neutral Test (D5)
<input type="checkbox"/>	Surface Soil Cracks (B6)	<input type="checkbox"/>	Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/>	Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/>	Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/>	Other (Explain in Remarks)	<input type="checkbox"/>	Frost-Heave Hummocks (D7)
<input type="checkbox"/>	Sparsely Vegetated Concave Surface (B8)				

Surface Water Present?	Yes	No	X	Depth (inches)	
Water Table Present?	Yes	X	No	Depth (inches)	10
Saturation Present?	Yes	X	No	Depth (inches)	10

Wetland Hydrology Present?

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections): if available
none

Remarks

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site Florence LWI City/County Florence/Lane Sampling Date 8/12/2010

Applicant/Owner City of Florence State OR Sampling Point 13

Investigator(s) AH/SE Section Township Range _____

Landform (hillslope, terrace, etc.) _____ Local relief (concave, convex, none) _____ Slope (%) _____

Subregion (LRR) _____ Lat _____ Long _____ Datum _____

Soil Map Unit Name _____ NWI Classification _____

Are climatic/hydrologic conditions on the site typical for this time of year? Yes _____ No _____ (if no, explain in Remarks)

Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) _____

Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is Sampled Area within a Wetland?	Yes <u>X</u>	No _____
Hydric Soil Present?	Yes <u>X</u>	No _____			
Wetland Hydrology Present?	Yes <u>X</u>	No _____			
Remarks					

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status	
Tree Stratum (plot size _____)				
1 _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That are OBL, FACW or FAC _____ (A) Total Number of Dominant Species Across All Strata <u>3</u> (B)
2 _____	_____	_____	_____	
3 _____	_____	_____	_____	
4 _____	_____	_____	_____	
	<u>0</u>	= Total Cover		
Sapling/Shrub Stratum (plot size _____)				
1 _____	_____	_____	_____	Percent of Dominant Species That are OBL, FACW or FAC <u>0%</u> (A/B)
2 _____	_____	_____	_____	
3 _____	_____	_____	_____	
4 _____	_____	_____	_____	
5 _____	_____	_____	_____	
	<u>0</u>	= Total Cover		
Herb Stratum (plot size <u>5</u>)				
1 <u>Festuca like</u>	<u>30</u>	<u>X</u>	<u>#N/A</u>	Prevalence Index Worksheet: Total % Cover of _____ Multiply by _____ OBL Species _____ x 1 = <u>0</u> FACW species _____ x 2 = <u>0</u> FAC Species _____ x 3 = <u>0</u> FACU Species _____ x 4 = <u>0</u> UPL Species _____ x 5 = <u>0</u> Column Totals <u>0</u> (A) <u>0</u> (B) Prevalence Index = B/A = <u>#DIV/0!</u>
2 <u>Salicornia virginica</u>	<u>10</u>		<u>OBL</u>	
3 <u>Agrostis like</u>	<u>45</u>	<u>X</u>	<u>#N/A</u>	
4 <u>Juncus tenuis like</u>	<u>10</u>		<u>#N/A</u>	
5 <u>fleshy-not pickleweed</u>	<u>30</u>	<u>X</u>	<u>#N/A</u>	
6 <u>yellow flower</u>	<u>5</u>		<u>#N/A</u>	
7 _____	_____	_____	_____	
8 _____	_____	_____	_____	
	<u>130</u>	= Total Cover		
Woody Vine Stratum (plot size _____)				
1 _____	_____	_____	_____	Hydrophytic Vegetation Indicators: <u>X</u> Dominance Test is >50% _____ Prevalence Index is ≤ 3.0 ¹ _____ Morphological Adaptations ¹ (provide supporting data in Remarks or on a separate sheet) _____ Wetland Non-Vascular Plants ¹ _____ Problematic Hydrophytic Vegetation ¹ (Explain)
2 _____	_____	_____	_____	
	<u>0</u>	= Total Cover		
% Bare Ground in Herb Stratum _____				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic Hydrophytic Vegetation Present? Yes <u>X</u> No _____
Remarks				

Sampling Point: 13

[illegible]²Location PL=Pore Lining M=Matrix

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1)(except MLRA 1)	<input type="checkbox"/> Other (explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

²Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Type	None
Depth (inches)	

Hydric Soil Present?	Yes	X	No
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Remarks

Wetland Hydrology Indicators:

Secondary Indicators (2 or more required)

<input type="checkbox"/>	Surface Water (A1)	<input type="checkbox"/>	Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/>	Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input checked="" type="checkbox"/>	High Water Table (A2)	<input type="checkbox"/>	Salt Crust (B11)	<input type="checkbox"/>	Drainage Patterns (B10)
<input checked="" type="checkbox"/>	Saturation (A3)	<input type="checkbox"/>	Aquatic Invertebrates (B13)	<input type="checkbox"/>	Dry-Season Water Table (C2)
<input type="checkbox"/>	Water Marks (B1)	<input type="checkbox"/>	Hydrogen Sulfide Odor (C1)	<input type="checkbox"/>	Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/>	Sediment Deposits (B2)	<input checked="" type="checkbox"/>	Oxidized Rhizospheres along Living Roots (C3)	<input checked="" type="checkbox"/>	Geomorphic Position (D2)
<input type="checkbox"/>	Drift Deposits (B3)	<input type="checkbox"/>	Presence of Reduced Iron (C4)	<input type="checkbox"/>	Shallow Aquitard (D3)
<input type="checkbox"/>	Algal Mat or Crust (B4)	<input type="checkbox"/>	Recent Iron Reduction in Plowed Soils (C6)	<input type="checkbox"/>	Fac-Neutral Test (D5)
<input type="checkbox"/>	Iron Deposits (B5)	<input type="checkbox"/>	Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/>	Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/>	Surface Soil Cracks (B6)	<input type="checkbox"/>	Other (Explain in Remarks)	<input type="checkbox"/>	Frost-Heave Hummocks (D7)
<input type="checkbox"/>	Inundation Visible on Aerial Imagery (B7)				
<input type="checkbox"/>	Sparsely Vegetated Concave Surface (B8)				

Surface Water Present?	Yes	No	<u>X</u>	Depth (inches)	
Water Table Present?	Yes	<u>X</u>	No	Depth (inches)	<u>10</u>
Saturation Present?	Yes	<u>X</u>	No	Depth (inches)	<u>4</u>

Wetland Hydrology Present?

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections) if available

None

Remarks

[illegible]

Office Data Form (OF)		Wetland Group	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	
D12	Size of Largest Nearby Tract or Corridor of Natural Land Cover	The largest patch or corridor that is natural land cover and is within 0.5 mile of the AA edge, and not separated from the AA by roads etc. that create gaps wider than 150 ft. occupies:																																			
		<1 acre	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		1-10 acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		10-100 acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		100-1000 acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
D13	Local Wetland Uniqueness	Within 0.5 mile of the center of the AA, the AA and vegetation of the same form that is contiguous to the AA together provide (select all that apply):																																			
the largest patch of currently ungrazed, unrowed, and unshaded herbaceous		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
the largest patch of unshaded shrubland (excluding plantations)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
the largest patch of deciduous or evergreen trees (excluding plantations)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
NONE of above		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
D14	Herbaceous Open Land in Landscape	Draw a circle of radius of 2 miles centered on the AA. The amount of herbaceous openland is:																																			
<5% of the land		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
5 to 20%		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
20 to 50%		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
50 to 80%		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
D15	Proximity to Open Land	The distance from the AA edge to the closest patch of herbaceous openland larger than 1 acre is:																																			
<100 ft. or the AA contains >1 acres of such cover, or is contiguous to >1 acre of such cover		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
100 to 200 ft.		0	0	0	0																																

Office Data Form (ODF)

[illegible]

Wolland Group

Field Data Form		Indicator answers: 1 = Yes / 0 = No																																
Indicator	Condition																																	
F1 Presence of Squeak Wetland Types	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
F2 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F3 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F4 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F5 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F6 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F7 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F8 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F9 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F10 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F11 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F12 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F13 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F14 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F15 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F16 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F17 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F18 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F19 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F20 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F21 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F22 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F23 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F24 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F25 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F26 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F27 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F28 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F29 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F30 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F31 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F32 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F33 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F34 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F35 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F36 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F37 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F38 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F39 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F40 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F41 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F42 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F43 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F44 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F45 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F46 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F47 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F48 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F49 Wetland Type of Conversion Channel	Does the AA contain, or at least part of, any of these wetland types? Many "1"s mean to fill out all "No"	0	0	0	0	0	0	0	0	0	0																							

34

1

[illegible]

Field F Data Form

Welland Group		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
OR	Indicator	Indicator answers: 1 = Yes / 0 = No																																	
F15	Open Water Interceptor With Partly Inundated Vegetation	<p>Visualize the extent and distribution of pounded open water within the AA, relative to the distribution of the most dominant form of partly-submerged vegetation (herbaceous or woody, with stems and leaves >4" above the water surface). Visualize this as it occurs during May of most years. In the table to the right, first estimate the percent open water (left column) in the AA, then its distribution (top row). Select the highest applicable number and enter it in column D. See photographs in Appendix A of manual. If the AA has no ponded water during May, score it "1." If this is a fringe welland, assume Open Water is >70%.</p> <p>Note: Pounded open water is surface water that is not visibly flowing and contains no vegetation (except perhaps floating-leaved or completely submerged species) and is not beneath a canopy of trees or shrubs. For tidal sites, consider the condition at average mid-tide.</p>																																	
F16	Inflow	<p>When surface water enters the AA, it enters as (select all applicable choices):</p> <p>flowing in streams, ditches, other channels</p> <p>surface water exchanged broadly as overflow with contiguous waters such as an estuary, lake, or bay</p> <p>water pumped into or intentionally diverted to the AA, e.g., as part of a stormwater dispersion system, irrigation practice, or drainage life outlet</p> <p>groundwater runoff and direct precipitation</p>																																	
F17	Groundwater	<p>Select one:</p> <p>Part of the welland contains strong evidence of groundwater discharges at the welland surface during summer: (a) Springs are observed or are shown on Welland Explorer map, or (b) water is cooler in summer and warmer in winter than in other local wellands, or (c) measurements from shallow wells indicate groundwater is discharging to the welland.</p> <p>Part of the welland has less definitive evidence of discharging groundwater during summer. Welland has no perennial tributary and is on organic, sandy, or gravelly soil (as determined in F5E) AND has one or more: (a) outflow is present and persists during most of the summer, or (b) on a natural slope of >5%, or (c) very close to the base of a natural slope steeper than 15%, and longer than 300 ft, or (d) located at a geologic fault, or (e) has rust deposits, colored precipitates, or dispersible natural oil sheen, or (f) within a mile of the top of a HUC4 watershed (see Welland Explorer for boundaries).</p> <p>Neither of above is true, although some groundwater may discharge to or flow through the welland, and welland is in a region of eastern Oregon with mean annual precipitation of less than 20 inches.</p>																																	
F18	Outflow Duration	<p>The most durable surface water connection between the welland and the closest contiguous upland downslope surface water is:</p> <p>persistent (>9 months/yr, or daily tidal exchange)</p> <p>seasonal (14 days to 9 months/yr, not necessarily consecutive)</p> <p>temporary (<14 days, not necessarily consecutive)</p> <p>none – the welland lacks an outlet. If so, mark "1" here and SKIP TO F25 (Sheltering of Water).</p>																																	
F19	Outflow Confinement	<p>During major runoff events, in the places where surface water exits the welland it is:</p> <p>impeded by a pipe, culvert, ledgegate, narrowly breached dike, berm, beaver dam, or other obstruction (other than natural topography), or water is pumped out of the welland (e.g., for irrigation)</p> <p>not impeded by anything other than (possibly) natural topography</p>																																	
F20	Inlet/Outlet	<p>Either the welland has BOTH an inlet and outlet with seasonal or persistent surface flow, or the welland is tidal or lacustrine. If so, enter "1" here and continue. If neither condition met, enter "0" here and then SKIP TO F25 (Sheltering of Water).</p>																																	
F21	Throughflow Complexity	<p>During peak annual flow, most of the surface water that flows through the AA:</p> <p>encounters little or no vegetation, boulders, or other sources of friction</p> <p>mostly encounters herbaceous vegetation that offers little resistance, and water follows a fairly straight path from entrance to exit (few internal channels, only slight meandering)</p> <p>mostly encounters herbaceous vegetation that offers little resistance and follows a fairly indirect path from entrance to exit (non-channelized flow or many internal channels, or very scattered or subtle meandering)</p> <p>encounters measurable resistance from fairly-rigid vegetation (e.g., cattail, bulrush, woody plants) or channel-clogging debris, and follows a fairly straight path from entrance to exit.</p> <p>encounters measurable resistance from fairly-rigid vegetation (e.g., cattail, bulrush, woody species) or channel-clogging debris, and follows a fairly indirect path from entrance to exit.</p>																																	
F22	Vegetated Zone Relative Width	<p>During most of the time open water is present in the AA, vegetated areas within the AA, where they are contiguous to open water, are:</p> <p>wider than the contiguous open water</p> <p>narrower than the contiguous open water</p>																																	
F23	Vegetated Zone Absolute Width	<p>The average width of vegetated area in the AA that separates adjoining uplands (if any) from contiguous open waters (if any) is:</p> <p>>300 ft or no contiguous upland or open waters (not even temporary)</p> <p>100-300 ft</p> <p>25-100 ft</p> <p>5-25 ft</p> <p><5 ft</p>																																	

Field F Data Form

Field F Data Form		Welland Group	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
D#	Indicator	Conditions	Indicator answers: 1 = Yes / 0 = No																																	
F24	Undercut Banks	The percent of the AA's water edge, if any, that has undercut banks that are partially visible above the water is:																																		
	>75%																																			
	50-75%																																			
	25-50%																																			
	1-25%																																			
	<1%, or no definable water edge is present																																			
	cannot estimate																																			
F25	Sheltering of Water	At midday in summer, the area of surface water within the AA that is shaded by herbaceous or woody vegetation, incised channels, streambanks, or other features also present within the AA is:																																		
	>75% of the water																																			
	50-75% of the water																																			
	25-50% of the water																																			
	5-25% of the water																																			
	<5% of the water																																			
	(surface water is typically exposed in summer or during low tide)																																			
F26	Above-water Wood	The number of downed wood pieces thicker than 4 inches that remain only partly underwater during most of the spring or early summer, thus potentially serving as basking sites for turtles, birds, or frogs is:																																		
	Several																																			
	Few or none, or AA never has any surface water at that time																																			
	Select all that apply:																																			
F27	Islands	During early summer the wetland contains a floating vegetation mat suitable for nesting birds and isolated from the shore by water depths >3 ft. Or AA is an island with similar sedation and a gently-sloping water edge that is mostly vegetated.																																		
	During early summer the wetland contains (or is) an island with a gently-sloping water edge, that is mostly bare and is isolated from the shore by water depths >3 ft.																																			
	Neither of above																																			
F28	Shorebird Feeding Habitats	The maximum extent of mudflats or unwooded shortgrass areas within the AA during shorebird migration and wintering (generally August through April (and for tidal AAs, during mean low tide)) is usually:																																		
	none, or <100 sq. ft., and there are none that cover >10,000 sq. ft. anywhere within 300 ft of the AA.																																			
	none, or <100 sq. ft., but some that cover >10,000 are within 300 ft of the AA.																																			
	100-1,000 sq. ft. within AA.																																			
	1,000 - 10,000 sq. ft. within AA.																																			
	>10,000 sq. ft. within AA.																																			
F29	Waves	Which of the following is most true:																																		
	Wind or boats frequently generate waves of >1 ft near the AA, those waves are intercepted by the wetland, and structures behind the AA are protected from wave erosion																																			
	Wind or boats frequently generate waves of >1 ft near the AA, those waves are intercepted by the wetland, but there are no structures behind the wetland																																			
	Neither wind nor boats frequently generate waves of >1 ft near the AA																																			
F30	Vectors for Waterside Pests	Select all that apply: a regularly-used boat dock is present within or contiguous to the AA. a regularly-used boat dock is not within the AA, but there is one within 300 ft of the AA and there is a permanent or total surface connection between the dock and the AA. large algae that anchor ballast water are repeatedly observed in nearby contiguous waters the AA has a persistent or tidal surface water connection (>9 mos./yr., via ditch, pipe, channel, bogate, or floodplain) to a nearby perennial stream, river, lake, or estuary																																		
	none of the above																																			
F31	Non-native Aquatic Animals	The following are known or likely to have reproducing populations in this AA, its wetland, or in water bodies within 300 ft that connect to the AA at least seasonally. Select all that apply: non-native amphibians (e.g., bullfrogs) or reptiles (e.g., red-ear sliders) carr other non-native fish (e.g., bass, gambusia, walleye, crappie, brook trout) non-native invertebrates (e.g., New Zealand mudsnail, milian crab, rusty crayfish) nutria none of above, or unknown																																		
For F32 to 34, if the statement is true, enter a "1" in column D. Otherwise that should be a "0"																																				
F32	Ice-free																																			
F33	Ponded Threshold	During most of the summer, the AA contains more than 0.25 acre of ponded non-tidal surface water that is deeper than 1 ft, or is within 300 ft of such an area and the intervening habitat is not developed (roads, etc.). Or nesting within the AA by ducks, geese, or swans has been proven.																																		
F34	No Scum	During most summers, less than 80% of the AA's water surface is covered by floating algae, duckweed, and other non-rooted aquatic plants, AND no major fish kills occur. If no surface water is present in summer, mark "1" in column D.																																		
F35	Submerged & Floating-leaved Aquatic Vegetation (SAV)	SAV (submerged & floating-leaved aquatic vegetation) occupies an annual maximum of: ->95% of the surface water area 50-95% of the surface water area <5-50% of the surface water area 5-25% of the surface water area -<5% of the surface water area. Mark "1" here and SKIP TO F38 (Herbaceous Extent).																																		

Field F Data Form		Wetland Group	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34		
DA	Indicator	Conditions	Indicator answers: 1 = Yes / 0 = No																																			
F36	SAV Invasive vs. Non-Invasive Cover	The small cover of SAV at mid-summer is comprised of: mostly invasive SAV species (see list in column E). Mark "1" here and underline the species in column E. Then SKIP TO F38 . mostly non-invasive species. impossible to tell.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
F37	SAV Native Species Dominance	Considering just the SAV species that are native: one or two of those species together comprise >50% of the SAV cover. Mark "1" here and underline the species in column E. no two of the native SAV species together comprise >50% of the SAV cover. impossible to tell.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
F38	SAV Species Ubiquity	Of all the SAV species in this AA: all are species that are common among Oregon's wetlands and lakes. at least one native species is a SAV plant that is not common among Oregon's wetlands and lakes, and it covers >1% of the SAV area or >100 sq. ft. See file ORWAP_SuppInfo, worksheet: P_UnCom. Mark "1" in next column and write names of the species in column E. impossible to tell.	0	0	0	0	1	0	1	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	1	1	0	0
Note: In the next 4 questions, "herbaceous" does not include SAV or herbaceous plants growing under a																																						
F39	Herbaceous Extent	The small cover of herbaceous plants during mid-summer is: >95% of the vegetated part of the AA. 50-95% of the vegetated part of the AA. 25-50% of the vegetated part of the AA. <25% of the vegetated part of the AA. Mark "1" here and SKIP TO F44 (Woody Extent).	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
F40	Graminoid vs. Forb Cover	When the small cover of herbaceous plants is at an annual maximum, these plants are: overwhelmingly graminoids (>80% cover of grass-like plants). mostly graminoids (50-80% cover). mostly non-graminoids (e.g. forbs, ferns) (50-80%). overwhelmingly (>80%) non-graminoids.	1	0	0	1	0	0	0	1	0	0	1	1	1	0	0	1	0	0	1	0	0	1	1	1	1	0	0	0	0	0	0	1	0	0	0	
F41	Herbaceous Native vs. Non-native Cover	The maximum annual small cover of herbaceous plants is: overwhelmingly (>80% cover) non-native species, of which >10% are species considered invasive (see column E). Mark "1" in next column and write names of dominant invasive species in column E. Then SKIP TO F43 . overwhelmingly (>80% cover) non-native species, but <10% are considered invasive (see column E). Mark "1" in next column and write names of dominant non-native species in column E. Then SKIP TO F43 . mostly (50-80%) non-native species, regardless of invasiveness. Mark "1" and SKIP TO F43 . mostly (50-80%) native species. overwhelmingly (>80%) native species.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
F42	Herbaceous Species Dominance	Of just the herbaceous (forb and graminoid) species that are native: one or two native species together comprise >50% of the small cover of native herbaceous plants at any time during the year. Mark "1" in next column and write names of dominant native species in column E. no two of the native species together comprise >50% of the small cover of native herbaceous plants.	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
F43	Herbaceous Plant Species Ubiquity	Of all the herbaceous species in this AA: all are species that are common among Oregon's wetlands. at least one native species is not common among Oregon's wetlands, and it covers >1% of the AA's herbaceous area or >100 sq. ft. (either contiguous or scattered). See file ORWAP_SuppInfo, worksheet: P_UnCom. Mark "1" in next column and write names of the species in column E. Species referenced in F43	1	0	1	1	0	0	0	1	0	1	0	1	1	1	0	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	1	0	1	1	
F44	Woody Extent Within the AA	Within the AA, woody vegetation (shrubs, trees, woody vines) occupies: >95% of the vegetated part of the AA. 50-95% of the vegetated AA. 25-50% of the vegetated AA. 5-25% of the vegetated AA. <5% of the vegetated AA.	0	1	0	1	1	1	0	0	0	1	1	1	0	0	1	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	
F45	Woody Extent Along Water Edge	Where surface water is present during the wettest time of year, the AA's woody vegetation occupies: >95% of the area within 100 ft of the open water. 50-95% of the area within 100 ft of open water. 25-50% of the area within 100 ft of open water. 5-25% of the area within 100 ft of open water. <5% of the area within 100 ft of water; mark "1" here and SKIP TO F50 (Woody Diameter Classes).	0	0	0	0	1	0	0	1	1	0	0	0	0	0	1	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	
F46	Woody Distribution	The woody vegetation (if any) within the AA is: clumped in fairly distinct bands or patches mostly separate from herbaceous vegetation, and most patches or bands are large (>1 acre including contiguous upland woody veg.). Or <u>within the entire AA is wooded</u> . Isolated shrubs or trees are few. clumped in fairly distinct bands or patches mostly separate from herbaceous vegetation, and most patches are small (<1 acre including contiguous upland woody veg.). dispersed quite evenly amid the herbaceous vegetation, in many small patches, or many isolated shrubs or trees.	0	1	1	1	1	1	0	1	1	0	1	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	

Field F Data Form

[illegible]

Field F Data Form

Field F Data Form		Wetland Group		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
QA	Indicator	Conditions	Indicator answers: 1 = Yes / 0 = No																																		
P56	Upland Edge Shape Complexity	Most of the edge between the wetland and upland is (select one):																																			
		Linear - a significant portion of the wetland's upland edge is straight, as in wetlands bounded by roads or abutted by dikes or roads.																																			
		Convulsed: Wetland perimeter is many times longer than maximum width of the wetland, with many alcoves and indentations ("fingers").																																			
		Intermediate: Wetland's perimeter either (a) is only mildly convulsed, or (b) mixed - contains about lengths of linear and convulsed segments.																																			
P57	Upland Inclusions	The extent of inclusions of upland within the AA (as indicated by their topography, plants, and/or soils) is:																																			
		Many (e.g., wetland-upland "mosaic").																																			
P58	Soil Composition in the Soil Pit	The composition of the soil in the soil pit at the ground surface (uppermost soil layer and excluding the surf layer - see protocol in ORWAP Manual, section 2.3.2) is:																																			
		Loamy - includes silt, silt loam, loam, sandy loam.																																			
		Clayey - includes clay, clay loam, silty clay, silty clay loam, sandy clay, sandy clay loam.																																			
		Organic - includes muck, muck peat, peat, and muddy mineral.																																			
P59	Downed Wood	Coarse - includes sand, loamy sand, gravel, cobble, stones, boulders, fluvials, fluvioglyphs, fluvioglyphs.																																			
		The number of downed wood pieces longer than 6 ft and with diameter >6", and not permanently submerged, is:																																			
P60	Ground Irregularity	Several (>5 if AA is >10 acres, or >1 for smaller AAs).																																			
		Few or none.																																			
		The number of animal burrows, mounds, hummocks, boulders, upturned trees, islands, natural levees, dry channels, pits, wide soil cracks, and microdepressions (in parts of the AA that has persisted) is:																																			
		Several (extensive micro-topography).																																			
P61	Internal Gradient	Few or none (minimal microtopography: <1% of the area that isn't persistently inundated), e.g., many flat sites having a single hydroperiod.																																			
		Intermediate.																																			
		The gradient along most of the AA's water flow paths (both sheet and channel flow) is:																																			
		>10%.																																			
P62	Fish Access From Offsite	5-10%.																																			
		<5%.																																			
P63	Nesting or Roosting Structures	Flat (<2%, no slope or flow is ever apparent, or AA is an estuarine fringe wetland): Includes most depressional sites.																																			
		Small fish (e.g., stonehead, minnow) from elsewhere in the watershed can access part of the AA for at least 2 days during most years or are known to already be present onsite.																																			
P64	Cliffs, Banks, or Beaver	Within the AA or within its wetland or within 300 ft of AA, there are bridges, buildings, caves, or ledges with openings/cracks, well-maintained bird or bat boxes, elevated platforms, or other artificial structures suitable for nesting by some native bird or bat species.																																			
		In the AA or within its wetland or within 100 ft of the AA, there are elevated terrestrial features such as cliffs, stream banks, excavated pits, or putative walls (but not riprap) that extend at least 5 ft nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Or there is evidence that beaver have used this AA (e.g., gnawed limbs).																																			
P65	Visibility																																				
		The maximum percent of the wetland that is visible from the best vantage point on public roads, public parking lots, public buildings, or public paved paths that adjoin or are within 300 ft of the AA (select one) is:																																			
		>50%.																																			
		25-50%.																																			
P66	Ownership	<25%.																																			
		Most of the AA is (select one):																																			
P67	Public Access	in public ownership.																																			
		in private ownership.																																			
		For most of the AA, permission for access is normally given or allowed.																																			
		to anyone, mostly unrestricted.																																			
P68	Non-consumptive Uses Actual or Potential	to anyone, but with certain restrictions (e.g., limited dates, permit required).																																			
		only on a case-by-case basis, but with few other restrictions.																																			
		only on a case-by-case basis, with restrictions (e.g., limited dates, permit required).																																			
		season or never.																																			
P69	Sustained Scientific Use	(do not know).																																			
		Assuming access permission was granted, select all statements that are true of this AA as it currently exists.																																			
		Fishing is physically possible in >5% of the AA during most of year, e.g., free of deep water and dense aquatic thickets.																																			
		All or part of the AA (or an area within sight of the AA and within 100 ft) would be physically accessible to people in wheelchairs, e.g., paved and flat.																																			
P70	Consumptive Uses (Provisioning Services)	Maintained roads, parking areas, or foot-trails are within 30 ft of the AA, or the AA can be accessed most of the year by boat.																																			
		Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA is part of an area that has been designated by an agency or institution as a benchmark, reference, or status-trends monitoring area.																																			
		(do not know).																																			
		Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select all that apply.																																			
P70	Consumptive Uses (Provisioning Services)	low-impact commercial timber harvest.																																			
		low-impact grazing.																																			
		commercial harvesting of fish or mussels/shellfish.																																			
		intensive hunting or subsistence hunting.																																			
P70	Consumptive Uses (Provisioning Services)	fishery (including shellfish harvest).																																			
		None of the above.																																			

Field F Data Form

[illegible]

Field S Data Form

Wetland Group

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34

'x' indicates that the condition was deemed satisfied; or activity is or was present

Field S Data Form				Wetland Group																																	
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
S3 Drier Water Regime - Internal Causes																																					
In the last column, place an X next to any item located within or immediately adjacent to the AA, that is likely to have caused a part of the AA to be inundated less extensively, less deeply, less frequently, and/or for shorter duration that it would be without that item.																																					
ditches or drain tile in the AA or along its edge that accelerate outflow from the AA																																					
lowering or enlargement of a surface water exit point (e.g., culvert) or modification of a water level control structure, resulting in quicker drainage																																					
accelerated downcutting or channelization of an adjacent or internal channel (cut below the historical water table level)																																					
deep ripping (e.g., with plows) that severs an underlying hydrologically-confining soil layer																																					
placement of fill material																																					
withdrawals (e.g., pumping) of natural surface or ground water directly out of the AA (not its tributaries)																																					
If any items were checked above, then for each row of the table below assign points (3, 2, or 1) in the last column that describe the combined maximum effect of those items in creating a drier water regime in the AA. To estimate that, contrast it with the condition if checked items never occurred or were no longer present.																																					
Spatial extent of AA's resulting drier condition																																					
When most of AA's drier condition began																																					
Score the following 2 rows only if the drier conditions began within past 10 years, and only for the part of the AA that got drier.																																					
Inundation now vs. previously																																					
Water level decrease																																					
0 if Sum=0, (1 pt) if Sum=1-4, (2 pt) if 5-6, (3 pt) if 7-8, (4 pt) if 9-10, (5 pt) if >10.																																					
final score=																																					
S4 Drier Water Regime - External Causes																																					
In the last column, place an X next to any item within the CA (including channels flowing into the AA) that is likely to have caused a part of the AA to be inundated less extensively, less deeply, less frequently, and/or for shorter duration that it would be without those.																																					
a dam, dike, levee, weir, berm, or tldgate that interferes with natural inflow to the AA																																					
relocation of natural tributaries whose water would otherwise reach the AA																																					
instream water withdrawals from tributaries whose water would otherwise reach the AA																																					
groundwater withdrawals that divert water that would otherwise reach the AA																																					
proliferation of phreatophytes (woody plants with deep roots and high transpiration, e.g., juniper, autumn olive) or crops with high transpiration rates that are near the AA																																					
changes not related directly to humans																																					
If any items were checked above, then for each row of the table below assign points (3, 2, or 1) in the last column that describe the combined maximum effect of those items in creating a drier water regime in the AA. To estimate that, contrast it with the condition if checked items never occurred or were no longer present.																																					
Spatial extent of AA's resulting drier condition																																					
When most of AA's drier condition began																																					
Score the following 2 rows only if the drier conditions began within past 10 years, and only for the part of the AA that got drier.																																					
Inundation now vs. previously																																					
Water level decrease																																					
0 if Sum=0, (1 pt) if Sum=1-4, (2 pt) if 5-6, (3 pt) if 7-8, (4 pt) if 9-10, (5 pt) if >10.																																					
final score=																																					
S5 Altered Timing of Water Inputs																																					
In the last column, place an X next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times, more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times).																																					
flow regulation in tributaries or water level regulation in adjoining water body, or tldgate or other control structure at water entry points that regulates inflow to the AA																																					
increased pavement and other impervious surface in the CA																																					
straightening, ditching, dredging, and/or lining of tributary channels in the CA																																					
discharges of irrigation water to the AA, applied at times when natural runoff typically is not significant																																					
other																																					
If any items were checked above, then for each row of the table below assign points (3, 2, or 1) in the last column that describe the combined maximum effect of those items on the timing of water inputs to the AA. To estimate that, contrast it with the condition if checked items never occurred or were no longer present.																																					
Spatial extent within the AA of timing shift																																					
When most of the timing shift began																																					
Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the AA that experiences those.																																					
Input timing now vs. previously																																					
Flashiness or muting																																					
0 if Sum=0, (1 pt) if Sum=1-4, (2 pt) if 5-6, (3 pt) if 7-8, (4 pt) if 9-10, (5 pt) if >10.																																					
final score=																																					

Field S Data Form

Wetland Group

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34

'x' indicates that the condition was deemed satisfied; or activity is or was present

S6 Accelerated Inputs of Nutrients, Contaminants, and/or Salts			
In the last column, place an X next to any item – occurring in either the AA or its CA – that is likely to have accelerated the inputs of nutrients, contaminants, or salts to the AA			
stormwater or wastewater effluent (including failing septic systems), landfills			
irrigation water discharges into the AA, including saline seeps			
livestock, dogs			
fertilizers applied to lawns, ag lands, or other areas in the CA			
pesticides applied to lawns, ag lands, roadsides, or other areas in the CA, but excluding spot applications for controlling non-natives in the AA			
dumping of large amounts of wood, leaves, grass clippings, trash into the AA or its tributaries			
artificial drainage of upslope lands			
reflooding of soils that had been dry for many years			
fire retardants from aerial firefighting			
oil or chemical spills (not just chronic inputs) from nearby roads			
erosion of nutrient-rich or contaminated soils			
chemical wastes from mining, oil/gas extraction, other industrial sources			
other human-related disturbances within the CA			
sources not related directly to humans, e.g., fire, extensive cover of nitrogen-fixing plants (e.g., alder), concentrations of waterbirds or other wildlife			
If any items were checked above, then for each row of the table below assign points (3, 2, or 1) in the last column that describe the combined maximum effect of those items in generating loads of nutrients, contaminants, or salts reaching the AA. To estimate that, contrast it with the condition if checked items never occurred or were no longer present.			
Usual toxicity of most toxic contaminants	Severe (3 pts) industrial effluent or 303d* for toxics	Medium (2 pts) domestic effluent, cropland, or 303d for nutrients	Mild (1 pt) mildly impacting livestock, pets, low density residential
Frequency & duration of input	frequent and year-round	frequent but mostly seasonal	infrequent & during high runoff events mainly
AA proximity to main sources (actual or potential)	0-50 ft	50-300 ft or in groundwater	in other part of contributing area
* categorized by ODEQ as Water Quality Limited (303d) and toxic substances are listed by ODEQ as one reason. See item D40 in data form OF.			
0 if Sum= 0, (1 pt) if Sum= 1-3, (2 pt) if 4-5, (3 pt) if 6-7, (4 pt) if 8, (5 pt) if 9.			
sum=			
final score=			
S7 Excessive Sediment Loading from Contributing Area			
In the last column, place an X next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the AA from its CA.			
erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires			
erosion from construction, in-channel machinery in the CA			
erosion from off-road vehicles in the CA			
erosion from livestock or foot traffic in the CA			
stormwater or wastewater effluent			
sediment from gravel mining, other mining, oil/gas extraction			
accelerated channel downcutting or headcutting of tributaries due to altered land use			
other human-related disturbances within the CA			
natural processes within the CA, e.g., streambank erosion, landslides, erosion of erosion-prone soils especially following fire, floods			
If any items were checked above, then for each row of the table below assign points (3, 2, or 1) in the last column that describe the combined maximum effect of those items in increasing the amount or transport of sediment into the AA. To estimate that, contrast it with the condition if checked items never occurred or were no longer present.			
Erosion in CA	Severe (3 pts) extensive evidence, high intensity*	Medium (2 pts) potentially (based on high- intensity* land use) or scattered evidence	Mild (1 pt) potentially (based on low- intensity* land use) with little or no direct evidence
Repetitiveness of significant soil disturbances in the CA	current & ongoing	1-12 months ago	>1 yr ago
Duration of sediment inputs to the AA	frequent and year-round	frequent but mostly seasonal	infrequent & during high runoff events mainly
AA proximity to actual or potential sources	0-50 ft, or farther but on steep erodible slopes	50-300 ft	in other part of contributing area
* high-intensity= plowing, grading, excavation, erosion with or without veg removal. low-intensity= veg removal only with little or no apparent erosion			
0 if Sum= 0, (1 pt) if Sum= 1-4, (2 pt) if 5-6, (3 pt) if 7-8, (4 pt) if 9-10, (5 pt) if >10.			
sum=			
final score=			

Field S Data Form

Wetland Group

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34

'x' indicates that the condition was deemed satisfied; or activity is or was present

Soil or Sediment Alteration Within the Assessment Area			
In the last column, place an X next to any item present in the AA that is likely to have compacted, eroded, or otherwise altered the AA's soil			
compaction from machinery, off-road vehicles, or mountain bikes, especially during wetter periods			
leveling or other grading not to the natural contour			
tillage, plowing (but excluding disking for enhancement of native plants)			
fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland			
livestock and other sediment- or soil-disturbing animals, e.g., carp, nutria, wild boar, people on foot			
excavation			
dredging in or adjacent to the AA			
boat traffic in or adjacent to the AA and sufficient to cause shore erosion or stir bottom sediments			
artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments			
natural processes within the AA, e.g., trampling by concentrated wildlife, shore or streambank erosion, landslides, normal erosion of erosion-prone soils especially following fire, floods			
If any items were checked above, then for each row of the table below assign points (3, 2, or 1) in the last column that describe the combined maximum effect of those items in altering the AA's soils. To estimate that, contrast it with the soil condition if checked items never occurred or were no longer present.			
	Severe (3 pts)	Medium (2 pts)	Mild (1 pt)
Spatial extent of altered soil	>95% of AA or >95% of its upland edge (if any)	5-95% of AA or 5-95% of its upland edge (if any)	<5% of AA and <5% of its upland edge (if any)
Frequency of significant soil disturbance in AA	current & ongoing	1-12 months ago	>1 yr ago
Duration	long-lasting, minimal veg recovery	long-lasting but mostly revegetated	short-term, revegetated, not intense
Timing of soil alteration	frequent and year-round	frequent but mostly seasonal	infrequent & mainly during scattered events
	sum=		
	final score=		
0 if Sum= 0, (1 pt) if Sum= 1-4, (2 pt) if 5-6, (3 pt) if 7-8, (4 pt) if 9-10, (5 pt) if >10.			
0 0 0 1 2 2 0 0 0 0 0 0 3 4 0 0 1 4 0 0 0 3 0 4 1 2 0 0 0 1 2 0 0 0 1			
Vegetated Cover Removal Within the Assessment Area			
In the last column, place an X next to any item present in the AA that is likely to have caused less canopy or ground cover, or less vegetation biomass, or less wood generally. If only the species composition (not total cover or biomass) changed, do not check any of these items.			
clearing, logging, excepting removal of woody vegetation from native prairies			
grazing by livestock			
mowing			
herbicides, excepting spot applications for controlling non-native plants in the AA			
plowing, regrading			
removal of woody debris			
shading from large artificial structure, e.g., bridge, boardwalk, dock			
other human-related disturbances within the AA			
natural processes concentrated within the AA, e.g., wind & wave scouring, windthrow, insect or disease infestations, fires, beaver damage, natural erosion, intensive grazing by deer, elk, geese			
If any items were checked above, then for each row of the table below assign points (3, 2, or 1) in the last column that describe the combined maximum effect of those items on the amount of vegetation cover in the AA.			
	Severe (3 pts)	Medium (2 pts)	Mild (1 pt)
Spatial extent of veg removal	>95% of AA or >95% of its water edge	5-95% of AA or 5-95% of its water edge	<5% of AA and <5% of its water edge if any
Frequency of significant veg removal	regularly during most of the year	a few times a year	annual or less
Slows recovery after each removal	> 20 yrs	2-20 yrs	<2 yrs
	sum=		
	final score=		
0 if Sum= 0, (1 pt) if Sum= 1-3, (2 pt) if 4-5, (3 pt) if 6-7, (4 pt) if 8, (5 pt) if 9.			
0 0 0 2 0 0 0 0 0 0 0 2 2 3 0 0 2 2 0 0 2 3 2 0 0 3 0 0 1 0 0 0 0 0 0			



Oregon

John A. Kitzhaber, MD, Governor

Department of State Lands

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June 21, 2012

Sandra Belson
Community Development Director
City of Florence
250 Highway 101
Florence, OR 97439

State Land Board

John A. Kitzhaber, MD
Governor

Kate Brown
Secretary of State

Ted Wheeler
State Treasurer

Re: Approval of Significance Criteria for Identifying Locally Significant Wetlands

Dear Ms. Belson:

In a letter dated March 29, 2010, the Department of State Lands (DSL) granted permission to the City of Florence to use the *Oregon Rapid Wetland Assessment Protocol* (ORWAP) to assess wetlands as part of the Siuslaw Estuary Partnership project, as allowed by Oregon administrative rules governing Local Wetlands Inventories (141-086-0185) for your Local Wetlands Inventory and Goal 5/Goal 17 planning.

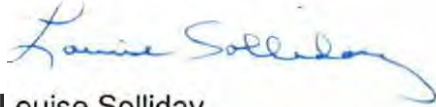
ORWAP has not yet been incorporated into the administrative rules for identifying Locally Significant Wetlands (OAR 141-86-300 through 350). Because Florence piloted the use of ORWAP for this purpose before administrative rule changes were made, you have worked closely with DSL's wetlands planning staff and stakeholders of the Siuslaw Estuary Partnership project to develop significance criteria based upon the ORWAP results.

In lieu of the administrative rules for identifying Locally Significant Wetlands (OAR 141-86-300 through 350), the criteria that will be used for determining significance of non-Goal 17 wetlands in the Florence urban growth boundary (UGB), as outlined in the April 30, 2012 Siuslaw Estuary Partnership document entitled "Proposed Florence Wetlands Significance Criteria and Protection Measures" (enclosed), are wetlands that score at or above the 75th percentile in either Function or Value for one or more of the following Grouped Functions, as defined in the Oregon Rapid Wetlands Assessment Protocol (ORWAP):

- a. Hydrologic Control (water storage and delay or "flood control"); or
- b. Water Quality (sediment retention and stabilization, phosphorus retention, nitrate removal and retention, and thermoregulation); or
- c. Habitat for fish, aquatic, or terrestrial species.

By way of this letter, DSL grants approval of the aforementioned criteria for determining locally significant wetlands for your Goal 5 planning. We appreciate your interest in using ORWAP for your project. This effort has been very informative for DSL's work on future rule revisions.

Sincerely,



Louise Solliday
Director

cc: Amanda Punton, DLCD
Dave Perry, DLCD, Newport Office
Peter Ryan, DSL

Siuslaw Estuary Partnership

An Integrated Multiple Objective Approach To Watershed Protection and Restoration

Proposed Florence Wetlands Significance Criteria and Protection Measures April 30, 2012

The Wetlands and Riparian Area Team met on March 6, 2012 and concurred with this proposal for determining the significance of, and measures to protect, wetlands in the Florence urban growth boundary (UGB). The Stakeholder Groups forwarded this proposal to the public for comment at their meetings in March and April. Then, the public provided comment on the proposal at the April 30, 2012 Open House.

In this paper, the significance criteria are applied to the wetlands and assessment, using the Oregon Rapid Wetland Assessment Protocol (ORWAP) in the 2010 Draft Florence Area Wetland and Riparian Inventory (Draft Inventory), prepared by Pacific Habitat Services for the Siuslaw Estuary Partnership (Partnership). The application of the significance criteria in this paper is based on the Draft Inventory; thus, the findings are subject to change based on the results of the Department of State Lands' (DSL) review. Any modifications made to the inventory or assessment as a result of DSL's review will be incorporated into the final analysis of wetlands and their significance.

Scope and Study Area

Statewide Planning Goal 5 criteria and protection measures apply to non-Statewide Planning Goal 17 wetlands in the Florence Area Inventory within the Florence Urban Growth Boundary (UGB) which is where Florence's land use measures would apply.¹

The 2010 Florence Area Wetlands Inventory, once approved by DSL, will replace the 1996 Florence Wetlands Inventory in the State Wetland Inventory (SWI), both within and outside the UGB.² In addition, if Lane County elects to determine significance of non-Goal 17 wetlands outside the UGB, the criteria ultimately selected for the Florence UGB may help guide that effort. At their meeting on March 22, the Elected Official Stakeholders will be asked to provide guidance on the question of whether or not to apply Goal 5 protection measures to wetlands outside the UGB.

¹ **OAR 660-023-0240. Relationship of Goal 5 to Other Goals**

"(2) The requirements of Goals 15, 16, 17, and 19 shall supersede requirements of this division for natural resources that are also subject to and regulated under one or more of those goals. However, local governments may rely on a Goal 5 inventory produced under OAR 660-023-0030 and other applicable inventory requirements of this division to satisfy the inventory requirements under Goal 17 for resource sites subject to Goal 17."

² In accordance with OAR 141-086-0185, "once approved by the Department of State Lands (DSL), the Local Wetland Inventory (LWI) must be used in place of the National Wetlands Inventory (NWI) and is incorporated into the "State Wetland Inventory" (SWI). The SWI is an inventory which contains the location, wetlands types, and approximate boundaries of wetlands in the State of Oregon. This inventory is continually revised as additional information is received or obtained by the Division of State Lands. The approved LWI must be used by cities and counties in lieu of the NWI for notifying the Department of land use applications affecting mapped wetlands and other waters (ORS 215.418 and 227.350).

Significance

1. The criterion for determining significance of non-Goal 17 wetlands in the Florence urban growth boundary (UGB) is wetlands that score at or above the 75th percentile in either Function or Value for one or more of the following Grouped Functions, as defined in the Oregon Rapid Wetlands Assessment Protocol (ORWAP):
 - a. Hydrologic Control (water storage and delay or “flood control”); or
 - b. Water Quality (sediment retention and stabilization, phosphorus retention, nitrate removal and retention, and thermoregulation); or
 - c. Habitat for fish, aquatic, or terrestrial species.
2. The results of the analysis are presented in Table 1, ORWAP Summary for Florence LWI Functions and Values of Grouped Functions, attached. In applying the significance criterion to the Draft Florence Area Inventory, the sixteen non-Goal 17 wetlands in the Florence UGB are significant, as shown in Table 1. This is almost exclusively due to their high Function or Value in providing flood control and water quality protection. All of the wetlands, except Wetland 25, meet the criteria for Hydrologic Control or Water Quality; and Wetland 25 meets the criteria for Aquatic Habitat and is also at the head of a significant riparian corridor. In addition, all of the wetlands except 8, 26, and 34 meet the criteria for providing habitat for fish, aquatic, and/or terrestrial species.

Protection

1. The proposed protection measures are to:
 - a. apply the Safe Harbor approach in Statewide Planning Goal 5, attached, to protect significant wetlands in the UGB;
 - b. include a Variance procedure that recognizes the rights of a property owner to develop property that would otherwise be unbuildable (avoids unconstitutional “taking” of private property without just compensation); and
 - c. Use the ESEE (Economic, Social, Environmental, and Energy) Analysis prescribed in Statewide Planning Goal 5 to address conflicts between construction of planned infrastructure projects and resource conservation in the Florence UGB. The ESEE analysis for public utilities and transportation facilities will evaluate these conflicts within the urban growth boundary and propose the appropriate level of resource protection in these areas. Note: The Goal 5 Administrative Rules for ESEE Analysis are attached.

Analysis

1. The proposed approach to determining significance for the Florence Area Inventory bases significance on the ORWAP scores separately for relative effectiveness of the Function and Value of the wetland. The proposed criteria do not require high scores in both the Functions and Values.

Grouped Functions in ORWAP	
Grouped Functions	Component Functions
Hydrologic Function	Water Storage and Delay (WS)
Water Quality Support Group	Sediment Retention and Stabilization (SR) Phosphorus Retention (PR)

Grouped Functions in ORWAP	
Grouped Functions	Component Functions
	Nitrate Removal & Retention (NR) Thermoregulation (T)
Fish Support Group	Anadromous Fish Habitat (FA) Non-anadromous Fish Habitat (FR)
Aquatic Habitat Support Group	Organic Matter Export (OE) Aquatic Invertebrate Habitat (INV) Amphibian and Reptile Habitat (AM) Waterbird Feeding Habitat (WBF) Waterbird Nesting Habitat (WBN)
Terrestrial Habitat Support Group	Songbird, Raptor, and Mammal Habitat (SBM) Pollinator Habitat (POL) Native Plant Diversity (PD)

The Florence Wetlands Project is a pilot and, as such, is one of the first attempts to use the ORWAP method for planning purposes. The Wetlands and Riparian Area Protection Team worked together to come to a mutual understanding of how best to use the ORWAP tool and to agree to criterion for significance that makes sense in a planning context.

2. The "service area" for the Florence Comprehensive Plan is the urban growth boundary (UGB). Flood control and water quality are critical issues for the North Florence Dunal Aquifer, both inside and outside the City limits. Wetlands that provide flood control or water quality protection, today or in the future, are of critical importance in providing these two services. For this reason, the proposed criteria take both the Function and the Value of the wetlands into consideration in determining significance.
3. The proposed significance criteria recognize the critical role that wetlands play in controlling floods and protecting water quality in the North Florence Sole Source Dunal Aquifer. All wetlands in the UGB play a role, or will play a role in the future, in Hydrologic Control and/or Water Quality Protection. All but one of the "significant" wetlands meet the criteria for these functions or values, and are thus recommended for protection. The proposed criteria also recognize the importance of wetlands for providing Habitat for fish, aquatic, and terrestrial species. All of the wetlands except 8, 26, and 34 meet the criteria for providing habitat for fish, aquatic, and/or terrestrial species.
4. For wetland protection measures, the proposal is to apply the Safe Harbor approach in Statewide Planning Goal 5, including the Variance procedure, to protect locally significant wetlands in the UGB, and exempt planned infrastructure and public improvement projects using the ESEE Analysis approach in Goal 5. This would mean that the significant wetlands would be protected, with a Variance procedure available that recognizes the rights of a property owner to develop property (avoids unconstitutional "taking" of private property without just compensation); and that planned public improvements can be constructed as long as the needed state and federal permits are obtained.

The proposed protection measures combine the approaches available under State law, i.e., safe harbor and ESEE analysis, in a manner that ensures all properties

will retain some development potential while at the same time allowing planned infrastructure and public improvement projects to proceed as planned. The ESEE analysis is a tool that can be used to ensure that planned infrastructure and public improvements, such as roads, stormwater systems, wastewater systems, and parks, can be constructed as planned, without being subject to the variance process, although any such development will nevertheless be subject to any required state and federal permit processes.

Table 1. Significant Florence Wetlands and ORWAP Scores for Functions (F) and Values (V)

Wet-land #	Hydrologic Control		Water Quality		Fish Habitat		Aquatic Habitat		Terrestrial Habitat		Notes and Significance			
	F	V	F	V	F	V	F	V	F	V	Outside UGB	Goal 17	In City Limits	Significant?
1	5.75	3.67	10	7.19	5.87	10	4.88	6.67	5.94	6.67	Part Out		In part	yes
2	3.5	3.08	10	6.07	3.69	4.2	6.37	7.33	6.63	6.67			Outside	yes
3	7	4.72	10	6.19	2.16	6.67	6.89	6.67	6.55	6.67	Outside			
4	2.31	7.64	6.17	7.5	6.56	10	6.11	10	7.61	7.51	Part Out		In part	yes
5	3.09	7.22	7.39	7.5	7.89	10	6.52	7.33	8.79	10	Part Out	Outside UGB=G17	In part	yes
6	1.77	2.17	4.84	7.5	6.95	10	7.39	7.33	7.51	7.43			Mostly in	yes
7	6.0	3.17	10	6.03	2.21	6.67	6.41	7.33	5.23	6.67			Outside	yes
8	3.5	3.08	10	6.03	0.67	6.67	6.72	6.67	5.99	6.67			In	yes
9	3.46	2.17	7.37	5.28	2.3	6.67	7.12	4.0	7.9	6.67	Outside			
10	4.5	2.17	10	5.43	3.69	6.67	7.87	4.0	7.39	6.67	Outside			
11	2.45	6.39	6.2	4.34	3.01	6.67	8.31	5.67	9.01	7.68			Outside	yes
12	3.25	2.17	10	4.94	3.33	6.67	8.39	7.33	7.76	7.77	Part Out		Mostly Outside	yes
13	5.75	2.17	10	5.82	2.32	6.67	7.01	6.67	5.9	6.67	Outside			
14	4.25	2.17	10	5.07	3.52	6.67	8.04	6.67	6.94	6.67	Outside			
15	2.63	2.33	5.09	6.67	6.68	10	7.14	6.67	7.84	6.67	Outside			
16	3.25	2.17	10	5.07	0.74	6.67	7.67	7.33	6.68	6.7	Outside			
17	3.25	2.17	10	5.57	2.05	6.67	7.87	7.33	7.09	6.99	Outside			
18	3.85	2.33	6.46	5.78	1.59	6.67	6.92	7.33	7.71	6.67	Outside			
19	3.25	2.17	10	5.36	2.64	5.11	7.31	6.67	6.53	6.67	Outside			
20	3.25	2.17	10	5.36	0.83	6.67	7.34	7.33	6.06	6.67	Outside			
21	4.5	3.58	10	6.49	2.95	6.67	7.84	7.33	6.99	7.22	Outside			
22	3.13	2.67	4.21	6.67	7.06	10	6.97	6.67	6.34	6.67	Outside	G17		
23	4.5	2.17	10	5.45	4.26	5.47	8.28	7.33	6.72	7.21	Outside			
24	5.75	2.17	10	5.61	3.54	6.67	7.82	7.33	7.08	7.09	Part Out	Part G17	Outside	yes
25	3	2.17	5.52	5.28	2.59	5.41	7.23	7.33	5.83	6.7	Part Out		Outside	yes
26	3.25	2.42	10	5.57	2.89	6.67	5.98	6.67	5.95	6.67			Outside	yes
27	3.5	2.67	10	6.28	3.22	4.73	6.78	7.33	5.35	6.67	Part Out		Outside	yes
28	2.25	2.17	10	5.28	3.9	6.67	6.38	7.33	5.85	6.67			Outside	yes
29	4.5	2.17	10	5.36	3.33	6.67	6.41	7.33	5.43	6.67		G17		
30	3.5	1.67	10	5.11	3.97	6.67	7.42	7.33	6.16	6.67		G17		
31	2.71	2.92	6.17	7.5	7.93	10	5.89	7.33	6.3	7.03		G17		
32	2.09	2.0	5.08	6.67	6.3	10	7.08	7.33	7.48	7.35	Outside	G17		
33	4.5	1.67	10	4.77	1.22	7.13	7.36	7.33	7.09	6.97			Inside	yes
34	1.64	1.67	5.03	6.64	2.57	6.67	6.06	6.67	4.66	6.67		Part G17	Inside	yes
Mean	3.58	2.87	8.52	5.92	3.66	7.22	7.05	6.97	6.71	6.97				
Median	3.36	2.17	10.00	5.70	3.28	6.67	7.10	7.33	6.66	6.67				
75%	4.50	3.04	10.00	6.60	4.19	7.02	7.61	7.33	7.46	7.08	Significance Threshold			

GOAL 5 ADMINISTRATIVE RULES: WETLANDS

OAR 660-023-0100 Wetlands

(1) For purposes of this rule, a "wetland" is an area that is inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

(2) Local governments shall amend acknowledged plans and land use regulations prior to or at periodic review to address the requirements of this division, as set out in OAR 660-023-0250(5) through (7). The standard inventory process requirements in OAR 660-023-0030 do not apply to wetlands. Instead, local governments shall follow the requirements of section (3) of this rule in order to inventory and determine significant wetlands.

(3) For areas inside urban growth boundaries (UGBs) and urban unincorporated communities (UUCs), local governments shall:

- (a) Conduct a local wetlands inventory (LWI) using the standards and procedures of OAR 141-086-0110 through 141-086-0240 and adopt the LWI as part of the comprehensive plan or as a land use regulation; and
- (b) Determine which wetlands on the LWI are "significant wetlands" using the criteria adopted by the Division of State Lands (DSL) pursuant to ORS 197.279(3)(b) and adopt the list of significant wetlands as part of the comprehensive plan or as a land use regulation.

(4) For significant wetlands inside UGBs and UUCs, a local government shall:

- (a) Complete the Goal 5 process and adopt a program to achieve the goal following the requirements of OAR 660-023-0040 and 660-023-0050; or
- (b) Adopt a safe harbor ordinance to protect significant wetlands consistent with this subsection, as follows:
 - (A) The protection ordinance shall place restrictions on grading, excavation, placement of fill, and vegetation removal other than perimeter mowing and other cutting necessary for hazard prevention; and
 - (B) The ordinance shall include a variance procedure to consider hardship variances, claims of map error verified by DSL, and reduction or removal of the restrictions under paragraph (A) of this subsection for any lands demonstrated to have been rendered not buildable by application of the ordinance.

(5) For areas outside UGBs and UUCs, local governments shall either adopt the statewide wetland inventory (SWI; see ORS 196.674) as part of the local comprehensive plan or as a land use regulation, or shall use a current version for the purpose of section (7) of this rule.

(6) For areas outside UGBs and UUCs, local governments are not required to amend acknowledged plans and land use regulations in order to determine significant wetlands and complete the Goal 5 process. Local governments that choose to amend acknowledged plans for areas outside UGBs and UUCs in order to inventory and protect significant wetlands shall follow the requirements of sections (3) and (4) of this rule.

(7) All local governments shall adopt land use regulations that require notification of DSL concerning applications for development permits or other land use decisions affecting

wetlands on the inventory, as per ORS 227.350 and 215.418, or on the SWI as provided in section (5) of this rule.

(8) All jurisdictions may inventory and protect wetlands under the procedures and requirements for wetland conservation plans adopted pursuant to ORS 196.668 et seq. A wetlands conservation plan approved by the director of DSL shall be deemed to comply with Goal 5 (ORS 197.279(1)).

Stat. Auth.: ORS 183 & ORS 197

Stats. Implemented: ORS 197.040 & ORS 197.225 - ORS 197.245

Hist.: LCDC 2-1996, f. 8-30-96, cert. ef. 9-1-96

GOAL 5 ADMINISTRATIVE RULES: ESEE ANALYSIS

OAR 660-023-0010

Definitions

(2) "ESEE consequences" are the positive and negative economic, social, environmental, and energy (ESEE) consequences that could result from a decision to allow, limit, or prohibit a conflicting use.

(7) "Protect," when applied to an individual resource site, means to limit or prohibit uses that conflict with a significant resource site (except as provided in OAR 660-023-0140, 660-023-0180, and 660-023-0190). When applied to a resource category, "protect" means to develop a program consistent with this division.

660-023-0040

ESEE Decision Process

(1) Local governments shall develop a program to achieve Goal 5 for all significant resource sites based on an analysis of the economic, social, environmental, and energy (ESEE) consequences that could result from a decision to allow, limit, or prohibit a conflicting use. This rule describes four steps to be followed in conducting an ESEE analysis, as set out in detail in sections (2) through (5) of this rule. Local governments are not required to follow these steps sequentially, and some steps anticipate a return to a previous step. However, findings shall demonstrate that requirements under each of the steps have been met, regardless of the sequence followed by the local government. The ESEE analysis need not be lengthy or complex, but should enable reviewers to gain a clear understanding of the conflicts and the consequences to be expected. The steps in the standard ESEE process are as follows:

- (a) Identify conflicting uses;
- (b) Determine the impact area;
- (c) Analyze the ESEE consequences; and
- (d) Develop a program to achieve Goal 5.

(2) Identify conflicting uses. Local governments shall identify conflicting uses that exist, or could occur, with regard to significant Goal 5 resource sites. To identify these uses, local governments shall examine land uses allowed outright or conditionally within the zones applied to the resource site and in its impact area. Local governments are not required to consider allowed uses that would be unlikely to occur in the impact area because existing permanent uses occupy the site. The following shall also apply in the identification of conflicting uses:

(a) If no uses conflict with a significant resource site, acknowledged policies and land use regulations may be considered sufficient to protect the resource site. The determination that there are no conflicting uses must be based on the applicable zoning rather than ownership of the site. (Therefore, public ownership of a site does not by itself support a conclusion that there are no conflicting uses.)

(b) A local government may determine that one or more significant Goal 5 resource sites are conflicting uses with another significant resource site. The local government shall determine the level of protection for each significant site using the ESEE process and/or the requirements in OAR 660-023-0090 through 660-023-0230 (see OAR 660-023-0020(1)).

(3) Determine the impact area. Local governments shall determine an impact area for each significant resource site. The impact area shall be drawn to include only the area in which allowed uses could adversely affect the identified resource. The impact area defines the geographic limits within which to conduct an ESEE analysis for the identified significant resource site.

(4) Analyze the ESEE consequences. Local governments shall analyze the ESEE consequences that could result from decisions to allow, limit, or prohibit a conflicting use. The analysis may address each of the identified conflicting uses, or it may address a group of similar conflicting uses. A local government may conduct a single analysis for two or more resource sites that are within the same area or that are similarly situated and subject to the same zoning. The local government may establish a matrix of commonly occurring conflicting uses and apply the matrix to particular resource sites in order to facilitate the analysis. A local government may conduct a single analysis for a site containing more than one significant Goal 5 resource. The ESEE analysis must consider any applicable statewide goal or acknowledged plan requirements, including the requirements of Goal 5. The analyses of the ESEE consequences shall be adopted either as part of the plan or as a land use regulation.

(5) Develop a program to achieve Goal 5. Local governments shall determine whether to allow, limit, or prohibit identified conflicting uses for significant resource sites. This decision shall be based upon and supported by the ESEE analysis. A decision to prohibit or limit conflicting uses protects a resource site. A decision to allow some or all conflicting uses for a particular site may also be consistent with Goal 5, provided it is supported by the ESEE analysis. One of the following determinations shall be reached with regard to conflicting uses for a significant resource site:

(a) A local government may decide that a significant resource site is of such importance compared to the conflicting uses, and the ESEE consequences of allowing the conflicting uses are so detrimental to the resource, that the conflicting uses should be prohibited.

(b) A local government may decide that both the resource site and the conflicting uses are important compared to each other, and, based on the ESEE analysis, the conflicting uses should be allowed in a limited way that protects the resource site to a desired extent.

(c) A local government may decide that the conflicting use should be allowed fully, notwithstanding the possible impacts on the resource site. The ESEE analysis must demonstrate that the conflicting use is of sufficient importance relative to

the resource site, and must indicate why measures to protect the resource to some extent should not be provided, as per subsection (b) of this section.

Stat. Auth.: ORS 183 & ORS 197

Stats. Implemented: ORS 197.040 & ORS 197.225 - ORS 197.245

Hist.: LCDC 2-1996, f. 8-30-96, cert. ef. 9-1-96

Riparian Width Determination



Florence LWI & Riparian Inventory

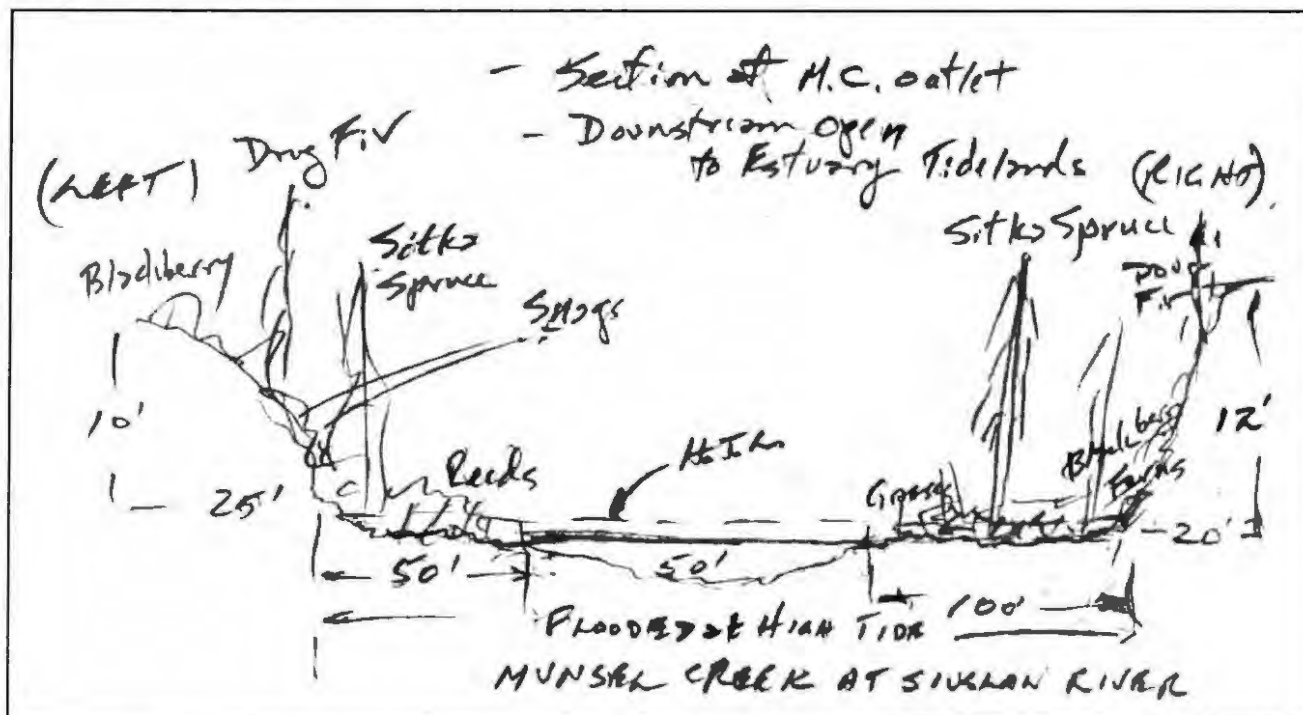
RIPARIAN CODE
RMC - 0

Date: 10/24/2010 Investigators: C. Lysdale
Dominant tree species: Sitka Spruce
Potential tree height (PTH)/Actual Width of riparian area : 120/25L & 20R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: _____

Photos RMC-0Sveg, RMC-0Sstr, RMC-0Sstr1, RMC-0Sest

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC-A Location of data point: RMC - 0

Reach Length: _____

Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 50 Low, 200 High Tide feet

Lake/Pond: ☐ Width: _____ feet

Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☒ No ☐

Is the water resource listed for temperature on DEQ's 303(d) list? Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☒ No ☐

Mapped soil series: Waldport fine sand, 0-12% slopes

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐

Commercial/Indus.: ☐ Undeveloped: ☐

Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Sitka Spruce	Grasses
Douglas Fir	Reeds
	Bracken Fern
	Blackberry

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☒

Outside HTL

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☒ No ☐

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☒ No or no flood prone area present ☐

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☒ 2 layers ☐ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

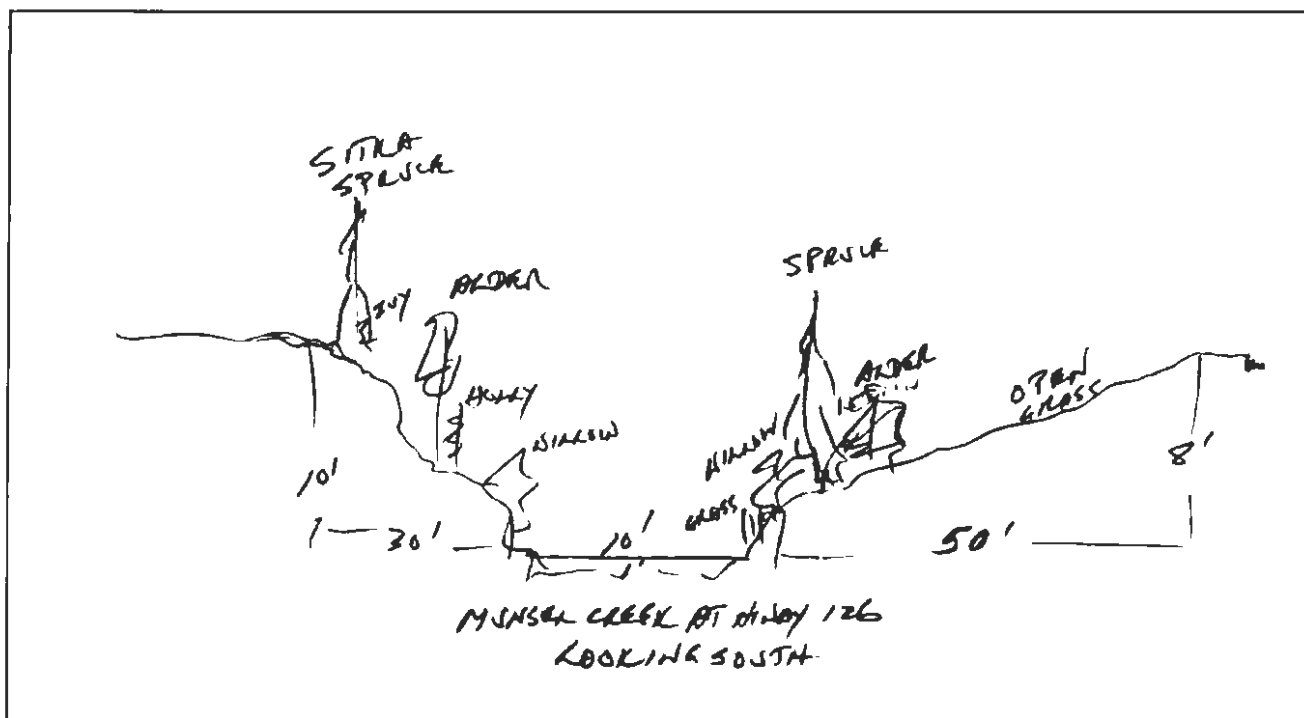
RIPARIAN CODE
RMC - 1 South

Date: 9/25/2010 Investigators: C. Lysdale & M. Tilton
Dominant tree species: Sitka Spruce
Potential tree height (PTH)/Actual Width of riparian area : 120/30L & 50R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: _____

Photos RMC-1S veg & RMC-1S str

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC - 1 South Location of data point: RMC - 1

Reach Length: _____

Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 10 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☒ No ☐

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☒ No ☐

Mapped soil series: Waldport fine sand, 0-12% slopes

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☒ Undeveloped: ☐
 Residential: ☐ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Sitka Spruce	Grasses
Red Alder	
Willow	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☒ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☒

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☐ 25% - 75% ☒ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☒ 2 layers ☐ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

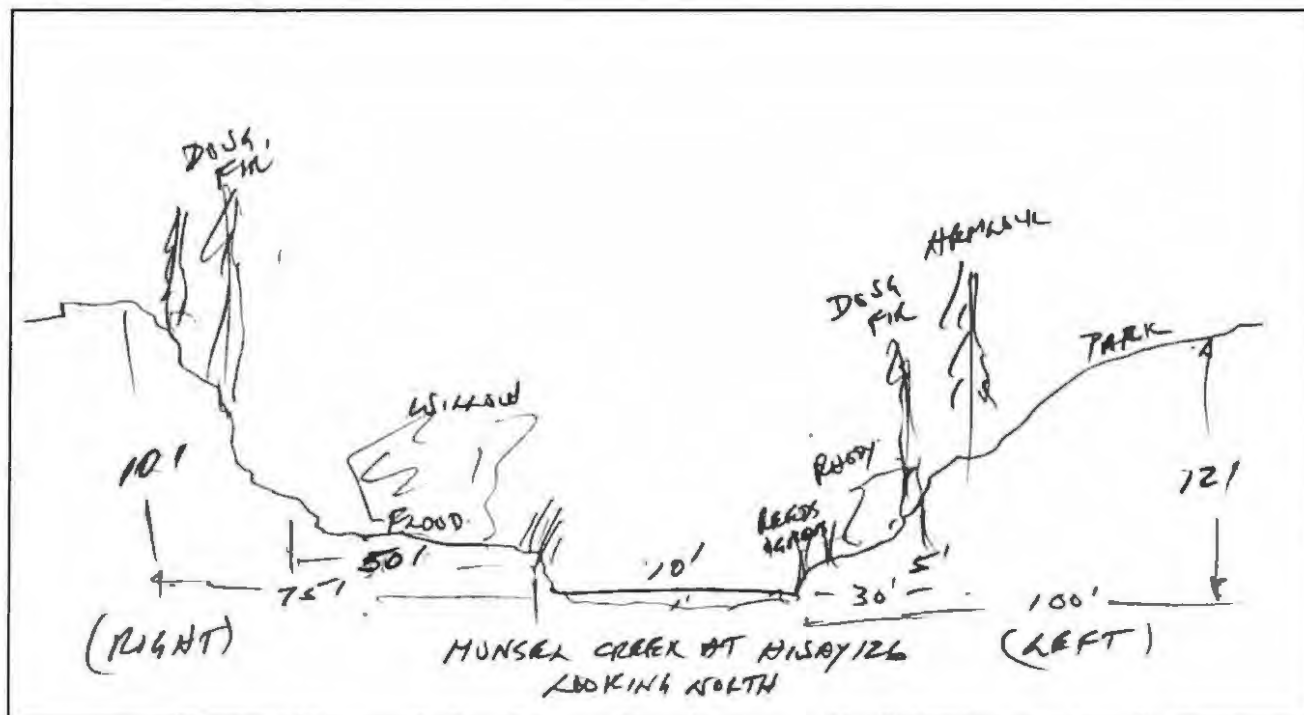
RIPARIAN CODE
RMC - 1 North

Date: 9/25/2010 Investigators: C. Lysdale & M. Tilton
Dominant tree species: Douglas Fir
Potential tree height (PTH)/Actual Width of riparian area : 120/100L & 75R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: _____

Photos RMC-1N veg & RMC-1N str

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC - 1 North Location of data point: RMC - 1
 Reach Length: _____
 Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 10 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☒ No ☐

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Yaquina loamy fine sand

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☒ Undeveloped: ☒
 Residential: ☐ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	Grasses
Western Hemlock	Reeds
Willow	
Rhododendron	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☒ >5:1 (20%) ☐

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☒ No ☐

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☒ No or no flood prone area present ☐

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☒ 2 layers ☐ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

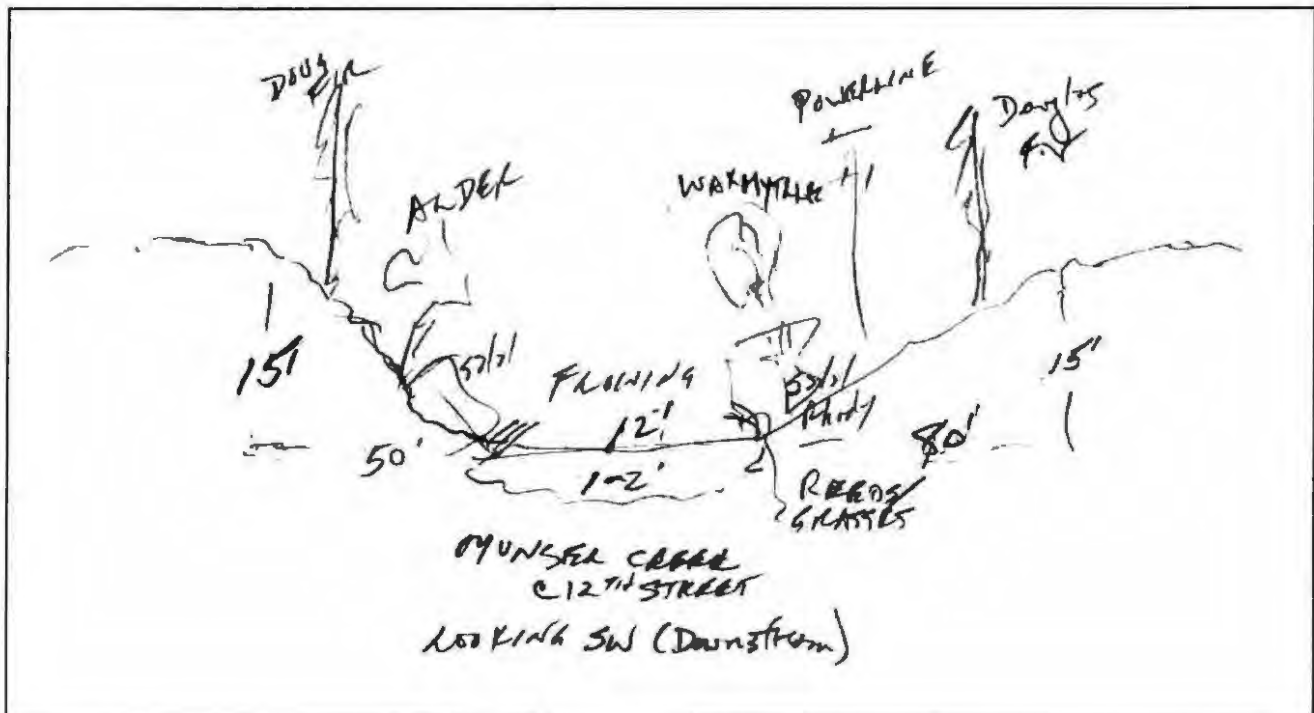
RIPARIAN CODE
RMC - 2 South

Date: 9/9/2010 Investigators: C. Lysdale
Dominant tree species: Douglas Fir
Potential tree height (PTH)/Actual Width of riparian area : 120/50L & 80R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: _____

Photos RMC-2S veg & RMC-2S str

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC - 2 South Location of data point: RMC - 2

Reach Length: _____

Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 12 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☒ No ☐

Is the water resource listed for temperature on DEQ's 303(d) list? Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Yaquina loamy fine sand

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☐
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	Grasses
Red Alder	Reeds
California Wax Myrtle	
Rhododendron	
Salal	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☒ >5:1 (20%) ☒

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☒ No ☐

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☒ 2 layers ☐ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

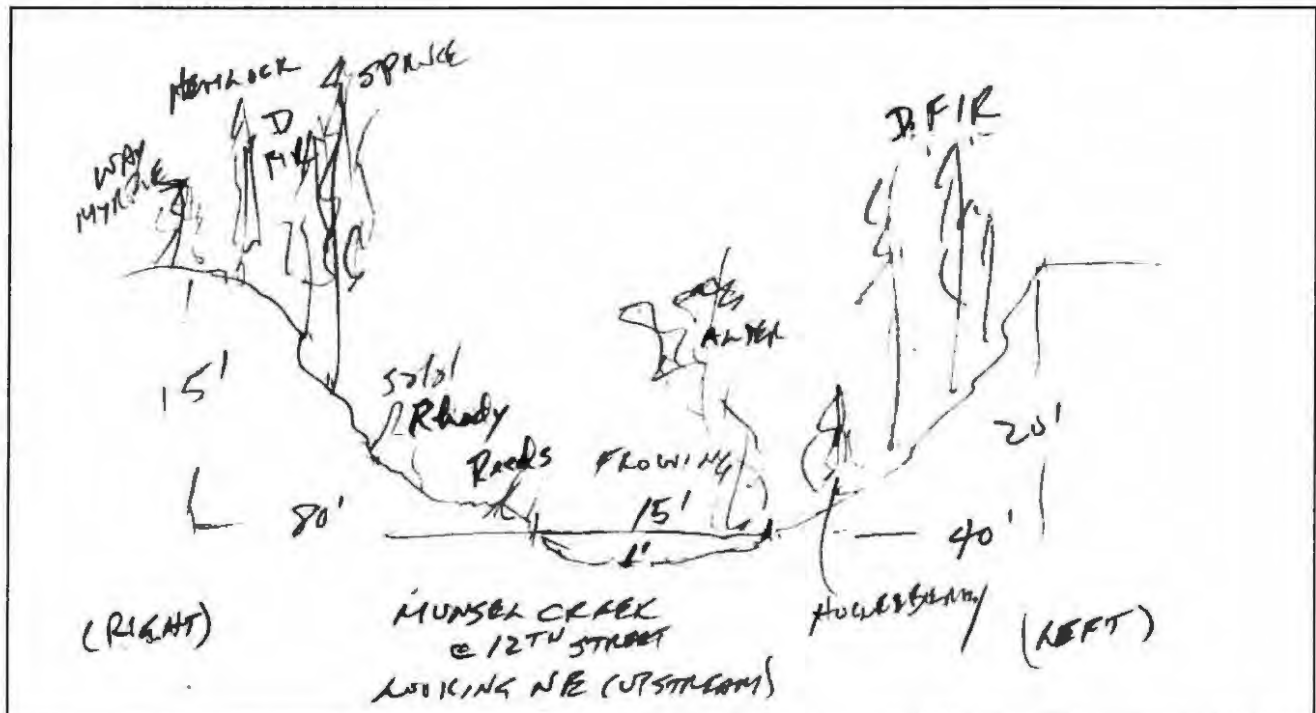
RIPARIAN CODE
RMC - 2 North

Date: 9/9/2010 Investigators: C. Lysdale
Dominant tree species: Douglas Fir
Potential tree height (PTH)/Actual Width of riparian area : 120/40L & 80R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: _____

Photos RMC-2N veg & RMC-2N str

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC - 2 North Location of data point: RMC - 2

Reach Length: _____

Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 15 feet

Lake/Pond: ☐ Width: _____ feet

Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☒ No ☐

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Yaquina loamy fine sand

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐

Commercial/Indus.: ☐ Undeveloped: ☐

Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	Grasses
Western Hemlock	Reeds
Sitka Spruce	
California Wax Myrtle	
Red Alder	
Rhododendron	
Salal, Huckleberry	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☒ >5:1 (20%) ☐

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☒ No ☐

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☒ 2 layers ☐ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

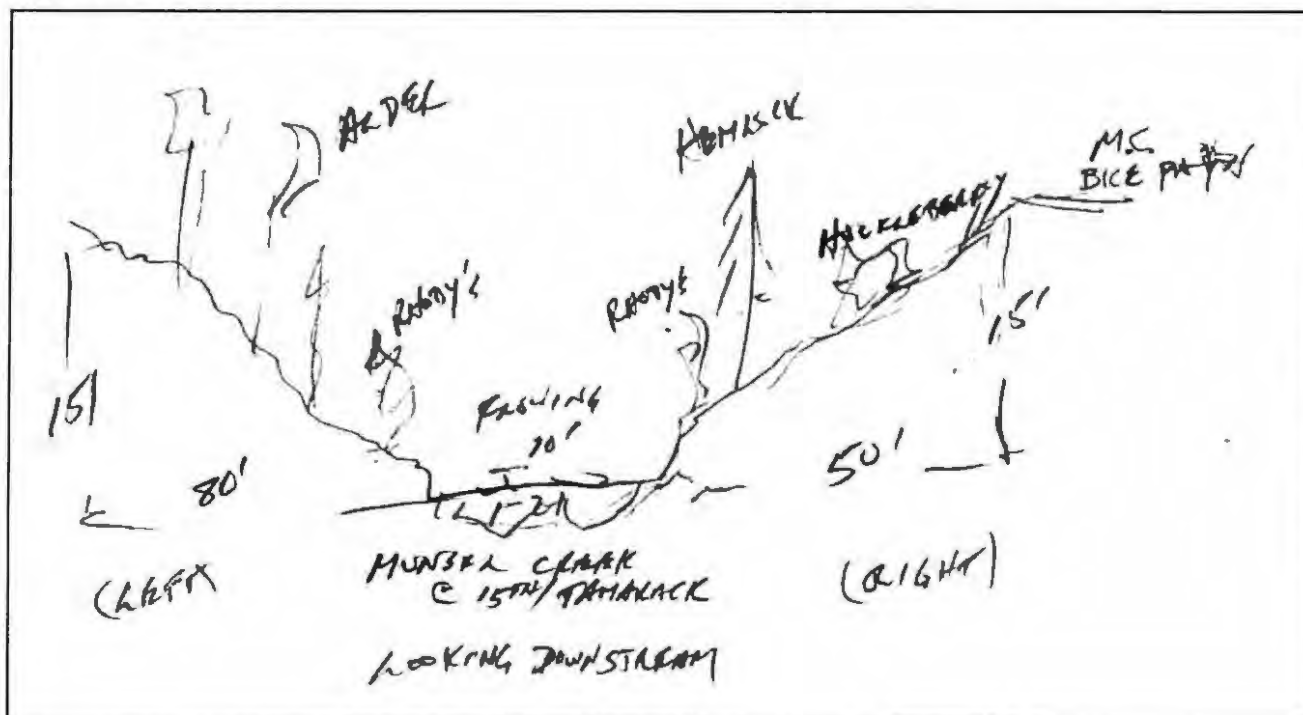
RIPARIAN CODE
RMC - 3

Date: 9/9/2010 Investigators: C. Lysdale
Dominant tree species: Red Alder
Potential tree height (PTH)/Actual Width of riparian area : 65/80L & 50R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments:

Photos RMC-3veg & RMC-3str

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC - 3 Location of data point: RMC - 3

Reach Length: _____

Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 10 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☒ No ☐

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Yaquina loamy fine sand

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☐
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines > 1 meter)	Herbaceous vegetation (include trees, shrubs, vines < 1 meter)
Western Hemlock	
Red Alder	
Huckleberry	
Rhododendron	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☒ >5:1 (20%) ☒
 Left Right

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☒ No ☐

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☒ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

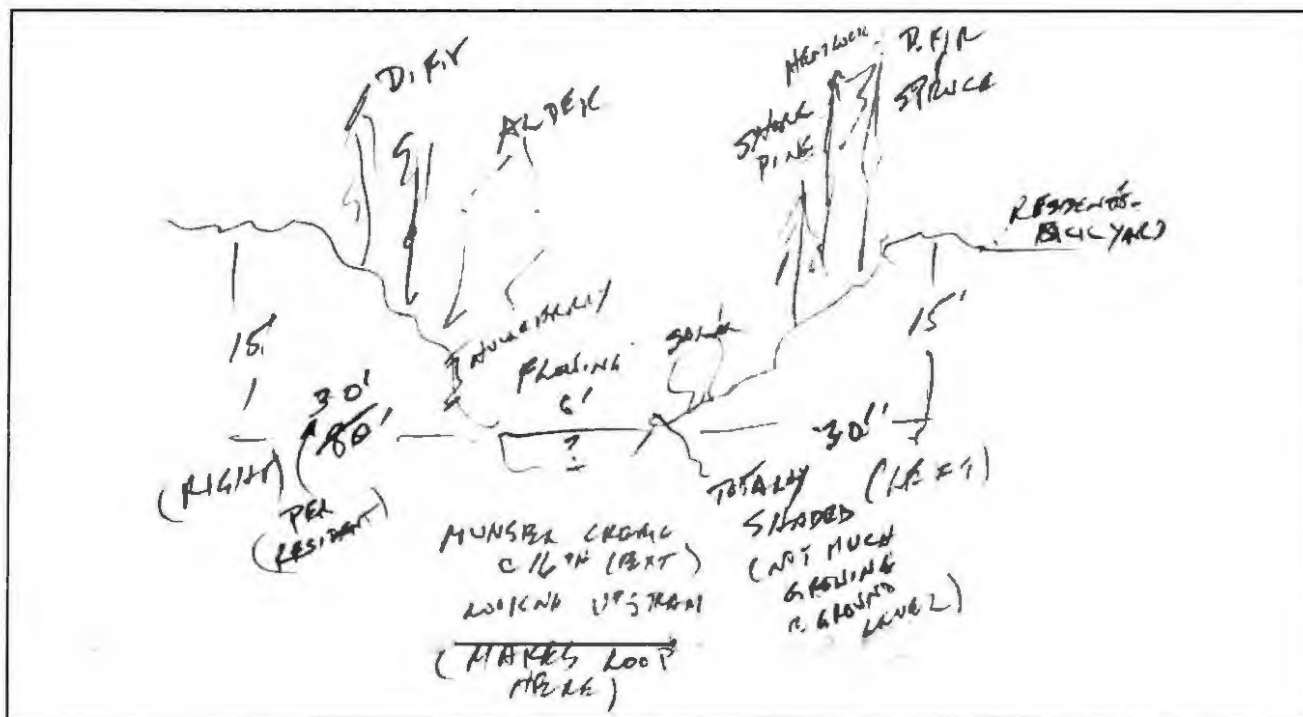
RIPARIAN CODE
RMC - 4

Date: 9/9/2010 Investigators: C. Lysdale
Dominant tree species: Douglas Fir
Potential tree height (PTH)/Actual Width of riparian area : 120/30L & 30R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code

Comments: _____

Photos RMC-4veg & RMC-4str

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC - 4 Location of data point: RMC - 4
 Reach Length: _____
 Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 6 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☒ No ☐

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Yaquina loamy fine sand

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☐
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	
Western Hemlock	
Red Alder	
Shore Pine	
Salal	
Huckleberry	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☒

Left&Right

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☒ No ☐

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☒ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

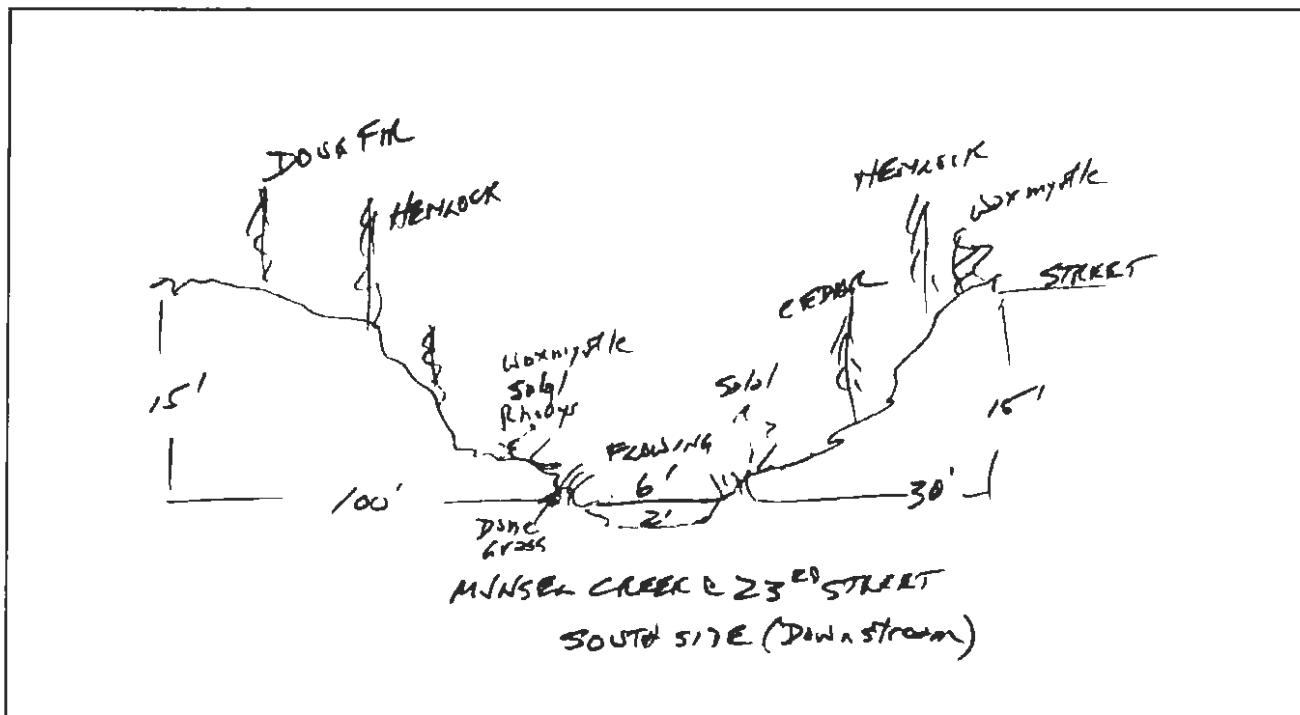
RIPARIAN CODE
RMC - 5 South

Date: 8/25/2010 Investigators: C. Lysdale
Dominant tree species: Douglas Fir
Potential tree height (PTH)/Actual Width of riparian area : 120/100L & 30R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: _____

Photos RMC-5S veg & RMC-5S str

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC - 5 South Location of data point: RMC - 5

Reach Length: _____

Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 6 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☒ No ☐

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Yaquina loamy fine sand

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☒
 Commercial/Indus.: ☐ Undeveloped: ☐
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	Grasses
Western Hemlock	
Rhododendron	
Salal	
Western Red Cedar	
California Wax Myrtle	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☒ >5:1 (20%) ☒
 Left Right

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☒ 2 layers ☐ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

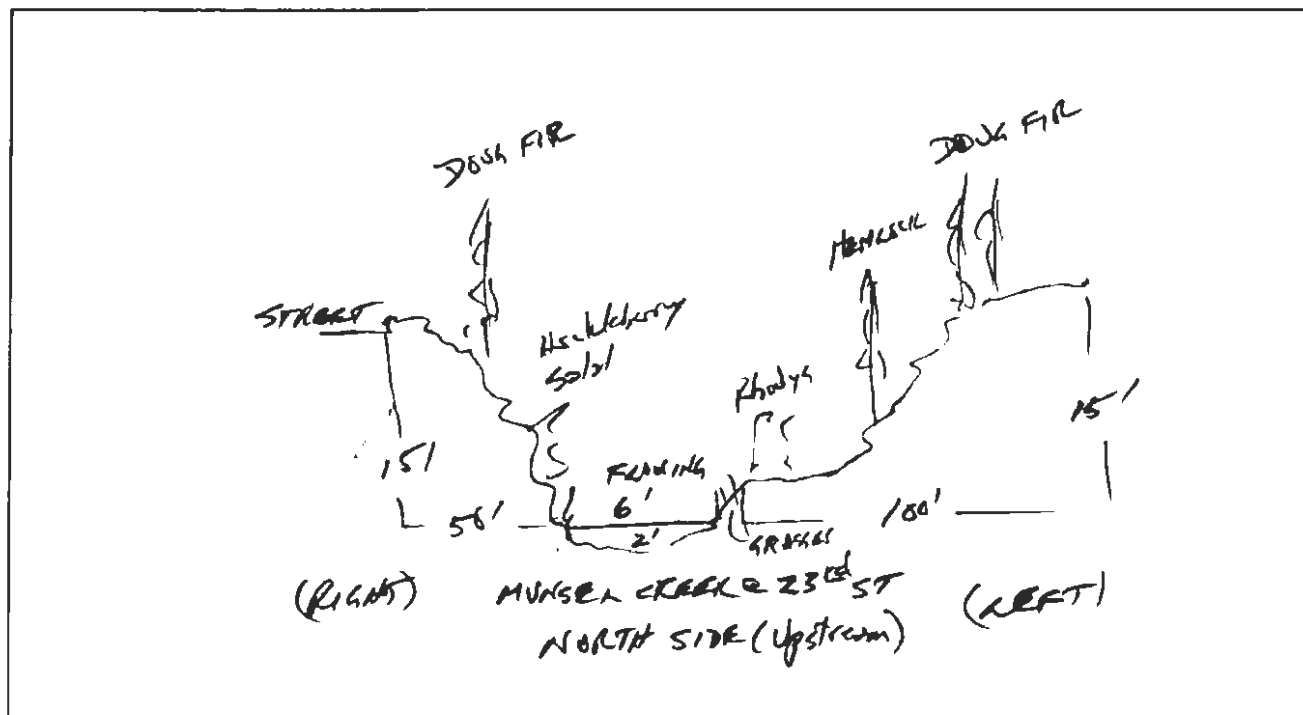
RIPARIAN CODE
RMC - 5 North

Date: 8/25/2010 Investigators: C. Lysdale
Dominant tree species: Douglas Fir
Potential tree height (PTH)/Actual Width of riparian area : 120/100L & 50R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: _____

Photos RMC-5N veg & RMC-5N str

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC - 5 North Location of data point: RMC - 5

Reach Length: _____

Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 6 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☒ No ☐

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Yaquina loamy fine sand

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☒
 Commercial/Indus.: ☐ Undeveloped: ☐
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	Grasses
Western Hemlock	
Rhododendron	
Salal	
Huckleberry	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☒ >5:1 (20%) ☒
 Left Right

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☒ 2 layers ☐ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

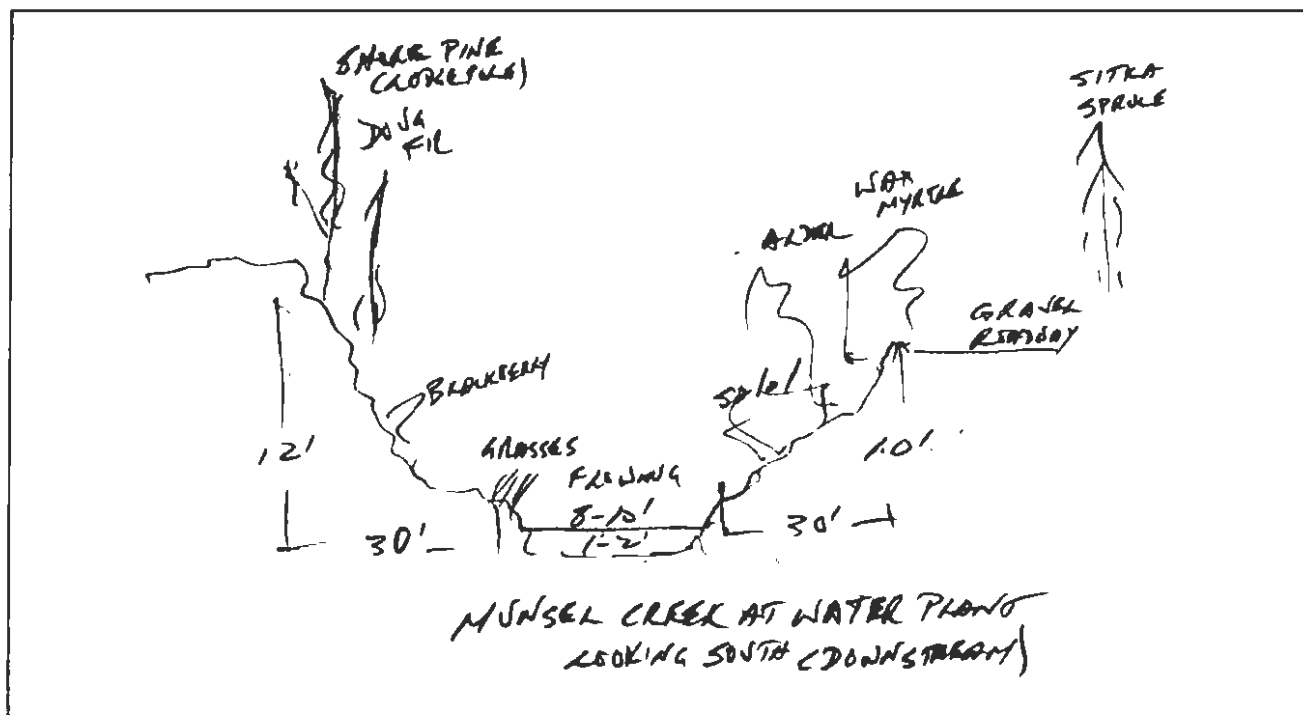
RIPARIAN CODE
RMC - 6

Date: 8/25/2010 Investigators: C. Lysdale
Dominant tree species: Douglas Fir/Sitka Spruce
Potential tree height (PTH)/Actual Width of riparian area : 120/30L & 30R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: Creek emerges from long culvert at this location (no upstream view).

Photos RMC-6veg & RMC-6str

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC - 6 Location of data point: RMC - 6
 Reach Length: _____
 Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 8 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☒ No ☐

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Yaquina loamy fine sand

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☒
 Commercial/Indus.: ☐ Undeveloped: ☐
 Residential: ☐ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	Grasses
Sitka Spruce	
Red Alder	
Shore Pine	
California Wax Myrtle	
Salal, Huckleberry	
Blackberry	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☒

Left&Right

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

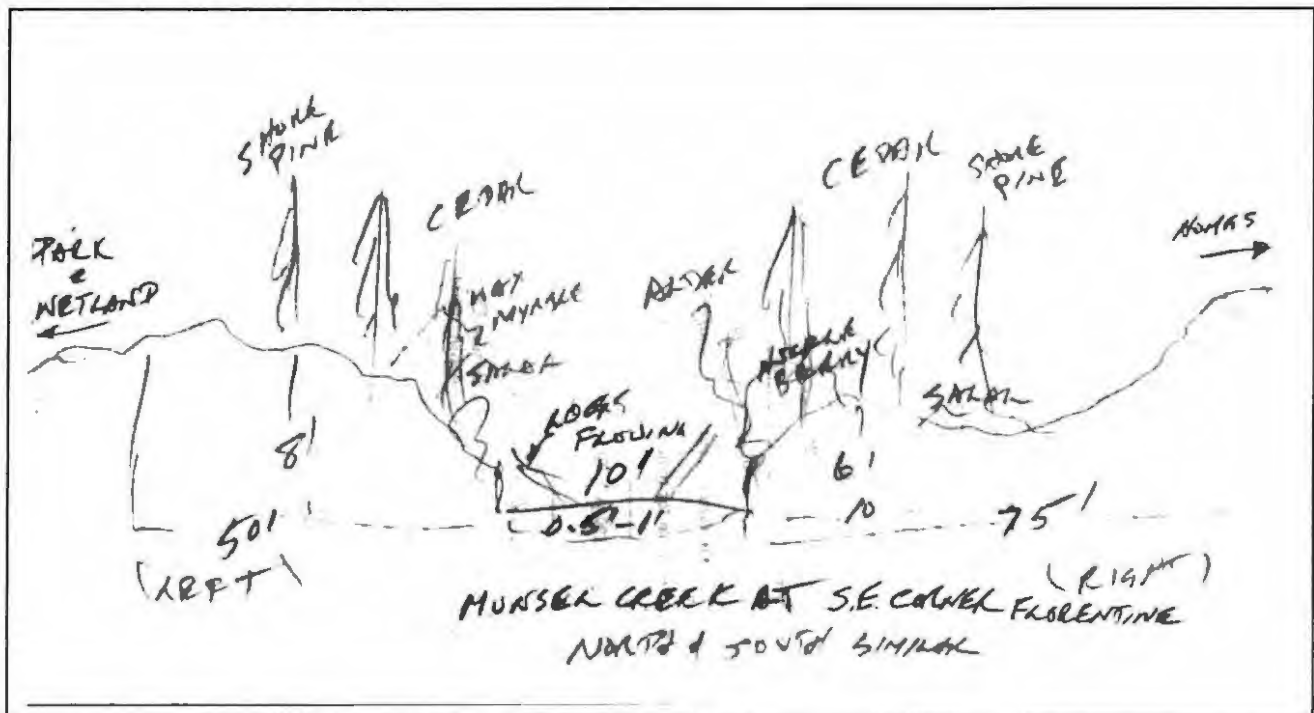
How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☒ 2 layers ☐ 1 layer or unvegetated ☐

RIPARIAN CODE
RMC - 6.3

Comments:

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC-6.3 South & North Location of data point: RMC - 6.3

Reach Length: _____

Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 10 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☒ No ☐

Is the water resource listed for temperature on DEQ's 303(d) list? Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Yaquina loamy fine sand

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☒
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Western Red Cedar	Salal
Lodgepole Pine	Huckleberry
Red Alder	
California Wax Myrtle	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☒ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☐

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒ (Shaded by canopy)

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☒ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

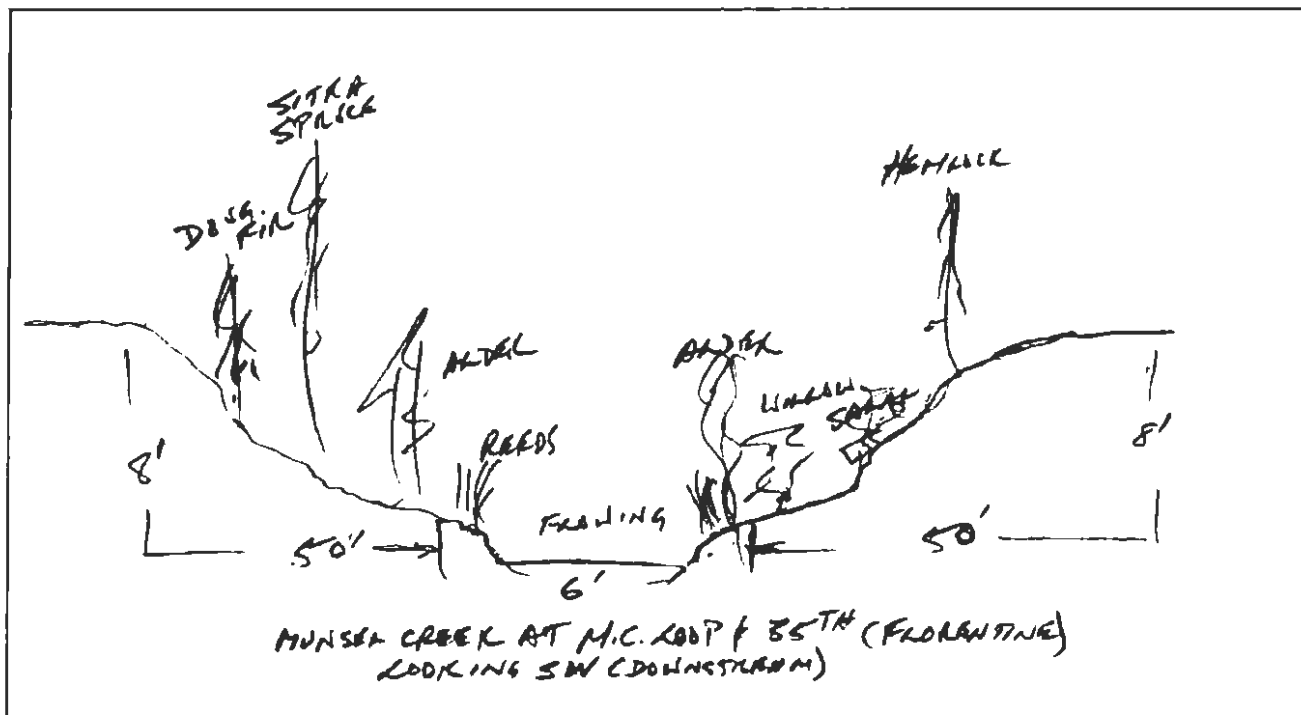
RIPARIAN CODE
RMC - 6.5

Date: 10/28/2010 Investigators: C. Lysdale
Dominant tree species: Red Alder
Potential tree height (PTH)/Actual Width of riparian area : 65/50L & 50R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: _____

Photos RMC-6.5Sveg, RMC-6.5Sstr

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC-6.5 Location of data point: RMC - 6.5

Reach Length: _____

Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 6 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☒ No ☐

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Yaquina loamy fine sand

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☐
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	Salal
Sitka Spruce	
Red Alder	
Willow	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☒ >5:1 (20%) ☐

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☒ No ☐

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☒ 2 layers ☐ 1 layer or unvegetated ☐

RIPARIAN CODE
RMC-6.7

Comments: Heavy vegetation and tall trees. Structures at topographical break.
Culverts at all C.V. street crossings are low and passable by fish.

Photos RMC-6.7Nveg, RMC6.7Sveg, RMC-6.7Sstr

Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC-C side Location of data point: RMC-6.7
 Reach Length: _____
 Hydrologic Basin: _____ On-site: ☐ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 5 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☐ No ☐

Are salmonids present in the adjacent water resource? Yes ☒ No ☐

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Yaquina loamy fine sand

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☐
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	Salal
Western Hemlock	Huckleberry
California Waxmyrtle	Rhododendron

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☒

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☒ No ☐ N-S with heavy vegetation

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☐ 10% - 40% ☐ <10% ☒

Degree of development or human caused disturbance. (Question 19)

<25% ☐ 25% - 75% ☒ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☒ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

RIPARIAN CODE
RMC-6.8S

Date: 3/25/2012 Investigators: C. Lysdale
Dominant tree species: Sitka Spruce
Potential tree height (PTH)/Actual Width of riparian area : 120/50N,15S feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code

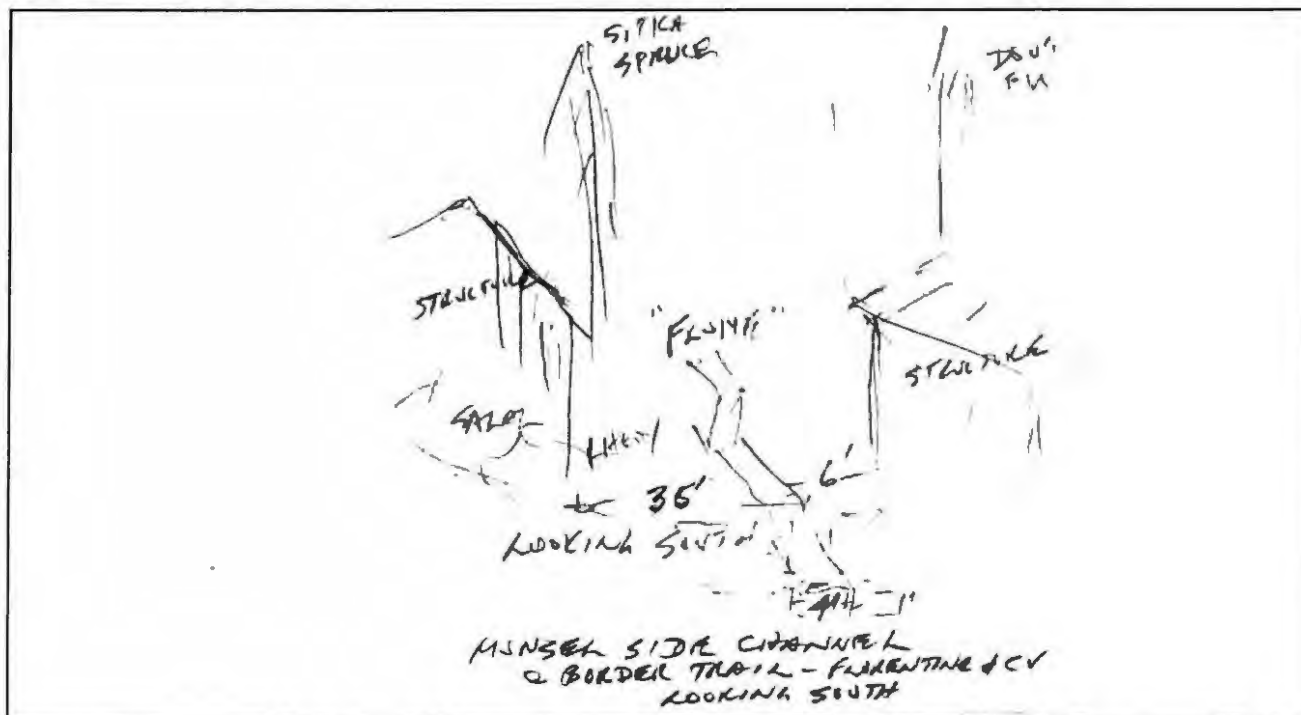
Comments: Location is south side of Florentine-CV border trail.

Stream passes through a wooden "flume" with nearby structures.

Limited riparian vegetation as stream passes through a residential yard.

Photos RMC-6.8Sveg(CV), RMC-6.8OtrNveg, RMC-6.8OtrNflum

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC-C side Location of data point: RMC-6.8S

Reach Length: _____

Hydrologic Basin: _____ On-site: ☐ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 4 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☐ No ☐

Are salmonids present in the adjacent water resource? Yes ☒ No ☐

Is the water resource listed for temperature on DEQ's 303(d) list? Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Yaquina loamy fine sand

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☐
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	Salal
Sitka Spruce	Rhododendron

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☒ >5:1 (20%) ☐

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☒ No ☐

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☐ Herbaceous vegetation ☒ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☐ No ☒

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☐ 10% - 40% ☐ <10% ☒

Degree of development or human caused disturbance. (Question 19)

<25% ☐ 25% - 75% ☒ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☐ Herbaceous vegetation ☐ Bare ground ☒

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☐ 1 layer or unvegetated ☒

Riparian Width Determination



Florence LWI & Riparian Inventory

RIPARIAN CODE
RMC-6.8N

Date: 3/25/2012 Investigators: C. Lysdale
Dominant tree species: Douglas Fir
Potential tree height (PTH)/Actual Width of riparian area : 120/50N,15S feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

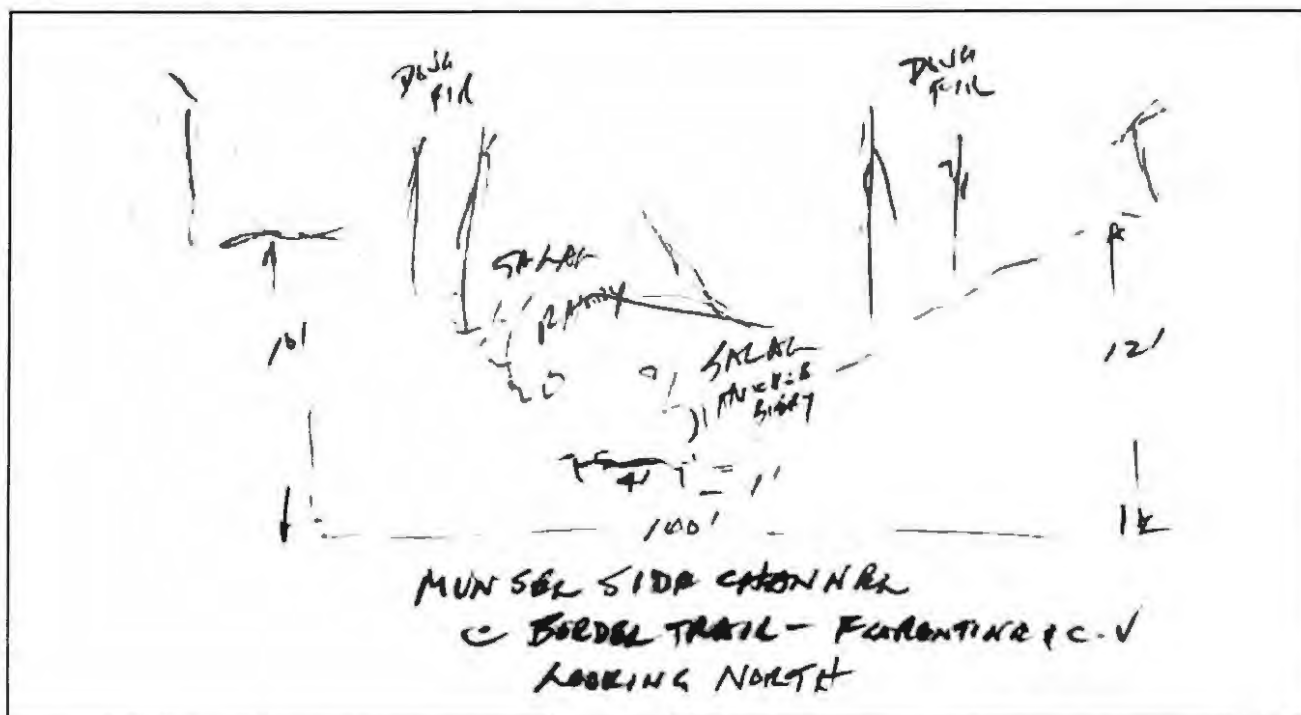
Comments: Location is north side of Florentine-CV border trail.

Heavy vegetation, tall trees, and downed logs/woody debris.

Stream is well shaded by woody and herbaceous vegetation at top of bank.

Photos RMC-6.8Nveg(Flo) & RMC-6.8Nstr(Flo)

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC-C side Location of data point: RMC-6.8N

Reach Length: _____

Hydrologic Basin: _____ On-site: ☐ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 4 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☐ No ☐

Are salmonids present in the adjacent water resource? Yes ☒ No ☐

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Yaquina loamy fine sand

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☐
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	Salal
Sitka Spruce	Rhododendron
Red Alder	English Ivy
California Waxmyrtle	Huckleberry

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☒ >5:1 (20%) ☐

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☒ No ☐

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☐ 10% - 40% ☒ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☐ 25% - 75% ☒ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☒ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

RIPARIAN CODE
RMC-6.9

Date: 3/25/2012 Investigators: C. Lysdale
Dominant tree species: Shore Pine
Potential tree height (PTH)/Actual Width of riparian area : 50/25 feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code

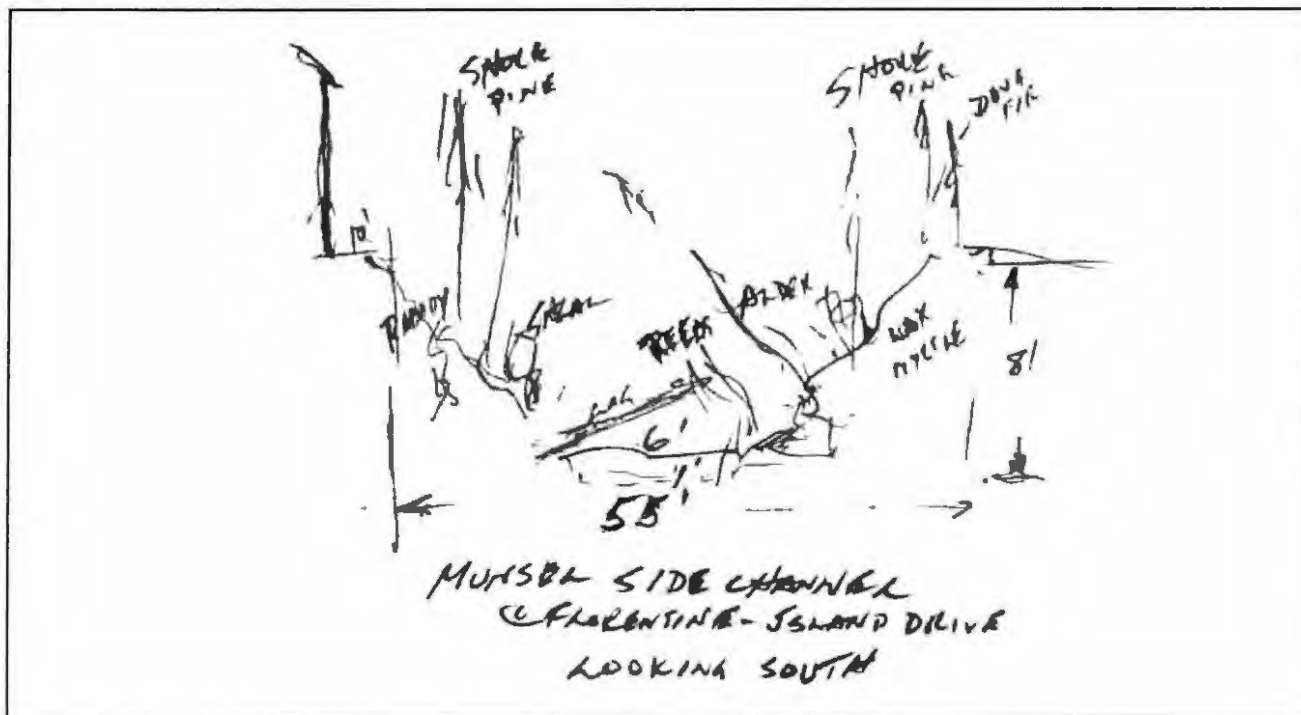
Comments: Open vegetation/brushy reeds at top of bank.

Tall trees and downed logs + woody debris in riparian area.

Reeds and grasses at top of bank on north side of bridge.

Photos RMC-6.9veg & RMC-6.9str

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC-C side Location of data point: RMC-6.9

Reach Length: _____

Hydrologic Basin: _____ On-site: ☐ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 6 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☐ No ☐

Are salmonids present in the adjacent water resource? Yes ☒ No ☐

Is the water resource listed for temperature on DEQ's 303(d) list? Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Yaquina loamy fine sand

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☐
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Shore Pine	Salal
Douglas Fir	Rhododendron
Red Alder	Huckleberry
California Waxmyrtle	Reeds
	Grasses (north)

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☒

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☐ 10% - 40% ☒ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☐ Herbaceous vegetation ☒ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☒ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

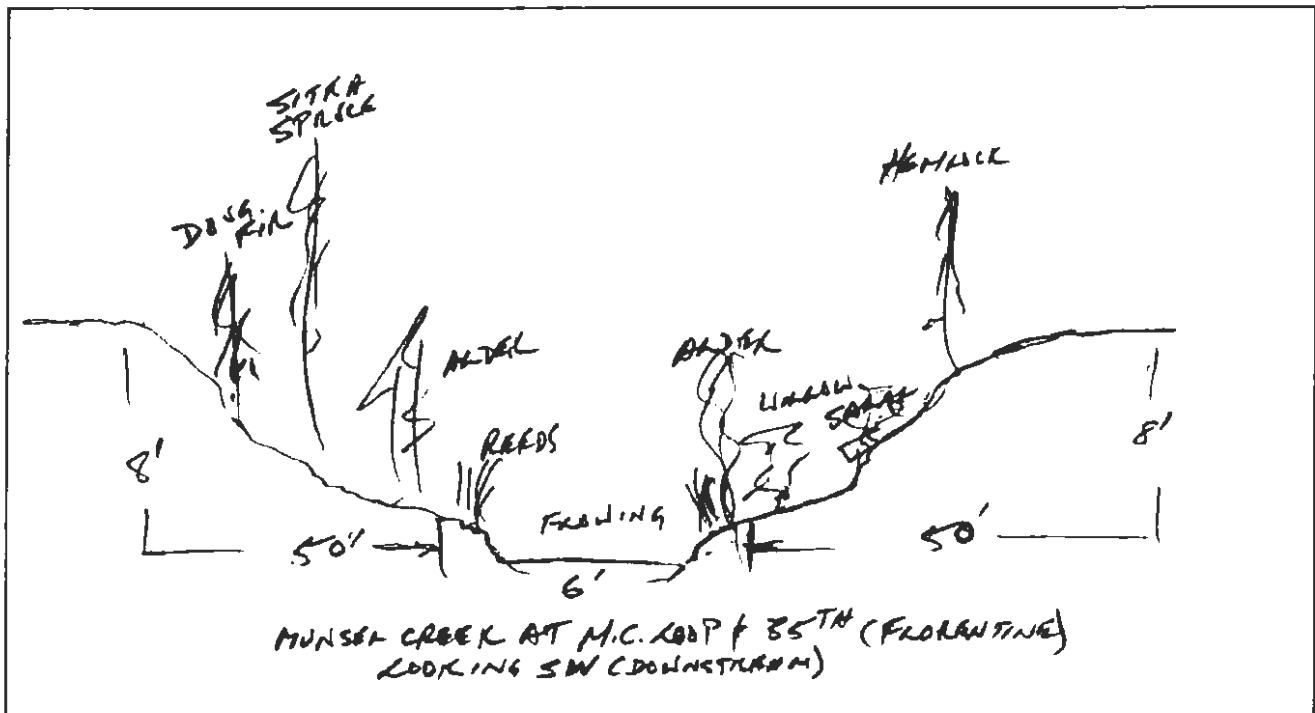
RIPARIAN CODE
RMC - 6.5

Date: 10/28/2010 Investigators: C. Lysdale
Dominant tree species: Red Alder
Potential tree height (PTH)/Actual Width of riparian area : 65/50L & 50R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code

Comments: _____

Photos RMC-6.5Sveg, RMC-6.5Sstr

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC-6.5 Location of data point: RMC - 6.5

Reach Length: _____

Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 6 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☒ No ☐

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Yaquina loamy fine sand

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☐
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	Salal
Sitka Spruce	
Red Alder	
Willow	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☒ >5:1 (20%) ☐

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☒ No ☐

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☒ 2 layers ☐ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

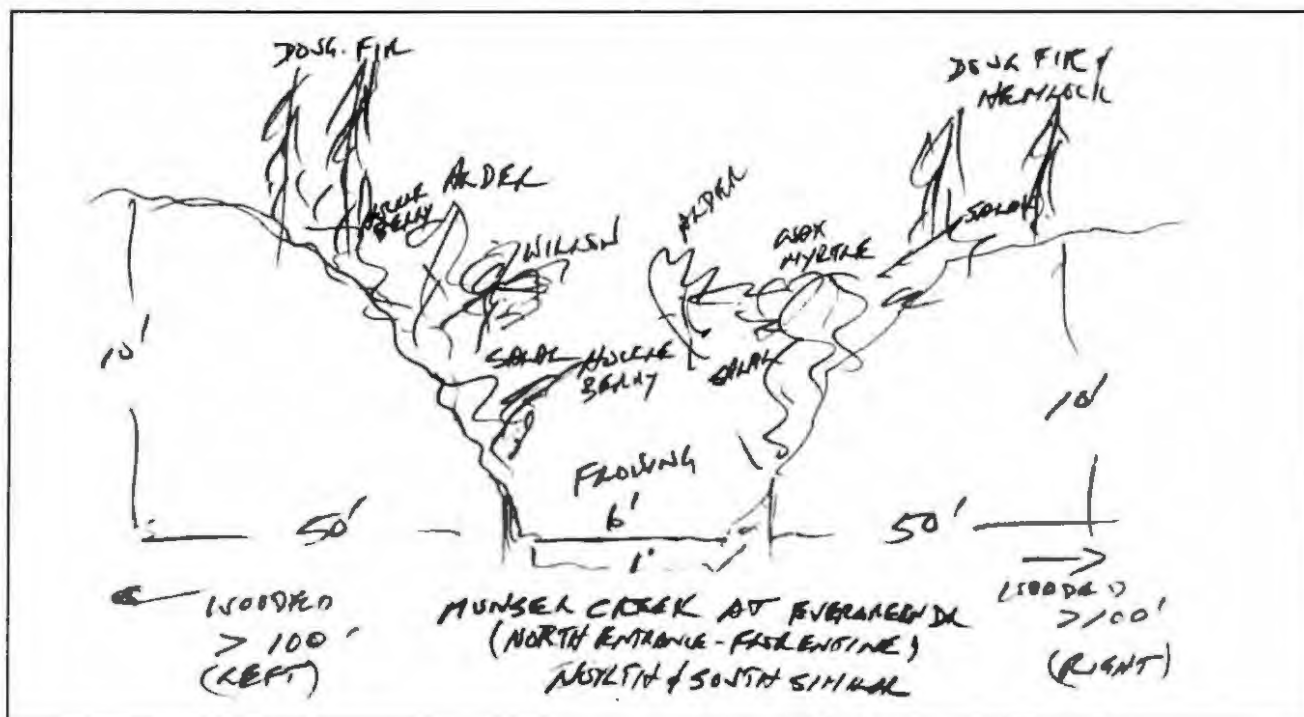
RIPARIAN CODE
RMC - 6.6

Date: 9/26/2010 Investigators: C. Lysdale
Dominant tree species: Douglas Fir
Potential tree height (PTH)/Actual Width of riparian area : 120/50L & 50R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: _____

Photos RMC-6.6Sveg, RMC-6.6Sstr ; RMC-6.6Nveg, RMC-6.6Nstr

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC-6.6 South & North Location of data point: RMC - 6.6

Reach Length: _____

Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 6 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☒ No ☐

Is the water resource listed for temperature on DEQ's 303(d) list? Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Yaquina loamy fine sand

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☒
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	Salal
Western Hemlock	Huckleberry
Red Alder	
California Wax Myrtle	
Willow	
Shore Pine	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☒ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☐

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☒ No ☐

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☒ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

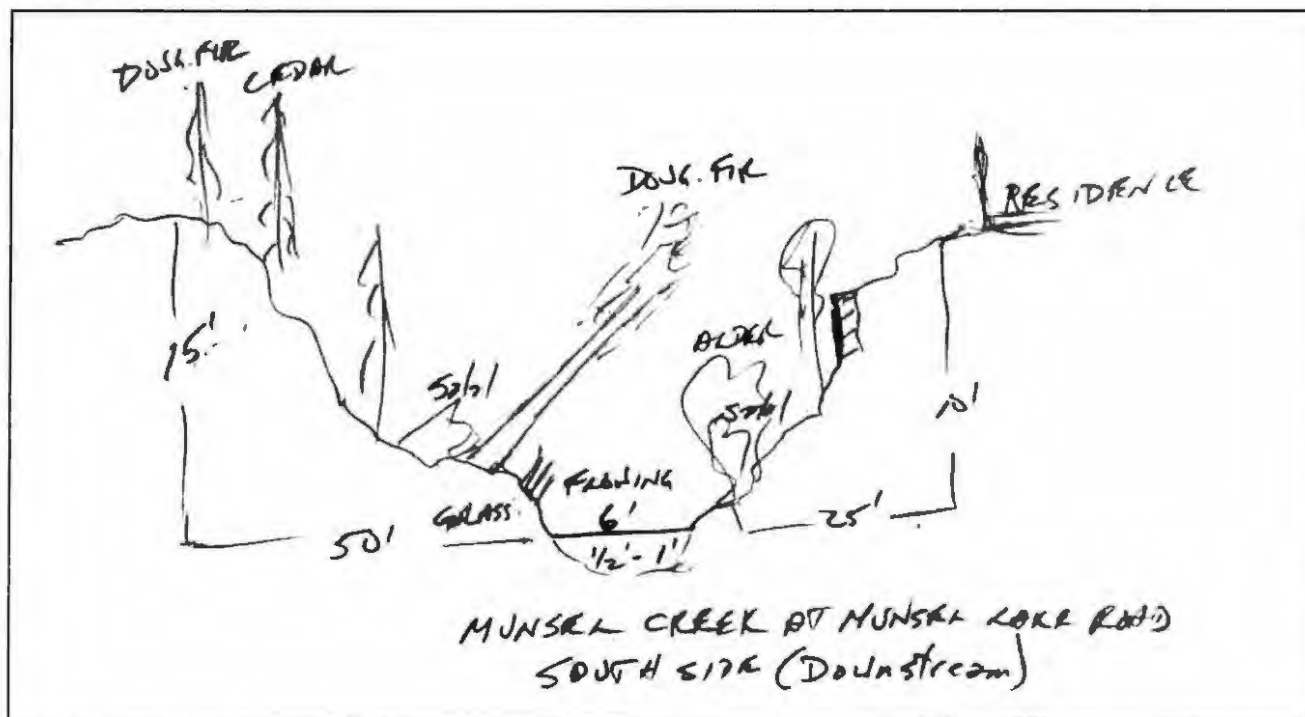
RIPARIAN CODE
RMC - 7 South

Date: 9/14/2010 Investigators: C. Lysdale
Dominant tree species: Douglas Fir
Potential tree height (PTH)/Actual Width of riparian area : 120/50L & 25R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: Small retaining wall on right well above OHW.

Photos RMC-7S veg & RMC-7S str

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC - 7 South Location of data point: RMC - 7
 Reach Length: _____
 Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 6 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☒ No ☐

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Yaquina loamy fine sand

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☐
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	Grasses
Western Red Cedar	
Red Alder	
Salal	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☒

Left&Right

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☒ 2 layers ☐ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

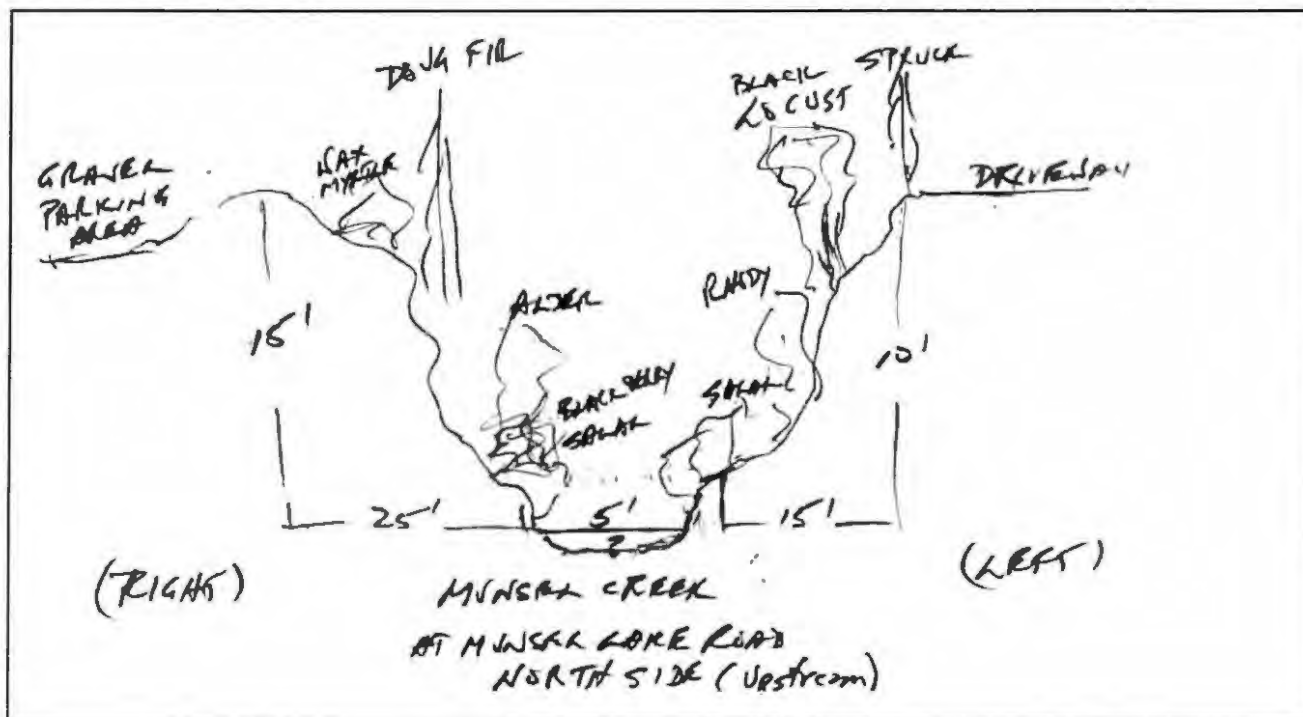
RIPARIAN CODE
RMC - 7 North

Date: 9/14/2010 Investigators: C. Lysdale
Dominant tree species: Douglas Fir/Sitka Spruce
Potential tree height (PTH)/Actual Width of riparian area : 120/15L & 25R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: _____

Photos RMC-7N veg & RMC-7N str

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC - 7 North Location of data point: RMC - 7
 Reach Length: _____
 Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 5 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☒ No ☐

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☐

Mapped soil series: Yaquina loamy fine sand

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☒
 Commercial/Indus.: ☐ Undeveloped: ☐
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	
Sitka Spruce	
Red Alder	
Black Locust	
California Wax Myrtle	
Rhododendron	
Salal, Blackberry	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☒ Left&Right

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☐ No ☒

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☐ 10% - 40% ☒ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☐ Herbaceous vegetation ☒ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☒ 2 layers ☐ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

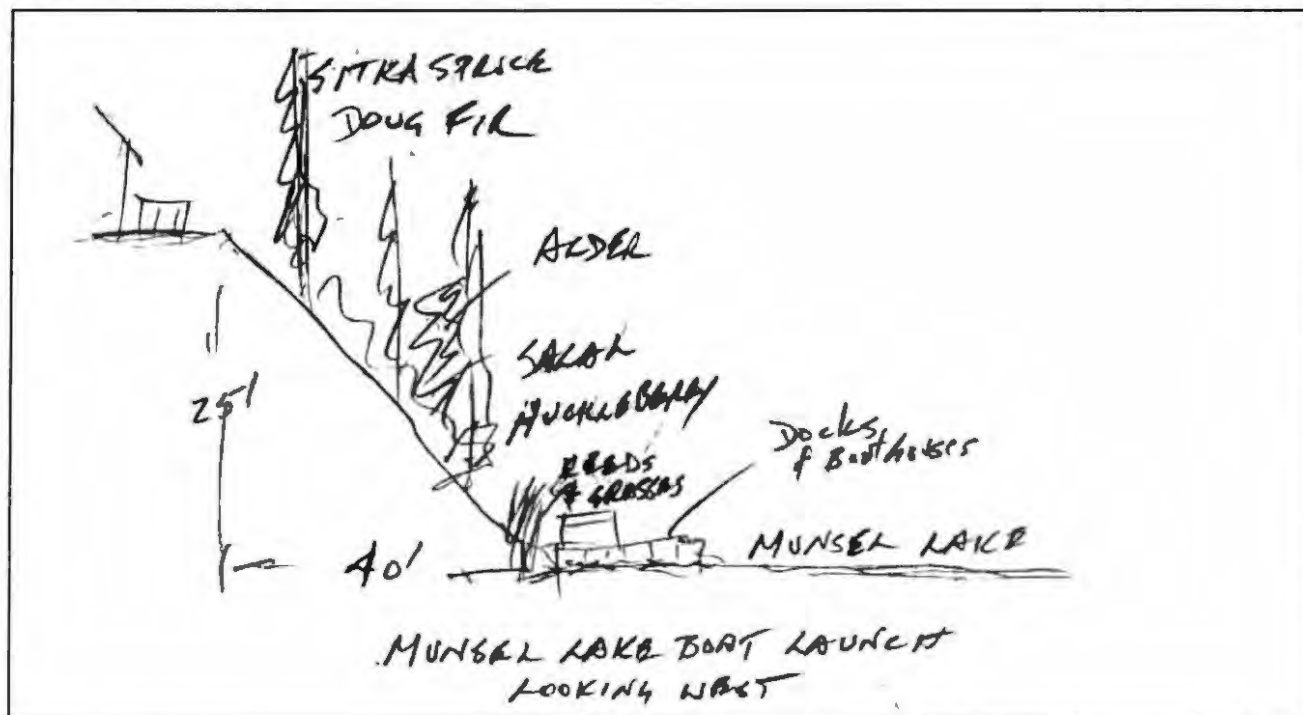
RIPARIAN CODE
RMC-7.5

Date: 3/28/2011 Investigators: C. Lysdale
Dominant tree species: Douglas Fir
Potential tree height (PTH)/Actual Width of riparian area : 120/40 feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code

Comments: _____

Photos _____

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC-D1 Location of data point: RMC-7.5
 Reach Length: _____
 Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☐ Width: _____ feet
 Lake/Pond: ☒ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☒ No ☐

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Yaquina loamy fine sand/Waldport fine sand, 0-12% slopes

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☐
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines > 1 meter)	Herbaceous vegetation (include trees, shrubs, vines < 1 meter)
Douglas Fir	Salal
Sitka Spruce	Huckleberry
Red Alder	
Shore Pine	
Wasmyle	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☒

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☐ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☐ 25% - 75% ☒ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☐ Herbaceous vegetation ☒ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☒ 2 layers ☐ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

RIPARIAN CODE
RMC-7.7

Date: 3/28/2011 Investigators: C. Lysdale

Dominant tree species: Shore Pine

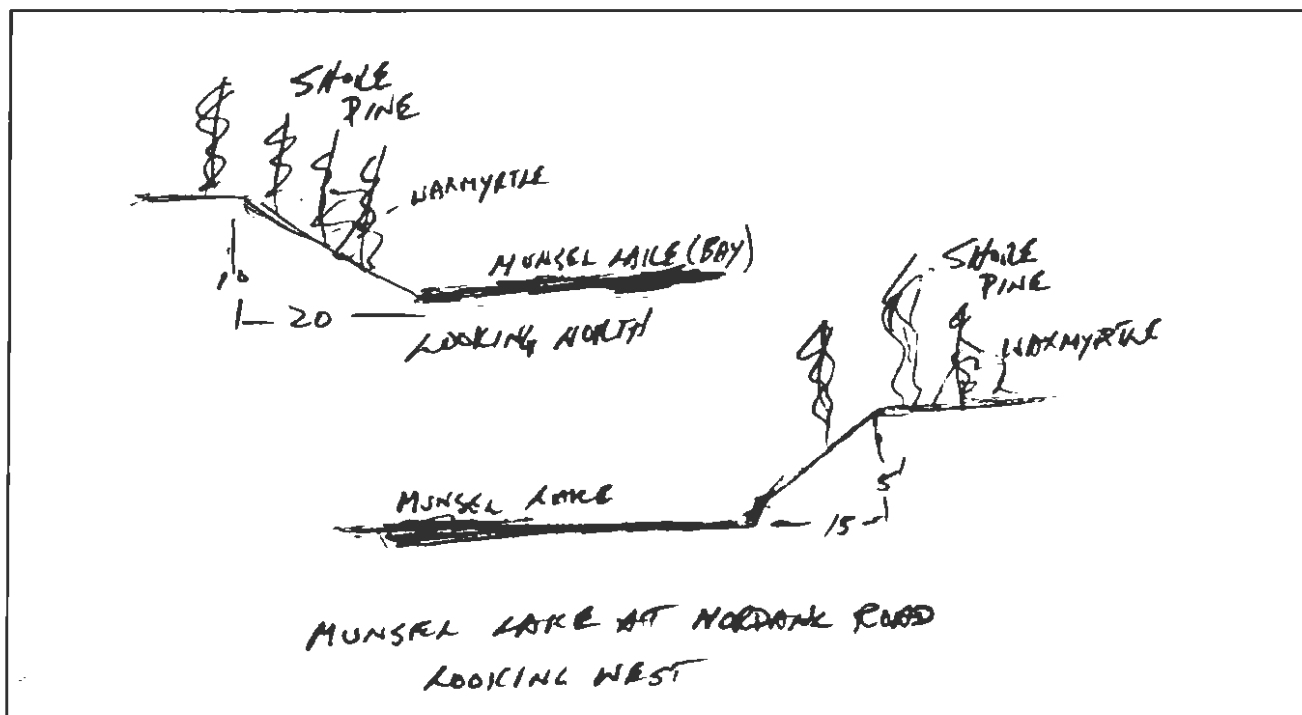
Potential tree height (PTH)/Actual Width of riparian area : 50/20 feet
(Width measured horizontally from edge of water resource)

PTH determined by:
On-site vegetation ☒ Reference site ☐ Code

Comments: _____

Photos _____

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC-D1 Location of data point: RMC-7.7
 Reach Length: _____
 Hydrologic Basin: Munsel Creek On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☐ Width: _____ feet
 Lake/Pond: ☒ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☒ No ☐

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: _____

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☐
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Shore Pine	Salal
Waxmyrtle	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☒

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☐ No ☒

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☐ 10% - 40% ☒ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☐ 25% - 75% ☒ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☒ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

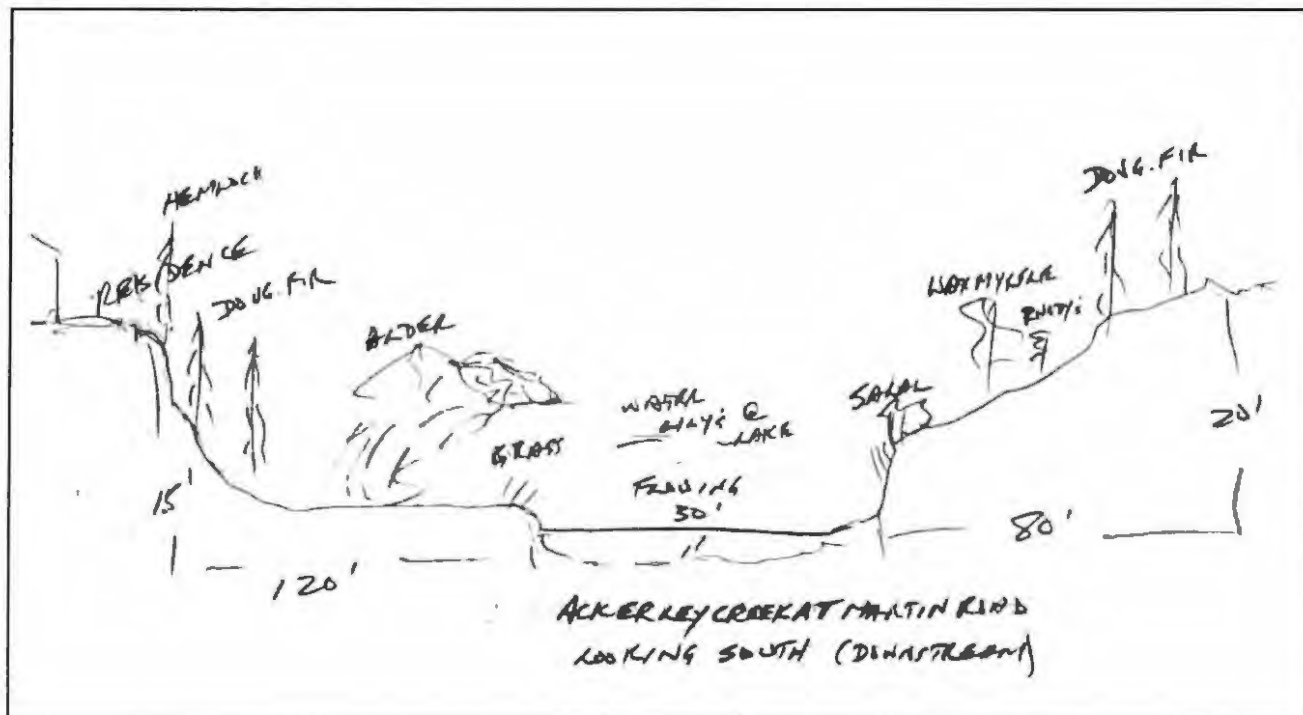
RIPARIAN CODE
RMC - 8 South

Date: 9/20/2010 Investigators: C. Lysdale
Dominant tree species: Douglas Fir
Potential tree height (PTH)/Actual Width of riparian area : 120/120L & 80R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code

Comments: _____

Photos RMC-8Sveg, RMC-8Sstr

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC-8 South Location of data point: RMC - 8
 Reach Length: _____
 Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 30 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☒ No ☐

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Netarts fine sand, 3-12% slopes

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☐
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	Salal
Western Hemlock	Grasses
Red Alder	
California Wax Myrtle	
Rhododendron	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☒ >5:1 (20%) ☒
 Left Right

Extent of impervious surface within the riparian area: (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒ (Shaded by canopy)

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance: (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☒ No ☐

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☒ No or no flood prone area present ☐

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☒ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

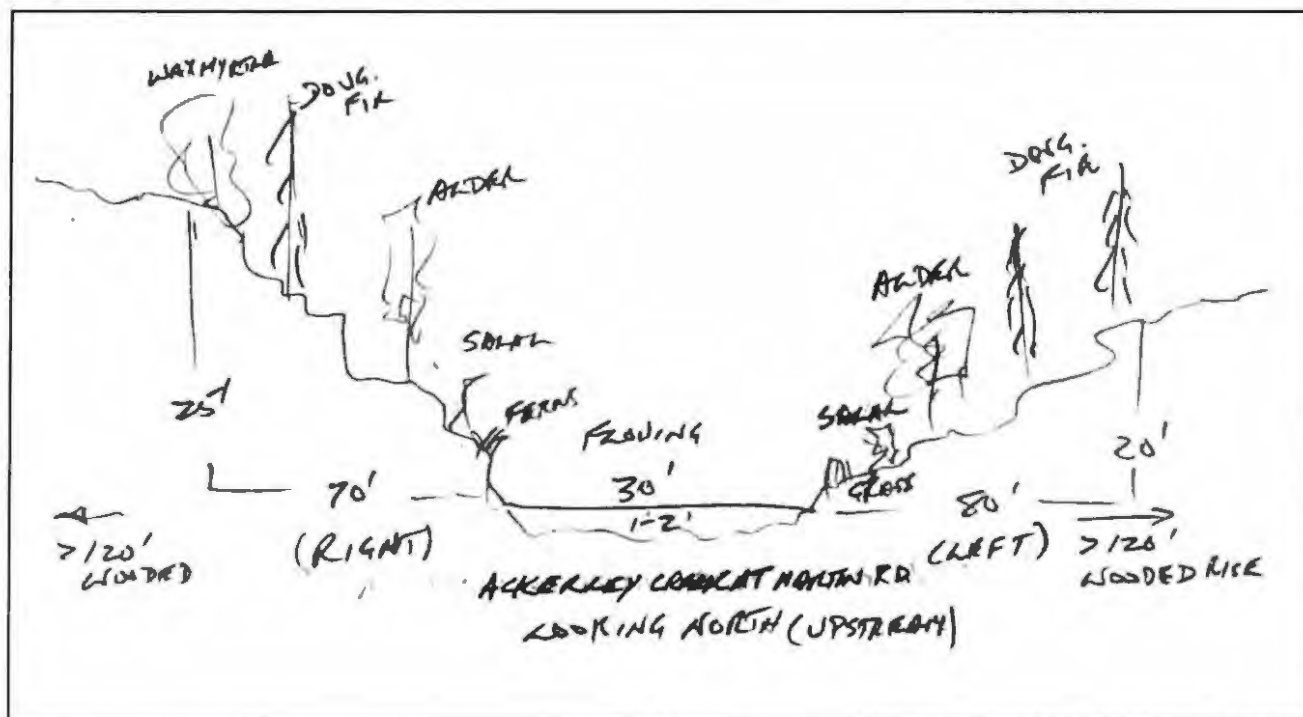
RIPARIAN CODE
RMC - 8 North

Date: 9/20/2010 Investigators: C. Lysdale
Dominant tree species: Douglas Fir
Potential tree height (PTH)/Actual Width of riparian area : 120/120L & 70R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: _____

Photos RMC-8Nveg, RMC-8Nstr

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC-8 North Location of data point: RMC - 8
 Reach Length: _____
 Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 30 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☒ No ☐

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Netarts fine sand, 3-12% slopes

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☒
 Residential: ☐ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	Salal
Red Alder	Grasses
California Wax Myrtle	Ferns

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☒ Left&Right

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☐ No ☒

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☐ Herbaceous vegetation ☒ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☒ 1 layer or unvegetated ☐

Riparian Width Determination



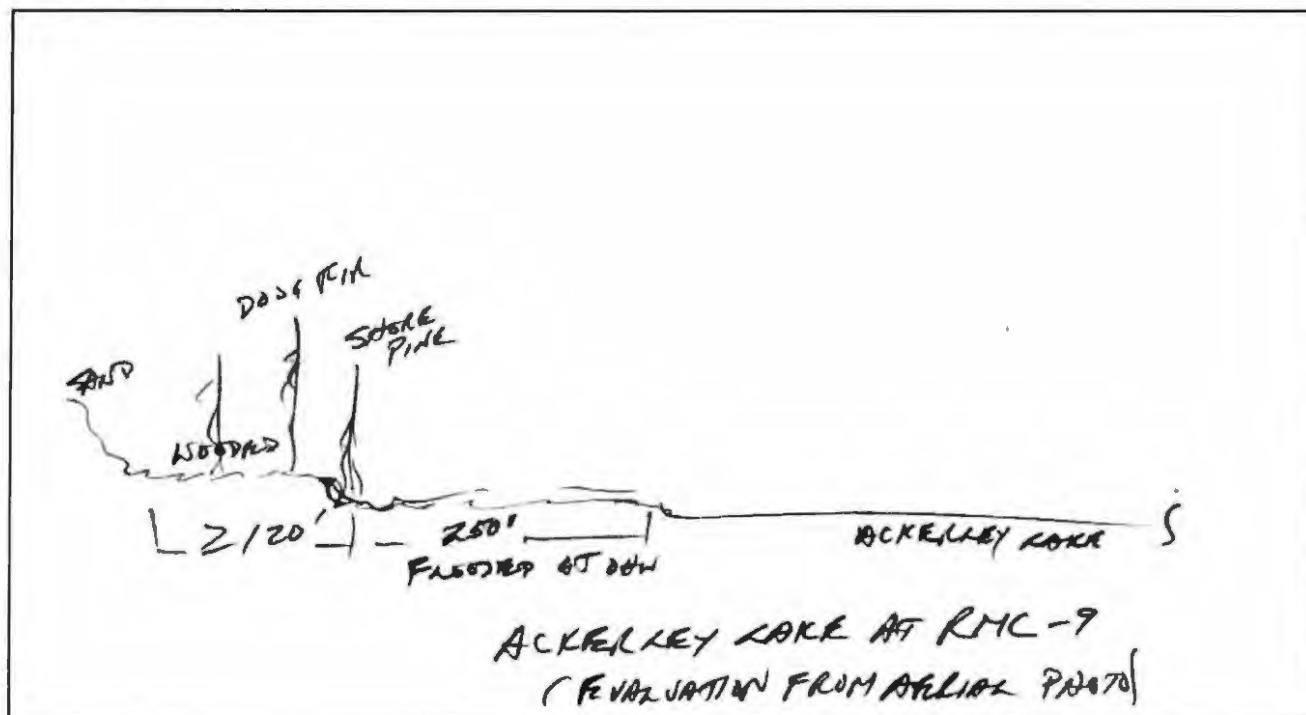
Florence LWI & Riparian Inventory

RIPARIAN CODE
RMC - 9

Date: 9/18/2010 Investigators: C. Lysdale
Dominant tree species: Douglas Fir
Potential tree height (PTH)/Actual Width of riparian area : 120/120+ feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code

Comments: No access - evaluation by aerial photo/comparison with RMC-13. Riparian zone at this location appears to be a flat area between the lake and a wooded back margin, with sand dune further inland.

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC - 9 Location of data point: RMC - 9

Reach Length: _____

Hydrologic Basin: _____ On-site: ☐ Off-Site: ☒

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☐ Width: _____ feet
 Lake/Pond: ☒ Width: 200-500 feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☒ No ☐

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Bullards-Ferrelo loams, 7-12% slopes

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☒
 Residential: ☐ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	
Shore Pine	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☒ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☒

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☐ No ☒

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☒ No ☐

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☒ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

RIPARIAN CODE
RMC - 10

Date: 9/18/2010 Investigators: C. Lysdale
Dominant tree species: Douglas Fir
Potential tree height (PTH)/Actual Width of riparian area : 120/120+ feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: No access - evaluation by aerial photo/comparison with RMC-12. Riparian area appears to be heavily wooded to lake shore with no indication of a seasonal flood plain.

Typical Cross Section:



CLEAR LAKE OF RMC -10

Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC - 10 Location of data point: RMC - 10

Reach Length: _____

Hydrologic Basin: _____ On-site: ☐ Off-Site: ☒

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☐ Width: _____ feet
 Lake/Pond: ☒ Width: 1000 feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☒ No ☐

Is the water resource listed for temperature on DEQ's 303(d) list? Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Slickrock gravelly loam, 3-25% slopes

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☐
 Residential: ☐ Forestry: ☒

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	
Shore Pine	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☒ >5:1 (20%) ☐

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☒ 1 layer or unvegetated ☐

Riparian Width Determination



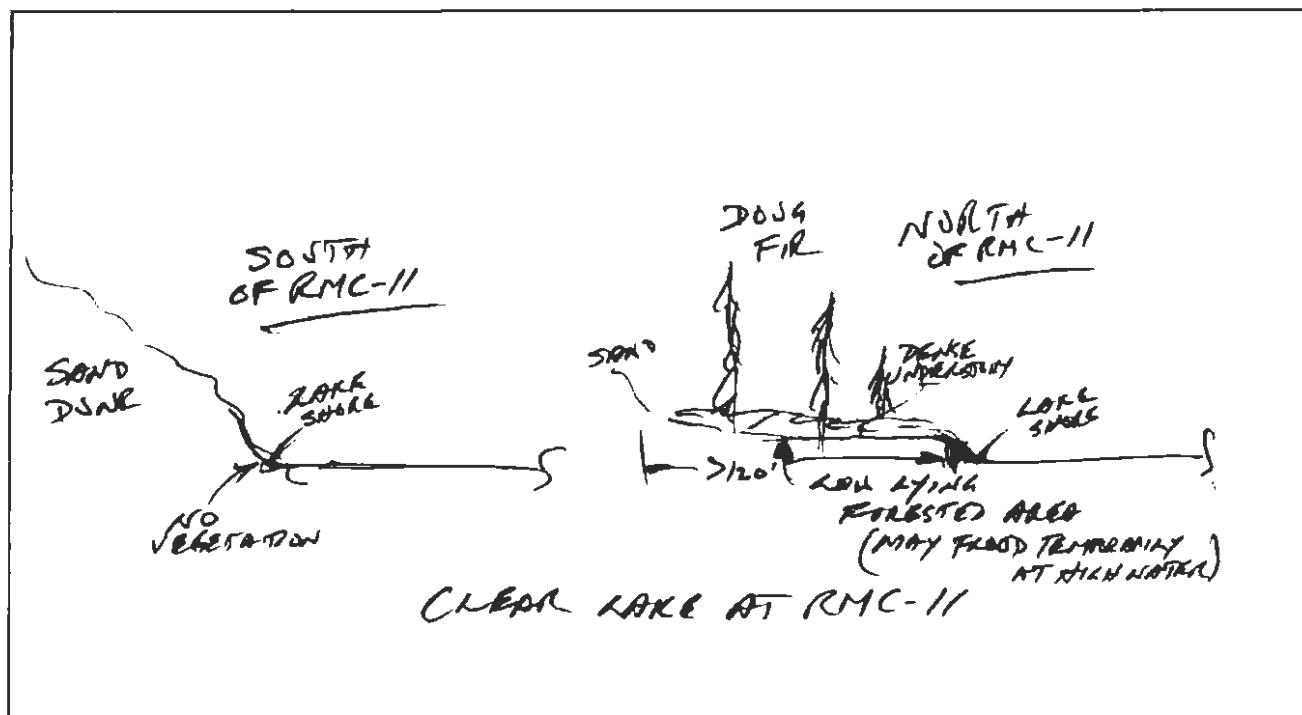
Florence LWI & Riparian Inventory

RIPARIAN CODE
RMC - 11

Date: 9/18/2010 Investigators: C. Lysdale
Dominant tree species: Douglas Fir
Potential tree height (PTH)/Actual Width of riparian area : 120/120+N, 0S feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: No access - evaluation by aerial photo/comparison with RMC-13. Riparian area at this location appears to transition from sand at waterline (south) to low lying forested area backed by sand dune (north).

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC - 11 Location of data point: RMC - 11

Reach Length: _____

Hydrologic Basin: _____ On-site: ☐ Off-Site: ☒

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☐ Width: _____ feet
 Lake/Pond: ☒ Width: >1000 feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☒ No ☐

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Dune land

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☒
 Residential: ☐ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☒ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☐

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ North Herbaceous vegetation ☐ Bare ground ☒ South

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☒

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☐ 10% - 40% ☒ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☐ high, very high, severe ☒

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ North Herbaceous vegetation ☐ Bare ground ☒ South

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☒ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☒ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☒ North 1 layer or unvegetated ☒ South

Riparian Width Determination



Florence LWI & Riparian Inventory

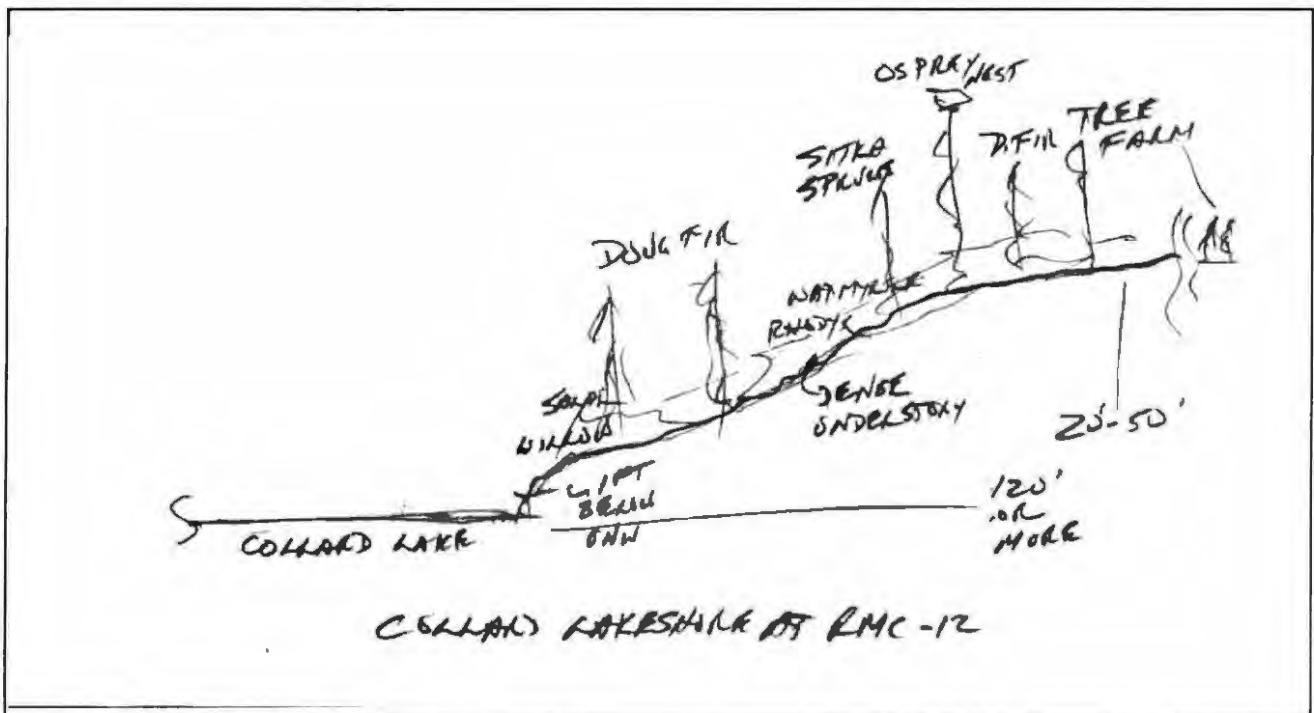
RIPARIAN CODE
RMC - 12

Date: 9/15/2010 Investigators: C. Lysdale
Dominant tree species: Douglas Fir/Sitka Spruce
Potential tree height (PTH)/Actual Width of riparian area : 120/120+ feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code

Comments: Riparian area is => 120 ft wide on East through North sides of Collard Lake
- except for scattered residence clearings.
(Note tree farm beyond riparian zone)

Photos RMC-12_13, RMC-12

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC-12 Location of data point: RMC - 12

Reach Length: _____

Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☐ Width: _____ feet
 Lake/Pond: ☒ Width: 200 - 800 feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☐ No ☒

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Bullards-Ferrelo loams, 7-12% slopes

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☐
 Residential: ☒ Forestry: ☒

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	Salal
Sitka Spruce	
Willow	
California Wax Myrtle	
Rhododendron	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☒ >5:1 (20%) ☐

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☒ No ☐ (Near shoreline)

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☒ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

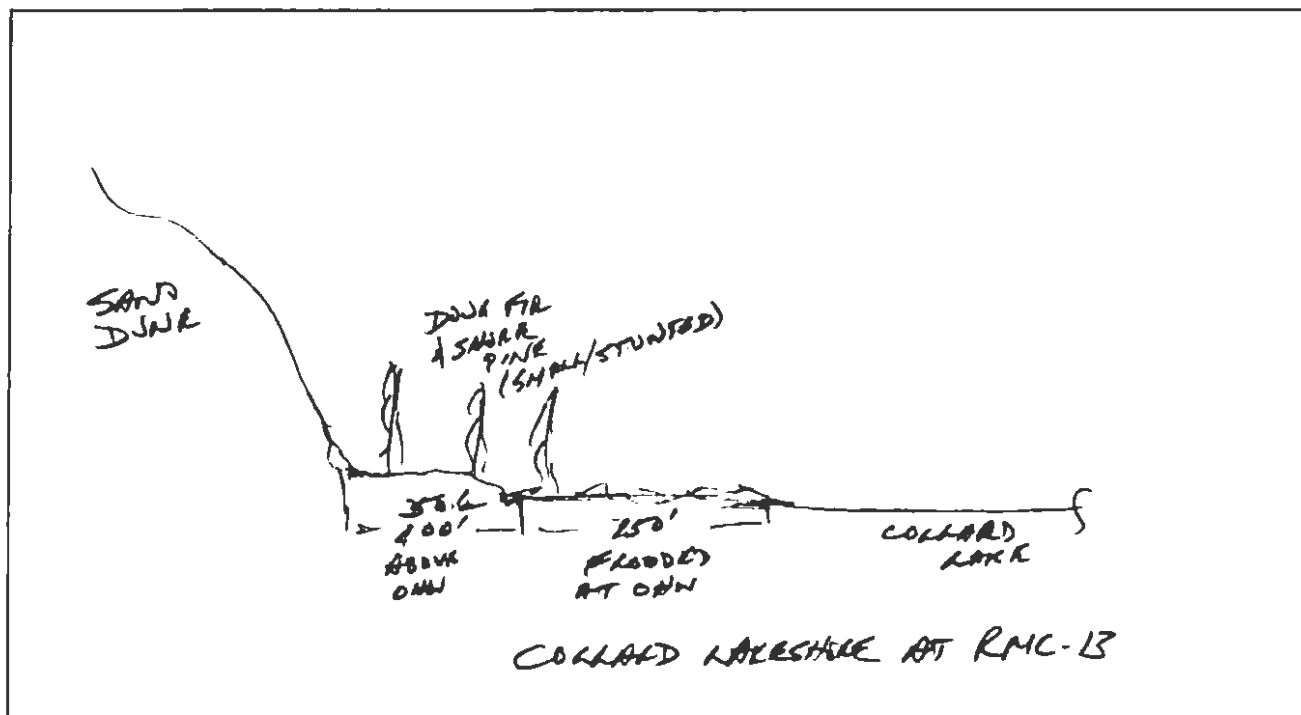
RIPARIAN CODE
RMC - 13

Date: 9/15/2010 Investigators: C. Lysdale
Dominant tree species: Douglas Fir/Sitka Spruce
Potential tree height (PTH)/Actual Width of riparian area : 120/120+ feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: RMC-13 is a flat area between Collard Lake and an encroaching sand dune. It is of small extent (400 ft long). To the south, the sand dune borders the lake. To the north, the riparian area slopes up from the lake shore and is heavily wooded with width > 120 ft.

Photos RMC-13N, RMC-13

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RMC-13 Location of data point: RMC - 13
 Reach Length: _____
 Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☐ Width: _____ feet
 Lake/Pond: ☒ Width: 200 - 800 feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☐ No ☒

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Dune land

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☒
 Residential: ☐ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	
Shore Pine	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☒ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☐

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☐ No ☒

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☐ high, very high, severe ☒

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☒ No ☐

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☒ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

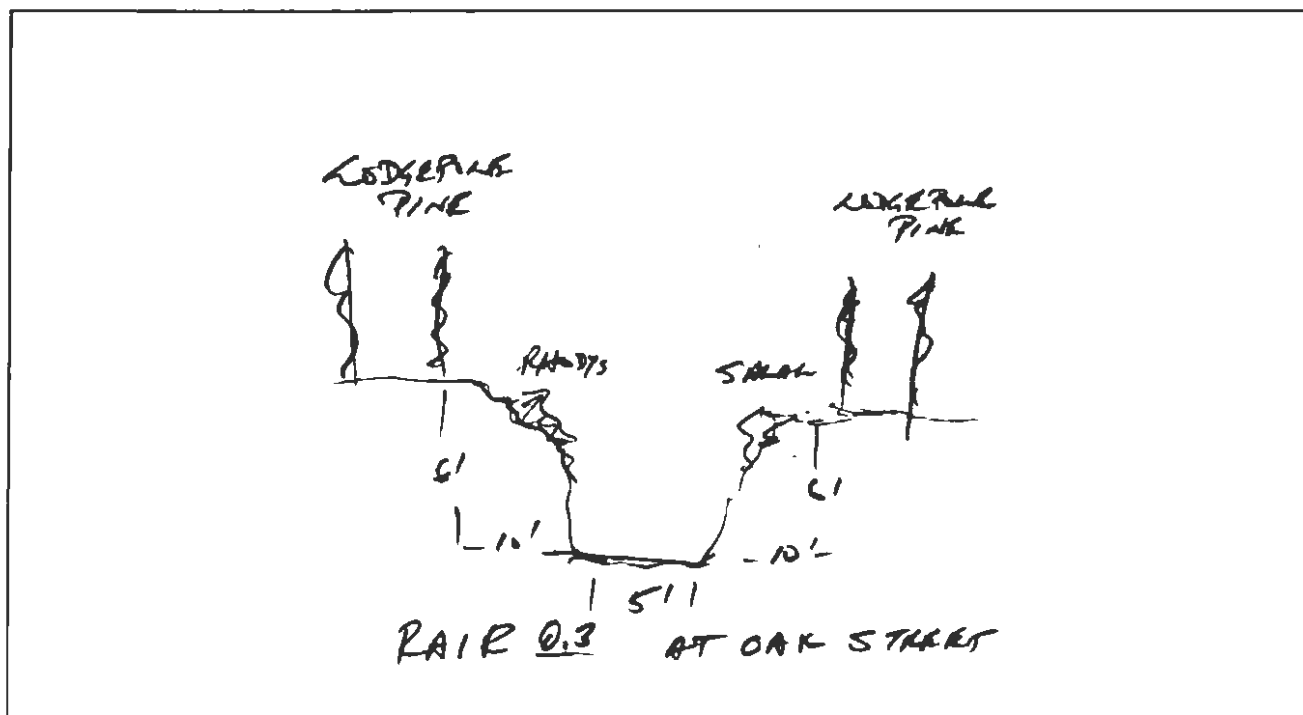
RIPARIAN CODE
RAIR - 0.3

Date: 10/24/2010 Investigators: C. Lysdale
Dominant tree species: Shore Pine
Potential tree height (PTH)/Actual Width of riparian area : 50/10L & 10R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: Stream emerges from a culvert at this location. Channel appears to be excavated and cleared.

Photos RAIR-0.3veg, RAIR-0.3str

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RAIR-A Location of data point: RAIR - 0.3

Reach Length: _____

Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 5 feet

Lake/Pond: ☐ Width: _____ feet

Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☐ No ☒

Are salmonids present in the adjacent water resource? Yes ☐ No ☒

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Yaquina loamy fine sand

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐

Commercial/Indus.: ☐ Undeveloped: ☒

Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Shore Pine	Salal
	Rhododendron

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☒ Left&Right

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☒ No ☐

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☐ Herbaceous vegetation ☒ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☐ 10% - 40% ☐ <10% ☒

Degree of development or human caused disturbance. (Question 19)

<25% ☐ 25% - 75% ☒ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☐ 1 layer or unvegetated ☒

Riparian Width Determination



Florence LWI & Riparian Inventory

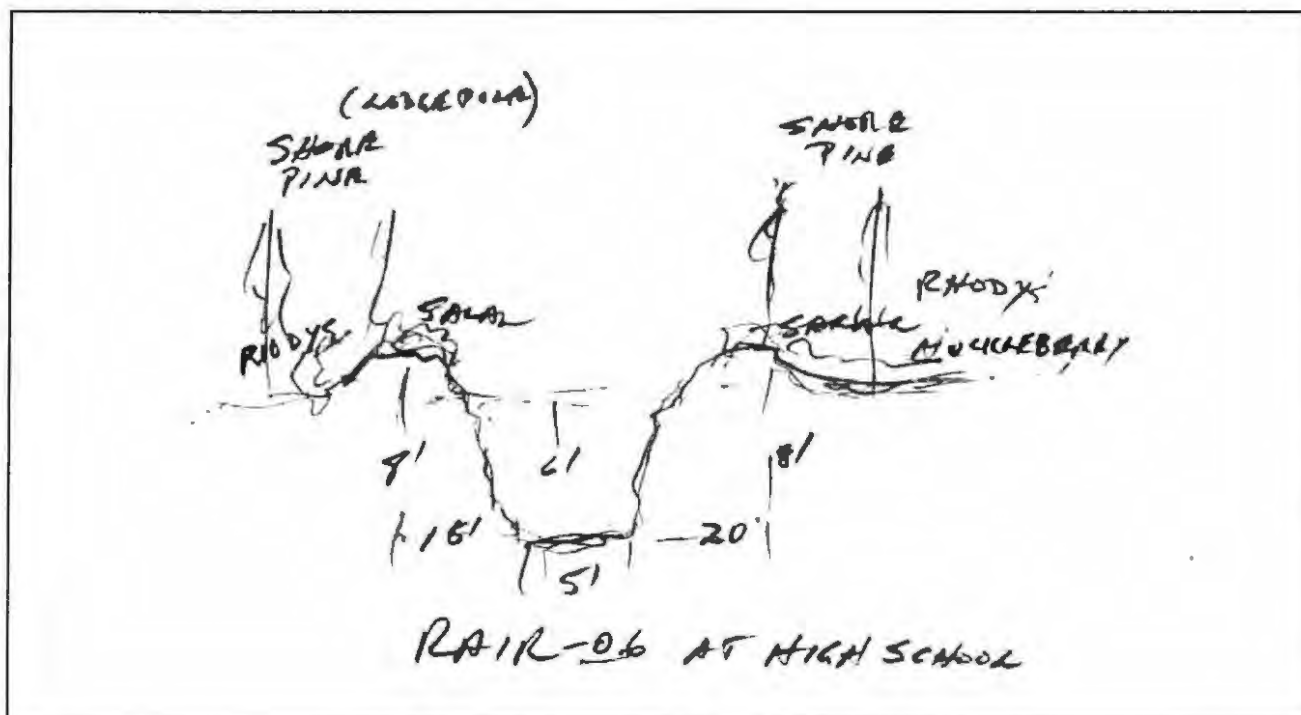
RIPARIAN CODE
RAIR - 0.6

Date: 10/24/2010 Investigators: C. Lysdale
Dominant tree species: Shore Pine
Potential tree height (PTH)/Actual Width of riparian area : 50/15L & 20R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: Channel appears to be excavated and cleared, including berms on each side.

Photos RAIR-0.6veg, RAIR-0.6str

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RAIR-A Location of data point: RAIR - 0.6

Reach Length: _____

Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 5 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☐ No ☒

Are salmonids present in the adjacent water resource? Yes ☐ No ☒

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Yaquina loamy fine sand

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☒
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Shore Pine	Salal
	Rhododendron
	Huckleberry

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☒ Left&Right

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☒ No ☐ Berms left and right

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☒ No ☐

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☐ Herbaceous vegetation ☒ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☐ 10% - 40% ☐ <10% ☒

Degree of development or human caused disturbance. (Question 19)

<25% ☐ 25% - 75% ☒ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☐ Herbaceous vegetation ☒ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☐ 1 layer or unvegetated ☒

Riparian Width Determination



Florence LWI & Riparian Inventory

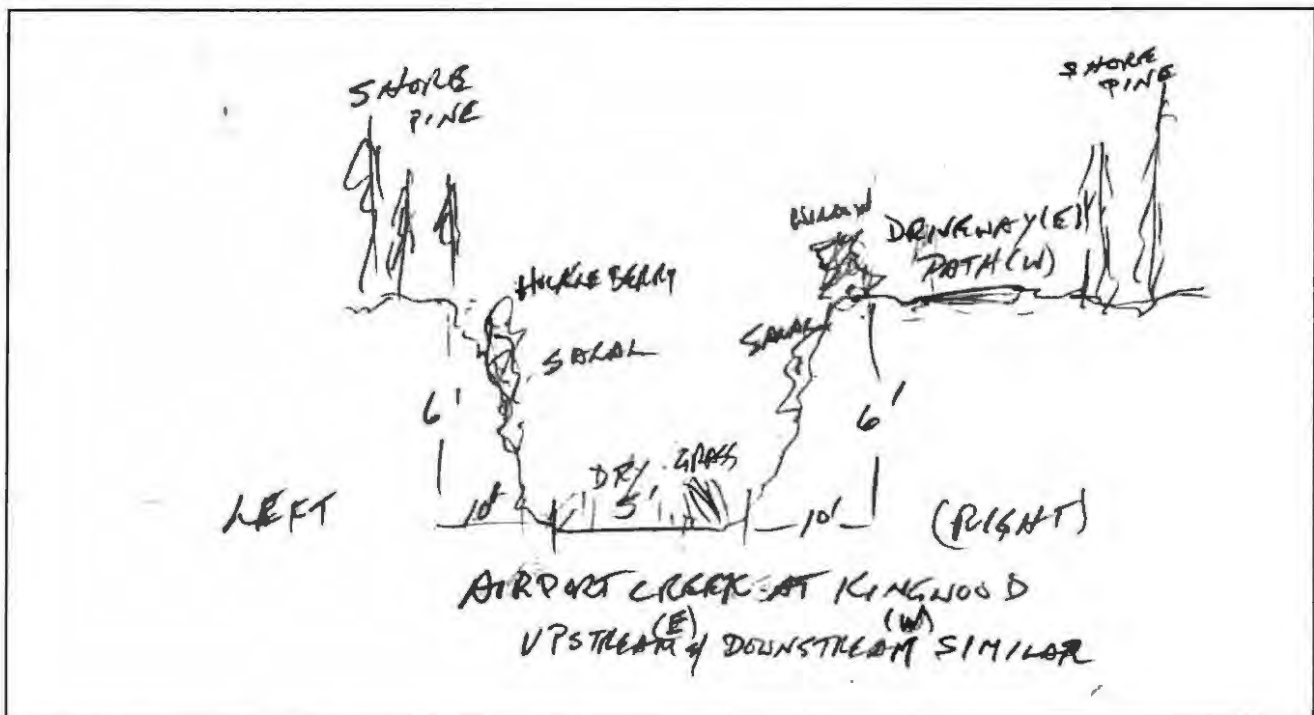
RIPARIAN CODE
RAIR - 1

Date: 9/26/2010 Investigators: C. Lysdale
Dominant tree species: Shore Pine
Potential tree height (PTH)/Actual Width of riparian area : 50/10L & 10R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: Streambed appears to be cleared. Banks are almost vertical to break in slope, surrounding area is level.

Photos RAIR-1Sveg, RAIR-1Sstr ; RAIR-1Nveg, RAIR-1Nstr

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RAIR-1 South & North Location of data point: RAIR - 1

Reach Length: _____

Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 5 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☐ No ☒

Are salmonids present in the adjacent water resource? Yes ☐ No ☒

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Yaquina loamy fine sand

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☒ Undeveloped: ☒
 Residential: ☐ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Shore Pine	Salal
Willow	Huckleberry

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☒ Left&Right

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☒ No ☐

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☐ Herbaceous vegetation ☒ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☐ No ☒

Large woody debris in riparian area? (Question 15)

Yes ☐ No ☒

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☐ 10% - 40% ☒ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☐ 25% - 75% ☒ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☐ Herbaceous vegetation ☐ Bare ground ☒

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☐ 1 layer or unvegetated ☒

Riparian Width Determination



Florence LWI & Riparian Inventory

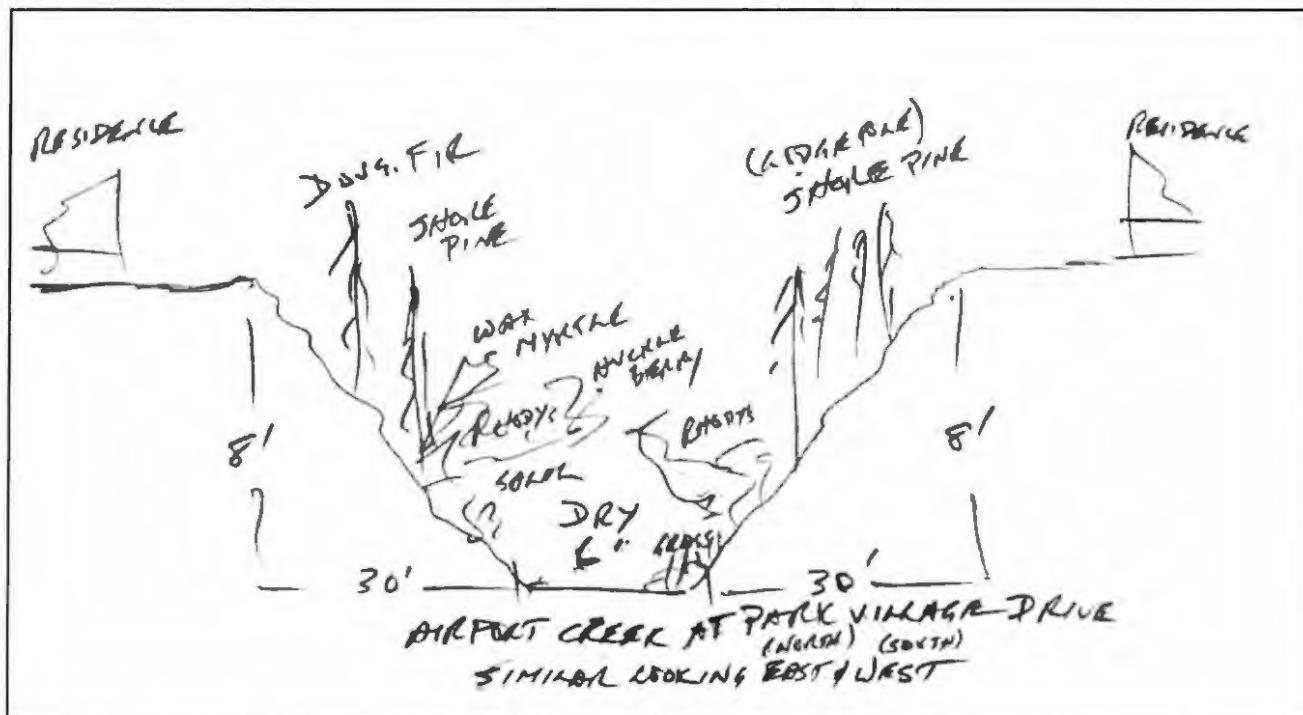
RIPIARIAN CODE
RAIR - 1.5

Date: 9/22/2010 Investigators: C. Lysdale
Dominant tree species: Shore Pine
Potential tree height (PTH)/Actual Width of riparian area : 50/30L & 30R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: Streambed appears to be cleared/straightened to the east.

Photos RAIR-1.5Sveg, RAIR-1.5Sstr ; RAIR-1.5Nveg, RAIR-1.5Nstr

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RAIR-1.5 Location of data point: RAIR - 1.5

Reach Length: _____

Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 6 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☐ No ☒

Are salmonids present in the adjacent water resource? Yes ☐ No ☒

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Waldport fine sand, 0-12% slopes

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☐
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines > 1 meter)	Herbaceous vegetation (include trees, shrubs, vines < 1 meter)
Douglas Fir	Salal
Shore Pine	Huckleberry
California Wax Myrtle	Grasses
Rhododendron	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☒

Left&Right

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☒ No ☐

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☐ No ☒

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☐ 25% - 75% ☒ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☐ Herbaceous vegetation ☒ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☒ 1 layer or unvegetated ☐

RIPARIAN CODE
RAIR - 2 North

Comments:

Typical Cross Section:

Hand-drawn sketch map of Airport Creek at 12th St. looking north (upstream). The map shows a creek flowing from right to left. On the right bank (upstream), there is a 'RESIDENCE' and a 'STALL PINE'. On the left bank (downstream), there is a 'DRY' area. Various plants are labeled: 'DOG FIR' on the left bank, 'RUBUS' and 'SALAL' on the right bank, and 'WAX MYRTLE' and 'GRASS' on the left bank. Distances are marked: '15'' from the left edge to the first bend, '60'' from the first bend to the 'DRY' area, '5'' from the 'DRY' area to the 'STALL PINE', and '30'' from the 'STALL PINE' to the right edge. The map is labeled '(RIGHT)' on the left and '(LEFT)' on the right.

Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RAIR-2 North Location of data point: RAIR - 2
 Reach Length: _____
 Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 5 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☐ No ☒

Are salmonids present in the adjacent water resource? Yes ☐ No ☒

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Waldport fine sand, 0-12% slopes

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☐
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	Salal
Shore Pine	Grasses
California Wax Myrtle	
Rhododendron	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☒ >5:1 (20%) ☒
 Left Right

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☒ 2 layers ☒ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

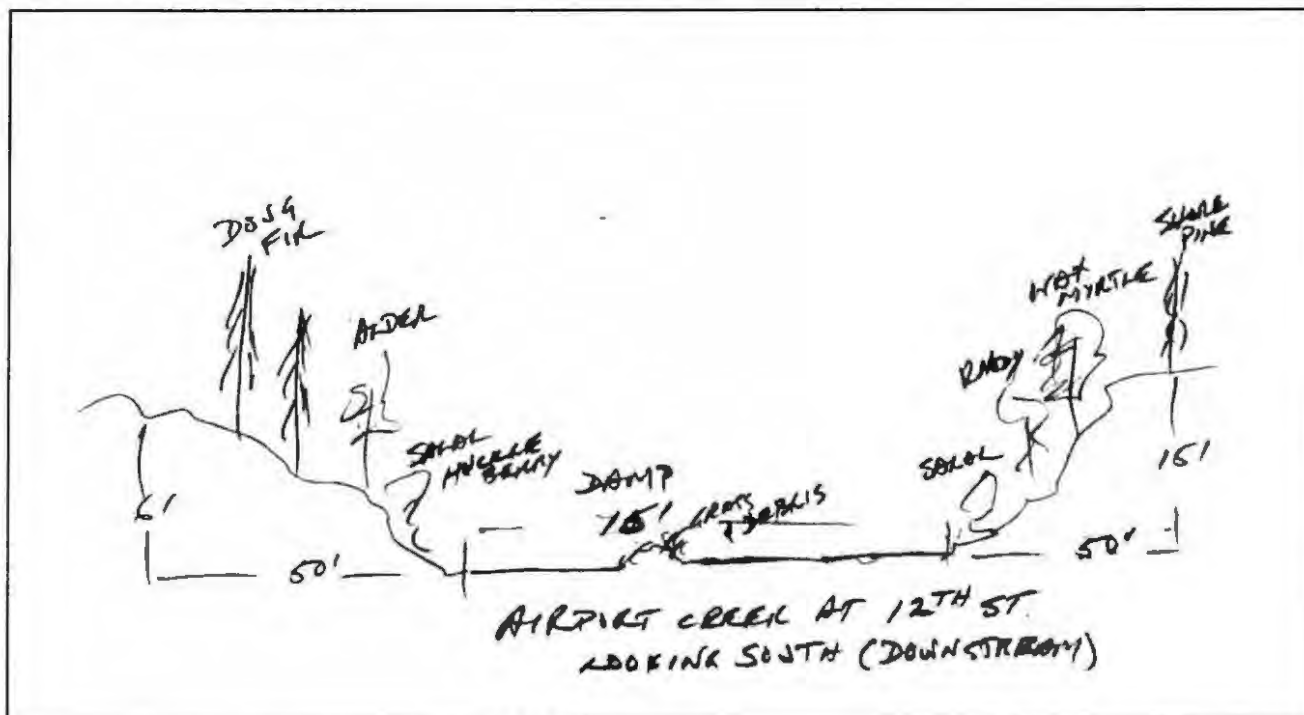
RIPARIAN CODE
RAIR - 2 South

Date: 9/22/2010 Investigators: C. Lysdale
Dominant tree species: Douglas Fir
Potential tree height (PTH)/Actual Width of riparian area : 120/50L & 50R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: Streambed not well defined at this location (crossing 12th street RoW).
Consists of a low-lying wide flat area interspersed with debris and vegetation. No culvert.

Photos RAIR-2Sveg, RAIR-2Sstr

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RAIR-2 South Location of data point: RAIR - 2
 Reach Length: _____
 Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 15 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☐ No ☒

Are salmonids present in the adjacent water resource? Yes ☐ No ☒

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Waldport fine sand, 0-12% slopes

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☒
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	Salal
Shore Pine	Huckleberry
California Wax Myrtle	Grasses
Red Alder	
Rhododendron	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☒ >5:1 (20%) ☒
 Left Right

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒ (Shaded by canopy)

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☒ 2 layers ☒ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

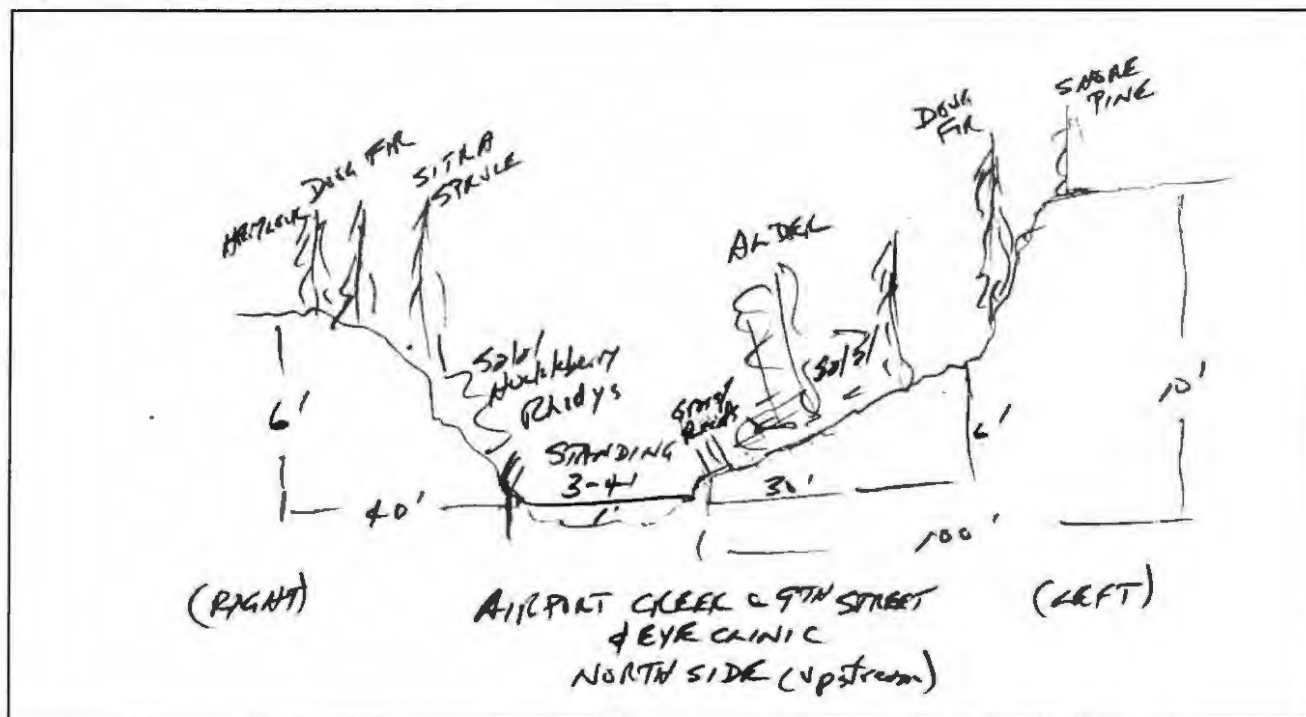
RIPARIAN CODE
RAIR - 3 North

Date: 8/25/2010 Investigators: C. Lysdale
Dominant tree species: Shore Pine
Potential tree height (PTH)/Actual Width of riparian area : 50/100L & 40R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code

Comments: _____

Photos RAIR-3Nveg, RAIR-3Nstr

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RAIR-3 North Location of data point: RAIR - 3
 Reach Length: _____
 Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 4 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☐ No ☒

Are salmonids present in the adjacent water resource? Yes ☐ No ☒

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Waldport fine sand, 0-12% slopes

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☒ Undeveloped: ☐
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	Reeds
Sitka Spruce	Grasses
Western Hemlock	
Shore Pine	
Red Alder	
Rhododendron	
Salal, Huckleberry	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☒ >5:1 (20%) ☐

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒ Shaded by canopy

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☒ 2 layers ☒ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

RIPARIAN CODE
RAIR - 3 South

Date: 8/25/2010 Investigators: C. Lysdale

Dominant tree species: Red Alder

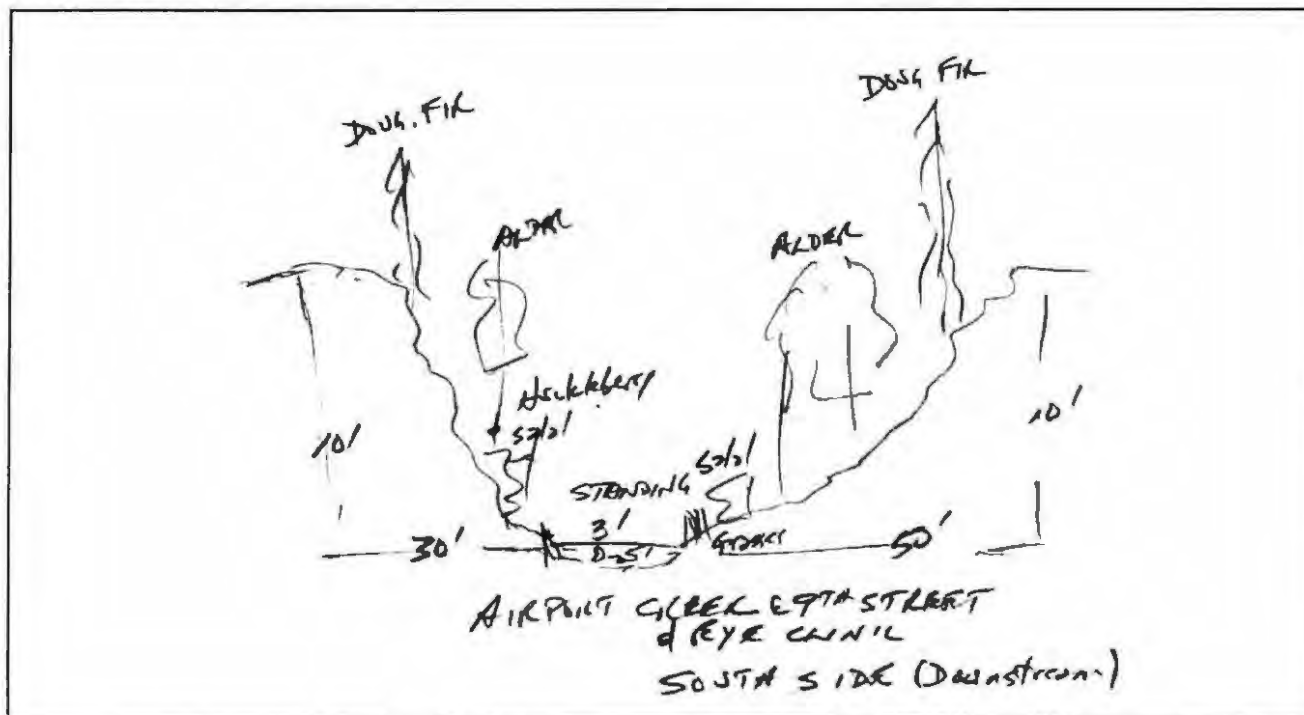
Potential tree height (PTH)/Actual Width of riparian area : 65/30L & 50R feet
(Width measured horizontally from edge of water resource)

PTH determined by:
On-site vegetation ☒ Reference site ☐ Code

Comments: _____

Photos RAIR-3Sveg, RAIR-3Sstr

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RAIR-3 South Location of data point: RAIR - 3
 Reach Length: _____
 Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 3 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☐ No ☒

Are salmonids present in the adjacent water resource? Yes ☐ No ☒

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Waldport fine sand, 0-12% slopes

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☒ Undeveloped: ☐
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	Grasses
Red Alder	
Salal	
Huckleberry	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☒ >5:1 (20%) ☒
 Right Left

Extent of impervious surface within the riparian area: (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒ Shaded by canopy

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance: (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☒ 2 layers ☐ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

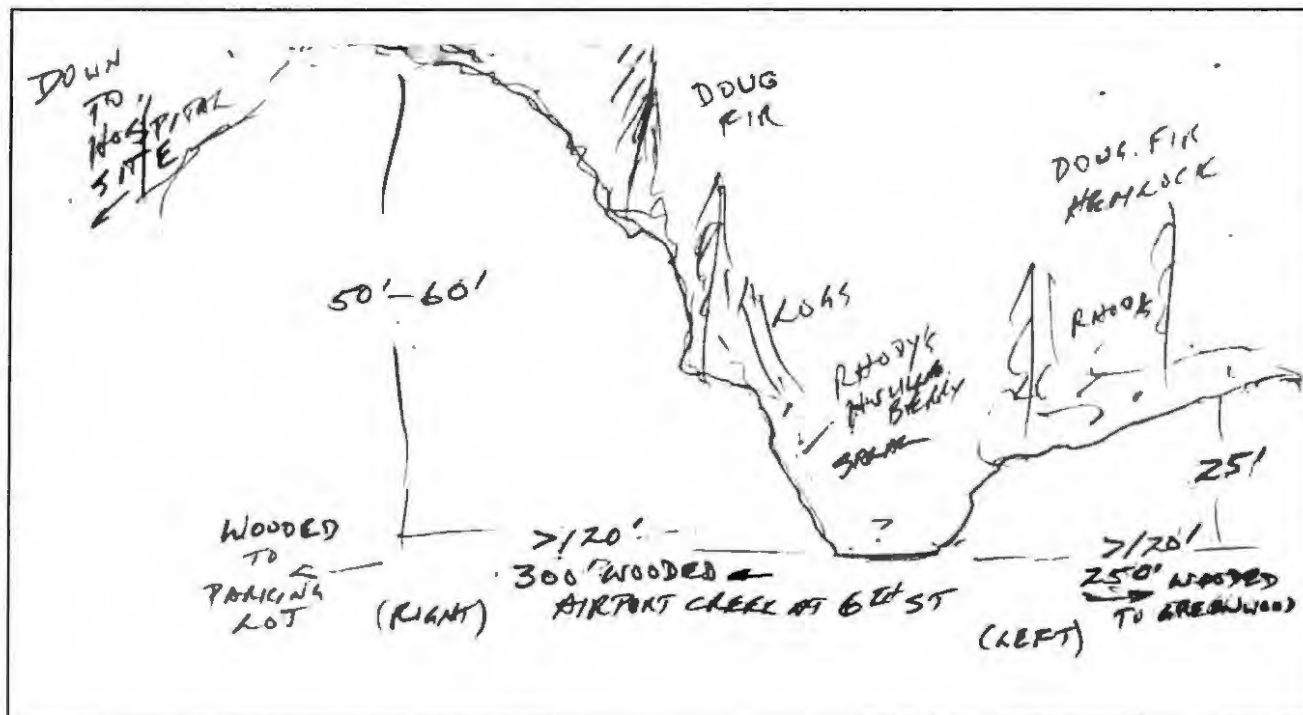
RIPARIAN CODE
RAIR - 4

Date: 9/25/2010 Investigators: C. Lysdale
Dominant tree species: Douglas Fir/Western Hemlock
Potential tree height (PTH)/Actual Width of riparian area : 120/120E&W feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: E-W location of stream is uncertain - no access due to heavy vegetation
and steep terrain.

Photos RAIR-4veg0, RAIR-4veg1, RAIR-4veg5, RAIR-4veg4

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RAIR-4 Location of data point: RAIR - 4

Reach Length: _____

Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: N/A feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☐ No ☒

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Waldport fine sand, 0-12% slopes

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☒
 Residential: ☐ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	Salal
Western Hemlock	Huckleberry
Rhododendron	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☒ >5:1 (20%) ☐

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒ Shaded by canopy

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☒ 2 layers ☐ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

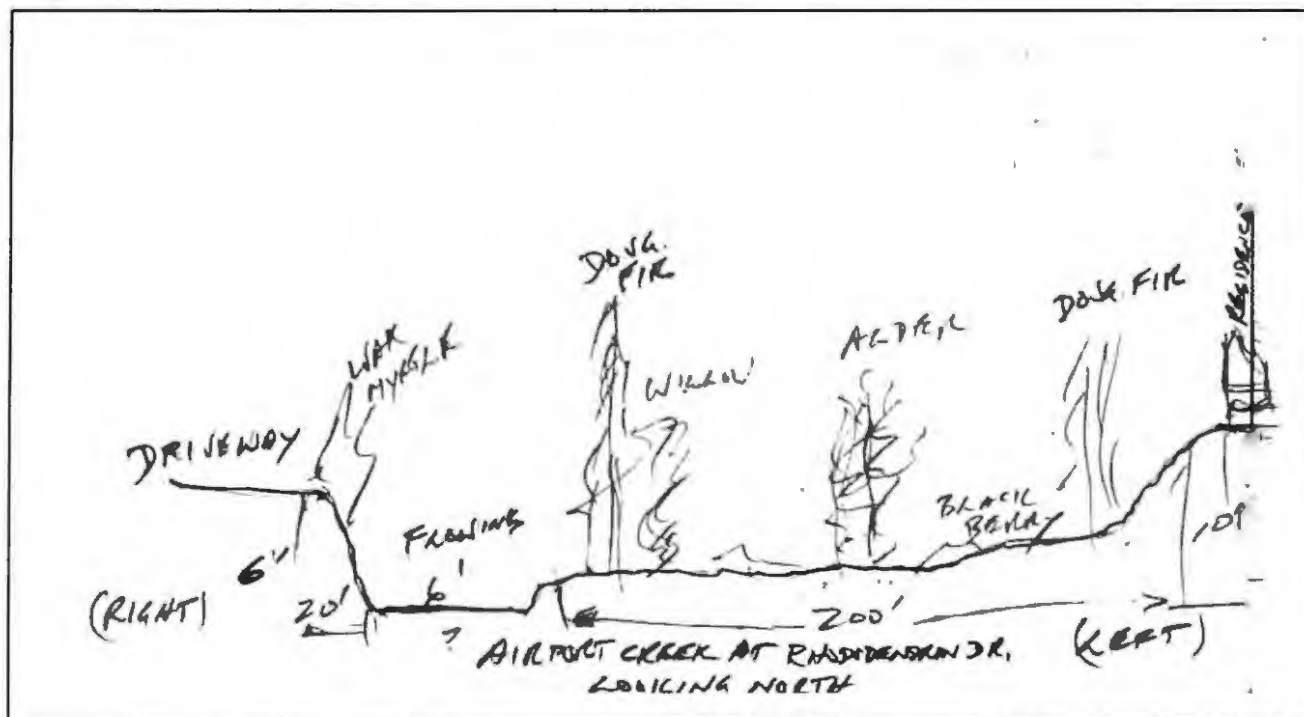
RIPARIAN CODE
RAIR - 5 North

Date: 9/25/2010 Investigators: C. Lysdale
Dominant tree species: Red Alder
Potential tree height (PTH)/Actual Width of riparian area : 65/200L & 20R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: _____

Photos RAIR-5Nveg, RAIR-5Nstr

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RAIR-5 North Location of data point: RAIR - 5

Reach Length: _____

Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 6 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☐ No ☒

Is the water resource listed for temperature on DEQ's 303(d) list? Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Waldport fine sand, 0-12% slopes

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☐
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	
Willow	
Red Alder	
California Wax Myrtle	
Blackberry	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☒ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☒
 Right Left

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☐ Herbaceous vegetation ☒ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☒ No ☐

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☒ No or no flood prone area present ☐

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☒ 2 layers ☐ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

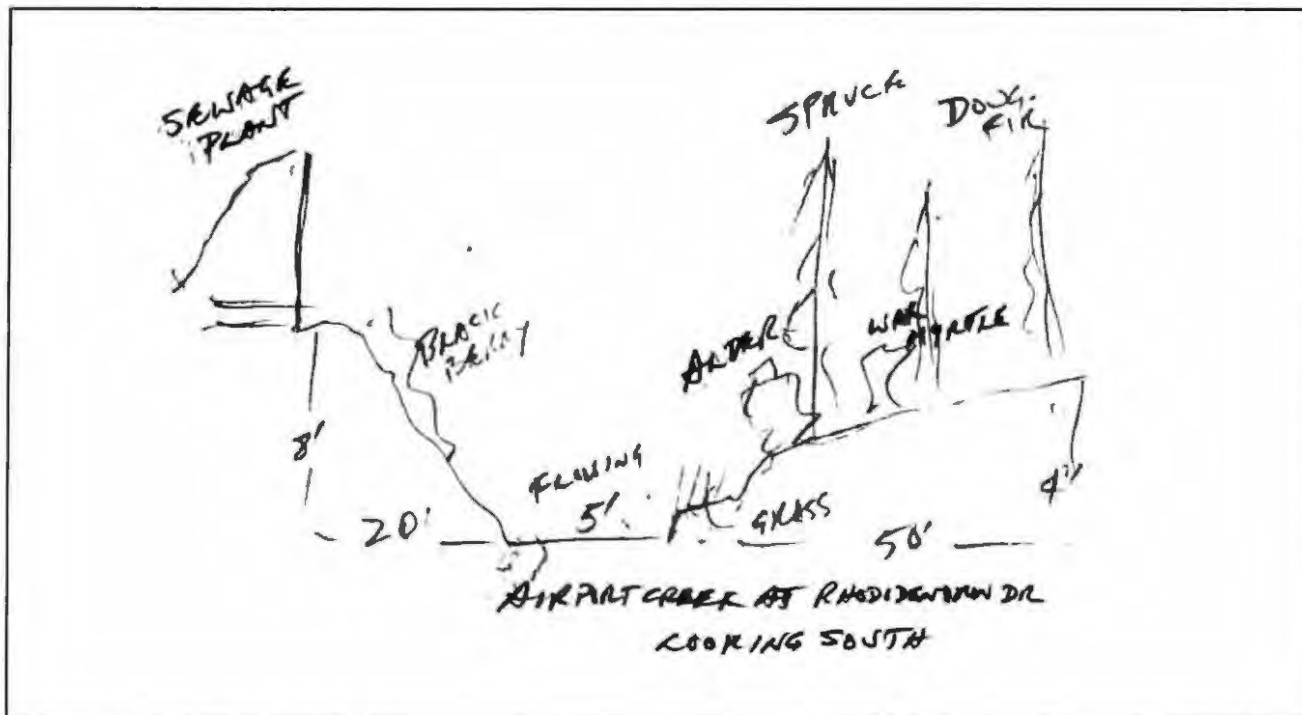
RIPARIAN CODE
RAIR - 5 South

Date: 9/25/2010 Investigators: C. Lysdale
Dominant tree species: Red Alder
Potential tree height (PTH)/Actual Width of riparian area : 65/20L & 50R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: Rip-rap bank at sewage plant

Photos RAIR-5Sveg, RAIR-5Sstr

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RAIR-5 South Location of data point: RAIR - 5

Reach Length: _____

Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 5 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☐ No ☒

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Waldport fine sand, 0-12% slopes/Dune land

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☒ Undeveloped: ☒
 Residential: ☐ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Sitka Spruce	Grasses
Douglas Fir	
Red Alder	
California Wax Myrtle	
Blackberry	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☒ >5:1 (20%) ☒
 Left Right

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☒ No ☐

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☐ 25% - 75% ☒ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☐ Herbaceous vegetation ☒ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☒ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

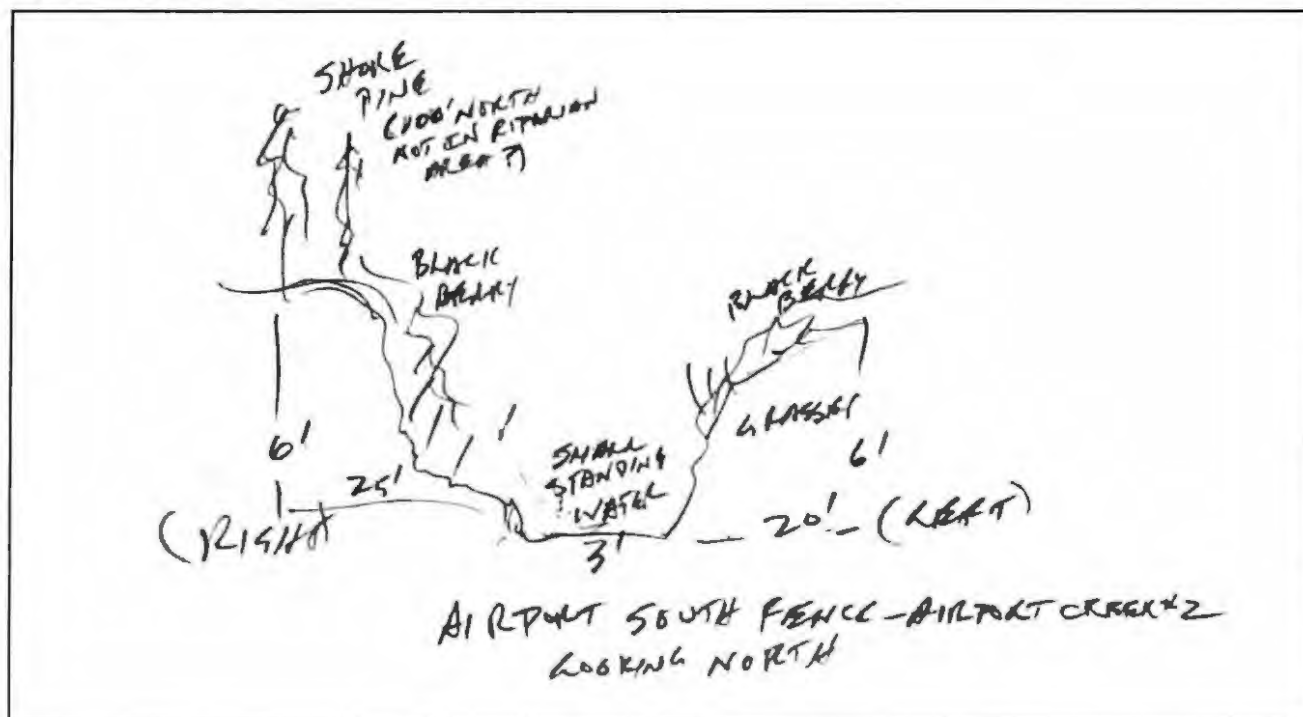
RIPARIAN CODE
RAIR - 6 North

Date: 9/22/2010 Investigators: C. Lysdale
Dominant tree species: Shore Pine
Potential tree height (PTH)/Actual Width of riparian area : 50/20L & 25R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: Stream drains very limited area, and streambed appears usually dry.

Photos RAIR-6Nveg, RAIR-6Nstr

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RAIR-6 North Location of data point: RAIR - 6

Reach Length: _____

Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 3 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☐ No ☒

Are salmonids present in the adjacent water resource? Yes ☐ No ☒

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Yaquina loamy fine sand

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☒
 Residential: ☐ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Shore Pine	Blackberry

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☒

Left&Right

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☐ Herbaceous vegetation ☒ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☐ No ☒

Large woody debris in riparian area? (Question 15)

Yes ☐ No ☒

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☐ 10% - 40% ☐ <10% ☒

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☐ Herbaceous vegetation ☒ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☐ 1 layer or unvegetated ☒

Riparian Width Determination



Florence LWI & Riparian Inventory

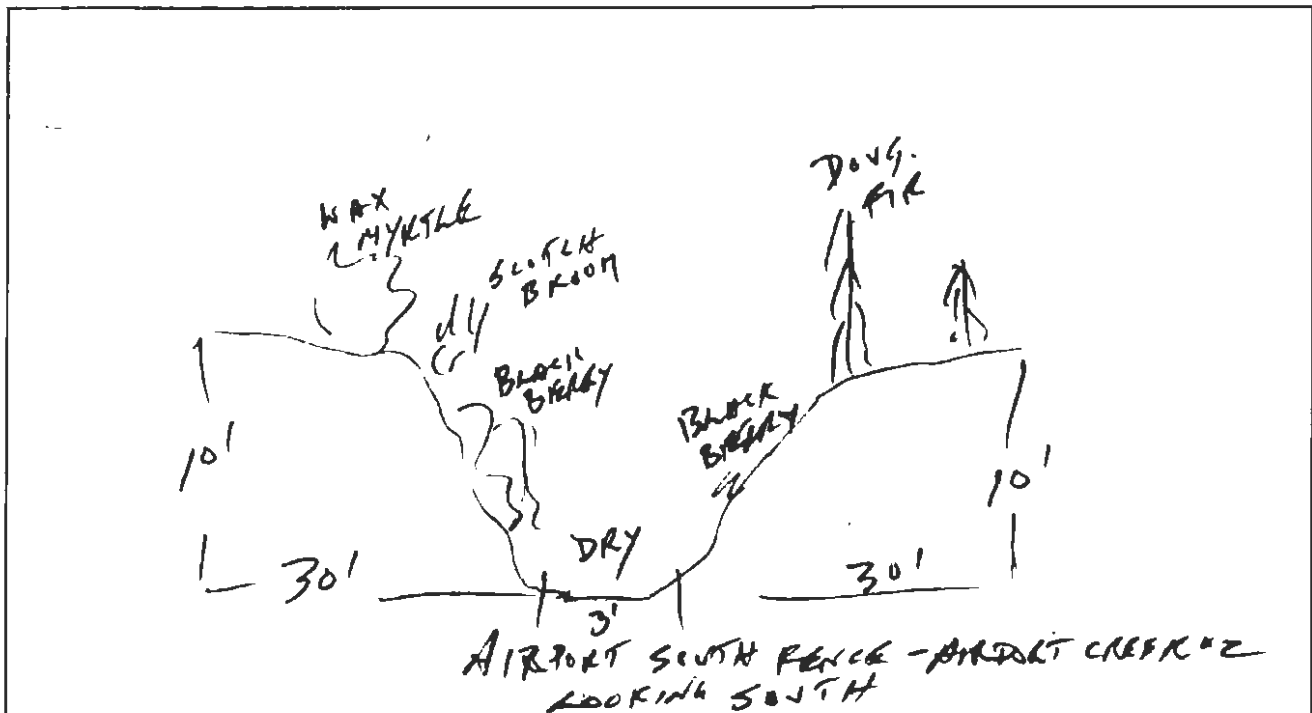
RIPARIAN CODE
RAIR - 6 South

Date: 9/22/2010 Investigators: C. Lysdale
Dominant tree species: Douglas Fir
Potential tree height (PTH)/Actual Width of riparian area : 120/30L & 30R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: Streambed appears usually dry.

Photos RAIR-6Sveg, RAIR-6Sstr

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RAIR-6 South Location of data point: RAIR - 6
 Reach Length: _____
 Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 3 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____
 Water present year-round: Yes ☐ No ☒
 Are salmonids present in the adjacent water resource? Yes ☐ No ☒
 Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Waldport fine sand, 12-30% slopes

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☒
 Residential: ☐ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	Blackberry
California Wax Myrtle	Scotch Broom

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☒ Left&Right

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☐ No ☒

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☐ Herbaceous vegetation ☒ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☒ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

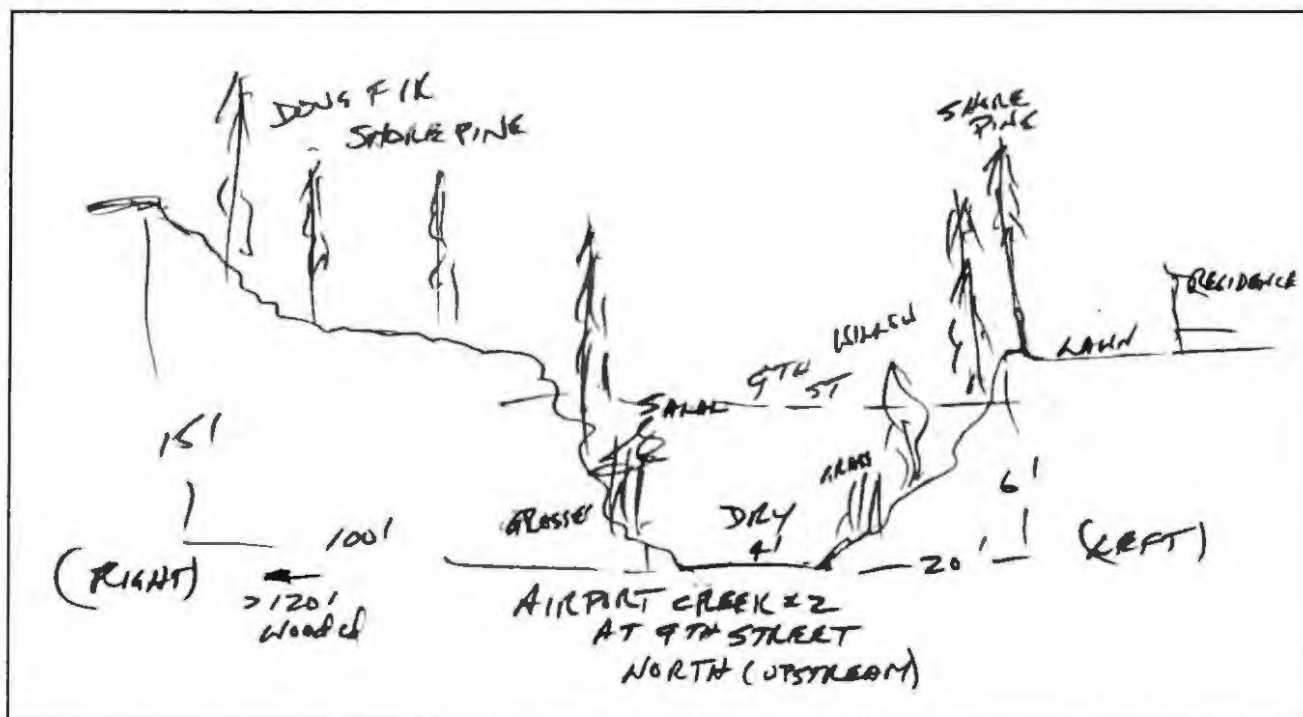
RIPARIAN CODE
RAIR - 7 North

Date: 9/22/2010 Investigators: C. Lysdale
Dominant tree species: Shore Pine
Potential tree height (PTH)/Actual Width of riparian area : 50/20L & 100R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: Stream disappears under street at this location - probably into storm sewer.

Photos RAIR-7Nveg, RAIR-7Nstr

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RAIR-7 North Location of data point: RAIR - 7
 Reach Length: _____
 Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 4 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☐ No ☒

Are salmonids present in the adjacent water resource? Yes ☐ No ☒

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Waldport fine sand, 0-12% slopes

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☐
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Douglas Fir	Salal
Shore Pine	Grasses
Willow	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☒ >5:1 (20%) ☒
 Right Left

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☐ No ☒

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☐ Herbaceous vegetation ☒ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☒ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

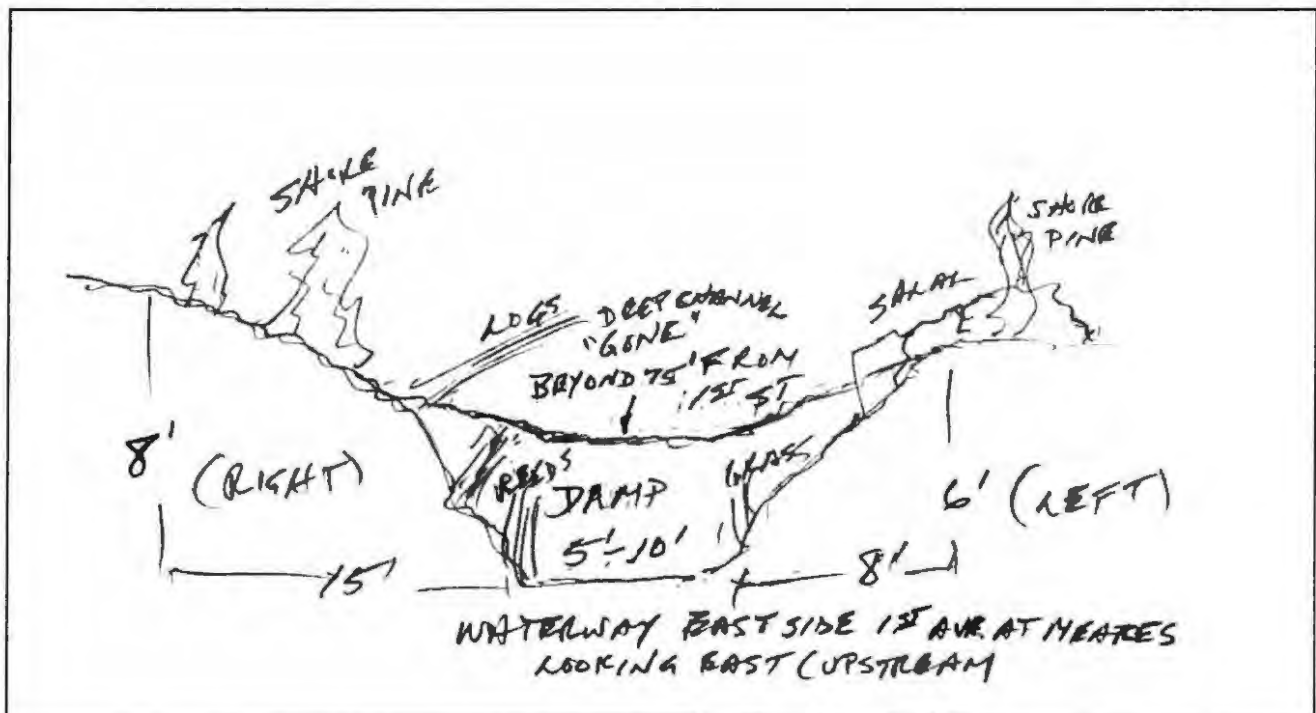
RIPARIAN CODE
RHB - 0.3

Date: 9/17/2010 Investigators: C. Lysdale
Dominant tree species: Shore Pine
Potential tree height (PTH)/Actual Width of riparian area : 50/8L & 15 R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: Waterway enters culvert to beach at 1st Avenue across from Meares Street.

Photos: At 1st Ave, RHB-.3Eveg0, RHB-.3Estr0; at 100' east, RHB-.3Estr&veg

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RHB-1 Location of data point: RHB-0.3
 Reach Length: _____
 Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 5 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☐ No ☒

Are salmonids present in the adjacent water resource? Yes ☐ No ☒

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Waldport fine sand, 0-12% slopes

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☒
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Shore Pine	Reeds
Salal	Grasses

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☒ Left&Right

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☒ No ☐

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☒ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

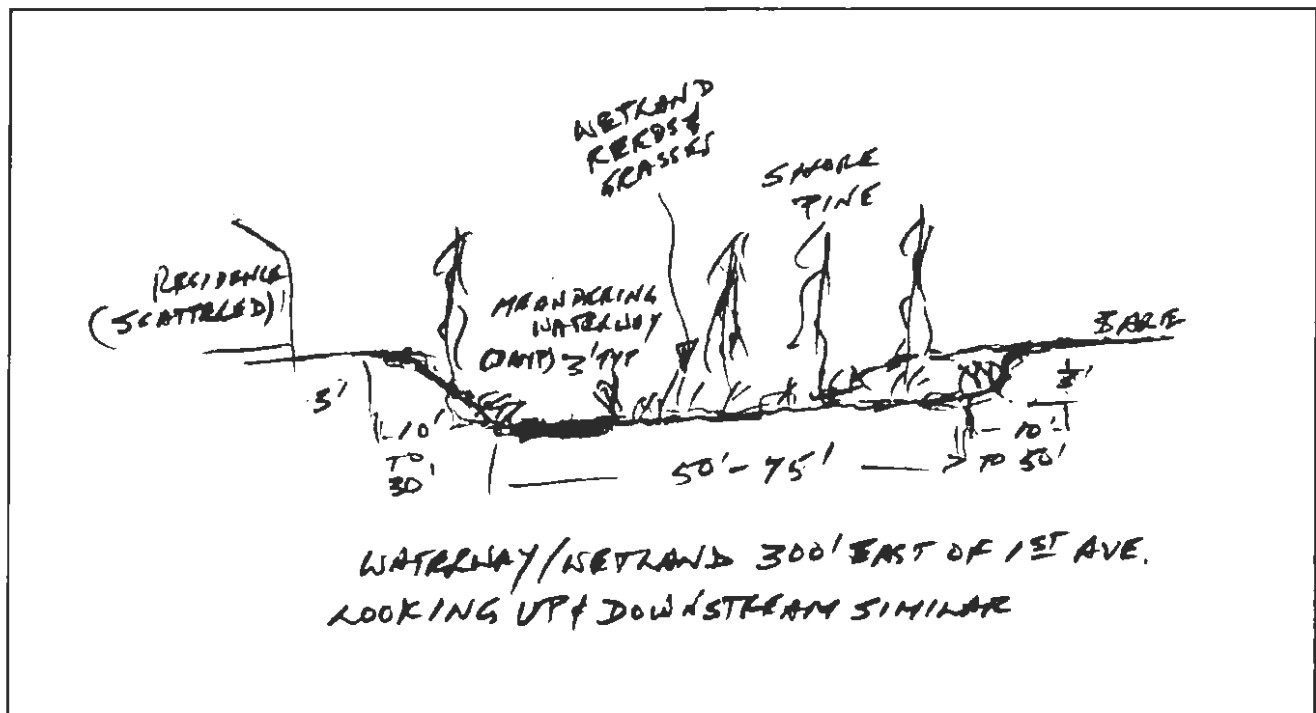
RIPARIAN CODE
RHB - 0.6

Date: 9/17/2010 Investigators: C. Lysdale
Dominant tree species: Shore Pine
Potential tree height (PTH)/Actual Width of riparian area : 50/30L & 30R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code

Comments: Seasonal waterway meanders through a riparian wetland of 50' to 100'
total width.

Photos RHB-.6Eveg, RHB-.6Eveg0, RHB-.6Estr

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RHB-A Location of data point: RHB - 0.6
 Reach Length: _____
 Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 3 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☐ No ☒

Are salmonids present in the adjacent water resource? Yes ☐ No ☒

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Waldport fine sand, 0-12% slopes

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☒
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Shore Pine	Grasses
	Reeds

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☒ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☐
 Left & Right

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☒ No ☐

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☐ 25% - 75% ☒ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☒ 1 layer or unvegetated ☐

RIPARIAN CODE
RHB - 1

Comments: Stream bed is a wide depression in an otherwise mostly level wooded area.

Photos RHB-1Eveg0, RHB-1Estr0; and at 100' east RHB-1Eveg, RHB-1Estr

SHORE 7WE

SITKA STRUCE

SNAGS

SALAL

MUDDY DAMP

MUCKY BRACK

LEVEL

WOODED

> 120'

2'

15'

2'

3'

SEASONAL WATERWAY
EAST OF 4TH AVE S. OF HEARES (SIMILAR LOOKING
EAST & WEST)

Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RHB-B Location of data point: RHB - 1
 Reach Length: _____
 Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 15 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☐ No ☒

Are salmonids present in the adjacent water resource? Yes ☐ No ☒

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Yaquina loamy fine sand

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☒
 Residential: ☐ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Sitka Spruce	Salal
Shore Pine	Huckleberry

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☒ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☐
 Left & Right

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☒ No ☐

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☒ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

RIPARIAN CODE
RNS - 2

Date: 10/25/2010 Investigators: C. Lysdale

Dominant tree species: Western Hemlock/Sitka Spruce

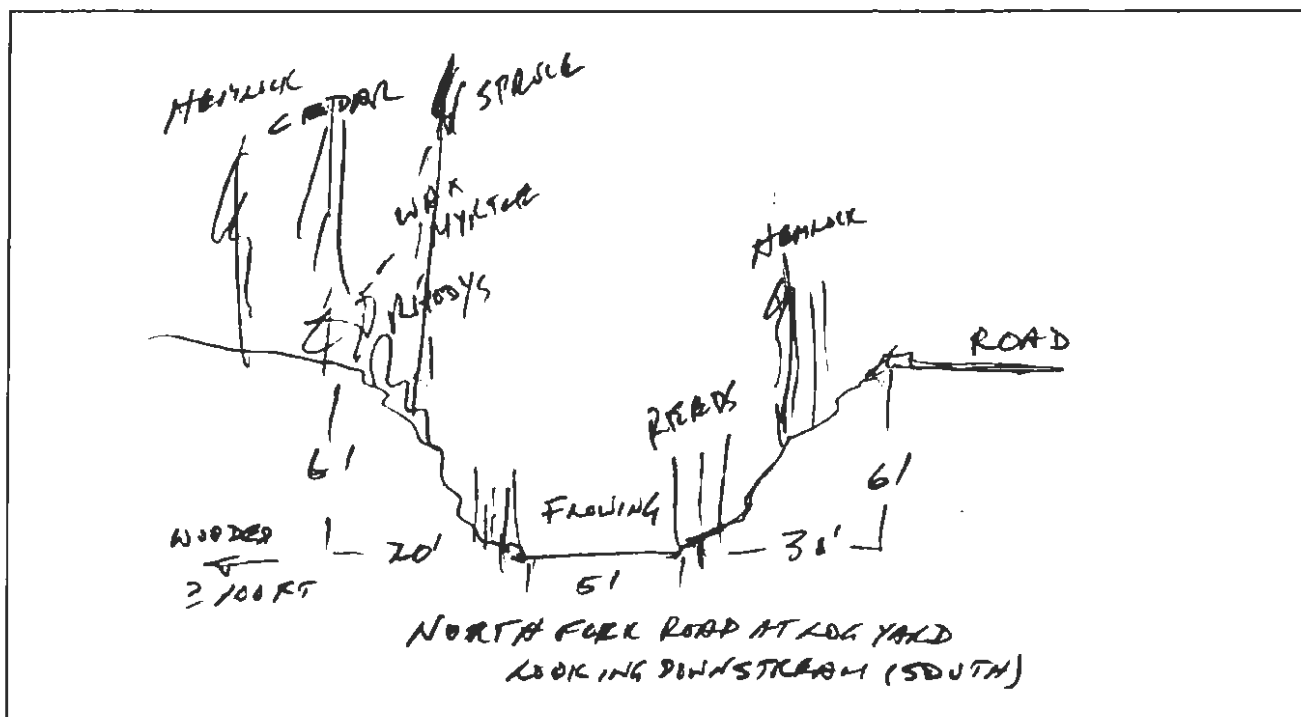
Potential tree height (PTH)/Actual Width of riparian area : 120/100L & 30R feet
(Width measured horizontally from edge of water resource)

PTH determined by:
On-site vegetation ☒ Reference site ☐ Code

Comments: Stream emerges from culvert (west) at this location.

Photos RNS-2veg, RNS-2str

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RNS-A Location of data point: RNS-2
 Reach Length: _____
 Hydrologic Basin: North Fork On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 5 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☒ No ☐

Are salmonids present in the adjacent water resource? Yes ☐ No ☒

Is the water resource listed for temperature on DEQ's 303(d) list? Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Waldport fine sand, 0-12% slopes

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☒
 Commercial/Indus.: ☐ Undeveloped: ☐
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Western Hemlock	Rhododendron
Western Red Cedar	Bracken Fern
Sitka Spruce	Reeds
California Wax Myrtle	
Douglas Fir	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☒ >5:1 (20%) ☒

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☐ 25% - 75% ☒ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☒ 2 layers ☐ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

RIPARIAN CODE
RNS - 3

Date: 10/25/2010 Investigators: C. Lysdale

Dominant tree species: Western Hemlock

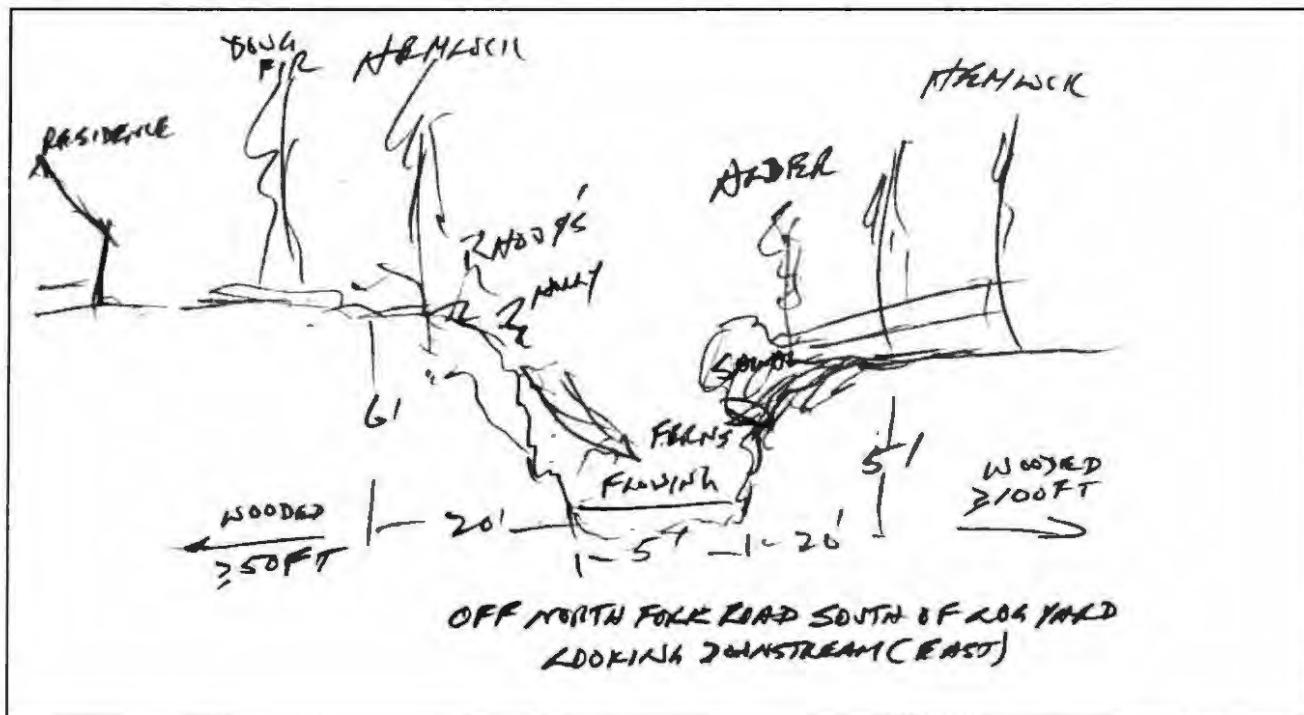
Potential tree height (PTH)/Actual Width of riparian area : 120/50L & 100R feet
(Width measured horizontally from edge of water resource)

PTH determined by:
On-site vegetation ☒ Reference site ☐ Code

Comments: _____

Photos RNS-3veg, RNS-3str

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RNS-A Location of data point: RNS-3
 Reach Length: _____
 Hydrologic Basin: North Fork On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 5 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____
 Water present year-round: Yes ☒ No ☐
 Are salmonids present in the adjacent water resource? Yes ☐ No ☒
 Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Waldport fine sand, 0-12% slopes

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☒ Undeveloped: ☐
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Western Hemlock	Rhododendron
Douglas Fir	Salal
Red Alder	Holly
	Bracken Fern

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☒ Left&Right

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☒ 2 layers ☐ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

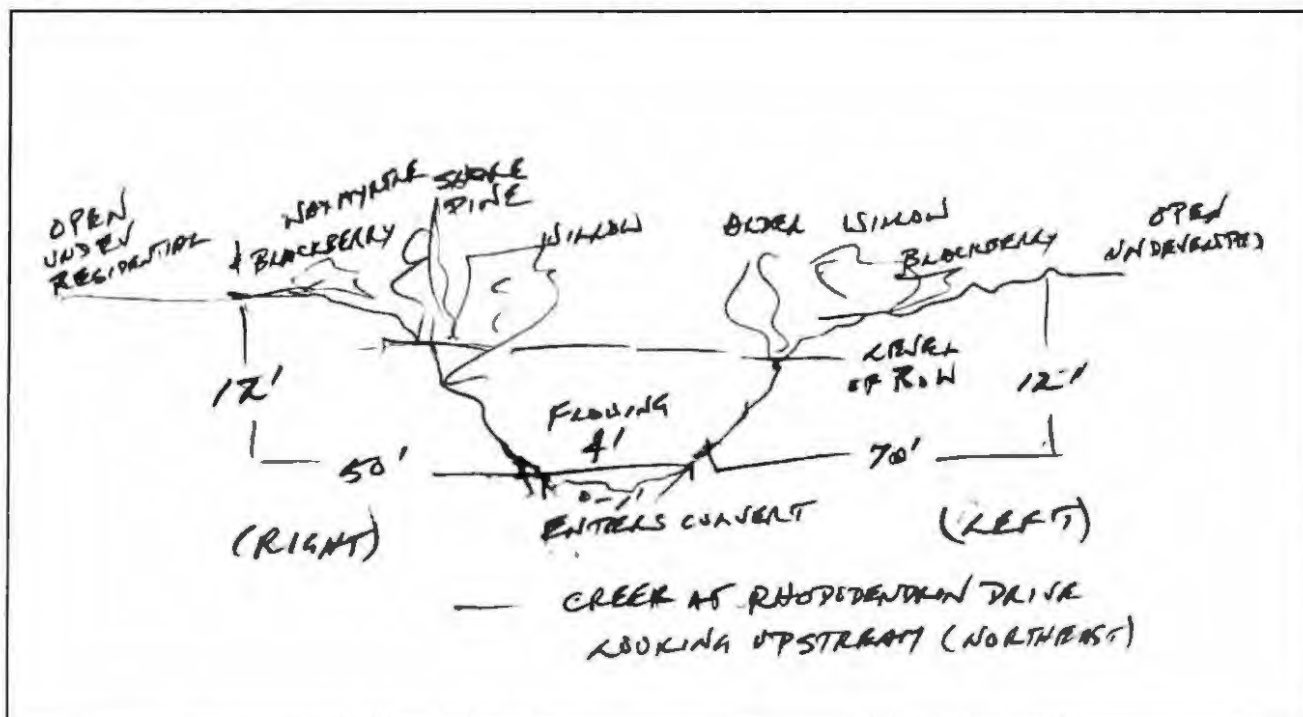
RIPARIAN CODE
RRH - 1

Date: 9/21/2010 Investigators: C. Lysdale
Dominant tree species: Red Alder/Shore Pine
Potential tree height (PTH)/Actual Width of riparian area : 65/70L & 50 R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code _____

Comments: Stream enters large concrete box culvert at this location.

Photos RRH-1Eveg0, RRH-1Eveg; RRH-1Estr

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RRH-1NE Location of data point: RRH - 1

Reach Length: _____

Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 4 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☐ No ☒

Are salmonids present in the adjacent water resource? Yes ☐ No ☒

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Waldport fine sand, 0-12% slopes

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☒
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Shore Pine	
Red Alder	
Willow	
California Wax Myrtle	
Blackberry	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☒ >5:1 (20%) ☒
 Left Right

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☒ No ☐

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☒ No ☐

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☒ high, very high, severe ☐

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☐ Herbaceous vegetation ☒ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☒ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

RIPARIAN CODE
RRH - 2SW

Date: 9/21/2010 Investigators: C. Lysdale

Dominant tree species: Shore Pine/Alder

Potential tree height (PTH)/Actual Width of riparian area : 50/75L & 75 R feet
(Width measured horizontally from edge of water resource)

PTH determined by:

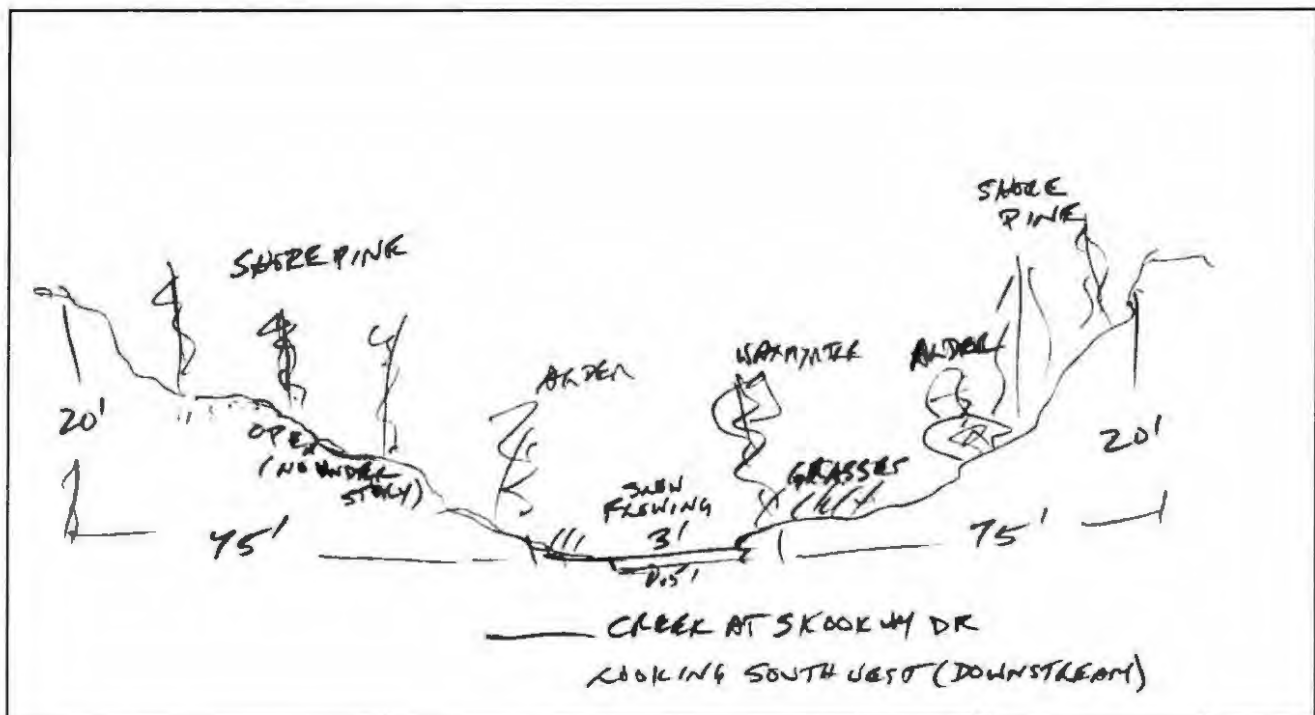
On-site vegetation ☒

Reference site ☐ Code _____

Comments: _____

Photos RRH-2Sveg, RRH-2Sstr

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RRH-2SW Location of data point: RRH - 2

Reach Length: _____

Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 3 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☐ No ☒

Are salmonids present in the adjacent water resource? Yes ☐ No ☒

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Dune land

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☐
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Shore Pine	Grasses
Red Alder	
California Wax Myrtle	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☒ Left&Right

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☒ No ☐

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☐ No ☒

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☐ high, very high, severe ☒

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☒ No ☐

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☒ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

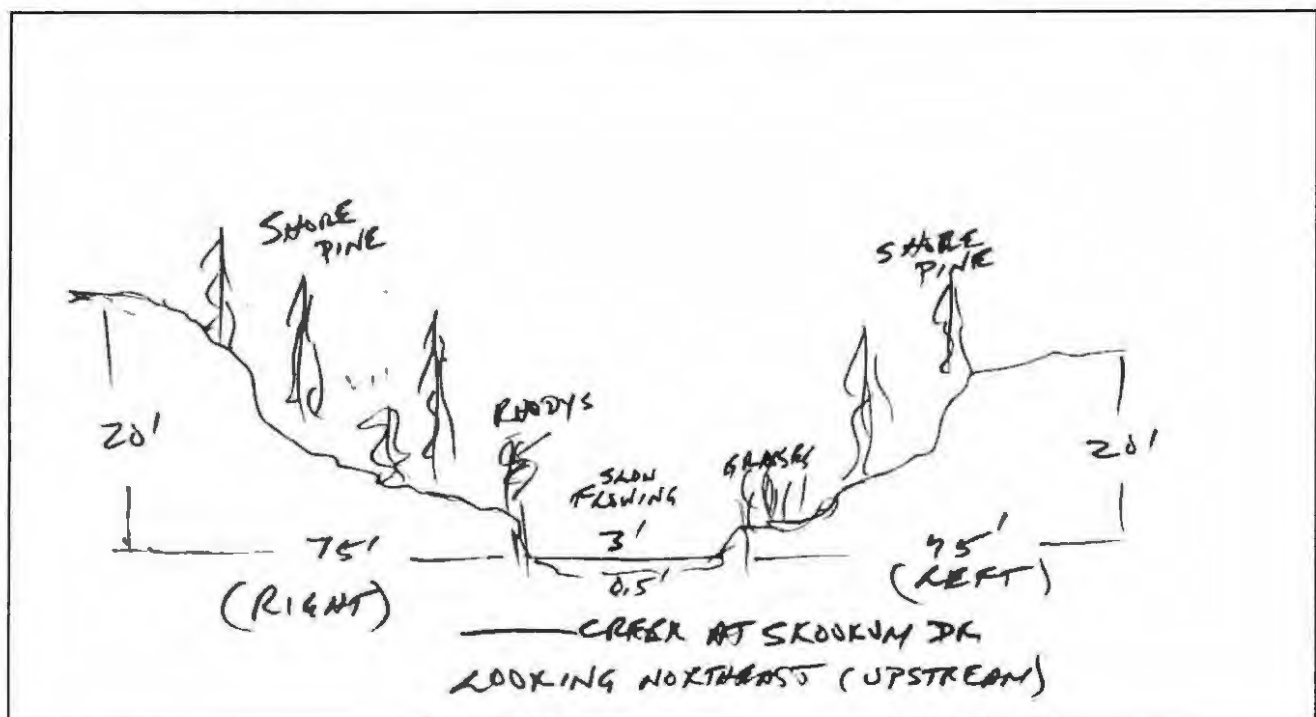
RIPARIAN CODE
RRH - 2NE

Date: 9/21/2010 Investigators: C. Lysdale
Dominant tree species: Shore Pine
Potential tree height (PTH)/Actual Width of riparian area : 50/75L & 75 R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code

Comments: _____

Photos RRH-2Nveg, RRH-2Nstr

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RRH-2NE Location of data point: RRH - 2

Reach Length: _____

Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 3 feet
Lake/Pond: ☐ Width: _____ feet
Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☐ No ☒

Are salmonids present in the adjacent water resource? Yes ☐ No ☒

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Dune land

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
Commercial/Indus.: ☐ Undeveloped: ☐
Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Shore Pine	Grasses
Rhododendron	

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☐ >5:1 (20%) ☒

Left&Right

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☒ No ☐

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☒ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☒ No ☐

Large woody debris in riparian area? (Question 15)

Yes ☐ No ☒

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☒ 25% - 75% ☐ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☐ high, very high, severe ☒

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☐ Herbaceous vegetation ☒ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☒ 1 layer or unvegetated ☐

Riparian Width Determination



Florence LWI & Riparian Inventory

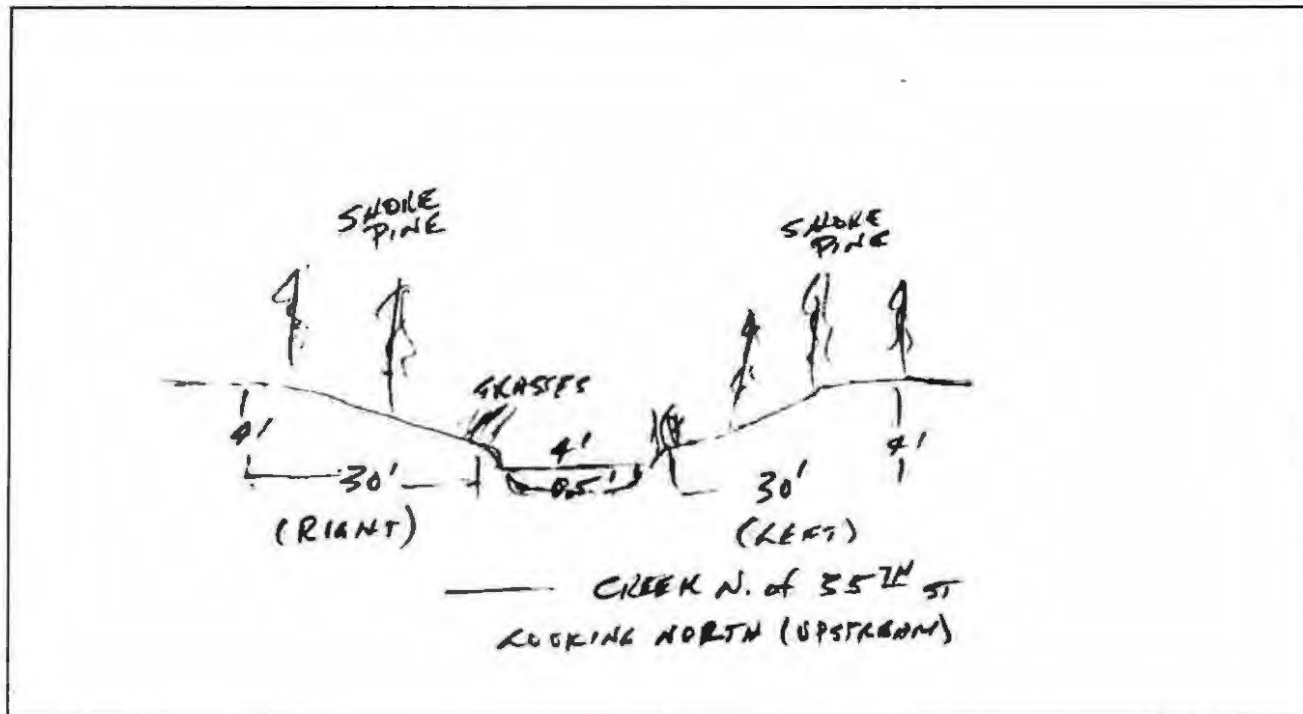
RIPARIAN CODE
RRH-3

Date: 3/1/2011 Investigators: C. Lysdale
Dominant tree species: Shore Pine
Potential tree height (PTH)/Actual Width of riparian area : 50/30L & 30R feet
(Width measured horizontally from edge of water resource)
PTH determined by:
On-site vegetation ☒ Reference site ☐ Code

Comments: _____

Photos _____

Typical Cross Section:



Riparian Characterization Form



Florence LWI & Riparian Inventory

GENERAL INFORMATION

Riparian Code: RRH-A Location of data point: RRH-3

Reach Length: _____

Hydrologic Basin: _____ On-site: ☒ Off-Site: ☐

WATER RESOURCE INFORMATION

Water Resource: Stream/River: ☒ Width: 4 feet
 Lake/Pond: ☐ Width: _____ feet
 Wetland: ☐ Width: _____ feet

LWI Wetland Code: _____

Water present year-round: Yes ☐ No ☒

Are salmonids present in the adjacent water resource? Yes ☐ No ☒

Is the water resource listed for temperature on DEQ's 303(d) list: Yes ☐ No ☒

Within FEMA-mapped 100-year floodplain: Yes ☐ No ☒

Mapped soil series: Dune land

Adjacent Land Uses? (Check as many as needed)

Agriculture: ☐ Roads: ☐
 Commercial/Indus.: ☐ Undeveloped: ☐
 Residential: ☒ Forestry: ☐

Woody vegetation (trees, shrubs, vines >1 meter)	Herbaceous vegetation (include trees, shrubs, vines <1 meter)
Shore Pine	Grasses

1 meter = 3.2 feet

Average slope in the riparian area: (Question 1)

<10:1 (10%) ☐ Between 10:1 (10%) and 5:1 (20%) ☒ >5:1 (20%) ☐

Extent of impervious surface within the riparian area. (Question 4)

<10% ☒ 10% - 25% ☐ >25% ☐

Is the reach constricted by man-made features? (Question 8)

Yes ☐ No ☒

Does the orientation of the riparian area allow for shading of the water resource at midday in summer? (Question 9)

Yes ☐ No ☒

Dominant vegetation layer within riparian area? (Question 10)

Woody vegetation ☐ Herbaceous vegetation ☐ Bare ground ☐

Does woody vegetation hang over the edge of the water? (Questions 11 & 14)

Yes ☐ No ☒

Large woody debris in riparian area? (Question 15)

Yes ☐ No ☒

Percent of water resource bordered by vegetated riparian area at least 30 feet wide? (Question 16)

>40% ☒ 10% - 40% ☐ <10% ☐

Degree of development or human caused disturbance. (Question 19)

<25% ☐ 25% - 75% ☒ >75% ☐

How does the NRCS soil survey rank water erosion hazard of the dominant mapped unit in the Riparian Area? (Question 5)

low, slight moderate ☐ high, very high, severe ☒

What is the dominant vegetation at the top of bank (if defined) or edge of water resource? (Question 3)

Woody vegetation ☐ Herbaceous vegetation ☒ Bare ground ☐

Are there flood prone areas (adjacent flat areas, depressions, swales, FEMA mapped 100-year floodplain, etc.) beyond the top of bank or edge of the water resource? (Question 6)

Yes ☐ No ☒

Is woody vegetation (trees, shrubs, vines) greater than 1 meter (3.2 feet) high dominant in the flood prone riparian area?

Yes ☐ No or no flood prone area present ☒

How many vegetation layers (i.e. canopy, mid-story, groundcover) are present?

More than 2 ☐ 2 layers ☒ 1 layer or unvegetated ☐

REACH SUMMARY -- Florence Riparian Inventory

Date(s) of field work: **9/25/10, 10/24/10** Stream Name: **Munsel Creek**
Investigator(s): **CAL** Stream Reach: **RMC-A**
Location: **Siuslaw Estuary to Hwy. 126** Reach Length: **545 feet**
Assessment Sites: **RMC-0, RMC-1S** Hydrologic basin: **Munsel Creek**

Water Resource(s): **Perennial N to S Stream**, Wetland _____, _____ Lake

Adjacent Land-Use: **Undeveloped, Commercial**

Soil - Mapped series: **Waldport fine sand, 0-12% slopes**

Channel & Riparian Characteristics:

Channel Width: **10-50** ft Depth of OHW: **4** ft Man-made Channel: _____ Y **X** N
Shaded Summer Midday: _____ Y **X** N Water Erosion Hazard: _____ Hi **X** Lo
Flood Prone Areas: **X** Y _____ N, Woody Vegetation in Flood Area: **X** Y _____ N
Woody Debris in Riparian Area: Present: **X** Not Present: _____
Extent of Impervious Surface: 0-10% **X** 11-24% _____ > 25% _____
Degree of Development/Human Disturbance: 0-25% **X** 26-74% _____ > 75% _____
Comments: **Reach is tidal from Siuslaw estuary.**

Riparian Vegetation

Number of Layers: 0-1 _____ 2 _____ > 2 **X** Hang over water: **X** Yes _____ No
Dominant Layer: **Woody > 1m** Dominant TOB: **Woody > 1m**

TREES

Sitka Spruce
Douglas Fir
Red Alder
Willow

SHRUBS

Blackberry
Holly

HERBACEOUS

Reeds
Grasses
Bracken Fern

Riparian Dimensions: (Estimated - Looking Downstream, TOB = Top of Bank)

Average Slope in Riparian Area: 0-10% _____ 11-19% **X** > 20% _____
Riparian Width at least 30 feet: 0-10% _____ 11-39% _____ > 40% **X**

Width of Riparian Area Looking Downstream: Left: **30** feet Right: **40** feet
Total Riparian Area: Left: **0.4** acres Right: **0.5** acres

Rationale/Comments: **Riparian widths are measured above the area flooded at high tide up slope to the topographical peak at level upland.**

REACH SUMMARY -- Florence Riparian Inventory

Date(s) of field work: **8/25/10 – 9/26/10** Stream Name: **Munsel Creek**
Investigator(s): **CAL** Stream Reach: **RMC-B**
Location: **Hwy. 126 to M.C. Greenway Park** Reach Length: **8550** feet
Assessment Sites: **RMC-1N, RMC-2, RMC-3, RMC-4, RMC-5, RMC-6, RMC-6.3** Hydrologic basin: **Munsel Creek**

Water Resource(s): **Perennial N to S Stream, Wetland _____, _____ Lake**
Adjacent Land-Use: **Residential**
Soil – Mapped series: **Yaquina loamy fine sand**

Channel & Riparian Characteristics:

Channel Width: 9 ft Depth of OHW: 3 ft Man-made Channel: Y X N
Shaded Summer Midday: Y Y _____ N Water Erosion Hazard: _____ Hi X Lo
Flood Prone Areas: _____ Y X N, Woody Vegetation in Flood Area: _____ Y X N
Woody Debris in Riparian Area: Present: X Not Present: _____
Extent of Impervious Surface: 0-10% X 11-24% _____ > 25% _____
Degree of Development/Human Disturbance: 0-25% X 26-74% _____ > 75% _____
Comments: Stream is perennial and well shaded by large conifers and shrubs.

Riparian Vegetation

Number of Layers: 0-1 _____ 2 _____ > 2 X Hang over water: X Yes _____ No
Dominant Layer: Woody > 1m Dominant TOB: Woody > 1m

TREES
Douglas Fir
Western Hemlock
Western Red Cedar
Red Alder

SHRUBS
Salal
Huckleberry
Rhododendron

HERBACEOUS
Grasses
Reeds

Riparian Dimensions: (Estimated – Looking Downstream, TOB = Top of Bank)

Average Slope in Riparian Area: 0-10% _____ 11-19% X > 20% _____
Riparian Width at least 30 feet: 0-10% _____ 11-39% _____ > 40% X

Width of Riparian Area Looking Downstream: Left: 50 feet Right: 50 feet
Total Riparian Area: Left: 9.8 acres Right: 9.8 acres

Rationale/Comments: Reach lies entirely within a residential area. Riparian widths are set from TOB to the topographical break to level upland, which is also typically the boundary of established residential development.

REACH SUMMARY -- Florence Riparian Inventory

Date(s) of field work: **9/26/10, 10/28/10** Stream Name: **Munsel Creek**
Investigator(s): **CAL** Stream Reach: **RMC-C**
Location: **M.C. Greenway Park to M.C. Loop** Reach Length: **2400** feet
at 35th Street
Assessment Sites: **RMC-6.3, RMC-6.5** Hydrologic basin: **Munsel Creek**

Water Resource(s): **Perennial N to S Stream**, Wetland **#6**, _____ Lake
Adjacent Land-Use: Residential, Undeveloped
Soil - Mapped series: Yaquina loamy fine sand

Channel & Riparian Characteristics:

Channel Width: Var. ft Depth of OHW: 1 ft Man-made Channel: Y X N
Shaded Summer Midday: X Y N Water Erosion Hazard: Hi X Lo
Flood Prone Areas: X Y N, Woody Vegetation in Flood Area: X Y N
Woody Debris in Riparian Area: Present: X Not Present:
Extent of Impervious Surface: 0-10% X 11-24% > 25%
Degree of Development/Human Disturbance: 0-25% X 26-74% > 75%
Comments: Stream flow primarily passes through wetland LWI - 6 with a minor part passing through a side channel in a residential area (see RMC-Cs).

Riparian Vegetation

Number of Layers: 0-1 2 > 2 X Hang over water: X Yes No
Dominant Layer: Woody > 1m Dominant TOB: Woody > 1m

TREES

Douglas Fir
Red Alder
Shore Pine
Willow

SHRUBS

Salal
Huckleberry

HERBACEOUS

Grasses
Reeds

Riparian Dimensions: (Estimated - Looking Downstream, TOB = Top of Bank)

Average Slope in Riparian Area: 0-10% X 11-19% > 20%
Riparian Width at least 30 feet: 0-10% 11-39% X > 40%

Width of Riparian Zone Looking Downstream: Left: 50 feet Right: 50 feet
Total Area of Riparian Zone: 33.5 acres

Rationale/Comments: The riparian corridor for this reach includes a large wetland with no definite stream bank or topographical break on the eastern (left) side. The stream splits over several seasonal routes within the wetland and re-converges near RMC-6.3. The right (west) riparian width is from TOB to the topographical break at level upland; the left (east) width is based on PTH for Shore Pine.

REACH SUMMARY -- Florence Riparian Inventory

Date(s) of field work: 3/13/12, 3/25/12 Stream Name: **Munsel Creek**
Investigator(s): **C. Lysdale with STEP, ODFW, and NMFS** Stream Reach: **RMC-Cs (side channel)**
Location: **Coast Village, Florentine Estates** Reach Length: **1900** feet
Assessment Sites: **RMC-6.7, RMC-6.8, RMC-6.9** Hydrologic basin: **Munsel Creek**
Water Resource(s): **Intermittent N to S Stream**, Wetland _____, _____ Lake
Adjacent Land-Use: Residential,
Soil – Mapped series: Waldport fine sand, Yaquina loamy fine sand

Channel & Riparian Characteristics:

Channel Width: 5 ft Depth of OHW: 1 ft Man-made Channel: ___ Y X N
Shaded Summer Midday: X Y ___ N Water Erosion Hazard: ___ Hi X Lo
Flood Prone Areas: ___ Y X N, Woody Vegetation in Flood Area: ___ Y ___ N
Woody Debris in Riparian Area: Present: X Not Present: ___
Extent of Impervious Surface: 0-10% X 11-24% ___ > 25% ___
Degree of Development/Human Disturbance: 0-25% ___ 26-74% X > 75% ___
Comments: The channel is in a residential area but riparian zone is mostly well vegetated. The stream passes through culverts at 7 locations which are all fish passable, plus a wooden flume across one residential lot.

Riparian Vegetation

Number of Layers: 0-1 2 X > 2 ___ Hang over water: X Yes ___ No
Dominant Layer: Woody > 1m Dominant TOB: Woody > 1m

TREES
Douglas Fir
Red Alder
Shore Pine
Calif. Waxmyrtle

SHRUBS
Salal
Huckleberry
Rhododendron

HERBACEOUS
Grasses
Reeds

Riparian Dimensions: (Estimated – Looking Downstream, TOB = Top of Bank)

Average Slope in Riparian Area: 0-10% ___ 11-19% ___ > 20% X
Riparian Width at least 30 feet: 0-10% X 11-39% ___ > 40% ___

Width of Riparian Zone Looking Downstream: Left: 25 feet Right: 25 feet
Total Riparian Area: Left: 1.1 acres Right: 1.1 acres

Rationale/Comments: Lysdale visited site with above agency staff on 3/13/12 and Lysdale returned on 3/25/12 to complete Reach Summary. This reach is a side channel off Munsel Creek which passes through heavy residential development and has low or no flow in summer. The 25-ft riparian width L and R is typical from TOB to a topographical break adjacent to streets and/or structures. All 3 agencies concurred in writing that Munsel Creek and the side channel are both considered as critical habitat for Oregon Coast coho salmon (a federally listed threatened species) and are important to the conservation and recovery of this species and recommended that the riparian area be declared as significant and protected with a 50-foot safe harbor riparian width.

REACH SUMMARY -- Florence Riparian Inventory

Date(s) of field work: **9/14/10 - 10/28/10** Stream Name: **Munsel Creek**
Investigator(s): **CAL** Stream Reach: **RMC-D**
Location: **M.C. Loop at 35th St to Munsel Lake** Reach Length: **8350 feet**
outfall into Munsel Creek
Assessment Sites: **RMC-6.5, RMC-6.6, RMC-7** Hydrologic basin: **Munsel Creek**

Water Resource(s): **Perennial N to S Stream**
Adjacent Land-Use: **Residential**
Soil – Mapped series: **Yaquina loamy fine sand/Waldport fine sand, 0-12% slopes**

Channel & Riparian Characteristics:

Channel Width: 6 ft Depth of OHW: 2 ft Man-made Channel: Y X N
Shaded Summer Midday: X Y N Water Erosion Hazard: Hi X Lo
Flood Prone Areas: Y X N, Woody Vegetation in Flood Area: Y X N
Woody Debris in Riparian Area: Present: X Not Present:
Extent of Impervious Surface: 0-10% X 11-24% > 25%
Degree of Development/Human Disturbance: 0-25% 26-74% X > 75%
Comments: Stream section is perennial and well shaded by large conifers and shrubs.

Riparian Vegetation

Number of Layers: 0-1 2 > 2 X Hang over water: X Yes No
Dominant Layer: Woody > 1m Dominant TOB: Woody > 1m

<u>TREES</u>	<u>SHRUBS</u>	<u>HERBACEOUS</u>
Douglas Fir	Salal	Grasses
Western Hemlock	Huckleberry	Reeds
Red Alder		
Shore Pine		

Riparian Dimensions: (Estimated – Looking Downstream, TOB = Top of Bank)

Average Slope in Riparian Area: 0-10% 11-19% X > 20%
Riparian Width at least 30 feet: 0-10% 11-39% > 40% X

Width of Riparian Area Looking Downstream: Left: 40 feet Right: 40 feet
Total Riparian Area: Left: 7.7 acres Right: 7.7 acres

Rationale/Comments: Reach lies mostly within developed residential areas. Riparian widths are set as distance from TOB to topographical break at level upland and/or boundary with established residential development.

REACH SUMMARY -- Florence Riparian Inventory

Date(s) of field work: 9/14/10 - 3/28/11 Stream Name: **Munsel Lake (West)**
Investigator(s): **CAL** Stream Reach: **RMC-D1**
Location: **Developed west shoreline of Munsel Lake** Reach Length: **4750** feet
Assessment Sites: **RMC-7.5, RMC-7.7** Hydrologic basin: **Munsel Creek**

Water Resource(s): **Munsel Lake**
Adjacent Land-Use: Residential
Soil - Mapped series: Yaquina loamy fine sand/Waldport fine sand, 0-12% slopes

Channel & Riparian Characteristics:

Channel Width: N/A ft Depth of OHW: N/A ft Man-made Channel: Y X N
Shaded Summer Midday: Y X N Water Erosion Hazard: Hi X Lo
Flood Prone Areas: Y X N, Woody Vegetation in Flood Area: Y X N
Woody Debris in Riparian Area: Present: Not Present: X
Extent of Impervious Surface: 0-10% X 11-24% > 25%
Degree of Development/Human Disturbance: 0-25% 26-74% X > 75%
Comments: Lakeshore is developed residential and includes a public boat launch..

Riparian Vegetation

Number of Layers: 0-1 2 X > 2 Hang over water: Yes X No
Dominant Layer: Woody > 1m Dominant TOB: Woody > 1m

TREES

Douglas Fir
Shore Pine
Red Alder

SHRUBS

Salal
Huckleberry

HERBACEOUS

Grasses
Reeds

Riparian Dimensions: (Estimated - Looking Downstream, TOB = Top of Bank)

Average Slope in Riparian Area: 0-10% 11-19% X > 20%
Riparian Width at least 30 feet: 0-10% 11-39% > 40% X

Width of Riparian Area: 50 feet
Total Riparian Area: 5.5 acres

Rationale/Comments: Reach lies mostly within developed residential areas. Riparian width is set as typical distance from lakeshore to topographical break with residential development (south), and PTH of dominant Shore Pine species (north)

REACH SUMMARY -- Florence Riparian Inventory

Date(s) of field work: **9/14/10 - 9/20/10** Stream Name: **Munsel Creek & Lake, Ackerley Creek & Lake, Clear Lake, Collard Lake**
Investigator(s): **CAL** Stream Reach: **RMC-E Left**
Location: **Munsel Lake through half of Collard Lake** Reach Length: **28,700 feet**
Assessment Sites: **RMC-8, RMC-9, RMC-10, RMC-11, RMC-12, RMC-13** Hydrologic basin: **Munsel Creek**

Water Resource(s): **Munsel Lake, Ackerley Lake, Clear Lake, south half of Collard Lake, and Ackerley Creek**
Adjacent Land-Use: **Left (east side) forestry**
Soil - Mapped series: **Left (east) Preacher-Bohannon-Slickrock complex;**

Channel & Riparian Characteristics:

Channel Width: N/A ft Depth of OHW: N/A ft Man-made Channel: Y X N
Shaded Summer Midday: Y X N Water Erosion Hazard: Hi X Lo
Flood Prone Areas: Y X N, Woody Vegetation in Flood Area: Y X N
Woody Debris in Riparian Area: Present: X Not Present:
Extent of Impervious Surface: 0-10% X 11-24% > 25%
Degree of Development/Human Disturbance: 0-25% X 26-74% > 75%
Comments: This reach includes several lakes and short interconnecting waterways.
The east side of the lakes and waterways are forested with prime riparian zones;
the west shorelines are primarily sand dunes with some forested lowland.

Riparian Vegetation

Number of Layers: 0-1 2 X > 2 Hang over water: X Yes No
Dominant Layer: Woody > 1m Dominant TOB: Woody > 1m

<u>TREES</u>	<u>SHRUBS</u>	<u>HERBACEOUS</u>
Douglas Fir	Huckleberry	Reeds
Western Hemlock	Salal	Grasses
Red Alder	Rhododenron	Bracken Fern
California Wax Myrtle		

Riparian Dimensions: (Estimated - Looking Downstream, TOB = Top of Bank)

Average Slope in Riparian Area: 0-10% 11-19% X > 20%
Riparian Width at least 30 feet: 0-10% 11-39% > 40% X

Width of Riparian Area: 120 feet
Total Riparian Area: 79.1 acres

Rationale/Comments: The riparian widths for forested sections of this reach are set at the Potential Tree Height (PTH).

REACH SUMMARY -- Florence Riparian Inventory

Date(s) of field work: 9/14/10 - 9/20/10 Stream Name: Munsel Creek & Lake,
Ackerley Creek & Lake, Clear Lake, Collard Lake
Investigator(s): CAL Stream Reach: RMC-E Right
Location: Munsel Lake through half of Collard Lake Reach Length: 10,050 feet
Assessment Sites: RMC-8, RMC-9, RMC-10, Hydrologic basin: Munsel Creek
RMC-11, RMC-12, RMC-13

Water Resource(s): Munsel Lake, Ackerley Lake, Clear Lake, south half of Collard Lake, and Ackerley Creek
Adjacent Land-Use: Right (west side) undeveloped
Soil - Mapped series: Right (west) Dune land

Channel & Riparian Characteristics:

Channel Width: N/A ft Depth of OHW: N/A ft Man-made Channel: Y X N
Shaded Summer Midday: Y X N Water Erosion Hazard: X Hi Lo
Flood Prone Areas: Y X N, Woody Vegetation in Flood Area: Y X N
Woody Debris in Riparian Area: Present: Not Present: X
Extent of Impervious Surface: 0-10% X 11-24% > 25%
Degree of Development/Human Disturbance: 0-25% X 26-74% > 75%
Comments: This reach includes several lakes and short interconnecting waterways.
The west shorelines are primarily sand dunes with some forested lowland.

Riparian Vegetation

Number of Layers: 0-1 X 2 > 2 Hang over water: Yes X No
Dominant Layer: Bare sand Dominant TOB: Bare sand

<u>TREES</u>	<u>SHRUBS</u>	<u>HERBACEOUS</u>
Douglas Fir	Huckleberry	Reeds
Western Hemlock	Salal	Grasses
Red Alder		

Riparian Dimensions: (Estimated - Looking Downstream, TOB = Top of Bank)

Average Slope in Riparian Area: 0-10% 11-19% X > 20%
Riparian Width at least 30 feet: 0-10% 11-39% X > 40%

Width of Riparian Area: 15 ft at dunes, 120 ft lowlands
Total Riparian Area: 14.5 acres

Rationale/Comments: For the west (right) side of the northern lakes, barren sand dunes reach to the shoreline. The riparian widths for forested lowland sections are set at the Potential Tree Height (PTH).

REACH SUMMARY -- Florence Riparian Inventory

Date(s) of field work: **9/15/10** Stream Name: **Collard Lake**
Investigator(s): **CAL** Stream Reach: **RMC-F Left**
Location: **North half of Collard Lake** Reach Length: **3950 feet**
Assessment Sites: **RMC-13** Hydrologic basin: **Munsel Creek**

Water Resource(s): **North half of Collard Lake**
Adjacent Land-Use: **Left (east side) residential**
Soil – Mapped series: **Bullards-Ferrelo loams, 12-30% slopes**

Channel & Riparian Characteristics:

Channel Width: N/A ft Depth of OHW: N/A ft Man-made Channel: Y X N
Shaded Summer Midday: Y X N Water Erosion Hazard: Hi X Lo
Flood Prone Areas: Y X N, Woody Vegetation in Flood Area: Y X N
Woody Debris in Riparian Area: Present: Not Present: X
Extent of Impervious Surface: 0-10% 11-24% X > 25%
Degree of Development/Human Disturbance: 0-25% 26-74% X > 75%

Comments: This reach covers the north half of Collard Lake.

The east and north shorelines are developed as residential.

Riparian Vegetation

Number of Layers: 0-1 2 X > 2 Hang over water: Yes X No
Dominant Layer: Woody > 1m Dominant TOB: Woody > 1m

TREES

Douglas Fir
Western Hemlock
Shore Pine

SHRUBS

Salal
Huckleberry

HERBACEOUS

Grasses

Riparian Dimensions: (Estimated – Looking Downstream, TOB = Top of Bank)

Average Slope in Riparian Area: 0-10% 11-19% X > 20%
Riparian Width at least 30 feet: 0-10% 11-39% > 40% X

Width of Riparian Area: 50 feet
Total Riparian Area: 4.5 acres

Rationale/Comments: The riparian width is set as typical distance from the lakeshore to established residential development and structures.

REACH SUMMARY -- Florence Riparian Inventory

Date(s) of field work: **9/15/10**

Stream Name: **Collard Lake**

Investigator(s): **CAL**

Stream Reach: **RMC-F Right**

Location: **North half of Collard Lake**

Reach Length: **1630 feet**

Assessment Sites: **RMC-13**

Hydrologic basin: **Munsel Creek**

Water Resource(s): **North half of Collard Lake**

Adjacent Land-Use: Right (west side) undeveloped.

Soil – Mapped series: Bullards-Ferrelo loams, 12-30% slopes

Channel & Riparian Characteristics:

Channel Width: N/A ft Depth of OHW: N/A ft Man-made Channel: Y X N

Shaded Summer Midday: Y X N Water Erosion Hazard: Hi X Lo

Flood Prone Areas: Y X N, Woody Vegetation in Flood Area: Y X N

Woody Debris in Riparian Area: Present: X Not Present:

Extent of Impervious Surface: 0-10% X 11-24% > 25%

Degree of Development/Human Disturbance: 0-25% X 26-74% > 75%

Comments: This reach covers the north half of Collard Lake.

The west shore is wooded and undeveloped.

Riparian Vegetation

Number of Layers: 0-1 2 X > 2 Hang over water: Yes X No

Dominant Layer: Woody > 1m Dominant TOB: Woody > 1m

TREES

Douglas Fir

Western Hemlock

Shore Pine

SHRUBS

Salal

Huckleberry

HERBACEOUS

Grasses

Riparian Dimensions: (Estimated – Looking Downstream, TOB = Top of Bank)

Average Slope in Riparian Area: 0-10% 11-19% X > 20%

Riparian Width at least 30 feet: 0-10% 11-39% > 40% X

Width of Riparian Area: 120 feet

Total Riparian Area: 4.5 acres

Rationale/Comments: The riparian widths for this forested reach are set at the Potential Tree Height (PTH).

REACH SUMMARY -- Florence Riparian Inventory

Date(s) of field work: 8/25/10 – 10/24/10

Stream Name: **Airport 1**

Investigator(s): **CAL**

Stream Reach: **RAIR-A**

Location: **Oak at 31st to RoW at
12th & Greenwood**

Reach Length: **8650** feet

Assessment Sites: **RAIR-0.3, RAIR-0.6, RAIR-1, Hydrologic basin: Airport
RAIR-1.5, RAIR-2N**

Water Resource(s): **Intermittent N to S Stream**, Wetland _____, _____ Lake

Adjacent Land-Use: **Undeveloped, airport, residential**

Soil – Mapped series: **Yaquina loamy fine sand/Waldport fine sand, 0-12% slopes**

Channel & Riparian Characteristics:

Channel Width: 5 ft Depth of OHW: 2 ft Man-made Channel: ____ Y X N

Shaded Summer Midday: ____ Y X N Water Erosion Hazard: ____ Hi X Lo

Flood Prone Areas: ____ Y X N, Woody Vegetation in Flood Area: ____ Y X N

Woody Debris in Riparian Area: Present: ____ Not Present: X

Extent of Impervious Surface: 0-10% X 11-24% ____ > 25% ____

Degree of Development/Human Disturbance: 0-25% ____ 26-74% X > 75% ____

Comments: The channel for this reach appears to have been cleared and
straightened over much of its length.

Riparian Vegetation

Number of Layers: 0-1 2 X > 2 ____ Hang over water: ____ Yes X No

Dominant Layer: Herb./Woody < 1m. Dominant TOB: Herb./Woody < 1m.

TREES

Shore Pine
Douglas Fir
Red Alder

SHRUBS

Salal
Huckleberry
Rhododendron

HERBACEOUS

Grasses

Riparian Dimensions: (Estimated – Looking Downstream, TOB = Top of Bank)

Average Slope in Riparian Area: 0-10% ____ 11-19% ____ > 20% X

Riparian Width at least 30 feet: 0-10% X 11-39% ____ > 40% ____

Width of Riparian Area Looking Downstream: Left: 20 feet Right: 20 feet

Total Riparian Area: Left: 4.0 acres Right: 4.0 acres

Rationale/Comments: Riparian widths are typically set from TOB to a topographical
break at level upland.

REACH SUMMARY -- Florence Riparian Inventory

Date(s) of field work: 8/25/10 – 10/24/10 Stream Name: Airport 1
Investigator(s): CAL Stream Reach: RAIR-B
Location: RoW at 12th & Greenwood to Siuslaw Estuary at Sewage Plant Reach Length: 3000 feet
Assessment Sites: RAIR-2S, RAIR-3, RAIR-4, RAIR-5 Hydrologic basin: Airport

Water Resource(s): Intermittent N to S Stream, Wetland _____, _____ Lake
Adjacent Land-Use: Undeveloped, residential
Soil – Mapped series: Waldport fine sand, 0-12% slopes

Channel & Riparian Characteristics:

Channel Width: 5 ft Depth of OHW: 2 ft Man-made Channel: ____ Y X N
Shaded Summer Midday: X Y ____ N Water Erosion Hazard: ____ Hi X Lo
Flood Prone Areas: ____ Y X N, Woody Vegetation in Flood Area: ____ Y X N
Woody Debris in Riparian Area: Present: X Not Present: ____
Extent of Impervious Surface: 0-10% X 11-24% ____ > 25% ____
Degree of Development/Human Disturbance: 0-25% X 26-74% ____ > 75% ____

Comments: The reach is heavily vegetated with large trees and dense understory over most of its length.

Riparian Vegetation

Number of Layers: 0-1 ____ 2 ____ > 2 X Hang over water: X Yes ____ No
Dominant Layer: Woody > 1m Dominant TOB: Woody > 1m

TREES
Red Alder
Sitka Spruce
Western Hemlock
Douglas Fir
California Wax Myrtle

SHRUBS
Salal
Huckleberry
Rhododendron

HERBACEOUS
Grasses

Riparian Dimensions: (Estimated – Looking Downstream, TOB = Top of Bank)

Average Slope in Riparian Area: 0-10% ____ 11-19% X > 20% ____
Riparian Width at least 30 feet: 0-10% ____ 11-39% ____ > 40% X

Width of Riparian Area Looking Downstream: Left: 65 feet Right: 65 feet
Total Riparian Area: Left: 4.5 acres Right: 4.5 acres

Rationale/Comments: Riparian widths are set by the Potential Tree Height (PTH) for the dominant Red Alder species.

REACH SUMMARY -- Florence Riparian Inventory

Date(s) of field work: **8/25/10 – 10/24/10** Stream Name: **Airport 2**
Investigator(s): **CAL** Stream Reach: **RAIR-C**
Location: **Airport south fence to** Reach Length: **1125** feet
9th Street at Ivy RoW
Assessment Sites: **RAIR-6, RAIR-7** Hydrologic basin: **Airport**
Water Resource(s): **Intermittent N to S Stream**, Wetland _____, _____ Lake
Adjacent Land-Use: Undeveloped, residential
Soil – Mapped series: Waldport fine sand, 0-12% slopes

Channel & Riparian Characteristics:

Channel Width: 3 ft Depth of OHW: 1 ft Man-made Channel: ____ Y X N
Shaded Summer Midday: ____ Y X N Water Erosion Hazard: ____ Hi X Lo
Flood Prone Areas: ____ Y X N, Woody Vegetation in Flood Area: ____ Y X N
Woody Debris in Riparian Area: Present: ____ Not Present: X
Extent of Impervious Surface: 0-10% X 11-24% ____ > 25% ____
Degree of Development/Human Disturbance: 0-25% X 26-74% ____ > 75% ____
Comments: North end of channel is mostly clear of trees and overgrown with
noxious non-native shrubs.

Riparian Vegetation

Number of Layers: 0-1 2 X > 2 ____ Hang over water: X Yes ____ No
Dominant Layer: Woody > 1m Dominant TOB: Herb. < 1m

TREES
Shore Pine
Douglas Fir
California Wax Myrtle

SHRUBS
Blackberry
Scotch Broom

HERBACEOUS
Grasses

Riparian Dimensions: (Estimated – Looking Downstream, TOB = Top of Bank)

Average Slope in Riparian Area: 0-10% ____ 11-19% ____ > 20% X
Riparian Width at least 30 feet: 0-10% ____ 11-39% X > 40% ____

Width of Riparian Area Looking Downstream: Left: 30 feet Right: 30 feet
Total Riparian Area: Left: 0.8 acres Right: 0.8 acres

Rationale/Comments: Riparian widths are typically set from TOB to a topographical
break. Streambed is dry much of the year.

REACH SUMMARY -- Florence Riparian Inventory

Date(s) of field work: 9/17/10

Stream Name: **Heceta Beach**

Investigator(s): **CAL**

Stream Reach: **RHB-A**

Location: **1st Avenue at Meares St to
4th Avenue south of Meares**

Reach Length: **730** feet

Assessment Sites: **RHB-0.3, RHB-0.6**

Hydrologic basin: **Heceta Beach**

Water Resource(s): **Intermittent E to W Stream**, Wetland _____, _____ Lake

Adjacent Land-Use: Undeveloped, residential

Soil – Mapped series: Waldport fine sand, 0-12% slopes

Channel & Riparian Characteristics:

Channel Width: 5 ft Depth of OHW: 1 ft Man-made Channel: _____ Y X N

Shaded Summer Midday: X Y _____ N Water Erosion Hazard: _____ Hi X Lo

Flood Prone Areas: _____ Y X N, Woody Vegetation in Flood Area: _____ Y X N

Woody Debris in Riparian Area: Present: X Not Present: _____

Extent of Impervious Surface: 0-10% X 11-24% _____ > 25% _____

Degree of Development/Human Disturbance: 0-25% _____ 26-74% X > 75% _____

Comments: Waterway meanders through a small wetland area.

Riparian Vegetation

Number of Layers: 0-1 2 X > 2 _____

Hang over water: X Yes _____ No

Dominant Layer: Woody > 1m

Dominant TOB: Woody > 1m

TREES

Shore Pine

SHRUBS

Salal

HERBACEOUS

Grasses

Reeds

Riparian Dimensions: (Estimated – Looking Downstream, TOB = Top of Bank)

Average Slope in Riparian Area: 0-10% _____ 11-19% X > 20% _____

Riparian Width at least 30 feet: 0-10% X 11-39% _____ > 40% _____

Width of Riparian Area Looking Downstream: Left: 20 feet Right: 20 feet

Total Riparian Area: Left: 0.3 acres Right: 0.3 acres

Rationale/Comments: Riparian widths are typically from stream TOB or the edge of wetland to a topographic break.

REACH SUMMARY -- Florence Riparian Inventory

Date(s) of field work: **9/17/10** Stream Name: **Heceta Beach**
Investigator(s): **CAL** Stream Reach: **RHB-B**
Location: **4th Avenue south of Meares** Reach Length: **860** feet
to wetland 0.2 miles east
Assessment Sites: **RHB-1** Hydrologic basin: **Heceta Beach**

Water Resource(s): **Intermittent E to W Stream**, Wetland **#25**, _____ Lake
Adjacent Land-Use: **Undeveloped**
Soil – Mapped series: **Yaquina loamy fine sand**

Channel & Riparian Characteristics:

Channel Width: **10** ft Depth of OHW: **1** ft Man-made Channel: _____ Y **X** N
Shaded Summer Midday: **X** Y _____ N Water Erosion Hazard: _____ Hi **X** Lo
Flood Prone Areas: **X** Y _____ N, Woody Vegetation in Flood Area: **X** Y _____ N
Woody Debris in Riparian Area: Present: **X** Not Present: _____
Extent of Impervious Surface: 0-10% **X** 11-24% _____ > 25% _____
Degree of Development/Human Disturbance: 0-25% **X** 26-74% _____ > 75% _____
Comments: **Wide channel with low banks, surrounding terrain is mostly level.**
Stream is dry part of year.

Riparian Vegetation

Number of Layers: 0-1 _____ 2 **X** > 2 _____ Hang over water: **X** Yes _____ No
Dominant Layer: **Woody > 1m** Dominant TOB: **Woody > 1m**

TREES
Shore Pine
Sitka Spruce

SHRUBS
Salal
Huckleberry

HERBACEOUS
Grasses

Riparian Dimensions: (Estimated – Looking Downstream, TOB = Top of Bank)

Average Slope in Riparian Area: 0-10% **X** 11-19% _____ > 20% _____
Riparian Width at least 30 feet: 0-10% _____ 11-39% _____ > 40% **X**

Width of Riparian Area Looking Downstream: Left: **50** feet Right: **50** feet
Total Riparian Area: Left: **1.0** acres Right: **1.0** acres

Rationale/Comments: **No topographic break outside of channel. Riparian width set by Potential Tree Height (PTH) of dominant Shore Pine species.**

REACH SUMMARY -- Florence Riparian Inventory

Date(s) of field work: **9/21/10** Stream Name: **Rhododendron**
Investigator(s): **CAL** Stream Reach: **RRH-A**
Location: **Rhododendron Dr. at Marine Manor** Reach Length: **2550** feet
to Royal St Georges at Troon Circle
Assessment Sites: **RRH-1, RRH-2, RRH-3** Hydrologic basin: **Rhododendron**
Water Resource(s): **Intermittent NE to SW Stream**, Wetland _____, _____ Lake
Adjacent Land-Use: Undeveloped, residential
Soil - Mapped series: Dune land

Channel & Riparian Characteristics:

Channel Width: 3 ft Depth of OHW: 1 ft Man-made Channel: _____ Y X N
Shaded Summer Midday: X Y _____ N Water Erosion Hazard: X Hi _____ Lo
Flood Prone Areas: _____ Y X N, Woody Vegetation in Flood Area: _____ Y X N
Woody Debris in Riparian Area: Present: _____ Not Present: X
Extent of Impervious Surface: 0-10% X 11-24% _____ > 25% _____
Degree of Development/Human Disturbance: 0-25% _____ 26-74% X > 75% _____
Comments: Understory is not dense over most of reach.

Riparian Vegetation

Number of Layers: 0-1 2 X > 2 _____ Hang over water: X Yes _____ No
Dominant Layer: Woody > 1m Dominant TOB: Herb. < 1m

TREES
Shore Pine
Red Alder
California Wax Myrtle
Willow

SHRUBS
Rhododendron
Blackberry

HERBACEOUS
Grasses

Riparian Dimensions: (Estimated - Looking Downstream, TOB = Top of Bank)

Average Slope in Riparian Area: 0-10% _____ 11-19% _____ > 20% X
Riparian Width at least 30 feet: 0-10% _____ 11-39% _____ > 40% X

Width of Riparian Area Looking Downstream: Left: 50 feet Right: 50 feet
Total Riparian Area: Left: 2.9 acres Right: 2.9 acres

Rationale/Comments: Riparian widths are set at the Potential Tree Height (PTH) of the dominant Shore Pine tree species.

REACH SUMMARY -- Florence Riparian Inventory

Date(s) of field work: **10/25/10**

Stream Name: **North Fork 1**

Investigator(s): **CAL**

Stream Reach: **RNS-A**

Location: **North Fork Road at logging yard
to North Fork Siuslaw Estuary**

Reach Length: **950** feet

Assessment Sites: **RNS-2, RNS-3**

Hydrologic basin: **North Fork
Siuslaw**

Water Resource(s): **Intermittent N to S Stream**, Wetland _____, _____ Lake

Adjacent Land-Use: **Commercial**

Soil – Mapped series: **Waldport fine sand, 0-12% slopes**

Channel & Riparian Characteristics:

Channel Width: **5** ft Depth of OHW: **1** ft Man-made Channel: _____ Y **X** N

Shaded Summer Midday: **X** Y _____ N Water Erosion Hazard: _____ Hi **X** Lo

Flood Prone Areas: _____ Y **X** N, Woody Vegetation in Flood Area: _____ Y **X** N

Woody Debris in Riparian Area: Present: **X** Not Present: _____

Extent of Impervious Surface: 0-10% _____ 11-24% **X** > 25% _____

Degree of Development/Human Disturbance: 0-25% _____ 26-74% **X** > 75% _____

Comments: **Reach is wooded and well shaded.**

Riparian Vegetation

Number of Layers: 0-1 **2** > 2 **X** Hang over water: **X** Yes _____ No

Dominant Layer: **Woody > 1m** Dominant TOB: **Woody > 1m**

TREES

Sitka Spruce

Western Hemlock

Western Red Cedar

California Wax Myrtle

Red Alder

SHRUBS

Rhododendron

Salal

Holly

HERBACEOUS

Grasses

Reeds

Bracken Fern

Riparian Dimensions: (Estimated – Looking Downstream, TOB = Top of Bank)

Average Slope in Riparian Area: 0-10% _____ 11-19% _____ > 20% **X**

Riparian Width at least 30 feet: 0-10% _____ 11-39% _____ > 40% **X**

Width of Riparian Area Looking Downstream: Left: **40** feet Right: **40** feet

Total Riparian Area: Left: **0.9** acres Right: **0.9** acres

Rationale/Comments: **Topographical breaks are not definitive except at road. Large trees provide favorable riparian effects out to the boundary with extensive commercial/residential development.**

**Resolution PC 13 03 CPA 01 & PC 13 04 TA 01 & PC 13 05 ZC 01
Florence Planning Commission**

A RESOLUTION TO RECOMMEND CITY COUNCIL ADOPTION OF AMENDMENTS TO THE FLORENCE REALIZATION 2020 COMPREHENSIVE PLAN ("COMPREHENSIVE PLAN") AND FLORENCE CITY CODE (FCC) FOR AQUIFER PROTECTION AND WETLANDS AND RIPARIAN CORRIDORS; AND AMENDMENTS FOR HOUSEKEEPING AND INTERNAL CONSISTENCY

WHEREAS, Florence City Code (FCC) Title 10, Chapter 1, Section 1-3-B provides that a quasi-judicial zoning change and related Comprehensive Plan changes may be initiated by motion of the City Council; and FCC 10-1-3-C provides that legislative changes to the Code or Comprehensive Plan may be initiated by a request of the Council to the Planning Commission that proposed changes be considered by the Commission and its recommendation returned to the Council;

WHEREAS, the City of Florence was awarded an EPA grant for the Siuslaw Estuary Partnership (EPA Cooperative Agreement #WC-00J04801-0) in 2009 and the EPA amended the work plan for the grant in September 2012; and the work plan, as amended includes an adoption process for comprehensive plan and code amendments for aquifer protection and wetlands and riparian corridors;

WHEREAS, the City Council and Planning Commission held a joint Work Session on April 15, 2013 and the City Council initiated amendments to the Florence Realization 2020 Comprehensive Plan and Florence City Code for aquifer protection and wetlands and riparian corridors and for housekeeping and internal consistency;

WHEREAS, on September 10, 2012, the City Council approved the public outreach and adoption process for the Partnership grant products, including the use of a joint City-Lane County adoption process for comprehensive plan amendments; the Lane County Board of Commissioners approved the use of the joint adoption process on October 17, 2012;

WHEREAS, the City Council provided policy direction on protection measures for wetlands and riparian on July 16 and September 10, 2012; and the City Council conceptually approved the Aquifer Protection Plan (Plan) for the North Florence Sole Source Aquifer on July 16, 2012; and the Lane County Board of Commissioners conceptually approved the Aquifer Protection Plan on July 25, 2012;

WHEREAS, changes are needed to the Comprehensive Plan and City Code to implement and adopt the Plan and protection measures, as amended, and make these documents mutually consistent and compliant with State Administrative Rules and Statewide Planning Goals;

WHEREAS, additional changes are needed to the Comprehensive Plan and Florence City Code in order to achieve the following objectives:

1. Protect the North Florence Sole Source Dunal Aquifer, the city's sole drinking water source, by
 - adopting and implementing an Aquifer Protection Plan, with source water components certified by the Oregon Department of Environmental Quality (DEQ);
 - basing management strategies on potential sources of contamination; and
 - using updated wellhead delineations and drinking water protection areas.
2. Protect significant wetlands and riparian areas for their functions and values in controlling floods and protecting water quality in the aquifer and surface waters, and in protecting fish and wildlife habitat, consistent with the requirements of Statewide Planning Goal 5.

WHEREAS, a joint City-County Planning Commission public hearing was held on May 7, 2013 in Florence;

NOW THEREFORE, BE IT RESOLVED that the Planning Commission recommends to the City Council adoption of the **Florence Realization 2020 Comprehensive Plan** amendments in **Exhibit B** for Aquifer Protection, Wetlands and Riparian Corridors, and Housekeeping with the Condition of Approval:

Prior to adoption, the 2013 Wetlands and Riparian Inventory is approved by the Oregon Department of State Lands (DSL) and includes any modifications approved by DSL to respond to property owner requests.

NOW THEREFORE, BE IT FURTHER RESOLVED that the Planning Commission recommends to the City Council adoption of the **Florence City Code** amendments in **Exhibit C** for Aquifer Protection, Wetlands and Riparian Corridors, and for internal consistency and housekeeping with the Condition of Approval:

That Exhibit C contain the additional changes to Florence City Code presented at the public hearing (incorporated into attached Exhibit C, May 7, 2013).

PASSED BY THE FLORENCE PLANNING COMMISSION this 7th day of May, 2013.


Cheryl Hoile, Chair

ATTACHMENTS:

- Exhibit A Findings of Fact
- Exhibit B to City of Florence Ordinance No. 2, Series 2003 and Lane County Ordinance No. PA 1299: Proposed Amendments to the Florence 2020 Comprehensive Plan for Aquifer Protection and Wetlands and Riparian Corridors, May 7, 2013
- Exhibit C to City of Florence Ordinance No. 2, Series 2003: Proposed Amendments to the Florence City Code for Aquifer Protection and Wetlands and Riparian Corridors, May 7, 2013

ATTACHMENTS UNDER SEPARATE COVER:

Note: The following documents are included in the public record and are available for review at City of Florence Planning Office or on line at:

<http://www.ci.florence.or.us/council/city-councilplanning-commission-work-session>

- Florence Planning Commission Resolution PC 13 03 CPA 01, PC 13 04 TA 01, PC 13 05 ZC 01
- City of Florence Ordinance No. 2, Series 2013
- Lane County Ordinance No. PA 1299
- Exhibit B to City of Florence Ordinance No. 2 Series 2013 and Lane County Ordinance No. PA 1299: Proposed Amendments To The Florence Realization 2020 Comprehensive Plan for Aquifer Protection and Wetlands and Riparian Corridors, April 15, 2013
- Exhibit C to City of Florence Ordinance No. 2, Series 2003: Proposed Amendments to the Florence City Code for Aquifer Protection and Wetlands And Riparian Corridors, April 15, 2013
- 2013 Aquifer Protection Plan for the North Florence Sole Source Dunal Aquifer and Appendices:
 - A: Surface and Groundwater Monitoring Report and Secondary Data
 - B: Siuslaw Estuary Partnership Public Involvement Plan
 - C: Oregon Water Resources Department construction logs and well reports
 - D: Drinking Water Protection Areas Delineation Report, February 15, 2012, GSI Water Solutions, Inc.
 - E: Other Source Water Assessments: Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians, June 2007; and Heceta Water District, 9/11/2001
 - F: EPA-Approved Quality Assurance Project Plan
 - G: 2003 Florence Source Water Assessment
 - H: Options for Responding to Contamination Threats in the North Florence Sole Source Dunal Aquifer
 - I: Resource List
 - J: DEQ Hazardous Waste Technical Assistance for Businesses brochure
 - K: Florence Water Management and Conservation Plan, March 2010
 - L: Mutual Emergency Water Agreement between City of Florence and Heceta Water District, July 6, 2010
 - M: Springfield Drinking Water Protection Overlay Zone
- 2013 Florence Area Local Wetlands and Riparian Inventory and Appendices:
 - A: Figures and Sheets
 - B: Wetland Summary Sheets
 - C: Wetland Determination Data Forms
 - D: ORWAP Answers Database
 - E: DSL Approval of Significance Criteria for Identifying Locally Significant Wetlands
 - F: Riparian Field Forms
 - G: Riparian Reach Summary Sheets
- 2013 City of Florence Significant Wetlands and Riparian Corridors Plan and Appendices:

- A. Existing Policies and Code for Wetlands and Riparian Areas
- B. Public Involvement Plan, Approved by the Florence Planning Commission, January 12, 2010 and Letters to Property Owners
- C. Statewide Planning Goal 5 Administrative Rules Related to Wetlands and Riparian Areas
- D. 2013 Florence Area Local Wetlands and Riparian Inventory and Appendices, Pacific Habitat Services, 2013 (under separate cover, see above)
- E. Department of State Lands Approvals: Letter from Louise Solliday, Oregon Department of State Lands (DSL), Approving Florence's use of the ORWAP Method, March 29, 2010; and letter approving the wetland significance criteria, June 23, 2012
- F. Lists and/or maps of planned public infrastructure projects (under separate cover; see adopted Public Facilities Plan)
- G. RMC-Cs Florentine Estates Planning Commission Resolution 98-6-23-33 and PUD map
- H. EPA Introduction and User's Guide to Wetland Restoration

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EXHIBIT A: FINDINGS OF FACT
PC Resolution 13 03 CPA 01, PC 13 04 TA 01, PC 13 05 ZC 01

Joint Hearing Date: May 7, 2013
Heinkel

Date of Report: April 22, 2013
ning Director

Planning Consultant: Carol

City: Kelli Weese, Interim Plan-

Lane County: Keir Miller, Senior Planner

Application: PC 13 03 CPA 01, PC 13 04 TA 01, PC 13 05 ZC 01 (City)
PA13-0582 (LC)

I. PROPOSAL DESCRIPTION

PROPOSALS:

- 1. JOINT CITY-COUNTY PUBLIC HEARING:** Recommend to the City Council and Lane County Board of Commissioners adoption of legislative amendments to the Florence Realization 2020 Comprehensive Plan ("Comprehensive Plan") for aquifer protection and wetlands and riparian corridors and for housekeeping and internal consistency (**EXHIBIT B**)
- 2. CITY PUBLIC HEARING (CONTINUATION):** Recommend to the City Council adoption of legislative amendments to the Florence City Code (FCC) for wetlands and riparian corridors and for housekeeping and internal consistency; and quasi-judicial amendments to City Code for aquifer protection (**EXHIBIT C**)

EXHIBIT B – Joint City-County (Attached)

Proposed Legislative Amendments to the Florence Realization 2020 Comprehensive Plan for Aquifer Protection and Wetlands and Riparian Corridors, April 15, 2013

The proposed Comprehensive Plan amendments in Exhibit B are as follows:

1. Aquifer Protection

- a. Amend Florence Comprehensive Plan Chapter 5 to protect groundwater resources for consistency with state law and to adopt the Aquifer Protection Plan.
- b. Consistency Amendments: Amend Comprehensive Plan Chapter 11, Utilities, Facilities, and Services for consistency with the proposed amendments.

2. Wetlands and Riparian Corridors

- a. Amend Florence Comprehensive Plan Chapter 5: Open Spaces and Scenic, Historic, and Natural Resources for consistency with Statewide Planning Goal 5, including adoption of the 2013 Florence Area Wetlands and Riparian Inventory (2013 Inventory) and 2013 City of Florence Significant Wetlands and Riparian Corridors Plan (2013 Plan).
- b. Consistency Amendments: Amend Florence Comprehensive Plan Chapter 1, Definitions and Chapter 11, Utilities, Facilities, and Services for consistency with the proposed amendments.

3. Housekeeping Amendment

- a. Amend Comprehensive Plan Chapter 1, Introduction, to make the Comprehensive Plan consistent with state law which changed the DLCD notice requirement from 45 to 35 days.

■ EXHIBIT C – City Only (Attached)

Proposed Amendments to the Florence City Code for Aquifer Protection and Wetlands and Riparian Corridors, April 15, 2013

The proposed Code amendments in Exhibit C are as follows:

1. Aquifer Protection (Quasi-judicial Amendments)

- a. Adopt a new Drinking Water Protection Overlay Zone (Overlay Zone) Map, attached to Exhibit C.
- b. Amend Florence City Code Title 10: Zoning Regulations to insert a new Chapter 32: Chapter 32 Drinking Water Protection Overlay District

2. Wetlands and Riparian Corridors (Legislative Amendments)

- a. Amend Florence City Code Title 10 Chapter 7: Special Development Standards to add a new section 10-7-4: Development Standards for Wetlands and Riparian Areas, and renumber sections sequentially.
- b. Consistency Amendments: Amend FCC Title 9 Chapter 5 stormwater management definitions and buffer zone provisions; Title 10 Chapter 1 Definitions; Title 10 Chapter 19, Prime Wildlife District; and Title 4 Chapter 6, Vegetation Clearing Permit requirements, for internal Code consistency and for consistency with state law.

3. Housekeeping Amendment (Legislative Amendment)

- a. Adopt an amendment to FCC Title 10 Chapter 19 to make the Code consistent with Statewide Planning Goal 16.

APPLICANT: City of Florence: Mike Miller, Public Works Director, Project Manager;
Planning Consultant: Carol Heinkel

PROPERTY OWNERS: See table below.

LOCATION:

- **Legislative amendments to Comprehensive Plan (Exhibit B):** Florence urban growth boundary (UGB)
- **Legislative amendments to City Code (Exhibit C):** Florence city limits
- **Quasi-judicial Code amendments (Overlay Zone):** At north end of city limits, east and west of Highway 101; specific properties listed below and shown in Overlay Zone Map (Exhibit C)

Quasi-judicial Code amendments (Overlay Zone):

Map & Taxlot Number:	Address:	Owners:
1812142001102	4701 HWY 101	Fred Meyer Stores
1812142001500	5055 HWY 101	Marvin and Neal Ryall
1812142001600	5071 HWY 101	Marvin and Neal Ryall
1812142001700	N/A Munsel Lake LLC	Munsel Lake LLC
1812142001900	5231 HWY 101	Johanna Pratte
1812142001201	4969 Hwy 101	James & Susan Genereaux
1812142001204	N/A	James & Susan Genereaux
1812142001205	N/A	Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians
1812142001206	N/A	Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians
1812142002000	N/A	John Sherman
1812142002100	5351 HWY 101	Dell Matthews
1812142001400	5045 HWY 101	Ocean Pacific Co. Inc
1812142001301	N/A	Sand Ranch Prop. LLC
1812142001303	4981 HWY 101	Dennis Fleming
1812142001302	N/A	Dennis Fleming
1812142001203	N/A	Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians
1812113301700	5491 HWY 101	Terrace Investments LLC II
1812113301603	N/A	Terrace Investments LLC II
1812142002200	5371 HWY 101	Erin Trebolo
1812113301602	5405 HWY 101	Twombly Investments LLC
1812113301600	N/A	Terrace Investments LLC II
1812113302000	N/A	Terrace Investments LLC II
1812142000500	N/A	Ohran Joint Revocable Trust
1812142000400	N/A	Ohran Joint Revocable Trust
1812142000600	N/A	Sunnyside McGill LLC

Quasi-judicial Code amendments (Overlay Zone):

Map & Taxlot

Number:	Address:	Owners:
1812142000300	5240 HWY 101	Glen & Ellona Seifert
1812142000201	N/A	Luis Hector Morales Decedents Trust
1812142001800	N/A	Johanna Pratte

COMPREHENSIVE PLAN MAP DESIGNATIONS:

- **Legislative amendments to Comprehensive Plan (Exhibit B):** All Plan designations
- **Legislative amendments to City Code (Exhibit C):** All Plan designations
- **Quasi-judicial Code amendments (Overlay Zone) (Exhibit C):** North Commercial Node, Service Industrial

ZONE MAP CLASSIFICATIONS:

- **Legislative amendments to Comprehensive Plan (Exhibit B): City:** All Zoning Classifications in City; **Lane County:** Natural Resource (NR), Impacted Forest (F2); and Suburban Residential (RA)
- **Legislative amendments to City Code (Exhibit C):** All Zoning Classifications in City
- **Quasi-judicial Code amendments (Overlay Zone) (Exhibit C):** North Commercial; Service Industrial

SURROUNDING LAND USE/ZONING:

- **Legislative amendments to Comprehensive Plan (Exhibit B):** N/A
- **Legislative amendments to City Code (Exhibit C):** N/A
- **Quasi-judicial Code amendments (Overlay Zone) (Exhibit C):** north: mixed residential, industrial, vacant; west: vacant; east: vacant/residential; south: commercial.

II. NARRATIVE

Purpose and Objectives:

The purpose of this proposal is to protect and improve water quality and fish and wildlife habitat in the lower Siuslaw Watershed. Specific objectives are as follows:

1. Meet the requirements of EPA Cooperative Agreement #WC-00J04801-0 to submit for local adoption plans and Comprehensive Plan and Code amendments for Aquifer Protection and Wetlands and Riparian Corridors;
2. Bring the Florence Comprehensive Plan into compliance with Statewide Planning Goals for wetlands, riparian corridors, and groundwater resources;
3. Bring the Florence City Code into compliance with Statewide Planning Goals for wetlands, riparian corridors, and groundwater resources;
4. Make additional Comprehensive Plan and Code amendments for internal consistency and housekeeping.

Background

These Exhibits are products of the Siuslaw Estuary Partnership, funded by the US Environmental Protection Agency (EPA Cooperative Agreement #WC-00J04801-0), a grant awarded to the City of Florence by EPA on October 1, 2009. The mission of the Partnership is to protect and improve water quality and fish and wildlife habitat in the lower Siuslaw watershed. Submission to the City and County for adoption of Comprehensive Plan amendments, and to the City for adoption of Code amendments, to protect the North Florence Sole Source Dunal Aquifer and for Wetlands and Riparian Corridors satisfies the City's commitment to the EPA for these grant products.

Community concern for the Siuslaw estuary, the North Florence Sole Source Dunal Aquifer and the area's streams, lakes, and wetlands is well-documented in Comprehensive Plan policies and Code provisions. In response to this concern, in October, 2009, the City and its partners from 19 federal, state, tribal, and local agencies embarked on the multi-year Siuslaw Estuary Partnership project. This project is funded by project partners and the US Environmental Protection Agency (EPA). The Siuslaw Estuary Partnership Guiding Principles, endorsed by the City and its partners, provided guidance for these products. For more information about the Partnership, visit the web site at: www.SiuslawWaters.org.

Over the past three and a half years, there has been extensive public involvement in the project, including public open houses, stakeholder group meetings, study area-wide distribution of newsletters, newspaper articles, and targeted outreach to interest groups, property owners, and businesses. The public outreach process is documented in detail in in Section V of this report (Findings for attached City Planning Commission Resolution PC 13 03 CPA 01, PC 13 04 TA 01, PC 13 05 ZC 01 and Lane County Ordinance No. PA 1299).

III. NOTICE AND REFERRALS

1. **NOTICE:** Notice of the proposed Comprehensive Plan Amendments was sent to DLCD on March 21, not less than 45 days prior to the first (Planning Commission) evidentiary hearing as required by the Comprehensive Plan and not less than 35 days prior to the hearing as required by state law. The hearing was noticed in the Siuslaw News on April 27 and May 1, 2013 as required by state law and the Florence Development Code.

Ballot Measure 56 Notice of the May 7, 2013 public hearing on City Ordinance No. 2, Series 2013 and Lane County Ordinance No. PA 1299 was sent on April 11th to owners of property in the urban growth boundary (UGB) with wetlands and riparian areas or within the Drinking Water Protection Areas (DWPAs) of the existing or proposed wellfield. In accordance with Florence City Code, adjacent property owners within 300 feet for the proposed Drinking Water Protection Overlay Zone were also sent notice on April 11, 2013 and notice was posted on properties within the proposed overlay zone.

2. **REFERRALS:** Referrals were sent to the Oregon Department of Transportation, Florence Police Department, Central Lincoln Public Utility District, Qwest, Charter Commu-

nications, Florence Public Works Department, Florence U.S. Postal Service, the Siuslaw Valley Fire and Rescue District, the Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians, Lane County Land Management, Lane County Transportation, Heceta Water District, Land Watch, and the staff representatives of the federal, state, and local agencies serving on the Siuslaw Estuary Partnership Inter-disciplinary Team. Notice was also sent to William Sherlock, who requested notice on behalf of this client.

IV. APPLICABLE CRITERIA

1. Florence Realization 2020 Comprehensive Plan

2. Florence City Code (FCC) Title 10: Zoning Regulations

Chapter 1: Zoning Administration, Sections: 10-1-1-5 Land Use Hearings; Section 10-1-2-2, Change of Boundaries on Zoning Map; 10-1-3 Amendments and Changes

3. Oregon Revised Statutes: ORS: 196.674; 197.175; 197.250; 197.251; 197.279(3)(b); 197.253; 197.610; 197.615; 215.418; 227.175; 227.186; 227.350

4. Statewide Land Use Planning Goals and Associated Administrative Rules:

Statewide Goals: 1: Citizen Involvement; 2: Land Use; 5: Natural Resources, Scenic and Historic Areas, and Open Spaces; 6: Air, Water and Land Resources Quality; 7: Areas Subject to Natural Hazards; 9: Economic Development; 10: Housing; 11: Public Facilities and Services; 12: Transportation; 16: Estuarine Resources; 17: Coastal Shorelands

Administrative Rules: OAR Chapter 660: Division 23 pertaining to wetlands, riparian, and groundwater resources and related provisions; Division 12; Division 15; Division 16; OAR Chapter 141 Division 86; OAR Chapter 333 Division 61; OAR Chapter 340 Division 40 and 71

5. Lane County Rural Comprehensive Plan Policies – Part 1, Section D; and Lane Code: 12.005, 12.050, 14.300, 16.400

V. FINDINGS

Applicable criteria are shown in bold and findings are in plain text below.

FLORENCE REALIZATION 2020 COMPREHENSIVE PLAN

Introduction:

Plan Adoption, Amendments, Review and Implementation

Amendments to the Plan may be initiated by citizens, citizen groups, the Citizen Advisory Committee, the Planning Commission or the City Council. In any amendment proceedings, the City Council shall obtain the recommendation of the

Planning Commission and the Citizen Advisory Committee before taking action on a proposed major amendment. Minor changes which do not have significant effects beyond the immediate area of the change require the recommendation of the Planning Commission. Minor changes may be initiated at any time. Notice of a public hearing for a proposed plan amendment shall be required at least 45 days prior to the first Planning Commission hearing.

The proposal is consistent with this Comprehensive Plan text because:

- The proposal was initiated by City Council Resolution 3 Series 2013 on April 15, 2013;
- The Planning Commission made a recommendation to the City Council; and
- Notice of the public hearing was sent to DLCD at least 45 days prior to the date of the first Planning Commission hearing.

FLORENCE CITY CODE (FCC) TITLE 10: ZONING REGULATIONS

CHAPTER 1: ZONING ADMINISTRATION

SECTION 3: AMENDMENTS AND CHANGES

FCC 10-1-3-C: LEGISLATIVE CHANGES

- 1. Initiation: A legislative change in zoning district boundaries, in the text of this Title, Title 11 or in the Comprehensive Plan may be initiated by resolution of the Planning Commission or by a request of the Council to the Planning Commission that proposes changes be considered by the Commission and its recommendation returned to the Council.**
- 2. Notice and Public Hearing: Such notice and hearing as prescribed by state law and the Comprehensive Plan then in effect. (Amd. by Ord. 30, Series 1990).**

The proposal is consistent with the criteria in FCC 10-3-C because:

- Exhibits B and C, except for the Drinking Water Protection Overlay Zone Map and Text, are legislative changes to the Comprehensive Plan and Code, affecting a large number of properties with broad policy application;
- The City Council initiated the process by Resolution and set a date of May 7 for Planning Commission public hearing and recommendation;
- Notice of the public hearing was sent to DLCD at least 45 days prior to the first Planning Commission hearing; Ballot Measure 56 notice was sent, consistent with the Comprehensive Plan and state law.

FCC 10-1-3-B: QUASI-JUDICIAL CHANGES

- 1. Initiation: A quasi-judicial zoning change and related Comprehensive Plan changes may be initiated by application of a property owner within the affected area, by a person having substantial ownership interest in the property,**

by resolution of the Planning Commission or motion of the City Council, and also by individual citizens or citizen groups during Plan update as provided in The Comprehensive Plan.

- 3. Notice and Public Hearing:** Notice and public hearing for quasi-judicial changes to this Code and the Comprehensive Plan shall be in accordance with Code Section 10-1-1-5.

The proposal is consistent with the criteria in FCC 10-3-B, subsections #1 and #3 because:

- The Drinking Water Protection Overlay Zone is a quasi-judicial zone change initiated by the City Council;
- Notice of the proposed change was provided in accordance with Code Section 10-1-1-5:

FCC 10-1-1-5: LAND USE HEARINGS:

- A. Hearings are required for quasi-judicial land use matters requiring Planning Commission review.**

B. Notification of Hearing:

- 1. At least twenty (20) days prior to a quasi-judicial hearing, notice of hearing shall be posted on the subject property and shall be provided to the applicant and to all owners of record of property within 100 feet of the subject property, except in the case of hearings for Conditional Use Permits, Variance, Planned Unit Development and Zone Change, which notice shall be sent to all owners of record of property within 300 feet of the subject property.**
 - a. Notice shall also be provided to the airport as required by ORS 227.175 and FCC 10-21-2-4 and any governmental agency that is entitled to notice under an intergovernmental agreement with the City or that is potentially affected by the proposal. For proposals located adjacent to a state roadway or where proposals are expected to have an impact on a state transportation facility, notice of the hearing shall be sent to the Oregon Department of Transportation.**
 - b. For a zone change application with two or more evidentiary hearings, notice of hearing shall be mailed no less than ten (10) days prior to the date of the Planning Commission hearing and no less than ten (10) days prior to the date of the City Council hearing.**
 - c. For an ordinance that proposes to rezone property, a notice shall be prepared in conformance with ORS 227.186 and ORS 227.175(8).**
- 2. Prior to a quasi-judicial hearing, notice shall be published one (1) time in a newspaper of general circulation.**

C. Notice Mailed to Surrounding Property Owners - Information provided:

1. The notice shall:

- a. Explain the nature of the application and the proposed use or uses which could be authorized;
- b. List the applicable criteria from the ordinance and the plan that apply to the application at issue;
- c. Set forth the street address or other easily understood geographical reference to the subject property;
- d. State the date, time and location of the hearing;
- e. State that failure of an issue to be raised in a hearing, in person or by letter, or failure to provide sufficient specificity to afford the decision maker an opportunity to respond to the issue precludes further appeal based on that issue;
- f. State that application and applicable criteria are available for inspection at no cost and will be provided at reasonable cost;
- g. State that a copy of the staff report will be available for inspection at no cost at least 7 days prior to the hearing and will be provided at reasonable cost;
- h. Include a general explanation of the requirements for submission of testimony and the procedure for conduct of hearings.
- i. Include the name of a local government representative to contact and the telephone number where additional information may be obtained.

The proposal is consistent with these criteria because:

- the Planning Commission held a public hearing on the request;
- notice was posted on the subject property (Drinking Water Protection Overlay Zone) and sent to all owners of record of property within 300 feet of the subject property on April 11, more than 20 days before the public hearing on May 7;
- on April 27 and May 1, notice of the hearing was published in the Siuslaw News, a newspaper of general circulation, the last not more than ten (10) days prior to the date of the hearing;
- The notices met all of the above requirements for content and timing; and
- Notice consistent with ORS 227.186 was sent to the owners of property with a wetland or riparian area or within a Drinking Water Protection Area for the existing or proposed wellfield, as follows:

ORS 227.186 NOTICE TO PROPERTY OWNERS OF HEARING ON CERTAIN ZONE CHANGE; FORM OF NOTICE; EXCEPTIONS; REIMBURSEMENT OF COST.

(3) Except as provided in subsection (6) of this section, at least 20 days but not more than 40 days before the date of the first hearing on an ordinance that proposes to amend an existing comprehensive plan or any element thereof, or to adopt a new comprehensive plan, a city shall cause a written individual notice of a land use change to be mailed to each owner whose property would have to be rezoned in order to comply with the amended or new comprehensive plan if the ordinance becomes effective.

The proposal is consistent with ORS 227.186 because:

- On April 11, at least 20 days but not more than 40 days before the date of the Planning Commission hearing (first hearing) on the adopting ordinance to amend the Comprehensive Plan and Code, the City mailed a written individual notice to the owners of each of the properties potentially affected by the proposal;
- the notice described in detail how the proposed ordinance would affect the use of the properties;
- the notice contained the text required in ORS 227.186; and
- the proposal is to adopt an ordinance that will limit or prohibit land uses previously allowed in the affected zone.

FCC 10-1-2-2: CHANGE OF BOUNDARIES ON ZONING MAP: ...Amendments to the map (zone boundary changes) shall be indicated on subsequent maps, dated and filed with the map originally adopted. Each map shall bear the signature of the Planning Commission chairman who shall testify to their authenticity. (Amd. by Ord. 30, 1990).

The proposal is consistent with this provision because the Drinking Water Protection Overlay Zone map will be dated, filed with the City Zoning Map, and signed by the Planning Commission chairman.

OREGON REVISED STATUTES

ORS 197.610: LOCAL GOVERNMENT NOTICE OF PROPOSED AMENDMENT OR NEW REGULATION; EXCEPTIONS; REPORT TO COMMISSION.

(1) A proposal to amend a local government acknowledged comprehensive plan or land use regulation or to adopt a new land use regulation shall be forwarded to the Director of the Department of Land Conservation and Development at least 35 days before the first evidentiary hearing on adoption. The proposal forwarded shall contain the text and any supplemental information that the local government believes is necessary to inform the director as to the effect of the proposal. The notice shall include the date set for the first evidentiary hearing.

The proposal is consistent with ORS 197.610 because notice to DLCD was sent on March 21, 2013, at least 35 days prior to the March 7, 2013 (first) Planning Commission public hearing and the notice contained the information required in this statute.

ORS 197.175: CITIES' AND COUNTIES' PLANNING RESPONSIBILITIES; RULES ON INCORPORATIONS; COMPLIANCE WITH GOALS.

(2) Pursuant to ORS Chapters 195, 196 and 197, each city and county in this state shall: (a) Prepare, adopt, amend and revise comprehensive plans in compliance with goals approved by the commission;

The proposal is consistent with ORS 197.175 because this staff report contains findings to conclude that the proposed comprehensive plan revisions are in compliance with the goals approved by the commission. A finding of "Not Applicable to this Proposal" is incorporated into these findings for all Statewide Planning Goals not specifically cited be-

low.

ORS 197.615: SUBMISSION OF ADOPTED COMPREHENSIVE PLAN OR LAND USE REGULATION CHANGES TO DEPARTMENT OF LAND CONSERVATION AND DEVELOPMENT

(1) When a local government adopts a proposed change to an acknowledged comprehensive plan or a land use regulation, the local government shall submit the decision to the Director of the Department of Land Conservation and Development within 20 days after making the decision.

(2) The submission must contain the following materials:

(a) A copy of the signed decision, the findings and the text of the change to the comprehensive plan or land use regulation;

(b) If a comprehensive plan map or zoning map is created or altered by the proposed change, a copy of the map that is created or altered;

(c) A brief narrative summary of the decision, including a summary of substantive differences from the proposed change submitted under ORS 197.610 (Submission of proposed comprehensive plan or land use regulation changes to Department of Land Conservation and Development) and any supplemental information that the local government believes may be useful to inform the director or members of the public of the effect of the actual change; and

(d) A statement by the individual transmitting the submission, identifying the date of the decision and the date of the submission.

The proposal is consistent with ORS 197.615 because when the city and county adopt the proposed change to an acknowledged comprehensive plan and the city adopts the proposed change to the FCC, the local governments shall submit the decision to the Director of the Department of Land Conservation and Development within 20 days after making the decision; and the submission shall contain the required materials.

ORS 197.253: PARTICIPATION IN LOCAL PROCEEDINGS REQUIRED FOR SUBMITTING COMMENTS AND OBJECTIONS

Notwithstanding the provisions of ORS 197.251 (Compliance acknowledgment)

(2)(a), a person may not submit written comments and objections to the acknowledgment request of any city or county that submits its plan or regulations to the Land Conservation and Development Commission for acknowledgment for the first time after August 9, 1983, unless the person participated either orally or in writing in the local government proceedings leading to the adoption of the plan and regulations.

The proposal is consistent with ORS 197.253 because only persons participating either orally or in writing in the city and county proceedings leading to the adoption of the plan and regulations shall be eligible to submit written comments and objections to the approval of the amendments by the Department of Land Conservation and Development.

ORS 197.250 COMPLIANCE WITH GOALS REQUIRED

Except as otherwise provided in ORS 197.245 (Commission amendment of initial goals), all comprehensive plans and land use regulations adopted by a local gov-

ernment to carry out those comprehensive plans and all plans, programs, rules or regulations affecting land use adopted by a state agency or special district shall be in compliance with the goals within one year after the date those goals are approved by the Land Conservation and Development Commission.

The proposal is consistent with ORS 197.250 because it is consistent with applicable statewide planning goals, as demonstrated in the findings below.

STATEWIDE PLANNING GOALS AND ADMINISTRATIVE RULES

GOAL 1: CITIZEN INVOLVEMENT

3. Citizen Influence -- To provide the opportunity for citizens to be involved in all phases of the planning process.

Citizens shall have the opportunity to be involved in the phases of the planning process as set forth and defined in the goals and guidelines for Land Use Planning, including Preparation of Plans and Implementation Measures, Plan Content, Plan Adoption, Minor Changes and Major Revisions in the Plan, and Implementation Measures.

The proposals are consistent with this Goal because citizens were provided the opportunity to be involved in all phases of the planning process as set out below.

- The Public Involvement Plan (PIP) for the Siuslaw Estuary Partnership was approved by the Florence Planning Commission on January 12, 2010 and is included as Appendix B of the Aquifer Protection Plan. Public involvement involved Technical Advisory Committees, Stakeholder Groups, and Public Education and Outreach.
- Technical Advisory Committees: The Siuslaw Estuary Partnership Inter-disciplinary Team served as the Technical Advisory Committee (TAC) for the plans and Trail Vision with additional agency staff added for specific products. These staff committees met regularly throughout the course of the project and recommended draft products to the Stakeholder Groups.
- Stakeholder Groups: The Florence City Council approved the use of two Stakeholder Groups for the Partnership: a Community Stakeholder Group and an Elected Official Stakeholder Group. The Community Stakeholder Group was expanded in order to include representative interests in the Drinking Water Protection Areas on the Group. Specifically, these interests were: Ocean Dunes Golf Links, Coast Village, Sand Ranch, Florentine Estates, Koning and Cooper business owners, and Recycling and Garbage. The Community Stakeholder Group met most recently on February 28, 2013 to review and comment on the draft products. The Elected Official Stakeholder Group met on March 14 and agreed by consensus with the products, as revised.
- Public Education and Outreach: In the fall of 2012, a targeted public outreach effort commenced on the draft Comprehensive Plan and Code amendments. This outreach included presentations, response to questions, and submission of comments on the draft proposals with the following groups:
 - Coast Village Homeowners Association: 10/29/12

- Central Oregon Coast Board of Realtors: 11/29/12
- Florence Area Chamber of Commerce: 2/21/13
- Golf Course Owners/Managers: 2/25/13
- Property owners within Drinking Water Protection Areas (DWPAs): 2/25/13
- Property owners with wetlands or riparian areas: 2/27/13
- Letters were sent to the owners in DWPAs and with wetlands or riparian areas on February 8th inviting them to the meeting, informing them of the draft products, and instructing them on ways they can be involved. Revisions to the draft were made based on feedback from meetings with property owners and Stakeholders in February and March 2013 and further changes may be made as needed to respond to comments raised during the public adoption process.
- Public Education and Outreach also involved three Open Houses and three newsletters, "Waters in Common," which were distributed throughout the UGB to residents, property owners, or both. Each of these newsletters provided information about the aquifer, wetlands and riparian areas, and the trail vision and the need to protect water quality. The third newsletter, distributed in April 2012, provided information about the draft plans and inventories and ways to provide comment. That newsletter was included in water bills and mailed directly to all owners of property in the DWPAs. At the third Open House, the elements of the plans were presented in detail in the power point presentation and in hard copies available for the public. Comment forms were available, although no one submitted a completed form. Over 50 members of the public attended the April 30, 2012 Open House and heard the presentation.
- In addition, public involvement efforts were conducted specifically for wetlands and riparian areas. Prior to beginning the inventory field work, selected landowners (i.e. those suspected of having wetlands or waters of the state on their property) were mailed notices describing the project and asking permission to enter their property. Right of access was granted by landowner permission only. The properties of those not responding were not accessed. Access information was collected in a database and then transferred to a base map for use in the field. At the May 5, 2010 Open House, the public was informed about the wetland inventory process and staff answered questions from property owners deciding whether or not to grant access to their property. Following completion of initial fieldwork, a public meeting was held on September 22, 2010 to allow citizens to observe the location of mapped wetlands and comment as appropriate.
- On March 6, 2012, the Wetlands and Riparian Area Team concurred with criteria and application of the criteria for determining the significance of, and measures to protect, wetlands and riparian corridors in the Florence urban growth boundary (UGB). On January 31, 2013, the Wetland and Riparian Team reviewed and commented on the revised 2013 Plan and forwarded it for public review and adoption.
- At their meetings in March and April, the Stakeholder Groups forwarded this proposal to the public for comment. Then, the proposal was presented to the public at the April 30, 2012 Open House.
- All products and Stakeholder meeting packets have been posted to the project web site: www.SiuslawWaters.org and the public has been encouraged to review and comment.

GOAL 2: LAND USE

City, county, state and federal agency and special district plans and actions related to land use shall be consistent with the comprehensive plans of cities and counties and regional plans adopted under ORS Chapter 268.

All land use plans shall include identification of issues and problems, inventories and other factual information for each applicable statewide planning goal, evaluation of alternative courses of action and ultimate policy choices, taking into consideration social, economic, energy and environmental needs. The required information shall be contained in the plan document or in supporting documents. The plans, supporting documents and implementation ordinances shall be filed in a public office or other place easily accessible to the public. The plans shall be the basis for specific implementation measures. These measures shall be consistent with and adequate to carry out the plans. Each plan and related implementation measure shall be coordinated with the plans of affected governmental units.

All land-use plans and implementation ordinances shall be adopted by the governing body after public hearing and shall be reviewed and, as needed, revised on a periodic cycle to take into account changing public policies and circumstances, in accord with a schedule set forth in the plan. Opportunities shall be provided for review and comment by citizens and affected governmental units during preparation, review and revision of plans and implementation ordinances.

The proposals are consistent with Goal 2 because:

- The amendments to the Florence City Code for aquifer protection and wetlands and riparian areas, and the Drinking Water Protection Overlay Zone to protect the City's proposed wellfield, are consistent with the Comprehensive Plan for the City of Florence, as amended in this proposal;
- The proposed Comprehensive Plan amendments include identification of issues and problems related to aquifer protection and wetlands and riparian areas, inventories and other factual information for each applicable statewide planning goal, and evaluation of alternative courses of action and ultimate policy choices, taking into consideration social, economic, energy and environmental needs;
- The proposal amends the Comprehensive Plan to include the Aquifer Protection Plan, Florence Area Wetlands and Riparian Inventory, City of Florence Significant Wetlands and Riparian Corridors Plan in the plan document or in supporting documents. The plans, supporting documents and implementation ordinances shall be filed in the City of Florence Planning Office easily accessible to the public;
- These plans are the basis for the proposed City Code amendments, which are consistent with and adequate to carry out the plans, including the Drinking Water Protection Overlay Zone, which is consistent with the Drinking Water Protection Area for the proposed wellfield which is incorporated as part of the Comprehensive Plan through these amendments;
- The amendments to the Comprehensive Plan have been coordinated with and co-adopted by Lane County, the affected governmental unit; and

- The Comprehensive Plan amendments were adopted by the by the City and County and the Code amendments by the City after public hearings; after a review and with revisions that take into account changing public policies and circumstances; opportunities were provided for review and comment by citizens and affected governmental units during preparation, review and revision of the plans and implementation ordinances.
- The Consistency Code amendment to FCC 10-19-9 Prime Wildlife District make the Code consistent with the proposed Comprehensive Plan and Code amendments as well as Statewide Planning Goal 2 (Land Use) by relying on the most recent inventory and assessment data for determining the boundaries and assessment of the management unit.

GOAL 5: NATURAL RESOURCES, SCENIC AND HISTORIC AREAS, AND OPEN SPACES

To protect natural resources and conserve scenic and historic areas and open spaces. Local governments shall adopt programs that will protect natural resources and conserve scenic, historic, and open space resources for present and future generations. These resources promote a healthy environment and natural landscape that contributes to Oregon's livability. The following resources shall be inventoried: a. Riparian corridors, including water and riparian areas and fish habitat; b. Wetlands;... f. Groundwater Resources;...

The proposal is consistent with Goal 5 requirements for wetlands, riparian corridors, and groundwater resources as demonstrated in the following findings of consistency with the Goal 5 Administrative Rule (OAR Chapter 60 Division 23).

OAR 660-023-0250: APPLICABILITY

(2) The requirements of this division are applicable to PAPAs initiated on or after September 1, 1996. OAR 660, Division 16 applies to PAPAs initiated prior to September 1, 1996. For purposes of this section "initiated" means that the local government has deemed the PAPA application to be complete.

(3) Local governments are not required to apply Goal 5 in consideration of a PAPA unless the PAPA affects a Goal 5 resource. For purposes of this section, a PAPA would affect a Goal 5 resource only if: (a) The PAPA creates or amends a resource list or a portion of an acknowledged plan or land use regulation adopted in order to protect a significant Goal 5 resource or to address specific requirements of Goal 5;...

The proposals are consistent with this Rule, as follows:

- The Goal 5 Rule applies to this PAPA (Post Acknowledgment Plan Amendment) because the City and County have updated inventories for wetlands, riparian, and groundwater resources.
- The proposed Comprehensive Plan amendments bring the Comprehensive Plan into compliance with Goal 5 for the updated inventories that the City and County have updated and adopted.

- The proposed Comprehensive Plan amendments bring the City and the County into compliance with Goal 5 for significant groundwater resources.
- The proposed City Code amendments bring the City Code into compliance with Goal 5 for significant wetlands, riparian, and groundwater resources in order to protect these significant Goal 5 resources and address specific requirements of Goal 5.

The City of Florence Significant Wetlands and Riparian Corridors Plan adopted in this proposal as part of the Comprehensive Plan will be implemented in stages. This initial proposal includes adoption of the wetland and riparian inventory for the entire UGB and adoption of Code provisions by the City to protect riparian and wetland areas, pursuant to Statewide Goal 5. Ultimately, the County is required to adopt measures to protect wetland and riparian areas, comparable to the Goal 5 Rule requirements for safe harbor, and that will be accomplished in a separate future action.

In the interim, there is not an imminent threat to significant wetlands and riparian areas in the Florence UGB. Current regulations prohibit new subdivisions and land partitioning prior to annexation, so that major development within the UGB in the future will occur under the City's Code; and the County's Beaches and Dunes Overlay, which covers all the County lands in the UGB through the /U Combining District in Lane Code Chapter 10, requires a case-by-case Preliminary Investigation (LC 10.270-45) to identify, among other issues, "critical fish or wildlife habitat." As an interim measure, this development review process is available to the County to protect wetlands and riparian areas. The existing Lane County Code Chapter 10 requirements that prohibit land divisions prior to annexation and apply the Lane County Beaches and Dunes Overlay which applies specific protections for "critical fish and wildlife habitat is as follows:"

Lane Code Chapter 10: Florence Urban Growth Boundary

10.122-25 Location.

The /U Combining District is for the purpose of reviewing land within those areas that are considered transitional and/or marginal; conditions which could either restrict and/or limit urban and semi-urban uses.

10.122-30 Lot Area. (1) For land within the Florence UGB that is within the North Florence Dunal Aquifer boundary, as designated by the US Environmental Protection Agency in September 1987, no land divisions shall be allowed prior to annexation to the City.

OAR 660-023-0020

STANDARD AND SPECIFIC RULES AND SAFE HARBORS

- (2) **A "safe harbor" consists of an optional course of action that satisfies certain requirements under the standard process. Local governments may follow safe harbor requirements rather than addressing certain requirements in the standard Goal 5 process. For example, a jurisdiction may choose to identify "significant" riparian corridors using the safe harbor criteria under OAR 660-023-0090(5) rather than follow the general requirements for determining "significance" in the standard Goal 5 process under OAR 660-**

023-0030(4). Similarly, a jurisdiction may adopt a wetlands ordinance that meets the requirements of OAR 660-023-0100(4)(b) in lieu of following the ESEE decision process in OAR 660-023-0040.

The City Code amendments for wetlands and riparian areas are consistent with this Rule because the Limited Protection Program adopted by the City:

- uses the safe harbor process for the riparian inventory for Munsel Creek, the only fish-bearing stream in the inventory, and the standard Goal 5 process under OAR 660-023-0030(4) for determining other significant riparian reaches;
- applies the safe harbor protections in Goal 5 to all significant riparian reaches in the city except the Munsel Creek side channel;
- applies the safe harbor protections to all significant wetlands in the City except where protection of the wetland conflicts with provision of public infrastructure in accordance with the City's adopted Public Facilities Plan;
- uses the ESEE decision process in OAR 660-023-0040 to address conflicts between significant wetlands and public infrastructure and between the significant riparian corridor and existing development along the Munsel Creek side channel

**DEPARTMENT OF LAND CONSERVATION AND DEVELOPMENT (DLCD) STATE-WIDE PLANNING GOAL 5 AND
DEPARTMENT OF STATE LANDS (DSL) ADMINISTRATIVE RULES: WETLANDS**

DLCD: OAR 660-023-0100

(2)The standard inventory process requirements in OAR 660-023-0030 do not apply to wetlands. Instead, local governments shall follow the requirements of section (3) of this rule in order to inventory and determine significant wetlands.

(3) For areas inside urban growth boundaries (UGBs) and urban unincorporated communities (UUCs), local governments shall:

- (a) Conduct a local wetlands inventory (LWI) using the standards and procedures of OAR 141-086-0110 through 141-086-0240 and adopt the LWI as part of the comprehensive plan or as a land use regulation; and**
- (b) Determine which wetlands on the LWI are "significant wetlands" using the criteria adopted by the Division of State Lands (DSL) pursuant to ORS 197.279(3)(b) and adopt the list of significant wetlands as part of the comprehensive plan or as a land use regulation.**

ORS 197.279

Approved wetland conservation plans comply with goals; exception; rules. (1) Wetland conservation plans approved by the Director of the Department of State Lands pursuant to ORS chapter 196 shall be deemed to comply with the requirements of statewide planning goals relating to other than estuarine wetlands for those areas, uses and activities which are regulated by the wetland conservation plans.

(3) The department shall adopt by rule:

(b) Criteria for cities and counties to use to determine when a wetland is a significant wetland. [1989 c.837 §25; 1995 c.472 §2]

DSL:

OAR 141-086-0180: PURPOSE

Pursuant to ORS 196.674 pertaining to the Statewide Wetlands Inventory (SWI), these rules establish a system for uniform wetland identification and comprehensive mapping. These rules also establish wetlands inventory standards for cities or counties developing a wetland conservation plan (WCP) pursuant to ORS 196.678. A Local Wetlands Inventory (LWI) is developed for all or a portion of a city or county according to the standards and guidelines contained in these rules (OAR 141-086-0180 through 141-086-0240).

OAR 141-086-0185: APPLICABILITY

- (1) Once approved by the Department of State Lands (Department), the LWI must be used in place of the National Wetlands Inventory (NWI) and is incorporated into the SWI.
- (2) The approved LWI must be used by cities and counties in lieu of the NWI for notifying the Department of land use applications affecting mapped wetlands and other waters (ORS 215.418 and 227.350).
- (3) An LWI fulfills the wetlands inventory requirements for Goal 5 and Goal 17 (OAR 660-015 and 660-023). An LWI that meets the additional WCP requirements specified in these rules must be used as the wetlands inventory basis for a WCP.
- (4) A wetland function and condition assessment of mapped wetlands must be conducted as part of the LWI using the Oregon Freshwater Wetland Assessment Methodology (OFWAM) published by the Department in 1996. An equivalent functional assessment methodology may be used or adjustments may be made to OFWAM upon written approval by the Director. The assessment results are used to determine the relative quality (functions, values, and condition) of the mapped wetlands and to designate significant wetlands (OAR 141-086-0300 through 141-086-0350) as required for Goal 5, or to assess wetland functions and values for a WCP.
- (5) An LWI is used by the Department, other agencies and the public to help determine if wetlands or other waters are present on particular land parcels.
- (6) An LWI provides information for planning purposes on the location of potentially regulated wetlands and other waters such as lakes and streams, but is not of sufficient detail for permitting purposes under the state Removal-Fill Law (ORS 196.800 through 196.990)....
- (7) All wetlands inventory procedures and products are subject to review and approval by the Department before the products:
 - (a) Are incorporated into the SWI;
 - (b) Can be used in lieu of the NWI for Wetland Land Use Notification purposes; or
 - (c) Can be used by a city or county for Goal 5, Goal 17 or WCP purposes.

OAR 141-086-0350: LOCALLY SIGNIFICANT WETLAND CRITERIA

2) **Mandatory LSW Criteria.** A local government shall identify a wetland as locally significant if it meets one or more of the following criteria:

(a) The wetland performs any of the following functions at the levels indicated below using the Oregon Freshwater Wetland Assessment Methodology:

- (A) "Diverse" wildlife habitat; or
- (B) "Intact" fish habitat; or
- (C) "Intact" water quality function; or
- (D) "Intact" hydrologic control function.

(b) The wetland or a portion of the wetland occurs within a horizontal distance less than one-fourth mile from a water body listed by the Department of Environmental Quality as a water quality limited water body (303 (d) list), and the wetland's water quality function is described as "intact" or "impacted or degraded" using OFWAM. The 303(d) list specifies which parameters (e.g., temperature, pH) do not meet state water quality standards for each water body. A local government may determine that a wetland is not significant under this subsection upon documentation that the wetland does not provide water quality improvements for the specified parameter(s).

(c) The wetland contains one or more rare plant communities, as defined in this rule.

(d) The wetland is inhabited by any species listed by the federal government as threatened or endangered, or listed by the state as sensitive, threatened or endangered, unless the appropriate state or federal agency indicates that the wetland is not important for the maintenance of the species.

(A) The use of the site by listed species must be documented, not anecdotal. Acceptable sources of documentation may include but are not limited to: field observations at the wetland sites during the local wetlands inventory and functional assessments, and existing information on rare species occurrences at agencies such as the Oregon Natural Heritage Program, Oregon Department of Fish and Wildlife, Oregon Department of Agriculture and the U.S. Fish and Wildlife Service.

(B) Input originating from other locally knowledgeable sources constitutes "documentation" if verified by one of the above agencies or a university or college reference collection.

(e) The wetland has a direct surface water connection to a stream segment mapped by the Oregon Department of Fish and Wildlife as habitat for indigenous anadromous salmonids, and the wetland is determined to have "intact" or "impacted or degraded" fish habitat function using OFWAM.

(3) **Optional LSW Criteria.** At the discretion of the local government, wetlands that meet one or more of the following criteria may be identified as locally significant wetlands:

(a) The wetland represents a locally unique native plant community: wetland is or contains the only representative of a particular native wetland plant community in the UGB/UUC, which is only applicable if the entire UGB/UUC is inventoried. To be identified as a LSW, such a wetland must also have been assessed to perform at least one of the following functions at the levels indicated below using OFWAM:

- (A) Its wildlife habitat descriptor is either "provides diverse habitat", or "provides habitat for some wildlife species"; or
 - (B) Its fish habitat descriptor is either "intact", or "impacted or degraded"; or
 - (C) Its water quality function descriptor is either "intact", or "impacted or degraded"; or
 - (D) Its hydrologic control function descriptor is either "intact", or "impacted or degraded".
- (b) The wetland is publicly owned and determined to "have educational uses" using OFWAM, and such use by a school or organization is documented for that site.

The proposed Comprehensive Plan amendments for wetlands are consistent with Administrative Rules for DLCD and DSL because the amendments and the process:

- Amended the acknowledged plan for the area inside the Florence UGB to address the requirements of the OAR following the requirements of section (3) of the rule in order to inventory and determine significant wetlands;
- Conducted a local wetlands inventory (LWI) using the standards and procedures of OAR 141-086-0110 through 141-086-0240 pursuant to ORS 197.279(3)(b);
- Used the Oregon Rapid Wetlands Assessment Protocol (ORWAP), an equivalent functional assessment methodology, in accordance with written approval by the Director of DSL;
- Used the assessment results to determine the relative quality (functions, values, and condition) of the mapped wetlands and to designate significant wetlands (OAR 141-086-0300 through 141-086-0350) as required for Goal 5;
- Will use the DSL-approved LWI for Goal 5 and Goal 17 purposes;
- Adopted the LWI as part of the Comprehensive Plan;
- Determined which wetlands on the LWI are "significant wetlands" using the criteria approved by the Department of State Lands;
- Through adoption of proposed Plan policy, the City and County will use the DSL-approved LWI in lieu of the NWI for notifying the Department of land use applications affecting mapped wetlands and other waters in accordance with ORS 215.418 and 227.350; and
- Through adoption of Code amendments, including consistency Code amendments, the LWI will fulfill the wetlands inventory requirements for Goal 5 and Goal 17, consistent with OAR 660-015 and 660-023.

DLCD: OAR 660-023-0100

- (4) For significant wetlands inside UGBs and UUCs, a local government shall:
- (a) Complete the Goal 5 process and adopt a program to achieve the goal following the requirements of OAR 660-023-0040 and 660-023-0050; or
 - (b) Adopt a safe harbor ordinance to protect significant wetlands consistent with this subsection, as follows:
 - (A) The protection ordinance shall place restrictions on grading, excavation, placement of fill, and vegetation removal other than perimeter mowing and other cutting necessary for hazard prevention; and

(B) The ordinance shall include a variance procedure to consider hardship variances, claims of map error verified by DSL, and reduction or removal of the restrictions under paragraph (A) of this subsection for any lands demonstrated to have been rendered not buildable by application of the ordinance.

The proposed City Code amendments for significant wetlands are consistent with this Goal 5 requirement because the City completed the Goal 5 process and adopted a program to achieve the Goal following both the safe harbor requirements and the requirements of OAR 660-023-0040 and 660-023-0050 (see finding of consistency with these OAR below), by:

- adopting a Limited Protection Program that applies the safe harbor Goal 5 provisions except where there are conflicts with public infrastructure, and, consistent with OAR 660-023-0040 and 660-023-0050 addresses conflicts, through an ESEE analysis, between public infrastructure and full protection of significant wetlands;
- including standards that place restrictions on grading, excavation, placement of fill, and vegetation removal other than perimeter mowing and other cutting necessary for hazard prevention; and
- including variance procedures to consider hardship variances, claims of map error verified by DSL, and reduction or removal of the restrictions for any lands demonstrated to have been rendered not buildable by application of the standards.

(7) All local governments shall adopt land use regulations that require notification of DSL concerning applications for development permits or other land use decisions affecting wetlands on the inventory, as per ORS 227 .350 and 215.418, or on the SWI as provided in section (5) of this rule.

The proposed Comprehensive Plan amendments are consistent with this administrative rule because the City and County will adopt plan policy to require notification of DSL concerning applications for development permits or other land use decisions affecting wetlands on the inventory.

Goal 5 Administrative Rule for Riparian Areas

OAR 660-023-0090 Riparian Corridors

(3) Local governments shall inventory and determine significant riparian corridors by following either the safe harbor methodology described in section (5) of this rule or the standard inventory process described in OAR 660-023-0030 as modified by the requirements in section (4) of this rule. The local government may divide the riparian corridor into a series of stream sections (or reaches) and regard these as individual resource sites.

(4) When following the standard inventory process in OAR 660-023-0030, local governments shall collect information regarding all water areas, fish habitat, riparian areas, and wetlands within riparian corridors. .. Local governments are encouraged, but not required, to conduct field investigations to verify the location, quality, and quantity of resources within the riparian corridor. At a

minimum, local governments shall consult the following sources, where available, in order to inventory riparian corridors along rivers, lakes, and streams within the jurisdiction:

- (a) Oregon Department of Forestry stream classification maps;
- (b) United States Geological Service (USGS) 7.5-minute quadrangle maps;
- (c) National Wetlands Inventory maps;
- (d) Oregon Department of Fish and Wildlife (ODFW) maps indicating fish habitat;
- (e) Federal Emergency Management Agency (FEMA) flood maps; and
- (f) Aerial photographs.

The Comprehensive Plan and Code amendments are consistent with this Rule because:

- The City and County have inventoried and determined significant riparian corridors by following a combined safe harbor methodology and the standard inventory process described in the Rule, divided the riparian corridor into a series of stream sections (or reaches), and regarded these as individual resource sites.
 - In using the standard inventory process in OAR 660-023-0030, the local governments collected information regarding all water areas, fish habitat, riparian areas, and wetlands within riparian corridors; conducted field investigations to verify the location, quality, and quantity of resources within the riparian corridor; and consulted the sources listed in the Rule as well as information provided by ODFW and the US National Marine Fisheries Service.
- (5) **As a safe harbor in order to address the requirements under OAR 660-023-0030, a local government may determine the boundaries of significant riparian corridors within its jurisdiction using a standard setback distance from all fish-bearing lakes and streams shown on the documents listed in subsections (a) through (f) of section (4) of this rule, as follows:..**
- (b) **Along all lakes, and fish-bearing streams with average annual stream flow less than 1,000 cfs, the riparian corridor boundary shall be 50 feet from the top of bank.**
 - (c) **Where the riparian corridor includes all or portions of a significant wetland as set out in OAR 660-023-0100, the standard distance to the riparian corridor boundary shall be measured from, and include, the upland edge of the wetland.**
- As a safe harbor in order to address the requirements under OAR 660-023-0030, the City and County determined the boundaries of significant riparian corridors within its jurisdiction using a standard setback distance of 50 foot from top of bank from Munsel Creek, the only fish-bearing stream in the inventory which has an average annual stream flow less than 1,000 cfs:
 - where the Munsel Creek riparian corridor includes portions of a significant wetland as set out in OAR 660-023-0100, the standard distance to the riparian corridor boundary shall be measured from, and include, the upland edge of the wetland.

(6) Local governments shall develop a program to achieve Goal 5 using either the safe harbor described in section (8) of this rule or the standard Goal 5 ESEE process in OAR 660-023-0040 and 660-023-0050 as modified by section (7) of this rule.

(7) When following the standard ESEE process in OAR 660-023-0040 and 660-023-0050, a local government shall comply with Goal 5 if it identifies at least the following activities as conflicting uses in riparian corridors:

- (a) The permanent alteration of the riparian corridor by placement of structures or impervious surfaces, except for:**
 - (A) Water-dependent or water-related uses; and**
 - (B) Replacement of existing structures with structures in the same location that do not disturb additional riparian surface area; and**
- (b) Removal of vegetation in the riparian area, except:**
 - (A) As necessary for restoration activities, such as replacement of vegetation with native riparian species;**
 - (B) As necessary for the development of water-related or water-dependent uses;...**

The Code amendments are consistent with this Rule because the City developed a program to achieve Goal 5 using both the safe harbor and the standard Goal 5 ESEE process that includes the provisions related to the permanent alteration of the riparian corridor by placement of structures or impervious surfaces, except for the uses specified in the Rule.

(8) As a safe harbor in lieu of following the ESEE process requirements of OAR 660-023-0040 and 660-023-0050, a local government may adopt an ordinance to protect a significant riparian corridor as follows:

- (a) The ordinance shall prevent permanent alteration of the riparian area by grading or by the placement of structures or impervious surfaces, except for the following uses, provided they are designed and constructed to minimize intrusion into the riparian area:**
 - (A) Streets, roads, and paths;**
 - (B) Drainage facilities, utilities, and irrigation pumps;**
 - (C) Water-related and water-dependent uses; and**
 - (D) Replacement of existing structures with structures in the same location that do not disturb additional riparian surface area.**
- (b) The ordinance shall contain provisions to control the removal of riparian vegetation, except that the ordinance shall allow:**
 - (A) Removal of non-native vegetation and replacement with native plant species; and**
 - (B) Removal of vegetation necessary for the development of water-related or water-dependent uses;**
- (d) The ordinance shall include a procedure to consider hardship variances, claims of map error, and reduction or removal of the restrictions under subsections (a) and (b) of this section for any existing lot or parcel demonstrated to have been rendered not buildable by application of the ordinance; ...**

The Code amendments and Limited Protection Program comply with this Rule because the Code standards contain all of the required provisions.

Goal 5 Administrative Rules: ESEE Analysis

660-023-0040

ESEE DECISION PROCESS

(1) Local governments shall develop a program to achieve Goal 5 for all significant resource sites based on an analysis of the economic, social, environmental, and energy (ESEE) consequences that could result from a decision to allow, limit, or prohibit a conflicting use. This rule describes four steps to be followed in conducting an ESEE analysis, as set out in detail in sections (2) through (5) of this rule. Local governments are not required to follow these steps sequentially, and some steps anticipate a return to a previous step. However, findings shall demonstrate that requirements under each of the steps have been met, regardless of the sequence followed by the local government. The ESEE analysis need not be lengthy or complex, but should enable reviewers to gain a clear understanding of the conflicts and the consequences to be expected. The steps in the standard ESEE process are as follows:

- (a) Identify conflicting uses;**
- (b) Determine the impact area;**
- (c) Analyze the ESEE consequences; and**
- (d) Develop a program to achieve Goal 5.**

(2) Identify conflicting uses. Local governments shall identify conflicting uses that exist, or could occur, with regard to significant Goal 5 resource sites. To identify these uses, local governments shall examine land uses allowed outright or conditionally within the zones applied to the resource site and in its impact area. Local governments are not required to consider allowed uses that would be unlikely to occur in the impact area because existing permanent uses occupy the site. The following shall also apply in the identification of conflicting uses:

- (a) If no uses conflict with a significant resource site, acknowledged policies and land use regulations may be considered sufficient to protect the resource site. The determination that there are no conflicting uses must be based on the applicable zoning rather than ownership of the site. (Therefore, public ownership of a site does not by itself support a conclusion that there are no conflicting uses.)**
- (b) A local government may determine that one or more significant Goal 5 resource sites are conflicting uses with another significant resource site. The local government shall determine the level of protection for each significant site using the ESEE process and/or the requirements in OAR 660-023-0090 through 660-023-0230 (see OAR 660-023-0020(1)).**

(3) Determine the impact area. Local governments shall determine an impact area for each significant resource site. The impact area shall be drawn to include only the area in which allowed uses could adversely affect the identified resource. The

impact area defines the geographic limits within which to conduct an ESEE analysis for the identified significant resource site.

(4) Analyze the ESEE consequences. Local governments shall analyze the ESEE consequences that could result from decisions to allow, limit, or prohibit a conflicting use. The analysis may address each of the identified conflicting uses, or it may address a group of similar conflicting uses. A local government may conduct a single analysis for two or more resource sites that are within the same area or that are similarly situated and subject to the same zoning. The local government may establish a matrix of commonly occurring conflicting uses and apply the matrix to particular resource sites in order to facilitate the analysis. A local government may conduct a single analysis for a site containing more than one significant Goal 5 resource. The ESEE analysis must consider any applicable statewide goal or acknowledged plan requirements, including the requirements of Goal 5. The analyses of the ESEE consequences shall be adopted either as part of the plan or as a land use regulation.

(5) Develop a program to achieve Goal 5. Local governments shall determine whether to allow, limit, or prohibit identified conflicting uses for significant resource sites. This decision shall be based upon and supported by the ESEE analysis. A decision to prohibit or limit conflicting uses protects a resource site. A decision to allow some or all conflicting uses for a particular site may also be consistent with Goal 5, provided it is supported by the ESEE analysis. One of the following determinations shall be reached with regard to conflicting uses for a significant resource site:

- (a) A local government may decide that a significant resource site is of such importance compared to the conflicting uses, and the ESEE consequences of allowing the conflicting uses are so detrimental to the resource, that the conflicting uses should be prohibited.**
- (b) A local government may decide that both the resource site and the conflicting uses are important compared to each other, and, based on the ESEE analysis, the conflicting uses should be allowed in a limited way that protects the resource site to a desired extent.**
- (c) A local government may decide that the conflicting use should be allowed fully, notwithstanding the possible impacts on the resource site. The ESEE analysis must demonstrate that the conflicting use is of sufficient importance relative to the resource site, and must indicate why measures to protect the resource to some extent should not be provided, as per subsection (b) of this section.**

The City Code Amendments, ESEE Analysis, and Limited Protection Program in the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan (2013 Plan) are consistent with this Rule because:

- The 2013 Plan documents the procedures used to complete the Goal 5 process and the 2013 Plan is adopted as part of the Comprehensive Plan.
- The City Code amendments, ESEE, and Limited Protection Program described in the 2013 Plan followed the steps in the Rule, i.e., identified conflicting uses; deter-

mined the impact area; analyzed the ESEE consequences; and developed a program to achieve Goal 5.

- The City developed a program to achieve Goal 5 by limiting conflicting uses for significant resource sites; and this decision is based upon and supported by the ESEE analysis in Chapter 3 of the 2013 Plan: ESEE Analysis for Public Facilities and the Munsel Creek Side Channel.
- The decision to limit conflicting uses protects significant wetlands and riparian corridors and is supported by the ESEE analysis.
- The determination was reached that both the resource site and the conflicting uses are important compared to each other, and, based on the ESEE analysis, the conflicting uses should be allowed in a limited way that protects the resource site to a desired extent.

OAR 660-023-0050: PROGRAMS TO ACHIEVE GOAL 5

(1) For each resource site, local governments shall adopt comprehensive plan provisions and land use regulations to implement the decisions made pursuant to OAR 660-023-0040(5). The plan shall describe the degree of protection intended for each significant resource site. The plan and implementing ordinances shall clearly identify those conflicting uses that are allowed and the specific standards or limitations that apply to the allowed uses. A program to achieve Goal 5 may include zoning measures that partially or fully allow conflicting uses (see OAR 660-023-0040(5)(b) and (c)).

(2) When a local government has decided to protect a resource site under OAR 660-023-0040(5)(b), implementing measures applied to conflicting uses on the resource site and within its impact area shall contain clear and objective standards. For purposes of this division, a standard shall be considered clear and objective if it meets any one of the following criteria:

- (a) It is a fixed numerical standard, such as a height limitation of 35 feet or a setback of 50 feet;**
- (b) It is a nondiscretionary requirement, such as a requirement that grading not occur beneath the dripline of a protected tree; or**
- (c) It is a performance standard that describes the outcome to be achieved by the design, siting, construction, or operation of the conflicting use, and specifies the objective criteria to be used in evaluating outcome or performance. Different performance standards may be needed for different resource sites. If performance standards are adopted, the local government shall at the same time adopt a process for their application (such as a conditional use, or design review ordinance provision).**

(3) In addition to the clear and objective regulations required by section (2) of this rule, except for aggregate resources, local governments may adopt an alternative approval process that includes land use regulations that are not clear and objective (such as a planned unit development ordinance with discretionary performance standards), provided such regulations:

- (a) Specify that landowners have the choice of proceeding under either the clear and objective approval process or the alternative**

regulations; and

(b) Require a level of protection for the resource that meets or exceeds the intended level determined under OAR 660-023-0040 (5) and 660-023-0050(1).

The proposals are in compliance with this Rule because the City will adopt City Code amendments that:

- implement the Limited Protection Program in the 2013 Plan;
- describe the degree of protection intended for each significant resource site;
- clearly identify those conflicting uses that are allowed (public infrastructure in the adopted Public Facilities Plan in significant wetlands and a 50% setback reduction along the Munsel Creek side channel) and the specific standards or limitations that apply to the allowed uses; and the standards are included in zoning measures that allow the conflicting uses. In the case of the side channel, specific criteria for replanting displaced native plants apply.
- contain clear and objective standards (i.e., a 50% setback reduction for the side channel; and to allow public infrastructure in significant wetlands)
- include incentives to encourage preservation, maintenance and restoration of significant wetlands and riparian areas.
- allow for landowners to choose proceeding under either the clear and objective approval process through Administrative Review; or through a Plan Amendment Option or Variance process with a required level of protection for the resource that meets or exceeds the intended level determined under OAR 660-023-0040 (5) and 660-023-0050(1).

OAR 660-023-0140: GROUNDWATER RESOURCES

(2) Local governments shall amend acknowledged plans prior to or at each periodic review in order to inventory and protect significant groundwater resources under Goal 5 only as provided in sections (3) through (5) of this rule. Goal 5 does not apply to other groundwater areas, although other statewide Goals, especially Goals 2, 6, and 11, apply to land use decisions concerning such groundwater areas. Significant groundwater resources are limited to:

(b) Wellhead protection areas, subject to the requirements in sections (4) and (5) of this rule instead of the requirements in OAR 660-023-0030 through 660-023-0050.

The adoption of the 2013 Aquifer Protection Plan and Comprehensive Plan amendments by the City and the County bring these local governments into compliance with Goal 5 for groundwater resources because:

- The local governments will amend the acknowledged plan to inventory and protect the Wellhead Protection Area, aka Drinking Water Protection Area (DWPA), for the existing wellfield, which is a significant groundwater resource under Goal 5;
- The DWPA for the proposed wellfield is protected under Goals 2, 6, and 11, as demonstrated in these Findings;
- The DWPA for the existing wellfield is a significant groundwater resource subject to the requirements in sections (4) and (5) of this rule instead of the requirements in OAR 660-023-0030 through 660-023-0050.

(4) A local government or water provider may delineate a wellhead protection area for wells or wellfields that serve lands within its jurisdiction. For the delineation of wellhead protection areas, the standards and procedures in OAR chapter 333, division 61 (Oregon Health Division rules) shall apply rather than the standards and procedures of OAR 660-023-0030.

(5) A wellhead protection area is a significant groundwater resource only if the area has been so delineated and either:

(a) The public water system served by the wellhead area has a service population greater than 10,000 or has more than 3,000 service connections and relies on groundwater from the wellhead area as the primary or secondary source of drinking water; or...

(6) Local governments shall develop programs to resolve conflicts with wellhead protection areas described under section (5) of this rule. In order to resolve conflicts with wellhead protection areas, local governments shall adopt comprehensive plan provisions and land use regulations, consistent with all applicable statewide goals, that:

(a) Reduce the risk of contamination of groundwater, following the standards and requirements of OAR Chapter 340, Division 40; and

(b) Implement wellhead protection plans certified by the Oregon Department of Environmental Quality (DEQ) under OAR 340-040-0180.

DEQ WELLHEAD PROTECTION ADMINISTRATIVE RULES

OAR 340-040-0170

Required Elements of A Wellhead Protection Plan

(1) A Wellhead Protection Plan shall contain and address the following seven elements:

(a) Specification of Duties:

(A) The Plan shall identify all the Responsible Management Authorities within a Wellhead Protection Area. The jurisdictional boundaries of each Responsible Management Authority shall be shown on a map;

(B) For each Responsible Management Authority identified, the expectations, their respective responsibilities, and the duties they will perform with regards to implementing the Plan must be identified;

(C) The Plan shall either:

(i) Have all Responsible Management Authorities in the Wellhead Protection Area sign the Wellhead Protection Plan indicating that they will implement the actions outlined for their jurisdiction in the Plan; or

(ii) Describe the procedure used to notify and attempt to involve those Responsible Management Authorities not willing to sign the Plan.

(b) Delineation of Wellhead Protection Areas: Delineation of Wellhead Protection Areas shall occur as described under Health Division's rules under OAR 333-061-0057(1)(i).

(c) Inventory of Potential Contaminant Sources: After delineation of the Wellhead Protection Area, an inventory identifying the potential sources of contamination within the Wellhead Protection Area shall be completed. The inventory shall be designed to identify:

- (A) Past practices which may have resulted in a potential threat to the groundwater;**
- (B) Those potential sources of contamination presently existing; and**
- (C) Those potential sources which may exist in the future.**

(d) Management of Potential Sources of Contamination:

- (A) For those potential sources of contamination identified under the inventory element of paragraphs (1)(A)(B)(C) of this rule, the Plan shall identify the management action to be employed to reduce the risk of contamination to the groundwater from those source(s) and justification for the proposed management actions and level of protection provided;**
- (B) The Plan must identify the process used to address unanticipated potential sources of contamination that may locate within the Wellhead Protection Area, how the source will be evaluated for acceptability within the area, and how the management actions identified in the Plan for reducing the risk of contamination will be implemented;**
- (C) Any management plans that directly regulate farming practices for the purpose of protecting water quality on agricultural lands within a Wellhead Protection Area shall be developed and implemented by the Oregon Department of Agriculture in accordance with Oregon Department of Agriculture authorities.**

(e) Contingency Plan: Development of contingency plans for Wellhead Protection Areas shall be in accordance with Health Division rules under OAR 333-061-0057(3);

(f) Siting of New Public Water System Wells or Springs: Siting of new public water system wells or springs shall be in accordance with Health Division rules under OAR 333-061-0057(2);

(g) Public Participation: A description of the public participation efforts shall be included in the Plan, including:

- (A) Documentation that property owners and residents within the Wellhead Protection Area were notified of the development of a Wellhead Protection Plan. Notification at a minimum shall include publication of the intent to develop a Wellhead Protection Plan in a local newspaper, and a description of the process for developing and participating in the development of the Wellhead Protection Plan;**
- (B) Formation of a Team to develop the Plan. The Team can either be a new group formed for the specific purpose of developing a Plan or it can be an existing group that is assigned the additional duty of developing a Plan;**
- (C) Description of steps taken to provide opportunity for various interests within the affected area to participate;**
- (D) Documentation that all local public hearing procedures were followed in developing and adopting the Plan.**

340-040-0180: CERTIFICATION PROCEDURE

- (1) For a Wellhead Protection Plan to be certified by the Department, the Plan must meet requirements specified in OAR 340-040-0170.**
- (2) The Department shall act as the contact point for development and approval of Wellhead Protection Plans. The Department shall coordinate with other governmental entities so that the Plan is consistent with the requirements of those governmental entities before Department certification of the Plan is granted.**
- (3) The Health Division shall be responsible for certifying the delineation, and reviewing contingency plans and the new wells elements of the Plan as provided for under OAR 333-061-0020 through OAR 333-061-0065. The Department shall accept the Health Division's recommendations and certification.**
- (4) After consultation with the Department of Agriculture on agricultural issues, the Department of Land Conservation and Development on land use issues, the Health Division, and other governmental entities as appropriate, the Department shall be responsible for reviewing the remaining elements and giving the overall certification for each local Wellhead Protection Plan if each element is found to be adequately addressed.**
- (5) Within 60 days of the receipt of a request for certification of a Wellhead Protection Plan, the Department will send a written acknowledgment of receipt of the request and an estimated date for Department review and certification of the Plan.**
- (6) After certification of the plan, the Department will provide a written certification of completion to all signatories to the Plan.**

The proposal is consistent with these rules as demonstrated in the findings below and the text of the proposed Aquifer Protection Plan for the North Florence Sole Source Dunal Aquifer (incorporated into these findings) because:

- The proposal amends the acknowledged plan in order to inventory and protect the Drinking Water Protection Area (DWPA) for the City's existing wellfield, which is a significant groundwater resource under Statewide Planning Goal 5.
- The City delineated the wellhead protection area for the wellfields that serve lands within its jurisdiction in accordance with the standards and procedures in OAR Chapter 333, Division 61; and the Oregon Health Authority certified the delineations as follows:
 - “The delineation of the capture zones for the current City of Florence wellfield meets the above requirements and is therefore certified collectively as Oregon Health Authority Drinking Water Program (OHA DWP) Delineation Certificate #0016. The delineation of capture zones for the proposed wellfield by OHA definition is a provisional delineations and cannot be included as part of this certification. Instead, OHA approves of the use of the provisional delineation for protection of possible future drinking water resources.”
- The DWPA for the proposed wellfield is protected under Goals 2, 6, and 11, in accordance with Goal 5.
- The DWPA for the existing wellfield is a significant groundwater resources because:
 - the DWPA was certified by the Oregon Health Authority consistent with the requirements in sections (4) and (5) of this rule;

- the City's water system served by the wellhead area has more than 3,000 service connections, and relies on groundwater from the wellhead area as the primary (sole) source of drinking water.
- The City and County have jointly adopted the Aquifer Protection Plan for the North Florence Sole Source Dunal Aquifer and Comprehensive Plan policies and the City has adopted a Drinking Water Protection Overlay Zone, consistent with all applicable statewide goals, that reduce the risk of contamination of groundwater, following the standards and requirements of OAR chapter 340, division 40; and implement well-head protection plans certified by the Oregon Department of Environmental Quality (DEQ) under OAR 340-040-0180.

GOAL 6: AIR, WATER, AND LAND RESOURCES QUALITY

To maintain and improve the quality of the air, water and land resources of the state.

All waste and process discharges from future development, when combined with such discharges from existing developments shall not threaten to violate, or violate applicable state or federal environmental quality statutes, rules and standards. With respect to the air, water and land resources of the applicable air sheds and river basins described or included in state environmental quality statutes, rules, standards and implementation plans, such discharges shall not (1) exceed the carrying capacity of such resources, considering long range needs; (2) degrade such resources; or (3) threaten the availability of such resources.

Waste and Process Discharges -- refers to solid waste, thermal, noise, atmospheric or water pollutants, contaminants, or products therefrom. Included here also are indirect sources of air pollution which result in emissions of air contaminants for which the state has established standards.

The proposed Aquifer Protection Plan (Plan), Comprehensive Plan policies, and City Drinking Water Protection Overlay Zone (Overlay) are consistent with and implement this Goal because they maintain and improve the quality of the groundwater resources in the North Florence Sole Source Dunal Aquifer, the sole source of drinking water in Florence, as follows:

- The North Florence Dunal Aquifer was designated a sole source aquifer by the EPA in September 1987. In designating the aquifer sole source, the September 1987 EPA Resource Document states:
"Potential for Contamination: Rapid infiltration rates into the sand cover combined with a shallow water table make the North Florence Dunal Aquifer highly susceptible to contamination from surface activity. Despite the relatively rapid flow of groundwater through the aquifer, water soluble contaminants introduced near the surface may remain in the ground water system for nearly 60 years.¹ Immiscible contaminants, such as petroleum distillates, would spread rapidly if

¹ Christensen, R. and Rosenthal, G., 1982, North Florence Dunal Aquifer Study: Lane Council of Governments, Eugene, Oregon, 174 p.

spilled onto the permeable sand cover but would resist flushing by natural ground water flow.

Possible sources of aquifer contamination include fuel storage tank failure, accidental spills of hazardous material transported across the aquifer, septic tank effluent, storm runoff, pesticides, and chemical fertilizers. The lakes located along the eastern margin of the dunal area would suffer from any contaminants introduced into that portion of the aquifer which recharges the lakes. Direct leaching from septic tanks located in sand-covered areas adjacent to the lakes could seriously downgrade the quality of Clear Lake – the only surface source of drinking water presently used in the area.² Localized over-pumping of the aquifer near the ocean could result in saltwater intrusion. However, population projects by the Lane County Planning Staff suggest that such overdrafts are unlikely.”

- The Aquifer Protection Plan contains management strategies such as public education, technical assistance, Comprehensive Plan and City Code amendments, and other management strategies that represent community-based approaches to protect the aquifer from identified existing and future Potential Contaminant Sources, consistent with the Oregon Department of Environmental Quality (DEQ) and Oregon Health Authority Rules for Source Water Protection Plans.
- Proposed Comprehensive Plan policies 6 and 7 address contamination threats from on site septic systems by specifically implementing OAR 340-071-0160 requirements for municipal wastewater systems to serve development within a UGB when the service is physically and legally available as those terms are defined in the OAR:

**“DEPARTMENT OF ENVIRONMENTAL QUALITY, DIVISION 71
ONSITE WASTEWATER TREATMENT SYSTEMS**

OAR 340-071-0160: Permit Application Procedures -- Construction, Installation, Alteration, and Repair Permits

(2) Application. A completed application for a (septic) construction, installation, alteration, or repair permit must be submitted to the appropriate agent on approved forms with all required exhibits the applicable permit application fee in OAR 340-071-0140(3). Applications that are not completed in accordance with this section will not be accepted for filing. Except as otherwise allowed in this division, the exhibits must include:...

(b) A land use compatibility statement from the appropriate land use authority signifying that the proposed land use is compatible with the Land Conservation and Development Commission-acknowledged comprehensive plan or complies with the statewide planning goals....

(4) Permit denial. The agent must deny a (septic) permit if any of the following occurs.

² Christensen, R., 1985, Phosphorous Accumulation in the Clear Lake Watershed: Lane County Land Management Division of the Department of Public Works, 81 p.

(f) A sewerage system that can serve the proposed sewage flow is both legally and physically available, as described in paragraphs (A) and (B) of this subsection.

(A) Physical availability.

(i) A sewerage system is considered available if topographic or man-made features do not make connection physically impractical and one of the following applies.

(I) For a single family dwelling or other establishment with a maximum projected daily sewage flow not exceeding 899 gallons, the nearest sewerage connection point from the property to be served is within 300 feet.

(II) For a proposed subdivision or group of two to five single family dwellings or other establishment with the equivalent projected daily sewage flow, the nearest sewerage connection point from the property to be served is not further than 200 feet multiplied by the number of dwellings or dwelling equivalents.

(III) For proposed subdivisions or other developments with more than five single family dwellings or equivalent flows the agent will determine sewerage availability.

(B) Legal availability. A sewerage system is deemed legally available if the system is not under a department connection permit moratorium and the sewerage system owner is willing or obligated to provide sewer service."

- The Drinking Water Protection Overlay Zone protects the City's proposed well-field from hazardous materials that could degrade the resource and threaten the availability of the resource to meet the drinking water needs of the City in the future.
- Comprehensive Plan policy 8 provides a process for the City and County to coordinate to help prevent contamination of the proposed wellfield from Dense Non-aqueous Phase Liquids (DNPLs) which can cause the City to abandon the well-field.

GOAL 7: AREAS SUBJECT TO NATURAL HAZARDS

To protect people and property from natural hazards.

A. NATURAL HAZARD PLANNING

- 1. Local governments shall adopt comprehensive plans (inventories, policies and implementing measures) to reduce risk to people and property from natural hazards.**
- 2. Natural hazards for purposes of this goal are: floods (coastal and riverine), landslides, earthquakes and related hazards, tsunamis, coastal erosion, and wildfires. Local governments may identify and plan for other natural hazards.**

The Code amendments for wetlands and riparian areas amend portions of Chapter 7 of

the Code – Special Development Standards – that implement the requirements of Goal 7. The amendments are consistent with this Goal because they protect the flood control functions and values of significant wetlands and riparian areas and they do not affect provisions for other natural hazards.

GOAL 9: ECONOMIC DEVELOPMENT

To provide adequate opportunities throughout the state for a variety of economic activities vital to the health, welfare, and prosperity of Oregon's citizens.

Comprehensive plans for urban areas shall:

- 1. Include an analysis of the community's economic patterns, potentialities, strengths, and deficiencies as they relate to state and national trends;**
- 2. Contain policies concerning the economic development opportunities in the community;**
- 3. Provide for at least an adequate supply of sites of suitable sizes, types, locations, and service levels for a variety of industrial and commercial uses consistent with plan policies;**
- 4. Limit uses on or near sites zoned for specific industrial and commercial uses to those which are compatible with proposed uses.**

The proposals are consistent with this Goal because they do not affect the supply of industrial or commercial sites in the UGB as specifically stated below.

The proposed City Code amendments for wetlands and riparian areas are consistent with Goal 9 because they enhance the economic development potential of employment lands by applying the City's existing Stormwater Buffer Zone to significant wetlands over ½ acre (instead of all wetlands) and to significant riparian areas (instead of all riparian areas); by providing for setback adjustments and Variances when properties are rendered unbuildable; and providing a Plan Amendment Option to address conflicts with the economic development potential of properties.

The proposed Aquifer Protection Plan is consistent with this Goal because it provides for public education and technical assistance to businesses to help them protect the aquifer; and protection of the aquifer, the City's sole drinking water source, is essential for all economic activity in the city. The Overlay Zone does not prohibit specific economic activity; it regulates the use and storage of hazardous materials through future land use permit application processes. No land uses are prohibited by the Overlay and the City's business assistance program (in the Aquifer Protection Plan) is designed so that the City will assist businesses in complying with the requirements of the Overlay.

GOAL 10: HOUSING

To provide for the housing needs of citizens of the state.

Buildable lands for residential use shall be inventoried and plans shall encourage the availability of adequate numbers of needed housing units at price ranges and rent levels which are commensurate with the financial capabilities of Oregon

households and allow for flexibility of housing location, type and density.

The proposal is also consistent with Goal 10 because it does not affect the supply of buildable residential lands: the 2013 Wetland and Riparian Inventory replaces the existing adopted 1997 Inventory and the two are nearly identical in the area covered by the regulations; and the Overlay Zone does not apply to residential land uses.

The proposed City Code amendments for wetlands and riparian areas are consistent with Goal 10 because they enhance development potential of residential lands by applying the City's existing Stormwater Buffer Zone to significant wetlands over ½ acre (instead of all wetlands) and to significant riparian areas (instead of all riparian areas); by providing for setback adjustments and Variances when properties are rendered unbuildable; and providing a Plan Amendment Option to address conflicts with the residential development potential of properties.

GOAL 11: PUBLIC FACILITIES AND SERVICES

To plan and develop a timely, orderly and efficient arrangement of public facilities and services to serve as a framework for urban and rural development.

The proposals are consistent with Goal 11 because they result in a timely, orderly, and efficient arrangement of public facilities and services for urban development as follows:

- The Limited Protection Program results in an allowance for public facilities that are part of the adopted Public Facilities Plan to be constructed in significant wetlands.
- Public and private facilities are allowed by Goal 5 in significant riparian areas and this is reflected in the proposed Code.
- The proposed wellfield is adopted as part of the Public Facility Plan and the Comprehensive Plan policies, Aquifer Protection Plan, and Overlay Zone protect the proposed wellfield for use by future residents and businesses of Florence.

Goal 12: Transportation

To provide and encourage a safe, convenient and economic transportation system.

OAR 660-012-0060

Plan and Land Use Regulation Amendments

(1) Where an amendment to a functional plan, an acknowledged comprehensive plan, or a land use regulation would significantly affect an existing or planned transportation facility, the local government shall put in place measures as provided in section (2) of this rule to assure that allowed land uses are consistent with the identified function, capacity, and performance standards (e.g. level of service, volume to capacity ratio, etc.) of the facility. A plan or land use regulation amendment significantly affects a transportation facility if it would:

- (a) Change the functional classification of an existing or planned transportation facility (exclusive of correction of map errors in an adopted plan);
- (b) Change standards implementing a functional classification system; or
- (c) As measured at the end of the planning period identified in the adopted transportation system plan:
 - (A) Allow land uses or levels of development that would result in types or levels of travel or access that are inconsistent with the functional classification of an existing or planned transportation facility;
 - (B) Reduce the performance of an existing or planned transportation facility below the minimum acceptable performance standard identified in the TSP or comprehensive plan; or
 - (C) Worsen the performance of an existing or planned transportation facility that is otherwise projected to perform below the minimum acceptable performance standard identified in the TSP or comprehensive plan.

The proposals are consistent with Goal 12 and these provisions in the Transportation Planning Rule because the proposals do not significantly affect a transportation facility, as follows:

- (a) They will not cause a change in the functional classification of an existing or planned transportation facility;
- (b) they do not change standards implementing a functional classification system; or
- (c) as measured at the end of the planning period identified in the adopted transportation system plan:
 - (A) they do not allow land uses or levels of development that would result in types or levels of travel or access that are inconsistent with the functional classification of an existing or planned transportation facility;
 - (B) they do not reduce the performance of an existing or planned transportation facility below the minimum acceptable performance standard identified in the TSP or comprehensive plan; or
 - (C) they do not worsen the performance of an existing or planned transportation facility that is otherwise projected to perform below the minimum acceptable performance standard identified in the TSP or comprehensive plan.

GOAL 16: ESTUARINE RESOURCES

To recognize and protect the unique environmental, economic, and social values of each estuary and associated wetlands; and To protect, maintain, where appropriate develop, and where appropriate restore the long-term environmental, economic, and social values, diversity and benefits of Oregon's estuaries.

The housekeeping amendment to FCC Title 10 Chapter 19 makes the Code consistent with Statewide Planning Goal 16 by replacing the phrase "and it is not possible to locate the use on an upland site" with "In approving these uses, the City shall consider the potential for using upland sites to reduce or limit the commitment of the estuarine surface area for surface uses." The amendment is consistent with the direction in Goal 16:

“Oregon’s Statewide Planning Goals & Guidelines, GOAL 16: ESTUARINE RESOURCES, OAR 660-015-0010(1) Management Units As a minimum, the following kinds of management units shall be established:... 3. Development: ... As appropriate the following uses shall also be permissible in development management units: ... Where consistent with the purposes of this management unit and adjacent shorelands designated especially suited for water-dependent uses or designated for waterfront redevelopment, water-related and nondependent, nonrelated uses not requiring dredge or fill; mining and mineral extraction; and activities identified in (1) and (2) above shall also be appropriate. In designating areas for these uses, local governments shall consider the potential for using upland sites to reduce or limit the commitment of the estuarine surface area for surface uses.”

GOAL 17: COASTAL SHORELANDS

To conserve, protect, where appropriate, develop and where appropriate restore the resources and benefits of all coastal shorelands, recognizing their value for protection and maintenance of water quality, fish and wildlife habitat, water-dependent uses, economic resources and recreation and aesthetics. The management of these shoreland areas shall be compatible with the characteristics of the adjacent coastal waters; and To reduce the hazard to human life and property, and the adverse effects upon water quality and fish and wildlife habitat, resulting from the use and enjoyment of Oregon’s coastal shorelands.

The proposals are consistent with Goal 17 as follows:

- The proposals do not affect Goal 17 management units, except that the consistency Code amendment to FCC 10-19-9 Prime Wildlife District makes the Code consistent with the proposed Comprehensive Plan and Code amendments as well as Statewide Planning Goal 2 (Land Use) and Goal 17 (Coastal Shorelands) by relying on the most recent inventory and assessment data for determining the boundaries and assessment of the management unit.
- The 2013 Plan addresses the significance of wetlands and riparian areas under Statewide Planning Goal 5. Wetlands that are regulated under Statewide Planning Goal 17, Coastal Shorelands, are not subject to Goal 5 significance or protection. In the Florence UGB, Goal 17 resources are identified in the Lane County Coastal Resources Inventory, the Management Unit descriptions in the Florence Comprehensive Plan, and in the Coastal Shorelands standards in Florence City Code Title 10 Chapter 19.
- As provided in Goal 5, the local wetland inventory and assessment (2013 LWI) will be used to update the general location and assessment of the South Heceta Junction Seasonal Lakes Goal 17 wetlands. This is necessary because the 2013 LWI is more current and precise and the general location of these wetlands in the 1978 Management Unit does not align with the general wetland location in the 2013 LWI, as described in detail in the “Statewide Planning Goals 5 and 17” section of Chapter 2 and “Consistency Code Amendments” in Chapter 4 of the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan, proposed for adoption as part of the Comprehensive Plan.

LANE COUNTY RURAL COMPREHENSIVE PLAN – PART 1, SECTION D

D. CITIES, COMMUNITIES AND RURAL LANDS

While the Policies in this document are directed at Lane County government, it is clearly recognized that the County has a responsibility to, and must coordinate efforts closely with, the incorporated cities within its boundaries. Statewide planning law requires that each incorporated city develop and adopt its own land use plan which must itself comply with LCDC Goals. The plan must contain essentially the same elements as the County General Plan, with an additional element of an identified Urban Growth Boundary (required by Goal 14). Future urban growth for each city is to take place within that Boundary. In the case of the Eugene-Springfield Metropolitan Area Plan, a mutual Boundary is adopted by both cities and the County. For all other cities, the County must ratify the cities UGBs by independent evaluation of, and adoption of, appropriate city plan provisions.

Through this method, the County becomes responsible for administering the provisions of city plans within the city UGBs but outside of the corporate city limits. "Joint Agreements for Planning Coordination" drawn up between the County and each city lay the framework for cooperative action in the effort. Policies concerning Goal 14 in this document further indicate County" posture toward city plans. County adoption of city plans--or amendments thereto--ensures that conflicts between city plans and County Plan do not readily occur.

The proposal is consistent with the Lane County Rural Comprehensive Plan because Lane County will co-adopt the Comprehensive Plan amendments in Exhibit B.

LANE CODE

Comprehensive Plan

12.050 Method of Adoption and Amendment.

(1) The adoption of the comprehensive plan or an amendment to such plan shall be by an ordinance. (2) The Board may amend or supplement the comprehensive plan upon a finding of:

- (a) an error in the plan; or**
- (b) changed circumstances affecting or pertaining to the plan; or**
- (c) a change in public policy; or**
- (d) a change in public need based on a reevaluation of factors affecting the plan; provided, the amendment or supplement does not impair the purpose of the plan as established by LC 12.005 above.**

The proposal is consistent with this Lane Code section because the adoption of the amendments to the Florence Comprehensive Plan are by ordinance based on findings of changed circumstances, change in public policy, change in public need related to aquifer protection and wetlands and riparian resources, and housekeeping and consistency amendments.

14.300 De Novo Hearing Procedure.

All applications or appeals, unless otherwise specified, subject to this Section shall be reviewed as follows:

(1) Hearing Deadlines.

(c) An application for review by the Planning Commission and a subsequent action by the Board, if accepted by the Director, shall be scheduled as follows:

(i) The Planning Commission hearing shall be no sooner than 45 days from the date of application acceptance and no later than 60 days from the date of application acceptance.

(ii) The Board hearing shall be no sooner than 60 days from the date of application acceptance and no later than 75 days from the date of application acceptance.

(2) Publication of Notice. For a zone change application and/or plan amendment application, the Department shall cause to be published in a newspaper of general circulation, at least 21 days in advance of the hearing, a notice of the hearing which contains the information required by LC 14.070(2) above.

The proposal is consistent with this Lane Code section because the adoption of the amendments to the Florence Comprehensive Plan were subject to public hearings before the Planning Commission and Board in accordance with the above schedule; and notice of the plan amendment was published in the Siuslaw News at least 21 days in advance of the hearing, as stated in these findings. The proposed Comprehensive Plan amendments are legislative and therefore not subject to the quasi-judicial notice requirements of state law otherwise referenced in this Code.

(7) Order of Procedure. In the conduct of a public hearing, and unless otherwise specified by the Approval Authority, the Approval Authority shall:...

The proposal is consistent with this Lane Code section because the adoption of the amendments to the Florence Comprehensive Plan followed the procedures in this section.

(8) Decision and Findings Mailing. Within two days of the date that the written decision adopting findings is signed by the Approval Authority, the Director shall mail to the applicant, and all parties of record, a copy of the decision and findings; or if the decision and findings exceed five pages, the Director shall mail notice of the decision.

The proposal is consistent with this Lane Code section because the adoption of the amendments to the Florence Comprehensive Plan will include notice to the applicant, the City of Florence.

RURAL COMPREHENSIVE PLAN AMENDMENTS RURAL COMPREHENSIVE PLAN

(6) Plan Adoption or Amendment - General Procedures. The Rural Comprehensive Plan, or any component of such Plan, shall be adopted or amended in accordance with the following procedures:

(a) Referral to Planning Commission. Before the Board takes any action on a Rural Comprehensive Plan component, or an amendment to such Plan component, a report and recommendation thereon shall be requested from the County Planning Commission and a reasonable time allowed for the submission of such report and recommendation. In the event the Rural Comprehensive Plan component, or amendment applies to a limited geographic area, only the Planning Commission having jurisdiction of that area need receive such referral.

The proposal is consistent with this Lane Code section because the adoption of the amendments was referred to the Planning Commission for public hearing.

(b) Planning Commission - Hearing and Notice.

(i) The Planning Commission shall hold at least one public hearing before making a recommendation to the Board on a Rural Comprehensive Plan component, or an amendment to such Plan component, and the hearing shall be conducted pursuant to LC 14.300.

The proposal is consistent with this Lane Code section because the Planning Commission held at least one hearing on adoption of the amendments to the Florence Comprehensive Plan before making a recommendation to the Board and the hearing was conducted pursuant to LC 14.300.

(ii) Notice of the time and place of hearing shall be given, pursuant to LC 14.300.

(iv) The proposed Rural Comprehensive Plan component, or an amendment to such Plan component, shall be on file with the Director and available for public examination for at least 10 days prior to the time set for hearing thereon.

(c) Planning Commission - Consideration With Other Agencies.

(i) In considering a Rural Comprehensive Plan component, or an amendment to such Plan component, the Planning Commission shall take account of and seek to harmonize, within the framework of the needs of the County, the Plans of cities, and the Plans and planning activities of local, state, federal and other public agencies, organizations and bodies within the County and adjacent to it.

(ii) The Planning Commission, during consideration of a Rural Comprehensive Plan component or an amendment to such Plan component, shall consult and advise with public officials and agencies, public utility companies, civic, educational, professional and other organizations, and citizens generally to the end that maximum coordination of Plans may be secured.

(iii) Whenever the Planning Commission is considering a Rural Comprehensive Plan component, or an amendment to such Plan component, it shall be referred to the planning agency of every city and county affected to inform them and solicit their comments.

(iv) The provisions of this subsection are directory, not mandatory, and the failure to refer such Plan, or an amendment to such Plan, shall not in any manner affect its validity.

The proposal is consistent with this Lane Code section because the notice and referrals for adoption of the amendments to the Florence Comprehensive Plan were conducted in accordance with this section.

(d) Planning Commission - Recommendation and Record.

(i) Recommendation of the Planning Commission on a Rural Comprehensive Plan component, or an amendment to a Plan component, shall be by resolution of the Commission and carried by the affirmative vote of not less than a majority of its total voting members.

(ii) The record made at the Planning Commission hearings on a Rural Comprehensive Plan component, or an amendment to such Plan component and all materials submitted to or gathered by the Planning Commission for its consideration, shall be forwarded to the Board along with the recommendation.

(e) Board Action - Hearing and Notice.

(i) After a recommendation has been submitted to the Board by the Planning Commission on the Rural Comprehensive Plan component, or an amendment to such Plan component, all interested persons shall have an opportunity to be heard thereon at a public hearing before the Board conducted pursuant to LC 14.300.

(ii) Notice of the time and place of the hearing shall be given pursuant to LC 14.300.

(h) Method of Adoption and Amendment.

(i) The adoption or amendment of a Rural Comprehensive Plan component shall be by Ordinance.

(iii) The Board may amend or supplement the Rural Comprehensive Plan upon making the following findings:

(aa) For Major and Minor Amendments as defined in LC 16.400(8)(a) below, the Plan component or amendment meets all applicable requirements of local and state law, including Statewide Planning Goals and Oregon Administrative Rules.

(bb) For Major and Minor Amendments as defined in LC 16.400(8)(a) below, the Plan amendment or component is:

(i-i) necessary to correct an identified error in the application of the Plan; or

(ii-ii) necessary to fulfill an identified public or community need for the intended result of the component or amendment; or

(iii-iii) necessary to comply with the mandate of local, state or federal policy or law; or

(iv-iv) necessary to provide for the implementation of adopted Plan policy or elements; or

(v-v) otherwise deemed by the Board, for reasons briefly set forth in its decision, to be desirable, appropriate or proper.

(8) Additional Amendment Provisions. In addition to the general procedures set forth in LC 16.400(6) above, the following provisions shall apply to any amendment of Rural Comprehensive Plan components.

(b) Amendment proposals, either minor or major, may be initiated by the County or by individual application. Individual applications shall be subject to a fee established by the Board and submitted pursuant to LC 14.050.

The proposal is consistent with this Lane Code section because adoption of the amendments to the Florence Comprehensive Plan was supported by a majority of the Lane County Planning Commission. Further, the proposal was adopted by ordinance by the Lane County Board of Commissioners based on findings of changed circumstances, change in public policy, change in public need related to aquifer protection and wetlands and riparian resources, and housekeeping and consistency amendments.

VI. CONCLUSIONS

The proposed legislative amendments to the Comprehensive Plan in **Exhibit B** are consistent with the Florence Realization 2020 Comprehensive Plan, Florence City Code, Lane County Rural Comprehensive Plan, Lane Code, Oregon Revised Statutes, and Statewide Planning Goals and associated Administrative Rules.

The proposed legislative and quasi-judicial amendments to the City Code in **Exhibit C** are consistent with the Florence Realization 2020 Comprehensive Plan, Florence City Code, Oregon Revised Statutes, and Statewide Planning Goals and associated Administrative Rules.

EXHIBIT B
TO CITY OF FLORENCE ORDINANCE NO. 2 SERIES 2013
AND LANE COUNTY ORDINANCE NO. PA 1299
Proposed Amendments to the Florence Realization 2020 Comprehensive Plan for
Aquifer Protection and Wetlands and Riparian Corridors
May 7, 2013

Unless noted otherwise, proposed additions are shown in double underline and deletions in strike-out.

1. AQUIFER PROTECTION

- a. **Amend Florence Comprehensive Plan Chapter 5 to protect groundwater resources for consistency with state law and to adopt the Aquifer Protection Plan.**

Florence Comprehensive Plan
Chapter 5: Open Spaces and Scenic, Historic, and Natural Resources

Groundwater Resources

Goal

To protect the quality and quantity of the North Florence Dunal Aquifer, which has been designated a sole source aquifer by the Federal Environmental Protection Agency and which serves as a drinking water source for the City of Florence.

Objectives

1. To maintain recharge of the aquifer.
2. To protect the quality of water that recharges the aquifer.
3. To provide watershed/wellhead protection measures to protect water quality in the aquifer.
4. To protect the drinking water of the City of Florence.

Policies

1. The City shall implement the recommendations of the Stormwater management Plan regarding protection of the aquifer for the City's wellfield(s).

~~The City shall prepare and adopt a Wellhead Protection Program to protect the aquifers for the existing and potential wellfields, that supply drinking water for the residents of the City.~~

2. The City shall implement the 2013 *Aquifer Protection Plan for the North Florence Sole Source Dunal Aquifer (Aquifer Protection Plan)*, as amended and certified by the Oregon Department of Environmental Quality (DEQ) and the Oregon Health Authority (OHA). The Aquifer Protection Plan shall be implemented by: the policies in this Comprehensive Plan; Florence City Code provisions, including a Drinking Water Protection Overlay Zone; and City programs, as resources allow.
3. All portions of the *Aquifer Protection Plan*, except the Contingency Plan, are adopted as a supporting document to this Comprehensive Plan; and the Plan will be located in Appendix 5 of the Comprehensive Plan.
4. The "Certified Wellhead Delineations Report," (Delineations Report) February 2012, prepared by GSI Water Solutions, Inc. and certified by the Oregon Health Authority, is adopted into this Comprehensive Plan and is physically located in Appendix 5. The Delineations, including all Time of Travel Zones (TOTZ), shall serve as the drinking water source inventory for the City of Florence. The maps in the Delineations Report of Drinking Water Protection Areas (DWPAs) for the existing and proposed wellfield are adopted as part of this Comprehensive Plan. The City shall use the map of the delineated DWPAs for the proposed wellfield as the reference map for the Drinking Water Protection Overlay Zone.
5. The DWPA, including all delineated TOTZ, for the existing wellfield is a significant groundwater resource as that term is defined by Statewide Planning Goal 5. The DWPA, including all delineated TOTZ, for the proposed wellfield shall be protected through application of Statewide Planning Goal 2, Land Use; Goal 6, Air, Water and Land Resources Quality; and Goal 11, Public Facilities and Services.
6. Prior to issuing new or replacement septic permits, Lane County shall request the City to inform the County in writing whether municipal wastewater service is "physically and legally available," as those terms are defined in OAR 340-071-0160.
7. Consistent with policies in this Comprehensive Plan, the City shall implement state law that requires the City to provide municipal wastewater services at the time a new or replacement septic system permit is applied for, if the municipal service is physically and legally available, as prescribed in Comprehensive Plan policies and OAR 340-071-0160.
8. As part of the land use referral process under the existing Joint Agreement for Planning Coordination between the City of Florence and Lane County, the County and the City will work cooperatively to discourage the use of Dense Non-aqueous Phase Liquids (DNAPLs) by commercial and industrial businesses in the 20 year Time of Travel Zone for the proposed wellfield. The City will respond to the referral response for permits in this area by providing in-

formation on the effects of DNAPLs in wellfields and on alternative chemicals that may be appropriate for the proposed land use.

Recommendations

~~The City should explore funding sources for delineation of the aquifer for the current wellfield, as well as a more precise estimation of the extent of the aquifers for the potential wellfields identified by Brown and Caldwell.~~

- 2.1. The City should continue to support attempts by Heceta Water District and Lane County to protect the water quality of Clear and Collard Lakes.

~~The City should identify possible contaminants in the areas of the aquifers, and identify alternative sites for those businesses, if possible, and/or work with the County and those businesses to reduce the use of and to provide for safe disposal of potential contaminants.~~

2. The City should continue to work with the Lane County and the Oregon Department of Environmental Quality Health to identify areas of failing onsite sewage disposal systems in the UGB, and pursue annexation and provision of municipal sewer to those areas, with the areas having the potential for contamination of the aquifer having the highest priority.

3. The City and Lane County should consider amending their Joint Agreement for Planning Services to provide a process for ensuring that DNAPLs are not used in the DWPA for the proposed wellfield.

- 5.4. The City should investigate the issue of dry wells and sumps for stormwater disposal relative to its potential for contamination of groundwater and attempt to reconcile the State Plumbing Code requirements with Federal prohibitions on discharge of stormwater to surface waters.

5. The City should investigate whether Transfer of Development Rights is a feasible tool for Florence; and, if feasible, work with Lane County to determine applicability in area outside city within UGB.

Background

Florence's groundwater resource has been designated by the Federal Environmental Protection Agency as a sole-source aquifer, the only sole source aquifer in Oregon, one of the few in the State. Protecting the aquifer's present quality and quantity is are critical to Florence's future, and sound management is essential to avoidance of irreparable harm to that important natural resource. To this end, in 2013, the City and Lane County jointly adopted the 2013 Aquifer Protection Plan for the North Florence Sole Source Dunal Aquifer (Aquifer Protection Plan), in Appendix 5 of this Comprehensive Plan. The source water components of the Aquifer Protection Plan have been certified by the Oregon Department of Environmental Quality (DEQ) and the Oregon Health Authority (OHA) and are

adopted as part of this Comprehensive Plan.. In addition, the documents titled North Florence Dunal Aquifer – Modeling and Analysis by Ott Water Engineers, 1982 and the August 1987 EPA Resource Document for Consideration of the North Florence Dunal Aquifer as a Sole Source Aquifer, are included in Appendix 5-G as supporting documentation for the North Florence Dunal Aquifer and the "Certified Wellhead Delineations Report," (Delineations Report) February 2012, prepared by GSI Water Solutions, Inc. and certified by the Oregon Health Authority, is adopted into this Comprehensive Plan and is physically located in Appendix 5.

The DWPA for the existing wellfield is a "significant groundwater resource," as that term is defined in Oregon Administrative Rules for Goal 5 (Chapter 660 Division 23). The DWPA for the proposed wellfield is adopted as part of this Comprehensive Plan and protected by Plan policies and Code in order to protect this resource to meet the City's future needs for drinking water, consistent with Statewide Planning Goal 11; in order to protect water quality, consistent with Goal 6; and the delineation is based on the best available data, consistent with Goal 2.

The Aquifer Protection Plan was one of the products of the multi-year Siuslaw Estuary Partnership project funded by the Environmental Protection Agency to protect water quality and fish and wildlife habitat in the lower Siuslaw Watershed. The Comprehensive Plan and Florence City Code were amended to implement the Aquifer Protection Plan, including adoption of Comprehensive Plan policies and a new City Code Section 10-32: Drinking Water Protection Overlay District. This District regulates, within city limits, the use and storage of hazardous materials within the Drinking Water Protection Areas (DWPAs) of the City's proposed wellfield. Prohibition on the use of DNPLs is a key requirement of this overlay zone and the applicable Comprehensive Plan policy, above. DNAPLs do not break down in water as other contaminants do; and they are therefore extremely detrimental to a water source. Remediation of DNAPLs, if feasible, comes at a very high price and can be cause for abandoning a source. For this reason, prevention is the best and most effective protection strategy from this type of contaminant.

The Aquifer Protection Plan also contains Management Strategies such as inter-governmental coordination and education. These Management Strategies are prioritized in the Aquifer Protection Plan and high priority strategies are already being implemented or will be implemented in the immediate future. Other strategies will be implemented over time as resources allow. Through these efforts, Florence and its partners will ensure that the sole source aquifer is protected for current and future inhabitants of the Florence city limits and UGB.

- ~~• The City's municipal wellfield is located on 80 acres adjacent to the Ocean Dunes golf course. The wellfield consists of seven production wells for which the water source is the North Florence Dunal Aquifer. These wells were constructed beginning in the mid-60's with the last four wells constructed in 1994, and range in depth from 120 feet to 182 feet. The untreated water has high~~

levels of iron and some manganese, and is treated to reduce these levels to acceptable concentrations to meet drinking water standards.

- Clear Lake is one of a series of fresh water lakes located north of Florence which may serve as future water sources. The City has received water from Clear Lake through an agreement with the Heceta Water District. The City, Lane County and the Water District have, until recently, been negotiating on the construction of a filtration plant on Clear Lake. This is necessary to meet federal drinking water standards for surface water sources. However, homeowners on Clear Lake challenged this effort, and the City has decided not to pursue this effort at this time. An agreement between the District, Lane County and a Clear Lake landowner limits withdrawals from Clear Lake to 1 mgd after March 2002.

- In the absence of an agreement for future water supply from Clear Lake, the City's Water Facilities Plan, (Brown & Caldwell, September 1998) was updated (see Chapter 11, and Appendix 11) to provide for up to five new wells near the existing wellfield, with future well locations identified north and south of Heceta Beach Road. The City may work with Heceta Water District to obtain future withdrawals from Clear Lake up to sustainable levels.

- The Water Facilities Plan recommends that, "to preserve groundwater quality, the potential wellfield capture zones should be protected from industrial development or other activities that may release contaminants to the subsurface." In another section of the City's Water Facilities Plan, Brown and Caldwell recommends that, "given the potentially rapid recharge and the highly transmissive sands in the study area, a wellhead protection program is recommended for Florence's existing wellfield and any future wellfields."

- Protection of Oregon's groundwater resources is the primary goal of the Oregon Wellhead Protection Program. This is a voluntary program administered jointly by the Department of Environmental Quality and the Health Division. Under this program, a community:

- identifies the recharge area for its groundwater supplies;
- determines the potential sources of contamination;
- makes decisions about how the groundwater resource will be managed.

- DEQ is responsible for:

- certifying a community's Wellhead Protection Plan;
- assisting in the inventory of possible contaminant sources;
- assisting in development of management strategies.

- The Health Division is responsible for:

- ~~certifying the delineation of Wellhead Protections Areas,~~
- ~~providing assistance in developing a Water Contingency Plan,~~
- ~~planning for new groundwater sources.~~
- ~~—~~
- ~~Oregon's voluntary Wellhead Protection Program was approved in 1996, following defeat in the Legislature in 1993 of a proposal for a mandatory Wellhead Protection Program. Since it is a relatively new program, only a few communities have certified wellhead protection programs. Among them are Junction City and Coburg, both small cities, and the City of Springfield.~~
- ~~—~~
- ~~Applicable rules and regulations include:~~
- ~~—~~
- ~~(Wellhead Protection Plans) ORS 468.035, 468B.015(2), 468B.150-180 and implementing OAR Sections 340-40-140 — 340-40-210,~~
- ~~(Voluntary Wellhead Protection Program, delineation of Wellhead Protection Areas) ORS 448.123(1)(a), 448.131(2)(a)(b), 448.160, 672.525 and implementing OAR Sections 333-61-020, 333-61-050, 333-61-057, 333-61-065.~~

b. Consistency Amendments: Amend Comprehensive Plan Chapter 11, Utilities, Facilities, and Services for consistency with the proposed amendments.

Comprehensive Plan Chapter 11: Utilities, Facilities, and Services

Water System Supplies and Needs

Policies

2. The City shall develop ~~identify~~ new sources of water identified in the 2013 Aquifer Protection Plan to meet anticipated demands during the 2010-2030 period, and will provide treatment as appropriate for those sources.
3. The City will pursue strategies in the 2013 Aquifer Protection Plan to protect domestic water sources.

Recommendations

1. The City should implement the management strategies in the 2013 Aquifer Protection Plan, including adoption of a Drinking Water Protection Overlay Zone.
4. ~~The City should pursue ownership of private lands containing the proposed future wellfields.~~
5. ~~The City should initiate development of a wellhead/aquifer protection plan in order to assure that the aquifer, and the area around the wellheads is man-~~

~~aged with a goal of maintaining the aquifer as a source of domestic water meeting state and federal standards for potability.~~

2. WETLANDS AND RIPARIAN CORRIDORS

- a. Amend Florence Comprehensive Plan Chapter 5: Open Spaces and Scenic, Historic, and Natural Resources for consistency with Statewide Planning Goal 5.**

Florence Comprehensive Plan

Chapter 5: Open Spaces and Scenic, Historic, and Natural Resources

Florence's 20-year plan focuses on existing natural resources and their protection, which Oregon law now requires. This plan presents inventories of those selected resources, an understanding of each resource's environmental role in defining Florence's future, the identification of ways in which to protect those resources and to develop a local implementation program.

This chapter provides policy direction for the following specific resources:

- Wetlands and Riparian Areas
- Groundwater Resources
- Rare, Threatened, Endangered, and Sensitive Species
- Native Vegetation
- Mineral and Aggregate Resources
- Scenic Resources and Visual Quality
- Historic Resources

Goal

To conserve natural resources such as wetlands, riparian areas, groundwater supplies, air and water, and fish and wildlife habitat in recognition of their important environmental, social, cultural, historic and economic value to the Florence area and the central Oregon Coast.

Wetlands and Riparian Areas

Objectives

(Note: the following combine the objectives in the adopted Comprehensive Plan for wetlands and riparian areas and propose no changes.)

1. To maintain an accurate inventory of significant wetlands and riparian areas for use in land use planning and development review.
2. To protect significant wetlands and riparian areas for their critical functions and values in protecting surface and groundwater quality, flood control, habi-

for fish, and terrestrial creatures, and for enhancing the visual character of the Florence community.

Policies

(Note: the following edits combine redundant policies in the adopted Comprehensive Plan for wetlands and riparian areas and propose amendments.)

1. For the purpose of land planning and initial wetland and riparian identification within the Florence Urban Growth Boundary (UGB), the City and Lane County shall rely on the 2013 1997 Florence Area Local Wetland and Riparian Area Inventory (2013 Inventory), approved by the Oregon Department of State Lands, and as amended hereafter. The 2013 Inventory within the Florence UGB, as amended, is adopted as part of this Comprehensive Plan and is physically located in Appendix 5.
2. Disturbance of significant³ wetlands for land development activities shall be permitted within the Florence UGB only as determined by the permitted provisions of permits issued by the Department ~~Division~~ of State Lands (DSL) and/or the Army Corps of Engineers.
3. In accordance with ORS 215.418, the City and County shall notify DSL when wetlands are present on a property that is subject to a local land use or building permit approval. The City shall notify DSL when riparian areas are present on a property that is subject to a local land use or building permit approval.
4. The City and County shall consider formal wetland delineation reports approved by the Oregon ~~Division~~ Department of State Lands as a valid source of wetland information specific to a land use action or limited land use action. Such reports, if approved by DSL, will be incorporated by reference into the City's 19972013 Florence Area Local Wetlands and Riparian Area ~~Inventory~~.
5. No significant wetland or riparian corridor as defined by the 20131997 Florence Area Local Wetlands and Riparian Inventory shall be drained by re-routing of natural drainage ways.
6. The City shall protect the functions and values of significant⁴ Goal 5 riparian corridors and wetlands for flood control, water quality, and fish and wildlife habitat through Code provisions that protect these resources from development in accordance with Statewide Planning Goal 5 administrative rules (OAR 660 Division 23) and the Economic, Social, Environmental, and Energy (ESEE) Analysis and Limited Protection Program.

The ESEE Analysis is included, and significant wetlands and riparian corri-

³ Significant wetlands and riparian corridors as identified by the 19972013 Florence Area Local Wetlands and Riparian Area ~~Inventory~~, Pacific Habitat Service, Inc. Comprehensive Plan Appendix 5.

⁴ "Significant" means wetlands that meet the definition of significant in Statewide Planning Goal 5.

dors are listed and mapped, in the ⁵ "2013 City of Florence Significant Wetlands and Riparian Corridors Plan" adopted by reference into this Comprehensive Plan. The Program exempts public infrastructure, as defined in the ESEE Analysis, from local wetland protection measures, and allows special setback reductions and other allowances for development along the Munsel Creek Side Channel (Reach RMC-Cs in the 2013 Riparian Inventory).

2. ~~Riparian areas shall be prevented from permanent alteration by grading or the placement of structures or impervious surfaces, except for the following uses provided they are designed to minimize intrusion into the riparian area:~~

~~streets, roads and paths,
drainage facilities,
utilities and irrigation pumps,
water-related (outside of coastal shoreland areas) and water-dependent uses,
replacement of existing structures in the same location that do not disturb additional riparian surface area.~~

7. The City shall include a procedure in the Code to consider hardship variances, claims of map error, and reduction or removal of the restrictions for any existing lot or parcel demonstrated to have been rendered unbuildable⁶ by application of the significant wetlands and riparian areas standards in the Code.

8. The City shall encourage restoration and protection of privately-owned wetlands and riparian areas through Code incentives, and, as resources allow, through education in partnership with the Siuslaw Watershed Council and the Siuslaw Soil and Water Conservation District.

~~3. While not required to adopt safe harbor policies and ordinances under the requirement of this periodic review, the City has chosen to modify the riparian setback on Munsel Creek to require a 50 foot minimum setback from the thread of the creek, which must include at least 15 feet from the top of the bank. The minimum must be increased as necessary to meet the 15 foot requirement.~~

4. ~~The riparian setback from the Siuslaw River shall be 50 feet from the top of the cut bank.~~

5. ~~The retention of native vegetation in riparian areas is critical to their function. Therefore, the City shall adopt effective regulations ensuring the retention, or if necessary, the replanting of native species in riparian areas and may include~~

⁵ The ESEE and Limited Protection Program are contained in the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan in Appendix 5 of the Comprehensive Plan.

⁶ The term "unbuildable" is defined in the definitions section of Chapter 1 of the Comprehensive Plan and in FCC 10-1. See Consistency Amendments, below.

conditions regarding fertilizer and pesticide runoff. The regulations will address the following:

A. ~~Control the removal of riparian vegetation, except for:~~

- ~~(1) removal of non-native vegetation and replacement with native plant species; and~~
- ~~(2) removal of vegetation necessary for the development of water-related or water-dependent uses;~~

9. Plan Amendment Option: Any owner of property affected by the Significant Wetlands and Riparian Areas Standards in City Code may apply for a quasi-judicial comprehensive plan amendment. This amendment must be based on a specific development proposal. The effect of the amendment would be to remove the requirement to comply with these standards from all or a portion of the property. The applicant shall demonstrate that such an amendment is justified by completing an Environmental, Social, Economic and Energy (ESEE) consequences analysis prepared in accordance with OAR 660-23-040. If the application is approved, then the ESEE analysis shall be incorporated by reference into the Florence Comprehensive Plan, and the Florence Significant Goal 5 Wetlands and Riparian Areas Maps shall be amended to remove the wetland or riparian area from the inventory.

The ESEE analysis shall adhere to the following requirements:

A. The ESEE analysis must demonstrate to the ultimate satisfaction of the Florence City Council that the adverse economic consequences of not allowing the conflicting use are sufficient to justify the loss, or partial loss, of the resource. The City will confer with the Department of Land Conservation and Development (DLCD) prior to making their ultimate decision.

B. The ESEE analysis must demonstrate why the use cannot be located on buildable land outside of the significant wetland or riparian area and that there are no other sites within the City that can meet the specific needs of the proposed use.

C. The ESEE analysis shall be prepared by a qualified professional experienced in the preparation of Goal 5 ESEE analyses, with review by DLCD.

Recommendations

~~As the City's buildable lands begin to fill-in and prior to moving the UGB limit outward, the City should consider conducting an analysis of the economic, social, environmental, and energy (ESEE) consequences that could result from a decision to allow, limit, or prohibit a conflicting use for each of the locally identified significant wetlands. From this analysis, lesser quality wetlands may be found eligible for partial or full development.~~

~~The City should coordinate with the Oregon Division of State~~

~~Lands (DSL), the U.S. Army Corps of Engineers (ACE), and other appropriate state and federal agencies in the identification, protection and, where appropriate, mitigation of impacts to local wetland resources.~~

1. The City should consider restoring and protecting City-owned wetlands and riparian areas, using the preliminary assessment in the 2013 *City of Florence Significant Wetlands and Riparian Corridors Plan* in Comprehensive Plan Appendix 5.

Background

Note: Replace the separate Background sections for wetlands and riparian areas in the adopted Comprehensive Plan (shown in strike out below) with the following Background section:

The Wetland and Riparian Areas section of Chapter 5 of the Comprehensive Plan is based on the inventories, assessments, significance, and protection measures set out in the 2013 Florence Area Local Wetlands and Riparian Inventory (2013 Inventory) and the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan (2013 Plan), both located in Appendix 5 of the Comprehensive Plan. The 2013 Inventory and the 2013 Plan and ESEE Analysis and Limited Protection Program are adopted as part of this Comprehensive Plan.

Community concern for the Siuslaw estuary, the North Florence Sole Source Dunal Aquifer, and the area's streams, lakes, and wetlands is well-documented in Comprehensive Plan policies and Code provisions. In response to this concern, in October, 2009, the City and its partners from 19 federal, state, tribal, and local agencies embarked on a multi-year project called the Siuslaw Estuary Partnership (EPA Cooperative Agreement #WC-00J04801-0). The mission of the Partnership is to protect and improve water quality and fish and wildlife habitat in the lower Siuslaw watershed. This project is funded by project partners and the US Environmental Protection Agency (EPA). The Siuslaw Estuary Partnership Guiding Principles, endorsed by the City and its partners, provided guidance for the policies in this chapter of the Comprehensive Plan.

The 2013 Local Wetlands and Riparian Inventory updated the "City of Florence Local Wetlands and Riparian Area Inventory," prepared on December 30, 1996 by Pacific Habitat Services, Inc. and approved by DSL in 1997 (1997 Inventory). That inventory used the Oregon Freshwater Wetland Assessment Methodology (OFWAM). For the 2013 Inventory, an alternative wetland assessment, the Oregon Rapid Wetland Assessment Protocol (ORWAP; 2009), was used. The ORWAP provides much more detailed data on wetland functions, values and condition. The 1997 Inventory identified 270 wetlands, totaling 572 acres, and about 315 acres of riparian area. In the 2013 Plan, all of the 16 wetlands that are not subject to Goal 17 within the UGB were considered "significant" under Goal 5.

The improved inventories and assessment information in the 2013 Inventory assist the City in complying with Statewide Land Use Planning Goal 5 and will help the City and the County to make more informed land use decisions within the city and unincorporated lands within the study area.

On September 1, 1996, the Land Conservation and Development Commission adopted a revised Statewide Planning Goal 5. The Goal requires local jurisdictions to inventory the natural resources covered under the Goal, determine the significance of these resources, and develop plans to achieve the Goal. In other words, local jurisdictions must adopt land use ordinances regulating development in and around significant resource areas.

The purpose of the 2013 Inventory and Plan was to update the 1997 Inventory and to adopt protection measures, as required by state law. This inventory involves only freshwater wetland and riparian areas; it does not include the estuary or estuarine wetlands. Specific objectives were to:

- update the 1997 biological and functional assessment;
- assess omitted wetlands;
- include delineations made since 1997;
- adopt policies and measures to protect the unique functions and values of the resources; and
- conduct preliminary work to assess the potential for restoration of riparian areas and wetlands on City-owned property. This preliminary work is set out in Chapter 5 of the 2013 Plan in Appendix 5.

The 2013 Inventory provides a comprehensive functional assessment of wetlands and riparian areas. This is especially important in this watershed because this 2013 Plan, once adopted, will ensure: retention of the capacity of existing natural wetlands and riparian areas to store and slow the velocity of stormwater prior to discharge to area creeks and the estuary; critical water quality benefits for the North Florence Sole Source Dunal Aquifer, the source of the City's drinking water; and protection of the quality of area surface waters, habitat to numerous fish and wildlife. The protection measures in this 2013 Plan will enhance the carrying capacity of the land to fully address the anticipated impacts from planned urbanization. The functional assessment thus provides critical information to help guide future urbanization policy and stormwater management policy and capital programs.

Public involvement for the Wetlands and Riparian Areas project consisted of three annual open houses; three annual newsletters distributed to all residents and/or property owners in the study area; targeted outreach; a Stakeholder process; media outreach; and public hearings before the Planning Commission and City Council. In addition, public involvement efforts were conducted specifically for wetlands and riparian areas. Prior to beginning the inventory field work, selected landowners (i.e. those suspected of having wetlands or waters of the state on their property) were mailed notices describing the project and asking permission to enter their property. Right of access was granted by landowner permis-

sion only. The properties of those not responding were not accessed. Access information was collected in a database and then transferred to a base map for use in the field.

The City of Florence held an open house meeting May 5, 2010 to inform the public and property owners about the wetland inventory process and answer questions from property owners deciding whether or not to grant access to their property. Following completion of initial fieldwork, a second public meeting was held on September 22, 2010 to allow property owners to observe the location of mapped wetlands and comment as appropriate. A third meeting with property owners was held on February 27, 2013 to present the draft Comprehensive Plan and Code amendments and to address comments and concerns.

The Wetlands and Riparian Area Team met from 2010 through January 2013 and concurred with the proposal for determining the significance of, and measures to protect, wetlands and riparian areas in the Florence urban growth boundary (UGB). At their meetings in March, April, and July 2012 and February and March 2013, the Stakeholder Groups reviewed and commented on the draft products and amendments. The draft products were also presented to the public at Open Houses in 2011 and 2012 and summarized in newsletters distributed throughout the study area in 2011 and 2012. The proposal, and all updates to the proposal, have been consistently posted to the project web site at www.SiuslawWaters.org with an invitation for public comment on the home page.

Background

~~In 1996, Florence's local wetland inventory was conducted and included all UGB land and some land outside where UGB expansion was anticipated. In January 1997, the Division of State Lands officially accepted the Florence Local Wetland Inventory (LWI), replacing the National Wetlands Inventory (NWI) prepared many years ago for identifying such resources in the Florence area. The Florence inventory is helpful for at least two reasons:~~

~~It helps determine for planning purposes what land is "buildable" and what was not due to the anticipated presence of wetlands.~~

~~It will help the City and County review development proposals and identify when a wetland might possibly be impacted as a result of such development.~~

~~The LWI will also help the City's and County's required DSL notification when a land use action is proposed near an identified wetland.~~

~~After the City's Periodic Review work program was approved in November 1995, the State adopted amendments to Statewide Planning Goal 5. Goal 5 requires conservation of a variety of natural resources, including wetlands and riparian areas. The amendments included the LWI requirement, a requirement for the City to make determinations of local significance for identified wetland resources, and a requirement that the City and County protect those significant wetland resources.~~

The analysis and results of the City's determination of local significance for Florence's wetlands are included in Appendix 5, City of Florence Local Wetlands and Riparian Area Inventory, 1997.

Once local wetlands are identified and evaluated as to their significance, the Statewide Planning Goal 5 provides local jurisdictions with two planning options for mandated protection of wetlands. This protection must occur in addition to that protection provided by current State and federal regulations.

Under option one, Florence can use the "safe harbors" provisions of Oregon law. By adopting a safe harbors ordinance, restrictions are placed on grading, excavation, placement of fill and removal of vegetation within all locally significant wetlands within the Florence UGB.

Or, under option two, by conducting an economic, social, environmental and energy (ESEE) analysis, Florence may further refine its wetland protection program by allowing, limiting, or prohibiting conflicting uses of wetland resources depending on that analysis. The ESEE process is relatively intensive, especially in Florence's case, where 270 wetlands totaling 572.25 acres are identified by the LWI.

While it may be desirable for Florence to conduct an ESEE analysis for its significant wetland resources in the future, staff has identified sufficient "buildable lands" within the existing UGB to meet the City's residential, commercial, and industrial land needs. As such, the most expedient and effective path at this point to comply with Goal 5 and protect significant wetlands is adoption of a safe harbor ordinance by the City and Lane County.

However, since adoption of a safe harbor ordinance is not required of this periodic review, the City has chosen not to adopt such an ordinance at this time, but to continue to rely on DSL/ACE permits for wetland protection.

Background

The City's LWI also included a riparian area inventory. A riparian area can be best defined as a buffer of variable width between an aquatic resource and an upland area. The buffer is typically vegetated, and provides several beneficial functions to the lake or stream.

Those functions are:

- Acts as a natural filter of stormwater, limiting pollution of streams and waterways.
- Cools stream temperatures in summer and traps heat in winter when canopy is sufficient to screen all or part of the stream channel.
- Holds the stream bank in place and therefore reduces erosion.
- Adds controls to flood velocities of streams and drainage ways.
- Provides valuable wildlife habitat.

~~When properly integrated into a development design or recreational greenway, riparian buffers yield aesthetic benefits as well.~~

~~To some extent, Florence has been protecting its riparian areas within City limits prior to 1988, through the Munsel Creek and drainage way setback restrictions found in Florence City Code, Title 10, Chapter 7, Special Development Standards.~~

~~While not required by periodic review, the City realizes the importance of riparian buffers and has chosen to increase the protection of the riparian area on Munsel Creek which has been classified as a salmon stream and which is a teaching/management area for the Salmon and Trout Enhancement Program (STEP).~~

~~On the Siuslaw River, the riparian setback will remain at 50 feet from the top of the bank. Existing development is grandfathered. Expansions of existing development and new development must provide for the required setback, or request a variance and include provisions to mitigate the proposed intrusion into the setback.~~

b. Consistency Amendments: Amend Florence Comprehensive Plan Chapter 1, Definitions and Chapter 11, Utilities, Facilities, and Services for consistency with the proposed amendments.

Definitions

Note: Delete the following definition from the Comprehensive Plan because this term is not used in the Comprehensive Plan.

~~**SENSITIVE AREA.** Natural streams (perennial or intermittent), rivers (including the estuary portion of the river), lakes, or wetlands hydraulically connected by surface water to streams, rivers, or lakes and areas defined by the City of Florence's Local Wetlands and Riparian Inventory. Also, includes all areas that are protected for species as per areas designated by Oregon Department of Fish and Wildlife, Oregon Division of State Lands, National Marine Fisheries Service, United States Fish and Wildlife Service and Oregon Department of Transportation.~~

Note: Add this definition of unbuildable to the Comprehensive Plan definitions:

UNBUILDABLE. Lots that are rendered "unbuildable" by the required setback for significant wetlands and riparian areas.

- a) For single family housing, lots are considered unbuildable if the required setback for the significant wetland or riparian area is such that no contiguous space exists outside the setback that allows for a dwelling unit at least 50 feet by 27 feet.⁷
- b) For all affected properties, lots are deemed unbuildable if strict adherence to the applicable setback standards and conditions would effectively preclude a

⁷ Note: A 50 foot by 27 foot area allows the siting of a typical double-wide manufactured home, a form of affordable housing.

use of the parcel that could be reasonably expected to occur in the zone and that the property owner would be precluded a substantial property right enjoyed by the majority of landowners in the vicinity.

- c) For the Munsel Creek side channel (Reach RMC-Cs in the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan in Appendix 5 of the Comprehensive Plan), the "required setback" for the purpose of the un-buildable definition, is the reduced setback allowed through the ESEE Analysis adopted into this Comprehensive Plan Appendix 5.

Florence Comprehensive Plan

Chapter 11: Utilities, Facilities, and Services

Note: The following amendment makes this policy consistent with the Limited Protection Program.

Stormwater Management

Policies

Water Quality

- 2. Protect the quality of water in surface waters, i.e., the estuary, significant wetlands and riparian corridors, creeks, lakes, wetlands, and ocean/beach, from contamination threats that could impair the quality of the water for fish and wildlife habitat and human recreation.

- 3. **Housekeeping Amendment: Amend Comprehensive Plan Chapter 1, Introduction, to make the Comprehensive Plan consistent with state law which changed the DLCD notice requirement from 45 to 35 days.**

Note: The following amendment makes the Comprehensive Plan consistent with state law which changed from 45 to 35 days.

Florence Comprehensive Plan

Chapter 1: Introduction

Amendments to the Plan may be initiated by citizens, citizen groups, the Citizen Advisory Committee, the Planning Commission or the City Council. In any amendment proceedings, the City Council shall obtain the recommendation of the Planning Commission and the Citizen Advisory Committee before taking action on a proposed major amendment. Minor changes which do not have significant effects beyond the immediate area of the change require the recommendation of the Planning Commission. Minor changes may be initiated at any time. Notice to the Oregon Department of Land Conservation and Development (DLCD) of a public hearing for a proposed plan amendment shall be required at least ~~45~~35 days prior to the first Planning Commission hearing.

EXHIBIT C
TO CITY OF FLORENCE ORDINANCE NO. 2, SERIES 2003
Proposed Amendments to the Florence City Code for
Aquifer Protection and Wetlands and Riparian Corridors
May 7, 2013

1. AQUIFER PROTECTION

- a. Adopt a new Drinking Water Protection Overlay Zone Map, attached.**
- b. Amend Florence City Code Title 10: Zoning Regulations to insert a new Chapter 32:**

Chapter 32 Drinking Water Protection Overlay District

SECTION

- 10-32-1 Purpose
- 10-32-2 Applicability
- 10-32-3 Warning and Waiver of Liability
- 10-32-4 Time of Travel Zones (TOTZ)
- 10-32-5 Review
- 10-32-6 Exemptions
- 10-32-7 Standards for Hazardous Materials within TOTZ
- 10-32-8 Conditions
- 10-32-9 Appeals

10-32-1: PURPOSE:

- A. The Drinking Water Protection (DWP) Overlay District is established to protect from contamination the North Florence Sole Source Dunal Aquifer, used as the sole potable water supply source by the City. This Section establishes procedures and standards for the physical use of hazardous or other materials harmful to groundwater within TOTZ by new and existing land uses requiring development approval. The provisions of this Section are designed to:
 - 1. Protect the City's drinking water supply, which is obtained from groundwater resources, from impacts by facilities that store, handle, treat, use, produce, or otherwise have on premises substances that pose a hazard to groundwater quality; and
 - 2. Provide standards for hazardous or other materials that pose a risk to groundwater within the TOTZ.
- B. In order to accomplish this purpose, the DWP Overlay District includes methods and provisions to:

1. Restrict or prohibit the use of hazardous or other materials which are potential groundwater contaminants;
2. Set standards for the storage, use, handling, treatment, and production of hazardous or other materials that pose a risk to groundwater within TOTZ; and
3. Review new or expanded uses of hazardous or other materials that pose a risk to groundwater.

10-32-2: APPLICABILITY:

This DWP Overlay District applies to industrial and commercial land uses within the Drinking Water Protection Area (DWPA) for the proposed wellfield. As of (DATE OF ORDINANCE ADOPTION), 2013, all areas in an industrial or commercial zoning district within the specified wellhead TOTZ are automatically are rezoned to add the DWP Overlay District to the underlying zoning district. The areas to which the DWP Overlay District is applied are shown on the Drinking Water Protection Overlay Map, on file in the Community Development Department and incorporated in this Section by reference.

10-32-3: WARNING AND WAIVER OF LIABILITY:

The degree of aquifer protection required by this Section in the areas designated in Section 10-32-2 is based on scientific and engineering considerations. The nature of these considerations is that the exact boundaries of Time of Travel Zones (TOTZ) have an associated uncertainty that renders conclusions based on them to be estimates. Under no conditions should this Section be construed to guarantee the purity of the ambient ground water or guarantee the prevention of ground water contamination. Therefore, this Section shall not create liability on the part of the City, or any City personnel, for any contamination that may result from reliance on this Section or any administrative decision made under this Section.

10-32-4: TIME OF TRAVEL ZONES (TOTZ):

- A. The DWP Overlay District includes 3 TOTZ for the proposed wellfield: 5-10 years; 10-20 years; and 20-30 years. The Overlay District does not include the 0-5 year TOTZ because there are no industrial or commercial properties or zones in that TOTZ. The locations of the TOTZ for the proposed wellfield are shown on the Drinking Water Protection Area Map for the Proposed Wellfield on file with the City's Planning Department; Public Works Department; the Siuslaw Valley Fire and Rescue Agency; and Heceta Water District (HWD).
- B. The areas within specified wellhead TOTZ are those drinking water protection areas for which the Oregon Health Authority issued a "provisional delineation," stating, "OHA approves the use of this delineation for protection of possible future drinking water sources," under the Oregon Administrative Rules

that apply to Oregon's EPA-approved Drinking Water Protection Program, in Oregon Health Authority Delineation Certification #0016, March 16, 2012.

C. In determining the location of a property within a TOTZ, the following criteria apply:

1. The Lane County Department of Assessment and Taxation maps shall be used as a base map with the addition of TOTZ boundaries.
2. That portion of a tax lot that lies within a TOTZ is governed by the restrictions applicable to that TOTZ.
3. Tax lots having parts lying within more than one TOTZ are governed by the standards of the more restrictive TOTZ.
4. EXCEPTION: The Public Works Director (Director) may waive the requirement that the more restrictive standards apply when all of the following apply:
 - a. Storage, use, handling, treatment, and/or production of hazardous or other materials that pose a risk to groundwater will not take place within the portion of the tax lot having the more restrictive TOTZ standards; and
 - b. Storage, use, handling, treatment, and/or production of hazardous or other materials that pose a risk to groundwater will not take place within 50 feet of the portion of the tax lot having more restrictive TOTZ standards; and
 - c. The tax lot is 20,000 square feet or larger.
5. A property owner may request the TOTZ be modified by submitting a Zone Change application to the City. Any request for modification of the TOTZ shall be accompanied by certification of the TOTZ as proposed to be modified by the Oregon Health Authority, under the Administrative Rules that apply to Oregon's EPA-approved Drinking Water Protection Program.

10-32-5: REVIEW:

- A. A DWP Overlay District Development Application is required when all of the following criteria are met:
1. Industrial and commercial land uses that are affected by one or more of the following: a land use permit application or building permit application;
 2. The action in Subsection A.1., above will:

- a. Affect the storage, use, and/or production of hazardous or other materials that pose a risk to groundwater; or
 - b. Increase the quantity of hazardous or other materials that pose a risk to groundwater that are stored, used and/or produced.
- B. Prior to the submittal of a DWP Overlay District Development Application, an exemption request may be submitted to the Director as specified in Section 10-32-6-B-1.
- C. DWP Overlay District applications shall be reviewed under Administrative Review procedures in 10-1-1-6.
- D. Prior to undertaking an activity covered by Section 10-32-5-A, the owner or tenant shall submit a DWP Overlay District Application to the City for review and approval. Applications shall include the following information:
 - 1. A Hazardous Material Inventory Statement and a Material Safety Data Sheet for any or all materials entered in the Statement unless exempted under Section 10-32-6. Hazardous material weights shall be converted to volume measurement for purposes of determining amounts; 10 pounds shall be considered equal to one gallon as specified in Florence Fire Code;
 - 2. A list of the chemicals to be monitored through the analysis of groundwater samples and a monitoring schedule if ground water monitoring is anticipated to be required;
 - 3. A detailed description of the activities conducted at the facility that involve the storage, handling, treatment, use or production of hazardous materials in quantities greater than the maximum allowable amounts as stated in Section 10-32-7-A;
 - 4. A description of the primary and any secondary containment devices proposed, and, if applicable, clearly identified as to whether the devices will drain to the storm or sanitary sewer;
 - 5. A proposed Hazardous Material Management Plan for the facility that indicates procedures to be followed to prevent, control, collect and dispose of any unauthorized release of a hazardous material;
 - 6. A description of the procedures for inspection and maintenance of containment devices and emergency equipment;
 - 7. A description of the plan for disposition of unused hazardous materials or hazardous material waste products over the maximum allowable amounts including the type of transportation, and proposed routes.

- E. The Director shall review the application and make a decision based on the standards contained in Section 10-32-7, after consulting with the Building Official, Fire Marshall, Planning Director, and the manager of HWD, as appropriate.

10-32-6: EXEMPTIONS:

This Section does not exempt any material or use from Fire Code regulations adopted by the City.

- A. Exemptions are as specified in this Section unless the Director, in consultation with the Fire Marshall, determines that a hazardous material, activity, and/or facility that is exempt pursuant to this Section has a significant or substantial potential to degrade groundwater quality. Then the Director may require compliance with the requirements of this Section related to that hazardous material, activity or facility. This determination will be based upon site and/or chemical-specific data and are eligible for appeal to the Planning Commission, as specified in Section 10-32-9.
- B. Unless otherwise provided herein, the following materials are exempt from regulation hereunder:
 - 1. Use, storage and handling of specific hazardous materials that do not present a risk to the aquifer, as determined and listed by the Director, are exempt from all regulation under this Section with the exception of the potential requirement to list these hazardous materials on the Hazardous Material Inventory Statement as found in the most recent Fire Code regulations adopted by the City. A Hazardous Materials Exemption Request may be submitted to the Director for Hazardous Materials that can be demonstrated to pose no threat to the aquifer. These materials may be exempted from regulation and added to the list. The demonstration of no threat is the responsibility of the applicant seeking the exemption and will be subject to review by technical experts.
 - 2. Hazardous materials offered for sale in their original sealed containers of 5 gallons or less are exempt from the 500-gallon storage limit specified in Section 10-32-7-A-1.
 - 3. Hazardous materials in fuel tanks and fluid reservoirs attached to a private or commercial motor vehicle and used directly in the motoring operation of that vehicle, or machinery, including, but not limited to: fuel, engine oil and coolant.
 - 4. Fuel oil used in existing heating systems.
 - 5. Emergency use, storage, and handling of hazardous materials by governmental organizations in the public interest.

6. Hazardous materials used and stored specifically for water treatment processes of public water systems and private systems for the same purposes when approved by the Director.
7. Hazardous materials contained in properly operating sealed units (including, but not limited to: transformers, refrigeration units) that are not opened as part of routine use.
8. Local natural gas distribution lines, when available.
9. Fuel for emergency generators located at facilities that provide essential community services (including, but not limited to: hospitals, fire/life safety, police, public shelters, and telephone systems).
10. Any commonly used office supply—including, but not limited to: correcting fluid for typewriters, toner for computer printers or cleaners for windows and bathrooms—where the supplies are purchased off-site for use on-site.
11. Aggregate quantities equal to or less than 20 gallons of hazardous materials that do not contain DNAPLs.⁸

10-32-7: STANDARDS FOR HAZARDOUS MATERIALS WITHIN TOTZ

Applications shall comply with the following standards. Where the following standards are more restrictive than the standards of the Florence Fire Code, the following standards shall apply:

A. Five to Ten Year TOTZ Standards.

1. The storage, handling, treatment, use, application, or production or otherwise keeping on premises of more than 20 gallons of hazardous materials that pose a risk to groundwater in aggregate quantities not containing DNAPLs are allowed only upon compliance with containment and safety standards specified by the most recent applicable Fire Code.
2. Unless exempted, all hazardous or other materials that pose a risk to groundwater shall be stored in areas with approved secondary containment in place (Fire Code).
3. All new use of DNAPLs are prohibited.
4. Any change in the type of use or an increase in maximum daily inventory quantity of any DNAPL is considered a new use and is prohibited.

⁸ DNPLs are organic substances that are relatively insoluble in water and more dense than water. DNAPLs tend to sink vertically through sand and gravel aquifers to the underlying layer. The most common are chlorinated solvents. Significant amounts of DNAPLs are present at chlorinated solvent-contaminated sites, such as manufacturing and degreasing facilities, dry cleaners, wood treaters, and former manufacturing gas plants.

5. The following certain types of facilities or changes in chemical use and/or storage of hazardous or other materials that pose a risk to groundwater are prohibited:
 - a. Hazardous material product pipelines used to transport the hazardous material off of the tax lot where it is produced or used;
 - b. Injection wells, except for dry wells for roof drainage;
 - c. Solid waste landfills and transfer stations;
 - d. Fill materials containing hazardous materials;
 - e. Land uses and new facilities that will use, store, treat handle, and/or produce DNAPLs.
6. Requirements found in the Fire Code for a monitoring program and monitoring methods to detect hazardous or other materials in the secondary containment system shall be met for all amounts of hazardous materials that pose a risk to groundwater unless exempted.
7. The following requirements for inspection and record keeping procedures for monthly in-house inspection and maintenance of containment and emergency equipment for all amounts of hazardous or other materials that pose a risk to groundwater shall be met unless exempted: Schedules and procedures for inspecting safety and monitoring and emergency equipment. The applicant shall develop and follow a written inspection procedure acceptable to the Director for inspecting the facility for events or practices which could lead to unauthorized discharges or hazardous materials. An inspection check sheet shall be developed to be used in conjunction with routine inspections. The check sheet shall provide for the date, time, and location of inspection; note problems and dates and times of corrective actions taken; and include the name of the inspector and the countersignature of the designated safety manager for the facility.

B. Ten to Twenty Year TOTZ Standards.

1. The storage, handling, treatment, use, production or otherwise keeping on premises of more than 20 gallons of hazardous materials that pose a risk to groundwater in aggregate quantities not containing DNAPLs is allowed upon compliance with containment and safety standards specified by the most recent Fire Code adopted by the City
2. All hazardous or other materials that pose a risk to groundwater shall be stored in areas with approved secondary containment in place (Fire Code).

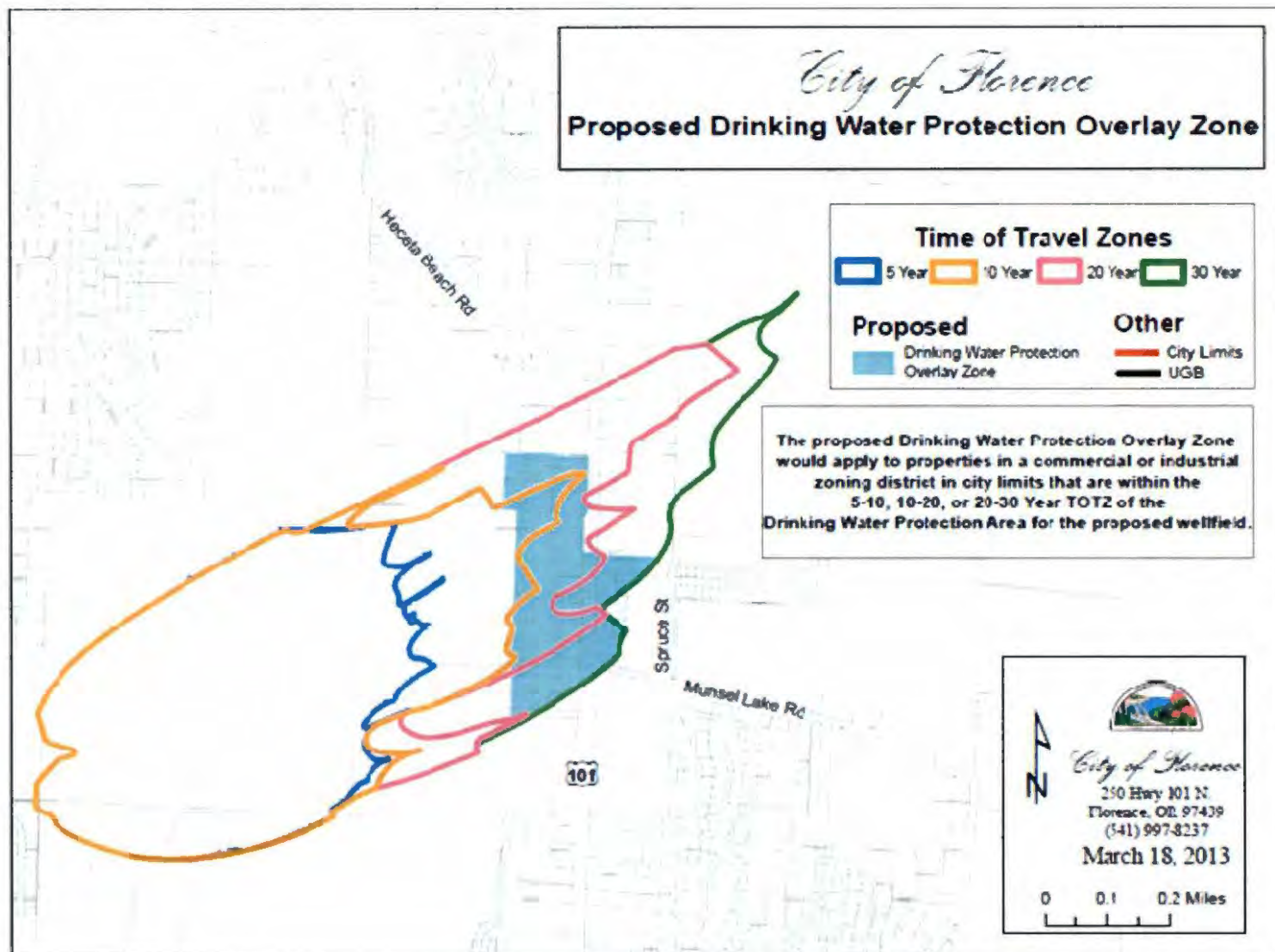
3. All new use of DNAPLs are prohibited.
 4. Any change in type of use or an increase in the maximum daily inventory quantity of any DNAPL is considered a new use and is prohibited.
 5. The following requirements for inspection and record keeping procedures for monthly in-house inspection and maintenance of containment and emergency equipment for all amounts of hazardous or other materials that pose a risk to groundwater shall be met unless exempted: Schedules and procedures for inspecting safety and monitoring and emergency equipment. The applicant shall develop and follow a written inspection procedure acceptable to the Director for inspecting the facility for events or practices which could lead to unauthorized discharges or hazardous materials. An inspection check sheet shall be developed to be used in conjunction with routine inspections. The check sheet shall provide for the date, time, and location of inspection; note problems and dates and times of corrective actions taken; and include the name of the inspector and the countersignature of the designated safety manager for the facility.
- C. Twenty to Thirty Year TOTZ Standards. The storage, handling, treatment, use, production or keeping on premises of more than 20 gallons of hazardous materials that pose a risk to groundwater in aggregate quantities is allowed only upon compliance with containment and safety standards specified by the most recent Fire Code adopted by the City.

10-32-8: CONDITIONS:

The Director may attach conditions of approval that will minimize negative impacts of regulated substances on groundwater and ensure that the facility or the proposed development can fully meet the standards specified in Section 10-32-7. These conditions may include, but are not limited to: on-site monitoring wells, Wellhead Protection Area signs, special storm water facilities or other conditions to address specific risks associated with the proposed development.

10-32-9: APPEALS:

The only portions of this Section that are subject to appeal are: Section 10-32-5-E, the Director's decision on a DWP application, Section 10-32-6, Exemptions, and Section 10-32-7-A-1, Waiver. The decision of the Director may be appealed as specified in Section 10-1-1-7.



2. WETLANDS AND RIPARIAN CORRIDORS

- a. **Amend Florence City Code Title 10 Chapter 7: Special Development Standards to add a new section 10-7-4: Development Standards for Wetlands and Riparian Areas, and renumber sections sequentially. Unless noted otherwise, additions are shown in double underline and deletions in strike-out.**

SECTION:

10-7-1: Purpose

10-7-2: Identification of Wetlands and Riparian Areas and Potential Problem Areas

10-7-3: Development Standards for Potential Problem Areas

10-7-4: Development Standards for Wetlands and Riparian Areas

10-7-45 Site Investigation

10-7-56: Review and Use of Site Investigation Reports (Amended Ord. 10, Series 2009)

10-7-1: PURPOSE: The purpose of this Chapter is to apply additional development standards to areas with wetlands or riparian areas and potential problem areas, such as natural hazards or soils which are particularly subject to erosion, landslide or seasonal surface water. Compliance with these standards is required in order to obtain a Special Use Permit. The standards are intended to: eliminate the danger to the health, safety or property of those who would live in potential problem areas and the general public; and to protect areas of critical environmental concern; areas having scenic, scientific, cultural, or biological importance; and significant fish and wildlife habitat as identified through Goal 5: Open Spaces and Scenic, Historic, and Natural Resources, and Goal 17: Coastal Shorelands. (Amended Ord. No. 10, Series 2009).

10-7-2: IDENTIFICATION OF WETLANDS AND RIPARIAN AREAS AND POTENTIAL PROBLEM AREAS: At minimum, the following maps shall be used to identify wetlands and riparian areas and potential problem areas:

A. "Hazards Map", Florence Comprehensive Plan Appendix 7.

B. "Soils Map", Florence Comprehensive Plan Appendix 7. (Ord. 625, 6-30-80)

C. "Beaches and Dunes Overlay Zone." See Chapter 19 for overlay zone requirements. Where conflicts exist between that chapter and this one, the more restrictive requirements shall apply.

D. 2013 City of Florence Significant Wetlands Map and 2013 City of Florence Significant Riparian Reaches Map in Appendix A of the 2013 Florence Area Local Wetlands and Riparian Inventory (2013 Inventory) and in the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan (2013 Plan), in Comprehensive Plan Appendix 5.

D. E. Other information contained in the plan or adopted by reference into the plan, or more detailed inventory data made available after adoption of the plan

may also be used to identify potential problem areas. (Amended Ord. No. 10, Series 2009)

NOTE: Delete 10-7-3 B, below, and renumber sequentially; and amend section H, as shown.

10-7-3: DEVELOPMENT STANDARDS FOR POTENTIAL PROBLEM AREAS:

The following standards shall be applied to development in potential problem areas unless an approved Phase I Site Investigation Report or an on-site examination shows that the condition which was identified in the Comprehensive Plan or Overlay Zoning Map does not in fact exist on the subject property. These standards shall be applied in addition to any standards required in the Zoning Districts, Comprehensive Plan, and to any requirements shown to be necessary as a result of site investigation. Where conflicts or inconsistencies exist between these Development Standards, City Code, and the Comprehensive Plan, the strictest provisions shall apply unless stated otherwise.

A. Special Flood Hazard Area: All uses proposed in the flood area shall conform to the provisions of the National Flood Insurance Programs.

~~B. Munsel Creek and Other Drainageways: A fifty foot (50') setback shall be required for all buildings from the creek channel, except by Planning Commission approval where it can be shown by accepted engineering practices or treatment that no erosion hazards, slide potential, or possible flood damage are likely to occur, and that riparian vegetation will be protected.~~

~~H.~~ Yaquina Soils and Wet Areas(except significant wetlands and riparian areas identified in the 2013 Wetland and Riparian Inventory, as amended): In areas with seasonal standing water, construction of a drainage system and/or placement of fill material shall be required according to plans prepared by a registered engineer and approved by the City. (Ord. 625, 6-30-80; amd. Ord. 669, 5-17-82) (Amended Ord. 10, Series 2009)

NOTE: Insert new code section 10-7-4:

10-7-4: DEVELOPMENT STANDARDS FOR WETLANDS AND RIPARIAN AREAS

A. Purpose: Significant wetlands, and their related wetland buffer zones, and significant riparian corridors provide hydrologic control of floodwaters; protect groundwater and surface water quality; provide valuable fish and wildlife habitat, including habitat for anadromous salmonids; improve water quality by regulating stream temperatures, trapping sediment, and stabilizing stream-banks and shorelines; and provide educational and recreational opportunities. It is recognized that not all resources will exhibit all of these functions and conditions.

The purpose of this Subsection (FCC 10-7-4) is to protect significant wetlands, wetland buffer zones, and significant riparian corridors in order to:

1. Implement the goals and policies of the Comprehensive Plan;
2. Satisfy the requirements of Statewide Planning Goal 5 and ensure consistency with adopted City Stormwater requirements in Florence City Code Title 9 Chapter 5;
3. Safeguard the City's locally significant wetland and riparian areas, especially the flood control and water quality functions these areas provide for the community;
4. Safeguard fish and wildlife habitat;
5. Safeguard water quality and natural hydrology, to control erosion and sedimentation, and to reduce the adverse effects of flooding;
6. Safeguard the amenity values and educational opportunities for City's wetlands and riparian areas for the community; and
7. Improve and promote coordination among Federal, State, and local agencies regarding development activities near wetlands and riparian areas.

B. Applicability.

1. Affected Property: The procedures and requirements of the Significant Wetland and Riparian Area Standards:
 - a. Apply to any parcel designated as having a Significant Goal 5 Wetland or Significant Goal 5 Riparian Corridor, and Significant Wetland Buffer Zones, as defined in FCC Title 9 Chapter 5 and FCC Title 10 Chapter 1. Significant Goal 5 wetlands and significant riparian corridors are mapped in Appendix A of the 2013 Inventory and Tables 2.1 and 2.2 and the Significant Wetland and Riparian Reaches Maps in the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan (2013 Plan), as amended, in Comprehensive Plan Appendix 5, which is adopted into this Code by reference.
 - b. Apply in addition to the stormwater standards in FCC 9-5-3-3-F (incorporated herein) and the standards of the property's zoning district, except that the required setbacks in this subsection are not in addition to the required setbacks in the underlying zone. Where conflicts exist between this subsection and the underlying zoning district, this subsection shall apply.
2. Applicability to properties adjacent to the side channel of Munsel Creek (Reach RMC-Cs in the 2013 Inventory). These properties are subject to special setback reductions and provisions, as set out below, due to the unique development patterns and history of the area. These special provisions are supported by, and explained in, the Economic, Social, Environmental, and Energy (ESEE) Analysis and Limited Protection Program (ESEE Analysis) in Chapter 3 of the 2013 City of Florence Significant Wet-

lands and Riparian Corridors Plan in Appendix 5 of the Comprehensive Plan. The ESEE Analysis is adopted as part of the Comprehensive Plan and is incorporated herein by reference.

3. Applicability to public facilities in significant wetlands. Public facilities (transportation, water, wastewater, and stormwater) that are included in the City's Public Facility Plan, as amended, are exempt from the requirements of this subsection provided that permitted uses are designed and constructed to minimize intrusion into the riparian area; disturbed areas are replanted with native vegetation; and all required federal and state permits are obtained. This exemption is authorized by the ESEE Analysis in Appendix 5 of the Comprehensive Plan. See Section, "Exemptions," below.

C. Activities Subject to Standards and Requirements: Activities subject to the Special Development Standards in this subsection shall include the following, unless specifically exempted by Code:

1. Partitioning and subdividing of land;
2. New structural development;
3. Exterior expansion of any building or structure, or increase in impervious surfaces or storage areas;
4. Site modifications including grading, excavation or fill (as regulated by the Oregon Department of State Lands and the Army Corps of Engineers), installation of new above or below ground utilities, construction of roads, driveways, or paths, except as specifically exempted in the section "exemptions" below;
5. The cutting of trees and the clearing of any native vegetation within a Significant Wetland, Wetland Buffer Zone, or Riparian Corridor beyond that required to maintain landscaping on individual lots existing on the effective date of this title.

D. Exemptions:

1. Only the following uses and activities in significant riparian corridors or wetland buffer zones are exempt from these Significant Wetland and Riparian Area Standards, provided: the uses and activities are designed and constructed to minimize intrusion into the buffer zone; disturbed areas are replanted with native vegetation; and all required federal and state permits are obtained:
 - a) Replacement of lawfully created existing structures with structures in the same location that do not disturb additional wetland buffer zone or significant riparian surface area. All Coast Village structures existing on (insert date ordinance is adopted) are grandfathered and qualify as "lawfully created existing structures" for purposes of this subsection. This provision supersedes the provisions for non-conforming structures in FCC 10-8.

- b) Installation or maintenance of public and private facilities and utilities (such as transportation, water, wastewater, and stormwater, electric, gas, etc.) in riparian areas.
- c) The sale of property.
- d) Temporary emergency procedures necessary for the safety or protection of property.
- e) All water-related and water-dependent uses as defined in the Definitions in the Florence Code Title 10.
- f) Removal of non-native vegetation and replacement with native plant species.
- g) Removal of vegetation necessary for the development of water-related or water-dependent uses.
- h) Public facilities identified in the City's Public Facility Plan, in Appendix 11 of the Comprehensive Plan, as amended, that are installed in significant wetlands, provided that the facilities are designed and constructed to minimize intrusion into the wetland; disturbed areas are replanted with native vegetation; and all required federal and state permits are obtained.

E. Agency Review: Decisions made by the City of Florence under this title do not supersede the authority of the state or federal agencies which may regulate or have an interest in the activity in question. It is the responsibility of the landowner to ensure that any other necessary state or federal permits or clearances are obtained. In particular, state and federal mitigation requirements for impacts associated with approved water-related or water-dependent uses may still be required.

F. General Development Standards and Requirements: When development is proposed that is subject to these standards, the property owner is responsible for the following. Figure 1 below is a cross section illustrating terms used in the discussion of wetland and riparian setbacks as defined by Oregon Statewide Planning Goal 5.

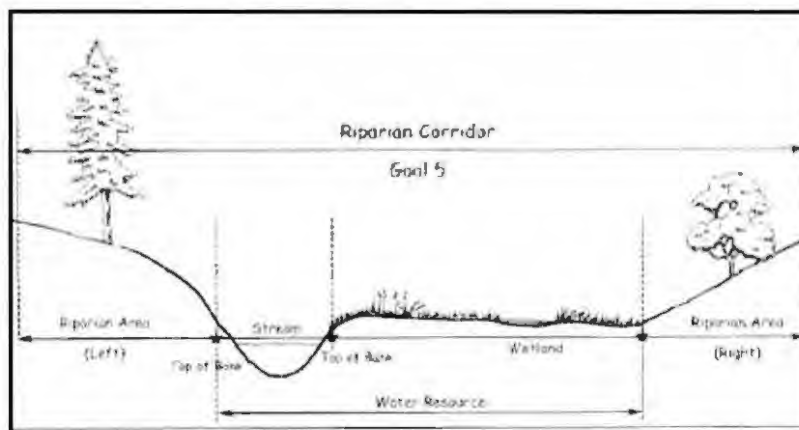


Figure 1: Downstream cross section illustrating terms used in Statewide Planning Goal 5. Source: *Urban Riparian Inventory and Assessment Guide*, Oregon Department of State Lands, 1998.

1. Determination of Significant Wetland and Riparian Area Boundaries.
 - a. For the purpose of showing the boundary of a significant wetland on a site plan, property owners may choose one of the following options:
 - 1) hire a Qualified Professional to do the delineation and have the delineation approved by the Oregon Department of State Lands (DSL); or
 - 2) hire a Qualified Professional to do the delineation but do not request DSL approval of the delineation. The Qualified Professional must have performed prior wetland delineations that were approved by DSL; or
 - 3) If the site plan shows the proposed development is outside the 50 foot Stormwater Buffer Zone, the wetland boundaries shown on the adopted Local Wetland Inventory (LWI) Map can be used to determine the wetland boundary for this purpose.
 - b. For significant riparian corridors, the width of the corridor boundary is the "significant riparian width" in Table 2.2 of the 2013 City of Florence Significant Wetlands and Riparian Corridor Plan in Comprehensive Appendix 5.
 - c. For significant riparian corridors, the boundaries of the riparian corridor will be measured and shown on an approved site plan. The City shall maintain maps of regulated riparian areas, and make them available to the public. These maps will be used to identify the extent of the riparian area unless the applicant can demonstrate through detailed inventory information (including maps, photos, and Lane County aerial photos showing the location and species of vegetation growing in the disputed area) that the city's maps are in error. For purposes of making these measurements, the following shall apply:
 - 1) Riparian buffer zones are measured horizontally from the top of bank. The top of the bank is the highest point at which the bank meets the grade of the surrounding topography, characterized by an abrupt or noticeable change from a steeper grade to a less steep grade, and, where natural conditions prevail, by a noticeable change from topography or vegetation primarily shaped by the presence and/or movement of the water to topography not primarily shaped by the presence of water. Where there is more than one such break in the grade, the uppermost shall be considered the top of bank.
 - 2) If the top of the bank is not identifiable, the riparian buffer zones are measured horizontally from the line of ordinary high water. In a given stream, the line of ordinary high water is the line on the bank or shore to which seasonal high water rises annually and identified in the field by physical characteristics that include one or more of the following:
 1. A clear, natural line impressed on the bank
 2. Changes in the characteristics of soils

3. The presence of water-borne litter and debris
4. Destruction of terrestrial vegetation

If reliable water level data are available for 3 or more consecutive previous years, the line of ordinary high water can be considered the mean of the highest water level for all years for which data are available.

2. Preparation and submission of a site plan (vegetation clearing permits are also subject to the submission requirements in FCC Title 4 Chapter 6) that shows:
 - a. the wetland boundary or the top of bank of the riparian corridor,
 - b. the significant riparian corridor width or the wetland buffer zone,
 - c. the footprint of the proposed structure measured from the riparian corridor boundary or wetland buffer zone edges,
 - d. any requested setback adjustments as measured from the edge of the wetland or riparian corridor boundary,
 - e. the type and location of dominant existing native plants that would be displaced, and
 - f. the type of native plants to be planted and the location where they will be replanted.
3. It is prohibited to permanently alter a significant wetland by: the placement of structures or impervious surfaces; or by the removal of native vegetation; or by grading, excavation, placement of fill, or vegetation removal (other than perimeter mowing and other cutting necessary for hazard prevention), except as follows:
 - a) where full protection of the Significant Wetland renders a property unbuildable, as defined in the definitions in Title 10 Chapter 1 of this Code; or
 - b) public facilities identified in the City's Public Facility Plan, Appendix 11 of the Comprehensive Plan, as amended, may be installed in significant wetlands or riparian areas, provided that the facilities are designed and constructed to minimize intrusion into the wetland or riparian area; disturbed areas are replanted with native vegetation; and all required federal and state permits are obtained.

G. Stormwater Quality: As provided in FCC 9-5-5-3-F and the Code Definitions in FCC-10-1, significant wetlands over ½ acre and significant streams are "sensitive areas" that shall be protected by a buffer zone of native, undisturbed vegetation. The outer boundary of the buffer shall be determined by a minimum 50-foot setback from the edge of the significant wetland; for significant riparian areas, the buffer zone shall be the significant riparian width identified in the 2013 Inventory and 2013 City of Florence Significant Wetlands and Riparian Corridors Plan. The width and nature of protection required within the buffer may change as the Endangered Species Act and other state

and federal regulations are promulgated. The City requires that the buffer width meet all state and federal requirements.

No land disturbing activities, structures, development and construction activities, gardens, lawns, application of chemicals, pet wastes, dumping of any kind of materials shall be permitted within the buffer zone, except as noted below:

1. Roads, pedestrian, or bike paths crossing the buffer from one side to the other in order to provide access to or across the sensitive area.
2. A pedestrian or bike path constructed within a buffer and parallel to a sensitive area shall have the buffer widened by the width of the path if the path is constructed of impervious material.
3. Pedestrian or bike paths shall not exceed 10-feet in width.
4. Utility/service infrastructure construction (i.e., storm, sanitary sewer, water, phone, gas, cable, etc.) If approved by the City Manager or his/her designee.
5. Measures to remove or abate hazards, nuisance, or fire and life safety violations as approved by the City.
6. Enhancement of the riparian corridor for water quality or quantity benefits, fish, or wildlife habitat as approved by the City and other appropriate regulatory authorities.
7. Water quality facilities planted with appropriate native vegetation may encroach into the buffer area as approved by the City and other appropriate authorities.

H. Additional Statewide Planning Goal 5 exceptions: The following exceptions are in addition to the exceptions in G, above. Consistent with Statewide Planning Goal 5 [OAR 660-023-0090 (8) (a)], the permanent alteration of significant riparian areas by grading or the placement of structures or impervious surfaces is prohibited, except for the following uses, provided they are designed and constructed to minimize intrusion into the riparian area:

1. Water-related and water-dependent uses and removal of vegetation necessary for the development of water-related or water-dependent uses;
2. Replacement of existing structures with structures in the same location that do not disturb additional riparian surface area; and
3. Removal of non-native vegetation and replacement with native plant species.

I. Removal of native vegetation: In accordance with Goal 5, removal of vegetation from a significant riparian corridor is prohibited, except as otherwise provided in these Wetland and Riparian Standards and in FCC 4-6-3 and for the following:

1. Removal of non-native vegetation and replacement with native plant species. The replacement vegetation shall cover, at a minimum, the area from which vegetation was removed, shall maintain or exceed the density of the

removed vegetation, and shall maintain or improve the shade provided by the vegetation.

2. Removal of vegetation necessary for the development of approved water-related or water-dependent uses or for the continued maintenance of dikes, drainage ditches, or other stormwater or flood control facilities. Vegetation removal shall be kept to the minimum necessary.
3. Trees in danger of falling and thereby posing a hazard to life or property may be removed, following consultation and approval from the Planning Director. If no hazard will be created, the Planning Department may require these trees, once felled, to be left in place in the Significant Wetland or Riparian Area.
4. The control or removal of nuisance plants should primarily be by mechanical means (e.g. hand-pulling). If mechanical means fail to adequately control nuisance plant populations, a federally approved herbicide technology for use in or near open water is the only type of herbicide that can be used in a Significant Riparian Corridor. Pre-emergent herbicides or auxin herbicides that pose a risk of contaminating water shall not be used. Herbicide applications are preferred to be made early in the morning or during windless periods at least 4 hours before probable rainfall. Any herbicide use must follow the label restrictions, especially the cautions against use in or near open water.

J. Special provisions for the Munsel Creek Side Channel: The following special provisions apply to properties in the significant riparian corridor of the Munsel Creek side channel (Reach RMC-Cs in Table 2.2 of the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan). These provisions are in addition to, or provide relief from, the other standards in this subsection, and, where conflicts exist, this section shall prevail.

1. In addition to the other setback adjustments and Variances allowed by this subsection, a 50% setback adjustment to the required 50-foot significant riparian width for properties along the Munsel Creek side channel will be permitted in order to allow new or expanded development to build up to 25 feet from the top of bank of the creek, as long as any native plants disturbed by the development are replaced elsewhere in the buffer zone, subject to the following exceptions and procedures:
 - a. Properties in Florentine Estates PUD that were granted a reduced setback by the Planning Commission prior to the (inset date of this ordinance) are deemed to comply with the standards in this subsection and do not need to apply for this setback adjustment.
 - b. The setback adjustment for other affected properties shall be granted through the Administrative Review process in 10-1-1-6.
 - c. The applicant shall be granted the setback reduction upon demonstration that any native vegetation displaced by the development shall be replanted in the remaining buffer zone (shrub for shrub, tree for tree, etc.).

- d. The applicant is not required to retain a professional for this application but a qualified professional may help a property owner identify displaced native plants and show how they will be replanted. To provide technical assistance, the City will provide the applicant with a native plant guide. Staff from the Siuslaw Watershed Council and Soil and Water Conservation District are available to provide property owners with technical assistance with native plant identification and guidance on replanting.

K. Setback Adjustments: The following reductions in setbacks shall be allowed for properties affected by the significant wetland and riparian area standards as set out below.

1. Eligibility for setback adjustment. Property owners affected by these significant wetland and riparian corridor standards shall be eligible for setback adjustments as follows:
 - a. Single family dwellings: when the significant wetland or significant riparian corridor standard or requirement is such that no contiguous space exists outside the setback that allows for a dwelling unit at least 50 feet by 27 feet.
 - b. For the Munsel Creek side channel: the "required setback" for the purpose of eligibility for the setback adjustment is the reduced setback allowed in subsection "J" above.
2. If the required setback or standard for the significant wetland or riparian corridor is such that no contiguous space exists outside the setback that allows for a dwelling unit at least 50 feet by 27 feet, then a primary dwelling, this size or less, shall be permitted to intrude into the setback area in accordance with the standards of this subsection. Any Code requirements of the applicable zoning district (such as required garages) that would necessitate intrusion into additional riparian area shall not apply.
3. If the proposed primary dwelling will be more than 20 feet from a significant or wetland or stream, the adjustment application shall use the Administrative Review process in FCC 10-1-1-6.
4. If a proposed primary dwelling will be built within 20 feet of a significant wetland or stream, a Hardship Variance from the Planning Commission shall be required in accordance with Florence City Code Title 10 Chapter 4.

L. Hardship Variances: A variance to the provisions of this subsection shall be granted by the Planning Commission in accordance with the procedures in Florence City Code Title 10 Chapter 4 only as a last resort and is only considered necessary to allow reasonable economic use of the subject property. The property must be owned by the applicant and not created after the effective date of this title.

1. Eligibility. An application for a hardship variance from the provisions of this subsection shall be available upon demonstration of the following conditions:

- a. Siting of a primary dwelling 50 feet by 27 feet or less requires intrusion into the significant wetland buffer zone or significant riparian corridor within 20 feet of a significant wetland or stream; or
 - b. Strict adherence to the applicable standards or requirements of this subsection would effectively preclude a use of the parcel that could be reasonably expected to occur in the zone and that the property owner would be precluded a substantial property right enjoyed by the majority of landowners in the vicinity.
 - c. Due to unique circumstances and historic development patterns outside the control of the property owners, the Variance fee for this application shall be waived for affected Coast Village properties.
2. The following additional standards shall apply:
- a. Demonstration that the intrusion into the setback must be the minimum necessary;
 - b. Demonstration that any native vegetation displaced by the development will be replanted in the remaining significant wetland buffer zone or riparian corridor. The applicant is not required to retain a professional for this application but a qualified professional may help a property owner identify displaced native plants and show how they will be replanted. To provide technical assistance, the City will provide the applicant with a native plant guide; staff from the Siuslaw Watershed Council and Soil and Water Conservation Service are available to provide property owners with technical assistance with native plant identification and guidance on replanting.
 - c. Permanent alteration of the Significant Wetland or Riparian Area by an action requiring a variance is subject any mitigation requirements imposed by federal and state permitting authorities.
 - d. In granting a Variance, the Planning Commission shall impose conditions of approval that address all of the following criteria:
 - 1) The site plan and application shall document the location of the impact, the existing conditions of the resource prior to the impact, a detailed planting plan for the approved setback area with dominant native plant species and density, and a narrative describing how the impacted resource will be replaced and approved setback area restored.
 - 2) Invasive vegetation shall be removed from, and native vegetation planted in, the approved setback area, with a minimum replacement ratio of 1:1 for the impacted area.
 - 3) Herbicides and pesticides not approved for use in buffer zones or riparian areas is prohibited in the approved setback area.
 - 4) All vegetation planted within the approved setback area shall be native to the region. In general, species to be planted shall replace those impacted by the development activity, i.e., trees must replace trees, brush must replace brush, and, within reason, like plants must replace like plants (i.e., dominant plant species).

- 5) Trees shall be planted at a density not less than the density in place prior to development.
- 6) The property owners will work with available federal, state, and local agencies, such as the Siuslaw Watershed Council, the Siuslaw Soil and Water Conservation District, ODFW, DSL, STEP to implement practices and programs to restore and protect the riparian area.

M. Significant wetland and riparian corridor enhancement incentives:

1. Enhancement of Significant Wetland Buffer Zones or Riparian Corridors is encouraged, including: riparian or in-channel habitat improvements, non-native plant control, and similar projects which propose to improve or maintain the quality of a Significant Wetland or Riparian Area; however, no enhancement activity requiring the excavation or filling of material in a wetland or jurisdictional stream shall be allowed unless all applicable State and Federal permits have been granted.
2. Incentives shall be provided to improve the continuity of Significant Riparian Corridors in situations where lots would be rendered unbuildable by the setback, as defined in the Definitions in FCC Title 10 Chapter 1. Such incentives may include: reducing the required front yard setback, alternative access, vacating right-of-way, property line adjustments, re-orientation of lots, transfer of development rights (if feasible), and density bonuses, among others. The resulting development will conform, to the maximum extent practical, to the general development patterns in the vicinity of the affected lot.
3. These incentives may also be provided to properties that are severely impacted by the setback when doing so will result in enhancement of the significant wetland, wetland buffer zone, or significant riparian corridor.

L. Inventory map corrections: The Planning Director may correct the location of a wetland or riparian boundary shown on the Local Wetland and Riparian Areas Inventory Maps when it has been demonstrated by a property owner or applicant that a mapping error has occurred and the error has been verified by DSL. Wetland delineations verified by DSL shall be used to automatically update and replace the City's Local Wetland Inventory mapping. No variance application shall be required for map corrections where approved delineations are provided.

b. Consistency Amendments: Amend FCC Title 9 Chapter 5 stormwater management definitions and buffer zone provisions; Title 10 Chapter 1 Definitions, and Title 10 Chapter 19, Prime Wildlife District; and Title 4 Chapter 6 Vegetation Clearing Permit requirements, for internal Code consistency.

The following Code amendments are proposed for consistency with the proposed Comprehensive Plan and Code amendments or are otherwise for consistency

with state law. Unless noted otherwise, deletions are in strike out and additions in double underline.

FCC TITLE 9, CHAPTER 5

STORMWATER MANAGEMENT UTILITY, USER FEE SYSTEM AND STORMWATER MANAGEMENT REQUIREMENTS

9-5-1-2: DEFINITIONS

SENSITIVE AREAS Significant wetlands greater than ½ acre and significant streams identified in the 2013 Florence Area Local Wetlands and Riparian Inventory, as amended. Natural streams (perennial or intermittent), rivers, including the estuary, and lakes, or wetlands hydraulically connected by surface water to streams, rivers, or lakes and areas defined by the City of Florence's Local Wetlands and Riparian Inventory. Also, includes all areas that are protected for species as per areas designated by Oregon Department of Fish and Wildlife, Oregon ~~Division~~Department of State Lands, National Marine Fisheries Service, United States Fish and Wildlife Service and Oregon Department of Transportation.

9-5-3-3: STORM WATER QUALITY

- F. Sensitive areas shall be protected by a buffer zone of native, undisturbed vegetation. The outer boundary of the buffer shall be determined by a minimum 50-foot setback from the edge of the sensitive area, or as wider if required by other City Code provisions~~requirements.~~ (See additional standards and requirements for significant wetlands and significant riparian corridors in Florence City Code Title 10, Chapter 7; and for the Estuary, Coastal Shorelands, and Beaches and Dunes in Title 10 Chapter 19.) The width and nature of protection required within the buffer may change as the Endangered Species Act and other state and federal regulations are promulgated. The City requires that the buffer width meet all state and federal requirements. No land disturbing activities, structures, development and construction activities, gardens, lawns, application of chemicals, pet wastes, dumping of any kind of materials shall be permitted within the buffer zone, except as noted below:
1. Roads, pedestrian, or bike paths crossing the buffer from one side to the other in order to provide access to or across the sensitive area.
 2. A pedestrian or bike path constructed within a buffer and parallel to a sensitive area shall have the buffer widened by the width of the path if the path is constructed of impervious material.
 3. Pedestrian or bike paths shall not exceed 10-feet in width.

4. Utility/service infrastructure construction (i.e., storm, sanitary sewer, water, phone, gas, cable, etc.) If approved by the City Manager or his/her designee.
5. Measures to remove or abate hazards, nuisance, or fire and life safety violations as approved by the City.
6. Enhancement of the riparian corridor for water quality or quantity benefits, fish, or wildlife habitat as approved by the City and other appropriate regulatory authorities.
7. Water quality facilities planted with appropriate native vegetation may encroach into the buffer area as approved by the City and other appropriate authorities.

FCC Title 10, Chapter 1: Zoning Administration

FCC 10-1-4: DEFINITIONS

Insert the following definitions in alphabetical order into FCC 10-1-4. Where an existing definition is proposed to be modified, additions are shown in double underline and deletions in strike-out.

BANKFULL STAGE	Means the elevation at which water overflows the natural banks of the stream.
BIOENGINEERING	Means a method of erosion control and landscape restoration using live plants, such as willows.
BUFFER ZONE	A physical setback from a sensitive area used to protect the <u>flood storage capacity</u> , water quality, the aquatic and riparian wildlife communities, and the habitat value within the sensitive area. The start of the buffer starts at the edge of the defined channel (bank full stage) for streams/rivers, delineated wetland boundary, delineated spring boundary, or average high water for lakes.
BUILDING	Any temporary or permanent structure constructed and maintained for the support, shelter, or enclosure of people, motor vehicles, animals, chattels or personal or real property of any kind. The words "building" and "structure" shall be synonymous.
DELINEATION	Means a wetland delineation report that contains the methods, data, conclusions and maps used to determine if wetlands and/or other waters of the state are present on a land parcel and, if so, describes and maps their location and geographic extent. A wetland determination report documenting wetland presence or absence is included within this definition.

ENHANCEMENT	An action which results in a long-term improvement of existing functional characteristics and processes that is not the result of a creation or restoration action. <u>Enhancement is a modification of a wetland or riparian area to improve its condition. Enhancement is conducted only on degraded features, results in a net gain in functions and values, and does not replace or diminish existing functions and values with different ones unless justified as ecologically preferable.</u>
EXCAVATION	Means removal of organic or inorganic material (e.g. soil, sand, sediment, muck) by human action.
IMPERVIOUS SURFACE	Means any material (e.g. rooftops, asphalt, concrete) which reduces or prevents absorption of water into soil.
INVASIVE VEGETATION	Includes plants that appear on the current Oregon Department of Agriculture Noxious Weed List, plus known problem species including <i>Phalaris arundinacea</i> , <i>Holcus lanatus</i> , and <i>Anthoxanthum odoratum</i> . In addition, any non-native plant species may be considered invasive if it comprises more than 15% of the total plant cover and appears to be increasing in cover or frequency over time.
LAWN	Means grass or similar materials usually maintained as a ground cover of less than 6 inches in height. For purposes of this title, lawn is not considered native vegetation regardless of the species used.
MITIGATION	The creation, restoration, or enhancement of an estuarine area to maintain the functional characteristics and processes of the estuary, such as its natural biological productivity, habitats, and species diversity, unique features and water quality. <u>For wetlands and riparian areas, "mitigation" is a means of compensating for impacts to a Wetland or and Riparian Area or its buffer including: restoration, creation, or enhancement. Some examples of mitigation actions are construction of new wetlands to replace an existing wetland that has been filled, replanting trees, removal of nuisance plants, and restoring streamside vegetation where it is disturbed.</u>
NATIVE VEGETATION	Means plants identified as naturally occurring and historically found within the City of Florence.
QUALIFIED PROFESSIONAL	Means an individual who has proven expertise and vocational experience in a given natural resource field. A qualified professional conducting a wetland

REVIEW AUTHORITY	delineation must have had a delineation approved by the Oregon Department of State Lands.
RIPARIAN AREA	Means the City of Florence. Means the area adjacent to a river, lake, or stream, consisting of the area of transition from an aquatic ecosystem to a terrestrial ecosystem. For purposes of this title, riparian areas are identified on the Significant Wetlands and Riparian Areas Map in the Comprehensive Plan.
RIPARIAN CORRIDOR	Means a Goal 5 Resource that includes the water areas, adjacent riparian areas, and wetlands within the riparian area boundary. For purposes of this title, riparian corridors are identified on the Significant Wetlands and Riparian Areas Map in the Comprehensive Plan.
SENSITIVE AREA	<u>Significant wetlands greater than ½ acre and significant streams identified in the 2013 Florence Area Local Wetlands and Riparian Inventory, as amended.</u> Natural streams (perennial or intermittent), rivers, including the estuary, and lakes, or wetlands hydraulically connected by surface water to streams, rivers, or lakes and areas defined by the City of Florence's Local Wetlands and Riparian Inventory. Also, includes all areas that are protected for species as per areas designated by Oregon Department of Fish and Wildlife, Oregon Division Department of State Lands, National Marine Fisheries Service, United States Fish and Wildlife Service and Oregon Department of Transportation.
SHRUBS	Consists of woody plants less than 3 inches in diameter at breast height, regardless of height.
SIGNIFICANT WETLANDS AND RIPARIAN AREAS	Wetlands and riparian corridors identified as significant by the 2013 Florence Area Local Wetlands and Riparian Inventory and the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan, as amended, and designated significant by the local government.
SIGNIFICANT WETLAND BUFFER ZONE	The 50 foot buffer zone required by the stormwater management requirements of FCC 9-5-3-3-F, measured on accordance with the boundary determinations in FCC 10-7 standards and requirements for wetlands and riparian corridors.

STATE AND FEDERAL
NATURAL RESOURCE
AGENCY

The Oregon Department of State Lands, Oregon Department of Fish and Wildlife, U.S. Army Corps of Engineers, U.S. Department of Agriculture Natural Resources Conservation Service, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, and Department of Environmental Quality.

STREAM

A channel such as a river or creek that carries flowing surface water, including perennial streams and intermittent streams with defined channels, and excluding man-made irrigation and drainage channels. A perennial stream is one that flows continuously. An intermittent or seasonal stream is one that flows only at certain times of the year.⁹

STRUCTURE

~~See "Building." For the purposes of administering Code Chapters 7, 18, 19, and 24, the definition shall also mean Anything constructed, installed, or portable, and the use of which requires a location on a parcel of land or on the ground, either above or below water.~~

SUBSTANTIAL
IMPROVEMENT

Any repair, reconstruction, or improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure either:

- (a) Before the improvement or repair is started, or
- (b) If the structure has been damaged and is being restored, before the damage occurred. For the purposes of this definition "substantial improvement" is considered to occur when the first alteration of any wall, ceiling, floor, or other structural part of the building commences, whether or not that alteration affects the external dimensions of the structure. The term does not, however, include either:
 - (1) Any project for improvement of a structure to comply with existing state or local health, sanitary, or safety code specifications which are solely necessary to assure safe living conditions, or
 - (2) Any alteration of a structure listed on the National Register of Historic Places or a State Inventory of Historic Places.

TREE

Consists of woody plants 3 inches or more in diameter at breast height, regardless of height.

⁹ Department of State Lands (DSL) and U.S. Geological Survey (USGS) definitions.

TOP OF BANK	Refers to the location where the rising ground bordering a stream intersects the side of the stream channel. The stream channel is typically non-vegetated, and the top of bank normally corresponds with the bankfull stage. In the absence of physical evidence, the two-year recurrence interval flood elevation may be used to delineate the top of bank.
UNBUILDABLE.	<p>Lots that are rendered "unbuildable" by the required setback for significant wetlands and riparian areas.</p> <ul style="list-style-type: none"> a) For single family housing, lots are considered unbuildable if the required setback for the significant wetland or riparian area is such that no contiguous space exists outside the setback that allows for a dwelling unit at least 50 feet by 27 feet.¹⁰ b) For all properties, lots are deemed unbuildable if strict adherence to the applicable setback standards and conditions would effectively preclude a use of the parcel that could be reasonably expected to occur in the zone and that the property owner would be precluded a substantial property right enjoyed by the majority of landowners in the vicinity. c) For the Munsel Creek side channel (Reach RMC-Cs in the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan in Appendix 5 of the Comprehensive Plan), the "required setback" for the purpose of the unbuildable definition, is the reduced setback allowed in FCC Title 10 Chapter 7.
WETLANDS	<p>Land areas where water is the dominant factor determining the nature of soil development and the types of plant and animal communities living at the soil surface. Wetland soils retain sufficient moisture to support aquatic or semi-aquatic plant life. In marine and estuarine areas, wetlands are bounded at the lower extreme by extreme low water; in freshwater areas, by a depth of six feet. The areas below wetlands are submerged lands. Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Based on the above definition, three major factors characterize a wetland: hydrology, soils, and plants.</p>

¹⁰ Note: A 50 foot by 27 foot area allows the siting of a typical double-wide manufactured home, a form of affordable housing.

**WETLAND
BOUNDARY**

The edges of a wetland as delineated by a qualified professional or as determined through the standards in FCC Title 10 Chapter 7.

FCC 10-19-9: PRIME WILDLIFE OVERLAY DISTRICT /PW

Note: The following Code amendments make the Code consistent with the proposed Comprehensive Plan and Code amendments as well as Statewide Planning Goal 2 (Land Use) and Goal 17 (Coastal Shorelands).

A. Purpose and Application:

Purpose: The purpose of the /PW District is to protect areas in and adjacent to the North Jetty Lake and the South Heceta Junction Seasonal Lakes that have native vegetation and habitats of specific species of concern and to protect wildlife habitat, water quality, bank stability and provide flood control. The requirements imposed by the /PW District shall be in addition to those imposed by the base zoning district. Where the requirements of the /PW District conflict with the requirements of the base zoning district or the Comprehensive Plan, the more restrictive requirements shall apply.

Application: The Prime Wildlife Overlay District (/PW) is applied within the Florence city limits to Coastal Lake Shorelands identified in inventory information and designated in the Comprehensive Plan as possessing areas of unique biological assemblages, habitats of rare or endangered species, or a diversity of wildlife species. The /PW Overlay applies to the North Jetty Lake Shorelands as shown on the Florence Coastal Overlay Zoning Map. The extent of the /PW Overlay application for the South Heceta Junction Seasonal Lakes shall be determined through a Preliminary Investigation as specified below.

Preliminary Investigation: Any land use or building permit application within the /PW District as it applies to the South Heceta Junction Seasonal Lakes shall require a preliminary investigation by the Planning Director to determine the specific area to which the requirements of the district shall apply. The requirements of the district shall apply in an area generally identified on the Florence Coastal Overlay Zoning Map and the 2013 Local Wetland Inventory, as amended, and, specifically, in the site-specific information submitted by an applicant to determine whether the site possesses areas of unique biological assemblages, habitats of rare or endangered species, or a diversity of wildlife species ~~identified in the Coastal Resources Inventory,~~ or function to provide or affect water quality, bank stability or flood control, as identified in the Lane County Coastal Resources Inventory or the wetland functions and values in the 2013 Florence Area Local Wetlands and Riparian Inventory, as amended.

FCC 4-6-3: VEGETATION CLEARING PERMIT REQUIRED:

- A. A vegetation clearing permit shall be required in any of the following circumstances:...
1. Clearing native vegetation from... areas which have been designated by the City as a significant riparian corridor, significant wetland buffer zone, greenbelt, or view corridor.

FCC 4-6-4: PROCEDURE FOR OBTAINING A VEGETATION CLEARING PERMIT:

- A. ~~A~~ No vegetation clearing permit application is required will be accepted unless the application also includes a concurrent application for a building permit or Conditional Use Permit, except that the criteria in FCC 4-6-4 C shall also apply to any removal of native vegetation from a significant riparian or wetland buffer zone requested as part of a setback adjustment granted under FCC 10-7-4..
- B. All requests for a Vegetation Clearing Permit shall be submitted to the ~~Community Development~~ Planning Department on a form available from that department, and containing the following minimum information. (See FCC 10-7-4 for additional submission requirements for areas within significant wetland or riparian buffer zones):...
- C. The ~~Planning~~ Community Development Department shall process the Vegetation Removal Permit application through the Administrative Review procedures in FCC Title 10 Chapter 1 and forward a report to the Design Review Board within thirty (30) days of filing a complete application. Review and approval ~~by the Design Review Board~~ shall be based on the following criteria, as applicable to the request:
1. The necessity to remove native vegetation in order to construct proposed improvements or otherwise utilize the property in a reasonable manner consistent with the City Code and policies;
 2. The environmental and physical impacts such clearing may have, including visual drainage, wind erosion, protection of adjoining property and structures, and impacts on significant riparian corridors or wetland buffer zones. and impacts on any affected significant wetland or riparian buffer zones shall be supported by a qualified professional or through consultation with staff from the Soil and Water Conservation District, Siuslaw Watershed Council, ODFW, OSU, or another person or agency with knowledge or experience with the affected resource;
 3. The adequacy of the applicant's proposed landscaping or revegetation plan, including plant selection, staking, irrigation, and other maintenance provisions.

3. **Housekeeping Amendment: Adopt an amendment to FCC Title 10 Chapter 19 to make the Code consistent with Statewide Planning Goal 16. See discussion, below, for rationale.**

FCC 10-19-4: DEVELOPMENT ESTUARY DISTRICT (DE):

- F. Conditional Uses: Outside of Areas Managed for Water Dependent Activities, the following uses and activities are allowed in the estuary with a Conditional Use Permit, subject to the applicable criteria....

10. Water-related uses, non-water-dependent uses, and non-water-related uses, provided no dredge or fill is involved, ~~and it is not possible to locate the use on an upland site. In approving these uses, the City shall consider the potential for using upland sites to reduce or limit the commitment of the estuarine surface area for surface uses.~~ Nonwater-dependent and non-water-related uses that existed as of July 7, 2009 will retain their non-conforming status for five years from the date the use is abandoned or the structure is destroyed; and the existing structure for the same use may be replaced; the provisions of non-conforming uses in the Florence City Code not withstanding.

Discussion:

The amendment is consistent with the direction in Goal 16:

“Oregon’s Statewide Planning Goals & Guidelines, GOAL 16: ESTUARINE RESOURCES, OAR 660-015-0010(1) Management Units As a minimum, the following kinds of management units shall be established:... 3. Development: ... As appropriate the following uses shall also be permissible in development management units: ... Where consistent with the purposes of this management unit and adjacent shorelands designated especially suited for water-dependent uses or designated for waterfront redevelopment, water-related and nondependent, nonrelated uses not requiring dredge or fill; mining and mineral extraction; and activities identified in (1) and (2) above shall also be appropriate. In designating areas for these uses, local governments shall consider the potential for using upland sites to reduce or limit the commitment of the estuarine surface area for surface uses.”

City of Florence
Joint City Council & Planning Commission Work Session Minutes
April 15, 2013

CALL TO ORDER

Mayor Xavier opened the joint work session at 6:00 p.m. Other members present included Councilor Brian Jagoe, Councilor Joe Henry, and Councilor Joshua Greene. Councilor Suzanne Roberts was absent. Planning Commission members in attendance included Chairperson Cheryl Hoile, Commissioner Robert Bare, Commissioner Alan Burns, and Commissioner John Murphey. Commissioner Curt Muilenburg was absent. Staff in attendance included City Manager Jacque Betz, Public Works Director Mike Miller, Finance Director Erin Reynolds, Interim Planning Director/City Recorder Kelli Weese, RARE Participant Katya Reyna, and Planning Consultant Carol Heinkel.

Mayor Xavier began by turning the work session over to Planning Consultant Carol Heinkel.

PC Heinkel began by stating the purpose of the joint work session which was to familiarize the Council and the Commission with the Siuslaw Estuary Project products. The project had been going on for over three years and the goal was to finish it up by July. She presented information through a PowerPoint presentation that can be seen in *Attachment 1*.

PC Heinkel stated that the Siuslaw Estuary Partnership is an integrated multiple objective approach to watershed protection and restoration. She described the makeup of the Partnership member and stakeholder groups and their work over the past three and a half years.

The mission of the project is to protect and improve water quality and fish and wildlife habitat in the Lower Siuslaw Watershed through an EPA grant awarded to the City in 2009. PC Heinkel described the fish and wildlife living in the Estuary including several endangered and threatened species. The Siuslaw is on the DEQ list for impaired water bodies as well.

PC Heinkel went on to describe what can be gained from maintaining a natural environment that contains these recreational benefits. She explained the process of the Partnership through the various years and the different products of the project that had been completed and were ongoing. She also provided an update on the submissions of different pieces of the Plan for state review and approval.

PC Heinkel stated that they had done targeted outreach to various stakeholders and met with different individuals when concerns came up. She described the benefits of having a joint adoption process rather than the City and Lane County adopting at different times. The joint process allows both

entities to hear the comments from various people. She said public hearings would be held jointly.

PC Heinkel explained the importance of the aquifer for drinking water and how protecting ground and surface water was connected. The Aquifer Protection Plan assists in inventorying the significant areas and prioritizing strategies to prevent future potential contamination. The Plan looks at where the potential future contamination sources would be due to land use. She described the different area ratings and the strategies in the various areas.

PC Heinkel presented the proposed policies that the Council has the opportunity to implement as part of the Comprehensive Plan and code amendments for the proposed Partnership Plan. She explained how these proposed changes related to the State-Wide Planning Goals and the protections that the Goals provide.

In regards to new or replacement septic permits, PC Heinkel explained the current processes for DEQ and the County in issuing permits. Councilor Jagoe asked what types of costs were increasing or being looked at regarding water protection for residents who are denied permits due to this Plan. PC Heinkel explained that the rules were state law that the City and County would be implementing. Placing the items in the Plan would make people aware that the state laws exist. She described the process that would occur when a citizen applied for a permit. The language in this Plan represents the communication that should be occurring already based on state law.

Councilor Henry asked whether the communication between the City and the County was occurring in the past. PC Heinkel explained that it did not always occur in the past but due to the research during the process of creating this plan staff was made aware of these requirements. Councilor Henry asked whether the City will require people to hook-up to City services. PC Heinkel stated that the City and the Council has made it a policy to not require people to annex into the City. She explained that the items being discussed for the Aquifer Protection Plan were state laws.

Planning Commissioner Murphey asked if service was physically and legally available and the County would not issue a septic permit then does the owner have to hook up to services. PC Heinkel clarified that the service would not be legally available unless the owner wanted to annex. PWD Miller gave an example of a recent resident who was physically available but not legally available unless they annexed in. Councilor Jagoe asked how much time it added to the process to communicate between the different groups. PWD Miller said the homeowner was in control of the process. PC Heinkel added that if they did not do this process then they would be in violation of state law.

Councilor Henry asked how long the City had been in violation of the state law. PWD Miller stated that the City has only been able to provide these services to people outside the city limits since around 2008 due to capacity and location of the sewer line.

PC Heinkel went on to explain the importance of implementing the state law. Councilor Jagoe stated that he did not feel everyone believed that the City needed to implement the state law and that the state should be implementing it. The City should be implementing City laws and by not including it in the Plan then the City would not need to implement it. PC Heinkel further explained the state law and that it does require the City to provide municipal wastewater service at the time a new or replacement septic system permit is applied for if it is physically and legally available. It is a requirement placed on the City. Councilor Jagoe stated that it is not a requirement to put it in the Comprehensive Plan though. PC Heinkel stated that placing it in the Comprehensive Plan benefits property owners and the City by ensuring that all parties know the state law. She provided an example to explain the protection for the City from liability and providing options for property owners.

Planning Commissioner Bare stated that the law says the City shall implement state law. Planning Commissioner Burns questioned whether the Plan could result in people feeling it as a form of requiring annexation. PC Heinkel stated that if the City changed its policy then it could alter the requirements for connecting to sewer. She said that there are requirements in state law to determine physical availability.

Councilor Henry asked whether this concerned homes outside the Urban Growth Boundary. PC Heinkel stated that it only applies to property within the Urban Growth Boundary.

Planning Commissioner Murphey asked whether there was anything in the Plan stating that the City would be liable to pay the grant back if they did not adopt certain language in the plan. PC Heinkel stated there was not.

PC Heinkel continued to explain aspects of the code amendment for the Aquifer Protection Plan. The objectives are to protect the City's drinking water supply from facilities that would store, produce, and use chemicals that could potentially be hazardous through education and the land use process for new applicants. She went on to explain the overlay zone and the different areas within it.

PC Heinkel described the Wetland and Riparian Inventory with the purpose to bring the City in compliance with State-wide Planning Goal 5 and to provide a comprehensive plan for wetland and riparian areas. These areas provide both flood control and water quality that cannot be replicated by manmade systems. These areas are critical for Florence but prior to the assessment it was not known which areas provided those benefits. She stated that the key aspect of this Plan was to fix the code to better serve the Florence environment, respect the rights of property owners and address the need to provide public facilities. She explained how the inventory would be used.

PC Heinkel explained how the Plan relates to other State-wide Planning Goals. She described how different wetlands and riparian areas were identified as significant and how they are protected under the Goals.


PC Heinkel explained that existing structures would not be affected but that these would be applied to new development. She stated that these policy updates are common throughout the state. She reiterated the aspects of the Plan that are required to be in the Comprehensive Plan and those that are up to the City to include. In addition, she provided further explanation of the changes that were being proposed.

Due to time restrictions, Mayor Xavier asked the Planning Commission if they had any questions regarding the Vision that was to be voted on by Council at the following meeting. The Planning Commission said they did not have any questions. PC Heinkel discussed the Vision at the Council meeting.

Mayor Xavier asked the Planning Commission for further questions for PC Heinkel or comments for the Council. Hearing none, Mayor Xavier closed the Work Session at 7:05pm.


Nola Xavier, Mayor

ATTEST:


Kelli Weese, City Recorder

Siuslaw Estuary Partnership

An Integrated Multiple Objective Approach to Watershed Protection and Restoration



Joint City Council-Planning Commission
Work Session April 15, 2013

Siuslaw Estuary Partnerships

- Interdisciplinary Team:
19 federal, state, tribal, and local agencies
- Elected Official Stakeholders
- Community Stakeholders



Funded by the U.S. Environmental Protection Agency and Project Partners



Project Partners: City of Florence; Lane County; Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians; Heceta Water District; Oregon Department of Environmental Quality; Oregon Department of Fish and Wildlife; Oregon Department of Human Services; Drinking Water Program; Oregon Department of Land Conservation and Development; Oregon Department of State Lands; Oregon Department of Transportation; Oregon Department of Water Resources; Port of Siuslaw; Siuslaw Soil and Water Conservation District; Siuslaw Watershed Council; US Army Corps of Engineers; US Bureau of Land Management; U.S. Geological Survey; USFS Siuslaw National Forest; US Environmental Protection Agency.

This project has been funded totally or in part by the United States Environmental Protection Agency under assistance agreement #W-90-M-0001-2. The contents of this document do not necessarily reflect the views and policies of the U.S. Environmental Protection Agency. No claim is made of trade names or commercial products, consultation endorsement or recommendation for use.

Siuslaw Estuary Partnership Mission

Protect and improve water quality and fish and wildlife habitat in the lower Siuslaw Watershed.

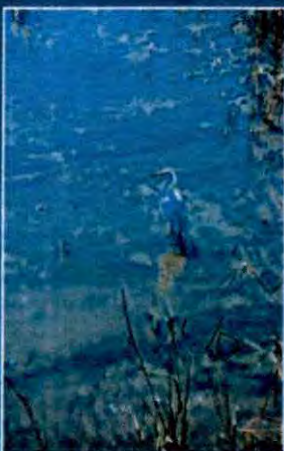
For more information, visit the web site:

www.SiuslawWaters.org

Siuslaw Estuary

The estuary and lower Siuslaw Watershed:

- Home to 23 species of fish, almost 200 species of birds, and numerous marine mammals
- A significant natural area and Important Bird Area
- Provide habitat to several endangered and threatened species



The Siuslaw River



The Siuslaw was once the Oregon Coast's second largest coho-producing system. Today, salmon production is significantly diminished. The Siuslaw is "Water Quality Limited" for temperature, dissolved oxygen, fecal coliform, and sediment and is on DEQ's list of Impaired Water Bodies.



What's Good for Fish is Good for Florence

- Lane County Travel Generated Expenditures, 2008:
 - Shell fishing: \$1,840,000
 - Fishing: \$17,642,000
 - Hunting: \$7,907,000
 - Wildlife viewing: \$27,570,000
 - Combined: \$54,959,000

Project Timeline

- **Project:** October 1, 2009 thru March 31, 2014
- **Phases:**
 - **Phase I: Form Partnerships and Integrated Approach**
Oct 1, 2009 thru Sept 30, 2010
 - **Phase II: Collect Data and Analyze Alternatives**
Oct 1, 2010 thru Sept 30, 2011
 - **Phase III: Prepare Plans and Conduct Local Adoption Process for Comp Plan and Code Amendments**
Oct 1, 2011 thru 9/30/13 (Target)

Products

- 2013 Aquifer Protection Plan (Draft)
- 2013 Florence Area Local Wetlands and Riparian Inventory
- 2013 City of Florence Significant Wetlands and Riparian Corridors Plan (Draft)
- Comprehensive Plan and Code Amendments (Drafts)
- 2013 Siuslaw Estuary Trail Vision
- Stormwater Demonstration Project (in progress)
- Tidal Wetland Delineation (new)

Completed

- Guiding Principles
- Stormwater Design Manual and Comprehensive Plan and Code Amendments
- Climate Change Report
- Strategic Interpretive Site Planning Approach & Streambanking
- Water Monitoring Program; Shell fishing restricted to continue for two more years
- Key Estuary Wetlands Acquisition and Restoration

Process

Elected Official Check-ins, State Agency Coordination, and Public Outreach

1. City Council concurred with Draft Aquifer Protection Plan (APP) & policy direction on Wetlands and Riparian Areas, Estuary Trail, and use of joint adoption process: 7/16 & 9/11, 2012
2. Lane County Board concurrence with Draft APP and use of joint adoption process: 7/25 & 10/17, 2012
3. Draft APP submitted for State certification: 7/25/12
4. State agencies concurrence with wetland and riparian approach and meetings with property owners, businesses, & Stakeholders: August through March 2013

Process

Targeted Public Outreach and Meetings with Affected Property Owners and Businesses

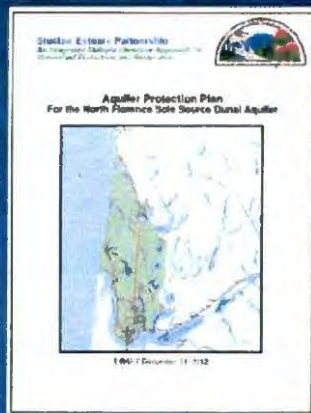
- Coast Village Homeowners Association: 10/29/12
- Central Oregon Coast Board of Realtors: 11/29/12
- Florence Area Chamber of Commerce: 2/21/13
- Golf Course Owners/Managers: 2/25/13
- Property owners & Businesses within Drinking Water Protection Areas (DWPAs): 2/25/13
- Property owners with wetlands or riparian areas: 2/27/13
- Community Stakeholders: 2/28/13
- Elected official Stakeholders: 3/14/13

Process

Joint City-County Adoption and Key Dates

- Joint City Planning Commission-City Council Work Session: **April 15**
- City Council action to initiate Comprehensive Plan and Code amendments for Aquifer Protection and Wetlands and Riparian Areas and approve Siuslaw Estuary Trail Vision: **April 15**
- Lane County Planning Commission Work Session: **April 16**
- Joint City-County Planning Commissions Public Hearing: **May 7**
- Lane County Board Work Session: **June 4**
- Joint City-County Elected Officials Public Hearing: **To be scheduled**

Drinking Water Inventory and Aquifer Protection:



North Florence Dunal Aquifer: Drinking Water Source

- Only EPA-designated Sole Source Aquifer in Oregon
- Highly susceptible to surface contamination: shallow and highly permeable
- Connected to surface water: wetlands, lakes, streams
- The **Aquifer Protection Plan**: community-based strategies to protect the aquifer and surface waters



North Florence Dunal Aquifer Groundwater, Surface Water and Stormwater – It's all connected.



Groundwater in the aquifer flows to the ocean, the estuary, lakes, wetlands, and streams. Pumping groundwater can affect surface waters. Contamination of one affects the others.

Inventory: Existing and Proposed DWPAs

Delineations
certified by
the Oregon
Health
Authority



Aquifer Protection Plan Prioritized Strategies to protect the aquifer and surface waters

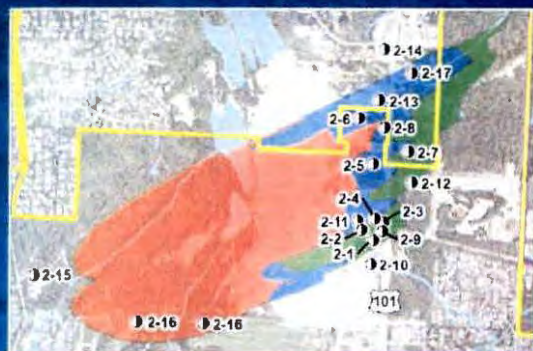
- **Aquifer-wide Management Strategies**
- **Management Strategies for Existing Wellfield Drinking Water Protection Area (DWPA)**
- **Management Strategies for Proposed Wellfield DWPA**

Management Strategies tied to Potential Contaminant Source Inventory

Existing Land
Uses in DWPA for
Existing Wellfield



Management Strategies tied to Potential Contaminant Source Inventory Existing Land Uses in DWPA for **Proposed** Wellfield



Management Strategies tied to Potential Contaminant Source Inventory

Planned Land Uses in DWPA for Existing and Proposed Wellfields



Aquifer Protection Plan Prioritized Management Strategies to protect the aquifer and surface waters

- **H (High):** Begin to implement immediately or continue to implement, if already being done
- **M (Medium):** Begin to implement in next two fiscal years
- **L (Low):** Implement as time and financial resources are available

Aquifer-wide Management Strategies

- **Land uses:** All
- **Strategies:**
 1. Surface and Ground Water Monitoring - H
 2. Public Education - H
 3. Coordination - H
 4. Integrated Pest Management - M

Existing Wellfield Management Strategies

- **Land uses:** Residential, Private Open Space, Public
- **Strategies:**
 1. Conduct targeted public education and outreach (M)
 2. Continue to monitor potential contaminant sources (H)
 3. Work with realtors (H)
 4. Target integrated pest management efforts to DWPA (M)
 5. Adopt comprehensive plan policies and code amendments (H)
 6. Work with home owners associations (H)
 7. Continue to work with golf course managers (H)
 8. Continue to monitor sewer lines (H)

Proposed Wellfield Management Strategies

- **Land uses:** Residential, Commercial/Industrial, Private Open Space, Public
- **Strategies:**
 1. Conduct targeted public education and outreach (M)
 2. Adopt comprehensive plan policies and code amendments (H)
 3. Continue to monitor potential contaminant sources (H)
 4. Work with realtors (H)
 5. Target integrated pest management efforts to DWPA (M)
 6. Adopt drinking water protection overlay zone (H)
 7. Inventory and rank chemicals used in the DWPA and prepare related responses (H)
 8. Provide business assistance (H)
 9. Continue to work with golf course managers (H)
 10. Continue to monitor sewer lines (H)

Proposed Comprehensive Plan Policies - I

Policies

1. The City shall implement the recommendations of the Stormwater Management Plan regarding protection of the aquifer for the City's wellfield(s).
2. The City shall implement the 2013 *Aquifer Protection Plan for the North Florence Sole Source Dunal Aquifer (Aquifer Protection Plan)*, as amended and certified by the Oregon Department of Environmental Quality (DEQ) and the Oregon Health Authority (OHA). The Aquifer Protection Plan shall be implemented by: the policies in this Comprehensive Plan; Florence City Code provisions, including a Drinking Water Protection Overlay Zone; and City programs, as resources allow.

Proposed Comprehensive Plan Policies - II

Policies

3. All portions of the *Aquifer Protection Plan*, except the Contingency Plan, are adopted as a supporting document to this Comprehensive Plan, and the Plan will be located in Appendix 5 of the Comprehensive Plan.
4. The "Certified Wellhead Delineations Report," (Delineations Report) February 2012, prepared by GSI Water Solutions, Inc. and certified by the Oregon Health Authority, is adopted into this Comprehensive Plan and is physically located in Appendix 5. The Delineations, including all Time of Travel Zones (TOTZ), shall serve as the drinking water source inventory for the City of Florence. The maps in the Delineations Report of Drinking Water Protection Areas (DWPAs) for the existing and proposed wellfield are adopted as part of this Comprehensive Plan. The City shall use the map of the delineated DWA for the proposed wellfield as the reference map for the Drinking Water Protection Overlay Zone.

Proposed Comprehensive Plan Policies - III

Policies

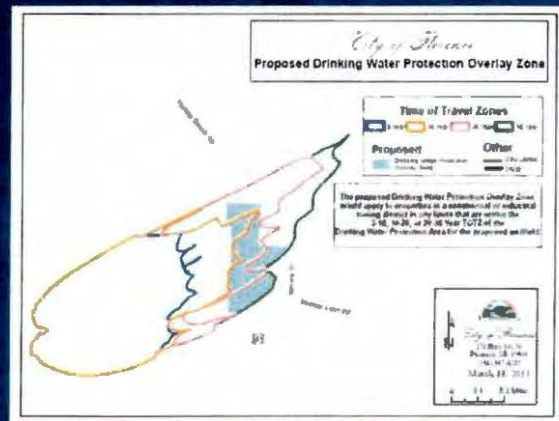
5. The DWA, including all Time of Travel Zones (TOTZ), for the existing wellfield is a significant groundwater resource as that term is defined by Statewide Planning Goal 5. The DWA, including all Time of Travel Zones (TOTZ), for the proposed wellfield shall be protected through application of Statewide Planning Goal 2, Land Use; Goal 6, Air, Water and Land Resources Quality; and Goal 11, Public Facilities and Services.
6. Prior to issuing new or replacement septic permits, Lane County shall request the City to inform the County in writing whether municipal wastewater service is "physically and legally available," as those terms are defined in OAR 340-071-0160.

Proposed Comprehensive Plan Policies - III Policies

7. Consistent with policies in this Comprehensive Plan, the City shall implement state law that requires the City to provide municipal wastewater services at the time a new or replacement septic system permit is applied for, if the municipal service is physically and legally available, as prescribed in Comprehensive Plan policies and OAR 340-071-0160.
8. As part of the land use referral process under the existing Joint Agreement for Planning Coordination between the City of Florence and Lane County, the County and the City will work cooperatively to discourage the use of Dense Non-aqueous Phase Liquids (DNAPLs) by commercial and industrial businesses in the 20 year Time of Travel Zone for the proposed wellfield. The City will respond to the referral response for permits in this area by providing information on the effects of DNAPLs in wellfields and on alternative chemicals that may be appropriate for the proposed land use.

Proposed City Code Amendments

- Drinking Water Protection Overlay Zone for industrial and commercial uses in DWA for Proposed Wellfield



To apply to industrial and commercial uses in DWA for Proposed Wellfield inside City Limits

Proposed Drinking Water Protection Overlay Zone

Objectives:

1. Protect the City's drinking water supply, which is obtained from groundwater resources, from impacts by facilities that store, handle, treat, use, produce, or otherwise have on premises substances that pose a hazard to groundwater quality; and
2. Provide standards for hazardous or other materials that pose a risk to groundwater within the TOTZ.

Proposed Drinking Water Protection Overlay Zone

Methods:

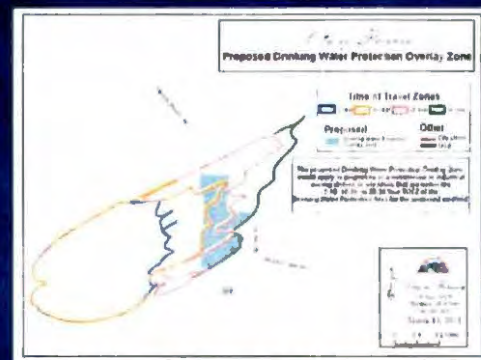
1. Restrict or prohibit the use of hazardous or other materials which are potential groundwater contaminants;
2. Set standards for the storage, use, handling, treatment, and production of hazardous or other materials that pose a risk to groundwater within TOTZ; and
3. Review new or expanded uses of hazardous or other materials that pose a risk to groundwater.

Draft Drinking Water Protection Overlay Zone

A DWP Overlay District Development Application would be required when all of the following criteria are met:

1. Industrial and commercial land uses that are affected by one or more of the following: land use permit application, or building permit application that:
2. Affect the storage, use, and/or production of hazardous or other materials that pose a risk to groundwater; or increase the quantity of hazardous or other materials that pose a risk to groundwater that are stored, used and/or produced.

Drinking Water Protection Overlay Zone



Standards vary by Time of Travel Zone (TOTZ).

Draft Drinking Water Protection Overlay Zone

20-30 Year Time of Travel Zone:

1. Storage, handling, treatment, use, production or keeping on premises of more than 20 gallons of hazardous materials that pose a risk to groundwater allowed only upon compliance with Fire Code.

Draft Drinking Water Protection Overlay Zone

10-20 Year Time of Travel Zone:

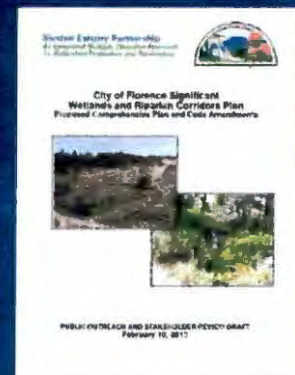
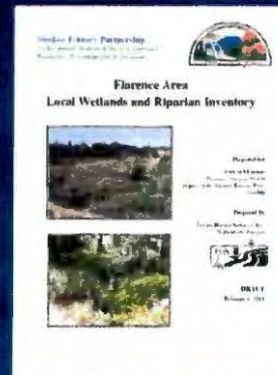
1. Same requirements as for 20-30 Year TOTZ plus:
2. Store in areas with approved secondary containment in place (Fire Code);
3. All new use of DNAPLs is prohibited;
4. Any change in type of use or increase in max. daily inventory of any DNAPL is considered a new use and is prohibited;
5. Requirements for inspection and record keeping procedures for monthly in-house inspection and maintenance of containment and emergency equipment.

Draft Drinking Water Protection Overlay Zone

5-10 Year Time of Travel Zone:

1. Same requirements as for 10-20 Year TOTZ plus:
2. The following that pose a risk to groundwater are prohibited: hazardous material product pipelines; injection wells except roof dry wells; fill materials containing hazardous materials; land uses and new facilities that will use, store, treat, handle, and/or produce DNAPLs.
3. Requirements in Fire Code for a monitoring program and methods to detect hazardous or other materials in the secondary containment system shall be met for all amounts of hazardous materials that pose a risk to groundwater.

Wetlands and Riparian Areas: Inventory and Protection



Purpose and Objectives

1. Bring the City into compliance with Statewide Planning Goal 5: Natural Resources, Scenic & Historic Areas & Open Space
2. Update the 1997 Florence Wetland and Riparian Area Inventory (1997 Inventory)
2. Provide a comprehensive functional assessment of wetlands and riparian areas
4. Protect "significant" resources primarily for water quality and flood control, and address conflicting uses through a "Limited Protection Program"
5. Modify existing City Code requirements to:
 - better fit the Florence environment
 - respect the rights of property owners
 - address the need to provide public facilities



Florence Freshwater Wetlands

Goal 5 Process

- STEP 1:** Inventory wetlands greater than ½ acre in size for Local Wetland Inventory (LWI)
- STEP 2:** Assess grouped wetlands for functions and values and determine significance.
- STEP 3:** Adopt local protection measures.

Local Wetland and Riparian Inventory



- Florence Area Wetlands Inventory replaces LWI in Statewide Wetlands Inventory (SWI) - refines and updates current inventory.
- City and County to adopt Florence Area Wetlands and Riparian Inventory for area within UGB - to comply with State Goal 5.

Florence Freshwater Wetlands Inventory

34 grouped wetlands greater than one-half acre, in 620 total acres:

- 60% Forested Wetlands
- 21% Scrub Shrub Wetlands
- 10% Emergent Wetlands
- 8% Unconsolidated Bottom
- 1% Other

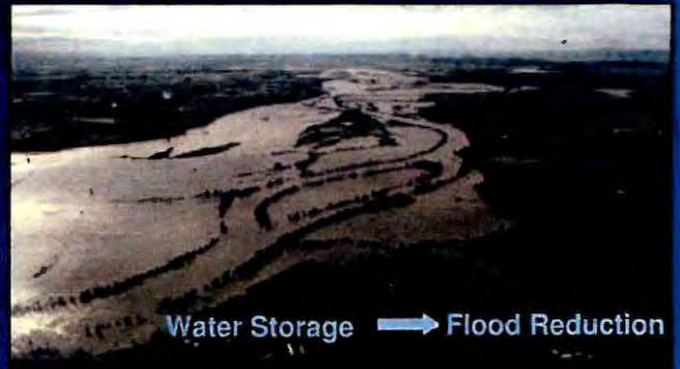


Florence Freshwater Wetlands Assessment

- **HYDROLOGIC FUNCTION (FLOOD CONTROL):** Water Storage and Delay
- **WATER QUALITY:** Sediment Retention and Stabilization, Phosphorus Retention, Nitrate Removal & Retention, Thermoregulation
- **FISH SUPPORT:** Anadromous & Non-anadromous Fish Habitat
- **AQUATIC HABITAT:** Organic Matter Export, Aquatic Invertebrate Habitat, Amphibian & Reptile Habitat, Waterbird Feeding Habitat, Waterbird Nesting Habitat
- **TERRESTRIAL HABITAT:** Songbird, Raptor, Mammal, & Pollinator Habitat, Native Plant Diversity



Wetland Functions & Values: Water Storage & Delay



Water Storage → Flood Reduction

Wetland Functions and Values: Water Quality Support



Retention of phosphorous & nitrogen

Clean Water

Wetland Functions & Values: Fish & Wildlife Habitat



Rearing habitat for young salmon



Waterfowl habitat



Habitat for threatened & endangered species

Florence Freshwater Wetlands Significance Criteria

Non-Goal 17 wetlands in the UGB that score at or above the 75th percentile in either Function or Value for one or more of the following Grouped Functions:

- **HYDROLOGIC CONTROL** (water storage and delay or "flood control"); or
- **WATER QUALITY** (sediment retention and stabilization, phosphorus retention, nitrate removal and retention, and thermoregulation); or
- **HABITAT** for fish, aquatic, or terrestrial species.

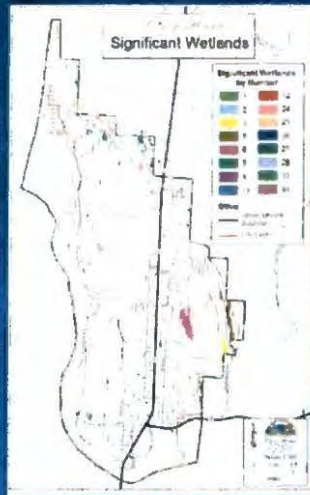
Florence Freshwater Wetlands Assessment & Significance Results

Wetland ID	Wetland Name	Hydrologic Control	Water Quality	Fish & Wildlife Habitat	Overall Significance
1	Wetland 1	High	High	High	Significant
2	Wetland 2	High	High	High	Significant
3	Wetland 3	High	High	High	Significant
4	Wetland 4	High	High	High	Significant
5	Wetland 5	High	High	High	Significant
6	Wetland 6	High	High	High	Significant
7	Wetland 7	High	High	High	Significant
8	Wetland 8	High	High	High	Significant
9	Wetland 9	High	High	High	Significant
10	Wetland 10	High	High	High	Significant
11	Wetland 11	High	High	High	Significant
12	Wetland 12	High	High	High	Significant
13	Wetland 13	High	High	High	Significant
14	Wetland 14	High	High	High	Significant
15	Wetland 15	High	High	High	Significant
16	Wetland 16	High	High	High	Significant
17	Wetland 17	High	High	High	Significant
18	Wetland 18	High	High	High	Significant
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26	Wetland 26	High	High	High	Significant
27	Wetland 27	High	High	High	Significant
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37	Wetland 37	High	High	High	Significant
38	Wetland 38	High	High	High	Significant
39	Wetland 39	High	High	High	Significant
40	Wetland 40	High	High	High	Significant
41	Wetland 41	High	High	High	Significant
42	Wetland 42	High	High	High	Significant
43	Wetland 43	High	High	High	Significant
44	Wetland 44	High	High	High	Significant
45	Wetland 45	High	High	High	Significant
46	Wetland 46	High	High	High	Significant
47	Wetland 47	High	High	High	Significant
48	Wetland 48	High	High	High	Significant
49	Wetland 49	High	High	High	Significant
50	Wetland 50	High	High	High	Significant

Sixteen non-Goal 17 wetlands in the Florence UGB are significant, almost exclusively due to their high Function or Value in providing flood control and water quality protection:

- All of these wetlands, except Wetland 25, meet the criteria for Flood Control or Water Quality
- Wetland 25 meets the criteria for Aquatic Habitat and is also at the head of a significant riparian corridor
- All of these wetlands except 8, 26, and 34 also meet the criteria for providing habitat for fish, aquatic, and/or terrestrial species

Significant Wetlands in the Florence UGB



Riparian Areas

Goal 5 Process

- Step 1: Inventory: Determine riparian widths – typical tree height or topographic break
- Step 2: Assess riparian functions - water quality, flood management, thermal regulation, and wildlife habitat
- Step 3: Determine significance
- Step 4: Adopt protection measures



Riparian Areas Inventory

The riparian corridors in the Florence UGB were divided into 17 riparian reaches in the following 5 basins:

- Munsel Creek
- Rhododendron Drive
- Airport
- Heceta Beach
- North Fork Siuslaw



Riparian Areas Inventory

Goal 5 allows for either a "safe harbor" or "standard" inventory approach.

A 50 foot "safe harbor" riparian width was used for Munsel Creek, the only fish bearing stream in the inventory.

The standard inventory approach was used for the other reaches.



Riparian Areas Assessment



- **WATER QUALITY:** riparian vegetation traps sediment, filters runoff, and binds soil to prevent erosion
- **FLOOD MANAGEMENT:** vegetation slows rate of storm runoff and increases groundwater recharge
- **THERMAL REGULATION:** trees and herbaceous layers provide shade and add humidity, cooling the water and providing important habitat for juvenile fish
- **WILDLIFE HABITAT:** riparian trees, vegetation, ground cover, and woody debris provide habitat for wildlife that thrive near a water resource

Florence Riparian Corridors Significance Criteria

Criteria for significance of non-Goal 17 riparian reaches in the UGB was:

- **Munsel Creek:** Use the "Safe Harbor" provisions of Statewide Planning Goal 5 to determine as a "significant riparian resource" the riparian corridor with boundaries 50 feet from the top of bank along each side of Munsel Creek; & where there is a wetland, width measured from, and includes, the upland edge of the wetland, except where width is 25 feet based on prior approval.
- **Other Riparian corridors:** reaches that scored at least one High Value in the Riparian Functional Assessment.

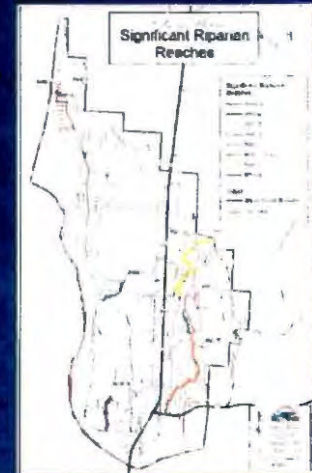
Florence Riparian Assessment & Significance Results

[illegible]

All non-Goal 17 riparian reaches in UGB are significant except RAIR-A and RAIR-C.

- All of these riparian reaches meet the criteria for Water Quality & Thermal Regulation.
- RAIR-A is cleared and channeled via Siuslaw High School, the airport runway, and Greentrees to 12th Street
- RAIR-C runs from the south airport fence to 9th Street; and restoration of this reach is questionable

Significant
Riparian
Reaches in the
Florence UGB



**Significant
Wetlands and
Riparian Areas and
Goal 17 Coastal
Shorelands in UGB**



How are these resources regulated today?

In general, today:

- Existing development is "grandfathered." Legally constructed structures are allowed to remain as legal non-conforming lots and uses (per FCC 10-8).
- Future development must proceed in accordance with adopted City policy and code.
- Comprehensive Plan policy and code apply within city limits.
- Comprehensive Plan policies apply in the UGB, if they have been co-adopted by Lane County.
- Riparian and Significant Wetlands are adopted in the existing Comp Plan.

How are these resources regulated today?

Wetlands

- A list and map of significant wetlands is adopted as part of the Comprehensive Plan.
- City Code does not prohibit development in wetlands. Existing code does require a 50 foot vegetated Stormwater Buffer Zone around wetlands as part of the City's Stormwater Management requirements in Title 9 (FCC 9-5-3-3-F).
- The Stormwater Buffer Zone is required to protect the water quality and flood control functions of wetlands and riparian areas defined by the City of Florence's Local Wetlands and Riparian Inventory.

How are these resources regulated today?

Riparian Areas

- Riparian areas are also protected by the buffer zone requirements in Florence City Code (FCC) 9-5-3-3-F.
- In addition, existing Comprehensive Plan policy contains Statewide Planning Goal 5 (Goal 5) protection for riparian areas, although existing policy omits some of the exemptions allowed by Goal 5.
- Specific sections of Title 10 Code also regulate riparian areas, as specifically set out in Table ES-1.

Wetland and Riparian Comprehensive Plan & Code Amendments

City to adopt:

- 2013 Wetlands and Riparian Inventory, for area within UGB, adopted as part of the Comprehensive Plan
- Comprehensive Plan policies to protect resources and for consistency and housekeeping
- 2013 City of Florence Significant Wetlands and Riparian Corridors Plan to be adopted as supporting document to the Comprehensive Plan
- City Code amendments to implement the "Limited Protection Program" and for consistency and housekeeping

Wetland and Riparian Comprehensive Plan & Code Amendments

Lane County to co-adopt for area outside city limits within UGB:

- 2013 Florence Area Local Wetland and Riparian Inventory
- Applicable Comprehensive Plan Amendments

The code amendments apply only within Florence city limits and are therefore not subject to co-adoption by Lane County.

Wetland and Riparian Comprehensive Plan Amendments

Policies

(Note: the following edits combine redundant policies in the adopted Comprehensive Plan for wetlands and riparian areas and propose amendments.)

1. For the purpose of land planning and initial wetland and riparian identification within the Florence Urban Growth Boundary (UGB), the City and Lane County shall rely on the 2013 Florence Area Local Wetland and Riparian Area Inventory (2013 Inventory), approved by the Oregon Department of State Lands, and as amended hereafter. The 2013 Inventory within the Florence UGB, as amended, is adopted as part of this Comprehensive Plan and is physically located in Appendix 5.

Wetland and Riparian Comprehensive Plan Amendments

Policies

2. Disturbance of significant wetlands for land development activities shall be permitted within the Florence UGB only as determined by the permitted provisions of permits issued by the Department of State Lands (DSL) and/or the Army Corps of Engineers.
3. In accordance with ORS 215.418, the City and County shall notify DSL when wetlands are present on a property that is subject to a local land use or building permit approval. The City shall notify DSL when riparian areas are present on a property that is subject to a local land use or building permit approval.

Wetland and Riparian Comprehensive Plan Amendments

Policies

4. The City and County shall consider formal wetland delineation reports approved by the Oregon Department of State Lands as a valid source of wetland information specific to a land use action or limited land use action. Such reports, if approved by DSL, will be incorporated by reference into the City's 2013 Florence Area Local Wetlands and Riparian Inventory.
5. No significant wetland or riparian corridor as defined by the 2013 Florence Area Local Wetlands and Riparian Inventory shall be drained by re-routing of natural drainage ways.

Wetland and Riparian Comprehensive Plan Amendments

Policies

6. The City shall protect the functions and values of significant Goal 5 riparian corridors and wetlands for flood control, water quality, and fish and wildlife habitat through Code provisions that protect these resources from development in accordance with Statewide Planning Goal 5 administrative rules (OAR 660 Division 23) and the Economic, Social, Environmental, and Energy (ESEE) Analysis and Limited Protection Program. The ESEE Analysis is included, and significant wetlands and riparian corridors are listed and mapped, in the "2013 City of Florence Significant Wetlands and Riparian Corridors Plan" adopted by reference into this Comprehensive Plan. The Program exempts public infrastructure, as defined in the ESEE Analysis, from local wetland protection measures, and allows special setback reductions and other allowances for development along the Munsel Creek Side Channel (Reach RMC-Cs in the 2013 Riparian Inventory).

Wetland and Riparian Comprehensive Plan Amendments

Policies

7. The City shall include a procedure in the Code to consider hardship variances, claims of map error, and reduction or removal of the restrictions for any existing lot or parcel demonstrated to have been rendered unbuildable by application of the significant wetlands and riparian areas standards in the Code.
8. The City shall encourage restoration and protection of privately owned wetlands and riparian areas through Code incentives, and, as resources allow, through education in partnership with the Siuslaw Watershed Council and the Siuslaw Soil and Water Conservation District.

"Unbuildable" Definition

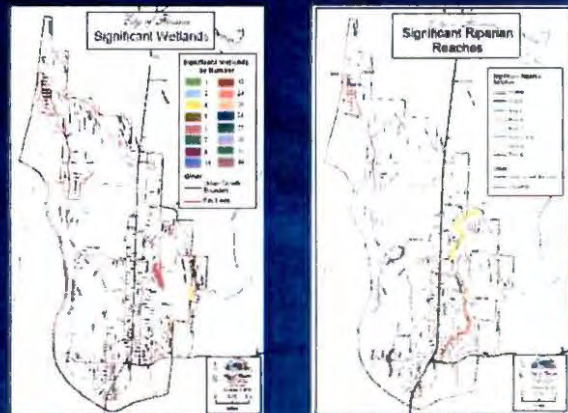
- a) For single family housing, lots are considered unbuildable if the required setback for the significant wetland or riparian area is such that no contiguous space exists outside the setback that allows for a dwelling unit at least 50 feet by 27 feet. [Note: A 50 foot by 27 foot area allows the siting of a typical double-wide manufactured home, a form of affordable housing.]
- b) For all affected properties, lots are deemed unbuildable if strict adherence to the applicable setback standards and conditions would effectively preclude a use of the parcel that could be reasonably expected to occur in the zone and that the property owner would be precluded a substantial property right enjoyed by the majority of landowners in the vicinity.
- c) For the Munsel Creek side channel (Reach RMC-Cs in the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan in Appendix 5 of the Comprehensive Plan), the "required setback" for the purpose of the unbuildable definition, is the reduced setback allowed through the ESEE Analysis adopted into this Comprehensive Plan Appendix 5.

Wetland and Riparian Comprehensive Plan Amendments

Policies

9. Plan Amendment Option: Any owner of property affected by the Significant Wetlands and Riparian Areas Standards in City Code may apply for a quasi-judicial comprehensive plan amendment. This amendment must be based on a specific development proposal. The effect of the amendment would be to remove the requirement to comply with these standards from all or a portion of the property. The applicant shall demonstrate that such an amendment is justified by completing an Environmental, Social, Economic and Energy (ESEE) consequences analysis prepared in accordance with OAR 660-23-040. If the application is approved, then the ESEE analysis shall be incorporated by reference into the Florence Comprehensive Plan, and the Florence Significant Goal 5 Wetlands and Riparian Areas Maps shall be amended to remove the wetland or riparian area from the inventory...

City Code applies to "significant" wetlands and riparian reaches within city limits.



ESEE Analysis

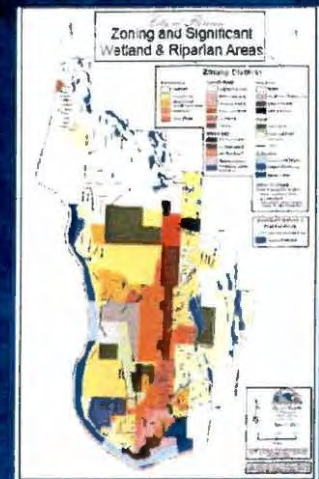
Munsel Creek Side Channel: Reach RMC-Cs



ESEE: Analyzes the Economic, Social, Environmental, & Energy consequences of three options:

1. Full Protection
2. Limited Protection
3. Full Development

The ESEE addresses resource protection conflicts with existing and future land uses.



Limited Protection Program - 1

Applies the "safe harbor" protections in Goal 5 to all significant wetlands and riparian areas with the following modifications, based on the ESEE (Economic, Social, Environmental, and Energy Consequences) Analysis:

- Exempts public facilities from Significant Wetland Standards.*
- Allows up to a 50% reduction in the required riparian setback, i.e., a 25 foot minimum setback, for the Munsel Creek side channel (Reach RMC-Cs) as long as displaced native plants are replanted.

*Goal 5 already exempts public and private utilities and facilities from riparian setback requirements.

Limited Protection Program - 2

Will provide for the following adjustments to required setbacks as necessary to allow some economic use of property:

- Administrative review will be used for hardship where proposed development is more than 20 feet from the significant creek or wetland.
- A Hardship Variance will be allowed when proposed development is 20 feet or less from a significant creek or wetland; intrusion into the riparian area must be minimized; and, displaced native vegetation replanted. Variance fee waived for Coast Village.

Limited Protection Program - 3

Will provide for the following adjustments to required setbacks as allowed by Goal 5:

- No land use permit will be required when existing lawfully constructed structures are rebuilt as long as replacement of existing structures is with structures in the same location that do not disturb additional riparian surface area and provided they are designed and constructed to minimize intrusion into the riparian area. Coast Village structures are grandfathered.

Limited Protection Program - 4

Will provide for the following adjustments to required setbacks to address conflicting uses along Munsel Creek Side Channel:

- Administrative Review will be used for Munsel Creek side channel owners to obtain the setback reduction (up to 25 feet from the creek).
- Florentine Estates properties that were granted a setback reduction by the Planning Commission do not need to apply for an adjustment.

Proposed Comprehensive Plan and Code Amendments

- ❑ Protect significant wetlands and riparian areas inside City limits.
- ❑ Provide for setback adjustments to allow some economic use of property.
- ❑ Provide exemptions allowed by State law and through ESEE for public infrastructure and Munsel Creek Side Channel.
- ❑ Provide for setback adjustments to be processed through Administrative Review except when proposed development is within 20 feet of stream or wetland; then, Variance process is used.
- ❑ Apply existing stormwater buffer zone to significant riparian areas and significant wetlands ½ acre and larger vs. all wetlands and riparian areas in existing Code.
- ❑ Allow incentives to encourage protection of the resource.
- ❑ Provide a "Plan Amendment Option" for specific sites at time of development.
- ❑ Specify how boundaries of wetlands and riparian areas are determined.

CITY OF FLORENCE PLANNING COMMISSION
May 7, 2013 ** MEETING MINUTES **

CALL TO ORDER – ROLL CALL – PLEDGE OF ALLEGIANCE

Chairperson Cheryl Hoile opened the meeting at 7:02 p.m. Roll call: City Commissioners: Robert Bare, Curt Muilenburg, Alan Burns, John Murphey were present. Also present: Interim Planning Director Kelli Weese, Planning Consultant Carol Heinkel, City Manager Jacque Betz, Public Works Director Mike Miller, Intern Katya Reyna, and City volunteer Clarence Lysdale.

Lane County Planning Commission Members: Ryan Sisson, Chair; Robert Noble, Vice-Chair; George Goldstein, Nancy Nichols, James Peterson, Dennis Sandow, John Sullivan, Larry Thorpe were present. Also present: Lane County Planning Director Matt Laird and Senior Planner Keir Miller

1. APPROVAL OF AGENDA

Commissioner Bare moved to approve the agenda as presented; second by Commissioner Muilenburg; by voice all yes. motion approved unanimously.

2. PUBLIC COMMENTS

*This is an opportunity for members of the audience to bring to the Planning Commission's attention any items **NOT** otherwise listed on the agenda. Comments will be limited to **3 minutes per person**, with a maximum time of 15 minutes for all items.*

There were no public comments.

JOINT CITY/COUNTY PUBLIC HEARING:

3. AQUIFER PROTECTION AND WETLAND & RIPARIAN CORRIDORS LANE COUNTY COMPREHENSIVE PLAN AMENDMENTS – ORDINANCE NO. PA 13-0582:

A proposal to amend the Comprehensive Plan text to adopt an updated Wetlands and Riparian Inventory, and Aquifer Protection Plan, and related policies that apply outside the city within the Florence Urban Growth Boundary (UGB). No County Code Regulations are proposed.

Chairperson Hoile said there was a public hearing before the Planning Commission that evening. The hearing would be held in accordance with the land use procedures required by the City in Florence City Code Title 2 Chapter 10 and the State of Oregon. Prior to the hearing(s) tonight, staff will identify the applicable substantive criteria which have also been listed in the staff report. These are the criteria the Planning Commission must use in making its decision. All testimony and evidence must be directed toward these criteria or other criteria in the Plan or Land Use Regulations which you believe applies to the decision per ORS 197.763 (5). Failure to raise an issue accompanied by statements or evidence sufficient to afford the Planning Commission and parties involved an opportunity to respond to the issue may preclude an appeal of this decision based on that issue. Prior to the conclusion of the initial evidentiary hearing, any participant may request an opportunity to present additional evidence, arguments or testimony regarding the application. Failure of the applicant to raise constitutional or other issues relating to proposed conditions of approval without sufficient specificity to allow the Planning Commission to respond to the issue precludes an action for damages in circuit court. Any proponent, opponent, or other party interested in a land use matter to be heard by the Planning Commission may challenge the qualification of any Commissioner to participate in such hearing and decision. Such challenge must state facts relied upon by the party relating to a Commissioner's bias, prejudgment, personal interest, or other facts from which the party has concluded that the Commissioner will not make a decision in an impartial manner.

Chairperson Hoile explained the purpose of the Joint Public Hearing of the City of Florence and Lane County Planning Commissions was to consider amendments to the Florence Comp Plan policies that applied outside the City within the Florence Urban Growth Boundary (UGB). No Lane Code regulations were proposed. Following the joint public hearing, the Florence Planning Commission would meet to consider Aquifer Protection and Wetland and Riparian Corridors Florence Code and Comp Plan Amendments.

Chairperson Hoile called for declarations of conflicts of interest or bias. No declarations were heard. She asked if any member of the public challenged the impartiality of the Commissioners. No Challenges were heard.

Chairperson Hoile opened the Florence Planning Commission public hearing at 7:10 p.m.

Lane County Chairperson Sisson opened the Lane County Planning Commission public hearing at 7:10 p.m.

PC Heinkel offered the staff report and provided a PowerPoint presentation (Attachment 1). She distributed a packet of information entitled *Conditions of Approval and Supplemental Information*. She entered into the record the Applicable Criteria as shown in the staff report.

PC Heinkel directed commissioners to Exhibit B in the staff note, which contained the Proposed Legislative Amendments to the *Florence Realization 2020 Comprehensive Plan for Aquifer Protection and Wetlands and Riparian Corridors, April 15, 2013*. PC Heinkel reviewed the Notice and Referrals process used for the proposed amendments process, as found on page 5 of the staff memorandum.

Chairperson Hoile called for questions from Florence Planning Commissioners.

Commissioner Muilenburg observed that the City had adopted the 2013 Wetlands and Riparian Inventory, but the State had not adopted the inventory. PC Heinkel said the State had approved the 1997 inventory, but the technology used to map the wetland had improved. The updated inventory would replace the 1997 inventory at the State and City levels. PC Heinkel confirmed the unbuildable definition would apply only to riparian and wetlands areas.

Commissioner Murphey asked who would monitor and how Rule 8, Dense Nonaqueous Phase Liquid (DNAPLS) would be monitored. PC Heinkel said the City had an existing water monitoring program. There was a business assistance program incorporated into the Aquifer Protection Plan strategies that worked in collaboration with the regulation. Outside the UGB, there was an existing relationship between the City and the County through an intergovernmental agreement (IGA). When development occurred outside the UGB, County staff notified City staff. In the area regulated by the proposed amendments, if proposed land use action occurred in the drinking water protection area for the City's proposed well field, the City Public Works Director would direct staff to determine if DNAPLS were being used, and if so, ask the property owner to use alternative chemicals. The City had initiated an impressive ground water monitoring program three years ago for which it had received a U.S. Environmental Protection Agency (EPA) grant to continue the program for two more years. PC Heinkel said she had received the list of DNAPLS that had been used by the City of Springfield within the last month.

Lane County Chairperson Sisson called for questions from Lane County Planning Commissioners.

Lane County Commissioner Goldstein asked if another treatment plant would be needed if wells were built on the east side of Highway 101. PWD Miller said yes, the City would need to build a new treatment facility.

Lane County Commissioner Goldstein expressed concern about fuel storage tanks at the Fred Meyer site, and asked if PWD Miller was concerned. PWD Miller said the current delineation indicated that the fuel tanks would be outside of the protection area.

PWD Miller confirmed the City had sampled wells at Sand Pines Golf Course and the water mimicked the water from the existing well field. The City had specifically analyzed the water for pesticides, nitrates, herbicides, and organics, and found no problems.

Lane County Commissioner Thorp understood the original wetlands delineation included wetlands outside of the UGB. He further understood Exhibit B and the wetland delineation would only be approved for the portion inside the UGB by Lane County, and would not address properties outside of the inventory.

PC Heinkel confirmed Mr. Thorp's understanding, directing commissioners to Proposed Policy 1, which stated "for identification within the Florence urban growth boundary...the inventory shall be relied on." She added Lane County was not required to address properties outside of the UGB by State law. The study went outside of the UGB because the Department of State Lands (DSL) wanted to update its inventory for that area, which would replace the inventory currently included in the statewide inventory.

PC Heinkel introduced Clarence Lysdale, a community volunteer, who did the riparian inventory. He had a degree in engineering and had experience in this field.

Lane County Commissioner Peterson noted significant areas close to the river as shown on a map in the *Conditions of Approval and Supplemental Information* packet. Mr. Lysdale indicated not all of the wetlands were noted on the map.

Lane County Commissioner Peterson asked if the marsh areas could be redeveloped for fisheries and if the City of Florence would look at a long term planning to rehabilitate the marsh areas. PC Heinkel said in Exhibit C, which would be discussed at the Florence Planning Commission meeting following the joint meeting, the City was proposing code amendments that would provide incentives to property owners to maintain riparian areas and restore the riparian corridor.

Lane County Commissioner Sisson asked if there was a fee at the counter for processing wetland map designations. IPD Weese said a fee had not been established for a map amendment.

Lane County Commissioner Goldstein asked why the Clear Lake watershed was referred to as dunal. PWD Miller said Portland State University (PSU) had mapped the aquifer in the Florence area in 2011, and concluded a portion of the aquifer fed Clear Lake. This was also illustrated in the maps used by the City.

Lane County Commissioner Goldstein stated the pumps were rated to 450 gallons per minute on a 24 hour drawdown. The report referred to one third that rate. PWD Miller asserted the Sand Pine Wells had the potential for producing from 400 to 450 gallons per minute. The City of Florence wells ranged from 200 to 250 gallons per minute, depending on the unique characteristics of each well.

In response to Lane County Commissioner Goldstein, PWD Miller said the aquifer below the surface was larger than 80 acres, and water traveled through the sand through a very broad area. The aquifer had distinct boundaries, running along the north fork of the Siuslaw River, to where the sands met the bedrock. He said nitrates were a concern, and an element of the drinking water standard. The City wanted to ensure the nitrates did not create issues with the septic systems and ground water. There was a well-defined capture area that ran to the north and east of the wells. PC Heinkel noted the capture zone was identified on the maps in the supplemental information.

In response to Commissioner Burns question related to Policy 6, PC Heinkel said by State law, the County was required to ask the City if City sewer service was legally and physically available if a new septic system is applied for or if one failed on property in the UGB. PWD Miller stated Driftwood Shores paid their portion for the extension of sewer service to the resort and the City annexed the right-of-way to build the sewer lines.

Commissioner Burns expressed concern that provision of sewer service could be used to force annexations in the future. PC Heinkel said that would require a change in City policy because today City policy does not allow forced annexation. She said if, in the future, the City changed that policy, the City could not force annexation unless that is allowed at that time by both the Comprehensive Plan and state law. The provision

of City sewer is a separate issue from annexation. The only tie in is that, in Florence, the only way a property owner can get City sewer today is to agree to annex. She said that nothing being proposed in these amendments will have any effect on annexation, today or in the future.

Commissioner Murphey understood if a septic system failed, and the property owner went to Lane County, by law, the County had to ask the City. But, if Lane County would not issue a new permit to build a septic system that could be considered forced annexation by Lane County. PWD Miller explained that other options besides annexation and hooking up to the sewer system were available. If a property owner did not want to hook up to the City sewer system, it could not be forced to do so. If the City told Lane County that sewer hookup was not legally and physically available, the County or DEQ would work with a property owner to find a solution.

Lane County Commissioner Peterson asked if the City recognized other options for sewer disposal other than hookup or septic tanks. PWD Miller said outside of the City, the County regulated sewer disposal. Inside the City, municipal wastewater service was provided.

Responding to Mr. Thorp, Mr. Miller said system development charge (SDC) for a single family residential home was approximately \$4,800, and the sewer connection fee was approximately \$200 to \$400.

Chairperson Hoile asked if anyone in the audience wished to speak concerning the Comp Plan Amendments, Exhibit B.

Leah Patton – 4699 N. Jetty Road, Florence, OR

Ms. Patton said she believed some of the issues before the Planning Commissions this evening were land use issues which required notification. She asserted this meeting was not given proper notification. She said the City said it wanted to protect City water, and it needed to drill new wells, which would cost City residents megabucks. The City did not need new wells because the Heceta Water District (HWD) was prepared to and was capable of providing water for a long time to the City. HWD currently had a maximum peak usage in the summer and fall of approximately 700,000 gallons. Currently HWD was capable of producing 1.5 million gallons per day.

Ms. Patton said the treatment plant was designed to add modular process units that processed 500,000 gallons per day per unit. There were currently three modular units in place, making it possible to process 1.5 million gallons per day. A fourth unit would bring the capacity to 2 million gallons per day. Heceta water was free of iron, and the City would not need to treat Heceta water for iron if the City used HWD water. For this to happen, the City would need to act in good faith and work with HWD to prepare an IGA. Then the City would not need to soak the citizens for money for digging the wells.

Ms. Patton said she believed annexation was high on the City's to do list. Ms. Patton recalled seeing maps at a meeting several years ago with an area identified for proposed future development. If annexed, residents of the north UGB would be required to hook up to the City sewer or pay a waiver fee, which she understood could be as high as \$10,000 per household, which would break the bank for retired people who lived on limited fixed incomes. There were no failed septic systems in that area. She said experts said that septic systems were more environmentally friendly than a sewer plant. Most of the proposed amendments covertly set the stage for annexation.

Ms. Patton asked the Commissioners to send the City's proposed amendments related to the UGB back to the drawing board. She said when Phil Brubaker was mayor, he attended a meeting in Eugene where people were talking about water. He told those present that Florence had plenty of water, would never run out, and could supply the whole area. She thanked Lane County Planning Commissioners for traveling to Florence.

Alta Taylor – 84955 Hwy 101, Florence, OR

Ms. Taylor said she had property within the 20 year travel zone and had not been notified of any meetings. She said she had two septic systems on the property and she had the permits for those systems. They were

legally installed and she felt they would last as long as she owned the property. There was a duplex and house on the property.

Ron Mann - 89201 Sherwood Island Road, Florence, OR

Mr. Mann said this would move forward, regardless of whether he was a proponent or opponent. It was probably going to happen, and all you could hope you got something that did not hurt you too much. His concern was about Exhibit C, related to removal of trees in a riparian area. He and his brother owned 40 acres on the east side of town, and had joined the Munsel Lake properties. The trees on the site had been planted since 1955. They were managing the site as a forestry property although it was zoned RR, rural residential. They would have to take trees down to protect adjacent property owners that were in the wetland.

Mr. Mann said under the proposal, if the trees were taken down, he would have to rely on the goodwill of the City planner to determine whether or not he could take the trees out. The City planner was not a forester and not a wetlands expert. The trees had a marketable value and if they had to come out, he asked why he had to leave them to rot and feed the bugs. He did not see that as helping the wetland issue or substantially protecting the wetland, and it would be punitive to not allow him to take the trees out.

Mr. Mann said he had several properties on Rhodo View that if there was a 50 foot setback, and a 27 foot by 50 foot footprint for a residence, he would not be able to meet the CCRs. Although the City may have a piece of property on which he could build a structure, it did not address what the homeowners' association or CCRs may allow for minimum size. He asked if every site where trees were located would require a delineation which would be costly. There were holes in the policy related to existing properties and structures, which needed to be reconsidered or reworded.

Mr. Mann said there was a gravel road on the mountain that was put in for potential future development of the north 40 acres. With a 50 foot setback for wetlands, if a PUD road was put in, he could not meet the setback because there were grade issues on the uphill side. He had to determine if he was better off logging the land as timber land, replanting the site, and letting his kids log it in 30 or 40 years. The City would help him make that decision based on the decision the City makes with the Comp Plan Amendments. Mr. Mann submitted a letter dated May 7, 2013 to the Planning Commission for inclusion in the public record.

Gene Wobbe – P.O. Box 1136, Florence, OR 97439

Mr. Wobbe identified himself as a representative for Habitat for Humanity. He said Habitat for Humanity had a property that would be impacted by the 50 foot setback on Munsel Lake Road. He had questioned the 27 foot by 50 foot minimum structure that could be built on the site. He understood the 50 foot by 27 foot size was a standard double wide manufactured home. He had also asked about zoning requirements for a garage. He was told the City would look into that, and he saw that the code now proposed that any code requirements of the applicable zoning district such as garages that would necessitate intrusion into the riparian area would not apply.

Mr. Wobbe said if the City felt it was important to have a garage when it passed the zoning ordinance and this was a necessity, it was as important now as it was then, and it did not make sense to now say the code did not apply and a garage was not needed. This did not seem to be in the best interest of the City or the property owners.

Staff Response

PC Heinkel suggested response to testimony from Ron Mann and Gene Wobbe related to zoning requirements related to Exhibit C be deferred until she gave the Exhibit C presentation to the Florence Planning Commission. She stated Goal 5 required clear and objective procedures, as well as performance standards that required weighing and balancing of resource protection versus property rights, which could only be done through a public hearing and deliberation by a body that represented the public and planning interests of the community.

PC Heinkel said when developing the City of Florence's definition of unbuildable, staff considered that the clear and objective path would allow a double wide manufactured home, because that was a form of affordable housing. Additionally, there was a variance process open to everyone, which would require a Planning Commission public hearing. The definition for unbuildable was included in the Comprehensive Plan and in the proposed City Code language that would allow for intrusion into the setback based on a hardship claim.

PC Heinkel said additionally, a Supreme Court takings case that addressed basic property owner rights was written into the Comprehensive Plan. In response to Ms. Patton's assertion that public notice was not provided, Ms. Heinkel said public notice provided was completely consistent with State law, City Code and Lane Code, and had gone beyond the minimal requirements. There were three public open houses, three newsletters were sent to every resident in the study area over a three year period, and there were meetings with property owners.

In response to Ms. Patton's questions about new wells, PWD Miller reviewed the City's well production. He said the wells were capable of producing 3 million gallons per day, and the treatment plant was capable of treating 3 million gallons per day. The peak summer demand he had observed was 2.2 million gallons per day. The typical year round average was approximately 1 million gallons per day. PWD Miller said the City currently had surplus capacity and was looking to the future.

PWD Miller said the proposed well field may be needed in 20 to 25 years. Water demands had dropped off during the last two years. Twelve wells were in production and a 13th well was ready to go into production this year, and well 14 would be drilled in the existing well field in about two years.

Responding to Ms. Patton's questions about failed septic systems, PWD Miller stated the City received notification on failed septic systems from Lane County, adding a dozen systems had failed since January 2013. There was no waiver fee for failed septic systems in the annexation process.

PWD Miller said negotiations with the HWD for an IGA were ongoing, but not required under State law. The City currently had sufficient capacity and did have ties with HWD for emergency water. It was not clear to him that HWD had the capacity to provide water to the City with the restrictions on their water rights.

PC Heinkel said a new well site analysis in the aquifer protection plan, documented the City's need for future wells, as required by State law, had been certified by the Oregon Health Authority (OHA). Additionally, the State Department of Environmental Quality (DEQ) and the U.S. EPA designated the North Florence dunal aquifer a sole source aquifer, which said septic systems were a threat to the aquifer, and the DEQ called for hooking up to municipal sewer systems when available because it recognized that municipal sewer systems were superior to septic systems in protecting the ground water. PC Heinkel reiterated that the City had an adopted policy that stated the City would not force property owners to annex to the City. She added the annexation policy was not in any way affected by any of the proposals before the Planning Commissions. The purpose was to improve and protect water quality in the lower Siuslaw Watershed.

In response to Ms. Taylor, PC Heinkel said the City did an overlay of the drinking water protection overlay zone areas and identified all of the property owners and sent them notice, and the notice was published in the newspaper, and posted on those properties, which went beyond State requirements. She said there was nothing being proposed that would prohibit Ms. Taylor from using the existing legally installed septic system on her property as long as the permitting agencies allowed it.

Commissioner Questions

Commissioner Muilenburg said the current code required a 50 foot setback from riparian sites, which was not proposed to be changed. PC Heinkel confirmed that issue was addressed in Exhibit C. The existing 50 foot setback requirement from Munsel Creek and other drainage areas in the City were riparian areas and wetlands. The proposed code amendments would make it better for property owners. She reviewed the unbuildable definition for homeowners. She added a developer of many homes or businesses would be

inclined to go before the Planning Commission because they had more to gain and more invested than the single family property owner.

Responding to Lane County Commissioner Nichols, PC Heinkel confirmed the footprint rather than the total square footage was the basis for the simple approach. Ms. Nichols suggested a 3,000 square foot house could be built within the footprint because it could be two stories.

Lane County Commissioner Peterson suggested the Oregon Department of Forestry could provide information for the urban protection program. PC Heinkel said wildfire protection issues would be addressed in the Exhibit C presentation.

Commissioner Bare heard concerns about well development. He had been the general manager of a water company and had worked in a sewer department. Developing wells as a main or backup source was consistent with sound planning and management principles and he was pleased the City was doing that planning and work.

Lane County Commissioner Sisson concurred with staff. He noted there was a mechanism through which staff, the City and DEQ could recognize requests for exemption for sewer connections, when the criteria were met.

PC Heinkel stated staff had concluded that the proposed legislative amendments to the Comp Plan in Exhibit B were consistent with the Florence Realization 2020 Comp Plan, the Florence City Code, Lane County Rural Comprehensive Plan, Lane Code, Oregon Revised Statutes, and Statewide Planning Goals and associated Oregon Administrative Rules. She said staff recommended the Florence Planning Commission and the Lane County Planning Commission recommend adoption of the Comp Plan amendments in Exhibit B to the Florence City Council and the BCC.

Chairperson Hoile observed there were no questions from Florence Planning Commissioners. She noted consensus by Commissioners to recommend the proposed legislative amendments to the Florence City Council.

Lane County Commissioner Sisson closed the Lane County Planning Commission public hearing and called for deliberation by the Lane County Planning Commission.

Lane County Commissioner Sullivan stated the Lane County Planning Commission typically was more specific with recommendations to the BCC than those proposed by staff. He asked staff if the BCC would be comfortable with the proposed general recommendation. PWD Miller suggested the Lane County Planning Commission make a recommendation to the BCC for or against or to modify PA 1299.

Lane County Commissioner Nichols was in favor of the proposed recommendation. She had served on one of the committees that reviewed the proposed amendments and believed the proposal was well thought out.

Lane County Commissioner Goldstein had reservations about the proposal but it was not his job to deal with them. He would go along with the proposal.

Lane County Commissioner Thorp supported the proposal. While some people had issues with components of the proposal, they were City of Florence issues rather than Lane County issues.

Lane County Commissioner Peterson was satisfied that the City of Florence was taking stewardship of the land seriously.

Lane County Chairperson Sisson concurred with comments from Lane County Planning Commissioners.

Lane County Commissioner Sullivan said the premise of the proposed amendments was to protect and improve water quality, and there were issues that the City of Florence would need to address. There had been excellent citizen involvement. There were no amendments to Lane Code through this process. Goal 5

requirements to the three step process had been addressed, which was a benchmark for consideration by the BCC. The management strategy related to co-adoption developed for Lane County was clear and concise.

Lane County Commissioner Sullivan, seconded by Mr. Peterson, moved to recommend to the Board of County Commissioners adoption of Ordinance No. PA 1299 and the proposed Comprehensive Plan amendments in Exhibit B, subject to the following condition: Prior to adoption, the 2013 Wetlands and Riparian Inventory be approved by the Oregon Department of State Lands and include any modification approved by the DSL to respond to property owner requests. The motion passed unanimously, 6:0.

~ ADJOURNMENT OF LANE COUNTY PLANNING COMMISSION MEETING ~

The City of Florence Planning Commission took a 10 minute break.

CITY PUBLIC HEARING (CONTINUATION):

- 4. AQUIFER PROTECTION AND WETLAND & RIPARIAN CORRIDORS FLORENCE CODE AND COMPREHENSIVE PLAN AMENDMENTS – RESOLUTION PC 13 03 CPA 01, PC 13 04 TA 01, AND PC 13 05 ZC 01 (ORDINANCE NO. 2, SERIES 2013):** A proposal to amend Florence Realization 2020 Comprehensive Plan to adopt an updated Wetlands and Riparian Inventory, an Aquifer Protection Plan, and related policies, as well as housekeeping amendments, and to amend Florence City Code to comply with Statewide Planning Goals for wetlands and riparian areas and groundwater resources, including a Drinking Water Protection Overlay Zone to apply to the use and storage of hazardous materials within the Drinking Water Protection Area for the City's proposed drinking water well field, and housekeeping amendments.

Commissioner Hoile called the meeting back from recess at 9:26 pm. She said they were moving on to the city public hearing. The next portion of the meeting was for the city's proposal to amend Florence City Code Text (Exhibit C).

Staff Report

PC Heinkel said this was a continuation of the city's public hearing on the ordinance (Part 2, Exhibit C), city only. She said it was the proposed amendments to the city code. PC Heinkel gave a quick recap of the first part of the public hearing. PC Heinkel continued with the power point (Attachment 1) that showed where the proposed Drinking Water Protection Area zone would apply for the city's proposed well fields.

PC Heinkel talked about the proposed Code amendments in Exhibit "C". She said they were the Aquifer Protection (Quasi-judicial Amendment), Wetlands and Riparian Corridors (Legislative Amendment), and a Housekeeping Amendment (Legislative Amendment).

PC Heinkel said the Aquifer Protection Amendment was to adopt a new Drinking Water Protection Overlay Zone Map and the Overlay Zone District would be a new Chapter 32 in Florence City Code Title 10. She said she received some public comments related to Exhibit "C" and they pertained to Wetlands and Riparian areas.

PC Heinkel gave a verbal report on the topic of the Aquifer Protection. She said changes were recommended to Exhibit "C". She said staff recommended adoption of the Florence City Code Amendments in Exhibit "C" with the condition that Exhibit "C" contain the changes to the proposed code presented at tonight's hearing. PC Heinkel said the changes were in response to a citizen, and staff did further research of the proposed code and found that additional provisions were necessary for clarification and consistency regarding the removal of native plants within the required buffer zones.

PC Heinkel said the Drinking Water Protection Overlay Zone would apply to industrial and commercial uses in the Drinking Water Protection area for the proposed well field. PC Heinkel pointed out that this area was

the 5, 10, 20 and 30 year time of travel zones. She said there were no industrial or commercial in the 5 year time of travel zone and that there would be no standards for this zone.

PC Heinkel discussed the objectives of the overlay zone which were to protect the city's drinking water supply from impacts by facilities that have on premises substances that pose a hazard to groundwater quality. She discussed the proposed regulations and how they would be implemented. PWD Miller stated this program was all about education and outreach, which included working with the businesses and the fire marshal.

PC Heinkel referred to the proposed code amendments for the Wetlands and Riparian Corridors from the staff report. She said the proposed city code applied to significant wetlands and riparian reaches within the city limits. PC Heinkel referred to the power point (Attachment 1) and stated that these areas were significant resources and were identified by number in the Wetlands Riparian Plan. PC Heinkel discussed the methods used to prepare the code changes including the Safe Harbor and limited protection approaches.

PC Heinkel discussed the ESEE Analysis on the Munsel Creek Side Channel, stating that a program was developed which would allow the Side Channel to get a 50% setback reduction, up to 25 feet from the creek if native vegetation was displaced. She said the Limited Protection Program was a combination of the Safe Harbor and the ESEE Analysis.

PC Heinkel discussed the current storm water code and the vegetation clearing permit code and the proposed amendments. She said that if the city was allowing people to improve the Riparian area, the city needed to have oversight to make sure the Riparian Area stayed in place.

PC Heinkel discussed the comment from Mr. Wobbe regarding the zoning requirements for garages. She said Mr. Wobbe testified if the city felt it was important to have a garage when they passed the zoning ordinance it was just as important now as it was then. PC Heinkel responded saying the decision needed to be made by the Planning Commission not the city staff. Property owners could put in a garage and make the argument that city code allowed a garage, required a garage and all neighbors had garages, but the Planning Commission would do that through a variance process rather than city staff having to make that call because it is not clear and objective criteria.

PC Heinkel said in Exhibit "C" there were specific provisions for how to measure the wetlands and the riparian areas. She said there were maps for the riparian areas that the city would give to people, and said there was a specific process in the city code to follow if someone did not agree with the map and how they could measure the riparian area themselves and bring to the city and demonstrate their measurement. She discussed the options available.

Questions from Commissioners

Commissioner Burns asked PC Heinkel to go back to the Proposed Drinking Water Protection Overlay Zone. He wanted it known that the new proposed wells were on the west side of Highway 101, not the east side as Lane County Commissioner Goldstein discussed.

Commissioner Muilenburg asked PDW Miller if there was any consideration given to the depth of the water level in each of the 5, 10, 20, 30 year zones, and asked if the level of the water in the aquifer varied in depth or was consistent. PWD Miller responded saying the water level was fairly consistent, because the groundwater came to the surface in a number of areas where the proposed wells were going. PWD Miller said the concern was anything that got into the aquifer would be costly to remove. He said that was why the standards were the way they were, to protect the resource in the future.

Commissioner Muilenburg asked about significant wetlands and if they had been defined as ½ acre or larger. PC Heinkel referred to the law by the Department of State Lands. She said that threshold was chosen for

applying the wetland buffer zone. Commissioner Muilenburg asked if anything on the DSL list for 2013 would be ½ acre or larger and PC Heinkel said it would be.

Commissioner Muilenburg asked if the discussion regarding the 50 foot riparian setback on Munsel Creek had been defined and PC Heinkel said it was from top of bank out to the edge of the riparian width as required by state law.

Commissioner Murphey questioned the wording in Exhibit C on page 1 regarding downed trees which he proposed to be changed from "the department may require these trees to remain in place" to "the department requires downed trees to be removed if they pose no threat to the wetlands or riparian resource area", because of the wildfire potential. PC Heinkel responded that it said "the city may require" and Commissioner Murphey wanted to know who would make that decision. PC Heinkel referred to the Vegetation Clearing Permit process. She said that was why the clause "by a professional" was added so that property owners would get the professional advice with the professional providing the justification to take out the downed trees or leave them. Commissioner Murphey thought that most of the time an expert in riparian area would require the downed trees be left because of the possible damage to the riparian area removing the trees. He talked about his concern of dead fuel being stacked up within the city limits waiting for disaster to happen. PC Heinkel said that there was an exception for hazardous trees in the code. She said there was another exception in the storm water quality code under "G" regarding hazardous trees, which was a cross reference to the vegetation clearing permit application. Commissioner Muilenburg pointed out that the wording in the beginning of the paragraph read "the department" and at the bottom it read "the planning department". He made a suggestion to change the wording to "the planning department" to be consistent. PC Heinkel said she would make the change.

Public Testimony

Chairperson Hoile asked for testimony from the public whether they were an opponent, proponent or neutral.

Marvin Ryall – 05460 Friendly Acres Road, Florence, OR.

Mr. Ryall said he owned two parcels in the Overlay Zone, one of those was Ron's Paint Building and the other were three warehouses that housed Habitat for Humanity Resale Store, Commercial Contractor Storage and a RV storage and for the outside RV storage he said he had a conditional use permit. He said he was opposed to the proposed zoning because he had questions.

Mr. Ryall said currently he was in the North Commercial Zone, which was a restrictive zone; the same zone as Fred Meyer's. He said when overlay zones were in place, it put the burden of proof on the property owner. He said this concerned him because it would depreciate the value of the property and make it harder to sell.

Mr. Ryall stated the time of travel zone was very confusing and hard to understand as to what it proved. He said he knew the aquifer water movements and agreed with the time frames. He said that there were other movements of water, such as the surface water, groundwater and high events flows where the water moved in all directions, allowing possible contamination from one property over to another property, disguising where the original contamination occurred.

Mr. Ryall said that his biggest concern was that the east third of the zone was Highway 101, a main corridor on the coast carrying all kinds of hazardous waste. He wanted to know how the property owners were going to be burdened with something they had no control over. Mr. Ryall stated his concern that this particular exposure area had not been addressed.

Mr. Ryall said his most important concern with the overlay zone was the cost to the property owners, such as additional development fees and inspection fees, water retention area modification, parking lot drainage as well as other possibilities that would cause conflict with the property owners. Mr. Ryall asked the

Commission to consider some of his concerns and said he would like to see other ways to educate the property owners rather than having this zone burden put on them.

Earle Schertell – 707 Quanagh Court, Florence, OR

Mr. Schertell said he was concerned about RRHA being declared as a waterway. He said it was a drainage ditch that does not completely flow 12 months out of the year. He said it might flow 6-9 months depending on the rainy season and how much water flowed through there. He said his concern was how this area was declared to be a riparian area, because it is not a full forest waterway 12 months out of the year. He went on to say that there were dead trees in the area as well. Mr. Schertell wanted to know who would be responsible for taking care of those trees, because if they were to fall, it could be a fire hazard, in the summer months if the creek is dry.

Dave Jaeger – 102 Manzanita Way, Florence, OR

Mr. Jaeger said he was one of the ten property owners in Coast Village that had been determined to be unbuildable or buildable with major restrictions. He said that ten years ago, after a friend fell into the drainage ditch, which is now the Munsel Creek Side Channel, they went to the City Planning Commission and talked to them about putting tubes in the ditch that would not disturb the water flow on either side of the ditch and the city approved it. Mr. Jaeger said they received a letter from the city stating it was okay for this modification to be done and they still have the letter. He said the drainage ditch they cleaned out, put the tubes in and covered at great expense is where their 5th wheel trailer is now, and the inspector at that time said it was fine. Mr. Jaeger said he asked the inspector if they would be able to put a double wide mobile home in the same spot at a later date and were told it would be fine. Mr. Jaeger stated 10 years later they discovered they can't put a double wide mobile home anywhere on their property because of the restrictions that were put on by Coast Village, the city, the fire department and now by the riparian proposal. He said the letter they received from the city years ago stated they could do anything they wanted legally, as long as they kept a 5 foot buffer zone on either side of the creek, in order to prevent erosion of the land.

Mr. Jaeger said there were two points to look at. The first point was that the commission was looking for clean water and he referred to the report PC Heinkel talked about and said it mentioned that there were trace amounts of phosphates and caffeine in Munsel Lake. He suggested that because phosphates came from dish soap and caffeine is found in coffee that the likely cause for the trace amounts were septic tank effluent and everybody in Coast Village was on city water and city sewer which means there was nothing dirty going into the creek.

Mr. Jaeger said the second point was for the fish. He said fish did not live on land and the creek was dry six months out of the year. He said the creek is 5 feet wide and Mr. Jaeger said the current depth of the creek was 2 inches deep and 4 feet wide. Mr. Jaeger said there was something wrong in calling this a riparian corridor because there was more water going down the shower drains than going through the creek. He said the Salmon and Trout Enhancement Program (STEP) knocked down a beaver dam in the headwaters last July in order for water to run through the creek, in order to show the creek was capable of carrying fish. Mr. Jaeger talked about two runs of fish; one in October and one in January. He said the one in January would have no water to spawn in and he wanted to know who was going to be responsible for those dead fish. He said the dead fish posed a public safety issue because the smell of the fish brought the bears into the area. Mr. Jaeger finished by suggesting the proposal be put on hold until all the rules and regulations were finalized in a manner that could be understood.

Diana Glasgow – 138 Driftwood Drive, Florence, OR.

Ms. Glasgow said she was a property owner along the Munsel Creek Side Channel inside Coast Village. She said she was very excited to hear the possibility that she had a Coho Salmon Habitat in her backyard. Ms. Glasgow stated she understood that the proposed code changes would have no negative effect on her property. Ms. Glasgow said she was on the Board of Directors of Coast Village and the Board was aware of

their mutual responsibility with the city for water quality in the Florence area. She said the board had budgeted and approved the replacement of all five sewer pump stations on their 5 year plan, with completion in June 2016 and they had the money, scheduling and were awaiting receipt of final bids, to replace 2 of the 5 sewer pumps in the summer of 2013.

Staff Response to Public Testimony

PC Heinkel responded to Mr. Schertell's concern of the Overlay Zone, saying the standards in the Overlay Zone did not apply to existing businesses, but to businesses that apply for a building or land use permit. She said the Overlay Zone did not apply to existing businesses using chemicals, unless they wanted to expand the business or change the use of the business to something else. PC Heinkel said that this was a policy choice of the city and it is not required by law. The city staff and the stakeholders recommended this Overlay Zone because the hazardous chemicals in the Time of Travel Zones could result in making this unavailable as a future water source for the city.

PC Heinkel defined the Time of Travel Zones and how hazardous chemicals moved in the aquifer. She referred to the City of Springfield, OR and said that hazardous chemicals entered one of their well fields and the well field had to be decommissioned. The business owner that was responsible paid multi-millions in order to remedy the situation and caused the City of Springfield to have a Drinking Water Protection Overlay Zone applied to their existing well fields as well as proposed well fields. PC Heinkel said that this was the reasoning for the Overlay Zone in the City of Florence.

Chairperson Hoile asked PC Heinkel about the Highway 101 concern in the Overlay Zone. PC Heinkel said the Aquifer Protection Plan had a procedure for the transportation of hazardous materials. She said when a spill happened, there was a well-established program through the Fire Marshal's Office called "Spill Response" and the city was notified; and in the Contingency Plan portion of the Aquifer Protection Plan it spelled out step by step how the transport materials were dealt with in the event of a spill. She said that just because there was a spill or contamination, the property owners would not be culpable just because it was an Overlay Zone. She stated that the Overlay Protection Zone actually helped the property owners because it would make sure that businesses on their property were using, storing chemicals in a way that doesn't create a liability.

PC Heinkel said there were no fees being proposed and it was a form that the property owner would fill out as part of a building or land use permit application. She said there were no requirements for increased water retention or drainage facilities. She said that this particular concern was addressed in the City Storm Water Regulations which were already adopted and updated as part of this process, and not likely to be proposed in the future.

PC Heinkel addressed the concern of depreciation of property by saying that in Springfield that was not the experience. She said that the relationship with the businesses concerning the Drinking Water Protection program was a very good one, and the businesses supported the Drinking Water Protection Program in Springfield when it was adopted.

Questions from Commissioners

Commissioner Burns asked PC Heinkel if it could be recommended to the Council that the city not establish an Overlay Zone fee, saying that PC Heinkel proposed no fee in the future, but he wanted it in writing. The Planning Commission agreed. PC Heinkel made a note to put in the request to council.

Staff Response (cont'd)

PC Heinkel responded to Mr. Schertell's concern about the RRHA Riparian Area because it did not flow year round. She said that intermittent flowing streams were treated the same as continuously flowing streams

under state law and it was not relevant that it was an intermittent stream as far as whether it was significant or not.

PC Heinkel addressed the concern of the hazardous trees, and stated she had spoken with Mr. Schertell and it was understood that he would come into the city and file a complaint regarding trees on his property or on another property that posed a fire hazard to his property.

PC Heinkel discussed Mr. Jaeger's concern over Munsel Creek Side Channel saying that there had been a 50 foot setback on all of Munsel Creek for over 30 years, and it was well established in city code. She said it applied to both sides of the creek as well as Munsel Creek Side Channel, and Florentine Estates is north of Coast Village on the side channel. PC Heinkel said that Florentine Estates received a variance from the Planning Commission for a 25 foot setback reduction of the 50 foot setback and it was very clear in the Planning Commission Resolution and staff report materials. PC Heinkel said that Coast Village did receive an agreement from the City Council for many considerations in the code amendments that were written into the code.

PC Heinkel said the first thing that occurred was the ESEE Analysis on the wetlands exception, the public infrastructure, as well as for the Munsel Creek Side Channel which was done out of consideration for the conflict that existed on the Munsel Creek Side Channel. She said the analysis was also done on the 50% setback adjustment through administrative review to address the concerns of the cost and also a variance fee waiver for situations where a Variance would be required. She said this was all in code to the Coast Village residents due to the unique circumstances of that area. PC Heinkel said staff and city council were aware of Mr. Jaeger's concern that his property was considered in violation. She said that all existing structures were grandfathered in Coast Village, but in other parts of the city, property owners would have to demonstrate that structures were lawfully created. She said all the structures in Coast Village were considered lawfully created, due to the way that area developed.

PC Heinkel stated that there were many considerations for Coast Village concerning the code amendments, and it benefited Coast Village by making their situation much better from what was in the code currently. She said this was a critical habitat for Coho Salmon and it had been in place in writing from federal and state agencies for years and this was why there was little that could be done to counter that.

Questions from Commissioners

Commissioner Muilenburg commented that the Planning Commission and the City realized that Coast Village was unique and met with the property owners and did a code update for them. He said they tried to work with the property owners to make some of the properties more developable. He said that the buildable language gave the possibilities for property owners to get variances.

Commissioner Muilenburg wanted clarification that he understood the reason for the Drinking Water Overlay Protection Plan was for the potential of possible contamination in that area, more than other areas depicted on the overlay map. PC Heinkel said he was correct in his understanding and that it was in place to protect the city's future water source.

Commissioner Muilenburg asked PWD Miller about the 10 year or 20 year well side of the overlay and wanted to know if there were test well sites in those areas to test. PWD Miller said it was a new well field and that they had access to many monitoring wells in the area, allowing them to have an idea as to what was happening to the area, and as they moved forward there would probably be more monitoring wells with access and that made for a large range of possibilities.

Commissioner Muilenburg wanted clarification of the "grandfathering" of the existing properties in the Overlay Zone. He asked if a business sold to another business, would the current business be pushed into the requirements, and PC Heinkel responded saying the Overlay Zone Requirements would only apply if the new owner received a building or land use permit.

Commissioner Muilenburg wanted to clarify that there were multiple regulatory agencies involved with Munsel Creek as it pertained to Coast Village, and the Planning Commission and the City Council had to be in agreement to approve changes.

Chairperson Hoile closed the hearing at 10:40 pm.

Staff Recommendations

PC Heinkel recommended adoption of the Florence City Code amendments in Exhibit "C" to the Florence City Council, subject to the following changes:

- That Exhibit "C" contain the changes to proposed codes that were presented at the hearing of May 7, 2013 which were in the handout Recommended Changes to Exhibit "C" and that staff forward to the city council the planning commission recommendations.
- The adding of the word "planning" to exhibit 3 page 1.

Commissioner Burns made a motion to approve Resolution PC 13 03 CPA 01, PC 13 04 TA 01, and PC 13 05 ZC 01 and forward the amendments to the City Council; second by Commissioner Muilenburg; by voice all ayes, motion carried unanimously as presented.

5. CALENDAR

IPD Weese informed the Commission on upcoming calendar events including...

- Tuesday, May 14, 2013 – Public Hearings for: Peace Harbor Hospital Design Review, Siuslaw River Christian Fellowship Church 7:00 pm at Florence City Hall
- Tuesday, May 28, 2013 – Public Hearing, Cannery Station Development, 7:00 pm at Florence City Hall
- Tuesday, June 11, 2013 – Regular Session, 7:00 pm at City Hall

Chairperson Hoile adjourned the meeting at 10:45 p.m.

Cheryl Hoile, Planning Commission Chairperson

**City of Florence
City Council Meeting Minutes
April 15, 2013**

CALL TO ORDER - ROLL CALL - PLEDGE OF ALLEGIANCE

Mayor Xavier opened the regular council meeting at 7:08 p.m. with the pledge of allegiance. Other members present included Councilor Brian Jagoe, Councilor Joe Henry, and Councilor Joshua Greene. Councilor Suzanne Roberts was absent and excused. Staff in attendance included City Manager Jacque Betz, Public Works Director Mike Miller, Finance Director Erin Reynolds, and Interim Planning Director/City Recorder Kelli Weese. Planning Consultant Carol Heinkel was also present.

APPROVAL OF AGENDA

Mayor Xavier asked for any additions or corrections to the agenda, hearing none she moved on to the next item.

PUBLIC COMMENTS

Mayor Xavier explained that this was a time in the meeting that offered an opportunity for anyone in the audience who would like to address the council for a maximum of three (3) minutes for any item not otherwise listed on the agenda.

Cindy Wobbe – Florence Area Chamber of Commerce President

Ms. Wobbe, Chair of the Rhododendron Scholarship Program, presented the 2013 Rhododendron Court. She introduced the senior and junior princesses to the Council and they took a photo with Mayor Xavier.

Mayor Xavier called for further public comment, hearing none she moved on to the next item.

CONSENT AGENDA

APPROVAL OF MINUTES

Consider approval of the regular council meeting minutes of April 1, 2013.

AUTHORIZE REFINANCING OF WATER GENERAL OBLIGATION BOND

Consider approval of Resolution No. 5, Series 2013, a resolution authorizing the refinancing of the water department General Obligation Bond with U.S. Bank at a rate of 2.11%.

Mayor Xavier stated that a correction to the minutes had been placed on the dais which clarified the motion made regarding the transient room tax at the previous meeting.

Councilor Henry requested that the item regarding refinancing of the water general obligation bond be removed from the Consent Agenda since he had questions.

Councilor Jagoe moved to approve the minutes of the April 1, 2013 Council meeting and move the water bond item out of the Consent Agenda. Seconded by Councilor Henry. By voice all 'ayes'. Motion carried unanimously.

AUTHORIZE REFINANCING OF WATER GENERAL OBLIGATION BOND

Item moved from Consent Agenda for discussion.

Councilor Henry asked what the bond was originally for. PWD Miller stated that the water bond was for the expansion of the water treatment plant, and explained what the expansion entailed. Councilor Henry asked about the payment schedule of the bond. FD Reynolds stated that the balance will be \$1.4 million at the time of refinancing. Councilor Henry asked whether the intent was to pay the bond off in the first ten years. FD Reynolds said it had an amortization schedule of 20 years and the refinancing will follow that schedule resulting in a final payment being made in June 2023. Councilor Henry asked if they could add that statement to the resolution. FD Reynolds said that statement could be added to the resolution. Councilor Henry stated he would be more comfortable if the resolution stated the final payment date.

Councilor Henry moved to revise the Resolution No. 5 to describe the anticipated amortization over 10 years. Mayor Xavier stated that the resolution said the bond shouldn't mature later than July 2023. FD Reynolds said the intent of the word mature would be that it is paid off but that staff could add a statement that the balance is paid in full.

Councilor Henry suggested that a summary page could be described in the resolution that they are going to approve that would include the amortization schedule.

Councilor Henry moved to approve Resolution No. 5 with a slight amendment to add a sentence to section 3 that says it will be paid in full by 2023. Seconded by Councilor Greene. By voice all 'ayes'. Motion carried unanimously.

STREET CLOSURE REQUEST FOR RHODODENDRON FESTIVAL VENDOR FAIR

Consider approving the request to temporarily close Maple Street between 1st and Bay Streets in Old Town from Friday May 17, 2013 to Sunday May 19, 2013 for the Rhododendron Festival Vendor Fair as applied for by Cal Applebee, Director of the Florence Area Chamber of Commerce.

Mayor Xavier noted that a second letter had been sent in to the Council for comment on the proposed street closure.

CM Betz introduced the agenda item. Chief Gutierrez presented an overview of the application. *(See Attachment 1 for PowerPoint presentation)*

Councilor Jagoe asked why the Council was only looking at the vendor fair permit. He said he felt that the Council should be able to look at the entire Rhododendron festival weekend to review the proposed activities. Chief Gutierrez stated that they had not received any other long term road closure applications. He also stated that the Chamber does not operate all of the events. CM Betz stated that the process has been established by the Council and each application has to be evaluated through that process.

Councilor Jagoe said that last year there were issues with the vendor fair site. He would like the approval to include that all the equipment and pets be contained within the street closure area. He would also like to see the vendor parking be addressed so that vendors park farther away from the vendor area. He thought that the vendors had very little regard for the residences in the area.

CM Betz suggested that Cal Applebee answer some of the questions from Council.

Cal Applebee - Executive Director of Florence Area Chamber of Commerce

Mr. Applebee stated that the Chamber has worked to address vendor parking. They have designated an offloading zone at the north and south area due to some of the vendors carting a lot of materials in for the event. The Chamber will work to provide some off-street parking similar to last year. Councilor Jagoe said that the vendor parking needed to be further out since the entire idea was to get the public in. Mr. Applebee stated that there are other opportunities they are looking in to.

Councilor Greene said that they might want to talk to Siuslaw Museum to use the back parking lot. They may have enough extra parking at those facilities. Vendors often have to be close to their vehicles to restock, but he understood Councilor Jagoe's concern.

Mr. Applebee said that last year was the first year for the vendor fair to be down there and they didn't allow enough spacing for generators and other equipment. Councilor Jagoe stated that dogs need to be on a leash and within their space since it was a problem last year and he mentioned it then.

Mayor Xavier opened the public hearing for comments.

PUBLIC HEARING

Cindy Wobbe – Florence Area Chamber of Commerce President

Ms. Wobbe stated that this was the second year at the proposed location. She acknowledged that there were a few glitches last year since it was the first year. The Chamber will be making it a point to address those concerns, but the overall response from vendors and brick and mortar stores was very positive. The owner of Captain's Lady Books initially expressed some displeasure but was so elated with the additional foot traffic that she wrote an unsolicited letter and also joined the Chamber. It was a good indication of the response. She also visited the owners of the Wind Drift Gallery and they indicated that the weekend had been favorable for them. She stated that they hope that the comments are a trend and they are working to address some of the issues, but it has been a positive move for the festival and the community.

Councilor Jagoe stated that he wanted to fix the problems from the prior year. Ms. Wobbe said they are working on it. Mr. Applebee said that they had applied for up to 40 vendors but have modified the layout to 34 to be more manageable. The reality is they were currently at 24 of the 34 spots filled at the time of the public hearing. He said that they did not think they would end up filling the entire 34 to give some flexibility for overflow of equipment.

Mayor Xavier closed the requests for public comment at 7:45pm.

Councilor Greene said that it may be worthwhile for the Chamber to be responsible for talking with vendors to mandate where they park their vehicles. Vendors do have to be told where they can park. He wanted to make sure the Chamber knew it was an issue but he did not want to include it in the conditions of approval.

Councilor Jagoe moved to approve the request to temporarily close Maple Street between Bay and 1st Streets during the Rhododendron Festival. Second by Councilor Henry, by voice all ayes, motion carried unanimously.

ACTION ITEMS

CHANGES TO THE FLORENCE REALIZATION 2020 COMPREHENSIVE PLAN AND CITY CODE

Consider approval of Resolution No. 3, Series 2013, a resolution initiating changes to the Florence Realization 2020 Comprehensive Plan in response to the Siuslaw Estuary Partnership grant products including the aquifer protection plan, the wetland and riparian corridors plan, and the associated Comprehensive Plan and code amendments.

Mayor Xavier referenced the presentation that PC Heinkel provided at the work session prior to the meeting. She asked the Council for their opinion on the issue.

Councilor Henry said that he was not comfortable with the portion of the plan that states what the County is required to do by state law. He said that it would be up to them to do and not up to the City for monitoring it. It appeared to him that it could be seen as a step towards forced annexation. PWD Miller stated that historically the issue with Lane County was with staffing resources and they have not been following state code and laws. They do not know where the sewer system is. By having it as part of the Comprehensive Plan, which they have to co-adopt, it will let everyone know what the rules are and inform staff that they need to communicate with the City.

CM Betz clarified that the annexation policy is set by the City Council and the current proposed amendments would not change that policy. Mayor Xavier stated that the Council intentionally put the policy in the Comprehensive Plan to make it as difficult to change as possible. She asked whether there was a way to phrase the change that says to the County that it was their responsibility to enforce the state law. PC Heinkel said the language that is there was negotiated with the County. They have agreed to the policy written in there now. PC Heinkel said the decision is not to approve the policies; it is to initiate the process. In the interim, they can have a chance to review the state law and think about whether they want it in when the time comes.

Councilor Jagoe stated that he had full faith in city staff if they felt the state law language needed to be there he agreed. He wanted to see the reassurances that they were not adopting something that, down the road, would set them up for offering to manage the program that would cost money and manpower. He did not see this lessening staff workload. CM Betz stated that the urban growth boundary (UGB) is for future orderly growth. In the past, the City has not known what the County is doing in areas outside the city limits but within the UGB. These changes serve to increase communication and have the County and City staff support. They will be working together with the County to have a better communication.

Councilor Jagoe said they had talked about the property owners but wanted to know if there were any that were concerned. PC Heinkel said that one of the issues originally came to the Council for policy direction about a proposed Comprehensive Plan policy to require advanced septic systems. They received feedback from people asking why they needed to have that policy because the septic systems would be in the 20 year time of travel zone where the nitrates would get diluted. She said input from a property owner caused them to take the policy out. PC Heinkel said that staff has notified everyone through sending letters and had about 50 or 60 people at the wetlands or riparian areas work shop.

PC Heinkel said that they have notified the public on the public hearing on May 7th between the City and Lane County Planning Commission to be held at City Hall.

Councilor Jagoe stated that he was not involved when the whole process started and he had issues with a lot of it, but it was probably something that

needed to happen. They need to protect the water quality and he understood that. He had a question regarding Policy #3 where the "City shall notify Department of State Lands." He would like to see that removed. PC Heinkel stated that that was one of the statements required to be in the Plan by state law. Councilor Jagoe said he felt like they were bringing it to the attention and that they would be bound to support it whether they could afford it or not. The notification will take staff time and he wanted to try to remove those obstacles since they always have the option to notify whether it is in the comp plan or not.

Councilor Greene acknowledged that staff has done a lot of work on this project. Reading through it, he believed that they have tried to mitigate every problem with every landowner where there was a conflict. He stated that it actually gives the landowner a path forward. It gives a landowner who wants to develop a large piece of property a way to hook up to the sewer. All they are doing is protecting the water. He stated that they will have to handle work with regulations one way or another and they need to deal with it in a way that is best for the community. He believed that is what they were doing with the Plan.

Mayor Xavier stated that she knew that Mr. Clarence Lysdale and PC Heinkel met on site with many property owners to look at exactly what the situations were and to find the best way possible to give them as much opportunity to make things work. She mentioned that they were able to succeed with this task – particularly with Coast Village.

Mayor Xavier moved to approve Resolution No. 3, 2013, a Resolution initiating changes to the Florence Realization 2020 Comprehensive Plan in response to the Siuslaw Estuary Partnership grant products including the aquifer protection plan, the wetland and riparian corridors plan, and the associated Comprehensive Plan and code amendments. Second by Councilor Greene. By voice all 'ayes' with the exception of Councilor Henry who voted "nay". Motion carried 3 to 1.

APPROVAL OF THE SIUSLAW ESTUARY TRAIL VISION

Consider approval of Resolution No. 4, Series 2013, a resolution approving the Siuslaw Estuary Trail Vision Preferred Location and Design proposal.

PC Heinkel presented on the Siuslaw Estuary Trail Vision. (See Attachment 2) She provided historical information and the proposed vision.

Councilor Jagoe asked about the proposal to bring the trail down to the docks and whether it would be a safety issue. Bob Forsythe, Port of Siuslaw Manager, stated that there would be a small section where the trail would be on the transient dock. He also stated that the Port is supporting the project.

PC Heinkel explained that the grant product requires the City to approve a vision for the project. Approval of the vision would also make it more viable for future grant opportunities.

Councilor Jagoe discussed the materials for the dock and referenced steel cantilever docks. He mentioned that steel does not hold up very well in saltwater. PWD Miller said it would likely be made of powder coated, galvanized steel because it does better in the environment and is less expensive than stainless steel.

Councilor Greene moved to approve Resolution No. 4, Series 2013, a resolution approving the Siuslaw Estuary Trail Vision Preferred Location and Design proposal. Second by Councilor Henry. By voice, all 'ayes'. Motion passed unanimously.

GREENER FLORENCE AWARDS

Consider approving the recommendations for the Greener Florence Awards from the Environmental Management Advisory Committee (EMAC).

CM Betz introduced RARE Participant Katya Reyna and EMAC Chair Bob Forsythe to update Council on the recommendation.

Mr. Forsythe explained the application and selection process and criteria. He stated that Morgan's Country Kitchen was recommendation from EMAC. The award would be presented at the May 6th meeting.

Mayor Xavier stated that she would have liked to see more applicants. Mr. Forsythe said they needed to work with the community to establish that this award was different than the similar award from the Chamber.

Councilor Greene asked for a clarification of the information in the application. Mr. Forsythe explained how the products used were biodegradable.

Councilor Jagoe asked whether the Casino was involved this year as in the past. Mr. Forsythe stated that the Casino does Styrofoam collection one time per month. RARE Reyna stated that they did not apply this year and was not sure if the Styrofoam program was still running due to feedback she had received from residents trying to drop off recycling.

Mayor Xavier stated that the Council was happy with the EMAC selection and that they would look forward to the presentation of the award at the next meeting.

REPORTS

FEBRUARY 28, 2013 FINANCIAL STATEMENT REPORT

Finance Director Erin Reynolds provided a report on the City's financial statements as of February 28, 2013.

FD Reynolds mentioned that she did add back in the transfer and inter-fund transfers to show how they balance to zero. She stated that they were on track for the year.

MONTHLY REPORTS FROM DEPARTMENT HEADS

City of Florence department heads provided a report on the workings of their departments for the month of March 2013.

The Council discussed the monthly reports.

Mayor Xavier mentioned that the City Recorder report stated that staff had closed out business renewals for the year. She asked when they would receive a report on the business license program. CR Weese stated that a report would be presented in May.

Chief Gutierrez stated that he added information to his report regarding 911 calls for other agencies as a comparison. Mayor Xavier stated that she was glad that code enforcement was contacting repeat offenders for signs being left out. Chief Gutierrez stated he has noticed that people are placing signs on private property more rather than in the right of way.

Councilor Henry thanked CM Betz and PWD Miller for allowing him to go on a tour of the public works department. Councilor Jagoe asked PWD Miller for an update on the airport. PWD Miller stated that the volunteer group is doing a good job. He said that he does still have a need for staff to go out daily to operate the fueling facility at the airport. Councilor Jagoe stated that the airport is a benefit for the community.

CITY MANAGER REPORT

- *Bio-solids Management Presentation by Public Works Director Mike Miller at Lane Community College*
- *League of Oregon Cities' On-line Resources*

CM Betz mentioned that PWD Miller would be presenting at Lane Community College about moving to a Class A Biosolids Program. She also mentioned the On-Line Resources page from the League of Oregon Cities. It was handed out at the legislative update that she and Mayor Xavier had attended the prior week.

MAYOR AND COUNCIL REPORTS

- *Legislative Policy Liaison from Council*

Mayor Xavier stated that she receives information from League of Oregon City staff regarding bills that are working their way through the legislature. They often call for comments to be sent to elected state officials regarding how

potential policy decisions would affect the City. In the past, the Mayor has had a second member of the Council to help review and comment on legislation.

Mayor Xavier discussed two requests for comments on bills that had come through in the past few weeks. She then asked for a volunteer to serve as this liaison. She nominated Councilor Roberts if no other Councilor wanted to serve in that capacity. The Councilors agreed with Councilor Roberts serving as the legislative policy liaison.

With no further business, Mayor Xavier adjourned the meeting at 8:42 p.m.


Nola Xavier, Mayor

ATTEST:



Kelli Weese, City Recorder

Attachment 1

Rhododendron Festival Vendor Fair Street Closure Request

Applicant

Florence Area Chamber of
Commerce

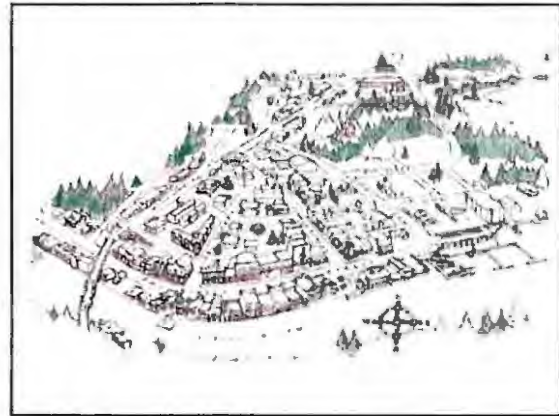
Requested Street Closure

Dates

Friday May 17, 2013 at 12 pm

To

Sunday May 19, 2013 at 5 p.m.



Process for Street Closure

- Applicant must supply the following information along with their Street Closure Application....
 - Detailed description of event including dates, hours, admission fees, and purpose
 - Map of the proposed streets and right of way closures
 - List of businesses within 100' of street closure (for official notification of Application)
 - Estimate on number of attendees
 - Street Closure Application Fee (\$250)

Process for Street Closure

Continued...

- The following plans...
 - Detailed plan for ingress and egress of closed area for participants, attendees, residents, and emergency vehicles
 - Sanitation Plan including an appropriate number of restroom and sanitation facilities
 - Security Plan including number and deployment of security personnel
 - List of on site contacts who will be available at all hours of the event
 - Information on possible alcohol sales, amplified sound approval, and Proof of Liability insurance

City Council Decision

- The City Council's Decision shall be based on the following questions...
 - Has the applicant demonstrated compliance with the criteria shown in FCC 7-5-1-1 (see following slide)
 - Is the information provided by the applicant credible and are the plans submitted by the applicant adequate to protect the City, the public, and the affected property owners
 - Is the potential harm and inconvenience to public and affected property owners created by this road closure reasonably mitigated or avoided by the applicant's plan for the event

Approval Criteria Considerations

- Traffic Disruption
- Safety Concerns
- Fire Hydrant Interference
- Emergency Services Access
- Undue Hardship to Adjacent Businesses that cannot be reasonably mitigated

Staff Recommendations Council Approve the Request with the Following Conditions...

- Promoter is required to post proposed closed road for no parking for the time periods of which the road is to be closed.
- Florence Police will not begin enforcement of the prohibited parking posting for all non-participants of the vendor fair until 8:00 am on Friday May 17th.
- Promoter shall permit delivery vehicles access as required
- Promoter shall ensure that no permanent business shall be blocked by vendors and promoter shall make efforts to ensure that foot traffic continues to permanent businesses

Proposed Conditions

Continued...

- Closure will be from Noon on Friday May 17th until 5:00 pm on Sunday May 19th
- Maple Street from Bay Street to 1st Street to be closed
- Vendors may set up between:
 - 2:00 pm & 6:00 pm on Friday May 17th
 - And must vacate the street by 5:00 pm on Sunday May 19th
- Promoter is responsible to ensure all vendors are properly licensed by the City of Florence (via master vendors license)

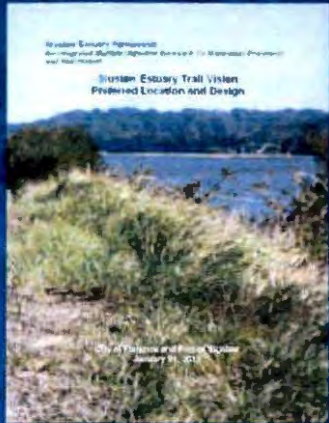
Public Comments

(Attachments 3)

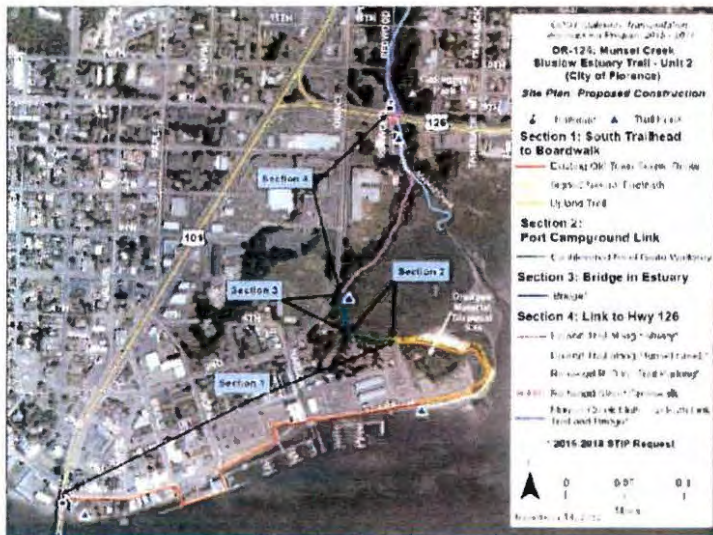
Attachment 3 - An e-mail dated March 31, 2013 written by Judith Gilman owner of Captains Lady Books and Gifts located at 128 Maple Street



Attachment 2



Siuslaw Estuary Trail Vision



Requested City Council Actions:

- Initiate Comprehensive Plan and Code amendments for Aquifer Protection and Wetlands and Riparian Areas via Resolution No. 3 Series 2013
- Approve Siuslaw Estuary Trail Vision via Resolution No. 4 Series 2013

Next Steps:

- Joint City-County Planning Commissions Public Hearing: **May 7**
- Lane County Board Work Session: **June 4**
- Joint City-County Elected Officials Public Hearing: **To be scheduled**

**CITY OF FLORENCE
FLORENCE CITY COUNCIL & LANE COUNTY COMMISSION
JOINT PUBLIC HEARING
August 6, 2013**

CALL TO ORDER – ROLL CALL – PLEDGE OF ALLEGIANCE

Mayor Xavier opened the joint meeting at 5:30 p.m. with the pledge of allegiance. Other members present included Councilor Suzanne Roberts, Councilor Brian Jagoe, Councilor Joshua Greene, and Councilor Joe Henry. Staff in attendance included City Manager Jacque Betz, City Recorder/Interim Planning Director Kelli Weese, Public Works Director Mike Miller, and Planning Consultant Carol Heinkel.

Lane County Commissioners present included Commissioner Faye Stewart, Commissioner Jay Bozievich Vice-Chair, and Commissioner Pat Far. Lane County Staff in attendance included Lane County Senior Planner Keir Miller and Steven Borrez Legal Counsel.

APPROVAL OF AGENDA

Mayor Xavier asked for any additions or corrections to the agenda, Councilor Jagoe moved to approve the agenda as submitted, seconded by Councilor Roberts. By voice all 'ayes'.

PUBLIC COMMENTS

Mayor Xavier explained that this was a time in the meeting that offered an opportunity for anyone in the audience who would like to address the council for a maximum of three (3) minutes for any item not otherwise listed on the agenda.

Jeff Ashmead - 88645 Collard Lake Road Florence, OR

Mr. Ashmead said he wanted to bring to the City Council's attention the National Blue Ways system. He presented the Council with a memorandum discussing how to achieve a healthy community and healthy watersheds. He said the Federal government went from state to state working with communities and private partnerships. He gave an example of what the program did and how it worked.

JOINT CITY/COUNTY PUBLIC HEARING:

**AQUIFER PROTECTION AND WETLAND & RIPARIAN CORRIDORS
COMPREHENSIVE PLAN AMENDMENTS**

Consider adopting City of Florence Ordinance No. 2, Series 2013 and Lane County Ordinance No. Pa 1299: A proposal to amend the Comprehensive Plan text to adopt an updated Wetlands and Riparian Inventory, and Aquifer Protection Plan, and related policies that apply outside the city within the Florence Urban Growth Boundary (UGB). No County Code Regulations are proposed.

Mayor Xavier read the script for the land use public hearing as shown.

Prior to the hearings tonight, staff will identify the applicable substantive criteria which have also been listed in the staff report. These are the criteria the City Council and County Board must use in making its decision. All testimony and evidence must be directed toward these criteria or in the Plans or Land Use Regulations which you believe applies to the decision per ORS 197.763 (5). Failure to raise an issue accompanied by statements or evidence sufficient to afford the City Council and parties involved an opportunity to respond to the issue, would preclude an appeal based on that issue. Prior to the conclusion of the initial evidentiary hearing any participant may request an opportunity to present additional evidence, arguments or testimony regarding the application. Failure to raise an issue accompanied by statements or evidence sufficient to afford the City, County, and parties involved an opportunity to respond to the issue, would preclude an appeal based on that issue. You must comment either in writing or verbally during a public hearing in order to have standing for an appeal.

Any proponent, opponent, or other party interested in a land use matter to be heard by the Council or Board may challenge the qualifications of any Councilor or Board Member to participate in such hearing and decision. Such challenge must state facts relied upon by the party relating to a Councilor or Commissioner's bias, prejudgement, personal interest, or other facts from which the party has concluded that the Council or Board will not make a decision in an impartial manner.

Mayor Xavier asked Councilors and Commissioners if they wished to declare a conflict or bias. No conflicts were declared. Mayor then asked members of the public if they wished to challenge the impartiality of any Councilors or Commissioners, no challenges were heard.

Mayor Xavier opened the public hearing for the City of Florence at 5:43 p.m.

Vice-Chair Bozievich opened the public hearing for Lane County at 5:44 p.m.

STAFF REPORT

PC Heinkel gave a power point presentation on the Siuslaw Estuary Partnership. She explained the comprehensive plan amendments for the Aquifer Protection Plan, Wetland & Riparian Areas purpose and objectives, and concluded with the Joint Planning Commission unanimous recommendation for Exhibit B. PC Heinkel also discussed the public comments received from the last public hearing. (See Attachment)

Commissioner Bozievich brought up questions about the map from the May 7, 2013 meeting. He said he received an email regarding the well time of travel map that included arrows and did not match up to 1982 natural water flow versus the stressed water flow.

PWD Mike Miller discussed the directional flow of water from the 1982 map versus the new map from 2012, including the differences between the two maps, the directional flow, and the time of travel.

Commissioner Bozievich said the increases in mapping technology in the last 30 years including GIS mapping, meant the science used to calculate ground water flow was much better. He related to his college days and compared mapping then and now. He asked if there were significant differences to the maps that were submitted summer 2012 and the maps presented at the current meeting.

PC Heinkel answered that the difference were changes to management strategies, which were a result of the public outreach process. She discussed the changes in policies since the beginning of the public outreach process.

Mayor Xavier asked if the City Council or Board of Commissioners had any more questions of staff. No questions were heard.

PUBLIC HEARING CONCERNING COMPREHENSIVE PLAN AMENDMENTS (EXHIBIT B)

Mayor Xavier said the City and Lane County would be taking testimony from proponents and opponents of the proposed changes. She said copies of the written comments received were distributed to the Council and the Commission.

Lea Patton – 04699 North Jetty Road, Florence OR

Ms. Patton apologized to the Lane County Commissioners and said she was concerned about the hassle of doing business with the City of Florence. She said dealing with the City of Florence was nearly impossible because they interfered with the public's right to know.

Ms. Patton said during the May 7, 2013, Joint Planning Commissions meeting PWD Miller spoke extensively about the City's plan for expansion in areas outside City limits and inside the Urban Growth Boundary (UGB). Ms. Patton said expansion meant annexation. She said during that meeting PWD Miller held up a map with arrows showing water flowing away from the rivers and ocean. She said when questioned about the direction of the water flow, PWD Miller stated the City had new research supporting the water flow on maps. Ms. Patton said PWD Miller discredited the work of the prior studies. She stated that she did not think water ran uphill.

Ms. Patton said she received an email earlier that day from the City of Florence staff and neither of the maps sent via that email were the map she was requesting. She said, in 2006, the City also presented a map on future annexation, which she has asked for and the City did not provide.

Ms. Patton stated that she couldn't find any information on the City's website about the May 7, 2013 meeting. She said she had recently requested information

from the City, but that it would be cost prohibitive. She said, due to restrictive access to public information and due to the standard format of this hearing, the public did not have an opportunity to hear claims made by the City. She said it would be good government to postpone a decision on the proposal until the public had received ample time to locate and study pertinent documents.

Mayor Xavier asked if either the Council or the Commission had any questions of those who testified.

Councilor Greene asked Ms. Patton about the 2006 Annexation map she mentioned as having been hung in the Council chambers. Ms. Patton said she discussed two maps in her testimony, the one hanging on the wall in 2006 showing annexation and the map PWD Miller used in the May 7, 2013 meeting showing water flow.

Mayor Xavier asked if the Commission or Council had any questions for those who testified. No additional questions were heard. Mayor Xavier asked if Staff had any rebuttal concerning the public testimony received.

PC Heinkel stated she and PWD Miller were at a loss on how to address Ms. Patton's issue about the map of the water flow from the May 7, 2013 meeting. She said no reference to ground water flow, nor was any map of the description Ms. Patton stated distributed, referenced to or in the PowerPoint presentation for the May 7, 2013 meeting.

PWD Miller stated that every map created for the project was included on the City's website. He said he was not aware of any map that represented ground water flowing uphill. He discussed what the Planning Commission talked about at the May 7, 2013 meeting including potential future well fields and how the time of travel zones would affect those potential wells.

PC Heinkel questioned the relevancy of the map in question. She said even if a map were to exist it was not in the Aquifer Protection Plan, or the Appendices, and the City Council or Commission were not being asked to adopt such a map and thus it would have no legal standing.

Mayor Xavier asked the Council and Commission if they had any more questions. No additional questions were heard.

Commissioner Bozievich asked City staff if they thought the map with bold arrows concerning the Wetland and Riparian Plan was the one Ms. Patton was referring to and simply mistook for water flow. The Council, Commission, and Staff continued to discuss the map Ms. Patton had brought up.

Mayor Xavier asked Commissioner Bozievich if he would like to close the Lane County Hearing.

Lane County SP Keir Miller said because testimony had been received requesting to keep the public record open, the Board was required to keep public record open for written comments for an additional 7 days.

Lane County Legal Counsel Steven Borrez stated that it would be most beneficial for the Lane County Commissioners and the City Council to coordinate the time period before setting a motion to approve a second reading. He recommended that the County and City set the same date to close the hearing so that both parties would have access to all the same information.

PC Heinkel said staff recommended closing the public hearing and leaving record open for additional written information for 7 days. The Council and Board of Commissioners discussed the timeline for follow up discussions and the amount of time to leave the record open for considering Ms. Patton's statement that she would be meeting with the County the next week. Mayor Xavier stated that the public record would be open for 10 days, until 5:00 p.m. on August 16, 2013.

Commissioner Far moved to close the Lane County public hearing and leave the public record open for 10 days, until the close of business on August 16, 2013, and to set a third reading of the Ordinance for August 20, 2013. Second by Commissioner Stewart. By voice, all "ayes". Motion carried unanimously.

Mayor Xavier asked Jay Bozievich if he would like to close the Lane County meeting. Commissioner Bozievich adjourned the Lane County meeting at 6:50 p.m.

Mayor Xavier called for a 10 minute break, and called the meeting back to order at 7:00 p.m.

AQUIFER PROTECTION AND WETLAND & RIPARIAN CORRIDORS FLORENCE CODE COMPREHENSIVE PLAN AMENDMENTS

Consider adopting Ordinance No. 2 series 2013 to amend Florence Realization 2020 Comprehensive Plan to adopt an updated Wetlands and Riparian Inventory, an Aquifer Protection Plan, and related policies, as well as housekeeping amendments, and to amend Florence City Code to comply with Statewide Planning Goals for wetlands and riparian areas and groundwater resources, including a Drinking Water Protection Overlay Zone to apply to ;the use and storage of hazardous materials within the Drinking Water Protection Area for the City's proposed drinking water well field, and housekeeping amendments.

STAFF REPORT

PC Heinkel provided a PowerPoint presentation on the Aquifer Protection Plan, Riparian Areas, and Wetlands. (See Attachment)

Councilor Jagoe stated that a business owner with the knowledge to open and run a business would know how to store the chemicals related to his business. He wanted to know if PWD Miller would know more about a business than the

owner. He felt telling a business owner what chemicals to use and how to store them was not good practice.

PC Heinkel said a similar program was in place in Springfield and the Public Works Director worked closely with business owners and had a good relationship. She said business owners in that community were not resentful of a protection plan, and appreciated working with the Fire Marshall or Staff member because they did not want to be responsible for polluting groundwater. She said those business owners considered groundwater to be an important asset for the community. PC Heinkel said she saw the program as collaboration with businesses to provide business assistance.

PWD Miller said Public Works was not an expert on business affairs but they were the ones looking at protecting groundwater resources along with business owners. He said there were a lot of business activities, whether here in Oregon or across the United States, which have had detrimental effects on water resources. He said this would be an effort to be proactive through education outreach.

Councilor Jagoe said he found it interesting that the City felt the education and outreach programs, as well as all the rules and regulations were so important, but public facilities were proposed to be exempt. He said the City was attempting to throw rules on everyone else that the City did not have to follow.

PC Heinkel stated that with the ESEE Analysis for wetlands and public infrastructure, Goal No. 5 exempted public infrastructure. She said the reason for that was because the City had a big investment in developing public facility plans. She said the City was required to do exempt public facilities by state law with Statewide Planning Goal No. 11 in order that it was not in contradiction with Goal No. 5.

Councilor Jagoe said his opinion was that he had a lot of problems with what was written in the proposed documents and wished he could have been involved when the process started.

PUBLIC HEARING CONCERNING CITY CODE AMENDMENTS (EXHIBIT C)

Mayor Xavier said the City Council would be taking testimony from the applicant, proponents, and opponents. Copies of the written comments received had been distributed to the City Council.

Jeff Magill – 60 Outer Drive, Florence, Oregon

Mr. Magill said he was a property owner in Coast Village and said he was in agreement with Councilor Jagoe on the proposed plan and the effect on the business community. He related this plan to a situation in California where regulations on fruit and nut growers killed the business. He said rules and regulations cause people grief and made it so that they may not want to live in Florence. He said they were told by Coast Village that this was going to happen

and were not given any options. He said the Coast Village Association called the questionable drainage a ditch, yet the proposal called it a fish bearing stream that was critical habitat for Coho Salmon. Mr. Magill disagreed with that assessment. He mentioned Ballot Measure 7 stating that no land could be taken without just compensation. He said a form of taking is making it less valuable. He discussed a Supreme Court ruling about taking of property. Mr. Magill said he would have a limited footprint and the proposed code changes would be limiting his abilities to do things with his property. He said the reason there were fish in the drainage ditch was because a gentleman from the Salmon Trout Enhancement Program (STEP) that lived in Coast Village planted salmon in the creek and took pictures. He said everyone knew salmon needed gravel to spawn and there was no gravel in the drainage ditch.

Councilor Greene asked how often the drainage ditch had water in it. Mr. Magill stated in the rainy months the ditch had between 6 inches and 12 inches of water and in some winters it would get 18 inches.

Dave Jaeger- 102 Manzanita Way, Florence, Oregon

Mr. Jaeger submitted photos of the water levels in the creek. He said the creek ran diagonally across his property. He said prior to buying the property, in December 2002, he inquired with the City about the channel on this property. Mr. Jaeger said at that time he received a letter from the City, which he read, stating: "You have requested information regarding the status of the drainage way that runs across your lot in Coast Village. According to maps and data Florence Riparian and Wetlands Inventory that drainage way is not shown as part of Munsel Creek. No riparian protection zone has been identified for that channel. The channel does connect to Munsel Creek so it's important to keep the silation of the channel bed to an absolute minimum when installing a bridge or culvert. You may want to check with Public Works on siting of the culvert so you don't flood your property or your neighbors. Since the channel has water most winters and during high flood table you will want to maintain the vegetation along the banks to prevent erosion, depending on the conditions of the banks and existing vegetation you may want to maintain an area as wide as 25ft from center of the channel especially where the bank is especially vulnerable".

Mr. Jaeger said after he received the letter from the City he and his wife bought the property, thinking he could put in culverts to be able to use all his property. Mr. Jaeger felt with this proposal his property had no value. He discussed the current value of his property and its square feet. He said with these changes there was no way to improve his property due to the footprint of his home. Mr. Jaeger stated that he was told he could build a house but not a garage, but didn't think a home would be worth anything without a garage.

Mr. Jaeger said recently somebody cut down a beaver dam to make sure the ditch had water. He said two years ago there were 3 fish in the water and now there were 2. He said if those spawned they would have a bunch of dead fish that would bring bears, raccoons, and flies.

Alta Taylor – 84955 Hwy 101, Florence, OR

Ms. Taylor said that there was no water in Munsel ditch. She said she has a rental home at 142 Outer Drive and wanted to verify that she can have the same size living quarters that she currently has if she were to replace her home.

Councilor Greene asked Mr. Jaeger about his property and how much of the property would be buildable. Mr. Jaeger said currently he had a trailer with a deck and sewing room built next to the trailer with a culvert over the creek. He said he wanted to build a 1300 sq. ft. home due to wife's medical condition.

STAFF REBUTTAL

PC Heinkel said, with regards to Mr. Magill's comment about this proposal deterring business, she felt that was unlikely because it had not proven the case in Springfield. She said staff met with the property and business owners in the proposed district and they had not protested against the Drinking Water Protection Overlay Zone at the Planning Commission or the current hearing.

PC Heinkel responded to the side channel in Coast Village stating that Title 9 required a 50 ft. setback from all waterways and Title 10 required a 50 ft. setback from drainage ditches. Currently, the code was very strict and did not allow variances. She said she met with the Coast Village residents several times and took their questions. She said they were not told this was going to happen, but rather staff had emphasized the options available. She said the City's hands were tied regarding the Coho Salmon designation. She said the statements by the National Marine Fisheries Service and the Oregon Department of Fish and Wildlife were that there was a threatened species using the creek as a winter habitat. She said that determination was not something that could be debated as long as the Federal and State agencies had gone on the record stating that the stream was fish habitat.

PC Heinkel said Florentine Estates was granted a variance in 1992, which indicated that the stream designation was already in effect. She said Coast Village didn't have to get a variance, but will have a 25 ft. setback and have to replant native plants.

PC Heinkel responded to the comment regarding taking of property stating that the US Supreme Court had determined that a jurisdiction cannot deny someone full economic use of their property. She said there had to be a rational nexus between a regulation and the objective it was supposed to serve. She said Mr. Jaeger had options to develop his property and that he would need to take his issue to the Planning Commission with evidence that he would meet the code via a variance procedure. She said Coast Village had been given special provisions.

Mayor Xavier confirmed with PC Heinkel that Mr. Jaeger's existing structures could be replaced to the same size over the existing culvert. PC Heinkel said he could replace his current structure with a same sized structure and he would only need a building permit. She said that went for the culvert as well. She said

that he might need approval from some State or Federal agencies in order to replace the culvert, but the City had no problems with the replacement.

Councilor Jagoe asked if the State and Federal Agencies would permit replacement of the culvert. He said he had seen those agencies shut down a culvert in Florentine Estates for a whole season due to Salmon. PC Heinkel said the Oregon Department of State Lands would likely work with a property owner to minimize the stress on the riparian area.

Councilor Jagoe asked if a new culvert would be permitted, whether or not the existing culverts were put in with permits. PC Heinkel said as the proposal was written the City considered all structures in Coast Village grandfathered in as existing structures.

PC Heinkel said in regards to the property owner who wanted to build a garage, they could include that in the total square footage, or, if they wanted more than that, they could ask for a variance and make their case before the Planning Commission showing how they would minimize intrusion into the riparian area. She said the variance fees were waived for Coast Village.

PC Heinkel said Ms. Taylor could replace her airstream trailer because the City's definition of structure included portable structures as existing structures that could be replaced.

Mayor Xavier asked about the side channel, stating that the Federal government declared it a habitat for endangered species and thus it fell under that protection. She said the City had no choice in that matter and that determination was not a City decision.

PC Heinkel said the City had received official statements from the National Marine Fisheries Service, the Salmon and Trout Enhancement Program, and the Oregon Department of Fish and Wildlife listing that side channel as a critical habitat for Coho Salmon.

Mayor Xavier asked when the channel was entered into the National Database. PC Heinkel said she was not sure but knew it was listed.

Mayor Xavier stated that, with her knowledge of Florentine Estates, the wetlands could change and even if an area was not significant 10 years ago it could be now. She said State and Federal Agencies regulations also changed throughout times and thus sometimes these sorts of regulations became moving targets making consistent implementation difficult.

PC Heinkel said Coast Village was very challenging and she appreciated that it was a hardship for property owners. She said staff did the best they could to address all of the Coast Village issues within the confines of the law.

Councilor Henry said there seemed to be some disconnect between what Mr. Jaeger was stating and what the staff had said. He said Mr. Jaeger said that his property had no value and was feeling that his situation was hopeless. The

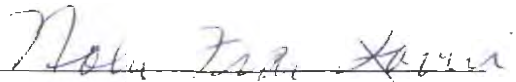
Council and staff discuss the options for residents of Coast Village as shown in Exhibit C.

PC Heinkel said she had explained the options for Coast Village residents to the homeowners many times.

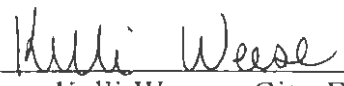
Councilor Roberts moved to close the public hearing for Ordinance No. 2, Series 2013 at 8:08 p.m., noting that the record would remain open for written comments for 10 days, or until August 20, 2013 at 5:00 p.m. Second by Councilor Greene. By voice all "ayes", motion carried unanimously.

The City Council and staff discussed the timeline for a potential second meeting on Ordinance No. 2, Series 2013, and decided to deliberate at their meeting on September 3, 2013, and to start that meeting at 5:30 p.m.

With no further business Mayor Xavier adjourned the meeting at 8:12 p.m.



Nola Xavier, Mayor

ATTEST:


Kelli Weese, City Recorder

Siuslaw Estuary Partnership



An Integrated Multiple Objective Approach to
Watershed Protection and Restoration




Joint City of Florence – Lane County
Elected Officials Public Hearing, August 6, 2013

Siuslaw Estuary Partnerships

- Interdisciplinary Team:
19 federal, state, tribal, and local agencies
- Elected Official Stakeholders
- Community Stakeholders



Funded by the U.S Environmental Protection Agency and Project Partners

Project Partners: City of Florence, Lane County, Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians, Heceta Water District, Oregon Department of Environmental Quality, Oregon Department of Fish and Wildlife, Oregon Department of Human Services, Drinking Water Program, Oregon Department of Land Conservation and Development, Oregon Department of State Lands, Oregon Department of Transportation, Oregon Department of Water Resources, Port of Siuslaw, Siuslaw Soil and Water Conservation District, Siuslaw Watershed Council, US Army Corps of Engineers, US Bureau of Land Management, U.S. Geological Survey, USFS Siuslaw National Forest, US Environmental Protection Agency.

This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement #W-160-N-000147 to the City of Florence. The contents of this document are not necessarily endorsed or approved by the U.S. Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

Siuslaw Estuary Partnership Mission

**Protect and improve water quality and fish
and wildlife habitat in the lower Siuslaw
Watershed.**

For more information, visit the web site:
www.SiuslawWaters.org.

Project Timeline

Project: October 1, 2009 thru March 31, 2014

Phases:

- Phase I: Form Partnerships and Integrated Approach
Oct 1, 2009 thru Sept 30, 2010
- Phase II: Collect Data and Analyze Alternatives
Oct 1, 2010 thru Sept 30, 2011
- Phase III: Prepare Plans and Conduct Local Adoption
Process for Comp Plan and Code
Amendments
Oct 1, 2011 thru 9/30/13

Process

Elected Official Check-ins, State Agency
Coordination, and Public Outreach

1. City Council concurred with Draft Aquifer Protection Plan (APP) & policy direction on Wetlands and Riparian Areas, Estuary Trail, and use of joint adoption process: 7/16 & 9/11, 2012
2. Lane County Board concurrence with Draft APP and use of joint adoption process: 7/25 & 10/17, 2012
3. Draft APP submitted for State certification: 7/25/12
4. State agencies concurrence with wetland and riparian approach and meetings with property owners, businesses, & Stakeholders: August through March 2013

Process

Targeted Public Outreach and Meetings with Affected Property Owners and Businesses

- ☐ Coast Village Homeowners Association: 10/29/12
- ☐ Central Oregon Coast Board of Realtors: 11/29/12
- ☐ Florence Area Chamber of Commerce: 2/21/13
- ☐ Golf Course Owners/Managers: 2/25/13
- ☐ Property owners & Businesses within Drinking Water Protection Areas (DWPAs): 2/25/13
- ☐ Property owners with wetlands or riparian areas: 2/27/13
- ☐ Community Stakeholders: 2/28/13
- ☐ Elected official Stakeholders: 3/14/13

7

Process

Joint City-County Adoption and Key Dates

- ☐ Joint City Planning Commission-City Council Work Session: **April 15**
- ☐ City Council action to initiate Comprehensive Plan and Code amendments for Aquifer Protection and Wetlands and Riparian Areas and approve Siuslaw Estuary Trail Vision: **April 15**
- ☐ Lane County Planning Commission Work Session: **April 16**
- ☐ Joint City-County Planning Commissions Public Hearing: **May 7**
- ☐ Lane County Board Work Session: **June 4**
- ☐ Joint City-County Elected Officials Public Hearing: **August 6**

8

Referrals

Sent on April 16 to the Oregon Department of Transportation, Florence Police Department, Central Lincoln Public Utility District, Qwest, Charter Communications, Florence Public Works Department, Florence U.S. Postal Service, the Siuslaw Valley Fire and Rescue District, the Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians, Lane County Land Management, Lane County Transportation, Heceta Water District, Land Watch, the staff representatives of the federal state, and local agencies serving on the Siuslaw Estuary Partnership Inter-disciplinary Team, and William Sherlock.

9

May 7, 2013 Joint Planning Commissions Public Hearing Notice

- ☐ DLCD Notice sent March 21, not less than 45 days prior to the first (Planning Commission) evidentiary hearing as required by the Comprehensive Plan and not less than 35 days prior to the hearing as required by state law.
- ☐ Siuslaw News posted notice on April 27 and May 1, 2013 as required by state law, the Florence Development Code, and Lane Code.
- ☐ Ballot Measure 56 Notice sent on April 11th to owners of property in the urban growth boundary (UGB) with wetlands and riparian areas or within the Drinking Water Protection Areas (DWPAs) of the existing or proposed wellfield.
- ☐ In accordance with Florence City Code, adjacent property owners within 300 feet for the proposed Drinking Water Protection Overlay Zone were also sent notice on April 11, 2013 and notice was posted on properties within the proposed overlay zone.

10

August 6, 2013 Joint Elected Officials Public Hearing Notice

- ☐ Siuslaw News posted notice on July 27 and 31, Register Guard on July 16, 2013, as required by state law, the Florence Development Code, and Lane Code.
- ☐ All those who submitted written or oral testimony at the Planning Commission hearing were sent notice of the August 6th hearing on May 20, 2013 in accordance with Florence City Code.
- ☐ In accordance with Florence City Code, on July 17, 2013, property owners within the proposed Drinking Water Protection Overlay Zone and within 300 feet of the zone were also sent notice and notice was posted on properties within the proposed overlay zone.

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Tonight's Public Hearings

1. **JOINT CITY-COUNTY PUBLIC HEARING - EXHIBIT B:** adoption of legislative amendments to the Florence Realization 2020 Comprehensive Plan ("Comprehensive Plan") for aquifer protection and wetlands and riparian corridors and for housekeeping and internal consistency
2. **CITY PUBLIC HEARING (CONTINUATION) - EXHIBIT C:** adoption of legislative amendments to the Florence City Code (FCC) for wetlands and riparian corridors and for housekeeping and internal consistency, and quasi-judicial amendments to City Code for aquifer protection

12

Joint City-County Public Hearing EXHIBIT B

13

Proposal Description: Exhibit B

Proposed Legislative Amendments to the Florence Realization 2020 Comprehensive Plan for:

- Aquifer Protection
- Wetlands and Riparian Corridors
- Housekeeping – amend text to change DLCD notice from 45 days to 35 days in keeping with change in state law

14

Synopsis of Exhibit B

The proposed Amendments to the Comprehensive Plan in Exhibit B:

- Do not apply outside the Florence urban growth boundary (UGB)
- Do not affect or change current annexation policy of the City
- Are mandated by, and/or implement, state law, particularly Statewide Planning Goal 5 and Oregon Administrative Rules for the Department of Environmental Quality (DEQ) and Oregon Health Authority (OHA), except where noted "local option"

15

Synopsis of Exhibit B

The proposed Amendments to the Comprehensive Plan in Exhibit B:

- Bring City Comprehensive Plan into compliance with the three steps in Statewide Planning Goal 5 for wetlands, riparian areas, and groundwater resources:
 1. Inventory & Assessment
 2. Significance
 3. Protection
- For groundwater resources: Completes Steps 1, 2, and 3
- For wetlands and riparian areas: Completes Steps 1, 2, 3 for City Comp Plan and City Code. This will bring the City Comprehensive Plan and City Code into full compliance with Goal 5 for wetlands and riparian areas

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Applicable Criteria

- Florence Realization 2020 Comprehensive Plan
- Florence City Code (FCC) Title 10: Zoning Regulations: Chapter 1: Zoning Administration, Sections: 10-1-1-5 Land Use Hearings; Section 10-1-2-2, Change of Boundaries on Zoning Map, 10-1-3 Amendments and Changes
- Oregon Revised Statutes: ORS: Chapter 196 Section 674; Chapter 197 Sections 175, 250, 251, 279(3)(b), 253, 610, 615, Chapter 215 Section 418, Chapter 227 Sections 175, 186 and 350
- Statewide Land Use Planning Goals and Associated Administrative Rules: Statewide Goals: 1. Citizen Involvement, 2. Land Use, 5. Natural Resources, Scenic and Historic Areas, and Open Spaces, 6. Air, Water and Land Resources Quality, 7. Areas Subject to Natural Hazards, 9. Economic Development, 10. Housing, 11. Public Facilities and Services, 12. Transportation, 16. Estuarine Resources, 17. Coastal Shorelands
- Administrative Rules: OAR Chapter 669, Division 23 pertaining to wetlands, riparian, and groundwater resources and related provisions; Division 12, Division 15, Division 16, OAR Chapter 141, Division 86, OAR Chapter 333, Division 61, OAR Chapter 340, Division 40 and 71
- Lane County Rural Comprehensive Plan Policies – Part 1, Section D, and Lane Code: 12.005, 12.050, 14.300, 16.400

17

Exhibit B: AQUIFER PROTECTION

18

EXHIBIT B: Comprehensive Plan Amendments for Aquifer Protection

- ❑ Adopt Aquifer Protection Plan as part of Comprehensive Plan, except for Contingency Plan (City will adopt Contingency Plan through Ordinance but not as part of Comp Plan)
 - ❑ All Management Strategies in Plan apply to City of Florence
 - ❑ Only some Management Strategies apply to Lane County
- ❑ Adopt OHA-Certified Drinking Water Protection Delineations (DWPAs) and Delineation Report as part of Comprehensive Plan (City will use DWPA for proposed wellfield for reference for DWPA Overlay Zone – City only)
- ❑ Adopt Comprehensive Plan policies for compliance with Statewide Planning Goal 5

19

DWPA Delineations certified by the Oregon Health Authority



20

Aquifer Protection Plan Prioritized Strategies to protect the aquifer and surface waters

- ❑ Aquifer-wide Management Strategies
- ❑ Management Strategies for Existing Wellfield Drinking Water Protection Area (DWPA)
- ❑ Management Strategies for Proposed Wellfield DWPA

21

Aquifer Protection Plan Prioritized Management Strategies to protect the aquifer and surface waters

- ❑ H (High): Begin to implement immediately or continue to implement, if already being done
- ❑ M (Medium): Begin to implement in next two fiscal years
- ❑ L (Low): Implement as time and financial resources are available

22

Aquifer-wide Management Strategies

- ❑ Land uses: All
- ❑ Strategies:
 1. Surface and Ground Water Monitoring - H
 2. Public Education - H
 3. Coordination - H
 4. Integrated Pest Management - M

23

Existing Wellfield Management Strategies

- ❑ Land uses: Residential, Private Open Space, Public
- ❑ Strategies:
 1. Conduct targeted public education and outreach (M)
 2. Continue to monitor potential contaminant sources (H)
 3. Work with realtors (H)
 4. Target integrated pest management efforts to DWPA (M)
 5. Adopt comprehensive plan policies and code amendments (H)
 6. Work with home owners associations (H)
 7. Continue to work with golf course managers (H)
 8. Continue to monitor sewer lines (H)

24

Proposed Wellfield Management Strategies

- ❑ Land uses: Residential, Commercial/Industrial, Private Open Space, Public
- ❑ Strategies:
 1. Conduct targeted public education and outreach (M)
 2. Adopt comprehensive plan policies and code amendments (H)
 3. Continue to monitor potential contaminant sources (H)
 4. Work with realtors (H)
 5. Target integrated pest management efforts to DWPA (M)
 6. Adopt drinking water protection overlay zone (H)
 7. Inventory and rank chemicals used in the DWPA and prepare related responses (H)
 8. Provide business assistance (H)
 9. Continue to work with golf course managers (H)
 10. Continue to monitor sewer lines (H)

25

Management Strategies Pertaining to Lane County

- ❑ Incorporate into the Aquifer Protection Plan, the Guiding Principles which have been endorsed by the Lane County Board and other partners
- ❑ Adopt Comprehensive Plan policy to protect the Drinking Water Protection Areas (DWPA) for the existing and proposed wellfield
- ❑ City to work with Lane County and Heceta Water District (HWD) to distribute educational materials to residents and businesses in the DWPA, and to educate them specifically about the DWPA and potential risk to their drinking water supply. County role would be to provide existing county-wide educational materials to City and HWD.
- ❑ City will consider specifying criteria and standards for transfer of development rights in City Code and work with County to adopt similar standards, if this tool is determined to be feasible for Florence
- ❑ City to ask Lane County to increase the hazardous waste program in Florence and to provide a storage area
- ❑ City to work with Lane County, Oregon Department of Environmental Quality (DEQ), Oregon Health Authority, Salmon and Trout Enhancement Program, Oregon Department of Fish and Wildlife, and the Watershed Council, to develop and implement strategies to respond to contamination incidents in the UGB
- ❑ Lane County and ODOT share information (with City) about integrated pest management.

26

Proposed Comprehensive Plan Policies

Policies (yellow- Lane County + City) (Red- local option)

1. The City shall implement the recommendations of the Stormwater Management Plan regarding protection of the aquifer for the City's wellfield(s)
2. The City shall implement the 2013 *Aquifer Protection Plan for the North Florence Sole Source Dunal Aquifer (Aquifer Protection Plan)*, as amended and certified by the Oregon Department of Environmental Quality (DEQ) and the Oregon Health Authority (OHA). The Aquifer Protection Plan shall be implemented by: the policies in this Comprehensive Plan, Florence City Code provisions, including a Drinking Water Protection Overlay Zone; and City programs, as resources allow.

27

Proposed Comprehensive Plan Policies

Policies (yellow- Lane County + City) (Red- local option)

3. All portions of the *Aquifer Protection Plan*, except the Contingency Plan, are adopted as a supporting document to this Comprehensive Plan, and the Plan will be located in Appendix 5 of the Comprehensive Plan.
4. The "Certified Wellhead Delineations Report," (Delineations Report) February 2012, prepared by GSI Water Solutions, Inc. and certified by the Oregon Health Authority, is adopted into this Comprehensive Plan and is physically located in Appendix 5. The Delineations, including all Time of Travel Zones (TOTZ), shall serve as the drinking water source inventory for the City of Florence. The maps in the Delineations Report of Drinking Water Protection Areas (DWPAs) for the existing and proposed wellfield are adopted as part of this Comprehensive Plan. The City shall use the map of the delineated DWPA for the proposed wellfield as the reference map for the Drinking Water Protection Overlay Zone.

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Proposed Comprehensive Plan Policies

Policies (yellow- Lane County + City) (Red- local option)

5. The DWPA, including all Time of Travel Zones (TOTZ), for the existing wellfield is a significant groundwater resource as that term is defined by Statewide Planning Goal 5. The DWPA, including all Time of Travel Zones (TOTZ), for the proposed wellfield shall be protected through application of Statewide Planning Goal 2, Land Use, Goal 6, Air, Water and Land Resources Quality, and Goal 11, Public Facilities and Services.
6. Prior to issuing new or replacement septic permits, Lane County shall request the City to inform the County in writing whether municipal wastewater service is "physically and legally available," as those terms are defined in OAR 340-071-0160. (Not required to be in Comp Plan; implements state law & complies with Goal 5 to protect aquifer from septic systems)

29

Proposed Comprehensive Plan Policies

Policies (yellow- Lane County + City) (Red- local option)

7. Consistent with policies in this Comprehensive Plan, the City shall implement state law that requires the City to provide municipal wastewater services at the time a new or replacement septic system permit is applied for, if the municipal service is physically and legally available, as prescribed in Comprehensive Plan policies and OAR 340-071-0160. (Not required to be in Comp Plan; implements state law & complies with Goal 5 to protect aquifer from septic systems)
8. As part of the land use referral process under the existing Joint Agreement for Planning Coordination between the City of Florence and Lane County, the County and the City will work cooperatively to discourage the use of Dense Non-aqueous Phase Liquids (DNAPLs) by commercial and industrial businesses in the 20 year Time of Travel Zone for the proposed wellfield. The City will respond to the referral response for permits in this area by providing information on the effects of DNAPLs in wellfields and on alternative chemicals that may be appropriate for the proposed land use. (Local Option)

30

Exhibit B: WETLANDS AND RIPARIAN CORRIDORS

31

Purpose and Objectives

- 1 Bring the City into compliance with Statewide Planning Goal 5 Natural Resources, Scenic & Historic Areas & Open Space
- 2 Update the 1997 Florence Wetland and Riparian Area Inventory (1997 Inventory)
- 3 Provide a comprehensive functional assessment of wetlands and riparian areas
- 4 Protect "significant" resources primarily for water quality and flood control, and address conflicting uses through a "Limited Protection Program"
- 5 Modify existing City Code requirements to:
 - better fit the Florence environment
 - respect the rights of property owners
 - address the need to provide public facilities

32



Florence Wetlands

Goal 5 Process

- STEP 1:** Inventory wetlands greater than ½ acre in size for Local Wetland Inventory (LWI)
- STEP 2:** Assess grouped wetlands for functions and values and apply significance criteria
- STEP 3:** Adopt local protection measures

33

Local Wetland Inventory (LWI)



- Florence Area Wetlands Inventory replaces LWI in Statewide Wetlands Inventory (SWI) - refines and updates current inventory
- City and County to adopt Florence Area Wetlands and Riparian Inventory for area within UGB – to comply with State Goal 5

34

Florence Wetlands Inventory

34 grouped wetlands greater than one-half acre, in 620 total acres:

- ❑ 60% Forested Wetlands
- ❑ 21% Scrub Shrub Wetlands
- ❑ 10% Emergent Wetlands
- ❑ 8% Unconsolidated Bottom
- ❑ 1% Other

35

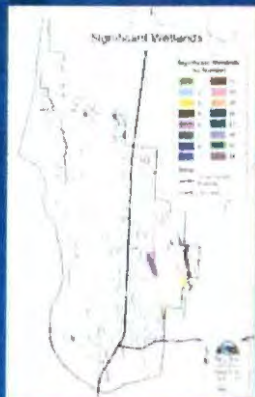
Florence Wetlands Assessment

- ❑ **HYDROLOGIC FUNCTION (FLOOD CONTROL)** Water Storage and Delay
- ❑ **WATER QUALITY** Sediment Retention and Stabilization, Phosphorus Retention, Nitrate Removal & Retention, Thermoregulation
- ❑ **FISH SUPPORT** Anadromous & Non-anadromous Fish Habitat
- ❑ **AQUATIC HABITAT** Organic Matter Export,
 - ❑ Aquatic Invertebrate Habitat, Amphibian
 - ❑ & Reptile Habitat, Waterbird Feeding
 - ❑ Habitat, Waterbird Nesting Habitat
- ❑ **TERRESTRIAL HABITAT** Songbird,
 - ❑ Raptor, Mammal, & Pollinator Habitat
 - ❑ Native Plant Diversity



36

Significant Wetlands in the Florence UGB



37

Riparian Areas

Goal 5 Process

- Step 1: Inventory. Determine riparian widths – typical tree height or topographic break
- Step 2: Assess riparian functions - water quality, flood management, thermal regulation, and wildlife habitat
- Step 3: Apply significance criteria
- Step 4: Adopt protection measures



38

Riparian Areas Inventory

The riparian corridors in the Florence UGB were divided into 17 riparian reaches in the following 5 basins:

- Munsel Creek
- Rhododendron Drive
- Airport
- Heceta Beach
- North Fork Siuslaw

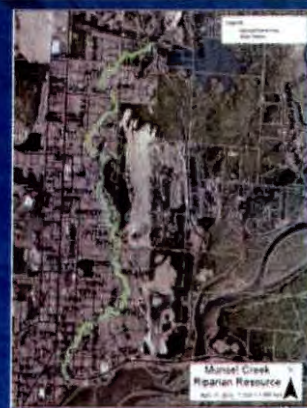


Riparian Areas Inventory

Goal 5 allows for either a "safe harbor" or "standard" inventory approach.

A 50 foot "safe harbor" riparian width was used for Munsel Creek, the only fish bearing stream in the inventory.

The standard inventory approach was used for the other reaches.

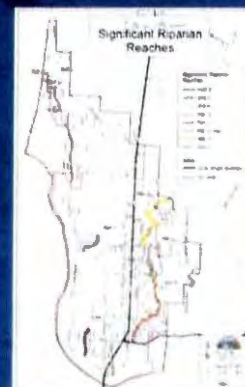


Riparian Areas Assessment

- WATER QUALITY: riparian vegetation traps sediment, filters runoff, and binds soil to prevent erosion
- FLOOD MANAGEMENT: vegetation slows rate of storm runoff and increases groundwater recharge
- THERMAL REGULATION: trees and herbaceous layers provide shade and add humidity, cooling the water and providing important habitat for juvenile fish
- WILDLIFE HABITAT: riparian trees, vegetation, ground cover, and woody debris provide habitat for wildlife that thrive near a water resource

41

Significant Riparian Reaches in the Florence UGB



42

Wetlands and Riparian Corridors Protection – Implemented in City Code

Options in State Law:

- ❑ **SAFE HARBOR**: protect wetlands and riparian corridors that meet local significance criteria with variance procedure that allows some development of property (*no lot is rendered unbuildable*).
- ❑ **ESEE (Site-specific)**: weigh and balance Economic, Social, Environmental, and Energy consequences of development vs. protection and protect, partially protect, or allow development.
- ❑ **COMBINED APPROACH**: use safe harbor to protect and use ESEE approach to allow development or partial development of some wetlands or riparian areas.

43

Wetlands and Riparian Corridor Protection – Implemented in City Code

Combined approach proposed:

- ❑ **SAFE HARBOR** to protect significant wetlands and riparian reaches in the city limits, i.e. prohibit development and allow setback adjustments, exemptions, and variances allowed in state law.
- ❑ **ESEE** approach for Public Infrastructure in significant wetlands and to address conflicts between existing development and significant riparian resources along the Munsel Creek side channel.

44

Wetland and Riparian Comprehensive Plan Amendments

City to adopt:

- ❑ 2013 Wetlands and Riparian Inventory for area within UGB, adopted as part of the Comprehensive Plan
- ❑ 2013 City of Florence Significant Wetlands and Riparian Corridors Plan to be adopted as supporting document to the Comprehensive Plan (implemented in City Code only)
- ❑ Comprehensive Plan policies to protect resources and for consistency and housekeeping

45

Wetland and Riparian Comprehensive Plan Amendments

County to Co-adopt:

- ❑ 2013 Wetlands and Riparian Inventory, for area within UGB, adopted as part of the Comprehensive Plan
- ❑ 2013 City of Florence Significant Wetlands and Riparian Corridors Plan to be adopted as supporting document to the Comprehensive Plan (implemented in City Code only)
- ❑ Comprehensive Plan policies: Wetlands and Riparian Policies 1, 2, 3, 4, 5, 6 (second paragraph pertaining to adoption of the 2103 City of Florence Significant Wetlands and Riparian Corridors Plan into the Comprehensive Plan), and 9, and Background and housekeeping amendment

The remaining Policies and the City Code amendments apply only within Florence city limits and are therefore not subject to co-adoption by Lane County.

46

Wetland and Riparian Comprehensive Plan Amendments

Policies (yellow- Lane County + City) (Red- local option)

(Note: the following edits combine redundant policies in the adopted Comprehensive Plan for wetlands and riparian areas and propose amendments.)

- 1 For the purpose of land planning and initial wetland and riparian identification within the Florence Urban Growth Boundary (UGB), the City and Lane County shall rely on the 2013 Florence Area Local Wetland and Riparian Area Inventory (2013 Inventory), approved by the Oregon Department of State Lands, and as amended hereafter. The 2013 Inventory within the Florence UGB, as amended, is adopted as part of this Comprehensive Plan and is physically located in Appendix 5.

47

Wetland and Riparian Comprehensive Plan Amendments

Policies (yellow- Lane County + City) (Red- local option)

- 2 Disturbance of significant wetlands for land development activities shall be permitted within the Florence UGB only as determined by the permitted provisions of permits issued by the Department of State Lands (DSL) and/or the Army Corps of Engineers
- 3 In accordance with ORS 215.418, the City and County shall notify DSL when wetlands are present on a property that is subject to a local land use or building permit approval. The City shall notify DSL when riparian areas are present on a property that is subject to a local land use or building permit approval.

48

Wetland and Riparian Comprehensive Plan Amendments

Policies (yellow- Lane County + City) (Red- local option)

- 4 The City and County shall consider formal wetland delineation reports approved by the Oregon Department of State Lands as a valid source of wetland information specific to a land use action or limited land use action. Such reports, if approved by DSL, will be incorporated by reference into the City's 2013 Florence Area Local Wetlands and Riparian Inventory.
- 5 No significant wetland or riparian corridor as defined by the 2013 Florence Area Local Wetlands and Riparian Inventory shall be drained by re-routing of natural drainage ways.

42

Wetland and Riparian Comprehensive Plan Amendments

Policies (yellow- Lane County + City) (Red- local option)

- 6 The City shall protect the functions and values of significant Goal 5 riparian corridors and wetlands for flood control, water quality, and fish and wildlife habitat through Code provisions that protect these resources from development in accordance with Statewide Planning Goal 5 administrative rules (OAR 600 Division 23) and the Economic, Social, Environmental, and Energy (ESEE) Analysis and Limited Protection Program. The ESEE Analysis is included, and significant wetlands and riparian corridors are listed and mapped, in the "2013 City of Florence Significant Wetlands and Riparian Corridors Plan" adopted by reference into this Comprehensive Plan. The Program exempts public infrastructure, as defined in the ESEE Analysis, from local wetland protection measures, and allows special setback reductions and other allowances for development along the Munsel Creek Side Channel (Reach RMC-Cs in the 2013 Riparian Inventory).

50

Wetland and Riparian Comprehensive Plan Amendments

Policies (yellow- Lane County + City) (Red- local option)

- 7 The City shall include a procedure in the Code to consider hardship variances, claims of map error, and reduction or removal of the restrictions for any existing lot or parcel demonstrated to have been rendered unbuildable by application of the significant wetlands and riparian areas standards in the Code.
- 8 The City shall encourage restoration and protection of privately-owned wetlands and riparian areas through Code incentives, and, as resources allow, through education in partnership with the Siuslaw Watershed Council and the Siuslaw Soil and Water Conservation District.

51

Wetland and Riparian Comprehensive Plan Amendments

Policies (City + County – Local Option)

- 9 Plan Amendment Option Any owner of property affected by the Significant Wetlands and Riparian Areas Standards in City Code may apply for a quasi-judicial comprehensive plan amendment. This amendment must be based on a specific development proposal. The effect of the amendment would be to remove the requirement to comply with these standards from all or a portion of the property. The applicant shall demonstrate that such an amendment is justified by completing an Environmental, Social, Economic and Energy (ESEE) consequences analysis prepared in accordance with OAR 600-23-040. If the application is approved, then the ESEE analysis shall be incorporated by reference into the Florence Comprehensive Plan, and the Florence Significant Goal 5 Wetlands and Riparian Areas Maps shall be amended to remove the wetland or riparian area from the inventory. (Local Option)

52

Conclusion: Exhibit B

The proposed legislative amendments to the Comprehensive Plan in Exhibit B are consistent with the Florence Realization 2020 Comprehensive Plan, Florence City Code, Lane County Rural Comprehensive Plan, Lane Code, Oregon Revised Statutes, and Statewide Planning Goals and associated Administrative Rules.

53

Joint Planning Commissions' Unanimous Recommendation: Exhibit B

- Adopt the Comprehensive Plan amendments in Exhibit B subject to the following condition of approval:
 - "Prior to adoption, the 2013 Wetlands and Riparian Inventory is approved by the Oregon Department of State Lands (DSL) and includes any modifications approved by DSL to respond to property owner requests."
- As required by OAR, DSL has approved the June 2013 Inventory and incorporated changes to respond to property owner requests.

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Requested Action: Exhibit B

- ❑ City Council - Agree to adopt Ordinance No. 2 Series 2013 pertaining to Exhibit B (straw vote)
- ❑ County Board – Adopt Ordinance No. PA 1299

"In the Matter of Adopting Amendments to the Florence Realization 2020 Comprehensive Plan ("Comprehensive Plan") for Aquifer Protection and Wetlands and Riparian Corridors and for Housekeeping and Internal Consistency, and Adopting a Severability Clause (File No. Pa 13-0582)"

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Continue City Public Hearing EXHIBIT C

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EXHIBIT C Proposed Amendments to the Florence City Code for:

- ❑ **Aquifer Protection (Quasi-judicial Amendments)**
- ❑ **Wetlands and Riparian Corridors (Legislative Amendments)**
- ❑ **Housekeeping Amendment (Legislative Amendment)**
 - a. Adopt an amendment to FCC Title 10 Chapter 19 to make the Code consistent with Statewide Planning Goal 16.

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Applicable Criteria

- ❑ **Florence Realization 2020 Comprehensive Plan**
- ❑ **Florence City Code (FCC) Title 10: Zoning Regulations:** Chapter 1 Zoning Administration, Sections 10-1-1-5 Land Use Hearings, Section 10-1-2-2 Change of Boundaries on Zoning Map, 10-1-3 Amendments and Changes
- ❑ **Oregon Revised Statutes:** ORS Chapter 196 Section 674, Chapter 197 Sections 175, 250, 251, 279(3)(b), 253, 610, 615, Chapter 215 Section 418, Chapter 227 Sections 175, 186 and 350
- ❑ **Statewide Land Use Planning Goals and Associated Administrative Rules:** Statewide Goals: 1. Citizen Involvement, 2. Land Use, 5. Natural Resources, Scenic and Historic Areas, and Open Spaces, 6. Air, Water and Land Resources Quality, 7. Areas Subject to Natural Hazards, 9. Economic Development, 10. Housing, 11. Public Facilities and Services, 12. Transportation, 16. Estuarine Resources, 17. Coastal Shorelands
- ❑ **Administrative Rules:** OAR Chapter 660 Division 23 pertaining to wetlands, riparian, and groundwater resources and related provisions, Division 12, Division 15, Division 16, OAR Chapter 141 Division 86, OAR Chapter 333 Division 61, OAR Chapter 340 Division 40 and 71

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Exhibit C: AQUIFER PROTECTION

59

Proposed Amendments to the Florence City Code for Aquifer Protection (Quasi-judicial Amendments)

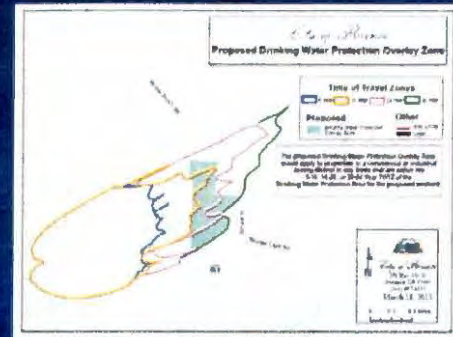
1. Adopt a new Drinking Water Protection Overlay Zone (Overlay Zone) Map, attached to Exhibit C
2. Amend Florence City Code Title 10: Zoning Regulations to insert a new Chapter 32: Chapter 32 Drinking Water Protection Overlay District

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Proposed City Code Amendments Groundwater Resources

- Drinking Water Protection Overlay Zone for industrial and commercial uses in DWPA for Proposed Wellfield

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To apply to industrial and commercial uses in DWPA for Proposed Wellfield inside City Limits

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Proposed Drinking Water Protection Overlay Zone

Objectives:

1. Protect the City's drinking water supply, which is obtained from groundwater resources, from impacts by facilities that store, handle, treat, use, produce, or otherwise have on premises substances that pose a hazard to groundwater quality, and
2. Provide standards for hazardous or other materials that pose a risk to groundwater within the TOTZ.

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Proposed Drinking Water Protection Overlay Zone

Methods:

1. Restrict or prohibit the use of hazardous or other materials which are potential groundwater contaminants;
2. Set standards for the storage, use, handling, treatment, and production of hazardous or other materials that pose a risk to groundwater within TOTZ, and
3. Review new or expanded uses of hazardous or other materials that pose a risk to groundwater.

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Proposed Drinking Water Protection Overlay Zone

A DWP Overlay District Development Application would be required when all of the following criteria are met:

1. Industrial and commercial land uses that are affected by one or more of the following: land use permit application; or building permit application that
2. Affect the storage, use, and/or production of hazardous or other materials that pose a risk to groundwater; or increase the quantity of hazardous or other materials that pose a risk to groundwater that are stored, used and/or produced.

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Drinking Water Protection Overlay Zone



Standards vary by Time of Travel Zone (TOTZ).

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Proposed Drinking Water Protection Overlay Zone

20-30 Year Time of Travel Zone:

- 1 Storage, handling, treatment, use, production or keeping on premises of more than 20 gallons of hazardous materials that pose a risk to groundwater allowed only upon compliance with Fire Code.

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Proposed Drinking Water Protection Overlay Zone

10-20 Year Time of Travel Zone:

- 1 Same requirements as for 20-30 Year TOTZ plus:
- 2 Store in areas with approved secondary containment in place (Fire Code);
- 3 All new use of DNAPLs is prohibited;
- 4 Any change in type of use or increase in max. daily inventory of any DNAPL is considered a new use and is prohibited;
- 5 Requirements for inspection and record keeping procedures for monthly in-house inspection and maintenance of containment and emergency equipment

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Proposed Drinking Water Protection Overlay Zone

5-10 Year Time of Travel Zone:

- 1 Same requirements as for 10-20 Year TOTZ plus:
- 2 The following that pose a risk to groundwater are prohibited: hazardous material product pipelines; injection wells except roof dry wells; fill materials containing hazardous materials; land uses and new facilities that will use, store, treat, handle, and/or produce DNAPLs.
- 3 Requirements in Fire Code for a monitoring program and methods to detect hazardous or other materials in the secondary containment system shall be met for all amounts of hazardous materials that pose a risk to groundwater.

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Exhibit C: WETLANDS AND RIPARIAN CORRIDORS

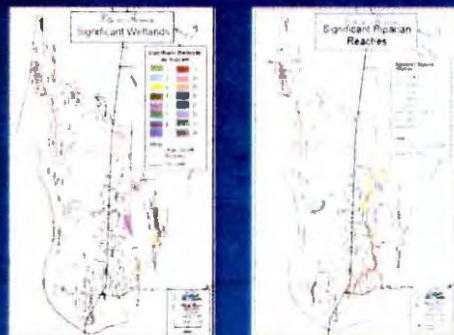
70

EXHIBIT C Proposed Amendments to the Florence City Code for:

- ❑ **Wetlands and Riparian Corridors (Legislative Amendments)**
 - a. Amend Florence City Code Title 10 Chapter 7: Special Development Standards to add a new section 10-7-4 Development Standards for Wetlands and Riparian Areas, and renumber sections sequentially.
 - b. Consistency Amendments: Amend FCC Title 9 Chapter 5 stormwater management definitions and buffer zone provisions; Title 10 Chapter 1 Definitions, and Title 10 Chapter 19, Prime Wildlife District, for internal Code consistency and for consistency with state law.

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City Code applies to significant wetlands and riparian reaches within city limits.



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Wetlands and Riparian Corridors Protection – Implemented in City Code

Options in State Law:

- ☐ **SAFE HARBOR**: protect wetlands and riparian corridors that meet local significance criteria with variance procedure that allows some development of property (*no lot is rendered unbuildable*)
- ☐ **ESEE** (Site-specific): weigh and balance Economic, Social, Environmental, and Energy consequences of development vs. protection and protect, partially protect, or allow development
- ☐ **COMBINED APPROACH**: use safe harbor to protect and use ESEE approach to allow development or partial development of some wetlands or riparian areas

ESEE Analyzes the Economic, Social, Environmental, & Energy consequences of three options:

1. Full Protection
2. Limited Protection
3. Full Development

The ESEE addresses resource protection conflicts with existing and future land uses.



Limited Protection Program Implemented in City Code – EXHIBIT C

Applies the "safe harbor" protections in Goal 5 to all significant wetlands and riparian areas with the following modifications, based on the ESEE (Economic, Social, Environmental, and Energy Consequences) Analysis:

- Exempts public facilities from Significant Wetland Standards *
- Allows up to a 50% reduction in the required riparian setback, i.e., a 25 foot minimum setback, for the Munsel Creek side channel (Reach RMC-Cs) as long as displaced native plants are replanted

*Goal 5 already exempts public and private utilities and facilities from riparian setback requirements.

Limited Protection Program

Will provide for the following adjustments to required setbacks as necessary to allow some economic use of property:

- ☐ Administrative review will be used for hardship where proposed development is more than 20 feet from the significant creek or wetland.
- ☐ A Hardship Variance will be allowed when proposed development is 20 feet or less from a significant creek or wetland; intrusion into the riparian area must be minimized, and, displaced native vegetation replanted. Variance fee waived for Coast Village.

Limited Protection Program

Will provide for the following adjustments to required setbacks as allowed by Goal 5:

- ☐ No land use permit will be required when existing lawfully constructed structures are rebuilt as long as replacement of existing structures is with structures in the same location that do not disturb additional riparian surface area and provided they are designed and constructed to minimize intrusion into the riparian area. Coast Village structures are grandfathered.

Limited Protection Program

Will provide for the following adjustments to required setbacks to address conflicting uses along Munsel Creek Side Channel:

- ☐ Administrative Review will be used for Munsel Creek side channel owners to obtain the setback reduction (up to 25 feet from the creek).
- ☐ Florentine Estates properties that were granted a setback reduction by the Planning Commission do not need to apply for an adjustment.

ESEE Analysis

Munsel Creek Side Channel: Reach RMC-Cs



Proposed Code Amendments

- ┐ Protect significant wetlands and riparian areas inside City limits.
- ┐ Provide for setback adjustments to allow some economic use of property
- ┐ Provide exemptions allowed by State law and through ESEE for public infrastructure and Munsel Creek Side Channel
- ┐ Provide for setback adjustments to be processed through Administrative Review except when proposed development is within 20 feet of stream or wetland, then, Variance process is used.
- ┐ Apply existing stormwater buffer zone to significant riparian areas and significant wetlands ½ acre and larger vs. all wetlands and riparian areas in existing Code
- ┐ Allow incentives to encourage protection of the resource
- ┐ Provide a "Plan Amendment Option" for specific sites at time of development
- ┐ Specify how boundaries of wetlands and riparian areas are determined
- ┐ Allow specific exemptions and waivers for Coast Village

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City Planning Commission Unanimous Recommendation: Exhibit C

- ┐ Adopt the Florence City Code amendments in Exhibit C, as amended.
- ┐ In response to citizen comments, staff further researched the proposed Code and found that additional provisions are necessary for clarification and consistency regarding the removal of native plants within the required buffer zones. Amendments to Exhibit C are discussed under wetlands and riparian regulations.

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Changes to EXHIBIT C Recommended by Planning Commission

- ┐ Changes to FCC 10-7-4 to cross-reference FCC Title 4 Chapter 6 – Vegetation Clearing Permit & for internal consistency
- ┐ Changes to FCC 4-6 to cross-reference FCC 10-7-4, for internal consistency, and to change approval process from Planning Commission to Administrative Review

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Conclusion: Exhibit C

The proposed legislative and quasi-judicial amendments to the City Code in Exhibit C are consistent with the Florence Realization 2020 Comprehensive Plan, Florence City Code, Oregon Revised Statutes, and Statewide Planning Goals and associated Administrative Rules.

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Requested Action

- ┐ City Council - Adopt Ordinance No. 2 Series 2013
 "An Ordinance for the Adoption of Amendments to the Florence Realization 2020 Comprehensive Plan ("Comprehensive Plan") and Florence City Code (FCC) for Aquifer Protection and Wetlands and Riparian Corridors, and for Housekeeping and Internal Consistency, and Adopting a Severability Clause."

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**City of Florence
City Council Meeting Minutes
September 3, 2013**

CALL TO ORDER - ROLL CALL - PLEDGE OF ALLEGIANCE

Mayor Xavier opened the regular council meeting at 5:30 p.m. with the pledge of allegiance. Other members present included Councilor Suzanne Roberts, Councilor Brian Jagoe, Councilor Joshua Greene, and Councilor Joe Henry. Staff in attendance included City Manager Jacque Betz, Interim Planning Director/City Recorder Kelli Weese, Public Works Director Mike Miller, and Planning Consultant Carol Heinkel.

APPROVAL OF AGENDA

Mayor Xavier asked for any additions or corrections to the agenda, hearing none she moved on to the next item.

PUBLIC COMMENTS

Council President Roberts explained that this was a time in the meeting that offered an opportunity for anyone in the audience who would like to address the council for a maximum of three (3) minutes for any item not otherwise listed on the agenda.

Mayor Xavier called for public comment, hearing none she moved on to the next item.

CONSENT AGENDA

APPROVAL OF MINUTES

Consider approval of the regular council meeting minutes of August 6, 2013 and August 19, 2013.

Councilor Greene moved to approve the consent agenda which included the minutes of the August 6, 2013 and August 19, 2013 Council meetings. Seconded by Councilor Roberts. By voice all 'ayes'. Motion carried unanimously.

ACTION ITEMS

**AQUIFER PROTECTION AND WETLAND & RIPARIAN CORRIDORS
COMPREHENSIVE PLAN AND FLORENCE CODE AMENDMENTS**

Consider adopting City of Florence Ordinance No. 2, Series 2013 to amend Florence Realization 2020 Comprehensive Plan and City Code for compliance with Statewide Planning Goals for wetlands and riparian areas and groundwater resources; and, specifically, to adopt an updated Wetlands and Riparian Inventory and Plan, an Aquifer Protection Plan, and related policies, as

well as housekeeping amendments, and to amend Florence City Code to implement the Comprehensive Plan and State law for wetlands and riparian areas and groundwater resources, including a Drinking Water Protection Overlay Zone to apply to the use and storage of hazardous materials within the Drinking Water Protection Area for the City's proposed drinking water well field, and housekeeping amendments. (Agenda Item Continued from August 6, 2013)

Mayor Xavier explained that the public hearing was closed at the August 6, 2013 meeting and the record had been left open until August 16, 2013. She stated that, since the record was closed, the Council only had the ability to discuss items received prior to the record closing on August 16, 2013.

CM Betz stated that PC Heinkel would provide a brief summary of events that had occurred since the Council met at the joint hearing on August 6, 2013.

PC Heinkel stated that the Lane County Board had scheduled August 20, 2013, to take action on the Plan. At staff's request, the Board did not take action at that time and they postponed their decision until September 10, 2013, to allow the Florence City Council to make a decision first. She stated that the Lane County Board had expressed no objections with the proposals at the August 20, 2013 meeting.

PC Heinkel stated that the only written comments that had been submitted were by Lea Patton and that she had submitted her comments directly to the Lane County Commissioners. She explained that the staff report included the comments that she and PWD Miller had submitted directly to Lea Patton over the course of the last several months relating to Clear Lake and comparing groundwater flow studies.

PC Heinkel stated that she had prepared a letter to Mr. Jager reiterating statements from prior meetings with Mr. Jager. The response she sent was included in the record. She said that the response hopefully made it clear that Mr. Jager's situation was much improved by the proposed code over the existing code.

PC Heinkel said that before the City Council was the Comprehensive Plan amendments in Exhibit B and Code Amendments in Exhibit C. She briefly discussed the processes for making changes.

PC Heinkel stated that she had spoken with the Department of Environmental Quality (DEQ) that morning and they assured her that DEQ was prepared to certify the Aquifer Protection Plan as is and they would write that letter as soon as the Lane County Board took action. She added that the existing plan had never been certified by the state.

Councilor Greene stated that PC Heinkel had worked hard on the project, stating that she had been very detail oriented and had taken the time to work with residents. He commended her for her work. He stated that the changes

that the City was adding were very much being responsible to constituents. Councilor Roberts also thanked PC Heinkel for her hard work.

Mayor Xavier stated that the action to be considered was the adoption of Ordinance No. 2, Series 2013.

Mayor Xavier called for the first reading of Ordinance No. 2, Series 2013, by short title only. CR Weese gave the first reading. Councilor Greene moved for approval of the first reading. Seconded by Councilor Roberts, by voice all 'ayes'. Motion carried unanimously.

Mayor Xavier called for the second reading of Ordinance No. 2, Series 2013. CR Weese gave the second reading. Councilor Greene moved for approval of the ordinance. Seconded by Councilor Roberts. By roll call vote: Councilor Henry, 'Aye'; Councilor Jagoe, 'Aye'; Councilor Roberts, 'Aye'; Councilor Greene, 'Aye'; Mayor Xavier, 'Aye'. Motion carried unanimously.

Mayor Xavier thanked everyone who had been a part of the process. Councilor Roberts thanked Clarence Lysdale.

REPORTS

CITY MANAGER REPORT

CM Betz discussed vandalism at the Florence Events Center (FEC) and the Dunes Café. She stated that they had several cameras at the FEC and were optimistic that they would have some leads.

CM Betz reminded the Council that the September 16, 2013 meeting would be held at the Florence Events Center (FEC) at 7:00pm.

MAYOR AND COUNCIL REPORTS

The Council discussed the final FEC Committee meeting on September 5, 2013.

With no further business, Mayor Xavier adjourned the meeting at 5:45 p.m.

Nola Xavier, Mayor

ATTEST:

Kelli Weese, City Recorder

AGENDA ITEM SUMMARY**ITEM NO: 6****FLORENCE CITY COUNCIL**

Meeting Date: April 15, 2013
Dept.: Public Works and
Community Development
Presented by: Carol Heinkel,
City Planning Consultant

ITEM TITLE: Joint Planning Commission-City Council Work Session on Siuslaw Estuary Partnership Grant Products and Council action on Comprehensive Plan and Code Amendments and Siuslaw Estuary Trail Vision

REQUEST:**I. Hold a Joint Planning Commission-City Council Work Session on:**

- Exhibit B to City Ordinance No. 2, Series 2013 and Lane County Ordinance No. PA 1299: Proposed Amendments to the Florence Realization 2020 Comprehensive Plan for Aquifer Protection and Wetlands and Riparian Corridors, April 15, 2013
- Exhibit C to Ordinance No. 2, Series 2013: Proposed Amendments to the Florence City Code for Aquifer Protection and Wetlands and Riparian Corridors, April 15, 2013
- Siuslaw Estuary Trail Vision

II. City Council action to:

- Initiate amendments to the Florence Realization 2020 Comprehensive Plan and Code (Exhibits B and C) via Resolution No. 3, Series 2013. A joint City-County Planning Commission Public Hearing date has been set for May 7, 2013, at 7:00 pm in Florence City Council Chambers.
- Approve Estuary Trail Vision, via Resolution No. 4, Series 2013.

DISCUSSION:**I. Joint Planning Commission-City Council Work Session**

Note: All documents referenced in this report can be found at:

<http://www.ci.florence.or.us/council/city-councilplanning-commission-work-session>

Background

These three items are products of the Siuslaw Estuary Partnership (EPA Cooperative Agreement #WC-00J04801-0). The mission of the Partnership is to protect and improve water quality and fish and wildlife habitat in the lower Siuslaw watershed.

Community concern for the Siuslaw estuary, the North Florence Sole Source Dunal Aquifer and the area's streams, lakes, and wetlands is well-documented in Comprehensive Plan policies and Code provisions. In response to this concern, in October, 2009, the City and its partners from 19 federal, state, tribal, and local agencies embarked on a multi-year project called the Siuslaw Estuary Partnership. This project is funded by project partners and the US Environmental Protection Agency (EPA). The Siuslaw Estuary Partnership Guiding Principles, endorsed by the City and its partners, provided guidance for these products.

Property Owner Notification

Ballot Measure 56 Notice of the May 7, 2013 public hearing on City Ordinance No. 2, Series 2013 and Lane County Ordinance No. PA 1299 will be sent on April 11th to owners of property in the urban growth boundary (UGB) with wetlands and riparian areas or that are within the Drinking Water Protection Areas (DWPAs) of the existing and proposed wellfield. In accordance with Florence City Code, adjacent property owners affected by the Drinking Water Protection Overlay Zone will also receive notice and notice will be posted in the Siuslaw News.

Public Involvement

The Public Involvement Plan (PIP) for the Siuslaw Estuary Partnership was approved by the Florence Planning Commission on January 12, 2010 and is included as Appendix B of the Aquifer Protection Plan. Public involvement involved Technical Advisory Committees, Stakeholder Groups, and Public Education and Outreach.

Technical Advisory Committees

The Siuslaw Estuary Partnership Inter-disciplinary Team served as the Technical Advisory Committee (TAC) for the plans and Trail Vision with additional agency staff added for specific products. These staff committees met regularly throughout the course of the project and recommended draft products to the Stakeholder Groups.

Stakeholder Groups

The Florence City Council approved the use of two Stakeholder Groups for the Partnership: a Community Stakeholder Group and an Elected Official Stakeholder Group. The Community Stakeholder Group was expanded in order to include representative interests in the Drinking Water Protection Areas on the Group. Specifically, these interests were: Ocean Dunes Golf Links, Coast Village, Sand Ranch, Florentine Estates, Koning and Cooper business owners, and Recycling and Garbage. The Community Stakeholder Group met most recently on February 28, 2013 to review and comment on the draft products. The Elected Official Stakeholder Group met on March 14 and agreed by consensus with the products, as revised.

Public Education and Outreach

In the fall of 2012, a targeted public outreach effort commenced on the draft Comprehensive Plan and Code amendments. This outreach included presentations, re-

sponse to questions, and submission of comments on the draft proposals with the following groups:

- Coast Village Homeowners Association: 10/29/12
- Central Oregon Coast Board of Realtors: 11/29/12
- Florence Area Chamber of Commerce: 2/21/13
- Golf Course Owners/Managers: 2/25/13
- Property owners within Drinking Water Protection Areas (DWPAs): 2/25/13
- Property owners with wetlands or riparian areas: 2/27/13

Letters were sent to the owners in DWPAs and with wetlands or riparian areas on February 8th inviting them to the meeting, informing them of the draft products, and instructing them on ways they can be involved. Revisions to the draft were made based on feedback from meetings with property owners and Stakeholders in February and March 2013 and further changes may be made as needed to respond to comments raised during the public adoption process.

Public Education and Outreach also involved three Open Houses and three newsletters, "Waters in Common," which were distributed throughout the UGB to residents, property owners, or both. Each of these newsletters provided information about the aquifer, wetlands and riparian areas, and the trail vision and the need to protect water quality. The third newsletter, distributed in April 2012, provided information about the draft plans and inventories and ways to provide comment. That newsletter was included in water bills and mailed directly to all owners of property in the DWPAs. At the third Open House, the elements of the plans were presented in detail in the power point presentation and in hard copies available for the public. Comment forms were available, although no one submitted a completed form. Over 50 members of the public attended the April 30, 2012 Open House and heard the presentation.

In addition, public involvement efforts were conducted specifically for wetlands and riparian areas. Prior to beginning the inventory field work, selected landowners (i.e. those suspected of having wetlands or waters of the state on their property) were mailed notices describing the project and asking permission to enter their property. Right of access was granted by landowner permission only. The properties of those not responding were not accessed. Access information was collected in a database and then transferred to a base map for use in the field. At the May 5, 2010 Open House, the public was informed about the wetland inventory process and staff answered questions from property owners deciding whether or not to grant access to their property. Following completion of initial fieldwork, a public meeting was held on September 22, 2010 to allow citizens to observe the location of mapped wetlands and comment as appropriate.

On March 6, 2012, the Wetlands and Riparian Area Team concurred with criteria and application of the criteria for determining the significance of, and measures to protect, wetlands and riparian corridors in the Florence urban growth boundary (UGB). At their meetings in March and April, the Stakeholder Groups forwarded this

proposal to the public for comment. Then, the proposal was presented to the public at the April 30, 2012 Open House. On January 31, 2013, the Wetland and Riparian Team reviewed and commented on the revised 2013 Plan and forwarded it for public review and adoption. All products and Stakeholder meeting packets have been posted to the project web site: www.SiuslawWaters.org and the public has been encouraged to review and comment.

EXHIBIT B (Attached)

Proposed Amendments to the Florence Realization 2020 Comprehensive Plan for Aquifer Protection and Wetlands and Riparian Corridors, April 15, 2013

The proposed Comprehensive Plan amendments in Exhibit B are as follows:

1. Aquifer Protection

- a. Amend Florence Comprehensive Plan Chapter 5 to protect groundwater resources for consistency with state law and to adopt the Aquifer Protection Plan.
- b. Consistency Amendments: Amend Comprehensive Plan Chapter 11, Utilities, Facilities, and Services for consistency with the proposed amendments.

2. Wetlands and Riparian Corridors

- a. Amend Florence Comprehensive Plan Chapter 5: Open Spaces and Scenic, Historic, and Natural Resources for consistency with Statewide Planning Goal 5, including adoption of the 2013 Florence Area Wetlands and Riparian Inventory (2013 Inventory) and 2013 City of Florence Significant Wetlands and Riparian Corridors Plan (2013 Plan).
- b. Consistency Amendments: Amend Florence Comprehensive Plan Chapter 1, Definitions and Chapter 11, Utilities, Facilities, and Services for consistency with the proposed amendments.

3. Housekeeping Amendment

- a. Amend Comprehensive Plan Chapter 1, Introduction, to make the Comprehensive Plan consistent with state law which changed the DLCD notice requirement from 45 to 35 days.

EXHIBIT C (Attached)

Proposed Amendments to the Florence City Code for Aquifer Protection and Wetlands and Riparian Corridors, April 15, 2013

1. Aquifer Protection

- a. Adopt a new Drinking Water Protection Overlay Zone Map, attached to Exhibit C.

- b. Amend Florence City Code Title 10: Zoning Regulations to insert a new Chapter 32: Chapter 32 Drinking Water Protection Overlay District

2. Wetlands and Riparian Corridors

- a. Amend Florence City Code Title 10 Chapter 7: Special Development Standards to add a new section 10-7-4: Development Standards for Wetlands and Riparian Areas, and renumber sections sequentially.
- b. Consistency Amendments: Amend FCC Title 9 Chapter 5 stormwater management definitions and buffer zone provisions; Title 10 Chapter 1 Definitions, and Title 10 Chapter 19, Prime Wildlife District, for internal Code consistency and for consistency with state law.

3. Housekeeping Amendment

- a. Adopt an amendment to FCC Title 10 Chapter 19 to make the Code consistent with Statewide Planning Goal 16.

Siuslaw Estuary Trail Vision

This item was last before the Council on November 19, 2012 when the Council agreed to proceed with application for Oregon Parks and Recreation Department Recreational Trails Grant for Siuslaw Estuary Trail (on Port property) and with an application to include the Siuslaw Estuary Trail in the 2015-2018 Statewide Transportation Improvement Program (STIP). The Lane Area Commission on Transportation (ACT) has included the project in the list of Tier One projects recommended to the Oregon Department of Transportation. No word has yet been received on the Oregon Recreational Trails grant request.

The January 31, 2013 "Siuslaw Estuary Trail Vision: Preferred Location and Design," report was prepared by project staff, with input and guidance from the Siuslaw Estuary Trail Technical Team (see back of front cover for a list of technical team members) and the Siuslaw Estuary Partnership Interdisciplinary Team. All sections of the trail will be multi-use, i.e., accessible by foot and bicycle, and all constructed surfaces will be ADA¹-approved. Each of these sections is described in detail below.

As shown in Figure 1, the 1.34 mile trail is divided into four sections, as shown below. In November 2012, the Siuslaw Estuary Trail Preferred Vision in Figure 1 was submitted by the City and the Port of Siuslaw for 2015-2018 State Transportation Improvement Program (STIP) funding; and, in January 2013, a 2013 Oregon Recreational Trails Grant application was submitted for Trail Sections 1 and 2.

¹ Americans with Disabilities Act.

***Section 1: South Trailhead to Boardwalk (4,114 feet)**

- Existing Old Town Scenic Route (2,544 feet)
- Upland Trail Link with Port of Siuslaw Boardwalk (1,570 feet)
- Signed Natural Footpath

***Section 2: Port Campground Link (350 feet)**

- Cantilevered Steel Grate Walkway

****Section 3: Bridge in Estuary (330 feet)**

Section 4: Link to Highway 126 (2,292 feet)

- Upland trail along estuary**
- Upland trail along Munsel Creek**
- Redwood right-of-way Trail parking**
- Redwood Street Crosswalk
- Munsel Creek Multi-use Path Link: Trail and Bridge**

*Trail Sections 1 and 2 were included in the 2013 Oregon Recreational Trails grant application. **These items in Trail Sections 3 and 4 were included in the 2015-2018 STIP funding request. The Redwood Street Crosswalk is a project in the current STIP.

II. City Council action is requested to:

1. Initiate amendments to the Florence Realization 2020 Comprehensive Plan and Code (Exhibits B and C) by Resolution No. 3, Series 2013. A joint City-County Planning Commission Public Hearing date has been set for May 7, 2013, at 7:00 pm in Florence City Council Chambers.
2. Approve Estuary Trail Vision, by Resolution No. 4, Series 2013.

PROCESS: If the Council approves request #1, the proposed amendments to the Florence Comprehensive Plan (Exhibit B) will be submitted for joint public hearing and recommendation by the City and Lane County Planning Commissions on May 7, 7:00 pm in Florence; and the proposed Code amendments (Exhibit C) will be the subject of the City Planning Commission's May 7 public hearing and recommendation. Exhibit B, as revised, will then be submitted to the City Council and Lane County Board of Commissioners for a joint public hearing and decision, followed by City Council action on Exhibit C, as revised (date to be set). If the Council approves request #2, the Siuslaw Estuary Trail Vision will be submitted to EPA as a final grant product.


FISCAL IMPACT: Work on this project is performed by City Planning Consultant Carol Heinkel with support from City staff and is funded through the Siuslaw Estuary Partnership EPA grant funds and committed match.

OPTIONS FOR COUNCIL:

1. Approve requests #1 and #2 as submitted.
2. Revise proposals and approve requests #1 and #2, as revised.
3. Do not approve request #1 and/or #2.
4. Take no action and continue discussion to a date certain. This option will require setting a new date for the joint public hearing with Lane County.

CITY MANAGER'S RECOMMENDATION:

Approve/Disapprove/Other



ATTACHMENTS:

Note: All of the following documents can be found at:

<http://www.ci.florence.or.us/council/city-councilplanning-commission-work-session>

- Florence City Council Resolution No. 3 Series 2013
 - Exhibit B to City of Florence Ordinance No. 2 Series 2013 and Lane County Ordinance No. PA 1299: Proposed Amendments To The Florence Realization 2020 Comprehensive Plan for Aquifer Protection and Wetlands and Riparian Corridors, April 15, 2013
 - Exhibit C to City of Florence Ordinance No. 2, Series 2003: Proposed Amendments to the Florence City Code for Aquifer Protection and Wetlands And Riparian Corridors, April 15, 2013
 - Figure 1: Proposed Siuslaw Estuary Trail Map
 - 2013 Aquifer Protection Plan for the North Florence Sole Source Dunal Aquifer and Appendix D: Drinking Water Protection Areas Delineation Report
 - 2013 Florence Area Local Wetlands and Riparian Inventory
 - 2013 City of Florence Significant Wetlands and Riparian Corridors Plan
 - 2013 Siuslaw Estuary Trail Vision: Preferred Location and Design
- Florence City Council Resolution No. 4, Series 2013.

AVAILABLE ON LINE OR AT CITY OF FLORENCE PLANNING OFFICES:

Note: The following documents are included in the public record and are available for review at City of Florence Planning Office or on line at:

<http://www.ci.florence.or.us/council/city-councilplanning-commission-work-session>

- 2013 Aquifer Protection Plan for the North Florence Sole Source Dunal Aquifer Appendices:
 - A: Surface and Groundwater Monitoring Report and Secondary Data
 - B: Siuslaw Estuary Partnership Public Involvement Plan
 - C: Oregon Water Resources Department construction logs and well reports

- D: Drinking Water Protection Areas Delineation Report, February 15, 2012, GSI Water Solutions, Inc. (attached, above)
- E: Other Source Water Assessments: Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians, June 2007; and Heceta Water District, 9/11/2001
- F: EPA-Approved Quality Assurance Project Plan
- G: 2003 Florence Source Water Assessment
- H: Options for Responding to Contamination Threats in the North Florence Sole Source Dunal Aquifer
- I: Resource List
- J: DEQ Hazardous Waste Technical Assistance for Businesses brochure
- K: Florence Water Management and Conservation Plan, March 2010
- L: Mutual Emergency Water Agreement between City of Florence and Heceta Water District, July 6, 2010
- M: Springfield Drinking Water Protection Overlay Zone

2013 Florence Area Local Wetlands and Riparian Inventory Appendices:

- A: Figures and Sheets
- B: Wetland Summary Sheets
- C: Wetland Determination Data Forms
- D: ORWAP Answers Database
- E: DSL Approval of Significance Criteria for Identifying Locally Significant Wetlands
- F: Riparian Field Forms
- G: Riparian Reach Summary Sheets

2013 City of Florence Significant Wetlands and Riparian Corridors Plan Appendices:

- A. Existing Policies and Code for Wetlands and Riparian Areas
- B. Public Involvement Plan, Approved by the Florence Planning Commission, January 12, 2010 and Letters to Property Owners
- C. Statewide Planning Goal 5 Administrative Rules Related to Wetlands and Riparian Areas
- D. 2013 Florence Area Local Wetlands and Riparian Inventory and Appendices, Pacific Habitat Services, 2013 (under separate cover, see above)
- E. Department of State Lands Approvals: Letter from Louise Solliday, Oregon Department of State Lands (DSL), Approving Florence's use of the ORWAP Method, March 29, 2010; and letter approving the wetland significance criteria, June 23, 2012
- F. Lists and/or maps of planned public infrastructure projects (under separate cover; see adopted Public Facilities Plan)
- G. RMC-Cs Florentine Estates Planning Commission Resolution 98-6-23-33 and PUD map
- H. EPA Introduction and User's Guide to Wetland Restoration

2013 Siuslaw Estuary Trail Vision: Preferred Location and Design Appendices:

- A: Siuslaw Estuary Trail Visioning Project Alternatives Analysis, October 18, 2010; and Siuslaw Estuary Trail Visioning Project Route Options, August 16, 2010
- B: Forest Service Trail Accessibility Guidelines

**Florence City Council
Resolution No. 3, Series 2013**

A RESOLUTION INITIATING AMENDMENTS TO THE FLORENCE REALIZATION 2020 COMPREHENSIVE PLAN ("COMPREHENSIVE PLAN") AND FLORENCE CITY CODE (FCC) FOR AQUIFER PROTECTION AND WETLANDS AND RIPARIAN CORRIDORS; AND AMENDMENTS FOR HOUSEKEEPING AND INTERNAL CONSISTENCY

WHEREAS, Florence City Code (FCC) Title 10, Chapter 1, Section 1-3-B provides that a quasi-judicial zoning change and related Comprehensive Plan changes may be initiated by motion of the City Council; and FCC 10-1-3-C provides that legislative changes to the Code or Comprehensive Plan may be initiated by a request of the Council to the Planning Commission that proposed changes be considered by the Commission and its recommendation returned to the Council;

WHEREAS, the City of Florence was awarded an EPA grant for the Siuslaw Estuary Partnership (EPA Cooperative Agreement #WC-00J04801-0) in 2009 and the EPA amended the work plan for the grant in September 2012; and the work plan, as amended includes an adoption process for comprehensive plan and code amendments for aquifer protection and wetlands and riparian corridors;

WHEREAS, the City Council and Planning Commission held a joint Work Session on April 15, 2013 on amendments to the Florence Realization 2020 Comprehensive Plan and Florence City Code for aquifer protection and wetlands and riparian corridors and for housekeeping and internal consistency;

WHEREAS, on September 10, 2012, the City Council approved the public outreach and adoption process for the Partnership grant products, including the use of a joint City-Lane County adoption process for comprehensive plan amendments; the Lane County Board of Commissioners approved the use of the joint adoption process on October 17, 2012; and a joint City-County Planning Commission public hearing has been set for May 7, 2013 in Florence;

WHEREAS, the City Council provided policy direction on protection measures for wetlands and riparian on July 16 and September 10, 2012; and the City Council conceptually approved the Aquifer Protection Plan (Plan) for the North Florence Sole Source Aquifer on July 16, 2012; and the Lane County Board of Commissioners conceptually approved the Aquifer Protection Plan on July 25, 2012;

WHEREAS, changes are needed to the Comprehensive Plan and City Code to implement and adopt the Plan and protection measures, as amended, and make these documents mutually consistent and compliant with State Administrative Rules and Statewide Planning Goals;

WHEREAS, additional changes are needed to the Comprehensive Plan and Florence City Code in order to achieve the following objectives:

1. Protect the North Florence Sole Source Dunal Aquifer, the city's sole drinking water source, by
 - implementing an Aquifer Protection Plan, with source water components certified by the Oregon Department of Environmental Quality (DEQ);
 - basing management strategies on potential sources of contamination; and
 - using updated wellhead delineations and drinking water protection areas.
2. Protect significant wetlands and riparian areas for their functions and values in controlling floods and protecting water quality in the aquifer and surface waters, and in protecting fish and wildlife habitat, consistent with the requirements of Statewide Planning Goal 5.

NOW THEREFORE, BE IT RESOLVED THAT THE CITY OF FLORENCE, a municipal corporation of the State of Oregon, at a regular meeting held on the 15th day of April, 2013, initiated **Florence Realization 2020 Comprehensive Plan** amendments in **Exhibit B**, as revised through the public adoption process, for Aquifer Protection, Wetlands and Riparian Corridors, and Housekeeping;

NOW THEREFORE, BE IT FURTHER RESOLVED THAT THE CITY OF FLORENCE, a municipal corporation of the State of Oregon, at a regular meeting held on the 15th day of April, 2013, initiated **Florence City Code** amendments in **Exhibit C**, as revised through the public adoption process, for Aquifer Protection, including a new Drinking Water Protection Overlay Zone Map and Code section; Wetlands and Riparian Corridors; and for internal consistency and housekeeping.

Passed by the Florence City Council this ____ day of _____, 2013.

AYES:

NAYS:

ABSTAIN:

ABSENT:

APPROVED BY THE MAYOR, this ____ day of _____, 2013.

Nola Xavier, MAYOR

ATTEST: _____
Kelli Weese, City Recorder

ATTACHMENTS for Agenda Item 6

PLACEHOLDER for the Changes to the Florence Realization 2020 Comprehensive Plan and City Code

Due to the large size of the documents we have provided the attachments to agenda item as an Adobe files electronically as posted on the City's website under Agenda Meeting items at:

<http://www.ci.florence.or.us/council/city-councilplanning-commission-work-session>

The Planning Department will provide printed reports upon request following the City's public records request policy.

AGENDA ITEM SUMMARY**ITEM NO:****FLORENCE CITY COUNCIL**

Meeting Date: August 6, 2013

Dept.: Public Works, Community Development

ITEM TITLE: Joint City-Lane County Public Hearing on amendments to the Comprehensive Plan (Exhibit B) and continued City-only public hearing on amendments to the Florence City Code for aquifer protection and wetlands and riparian corridors, in preparation for adoption of City of Florence Ordinance No. 2, Series 2013 and Lane County Ordinance No. PA 1299.

DISCUSSION/ISSUE:

This request is for the City Council to adopt Ordinance No. 2, Series 2013: An Ordinance for the Adoption of Amendments to the Florence Realization 2020 Comprehensive Plan ("Comprehensive Plan") and Florence City Code (FCC) for Aquifer Protection and Wetlands and Riparian Corridors; and for Housekeeping and Internal Consistency; and Adopting a Severability Clause. See attached Ordinance.

A joint City-County Elected Officials' public hearing is requested, followed by a continuation of the City public hearing, as follows:

1. **Joint City-County Public Hearing:** Co-adopt legislative amendments to the Florence Realization 2020 Comprehensive Plan ("Comprehensive Plan") for aquifer protection and wetlands and riparian corridors and for housekeeping and internal consistency (**EXHIBIT B**)
2. **City Public Hearing (Continuation):** Adopt legislative amendments to the Florence City Code (FCC) for wetlands and riparian corridors and for housekeeping and internal consistency; and quasi-judicial amendments to City Code for aquifer protection (**EXHIBIT C**)

Staff will provide a power point presentation at the start of the public hearing to walk the elected officials and members of the public through the proposal. Please note that this staff report was submitted on July 18, 2013 for the August 6th public hearing in order to meet County timelines and requirements for a first reading on the Ordinance which is scheduled to take place on July 23, 2013.

KEY MEETINGS AND ACTIONS:

Key meetings and actions on these amendments in the past year are as follows:

July 16, 2012: City Council concurred with Draft Aquifer Protection Plan to submit to State for certification review and provided policy direction on wetlands and riparian areas.

- July 25, 2012: Lane County Board approved Draft Aquifer Protection Plan to submit to State for certification review.
- August thru March, 2013: State agencies concurred with Draft proposals and meetings were held with property owners, businesses, and Stakeholders.
- April 15, 2013: The Florence City Council initiated the amendments through passage of Resolution No. 3, Series 2013, following a joint City Planning Commission-City Council work session.
- May 7, 2013: The joint City of Florence-Lane County Planning Commissions held a public hearing and recommended adoption of the Comprehensive Plan amendments in Exhibit B to the City Council and Lane County Board of Commissioners; and the Florence Planning Commission recommended adoption of the Code amendments in Exhibit C.
- June 4, 2013: The Lane County Board of Commissioners held a work session on the Comprehensive Plan amendments in Exhibit B.
- July 23, 2013: Lane County Board held first reading on Ordinance No. PA 1299.

PROPOSALS:

Please see Exhibit A, Findings of Fact, for a detailed description of the proposals, approval criteria, and findings of consistency with the criteria. All of the Exhibits and plans can be viewed at City Hall or downloaded from the City's website through the following link: <http://www.ci.florence.or.us/council/city-florence-and-lane-county-elected-officials-public-hearing>.

This proposal is for the City and Lane County to co-adopt Exhibit B which concerns adoption of the following Inventories and Plans, in addition to Comprehensive Plan policies:

- April 15, 2013 Aquifer Protection Plan for the North Florence Sole Source Dunal Aquifer and Appendices
- June 2013 Florence Area Wetlands and Riparian Inventory and Appendices
- June 2013 City of Florence Significant Wetlands and Riparian Corridors Plan and Appendices

In addition, this proposal is for the City to adopt Exhibit C which contains proposed amendments to Florence City Code. Exhibits B and C are summarized below.

EXHIBIT B:

Proposed Legislative Amendments to the Florence Realization 2020 Comprehensive Plan for Aquifer Protection and Wetlands and Riparian Corridors, August 6, 2013

1. Aquifer Protection

- a. Amend Florence Comprehensive Plan Chapter 5 to protect groundwater resources for consistency with state law and to adopt the Aquifer Protection Plan.
- b. Consistency Amendments: Amend Comprehensive Plan Chapter 11, Utilities, Facilities, and Services for consistency with the proposed amendments.

2. Wetlands and Riparian Corridors

- a. Amend Florence Comprehensive Plan Chapter 5: Open Spaces and Scenic, Historic, and Natural Resources for consistency with Statewide Planning Goal 5, including adoption of the 2013 Florence Area Wetlands and Riparian Inventory (2013 Inventory) and 2013 City of Florence Significant Wetlands and Riparian Corridors Plan (2013 Plan).
- b. Consistency Amendments: Amend Florence Comprehensive Plan Chapter 1, Definitions and Chapter 11, Utilities, Facilities, and Services for consistency with the proposed amendments.

3. Housekeeping Amendment

- a. Amend Comprehensive Plan Chapter 1, Introduction, to make the Comprehensive Plan consistent with state law which changed the DLCD notice requirement from 45 to 35 days.

EXHIBIT C:

Proposed Amendments to the Florence City Code for Aquifer Protection and Wetlands and Riparian Corridors, August 6, 2013

1. Aquifer Protection (Quasi-judicial Amendments)

- a. Adopt a new Drinking Water Protection Overlay Zone (Overlay Zone) Map, attached to Exhibit C.
- b. Amend Florence City Code Title 10: Zoning Regulations to insert a new Chapter 32: Chapter 32 Drinking Water Protection Overlay District

2. Wetlands and Riparian Corridors (Legislative Amendments)

- a. Amend Florence City Code Title 10 Chapter 7: Special Development Standards to add a new section 10-7-4: Development Standards for Wetlands and Riparian Areas, and renumber sections sequentially.
- b. Consistency Amendments: Amend FCC Title 9 Chapter 5 stormwater management definitions and buffer zone provisions; Title 10 Chapter 1 Definitions, and Title 10 Chapter 19, Prime Wildlife District, for internal Code consistency and for consistency with state law.

3. Housekeeping Amendment (Legislative Amendment)

- a. Adopt an amendment to FCC Title 10 Chapter 19 to make the Code consistent with Statewide Planning Goal 16.

PLANNING COMMISSIONS' PUBLIC HEARING AND RECOMMENDATIONS:

On May 7, 2013, the City of Florence Planning Commission and Lane County Planning Commission held a joint public hearing and unanimously recommended co-adoption of Comprehensive Plan amendments in Ordinance No. 2, Series 2013 and Lane County Ordinance No. PA 1299, with Conditions of Approval, described below; and the Florence Planning Commission recommended adoption of the City Code amendments in Ordinance No. 2, Series 2013, with Conditions of Approval, described below. The rec-

ommended changes to the Exhibits have been incorporated into the attached Exhibits and reports.

Five written comments were submitted and seven people testified orally at the hearing. Staff responded to the written comments in the staff report and proposed some additional changes to the Exhibits. Staff responded to the oral testimony at the hearing. The testimony before the Planning Commissions is presented in the Planning Commission agenda packet and in the minutes of the proceeding, attached.

CITY-LANE COUNTY PLANNING COMMISSIONS' ACTION ON EXHIBIT B:

The Florence and Lane County Planning Commissions recommended co-adoption of the Comprehensive Plan amendments in Exhibit B to Ordinance No. 2, Series 2013 (City) and Ordinance No. PA 1299 (Lane County) with the following condition of approval:

"Prior to adoption, the 2013 Wetlands and Riparian Inventory is approved by the Oregon Department of State Lands (DSL) and includes any modifications approved by DSL to respond to property owner requests."

Oregon Administrative Rules [OAR 141-086-0340] require that the Inventory be approved by the Oregon Department of State Lands (DSL) prior to adoption by the local governments. DSL approved the Inventory on June 27, 2013. The approved Inventory incorporates changes to the boundary of wetland #1 in response to questions raised by property owners during the Planning Commissions' hearing process. The changes to this boundary necessitated changes to the tables, texts and maps of the 2013 Inventory and 2013 Plan documents to reflect an .06 acre reduction in wetland #1 which changed the total acres in the Inventory from 654.60 to 654.54.

The attached replacement pages have been incorporated into the June 2013 versions of the Florence Area Wetlands and Riparian Inventory and the City of Florence Significant Wetlands and Riparian Corridors Plan, submitted for adoption as part of this Joint Florence-Lane County public hearing. The June 2013 versions of these documents posted to the web site are current and include all recommended changes. Those who have printed copies of the earlier versions should insert the attached replacement pages into printed copies of the April 15, 2013 versions of this Inventory and Plan.

CITY PLANNING COMMISSION ACTION ON EXHIBIT C:

On May 7, 2013, the Florence Planning Commission unanimously recommended adoption of Exhibit C with the changes outlined below which have been incorporated into the August 6, 2013 version of Exhibit C. Staff recommended the changes regarding the process for removal of native plants from buffer zones in response to comments made by Florence citizen, Bill Blackwell. Staff further researched the proposed Code and found that additional provisions are necessary for clarification and consistency regarding the removal of native plants within the required buffer zones. The Planning Commission also agreed to request that the Council consider not adopting a separate fee for administration of the Drinking Water Protection Overlay Zone at this time.

Changes to April 15, 2013 version of Exhibit C, recommended by Planning Commission and incorporated into Exhibit C, August 6, 2013:

Change proposed Code Section FCC 10-7-4 as follows to respond to public comments:

F. General Development Standards and Requirements: When development is proposed that is subject to these standards, the property owner is responsible for the following. Figure 1 below is a cross section illustrating terms used in the discussion of wetland and riparian setbacks as defined by Oregon Statewide Planning Goal 5....

2. Preparation and submission of a site plan (vegetation clearing permits are also subject to the submission requirements in FCC Title 4 Chapter 6) that shows:

1. **Removal of native vegetation:** In accordance with Goal 5, removal of vegetation from a significant riparian corridor is prohibited, except as otherwise provided in these Wetland and Riparian Standards and in FCC 4-6-3 and for the following:

Change existing Code as follows to respond to public comments and for consistency:

FCC 4-6-3: VEGETATION CLEARING PERMIT REQUIRED:

A. A vegetation clearing permit shall be required in any of the following circumstances:...

1. Clearing native vegetation from... areas which have been designated by the City as a significant riparian corridor, significant wetland buffer zone, greenbelt, or view corridor.

FCC 4-6-4: PROCEDURE FOR OBTAINING A VEGETATION CLEARING PERMIT:

A. ~~A~~ No vegetation clearing permit application ~~is required~~~~will be accepted~~ unless the application ~~also~~ includes a concurrent application for a building permit or Conditional Use Permit, except that the criteria in FCC 4-6-4 C shall also apply to any removal of native vegetation from a significant riparian or wetland buffer zone requested as part of a setback adjustment granted under FCC 10-7-4..

B. All requests for a Vegetation Clearing Permit shall be submitted to the ~~Community Development~~Planning Department on a form available from that department, and containing the following minimum information, (See FCC 10-7-4 for additional submission requirements for areas within significant wetland or riparian buffer zones):...

C. The ~~Planning~~Community Development Department shall process the Vegetation Removal Permit application through the Administrative Review procedures in FCC Title 10 Chapter 1 ~~and forward a report to the Design Review Board within thirty (30)~~

days of filing a complete application. Review and approval by the Design Review Board shall be based on the following criteria, as applicable to the request:

1. The necessity to remove native vegetation in order to construct proposed improvements or otherwise utilize the property in a reasonable manner consistent with the City Code and policies;
2. The environmental and physical impacts such clearing may have, including visual drainage, wind erosion, protection of adjoining property and structures, and impacts on significant riparian corridors or wetland buffer zones. , and impacts on any affected significant wetland or riparian buffer zones shall be supported by a qualified professional or through consultation with staff from the Soil and Water Conservation District, Siuslaw Watershed Council, ODFW, OSU, or another person or agency with knowledge or experience with the affected resource;
3. The adequacy of the applicant's proposed landscaping or revegetation plan, including plant selection, staking, irrigation, and other maintenance provisions.

FISCAL IMPACT: Adopting these amendments would not have any quantifiable impact on the city's budget. These amendments should make it easier for City staff and the Planning Commission to implement state land use and public facility requirements. No additional staff persons are proposed to be hired to administer the standards. The process for preparing these amendments is funded through the Siuslaw Estuary Partnership, a project funded in part by the U.S. Environmental Protection Agency and committed City match.

OPTIONS FOR ELECTED OFFICIALS:

EXHIBIT B (City of Florence and Lane County):

1. Co-adopt the Comprehensive Plan amendments in Exhibit B, as submitted, by adopting City of Florence Ordinance No. 2, Series 2013 (City) and Lane County Ordinance No. PA 1299 (County).
2. Modify Exhibit B by mutual agreement, amend findings to support modifications, and adopt Exhibit B via the Ordinances, as modified.
3. Continue the joint hearing to a date certain.
4. Leave the record open in order to allow more time for additional information to be submitted and set a date for a joint meeting for deliberation and action.
5. Deny the application based on findings of non-compliance with criteria and describe the revised findings.

EXHIBIT C (City of Florence):

1. Adopt the Florence City Code amendments in Exhibit C, as submitted, by adopting City of Florence Ordinance No. 2, Series 2013.
2. Modify Exhibit C, amend findings to support modifications, and adopt Exhibit C via the Ordinance, as modified.
3. Continue the City's hearing on Exhibit C to a date certain.

4. Leave the record open in order to allow more time for additional information to be submitted and set a date for a meeting for deliberation and action.
5. Deny the application based on findings of non-compliance with criteria and describe the revised findings.

ALS was prepared by Carol Heinkel, Planning Consultant.

CITY MANAGER'S RECOMMENDATION: Approve/Disapprove/Other

ATTACHMENTS:

- City of Florence Ordinance No. 2, Series 2013
- Exhibit A: Findings of Fact City for City of Florence Ordinance No. 2, Series 2013 and Lane County Ordinance No. PA 1299, August 6, 2013
- Exhibit B: To City Of Florence Ordinance No. 2 Series 2013 and Lane County Ordinance No. Pa 1299: Proposed Amendments to the Florence Realization 2020 Comprehensive Plan for Aquifer Protection and Wetlands and Riparian Corridors, August 6, 2013
- April 15, 2013 Aquifer Protection Plan for the North Florence Sole Source Dunal Aquifer and Appendices
- June 2013 Florence Area Wetlands and Riparian Inventory and Appendices
- June 2013 City of Florence Significant Wetlands and Riparian Corridors Plan and Appendices
- EXHIBIT C: To City Of Florence Ordinance No. 2 Series 2013: Proposed Amendments to the Florence City Code for Aquifer Protection and Wetlands and Riparian Corridors, August 6, 2013
- Exhibit D: Planning Commission Resolution PC 11 06 CPA 01 & PC 11 07 ZC 01 and Exhibits.
- Exhibit E: Minutes from May 7, 2013 Planning Commissions meeting and public hearing.
- Replacement Pages for Revisions to: City of Florence Significant Wetlands and Riparian Corridors Plan and Florence Area Local Wetlands and Riparian Inventory, August 6, 2013

This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement WC-00J04801-0 to City of Florence. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

AGENDA ITEM SUMMARY**ITEM NO: 4****FLORENCE CITY COUNCIL**

Meeting Date: September 3, 2013

Dept.: Public Works, Community Development

ITEM TITLE: Consider adopting City of Florence Ordinance No. 2, Series 2013 to amend Florence Realization 2020 Comprehensive Plan and City Code for compliance with Statewide Planning Goals for wetlands and riparian areas and groundwater resources; and, specifically, to adopt an updated Wetlands and Riparian Inventory and Plan, an Aquifer Protection Plan, and related policies, as well as housekeeping amendments, and to amend Florence City Code to implement the Comprehensive Plan and State law for wetlands and riparian areas and groundwater resources, including a Drinking Water Protection Overlay Zone to apply to the use and storage of hazardous materials within the Drinking Water Protection Area for the City's proposed drinking water wellfield, and housekeeping amendments. (Agenda Item Continued from August 6, 2013)

DISCUSSION/ISSUE:

Staff will provide a brief presentation on September 3 and will be available for questions from the Council about this report, including any additional response to public comments requested.

At the August 6th joint meeting with the Lane County Board of Commissioners, the Council and the Board held a public hearing, took testimony, closed the hearing, and, in response to a citizen request, left the written record open until the close of business on August 16. The Board set the date of August 20 for deliberation and the Council set the date of September 3 for deliberation and action.

On August 20, the Board held a Third Reading on the Ordinance and passed a motion to set a date for a Fourth Reading and possible action on September 10. This motion was recommended by staff in order to allow the Council to take action first. At their meeting, the Board raised no objections to the Comprehensive Plan amendments in Exhibit B, as presented at the August 6 public hearing.

If the Council adopts the Comprehensive Plan amendments in Exhibit B, as presented, on September 3, the Board will take action on September 10. If the Council adopts a modified version of Exhibit B, the revisions will be brought to the Lane County Board on September 10 for discussion; and the Board, in accordance with its Charter, will need to set another date for a Fifth Reading and possible action on the Ordinance, assuming the Board concurs with the changes. In addition, certain portions of Exhibits B and C are

governed by state statutes that have process requirements. These are explained below in the section "Discussion of Options."

Key meetings and actions on these amendments in the past year are as follows:

- July 16, 2012: City Council concurred with Draft Aquifer Protection Plan to submit to State for certification review and provided policy direction on wetlands and riparian areas.
- July 25, 2012: Lane County Board approved Draft Aquifer Protection Plan to submit to State for certification review.
- August 2012 thru March, 2013: State agencies concurred with Draft proposals and meetings were held with property owners, businesses, and Stakeholders.
- April 15, 2013: The Florence City Council initiated the amendments through passage of Resolution No. 3, Series 2013, following a joint City Planning Commission-City Council work session.
- May 7, 2013: The joint City of Florence-Lane County Planning Commissions held a public hearing and recommended adoption of the Comprehensive Plan amendments in Exhibit B to the City Council and Lane County Board of Commissioners; and the Florence Planning Commission recommended adoption of the Code amendments in Exhibit C.
- June 4, 2013: The Lane County Board of Commissioners held a work session on the Comprehensive Plan amendments in Exhibit B.
- July 23, 2013: Lane County Board held a first reading on Ordinance No. PA 1299.
- August 6, 2013, City and County held joint public hearing and County held second reading on Ordinance. City and County closed the public hearing and left the record open for 10 days for written comments.
- August 16, 2013, 5:00 p.m. deadline for written comments.
- August 20, 2013, Lane County Board Third Reading; deliberations and motion to set the Fourth Reading and possible final action date for September 10, 2013.
- September 3, 2013, City Council deliberation and requested action to adopt Ordinance No. 2, Series 2013.

Written Comments Submitted by August 16 Deadline and Staff Responses:

EXHIBIT B, COMPREHENSIVE PLAN AMENDMENTS:

Written comments were submitted on Exhibit B by Ms. Lea Patton, who made a request to continue the hearing. On August 12, Ms. Patten reviewed the tape of the May 7 Planning Commission public hearing at Lane County offices; on August 16, she sent an email directly to the County Commissioners which was forwarded to staff on August 20.

At the August 20 Lane County Board meeting, Commissioner Bozievich informed staff that the Commissioners had been sent this email. He offered his response that he did not find Ms. Patten's comments germane to the proceedings and therefore did not see the need for further consideration of the comments. Staff offered that if the Commissioners were comfortable with Commissioner Bozievich's response, that no staff response was necessary. The Commissioners concurred with Commissioner Bozievich and no further staff response was requested.

Ms. Patton's August 16 email is attached as part of the record of this proceeding. For the benefit of the Council, staff has included in this attachment a response to her comments which largely reiterate, for the record, responses to these questions posed by Ms. Patton at and between the two public hearings.

EXHIBIT C, CITY CODE AMENDMENTS:

No additional written comments were submitted by the public on Exhibit C prior to the August 16 deadline. However, City Planning Consultant and staff prepared a letter to Mr. Jaeger to respond to his testimony at the public hearing. That letter, attached, was hand delivered to Mr. Jaeger on August 13 and is included as part of the record of this proceeding. This letter reiterates statements made to Mr. Jaeger by City Planning Consultant, City volunteer Clarence Lysdale, City staff, Coast Village Home Owners Association representatives, and Community Stakeholders over the past several months.

On August 13, City Manager Jacque Betz and Interim Planning Director Kelli Weese met with Mr. Jaeger at City Hall, provided him with this letter, and went through it point by point. The purpose of the letter and the meeting was to clarify the differences between existing City Code and proposed City Code as it relates to his property and to explain why limited protection of the Munsel Creek side channel is necessary.

As stated in the letter, the proposed Code provides more options for development of his property than the existing Code; and full development of the riparian area is not an option because, during the riparian inventory process, written statements were submitted by the National Marine Fisheries Service and supported by the Oregon Department of Fish and Wildlife and local STEP Program representatives that confirmed the side channel is critical habitat for coho salmon. These statements are shown in the ESEE Analysis Excerpts attached to this letter. The ESEE Analysis allowed us to address conflicts between the riparian resource and existing development and to propose the Limited Protection Program in Exhibit C within the requirements of state law.

PROPOSALS:

Please see Exhibit A, Findings of Fact, for a detailed description of the proposals, approval criteria, and findings of consistency with the criteria. All of the Exhibits and plans can be viewed at City Hall or downloaded from the City's website through the following link: <http://www.ci.florence.or.us/council/city-florence-and-lane-county-elected-officials-public-hearing>.

This proposal is for the City and Lane County to co-adopt Exhibit B which concerns adoption of the following Inventories and Plans, in addition to Comprehensive Plan policies:

- ▣ April 15, 2013 Aquifer Protection Plan for the North Florence Sole Source Dunal Aquifer and Appendices
- ▣ June 2013 Florence Area Wetlands and Riparian Inventory and Appendices
- ▣ June 2013 City of Florence Significant Wetlands and Riparian Corridors Plan and Appendices

In addition, this proposal is for the City to adopt Exhibit C which contains proposed amendments to Florence City Code. Exhibits B and C are summarized below.

EXHIBIT B:

Proposed Legislative Amendments to the Florence Realization 2020 Comprehensive Plan for Aquifer Protection and Wetlands and Riparian Corridors, August 6, 2013

1. Aquifer Protection

- a. Amend Florence Comprehensive Plan Chapter 5 to protect groundwater resources for consistency with state law and to adopt the Aquifer Protection Plan.
- b. Consistency Amendments: Amend Comprehensive Plan Chapter 11, Utilities, Facilities, and Services for consistency with the proposed amendments.

2. Wetlands and Riparian Corridors

- a. Amend Florence Comprehensive Plan Chapter 5: Open Spaces and Scenic, Historic, and Natural Resources for consistency with Statewide Planning Goal 5, including adoption of the 2013 Florence Area Wetlands and Riparian Inventory (2013 Inventory) and 2013 City of Florence Significant Wetlands and Riparian Corridors Plan (2013 Plan).
- b. Consistency Amendments: Amend Florence Comprehensive Plan Chapter 1, Definitions and Chapter 11, Utilities, Facilities, and Services for consistency with the proposed amendments.

3. Housekeeping Amendment

- a. Amend Comprehensive Plan Chapter 1, Introduction, to make the Comprehensive Plan consistent with state law which changed the DLCD notice requirement from 45 to 35 days.

EXHIBIT C:

Proposed Amendments to the Florence City Code for Aquifer Protection and Wetlands and Riparian Corridors, August 6, 2013

1. Aquifer Protection (Quasi-Judicial Amendments)

- a. Adopt a new Drinking Water Protection Overlay Zone (Overlay Zone) Map, attached to Exhibit C.

- b. Amend Florence City Code Title 10: Zoning Regulations to insert a new Chapter 32: Chapter 32 Drinking Water Protection Overlay District
- 2. Wetlands and Riparian Corridors (Legislative Amendments)**
- a. Amend Florence City Code Title 10 Chapter 7: Special Development Standards to add a new section 10-7-4: Development Standards for Wetlands and Riparian Areas, and renumber sections sequentially.
 - b. Consistency Amendments: Amend FCC Title 9 Chapter 5 stormwater management definitions and buffer zone provisions; Title 10 Chapter 1 Definitions, and Title 10 Chapter 19, Prime Wildlife District, for internal Code consistency and for consistency with state law.
- 3. Housekeeping Amendment (Legislative Amendment)**
- a. Adopt an amendment to FCC Title 10 Chapter 19 to make the Code consistent with Statewide Planning Goal 16.

PLANNING COMMISSIONS' RECOMMENDATIONS:

On May 7, 2013, the City of Florence Planning Commission and Lane County Planning Commission unanimously recommended co-adoption of Comprehensive Plan amendments in Exhibit B; and the City Planning Commission unanimously recommended adoption of the Code amendments in Exhibit C. Staff continues to concur with these recommendations.

FISCAL IMPACT: Adopting these amendments would not have any quantifiable impact on the city's budget. These amendments should make it easier for City staff and the Planning Commission to implement state land use and public facility requirements. No additional staff persons are proposed to be hired to administer the standards. The process for preparing these amendments is funded through the Siuslaw Estuary Partnership, a project funded in part by the U.S. Environmental Protection Agency and committed City match.

OPTIONS FOR CITY COUNCIL:

- 1. Adopt Ordinance No. 2, Series 2013, as presented on August 6, 2013.
- 2. Modify Exhibits B and/or C, amend findings to support modifications, and adopt Ordinance, as modified.
- 3. Deny the application based on findings of non-compliance with criteria and describe the revised findings.

DISCUSSION OF OPTIONS:

Option 1: Adopt Ordinance No. 2, Series 2013 as presented on August 6, 2013.

This option will result in completion of the project except for the final action on Exhibit B by the Lane County Board which is scheduled for September 10, 2013.

Option 2: Modify Exhibit B and/or C, amend findings to support modifications, and adopt Ordinance, as modified.

This option could result in a variety of outcomes, depending on the specific modifications.

The following modifications would make the City non-compliant with state law:

- Modification to the Wetland and Riparian Inventory: The Inventory has been approved by the Department of State Lands (DSL) and is now a part of the Statewide Inventory. The City cannot legally adopt a version of the Inventory that is not approved by DSL. State law requires that local decisions and the Comprehensive Plan be based on the DSL-approved Inventory.

The following modifications would result in the need for additional local process and/or the need to postpone City action on the amendments:

- Modifications to Exhibit B: The City and the County must co-adopt the exact same Comprehensive Plan amendments that apply to the area outside the city within the UGB. Modifications to any applicable policies or plans will result in the need for at least one additional meeting with the Lane County Board, including applicable Comprehensive Plan policies, the Wetland and Riparian Plan, and the Aquifer Protection Plan.
- Modifications to the Wetland and Riparian Area Plan, including the protection approach in the Plan: In addition to the Lane County Board, concurrence with the Plan by the Department of Land Conservation and Development (DLCD) and the other state and federal agencies with oversight of these resources is mandated by State law. Changes to the Plan, including the Code amendments, may or may not be consistent with State law. To avoid a remand of the City's decision, the Council may want to consider postponing action on the amendments if there are desired changes that involve consistency with state law.
- Modifications to the Aquifer Protection Plan, including Management Strategies: In addition to the Lane County Board, concurrence with the Plan by the Department of Environmental Quality (DEQ), Oregon Health Authority (OHA) and DLCD is mandated by State law. DEQ is poised to certify the Plan as submitted, and has concurred with the changes made during the adoption process. Major changes to the Plan, particularly Management Strategies, may not meet state criteria. For example, state law requires that a Technical Advisory Committee (TAC) recommend the Source Water component of the Plan, including Management Strategies to protect the existing and proposed wellfield. Major substantive changes to these strategies

could result in the need to reconvene the committee in order for the Plan to be certified by DEQ. The TAC for this Plan was a combination of the Water Quality and Quantity Team and the Community Stakeholders.

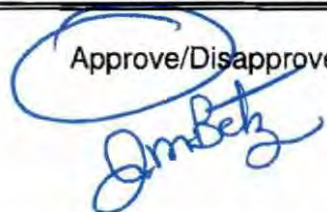
Option 3: Deny the application based on findings of non-compliance with criteria and describe the revised findings.

This option would result in a continuation of the City's existing policies and code provisions related to wetlands and riparian areas, which are more burdensome to private property owners than current Code and policies. It would also make the City non-compliant with State law for these resources. In terms of protection of the City's drinking water source, the City would lose the benefit of a Plan that has the support of the community and a tool for protecting the City's drinking water source.

AIS was prepared by Carol Heinkel, Planning Consultant.

CITY MANAGER'S RECOMMENDATION:

Approve/Disapprove/Other

A handwritten signature in blue ink, appearing to read "Jim Behr", is written over the printed text "Approve/Disapprove/Other". The signature is written in a cursive, flowing style.

ATTACHMENTS:

Staff Responses And Written Comments Submitted By Lea Patten Sent Via Email Directly To County Commissioners
August 13, 2013 Letter to Mr. Jaeger
City of Florence Ordinance No. 2, Series 2013
Exhibit A: Findings of Fact City for City of Florence Ordinance No. 2, Series 2013 and Lane County Ordinance No. PA 1299, August 6, 2013
Exhibit B: To City Of Florence Ordinance No. 2 Series 2013 and Lane County Ordinance No. Pa 1299: Proposed Amendments to the Florence Realization 2020 Comprehensive Plan for Aquifer Protection and Wetlands and Riparian Corridors, August 6, 2013
April 15, 2013 Aquifer Protection Plan for the North Florence Sole Source Dunal Aquifer and Appendices
June 2013 Florence Area Wetlands and Riparian Inventory and Appendices
June 2013 City of Florence Significant Wetlands and Riparian Corridors Plan and Appendices
EXHIBIT C: To City Of Florence Ordinance No. 2 Series 2013: Proposed Amendments to the Florence City Code for Aquifer Protection and Wetlands and Riparian Corridors, August 6, 2013
Exhibit D: Planning Commission Resolution PC 11 06 CPA 01 & PC 11 07 ZC 01 and Exhibits.

- Exhibit E: Minutes from May 7, 2013 Planning Commissions meeting and public hearing.
- Replacement Pages for Revisions to: City of Florence Significant Wetlands and Riparian Corridors Plan and Florence Area Local Wetlands and Riparian Inventory, August 6, 2013

This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement WC-00J04801-0 to City of Florence. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

**STAFF RESPONSES AND WRITTEN COMMENTS SUBMITTED BY LEA PATTEN
SENT VIA EMAIL DIRECTLY TO COUNTY COMMISSIONERS**

STAFF RESPONSES:

Staff's response to these most recent comments by Ms. Patten are the same responses sent to her via email the day of the August 6, 2013 joint elected officials' public hearing, below. These are similar to the responses staff provided at the hearing and in response to similar comments made by Ms. Patten at the May 7, 2013 joint Planning Commission public hearing. One additional response staff can offer is that the Oregon Health Authority (OHA) has certified the 2012 Wellfield Delineations, as well as the groundwater flow model used in the analysis. The OHA is charged by state law to certify the accuracy of these elements.

Response to Lea Patten August 6, 2013 10:22 AM

From: cheinkel
To: Lea Patten
Cc: joe; MILLER MIKE; Jacque betz; Kelli Weese

- ☐ GW Flow Maps.doc (221.8 KB) Download | Remove
- ☐ N. Florence Dunal Aquifer.pdf (7.3 MB) Download | Remove
- ☐ May 7 Joint PC Presentation.pdf (2.9 MB) Download | Remove

Dear Ms. Patten,

Mike and I checked the files and there was no map presented at the Planning Commission public hearing on May 7 that matches your description. I have attached the power point from the hearing to show what was presented.

I believe your concern is that there is a difference between the maps produced in 1982 for the North Florence Dunal Aquifer Study by Ralph Christensen and Gerritt Rosenthal and the most recent map showing groundwater flow by GSI Water Solutions, Inc. Is that correct?

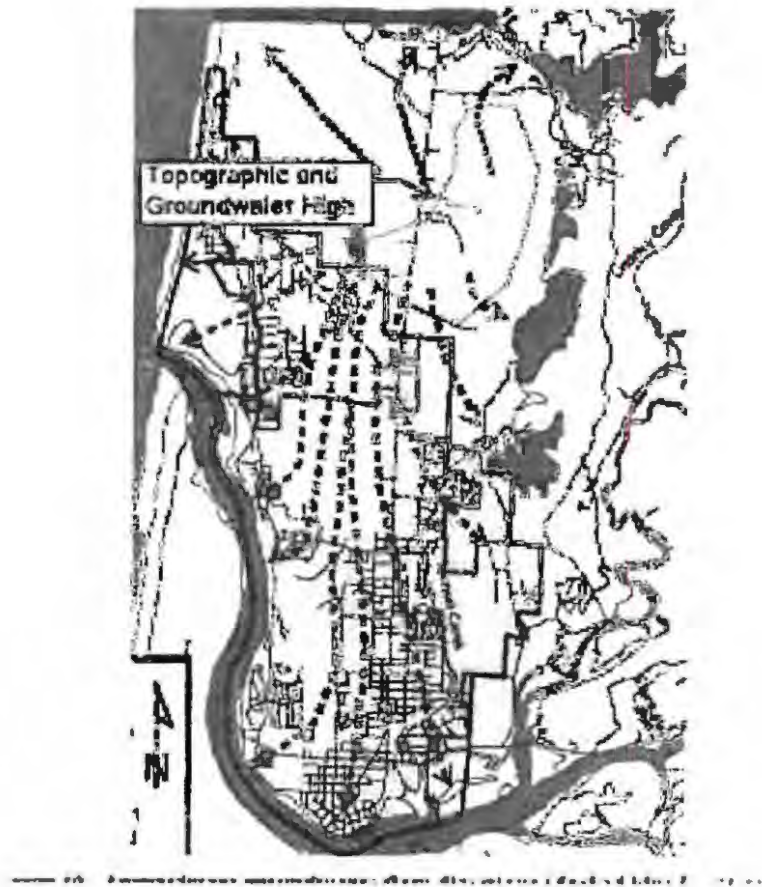
I put the two maps side by side in the attached document. My observation is that the maps are generally the same, although there are differences in detail and level of sophistication, which are to be expected given the advances in modeling and mapping technology over the past 30 years. I have also attached the full report from 1982. Mike has already sent you the most recent report by GSI.

I have also forwarded, below, an email I sent to Michael Mattick, Lane County Water Master, in response to your request for information from the State about water flow in the aquifer, in the event there is a relationship between the questions you are asking now and those you asked following the joint Planning Commission public hearing on May 7.

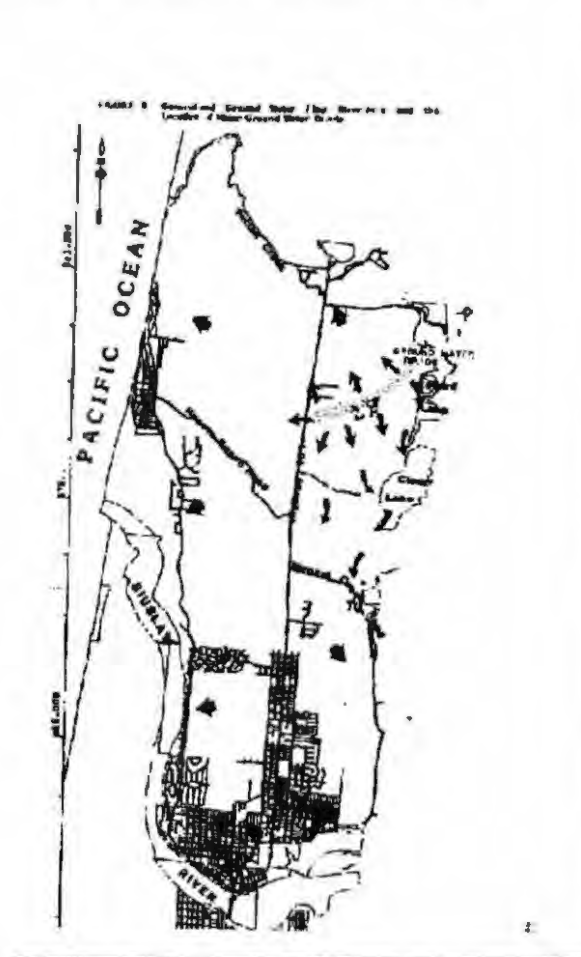
Please know that I am trying to respond to your request and am happy to continue to work with you on this.

Sincerely, Carol Heinkel

Most recent GSI Groundwater Flow Map



1982 North Florence Dunal Aquifer Study Map
Ralph Christensen and Gerritt Rosenthal



From: "Carol Heinkel" <cheinkel@q.com>
To: "Michael j mattick" <michael.j.mattick@state.or.us>
Cc: "Mike miller" <mike.miller@ci.florence.or.us>, "Jacque Betz" <jacque.betz@ci.florence.or.us>
Sent: Monday, May 13, 2013 1:17:42 PM
Subject: Response to Lea Patten

Dear Michael, Here are my responses to the email Lea Patten sent to the Senator, as I understand her question from my phone conversation with you this morning. I am copying Mike Miller, Florence Public Works Director, and City Manager Jacque Betz, who can provide additional information on this topic if you want to forward Ms. Patten's email to Mike and Jacque. Thanks, Carol

Apparently, Ms. Patten is concerned that the most recent study of the North Florence Dunal Aquifer refers to Clear Lake as a "dunal lake" and that she does not believe this to be the case, based on a report by Christensen done in the 1980s.

Response: Numerous studies over the course of several decades have affirmed the dunal nature of Clear Lake and have found that Clear Lake is fed, in part, by the North Florence Dunal Aquifer, including the report by Christensen that Ms. Patton cites (see below).

The August 10, 2012 Technical Memorandum by GSI (an Appendix to the Aquifer Protection Plan) reaffirms this:

Groundwater elevation contours and flow directions in the dunal aquifer based on water level measurements and geophysical data collected on the City's behalf by Portland State University: Groundwater flows towards discharge areas, including the Siuslaw River to the south and southwest, the Pacific Ocean to the west, the dunal lakes, e.g., Clear and Munsel, and towards Munsel Creek to the east and southeast. As a consequence, groundwater below a specific location may be flowing either south or west, or even southeast, depending on where in the site is located.

This finding is consistent with findings in previous studies, including the 1982 North Florence Dunal Aquifer Study upon which EPA relied in designating the aquifer a sole source aquifer in 1987. That report states:

After rainfall percolates to the water table, the water begins to move through the aquifer toward a discharge point. Most of the water is discharged directly to the ocean, to the Siuslaw River, or to Sutton Creek. A portion of the water from the upper reaches of the aquifer flows to Collard, Clear, Ackerley or Munsel Lakes. From there it either flows out the Munsel Creek system, if pumped out by the Heceta Water District or reenters the groundwater system at the southern end of these lakes.

EPA Resource Document: For Consideration of the North Florence Dunal Aquifer as a Sole Source Aquifer, September 1987, attached.

However, the aquifer supplies a significant amount of water to the lakes, especially during the summer months when surface water inflow decreases and withdrawals from Clear Lake are increased. Hydrographs comparing lake levels with aquifer levels strongly suggest a hydrologic connection between the surface and ground water supplies. More

refined studies estimate that the aquifer supplies at least 27% of Clear Lake's annual water supply and a much higher proportion during the dry season. (Christensen, R., 1985, Phosphorus Accumulation in the Clear Lake Watershed: Lane County Land Management Division of the Department of Public Works) Page 4.

These studies are referenced at Heceta Water District's web site: http://www.hecetafordistrict.com/index.php?option=com_content&view=article&id=5&Itemid=4 which states:

Clear Lake and others in this string lie along the eastern margin of the dune sheet, between the buildup of the dune sheet to the west and next to impermeable bedrock to the east. As the migrating dunes approach the hills the wind loses its ability to transport sand and the largest portion of the sand remains to the west, thus leaving a depression or series of troughs along the base of the hills. Collard, Clear and Munsel Lakes are thus due to marginal ponding by dune masses, a mode of formation typical of many other lakes on the Oregon coast.

From: "Lea Patten" <beachscene@centurylink.net>
To: "Carol Heinkel" <cheinkel@q.com>
Cc: "Joe Henry" <joe.henry@ci.florence.or.us>, "Mike Miller" <mike.miller@ci.florence.or.us>, "Kelli Weese" <kelli.weese@ci.florence.or.us>
Sent: Tuesday, August 6, 2013 8:42:20 AM
Subject: from LEA PATTEN Re: Requested Map

Good morning, Ms. Heinkel,

I truly believe my request is a simple one:

- the map in question is the one shown by Mike Miller -- as part of his testimony.
- the map allegedly was part of "new research" presumably negating the Ralph Christensen study of the 1980's.
- the map in question showed thick, black arrows in bold font.
- the thick, black arrows in bold font supposedly showed the flow of water.

Might I add, if all the documents had been readily available on the City website, none of these emails would have been necessary.

FYI, and thank you for your time.
Lea Patten

Dear Ms. Patten, I am available to help with your map request. From your email, it appears you are seeking a map that shows the water flows, but the map that Mike sent shows that. Can you give me more information about the map you seek? Did it have a title? do you know where you saw it and when? If you want to give me a call I would be happy to work with you on this.

Sincerely, Carol Heinkel [541-285-1824](tel:541-285-1824)

From: "Carol Heinkel" <cheinkel@q.com>
To: "Jacque Betz" <jacque.betz@ci.florence.or.us>
Cc: "Joe Henry" <joe.henry@ci.florence.or.us>, "Lea Patten" <beachscene@centurylink.net>, "Mike Miller" <mike.miller@ci.florence.or.us>, "Kelli Weese" <kelli.weese@ci.florence.or.us>
Sent: Tuesday, August 6, 2013 8:19:04 AM
Subject: Re: From Lea Patten - REQUESTED MAP NOT INCLUDED

Yes, Jacque, I will follow up with her. Carol

From: "Jacque Betz" <jacque.betz@ci.florence.or.us>
To: "Carol Heinkel" <cheinkel@q.com>
Cc: "Joe Henry" <joe.henry@ci.florence.or.us>, "Lea Patten" <beachscene@centurylink.net>, "Mike Miller" <mike.miller@ci.florence.or.us>, "Kelli Weese" <kelli.weese@ci.florence.or.us>
Sent: Tuesday, August 6, 2013 7:56:18 AM
Subject: RE: From Lea Patten - REQUESTED MAP NOT INCLUDED

Carol,

Ms. Patton is not satisfied with the information that we provided her or the website link to www.siuslawwaters.org that has all the maps. Perhaps you can communicate with her directly to make sure she has what she needs.

Thank you,

Jacque M. Betz
City Manager
250 Hwy 101
Florence, OR 97439
Phone: 541-997-3437

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PUBLIC RECORDS LAW DISCLOSURE: This email is a public record of the City of Florence and is subject to public inspection unless exempt from disclosure under Oregon Public Records Law. This email is also subject to the City's Public Records Retention Schedule.

From: Lea Patten [mailto:beachscene@centurylink.net]
Sent: Tuesday, August 06, 2013 7:29 AM
To: Jacque Betz
Cc: Joe Henry
Subject: From Lea Patten - REQUESTED MAP NOT INCLUDED

Good morning, Jacque.

Perhaps it was an oversight, but the specific map I requested (with short, black arrows showing water flow) was NOT included in the attachments.

Please re-send with the correct map.

Thank you,
Lea Patten

Good morning Lea,

I just returned from vacation and Councilor Henry asked that I forward this information on to you. Please let me know if I can provide you anything else.

Thank you,

Jacque M. Betz
City Manager
250 Hwy 101
Florence, OR 97439
Phone: 541-997-3437

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From: Mike Miller
Sent: Monday, August 05, 2013 8:49 AM
To: Jacque Betz; Carol Heinkel; Kelli Weese
Subject: RE: from LEA - additional information.

Good morning,

I have attached the map (SKMBT C22013080507430.pdf), page A1-10, from the water monitoring report (which is also attached). The report is located on the Siuslaw Waters website (www.siuslawwaters.org) along with all of the supporting documents regarding water quality pertaining to the Siuslaw Estuary Partnership.

Please let me know if you need additional information.

Mike

.....8

Fwd: From LEA PATTEN in FLORENCE re City 2020 Comp Plan Amendments August 20, 2013 1:47 PM

From: Jay Bozievich

To: cheinkel

FYI

Sent from my iPad

Begin forwarded message:

From: "PATTEN Lea (SMTP)" <beachscene@centurylink.net>
Date: August 16, 2013, 4:16:15 PM PDT

To: LEIKEN Sid W <Sid.LEIKEN@co.lane.or.us>, BOZIEVICH Jay K
<Jay.BOZIEVICH@co.lane.or.us>, "FARR Pat M (LC)" <Pat.FARR@co.lane.or.us>,
SORENSEN Pete <Pete.Sorenson@co.lane.or.us>, STEWART Faye H
<Faye.STEWART@co.lane.or.us>
Subject: From LEA PATTEN in FLORENCE re City 2020 Comp Plan Amendments

Friday, 15 August 2013

To: Commissioners, Lane County,
Sid Leiken,
Jay Bozievich,
Pat Farr,
Pete Sorenson,
Faye Stewart
125 E. 8th
Eugene, OR

From: Lea Patten
04699 N. Jetty Rd
Florence, OR 97439

RE: City of Florence – 2020 Comp Plan proposed amendments.

CHRONOLOGY:

Since Wednesday, August 7th, the following actions have been taken:

01. Monday, 12 August 2013, 1PM, Offices of Lane County Public works.
 - listened to & transcribed part of recording of Joint Planning Commission meeting (Aug 6).
02. See attached copy of portion of JPC recording where I believe Miller held up map showing water flowing uphill.
03. Telephoned PSU's Department of Geology re: "research" as mentioned by Mike Miller, Director, Florence Public Works.
04. Received from PSU provided name of "Sarah Rebecca Doliber".
05. Was give information to access Doliber thesis:
<[pdxscholar.library.pdx.edu/geology_grad/\[Doliber, Sarah Rebecca, "Groundwater Surface Trends in the North Florence Dunal Aquifer, Oregon Coast, USA" \(2012\). Dissertations and Theses \(Open Access\). Paper 530.http://pdxscholar.library.pdx.edu/open_access_etds/530\]](http://pdxscholar.library.pdx.edu/geology_grad/[Doliber, Sarah Rebecca,)>
06. Accessed & read Doliber's thesis by me and one other person; Questioned use of "suspected" and "believed" without providing documented proof of any kind.
07. Exchanged several phone calls & emails with PSU, Dept of Geology (see attached).
08. Had several conversations with former County Planning Commissioner, George Goldstein.
09. Email exchanges w/ Doliber.
10. Thursday (08-15-13) received telephone call from Doliber (lives in Nashville, TN)
11. Synopsis of comments made by Doliber (see below).
12. See attached map of Clear Lake & surrounding [forest covered] dunes that provide water runoff.

=====

FACTS:

- a. By definition, an "aquifer" is underground.

- b. Doliber said "the opportunity" to study the coastal dunal aquifer was "offered by Dennis Nelson who", at that time, was "doing consulting work for the City" of Florence."
- c. "Since [Nelson] offered [Doliber] the opportunity [she] asked Nelson to be on [her] Thesis Committee."
- d. Throughout her thesis, Doliber mentions "working with...GSI Water Solutions" and "Dennis Nelson GSI Water Solutions, personal contact."
- e. Doliber's research covered a "couple of days" in Florence.
I'm sure you Commissioners know it takes more than "couple of days" to determine water flow whether it be from the mountains down or, as the City claims, from the aquifer upward.
- f. Doliber did not contact Heceta Water District for any information because she "was told about the political situation [PUD effort]... and ...not to get involved...". [
- g. Doliber's use of vague terms ("suspected" & "believed") were not supported by proof of any kind.
- h. Doliber research shows Clear Lake is "approximately 30-35 m[eters] above sea level."
- i. Doliber states [forest covered] dunes "surrounding Clear Lake are around 45 m[eters] above sea level."
- j. In her email of August 15, 9:06 PM, Doliber states she "focused in on Clear Lake.. The dunes directly to the west of Clear lake are at a higher elevation than Clear Lake itself. According to satellite elevation data and the elevation measurements I took during my thesis Clear lake's elevation is around 30-35m above sea level while the surrounding dunes are around 45m. Clear lake sits in a 'valley' between the sand dune to the west and the grass covered dune (I believe there is a golf course there) to the east. So it is being fed on both sides by the dunes. If you have a copy of my thesis you can look at figures 6, 10 and 11 for visuals..."
- k. In the above statement, Doliber reaffirmed the definition of 'watershed.'
- l. According to several people, Doliber's words "... prove[s] that Clear Lake is fed from the runoff from the dunes. It is a watershed totally separate from the dunal supply." Even Doliber states, "...these lakes most likely receive additional input from surface water to the east."
- m. Doliber also states, "...groundwater surface trends on the east side of the Cities; well field are not established in this study."
- n. Doliber also states, "...'water table' was very roughly delineated by seismic refraction....sand aquifer down to the bedrock..."
- o. Doliber cites research from 1958, 1963, 1971, 1975, 1970, 1980, 1987, 2007, and Dennis Nelson's 2011 report but, until I mentioned "Ralph Christensen" to her, she had not heard of, nor was she told about Christensen's work. Why not?
- p. FYI: Lake altitudes:
 - Collard Lake: 36m[eters] or 186' above sea level.
 - Clear Lake: 30m[eters] or 98' above sea level.
 - Acklery Lake: 30m[eters] or 98' above sea level.
- q. Subterfuge and obfuscation are being used repeatedly by the City.
 - Time after time, when all else fails, City of Florence officials shout "failed septic, failed septic, failed septic!" This game has gone on for years.
 - The City seems to believe that if they tell the same preposterous story over and over again, and eventually people will believe it.

Between the proposed wellfield and water sources, there are numerous working and defunct commercial facilities where the ground is heavily polluted with industrial waste. Yet, the City is worried about nitrates (source not identified) near the water source. Gentlemen, the City claims are not supported by data! Their purpose is spurious at best. -- Please send these proposed amendments back to the City for review and rewriting, ** At this particular moment, these

amendments are not about annexation. The road bed must be prepared before the asphalt can be laid. ** . With these continuing amendments to the 2020 Comprehensive Plan, the City is laying the roadbed for annexation. Commissioners, the future well-being of the public is at stake. You are our elected representatives. We need your representation; We need your support.

Finally, I want to say that I believe if the Planning Commissioners were doing their job they would have seen the double-talk put forth by the City. Instead, they sat there, essentially, on their hands. I'm willing to wager that at this moment, none of them have researched very many, and if any, facts stated in the City's proposal. The lack of questions, the lack of interest...appalled me.

Thank you,
Lea Patten, Florence

Lea Patten 541-997-5054 beachscene@centurylink.net 04699 N. Jetty Rd Florence,
OR 97439

From: FAM-Patten, Lea

To: "Andrew Fountain" <andrew@pdx.edu>

Sir,

Many thanks for your efforts.
Sarah called me late yesterday afternoon.

I'm appreciative of all you/others did.
Please extend my gratitude to all involved.

Lea Patten, Florence

Lea Patten 541-997-5054 beachscene@centurylink.net 04699 N. Jetty Rd Florence,
OR 97439

=====

Re: from LEA PATTEN, Florence - re SARAH DOLIBER
August 14, 2012 1:38 PM

From: "Andrew Fountain" <andrew@pdx.edu>

To: FAM-Patten, Lea

=====

Dear Lea,

I've sent emails around the department to find out where Sarah Doliber is these days. Its a bad time of year for this inquiry because school is not in session.

Her advisor on her project is Dr. Curt Peterson. He lives in Sherwood, OR and you can find him on anywho.com.

Good luck!
Andrew

On Wed, Aug 14, 2013 at 1:17 PM, Lea Patten <beachscene@centurylink.net> wrote:
Dr. Fountain,

It is imperative that I get in touch with Sarah Doliber. She wrote her [2012] thesis on the North Dunal Aquifer in Florence. My concern is that the City is misusing her documentation. I'd like to speak with Sarah re her research, her intent, etc. If you'd please forward this email to her, and/or give her my phone number, I'd be appreciative.

Many than,
Lea Patten

Lea Patten 541-997-5054 beachscene@centurylink.net 04699 N. Jetty Rd Florence, OR 97439

.....g
Clear Lake



Clear Lake



Clear Lake is one of many lakes on the central Oregon coast that lie on the 50-mile long North Florence Dunal Aquifer, an important groundwater body supplying water for domestic needs in the Florence area. The Clear Lake Watershed is situated north of Florence, within the North Florence Dunal Aquifer, which was designated a 'sole source aquifer' by the Environmental Protection Agency on October 7, 1981. A sole source aquifer is an aquifer which has been determined to be the sole or principal drinking water source for the area.

Oregon Department of Environmental Quality: Clear Lake Source Water Assessment Summary and Map (PDF) - Heceta Water District's Drinking Water Protection Area and Potential Contamination Sources (PWS 4100301) Clear Lake is an oligotrophic lake, which means it is a lake with a limited supply of nutrients, therefore it is biologically unproductive with very transparent waters which are fully saturated with dissolved oxygen.

A 1985 study for Lane County showed that micro-organism growth increased when phosphorus was added to the water in Clear Lake - especially when the water was enhanced with nitrogen. Micro-organisms showed little increase in growth with the addition of nitrogen only. Therefore, it appears phosphorus is the major limiting nutrient. Increased phosphorus concentrations could lead to the abundance of various species of algae, including obnoxious species such as blue-green algae which can grow to excess. Increased algae abundance in the lake will lead to higher turbidity values in the summer. Because of stratification in concentration of phosphorus, it is difficult to detect change in phosphorus concentration before it becomes severe enough to cause noticeable changes in the lake.

The flushing rate in the lake is about once every 500 days. In the winter, when the lake is flushed most rapidly, it is well oxygenated. Under these conditions, phosphorus is likely to be bound to the sediment at the bottom of the lake and not susceptible to being washed out of the lake. The following information is from the Atlas of Oregon Lakes, printed in 1985 by Portland State University.

Area:	153 acres
Depth:	80 feet
Elevation:	99 feet above sea level
Volume:	6,100 acre feet
Length of Shoreline:	2.4 miles
Drainage Basin Area:	1.1 square mile
Location:	3 miles north of Florence, 1 mile east of US Hwy 101

Clear Lake is one of a string of lakes on the central Oregon coast that lies on the 50-mile long North Florence dunal aquifer, an important groundwater body supplying water for domestic needs in the Florence area. Heceta Water District withdraws directly from Clear Lake. The geologic origin of all the lakes in this group (Collard Lake, Clear Lake, Ackerly Lake and Munsel Lake) can be explained simultaneously. The dunal aquifer is an accumulation of aeolian (wind blown) sand that rests on an ancient wave cut terrace. This terrace can be seen at 50 to 150 feet above sea level along the coast to the north near Newport, and to the south near Bandon and Port Orford. However, along the coastal stretch from Coos Bay to Heceta Head the terrace has been warped downward below sea level and an extensive accumulation of sand deposited on it. This dunal sheet is of fairly recent geological origin. Carbon-14 dating of woody material deposited at the base of the sand and on top of the terrace clays showed that it originated about 27,000 years before the present. The dune sheet is broad and relatively flat and is composed of successive layers of sand that were built up as deflation plains behind eastward migrating sand dunes. The remnants of those dunes that have become stabilized and those which have not are the major topographic features on the dunal sheet surface.

Clear Lake and others in this string lie along the eastern margin of the dune sheet, between the buildup of the dunal sheet to the west and next to impermeable bedrock to the east. As the migrating dunes approach the hills the wind loses its ability to transport sand and the largest por-

tion of the sand remains to the west, thus leaving a depression or series of troughs along the base of the hills. Collard, Clear and Munsel Lakes are thus due to marginal ponding by dune masses, a mode of formation typical of many other lakes on the Oregon coast. The sands of the North Florence Aquifer are a substantial water holding and transporting system. Permeability is high as indicated by a lack of streams originating on the sands, inspite of over 60 inches of annual precipitation. Editors Note: The 1998 and 1999 rain seasons each produced over 100 inches of rain in the Florence area.

Most of the water percolates into the sand and discharges directly to the ocean. The only surface streams that cross the dune sheet, Sutton Creek to the north and the Siuslaw River to the south, derive most of their flow from the hills to the east; there is also substantial discharge of groundwater into these streams from the aquifer. The primary internal surface drainage system begins near Collard Lake and flows through a small stream to Clear Lake. A steady, year round flow of 1 to 2 cubic feet per second occurs in this stream. A portion of the outflow from Collard Lake flows to Clear Lake through sand that forms their western boundaries. Clear Lake water flows out by a surface stream to Ackerly Lake and then to Munsel Lake and Munsel Creek or it seeps into the sand aquifer system directly from the lake. Bottom material in Clear Lake is mostly clean sand. Small deposits of clay and organic mud occur along the north shore, in coves along the east shore, and at the outlet. These small clay and mud deposits are also the spots where a few macrophytes grow: water lilies, water shield, and rushes.

The most obvious features of the surrounding landscape are the areas of bare, mobile sand which contrast strikingly with the general forest cover. On the west side of the lake is the exposed ridge of a large active sand dune that is moving slowly eastward, encroaching on the water. Sand is constantly deposited in the lake on this side so that the bottom slopes away gently from the shore. In contrast, there is a steep slope on the east side of the lake basin where it abuts the abrupt rise of the Coast Range. The original forest on the eastern side of the drainage basin has been mostly logged off and is now covered partly by a second growth conifer forest, mixed with deciduous species and partly by brush such as salal, rhododendrons, and huckleberry. Most of the land on these forest and brush covered slopes is owned by private timber companies.

Development around Clear Lake is minimal. There is one house with a boathouse on the lake shore and, in the past, a sawmill was located at the north end near the inlet. The lake is reported to contain cutthroat trout and largemouth bass, but is certainly not fished heavily, nor used for any other recreational purposes. Editor's note: As of 2000, there were three houses on the lake shore, one on the south end and two on the north end. Most coastal lakes in Oregon are either mesotrophic or eutrophic, due to a combination of heavy use, shallow depth, and rapid infilling of sediment. Clear Lake, however, is quite deep and is one of the few oligotrophic lakes on the coast. Woahink Lake and the Clear Lake south of Reedsport are two other examples of deep, oligotrophic coastal lakes. The water quality in Clear Lake is generally excellent. Chemical constituents exist in low concentrations due to the relatively inert quality of fresh sands and the high flushing rate from heavy rainfall and rapid groundwater movement. There is only slight enrichment of sodium and calcium and the alkalinity is very low. The concentrations of phosphorus and chlorophyl and the transparency indicate a lower trophic state than Collard Lake which discharges into Clear Lake from the north. All indications show that Clear Lake is relatively unproductive. Phytoplankton densities are low and only about 10% of the lake is shallow enough to permit the growth of macrophytes; they are not a problem as in so many of the coastal lakes.

Comprehensive Plan, Proposed amendments

Carol Heinkel – improved tech today v 1997

Commissioners were allowed 3 questions only, one at a time.

1. **Goldstein** – re new treatment plant

2. **Goldstein** re: Fred Meyer

If you build wells, going to need another treatment plant?

MMiller: Yes, the answer is yes

...Would have to build a new treatment facility.

GG: concerned re pollutants-----

Mr. Goldstein asked why the Clear Lake watershed was referred to as dunal.

[the lake] is different from the other lakes.

Curious why.

Mike Miller [aka: MM]: Cited PSU report.

Delineates all characteristics

Sits on top of the

Microphone noise

BELIEVE THIS IS WHERE MILLER HELD UP MAP IN QUESTION.

MM: "Waters are all interconnected."

"PSU just did a recent mapping of aquifer (2011 in Florence"

"...Concluded that there is a portion of the aquifer that actually feeds Clear lake."

"Not the other way around."

" Lake doesn't feed into aquifer; "

"Not the other way around. Or a portion of characteristic"

"And that's also beared [sic] out from the maps"

"And the way the ground water flows."

"There's a portion of the ground water that actually flows toward the lake and not away."

"So, it is inter-tied, inter connected so it is part of the dunal system."

"There's a portion of the ground water that actually flows toward the lake and not away."

"So, it is inter-tied, inter connected so it is part of the dunal system."

Brief dead spot in recording at beginning of following comment by Commissioner Goldstein.

GG: '.....27% at most.'

Important issue. Don't know criteria It comes from a watershed settlings and not dunal And it feeds out to the other lakes and the other lakes are dunal. And this one [Clear Lake] isn't. and, I don't want to get into it. You'll have to read... Your pumps are rated at 450 gpm. 24-hr drawdown

MM: potential of wells...Sandpines [golf course] wells area able to produce 400-450gpm

Our [City] wells, with the size of the pumps we have, Are in the range of 200-250 gpm.

Depending on the uniqueness of the well characteristics of each well and the ... varies.

GG: well field is 80 acres You said 70% Figures out to 369,000 gal per day. Drawing 2.5 million. Doesn't figure Rest of area slopes diff directions. Plants & trees less percolation

Don't understand where you are getting the water.

MM: "It isn't just 80 acres aquifer goes under thetime travel."

"Through sands no isolated very broad area."

GG: Comes from mountains

MM: Aquifer has distinct boundaries.

NFork Siuslaw

Where sands meet the bedrock

Entire capture area.

GG: Where does water from mountain go?

MM: discharges into the North Fork, the Siuslaw.

CHAIR: have more questions [from other people] don't mean to cut you off...

GG: Nitrogen analysis

You went south of area.

Not a criteria in the ocean

Don't understand why you did it.

The results of you got ...more-so for fertilizer

MM: "nitrates area a concern."

"Drinking water standard."

"Known issues w/ septics wanted to make sure we didn't have issues with that..."

GG: "amount is pretty insignificant."

GG: "have to build wells on east side of 101"

"Not anywhere near the percolation."

MM: "capture area runs north and east of those wells."

"[to Heinkle] do you have a photo of that capture area.: Answer was "yes."

Jim Peterson: understand watersheds.

Area is about 5000 acres.



City of Florence

250 Hwy 101, Florence, OR 97439

www.ci.florence.or.us

August 13, 2013

Mr. Dave Jaeger
102 Manzanita Way
Florence, OR 97439

Dear Mr. Jaeger,

Thank you for meeting with City Manager, Jacque Betz, and Kelli Weese, Interim Planning Director today at 2:00 p.m. at Florence City Hall. This letter is to clarify the differences between existing City Code and proposed City Code as it relates to your property and to explain why limited protection of the Munsel Creek side channel is necessary.

At the August 6, 2013 City Council public hearing on the proposed Code amendments, you testified that you are concerned that the proposed amendments will remove all economic value from your property and render your property unbuildable. In fact, the proposed Code provides more options for development of properties in riparian areas than the existing Code, which is quite strict. The differences between the existing and proposed Code are shown in the table below.

What this means for you is that you have options under the proposed Code that you do not have today under the existing adopted regulations. Under the proposed Code, once it is adopted and in effect, you will be able to do the following (with all required federal and state permits):

- Replace all existing structures in the same location, including the culvert, as long as no additional or different riparian surface area is affected. No land use permit is necessary; only a building permit, where one is otherwise required. As a Coast Village owner, all of your existing structures are considered "lawfully constructed."
- As an owner of property adjacent to the Munsel Creek side channel, apply for a setback adjustment "over the counter" through Administrative Review to place new structures within 25 feet of the creek.
- If necessary in order to build a new 27' X 50' primary dwelling on your property, apply for a setback adjustment "over the counter" as long as you stay more than 20 feet from the creek; and apply for a Hardship Variance to the Planning Commission if you are 20 feet or closer to the creek, subject to proposed standards. As a Coast Village owner, you will not be required to pay the Variance fee.

Public Works
400 Spruce St.
(503) 507-6100

City Manager
City Hall
(503) 507-2511

Community Development
Planning & Building
(503) 507-2527

Finance
Utility Billing
(503) 507-2520

Juvenile Center
400 Greenwood St.
(503) 507-2528

Florence Events Center
715 Oregon St.
(503) 507-2526

- L Apply to the Planning Commission for a Hardship Variance, subject to the proposed standards, to allow proposed new structures within the required setback by demonstrating it is necessary in order to otherwise develop your property, i.e., where strict adherence to the applicable standards or requirements would effectively preclude a use of your parcel that could be reasonably expected to occur in the zone and that you would be precluded a substantial property right enjoyed by the majority of landowners in the vicinity. As a Coast Village owner, your Variance fee will be waived.

You also testified that you do not believe that the Munsel Creek side channel is critical habitat for coho salmon and that you should be allowed to fully develop your property. The special setback adjustments proposed for the Munsel Creek side channel were made possible through the ESEE analysis. State law allows the use of an ESEE in order to address conflicting uses with resource protection. In addition to the other functions and values of this riparian area, where the area supports threatened or endangered species such as coho salmon, full development is not a viable conclusion of an ESEE.

During the riparian inventory process, written statements were submitted by the National Marine Fisheries Service and supported by the Oregon Department of Fish and Wildlife and local STEP Program representatives that confirmed the side channel is critical habitat for coho salmon. These statements are shown in the ESEE Analysis Excerpts attached to this letter. The ESEE Analysis allowed us to address conflicts between the riparian resource and existing development and to propose the Limited Protection Program in Exhibit C within the requirements of state law.

SUMMARY OF DIFFERENCES BETWEEN EXISTING AND PROPOSED CODE

Here is a brief summary of the differences between the existing adopted Code and the Code amendments proposed in Exhibit C, as they would apply to your property: The sections of Code cited in this summary are attached to this letter.

Code Requirements Today	New Provisions Under Proposed Code
Mandatory 50 foot setback from Munsel Creek, including side channel (FCC 9-5-3-3-F and FCC 10-7-3-B, below). Replacement of existing structures is prohibited.	Existing "lawfully constructed" structures can be replaced anywhere in a riparian area or wetland buffer zone without a land use permit (just building permit, if required) as long as no additional riparian surface is disturbed. For Coast Village only, all existing structures are deemed "lawfully constructed." (FCC 10-7-4-D: Exemptions; Exhibit C page 14)
There is no guaranteed setback reduction for the Munsel Creek side channel today.	Owners of property adjacent to the side channel, including Coast Village, are guaranteed a 50% setback reduction (up to 25 feet from the creek) through Administrative

	<p>Review, as long as native plants are re-planted. The Code states that staff from the Watershed Council and Soil and Water Conservation District will help</p> <p>with this at no cost to property owners. Florentine Estates PUD lots that were granted a setback reduction by the City in the 1990s are considered already in compliance and do not need to apply for the reduction. This was made possible by the ESEE Analysis that was paid for out of the EPA grant. (FCC 10-7-4-J: Special provisions for the Munsel Creek Side Channel; Exhibit C, page 19).</p>
<p>Setback adjustments or Hardship Variances are not specifically allowed in existing City Code. If Coast Village owners request a Variance, they must pay a fee.</p> <p>There are no specific provisions if properties are rendered unbuildable by the regulations.</p>	<p>Allows setback adjustments or Hardship Variances when property would be rendered unbuildable by the setback requirements. Defines "unbuildable." Administrative Review is used when development is proposed more than 20 feet from creek. If within 20 feet of creek, Hardship Variances are available. Proposed definition of unbuildable provides a clear and objective path (through Administrative Review) and a performance-based path through Planning Commission Hardship Variance process. Variance fee is waived for Coast Village. (FCC 10-7-4-L: Hardship Variances, Exhibit C, page 20; Proposed new definition of "unbuildable" FCC 10-1-4 amendments; Exhibit C, page 27)</p>

Please review the attached Code references and excerpts from the ESEE Analysis for more detail and documentation of the explanations above. Hopefully, as you go through these together with Jacque and Kelli today, you will gain a better understanding of why limited protection of this riparian area is necessary and how your options for development would improve with the proposed Code changes over what is required today.

Sincerely,

Jacque Betz, Florence City Manager
Kelli Weese, Florence Interim Planning Director
Carol Heinkel, Florence Planning Consultant, Project Coordinator

Code Cited and ESEE Analysis Excerpts Concerning Munsel Creek Side Channel

EXISTING ADOPTED CODE REQUIREMENTS:

FCC 9-5-3-3: STORMWATER QUALITY

- F. Sensitive areas shall be protected by a buffer zone of native, undisturbed vegetation. The outer boundary of the buffer shall be determined by a minimum 50-foot setback from the edge of the sensitive area, or wider if required by other City requirements (See Florence City Code Title 10, Chapter 7.) The width and nature of protection required within the buffer may change as the Endangered Species Act and other state and federal regulations are promulgated. The City requires that the buffer width meet all state and federal requirements. No land disturbing activities, structures, development and construction activities, gardens, lawns, application of chemicals, pet wastes, dumping of any kind of materials shall be permitted within the buffer zone, except as noted below:
1. Roads, pedestrian, or bike paths crossing the buffer from one side to the other in order to provide access to or across the sensitive area.
 2. A pedestrian or bike path constructed within a buffer and parallel to a sensitive area shall have the buffer widened by the width of the path if the path is constructed of impervious material.
 3. Pedestrian or bike paths shall not exceed 10-feet in width.
 4. Utility/service infrastructure construction (i.e., storm, sanitary sewer, water, phone, gas, cable, etc.) If approved by the City Manager or his/her designee.
 5. Measures to remove or abate hazards, nuisance, or fire and life safety violations as approved by the City.
 6. Enhancement of the riparian corridor for water quality or quantity benefits, fish, or wildlife habitat as approved by the City and other appropriate regulatory authorities.
 7. Water quality facilities planted with appropriate native vegetation may encroach into the buffer area as approved by the City and other appropriate authorities.

FCC 9-5-1-2: DEFINITIONS

SENSITIVE AREAS Natural streams (perennial or intermittent), rivers, lakes, or wetlands hydraulically connected by surface water to streams, rivers, or lakes and areas defined by the City of Florence's Local Wetlands and Riparian Inventory. Also, includes all areas that are protected for species as per areas designated by Oregon Department of Fish and Wildlife, Oregon Division of State Lands, National Marine Fisheries Service, United States Fish and Wildlife Service, and Oregon Department of Transportation.

FCC 10-7-3: DEVELOPMENT STANDARDS: The following standards shall be applied to development in potential problem areas unless an approved Phase I Site Investigation Report or an on-site examination shows that the condition which was identified in the Comprehensive Plan or Overlay Zoning Map does not in fact exist on the subject property. These standards shall be applied in addition to any standards required in the Zoning Districts, Comprehensive Plan, and

to any requirements shown to be necessary as a result of site investigation. Where conflicts or inconsistencies exist between these Development Standards, City Code, and the Comprehensive Plan, the strictest provisions shall apply unless stated otherwise.

- B. **Munsel Creek and Other Drainageways:** A fifty foot (50') setback shall be required for all buildings from the creek channel, except by Planning Commission approval where it can be shown by accepted engineering practices or treatment that no erosion hazards, slide potential, or possible flood damage are likely to occur, and that riparian vegetation will be protected.

RELEVANT CODE CHANGES PROPOSED IN EXHIBIT C (Note, this is City only. Any federal or state permit requirements still apply):

Proposed New FCC 10-7-4:

D. Exemptions:

1. Only the following uses and activities in significant riparian corridors or wetland buffer zones are exempt from these Significant Wetland and Riparian Area Standards, provided: the uses and activities are designed and constructed to minimize intrusion into the buffer zone; disturbed areas are replanted with native vegetation; and all required federal and state permits are obtained:
 - a) Replacement of lawfully created existing structures with structures in the same location that do not disturb additional wetland buffer zone or significant riparian surface area. All Coast Village structures existing on (insert date ordinance is adopted) are grandfathered and qualify as "lawfully created existing structures" for purposes of this subsection. This provision supersedes the provisions for non-conforming structures in FCC 10-8....

- J. **Special provisions for the Munsel Creek Side Channel:** The following special provisions apply to properties in the significant riparian corridor of the Munsel Creek side channel (Reach RMC-Cs in Table 2.2 of the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan). These provisions are in addition to, or provide relief from, the other standards in this subsection, and, where conflicts exist, this section shall prevail.

1. In addition to the other setback adjustments and Variances allowed by this subsection, a 50% setback adjustment to the required 50-foot significant riparian width for properties along the Munsel Creek side channel will be permitted in order to allow new or expanded development to build up to 25 feet from the top of bank of the creek, as long as any native plants disturbed by the development are replaced elsewhere in the buffer zone, subject to the following exceptions and procedures:
 - a. Properties in Florentine Estates PUD that were granted a reduced setback by the Planning Commission prior to the (inset date of this ordinance) are deemed to comply with the standards in this subsection and do not need to apply for this setback adjustment.
 - b. The setback adjustment for other affected properties shall be granted through the Administrative Review process in 10-1-1-6.
 - c. The applicant shall be granted the setback reduction upon demonstration that any native vegetation displaced by the development shall be replanted in the remaining buffer zone (shrub for shrub, tree for tree, etc.).

- d. The applicant is not required to retain a professional for this application but a qualified professional may help a property owner identify displaced native plants and show how they will be replanted. To provide technical assistance, the City will provide the applicant with a native plant guide. Staff from the Siuslaw Watershed Council and Soil and Water Conservation District are available to provide property owners with technical assistance with native plant identification and guidance on replanting.
- K. Setback Adjustments:** The following reductions in setbacks shall be allowed for properties affected by the significant wetland and riparian area standards as set out below.
1. Eligibility for setback adjustment. Property owners affected by these significant wetland and riparian corridor standards shall be eligible for setback adjustments as follows:
 - a. Single family dwellings: when the significant wetland or significant riparian corridor standard or requirement is such that no contiguous space exists outside the setback that allows for a dwelling unit at least 50 feet by 27 feet.
 - b. For the Munsel Creek side channel: the "required setback" for the purpose of eligibility for the setback adjustment is the reduced setback allowed in subsection "J" above.
 2. If the required setback or standard for the significant wetland or riparian corridor is such that no contiguous space exists outside the setback that allows for a dwelling unit at least 50 feet by 27 feet, then a primary dwelling, this size or less, shall be permitted to intrude into the setback area in accordance with the standards of this subsection. Any Code requirements of the applicable zoning district (such as required garages) that would necessitate intrusion into additional riparian area shall not apply.
 3. If the proposed primary dwelling will be more than 20 feet from a significant or wetland or stream, the adjustment application shall use the Administrative Review process in FCC 10-1-1-6.
 4. If a proposed primary dwelling will be built within 20 feet of a significant wetland or stream, a Hardship Variance from the Planning Commission shall be required in accordance with Florence City Code Title 10 Chapter 4.
- L. Hardship Variances:** A variance to the provisions of this subsection shall be granted by the Planning Commission in accordance with the procedures in Florence City Code Title 10 Chapter 4 only as a last resort and is only considered necessary to allow reasonable economic use of the subject property. The property must be owned by the applicant and not created after the effective date of this title.
1. Eligibility. An application for a hardship variance from the provisions of this subsection shall be available upon demonstration of the following conditions:
 - a. Siting of a primary dwelling 50 feet by 27 feet or less requires intrusion into the significant wetland buffer zone or significant riparian corridor within 20 feet of a significant wetland or stream; or
 - b. Strict adherence to the applicable standards or requirements of this subsection would effectively preclude a use of the parcel that could be reasonably expected to occur in the zone and that the property owner would be precluded a substantial property right enjoyed by the majority of landowners in the vicinity.
 - c. Due to unique circumstances and historic development patterns outside the control of the property owners, the Variance fee for this application shall be waived for affected Coast Village properties....

RELEVANT PROPOSED AMENDMENTS TO FCC TITLE 10, CHAPTER 1: ZONING ADMINISTRATION

FCC 10-1-4: DEFINITIONS

- UNBUILDABLE.** Lots that are rendered "unbuildable" by the required setback for significant wetlands and riparian areas.
- a) For single family housing, lots are considered unbuildable if the required setback for the significant wetland or riparian area is such that no contiguous space exists outside the setback that allows for a dwelling unit at least 50 feet by 27 feet.¹
 - b) For all properties, lots are deemed unbuildable if strict adherence to the applicable setback standards and conditions would effectively preclude a use of the parcel that could be reasonably expected to occur in the zone and that the property owner would be precluded a substantial property right enjoyed by the majority of landowners in the vicinity.
 - c) For the Munsel Creek side channel (Reach RMC-Cs in the 2013 City of Florence Significant Wetlands and Riparian Corridors Plan in Appendix 5 of the Comprehensive Plan), the "required setback" for the purpose of the unbuildable definition, is the reduced setback allowed in FCC Title 10 Chapter 7.

EXCERPTS FROM THE ESEE ANALYSIS REGARDING THE MUNSEL CREEK SIDE CHANNEL:

"Fish biologists from ODFW, NMFS, and one of the at-large Directors of the Florence Salmon and Trout Enhancement Program (STEP) agreed in written email communications that "Munsel Creek and the side channel are both considered as critical habitat for Oregon Coast coho salmon (a federally listed threatened species) and are important to the conservation and recovery of this species;" and they concurred with the NMF's recommendation that this side channel reach and its riparian be declared as significant and protected with a 50-foot riparian setback." They determined that Munsel Creek side channel is important rearing habitat for coho salmon. Available information about the Munsel Creek side channel is from field visits and inventory assessments at several locations plus statements submitted by Jeff Young, National Marine Fisheries Service Fish Biologist; John Spangler, Oregon Department of Fish and Wildlife Fish Biologist; and Bill Hennig, Salmon and Trout Enhancement Program (STEP), community stakeholder, below.

Comments by Bill Hennig, Florence STEP Group:

"Adult coho will enter Munsel Creek in the fall, usually in October when rainfall is enough to provide access to the stream from the estuary. The adult migration period will extend into early January if there are late rains or very cold stream temperatures. There are several artificial gravel placement sites in Munsel Creek and Ackerley Creek where coho will spawn and produce some juveniles. Juvenile coho will spend their first summer and

¹ Note: A 50 foot by 27 foot area allows the siting of a typical double-wide manufactured home, a form of affordable housing.

following winter in freshwater habitats rearing before becoming smolts and migrating to the ocean in their second spring. Juveniles in the lake habitats will spend the same time period in fresh water but will not need to seek out slow water habitat for winter rearing as those in Munsel Creek will need to do. Beginning in early May coho juveniles will smolt and migrate to the estuary for several weeks of rearing before entering the open ocean. The smolt migration period lasts for a couple months.

We have captured a couple of non-fin-clipped coho juveniles in Munsel Creek so there is confirmed production occurring from the spawning channels but the level of production is unknown. We also have a fair number of non-fin-clipped adults moving into the system. I would expect these adults to be a combination of production from the spawning channels in the Munsel system and strays from other streams.

The steelhead follow much the same pattern but are several months later."

Comments by Jeff Young, Fishery Biologist, National Marine Fisheries Service
Habitat Conservation Division, Oregon Coast Branch:

"Yesterday (3/13/12), Clarence and I visited Munsel Creek and the RMC side channel. Based on what I saw of the side channel and the information that we gathered, it is rearing habitat for ESA-listed Oregon Coast coho salmon and juvenile coho salmon are using it for rearing purposes. This side channel riparian corridor provides cover and food for coho salmon and contributes to habitat complexity, which is important for coho salmon. This side channel and its riparian area are important to the growth and survival of coho salmon (as well as other fish and wildlife species) in the Munsel Creek drainage. Therefore, I recommend that this side channel reach and its riparian be declared as significant and protected with a 50-foot riparian setback.

While I did not specify the type of rearing habitat (winter or summer) for Oregon Coast coho salmon, I am in agreement with everything that John said. I do have a little to add to my earlier e-mail. When Oregon Coast coho salmon were listed under Endangered Species Act, NMFS also designated critical habitat and Munsel Creek was included in this designation. Therefore, Munsel Creek and the side channel are both considered by NMFS as critical habitat for Oregon Coast coho salmon and are important to the conservation and recovery of this species. Munsel Creek and the side channel are also designated as essential fish habitat (EFH) for coho salmon under the Magnuson-Stevens Fishery and Conservation Management Act."

Comments by John Spangler, Assistant District Fish Biologist
ODFW Midcoast Fish District, Florence Field Office:

"The side channel is likely not summer habitat for juvenile coho given low stream levels but rather winter rearing habitat. This type of habitat is in short supply for coho so it makes the side channel an important habitat feature within the Munsel Cr. system. The limiting factors for Oregon Coastal Coho is primarily stream complexity and winter habitat. From a fish habitat perspective this habitat type needs protection so it can function as winter rearing habitat for coho and cutthroat. The rest of the wetlands and riparian corridor are also important for other species of wildlife, amphibians and food production for fish."

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