Oregon
Theodore R. Kulongoski, Governor

Department of Land Conservation and Development
635 Capitol Street NE, Suite 150
Salem, Oregon 97301-2524
Phone: (503) 373-0050
First Floor/Costal Fax: (503) 378-6033
Second Floor/Director's Office: (503) 378-5518
Web Address: http://www.oregon.gov/LCD

NOTICE OF ADOPTED AMENDMENT

August 14, 2006

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

FROM: Mara Ulloa, Plan Amendment Program Specialist

SUBJECT: Tillamook County Plan Amendment
DLCD File Number 002-06

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: August 28, 2006

This amendment was submitted to DLCD for review 45 days 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.

*<u>NOTE:</u> **THE 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.**

Cc: Doug White, DLCD Community Services Specialist
Laren Woolley, DLCD Regional Representative
Paul Klarin, DLCD Coastal Policy Analyst
Lisa Phipps, Tillamook County

<paa> ya

FORM 2

D L C D NOTICE OF ADOPTION

This form must be mailed to DLCD within 5 working days after the final decision per ORS 197.610, OAR Chapter 660 - Division 18

(See reverse side for submittal requirements)

Jurisdiction: Tillamook County Local File No.: OA-06-01 (If no number, use none)

Date of Adoption: August 2, 2006 (Must be filled in) Date Mailed: August 7, 2006 (Date mailed or sent to DLCD)

Date the Notice of Proposed Amendment was mailed to DLCD: March 24, 2006

XX Comprehensive Plan Text Amendment
XX Comprehensive Plan Map Amendment
___ Land Use Regulation Amendment
___ Zoning Map Amendment
___ New Land Use Regulation
___ Other: _____ (Please Specify Type of Action)

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

Tillamook County updated Goal 16. All of the dredged material disposal sites were reviewed. Those sites that passed the screening protocol were re-characterized. The sites then were reviewed by various agency personnel utilizing their regulatory standards. Based on public testimony the Board added additional sites. Elements in Goals 17 and 18 were also updated to reflect the changes in Goal 16; typos were corrected

Describe how the adopted amendment differs from the proposed amendment. If it is the same, write "Same." If you did not give notice for the proposed amendment, write "N/A."

6 additional sites were added to the inventory; 2 priority sites and 4 reserve sites.

Plan Map Changed from: current status to reflect the new sites with new ~~numbering~~

Zone Map Changed from: _____ to _____

Location: Tillamook Bay and Nehalem Bay Acres Involved: _____

Specify Density: Previous: _____ New: _____

Applicable Statewide Planning Goals: Goals 16, 17, 18

Was an Exception Adopted? Yes: ____ No: XX not at this juncture

DLCD File No.: 002-06 (15115)

Did the Department of Land Conservation and Development **receive** a notice of Proposed Amendment **FORTY FIVE (45) days prior to the first evidentiary hearing**. Yes: XX No: ____

If no, do the Statewide Planning Goals apply. Yes: ___ No: ____

If no, did The Emergency Circumstances Require immediate adoption. Yes: ___ No: ____

Affected State or Federal Agencies, Local Governments or Special Districts: DLCD, ODFW, DSL, USACE, USFWS, OPRD, DEQ, Port of Garibaldi, Port of Nehalem, NOAA

Local Contact: Lisa Phipps Area Code + Phone Number: 503-842-3408

Address: 201 Laurel Avenue City: Tillamook

Zip Code+4: 97141 Email Address: lphipps@co.tillamook.or.us

ADOPTION SUBMITTAL REQUIREMENTS

This form **must be mailed** to DLCD **within 5 working days after the final decision**
per ORS 197.610, OAR Chapter 660 - Division 18.

1. Send this Form and **TWO (2) Copies** of the Adopted Amendment to:

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

2. Submit **TWO (2) copies** the adopted material, if copies are bounded please submit **TWO (2) complete copies** of documents and maps.

3. Please Note: Adopted materials must be sent to DLCD not later than **FIVE (5) working days** following the date of the final decision on the amendment.

4. Submittal of this Notice of Adoption must include the text of the amendment plus adopted findings and supplementary information.

5. The deadline to appeal will not be extended if you submit this notice of adoption within five working days of the final decision. Appeals to LUBA may be filed within **TWENTY-ONE (21) days** of the date, the "Notice of Adoption" is sent to DLCD.

6. In addition to sending the "Notice of Adoption" to DLCD, you must notify persons who participated in the local hearing and requested notice of the final decision.

7. **Need More Copies?** You can copy this form on to 8-1/2x11 green paper only ; or call the DLCD Office at (503) 373-0050; or Fax your request to:(503) 378-5518; or Email your request to Mara.Ulloa@state.or.us - ATTENTION: PLAN AMENDMENT SPECIALIST.

FORM 1

D L C D NOTICE OF PROPOSED AMENDMENT

This form must be received by DLCD at least 45 days prior to the first evidentiary hearing
per ORS 197.610, OAR Chapter 660 - Division 18
and Senate Bill 543 and effective on June 30, 1999.
(See reverse side for submittal requirements)

DEPT OF
AUG 08 2006
LAND CONSERVATION
AND DEVELOPMENT

Jurisdiction: Tillamook County Local File No.: _____ (If no number, Use none)

Date of **First Evidentiary Hearing**: 5/11/06 (Must be filled in) Date of Final Hearing: 6/14/06 (Must be filled in)

Date this proposal was sent or mailed: 3/24/06 (Date mailed or sent to DLCD) 9:30

Has this proposal previously been submitted to DLCD? Yes: ___ No: X Date: _____

X Comprehensive plan Text Amendment X Comprehensive Plan Map Amendment

____ Land Use regulation Amendment ____ Zoning Map Amendment

____ New Land Use regulation ____ Other: _____ (Please Specify Type of Action)

Briefly Summarize the proposal. Do not use technical terms. Do not write "See Attached."

Tillamook County is reviewing and updating Goal 16 Dredged Material Disposal Plan and sites.

Plan Map Changed from: current status to be determined

Zone Map Changed from: _____ to _____

Location: Tillamook Bay and Nehalem Bay Acres Involved: _____

Specified Change in Density: Current: _____ Proposed: to be determined

Applicable Statewide Planning Goals: 16, 17, 18

Is an Exception Proposed? Yes: ___ No: X

Affected State or Federal Agencies, Local Governments or Special Districts: DLCD ODFW DSL, USACE, USFWS, OPRD, Port of Garibaldi, Port of Nehalem

Local Contact: Lisa Phipps Area Code + Phone Number: 503 842 3408

Address: 201 Laurel Ave City: Tillamook

Zip Code + 4: 97141 Email Address: lphipps@co.tillamook.or.us

DCLD No: _____

SUBMITTAL REQUIREMENTS

This form must be received by DLCD at least 45 days prior to the first evidentiary hearing
per ORS 197.610, OAR Chapter 660 - Division 18
and Senate Bill 543 and effective on June 30, 1999.

1. Send this Form and TWO (2) Copies of the Proposed Amendment to:

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

2. Unless exempt by ORS 197.610 (2), proposed amendments must be **received** at the **DLCD's SALEM OFFICE** at least **FORTY-FIVE (45) days before the first evidentiary hearing on the proposal.** The **first evidentiary hearing** is usually the **first public hearing** held by the jurisdiction's planning commission on the proposal.

3. Submittal of proposed amendments shall include the text of the amendment and any other information the local government believes is necessary to advise DLCD of the proposal. "Text" means the specific language being added to or deleted from the acknowledged plan or land use regulations. A general description of the proposal is not adequate.

4. Submittal of proposed "map" amendments must include a map of the affected area showing existing and proposed plan and zone designations. The map should be on 8-1/2 x 11 inch paper. A legal description, tax account number, address or general description is not adequate. Text of background and / or reason for change request should be included.

5. Submittal of proposed amendments which involve a goal exception must include the proposed language of the exception.

6. **Need More Copies?** You can copy this form on to 8-1/2x11 green paper only ; or call the DLCD Office at (503) 373-0050; or Fax your request to:(503) 378-5518; or email your request to Mara.Ulloa@state.or.us - ATTENTION: PLAN AMENDMENT SPECIALIST.

BEFORE THE BOARD OF COMMISSIONERS

OF TILLAMOOK COUNTY, OREGON

In the matter of a request to amend the Tillamook County Comprehensive Plan Ordinance #32 (including maps) to amend Goal 16, Element 3 (Dredged Material Disposal Plan) for the Tillamook and Nehalem Bays and associated elements in Goals 17 and 18 to maintain consistency; and include typographical edits to Goal 16. The map designations of each site are: 3N 10W 23AC 100, 3N 10W 23AC 1900, 3N 10W 35 303, 3N 10W 27 380, 3N 10W 35 301, 3N 10W 35 202, 1N 10W 22A 201, 1S 10W 14 100, 1S 10W 23 900, 1S 10W 26 802, 1S 10W 26 2400, 3N 10W 27AC 801, 3N 10W 32 200, 2N 10W 3 500, 3N 10W 23 600, 3N 10W 23AC 1000, 3N 10W 33 1700, 3N 10W 35 400, 2N 10W 100, 2N 10W 4C 200, 2N 10W 2BC 4700, 2N 10W 2BC 4200, 2N 10W 3 500, 2N 10W 3 1300, 2N 10W 3 900, 1N 10W 27B 900, 2N 10W 9CC 4400, 2N 10W 17 106, 2N 10W 17 105, 2N 10W 17 100, 1N 10W 4300, 1N 10W 5790, 1N 10W 22A 200, 1N 10W 5780, 1N 10W 21D 400, 1N 10W 21D 500, 1N 10W 22A 400, 1N 10W 21D 200, 1N 10W 21BD 12300, 1N 10W 21D 200, 1N 10W 34B 600, 1N 10W 34AC 901, 1N 10W 31D 100, 1N 10W 34DB 4100, 1N 10W 34DB 7700, 1S 10W 11 300, 1S 10W 11A 2100, 1S 10W 22DA 600, 1S 10W 22DA 100, 1S 10W 22DA 200, and 3N 10W 27 500.

FINDINGS OF FACTS, CONCLUSIONS, AND ORDER

OA-06-01

This matter came before the Tillamook County Board of Commissioners at the request of the Department of Community Development, applicant. The subject properties are designated as referenced above.

The Board of Commissioners being fully apprised of the representations of the above-named applicant, records and files in this matter finds as follows:

(1) The files in this proceeding can be found in the office of the Department of Community Development under Ordinance Amendment OA-06-01.

(2) Notice of the proposed action was submitted to the Department of Land Conservation and Development on March 24, 2006.

(3) The Tillamook County Planning Commission held a public hearing for this request on June 8, 2006. The hearing was noticed in a proper manner according to the requirements of ORS 197 and 215. After reviewing the staff report containing findings of fact and conclusions, testimony and the file for OA-06-01, the Planning Commission found the

application met the criteria and recommended to the Tillamook County Board of Commissioners to adopt Ordinance Amendment OA-06-01 with the following motions:

a) Based on public testimony and the staff report, the Planning Commission recommends to the County Commissioners to accept the recommended sites as listed in the Staff Report OA-06-01(Requesting approval to amend the Tillamook County Comprehensive Plan Ordinance #32 to amend Goal 16, Element 3 (Dredged Material Disposal Plan) for the Tillamook and Nehalem Bays and associated elements in Goals 17 and 18 to maintain consistency; will include typographical edits to Goal 16 (Exhibit A). The map designations of each site are: 3N 10W 23AC 100, 3N 10W 23AC 1900, 3N 10W 35 303, 3N 10W 27 380, 3N 10W 35 301, 3N 10W 35 202, 1N 10W 22A 201, 1S 10W 14 100, 1S 10W 23 900, 1S 10W 26 802, 1S 10W 26 2400, 3N 10W 27AC 801, 3N 10W 32 200, 2N 10W 03 500, 3N 10W 23 600, 3N 10W 23AC 1000, 3N 10W 33 1700, 3N 10W 35 400, 2N 10W 100, 2N 10W 04C 200, 2N 10W 02BC 4700, 2N 10W 02BC 4200, 2N 10W 03 500, 2N 10W 03 1300, 2N 10W 03 900, 1N 10W 27B 900, 2N 10W 09CC 4400, 2N 10W 17 106, 2N 10W 17 105, 2N 10W 17 100, 1N 10W 4300, 1N 10W 5790, 1N 10W 22A 200, 1N 10W 5780, 1N 10W 21D 400, 1N 10W 21D 500, 1N 10W 22A 400, 1N 10W 21D 200, 1N 10W 21BD 12300, 1N 10W 21D 200, 1N 10W 34B 600, 1N 10W 34AC 901, 1N 10W 31D 100, 1N 10W 34DB 4100, 1N 10W 34DB 7700, 1S 10W 11 300, 1S 10W 11A 2100, 1S 10W 22DA 600, 1S 10W 22DA 100, 1S 10W 22DA 200, and 3N 10W 27 500, Tillamook County, applicant, and include Nehalem Site 17 as a reserve site and encourage staff to recommend to the County Commissioners to retain as many others of the existing sites as reserve sites as feasible.

b) Encourage the County Commissioners to explore the possibility of new disposal sites to clarify the dredging issue in Tillamook County and that they approve an advisory group and further study whatever means necessary to continue looking into that issue.

(4) The Board of County Commissioners opened a de novo public hearing on the Ordinance Amendment on June 21, 2006. The hearing was continued to June 28, 2006. The hearing was properly noticed according to the requirements of ORS 197 and 215.

(5) Public testimony raised questions regarding the suitability of additional sites to remain in the inventory.

(6) The Board found that the addition of 3 sites along the Tillamook Bay and 2 sites in addition to the recommendation by the Tillamook County Planning Commission along the Nehalem Bay would provide options for potential projects along those bays;

(7) The Board found that of those sites, Sites N-17 and N-19 should be made priority sites based upon public testimony.

(8) Furthermore, the 6 sites that have been added into the inventory in addition to Staff's recommendations have not been re-characterized. Re-characterization of these sites would be required as part of any permit process to utilize these sites for Dredged Material Disposal.

(9) After reviewing the Planning Commission's recommendation, the staff report containing findings and conclusions, Staff memos, public testimony, the record and file pertaining to OA-06-01, the Board made the following motions:

a) To accept Staff's recommendations in addition to maintaining the following sites: Sites N-14b (renumbered to N-5B), T-6 (renumbered to T-5B), T-7 (renumbered to T-6B), and T-10 (renumbered to T-7B) shall be included as reserve sites and Sites N-17 (renumbered to N-9) and N-19 (renumbered to N-10) will be included as Priority Sites; and Staff is directed to develop the findings and appropriate maps for ratification by the Board.

The decision was unanimous.

b) To approve the changes to the policies in Goals 16, 17, and 18 as stated in the land use request.

This decision was unanimous.

NOW THEREFORE, THE BOARD OF COUNTY COMMISSIONERS OF TILLAMOOK COUNTY, OREGON, ORDERS AS FOLLOWS:

The Tillamook County Comprehensive Plan is hereby amended as shown in Exhibit B, in the form of map changes, and plan and policy amendments to Goals 16, 17, and 18. The record shall identify these changes and filed with the Tillamook County Department of Community Development as OA-06-01, Exhibit A.

DATED THIS 2nd DAY OF August, 2006.

BOARD OF COUNTY COMMISSIONERS

FOR TILLAMOOK COUNTY, OREGON	Aye	Nay	Abstain/Absent
Tim Josi, Chair	✓		
Mark Labhart, Vice-Chair	✓		
Charles Hurliman, Commissioner	✓		

ATTEST: Tassi O'Neil,
County Clerk

Susan L. Becraft
Special Deputy

APPROVED AS TO FORM:

William K. Sargent

BOARD OF COMMISSIONERS, TILLAMOOK COUNTY, STATE OF OREGON

Includes Attachment I

Attachment I

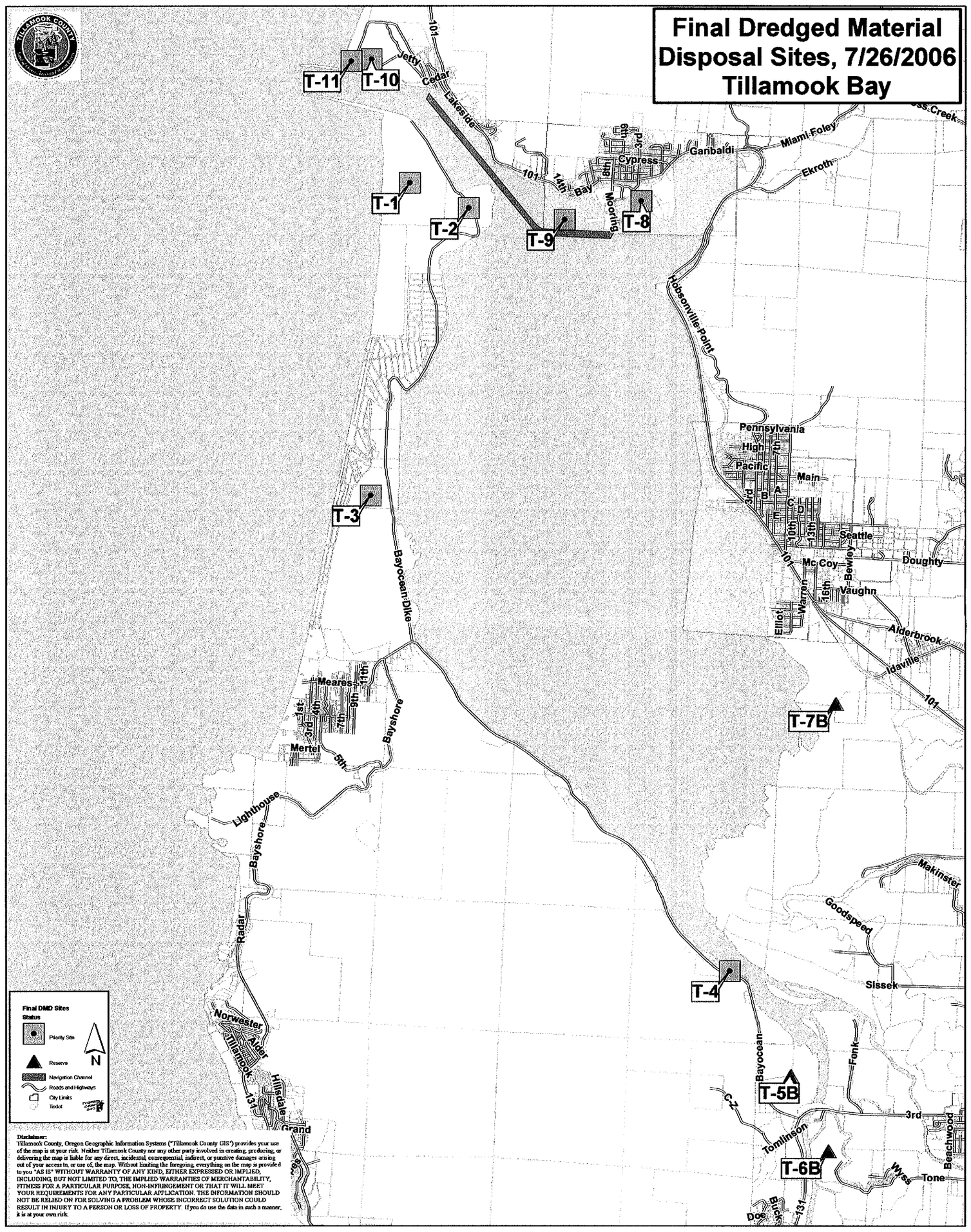
Renumbered Sites
8-2-06
Tillamook Bay

Former Numbering	Current Numbering
T-1	T-1
T-2	T-2
T-3	T-3
T-4	T-4
T-6	T-5B
T-7	T-6B
T-10	T-7B
T-22	T-8
T-30	T-9
T-26	T-10
T-25A	T-11

Nehalem Bay

Former Numbering	Current Numbering
N-1	N-1
N-2	N-2
N-4	N-3
N-11	N-4
N-14B	N-5B
N-14A	N-6
N-15B	N-7B
N-15A	N-8
N-17	N-9
N-19	N-10
N-21	N-11
N-25	N-12
N-26	N-13
N-27	N-14

Final Dredged Material Disposal Sites, 7/26/2006 Tillamook Bay



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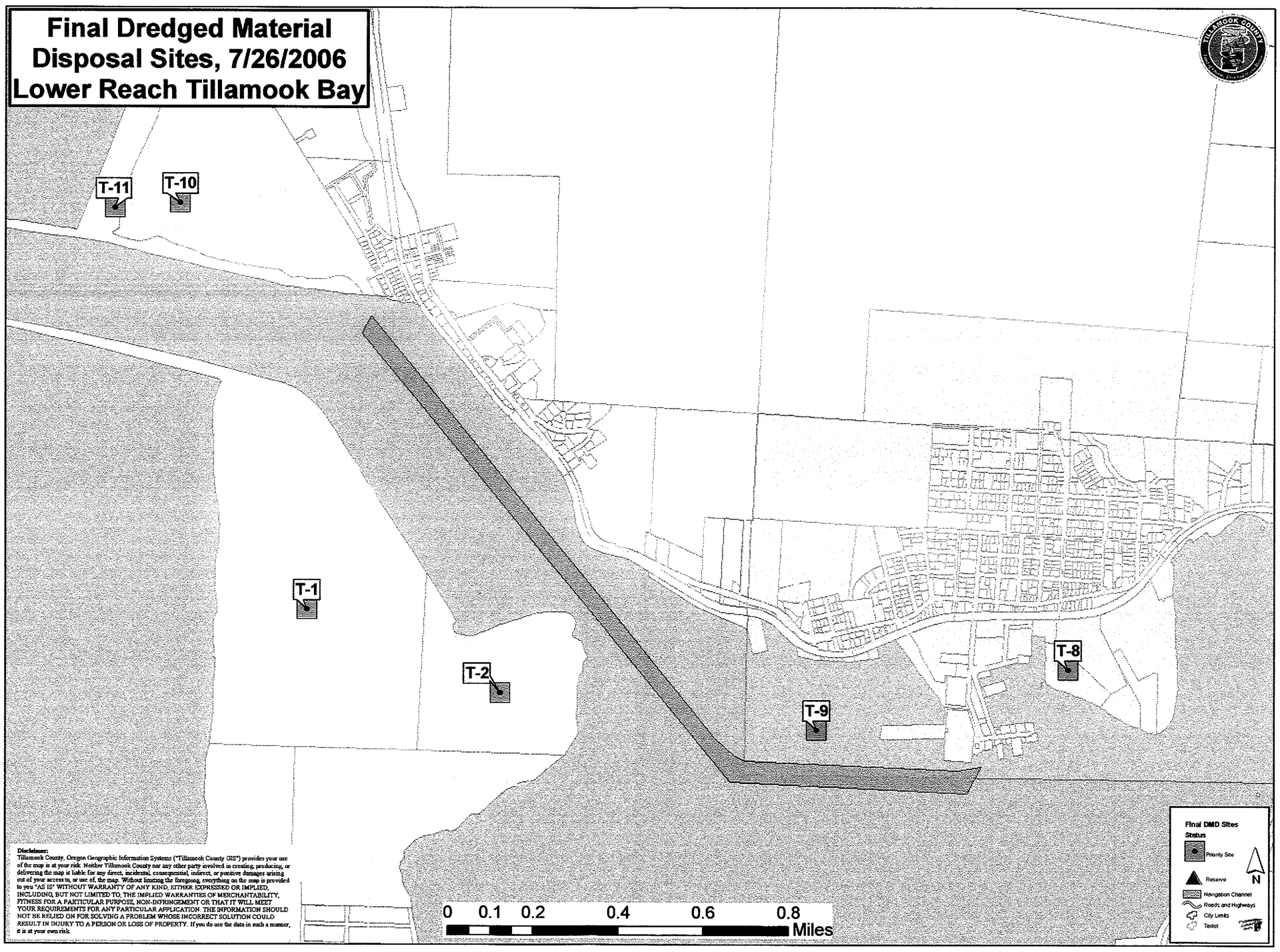
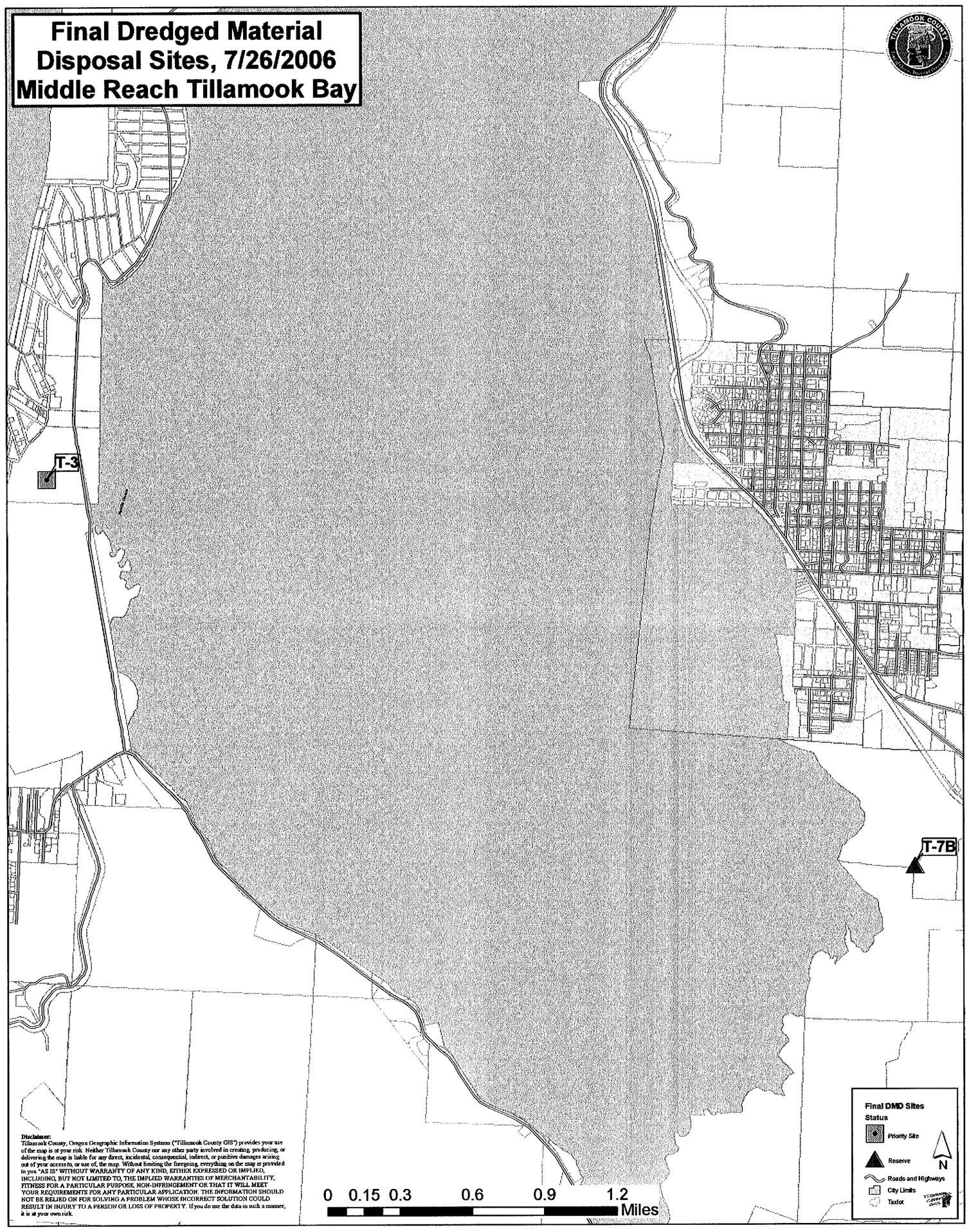
Final Dredged Material Disposal Sites, 7/26/2006 Lower Reach Tillamook Bay



Final Dredged Material Disposal Sites, 7/26/2006 Middle Reach Tillamook Bay



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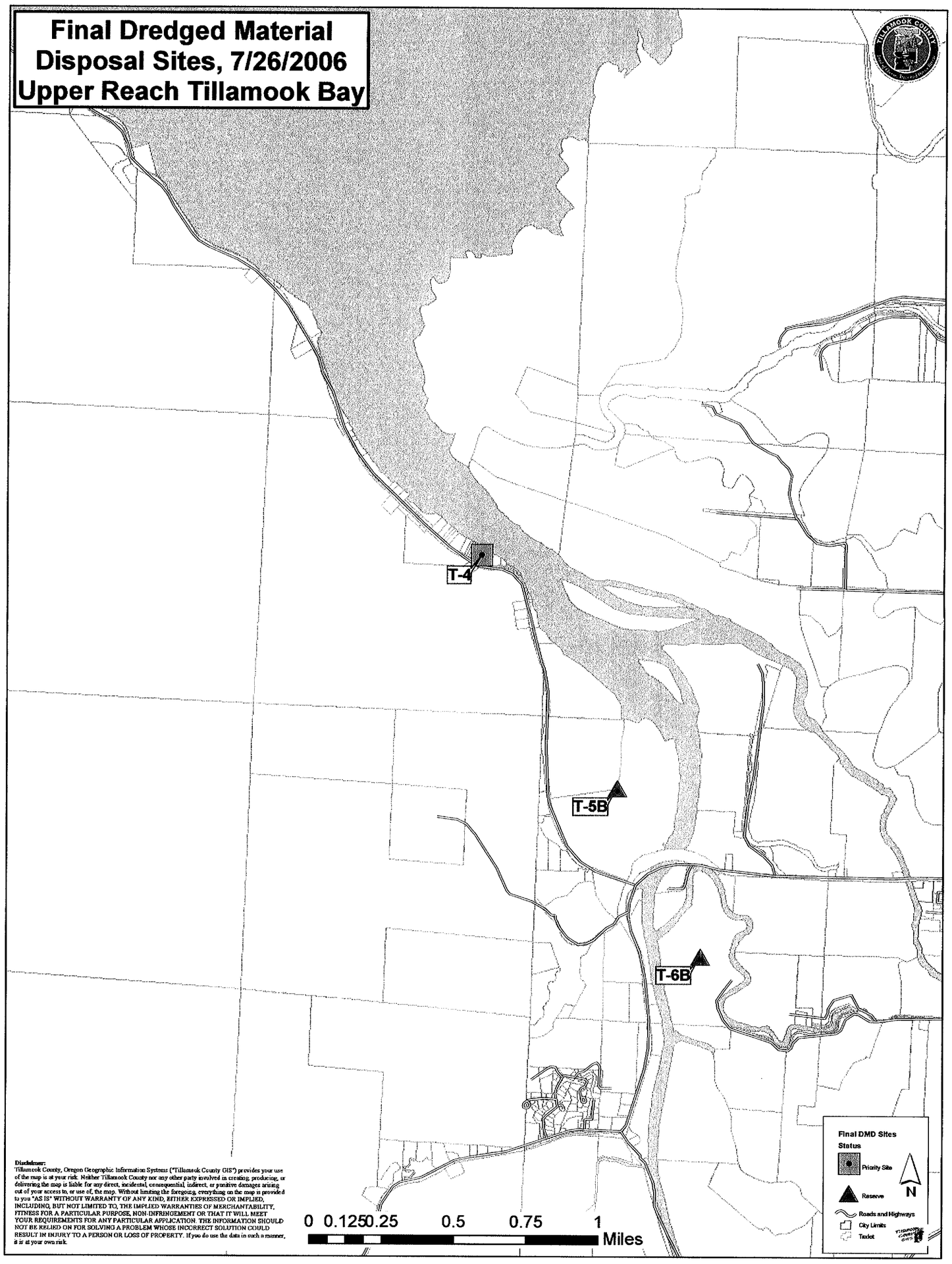
Final Dredged Material Disposal Sites, 7/26/2006 Upper Reach Tillamook Bay



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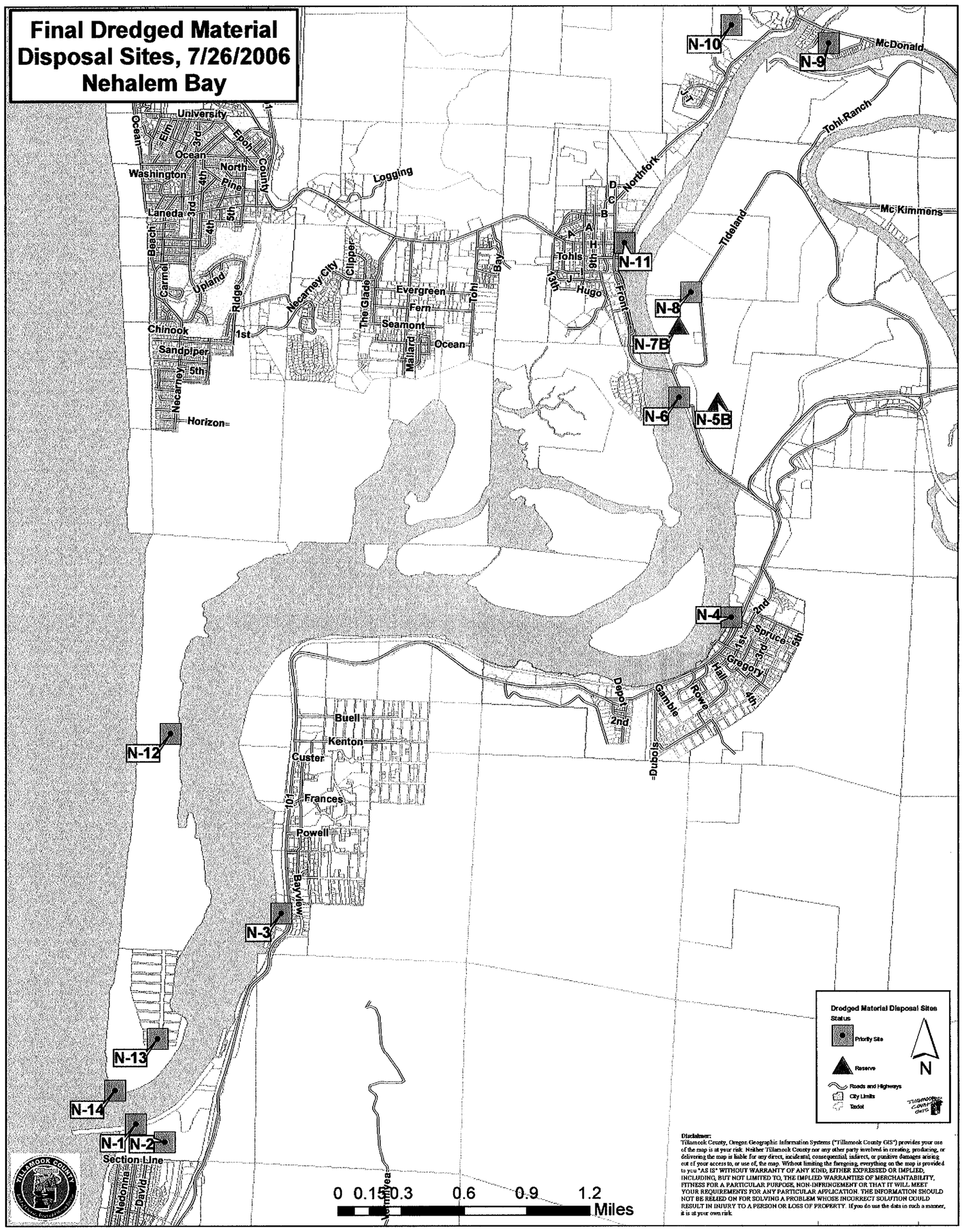
Final Dredged Material Disposal Sites, 7/26/2006 Nehalem Bay



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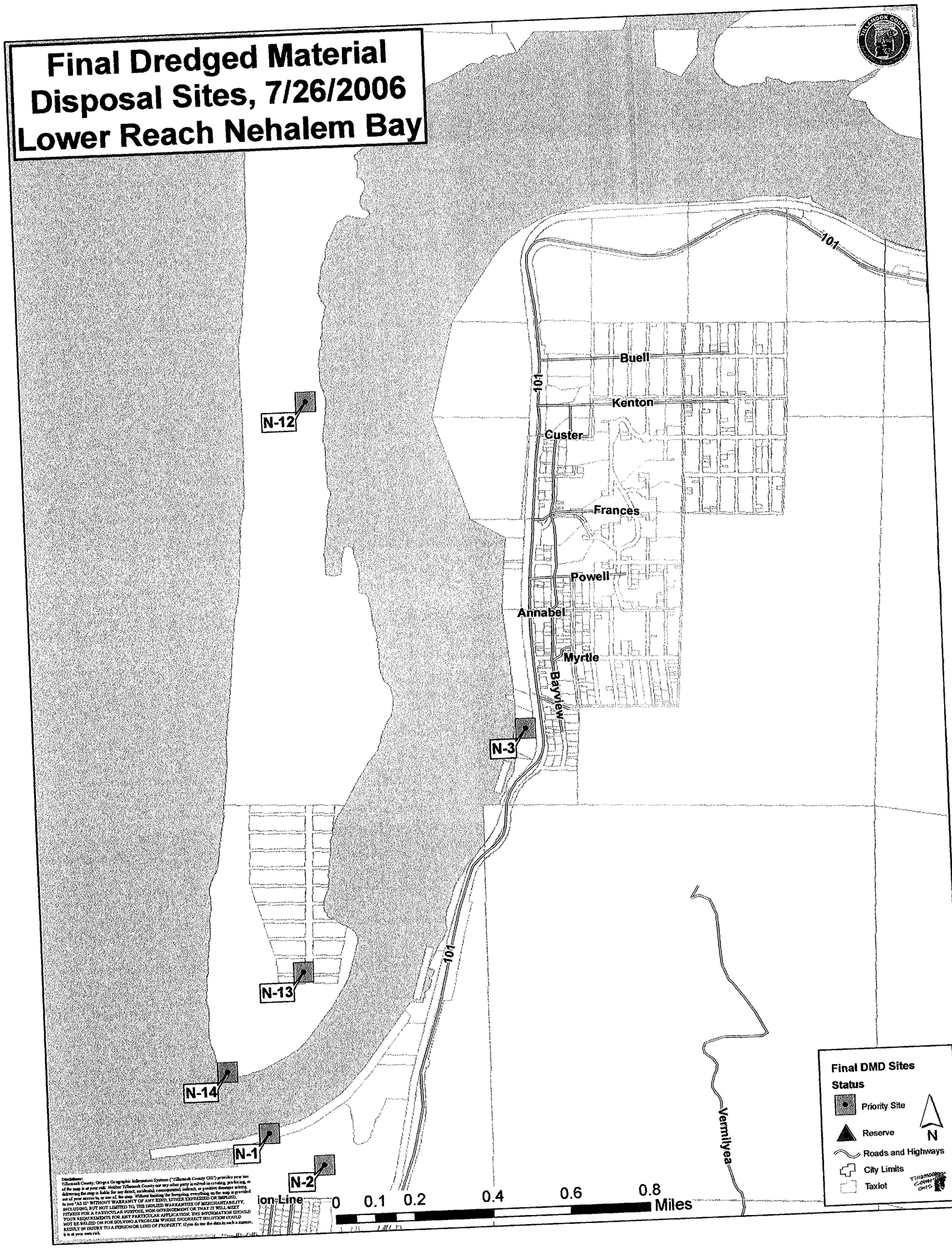
Final Dredged Material Disposal Sites, 7/26/2006 Lower Reach Nehalem Bay



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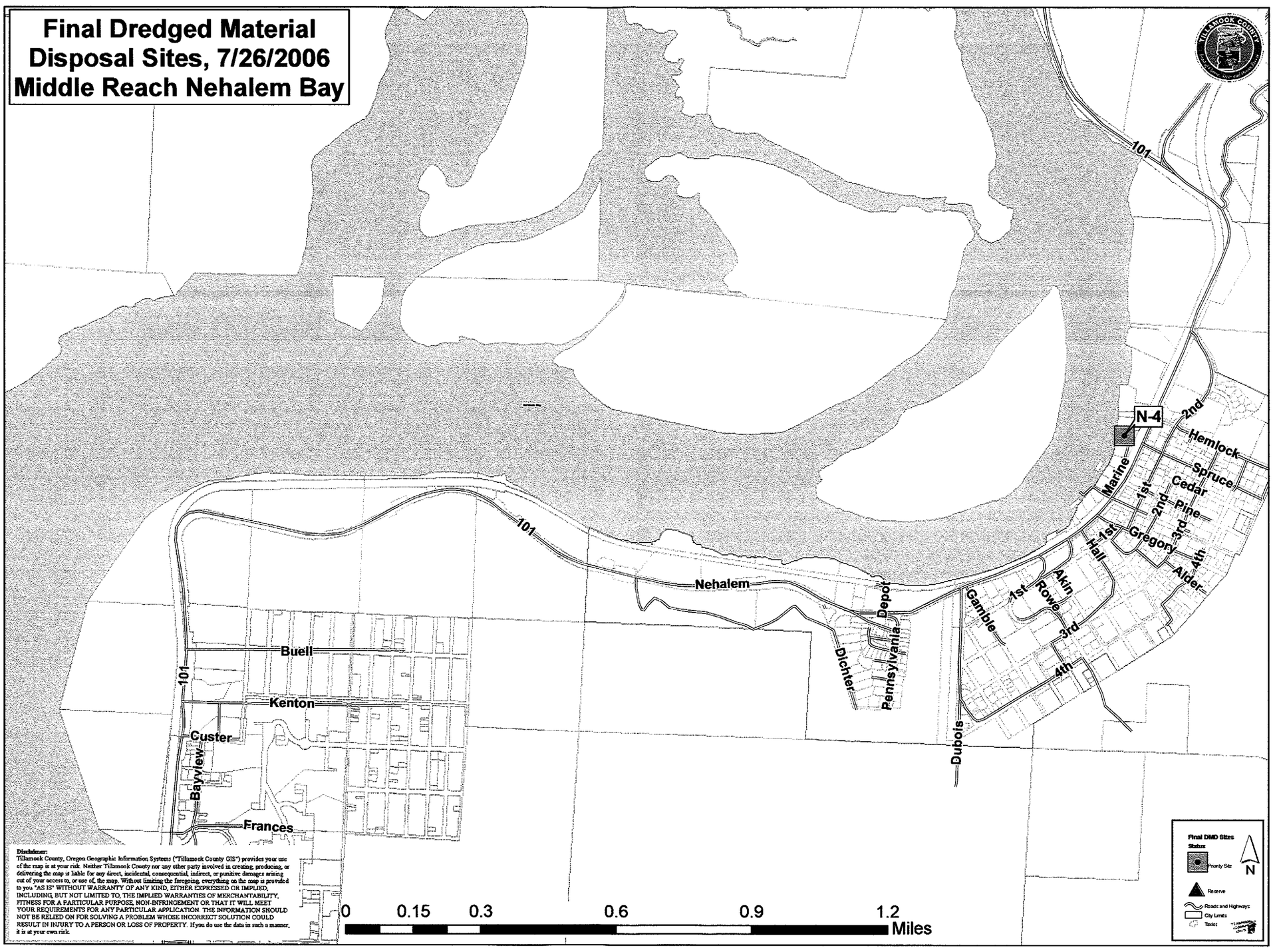
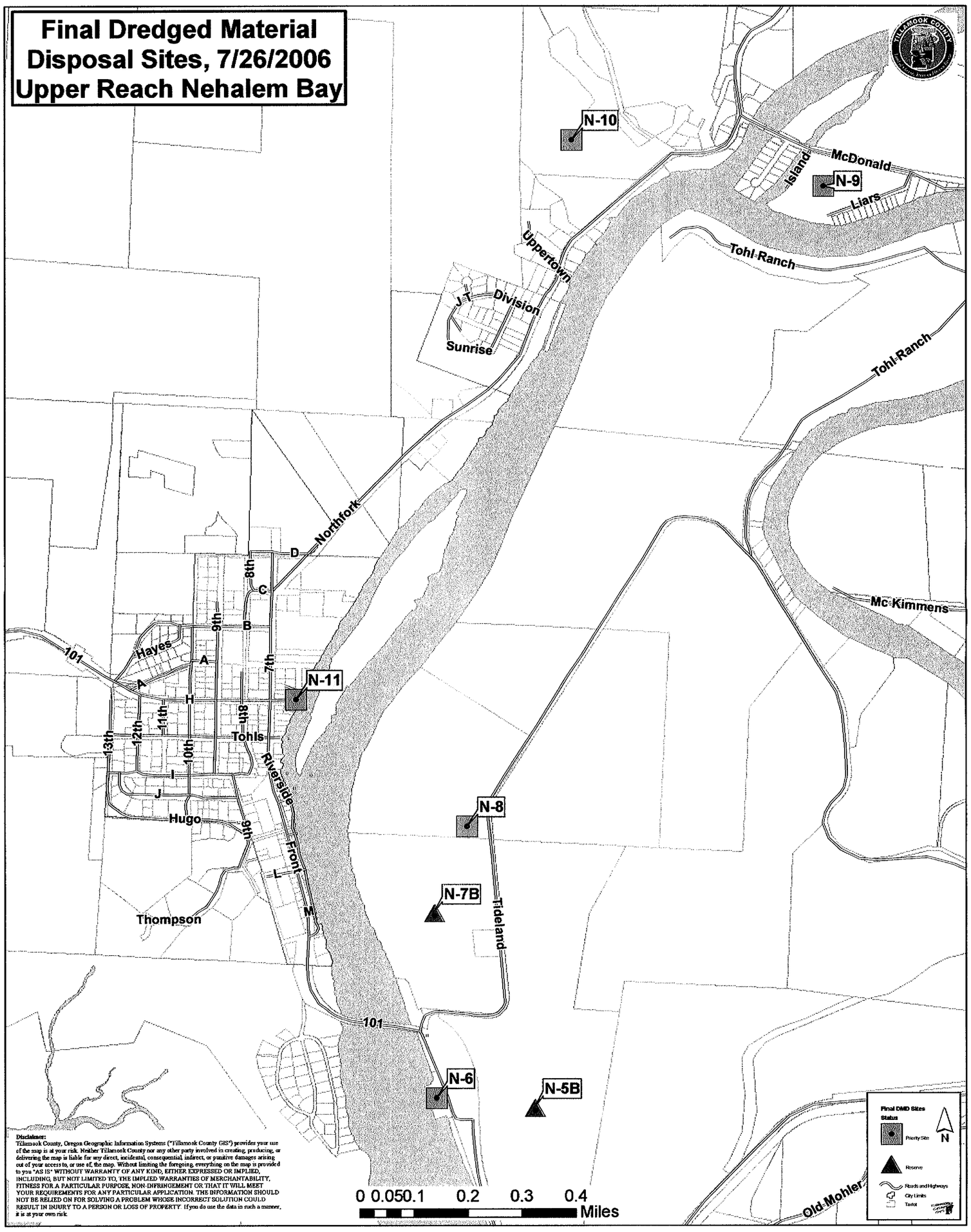
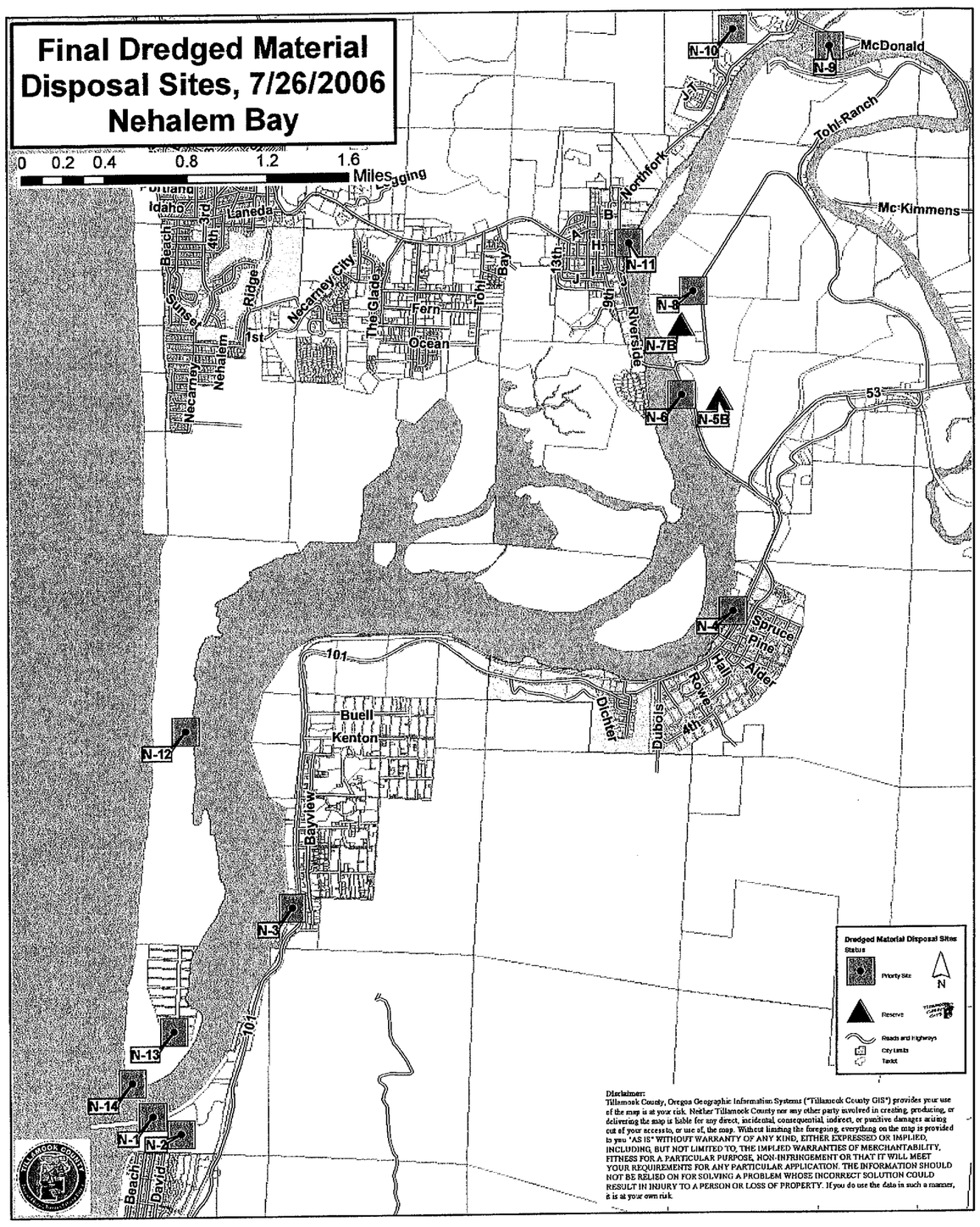
Final Dredged Material Disposal Sites, 7/26/2006 Middle Reach Nehalem Bay



Final Dredged Material Disposal Sites, 7/26/2006 Upper Reach Nehalem Bay




Final Dredged Material Disposal Sites, 7/26/2006 Nehalem Bay
0 0.2 0.4 0.8 1.2 1.6 Miles
N-10
McDonald
N-9
Toft Ranch
Mc Kimmens
Northfork
N-11
N-8
N-7B
N-6
N-5B
53
N-4
Spruce
Pine
Alder
Hall
Rowe
Dicher
Dorris
101
Buell
Kenton
Bayview
N-12
N-3
N-13
N-14
N-1
N-2
Beach
David
Laneda
Idaho
3rd
4th
Beach
Necarney
Nehalem
1st
Ridge
Necarney City
The Glade
Fern
Ocean
Tohl
Bay
13th
9th
Riverside
Dredged Material Disposal Sites
Status
Priority Site
Reserve
Roads and Highways
City Limits
Taxlot
N
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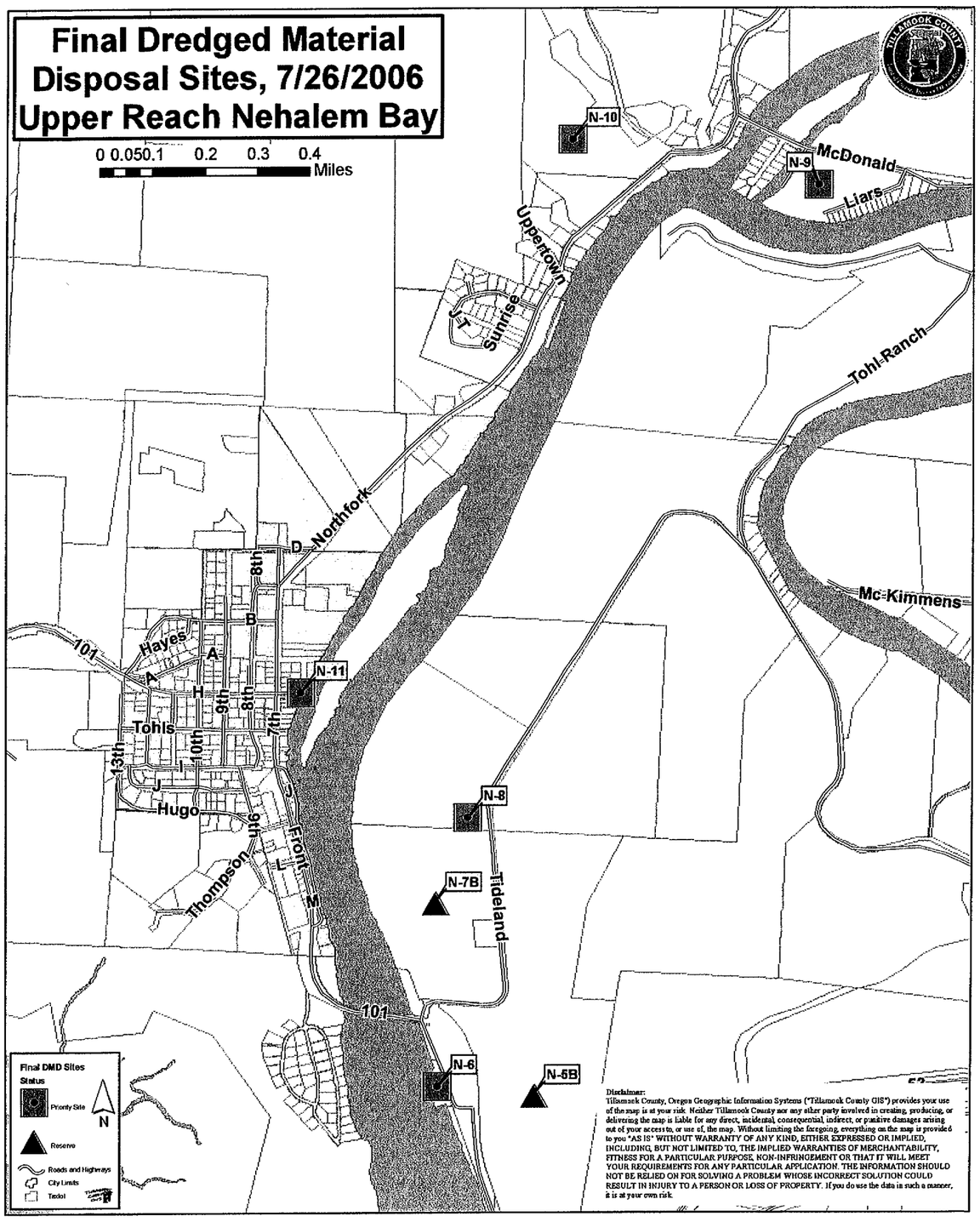
Final Dredged Material
Disposal Sites, 7/26/2006
Upper Reach Nehalem Bay
0 0.050.1 0.2 0.3 0.4
Miles
N-10
N-9
McDonald
Liars
Uppertown
Sunrise
Tohl-Ranch
Mc-Kimmens
D
Northfork
8th
B
Hayes
A
101
A
H
9th
8th
7th
N-11
Tohls
13th
10th
J
Hugo
9th
Front
Thompson
M
N-8
N-7B
Tideland
101
N-6
N-5B
Final DMD Sites
Status
Priority Site
N
Reserve
Roads and Highways
City Limits
Tedol
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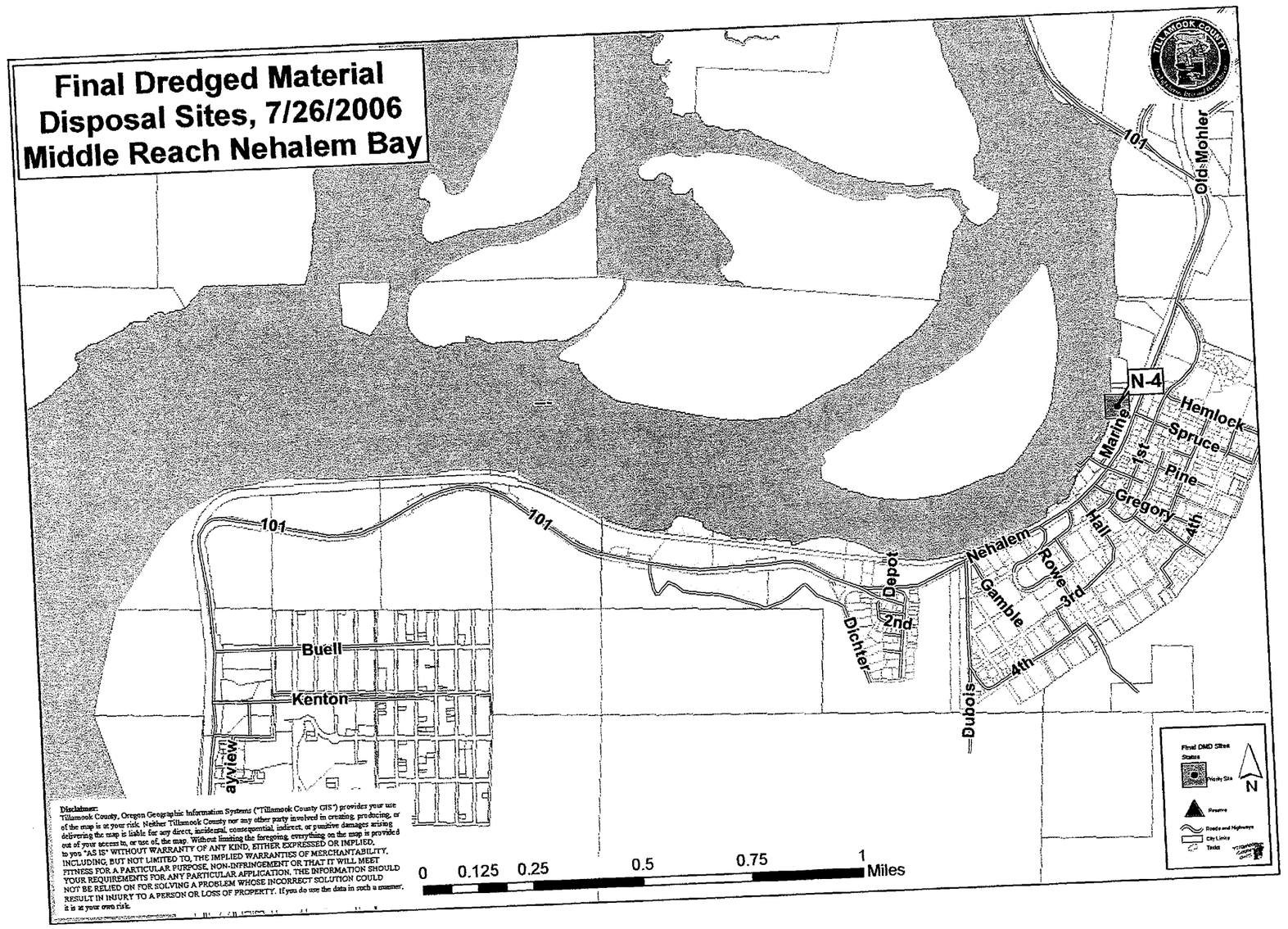
Final Dredged Material
Disposal Sites, 7/26/2006
Middle Reach Nehalem Bay
101
Old Mohler
N-4
Hemlock
Spruce
Pine
Gregory
Marine
1st
Hall
4th
Nehalem
Roweena
3rd
Gamble
4th
Depot
2nd
Dichter
Dubois
Buell
Kenton
Bayview
Final DMD Sites
Status
Pacific Site
Preserve
Roads and Highways
City Limits
Tides
N
0 0.125 0.25 0.5 0.75 1
Miles
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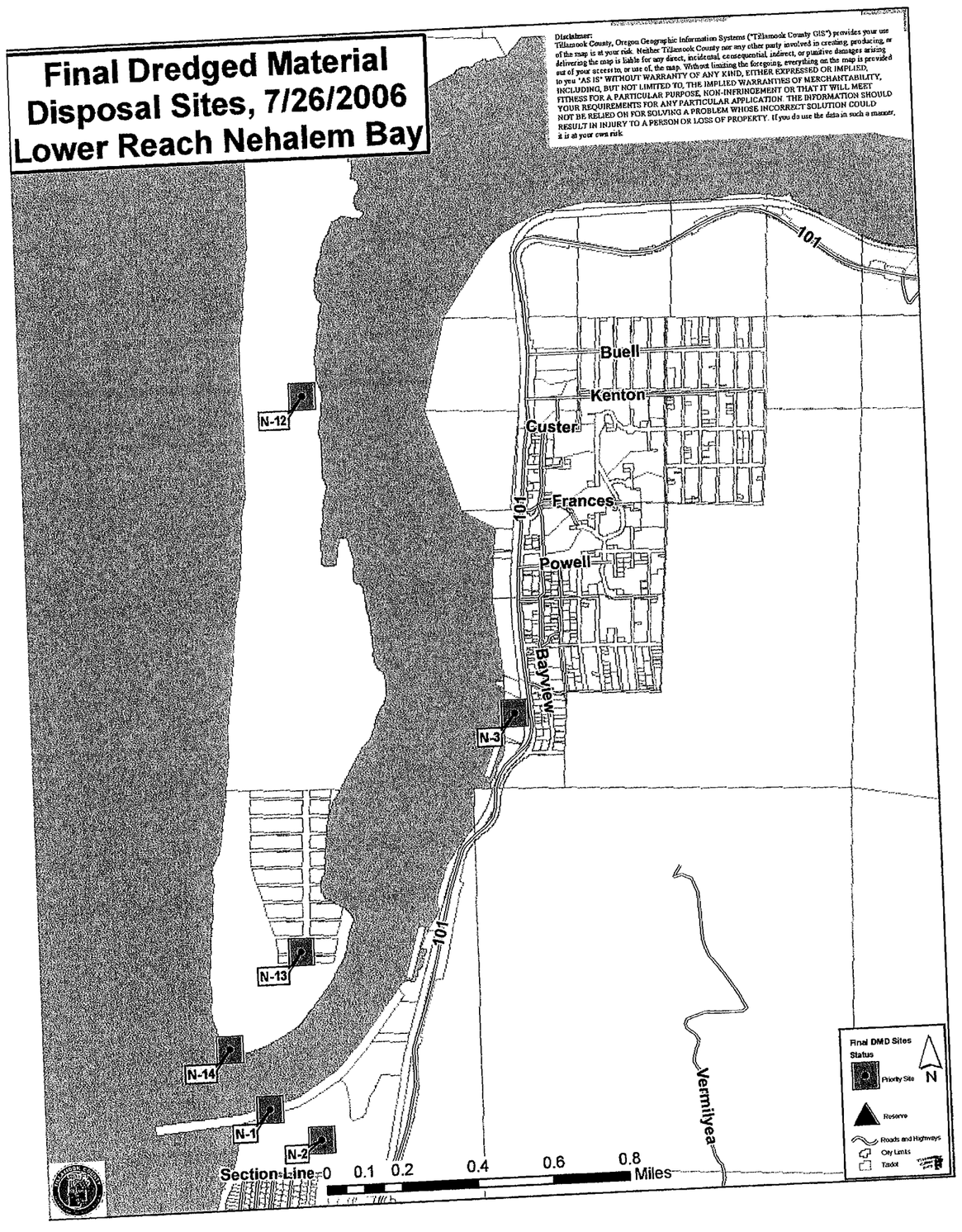
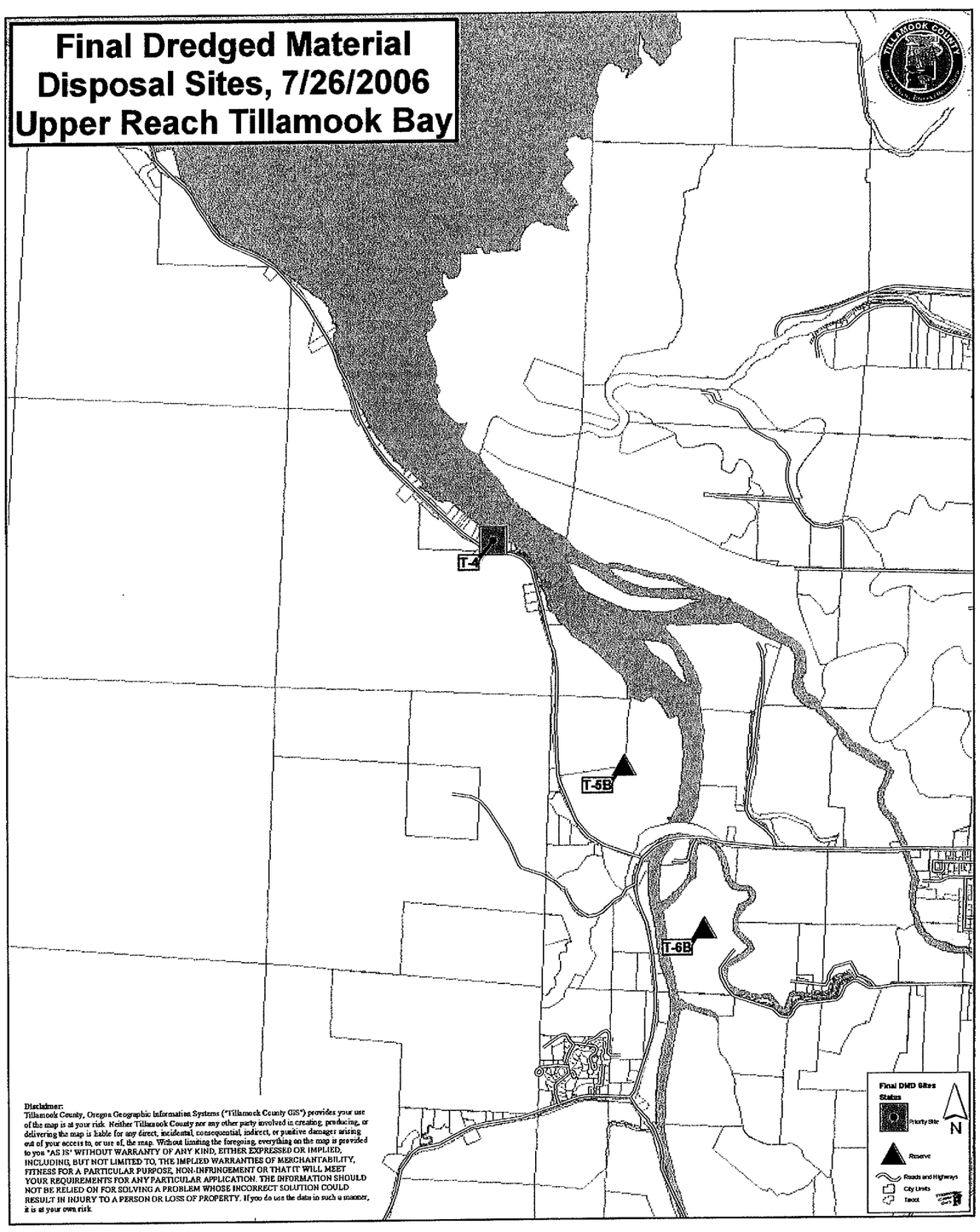
Final Dredged Material Disposal Sites, 7/26/2006 Lower Reach Nehalem Bay




Final Dredged Material
Disposal Sites, 7/26/2006
Upper Reach Tillamook Bay
T-4
T-5B
T-6B
Final DMD Sites
Status
Priority Site
Reserve
Roads and Highways
City Limits
Tract
N
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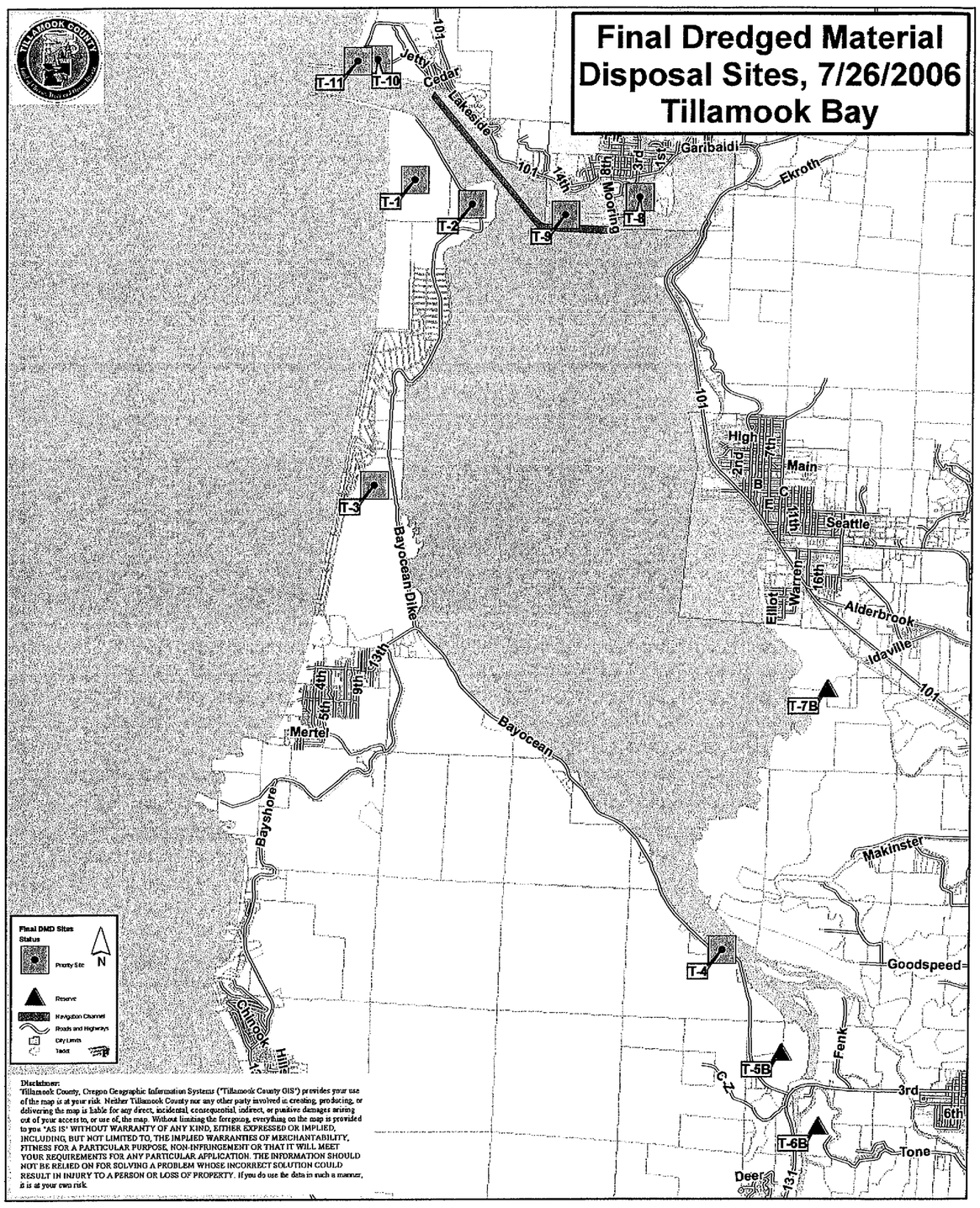
Final Dredged Material Disposal Sites, 7/26/2006 Tillamook Bay
T-11
T-10
T-1
T-2
T-9
T-8
T-3
T-4
T-7B
T-5B
T-6B
101
Jetty
Cedar
Lakeside
10th
14th
Garibaldi
Ekroth
Moorings
1st
High
2nd
Main
B
C
11th
Seattle
Warren
16th
Alderbrook
Idaville
Elliott
Bayocean Dike
13th
Mertel
Bayocean
Bayshore
Makinster
Goodspeed
Fenk
3rd
6th
Tone
Deer
131
Chinook Hill
Final DMD Sites
Status
Priority Site
Reserve
Navigation Channel
Roads and Highways
City Limits
Tract
N
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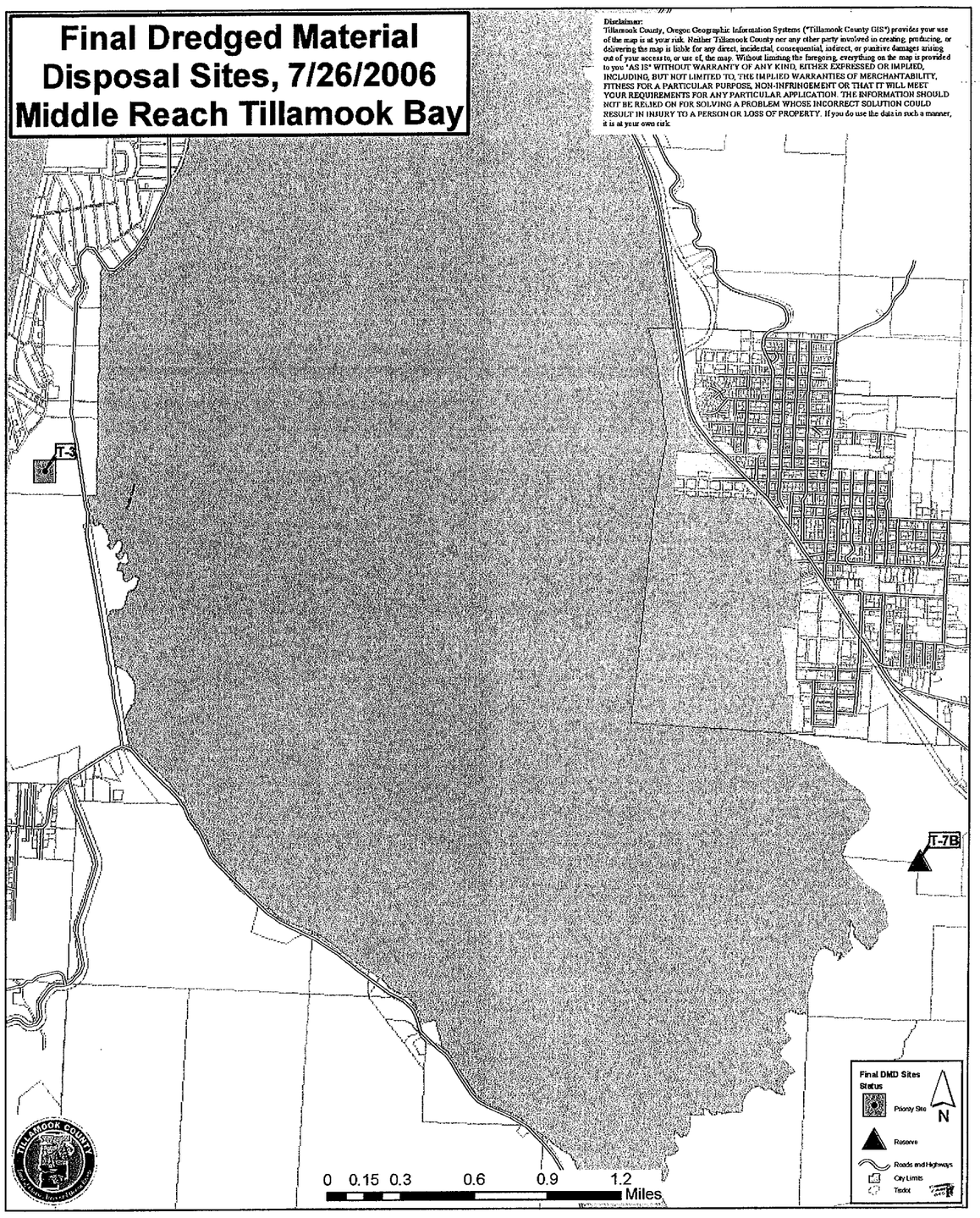
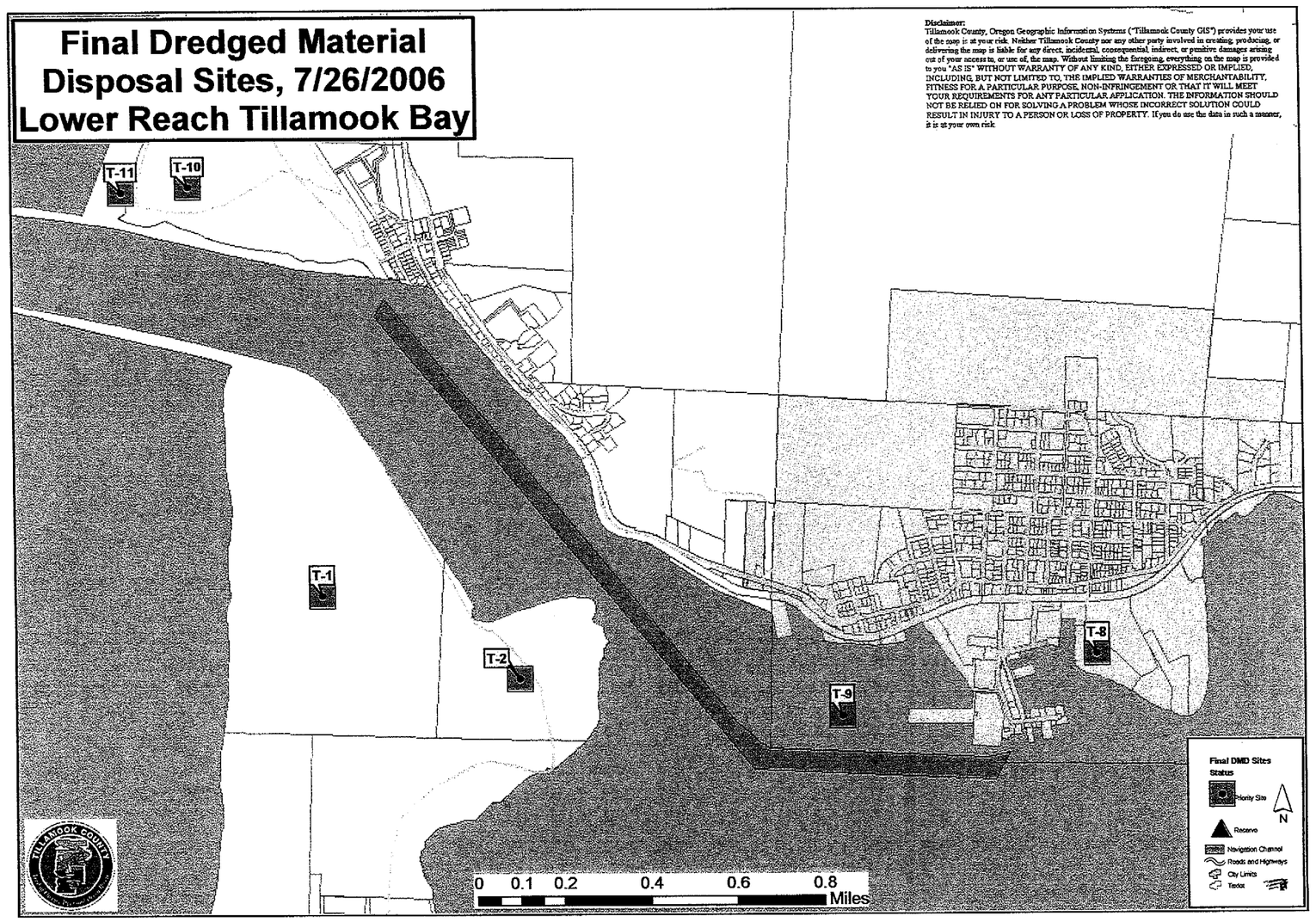
Final Dredged Material Disposal Sites, 7/26/2006 Middle Reach Tillamook Bay




Final Dredged Material Disposal Sites, 7/26/2006 Lower Reach Tillamook Bay
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T-11
T-10
T-1
T-2
T-9
T-8
0 0.1 0.2 0.4 0.6 0.8
Miles
Final DMD Sites
Status
Newly Site
Reserve
Navigation Channel
Roads and Highways
City Limits
Texas
N

Tillamook County

DEPARTMENT OF COMMUNITY DEVELOPMENT
BUILDING, PLANNING & ON-SITE SANITATION SECTIONS

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Tillamook, Oregon 97141

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Planning (503) 842-3408
On-Site Sanitation (503) 842-3409
FAX (503) 842-1819
Toll Free 1 (800) 488-8280

COMPREHENSIVE PLAN and MAP AMENDMENT
OA-06-01
Goal 16, Dredged Material Disposal Plan Element

STAFF REPORT DATE: June 1, 2006
PLANNING COMMISSION HEARING DATES: June 8, 2006
BOARD OF COUNTY COMMISSIONERS HEARING DATE: June 21, 2006

Report Prepared By: Lisa M. Phipps, Coastal Resource Planner, CFM

I. GENERAL INFORMATION:

Land Use Action: The request is a quasi-judicial action to amend the Comprehensive Plan Ordinance No. 32, to update and revise the Dredged Material Disposal Plan contained in the Goal 16 element of the Tillamook County Comprehensive Plan; to revise associated policies within Goals 17 and 18 of the Tillamook County Comprehensive Plan; and to correct typographical errors in Goal 16.

Location: The sites are located on the parcels designated as The map designations of each site are: 3N 10W 23AC 00100, 3N 10W 23AC 01900, 3N 10W 35 00303, 3N 10W 27 00380, 3N 10W 35 00301, 3N 10W 35 00202, 1N 10W 22A 00201, 1S 10W 14 00100, 1S 10W 23 00900, 1S 10W 26 00802, 1S 10W 26 02400, 3N 10W 27AC 00801, 3N 10W 32 00200, 2N 10W 03 00500, 3N 10W 23 00600, 3N 10W 23AC 01000, 3N 10W 33 01700, 3N 10W 35 00400, 2N 10W 00100, 2N 10W 04C 00200, 2N 10W 02BC 04700, 2N 10W 02BC 04200, 2N 10W 03 00500, 2N 10W 03 01300, 2N 10W 03 00900, 1N 10W 27B 00900, 2N 10W 09CC 04400, 2N 10W 17 00106, 2N 10W 17 00105, 2N 10W 17 00100, 1N 10W 04300, 1N 10W 05790, 1N 10W 22A 00200, 1N 10W 05780, 1N 10W 21D 00400, 1N 10W 21D 00500, 1N 10W 22A 00400, 1N 10W 21D 00200, 1N 10W 21BD 12300, 1N 10W 21D 00200, 1N 10W 34B 00600, 1N 10W 34AC 00901, 1N 10W 31D 00100, 1N 10W 34DB 04100, 1N 10W 34DB 07700, 1S 10W 11 00300, 1S 10W 11A 02100, 1S 10W 22DA 00600, 1S 10W 22DA 00100, 1S 10W 22DA 00200, and 3N 10W 27 00500, Tillamook County, Oregon.

Zone: Dredged Material Disposal Overlay

Applicant: Tillamook County Dept. of Community Development, 201 Laurel Avenue, Tillamook, Oregon 97141

Description of Proposal: The proposal is to update and refine the Dredged Material Disposal Plan element in Goal 16 of the Tillamook County Comprehensive Plan. The County collaborated with the Ports of Garibaldi and Nehalem to contract with Parsons and Brinkerhoff and PBS Engineering and Environmental to review the current Dredged Material Plan. The disposal sites identified for the Tillamook and Nehalem Bays included in the original inventory were reviewed against current local, state, and federal regulations. The purpose of the review was to identify viable dredged material disposal sites from the inventory for future dredging projects within each Bay. The plan currently has 19 sites that were deemed "acceptable" for the Tillamook Bay and 20 sites that were deemed "acceptable" for the Nehalem Bay. Based upon the review by the consultants (Exhibit I) as well as local, state, and federal agency personnel, 8 "priority" sites were identified for the Tillamook Bay and 10 "priority" sites were identified for the Nehalem Bay. A historic site has been recommended for the Tillamook Bay – a flowlane disposal site. The site is currently approved by the US Army Corps of Engineers and was approved through the County's development permit process in 2006. In that process an impact assessment was completed and conditions of approval require monitoring.

Maps which show the proposed changes are included as Exhibit "II" of this report.

II. APPLICABLE ORDINANCE, COMPREHENSIVE PLAN PROVISIONS AND STATE LAW:

1. Implementation Requirements 6 of Statewide Planning Goal 16: Estuarine Resources:
   "Local government and state and federal agencies shall develop comprehensive programs, including site specific sites and procedures for disposal and stockpiling of dredged materials. These programs shall encourage the disposal of dredged material in uplands or ocean waters, and shall permit disposal in estuary waters only where such disposal will clearly be consistent with the objectives of this goal and state and federal laws. Dredged materials shall not be disposed in intertidal or tidal marsh estuarine areas unless part of an approved fill project."

2. Implementation Requirement 3.5C of the Tillamook County Comprehensive Plan Goal 16 provides for Dredged Material Disposal Plan Review:

   "Tillamook County, in conjunction with local ports, The Corps of Engineers and other relevant state and federal resource agencies shall review the dredged material disposal plan if:
   d) a period of five years has elapsed since the last DMD plan review. The first DMD plan review shall be conducted no later than five years after the date of adoption of the Tillamook County Comprehensive Plan."

3. Section 3 of the Tillamook County Comprehensive Plan Goal 16, Dredged Material Disposal Plan Element outlining the purpose, dredging methods and constraints, material characteristics,

engineering criteria, environmental criteria, the Dredged Material Resource Plan, and implementation.

4. Tillamook County Land Use Ordinance Section 9.020: Map Amendment Procedures and 9.030: Text Amendment Procedure, contains the procedures most applicable to a request to amend the Comprehensive Plan and maps. These are addressed in Section III of this report.

III. ORDINANCE AMENDMENT ANALYSIS:

1. The Statewide Planning Goals require that Dredged Material Disposal Plans contain certain elements. The "Dredged Material Disposal Site Evaluation for Tillamook Bay and Nehalem Bay" prepared by Parsons and Brinkerhoff and PBS Engineering and Environmental contains the required analysis of the 35 existing "acceptable" DMD sites throughout the Tillamook and Nehalem Bays. Sites deemed "unacceptable" in the 1984 analysis were automatically excluded from consideration. Based on this 2006 analysis, viable "priority" and "reserve" sites were identified for the Tillamook and Nehalem Bays.

   This was a review of existing sites. Only one new site was proposed – a historic flow lane disposal site in the Tillamook Bay. This site has been approved by all relevant local, state, and federal agencies for a current dredging project for the Port of Garibaldi. The Evaluation identifies environmental limitations on the recommended sites and strategies to minimize impacts. The sites were reviewed by the Oregon Department of Fish and Wildlife (see Exhibit IV), the Oregon Department of State Lands, the Oregon Parks and Recreation Department, the US Army Corps of Engineers, the US Fish and Wildlife Service, the Oregon Department of Land Conservation and Development, the Tillamook Estuaries Partnership, and the Ports of Garibaldi and Nehalem. The Evaluation was also provided to the National Oceanic and Atmospheric Administration –Fisheries, the Oregon Department of Environmental Quality, and the Oregon Department of Geology and Mineral Industries. Public workshops were held in April 2006 in Garibaldi and Nehalem to review the recommended sites for continuing inclusion in the Comprehensive Plan. Two property owners of recommended "reserve" sites requested that their properties be removed from the Inventory (Exhibit VI). Staff recommendations reflect these requests.

2. Section 9.030(4) and (5) require the Department and Commission consider the proposed amendment and the intent of the applicable Comprehensive Plan policies; the intent of the provisions being amended; the affect on land use patterns in the County; the affect on the productivity of resource lands in the County; administration and enforcement; and the benefits or costs to Departmental resources resulting from the proposed amendment. The Commission shall recommend that the Board adopt, adopt with modifications, or not adopt the proposed amendment.

   The intent of the applicable Goal 16 policies is to provide sufficient area for disposal of dredged materials associated with approved dredging projects in the bays. The intent of the update and

revisions is identify viable sites within the two bays for disposal of dredged materials that have minimal environmental impacts, can be permitted under the current local, state, and federal laws, and can provide adequate storage space for future dredging needs.

There will be no affect on land use patterns in the County or on the productivity of resource lands in the County. The recommended sites are already contained within the Comprehensive Plan. Several sites such as the Port of Garibaldi site are currently being used. The lone "reserve" site on the Nehalem Bay will be used only when all other options have been exhausted and will be subject to additional reviews by the agencies. The site will need to be restored.

The recommended changes will not result in any additional impact to administration or enforcement. The recommended changes will result in a refinement of the existing inventory and focus on sites already identified in the plan. Only one new site was added – a historic flowlane disposal site in the Tillamook Bay. This site has been currently approved by the relevant agencies for a dredging project for the Port of Garibaldi. The benefit to the Department is to have clear guidelines for acceptable disposal sites along both Bays. These recommendations do not preclude the use of other sites for disposal of dredged materials. However, any new site will need to be fully evaluated and if the site is proposed for long term storage, may be subject to Goal Exceptions and/or Comprehensive Plan amendments. There will be no negative impacts on code enforcement nor any additional costs incurred by the County to administrate revisions.

Typographical errors were corrected in Goal 16. These are not substantive.

Amendments made to Goals 17 and 18 will improve consistency within the three goals and will have no appreciable impact on land use patterns, productivity of resource lands, administration, enforcement, or costs to the County.

3. Section 9.020(1) and (2) outline the notice requirements and the required analysis of the sites and the surrounding area in the form of a map and report.

   The notice of the proposed amendments were distributed according to the provisions of the Tillamook Land Use Ordinance, Section 10.060.

   This action by the Department is a re-characterization of Dredged Material Disposal Sites contained within the Tillamook County Comprehensive Plan. The maps are being updated to reflect the Evaluation performed by Parsons and Brinkerhoff and PBS Engineering and Environmental. The Evaluation was completed in collaboration with state and federal resource and regulatory agencies. The Ports of Garibaldi and Tillamook were partners in this venture (Exhibit V). Acreage, environmental issues, ownership, aesthetics and land use objectives were considered in the Evaluation. The update does not include new zoning or new sites with the exception of the historically used flow-lane disposal site. Sites were maintained in the Plan based upon the above factors as well as economic and social impacts

Conclusion: Based upon the findings, the update and revision of the Dredged Material Disposal Plan, policies, and associated policies within Goals 17 and 18 for consistency meet the requirements of the Statewide Planning Goals and the Comprehensive Plan.

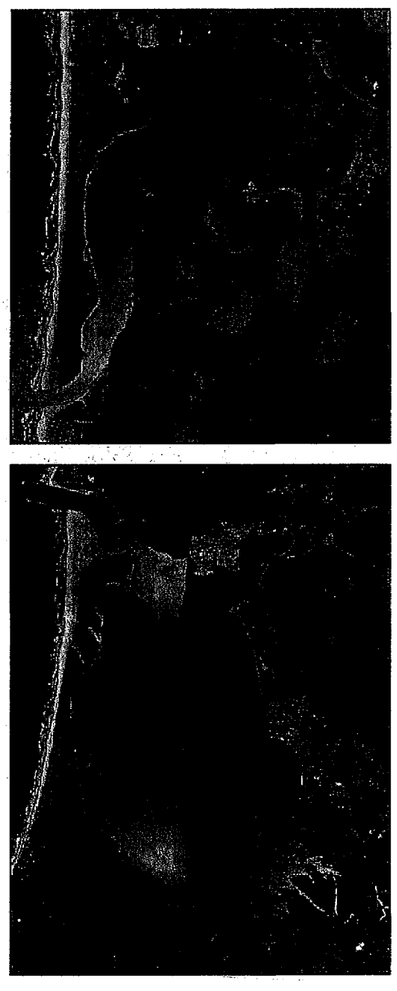
IV. RECOMMENDATION: Based on the findings of fact and other relevant information contained within this report, staff concludes that the revisions to the Dredged Material Disposal Plan element (and associated Goals 17 and 18 policies) meets the requirements of Goal 16 and the Comprehensive Plan, and therefore recommends **APPROVAL** of ordinance amendment request OA-06-01.

V. EXHIBITS:

I. "Dredged Material Disposal Site Evaluation for Tillamook Bay and Nehalem Bay.
II. Proposed Changes to the Comprehensive Plan
III. Proposed Changes to the Associated Maps in the Comprehensive Plan
IV. Agency Comments
V. Public Comments
VI. Property owner requests

Dredged Material Disposal Site Evaluation for Tillamook Bay and Nehalem Bay

Tillamook County, Oregon



Prepared for:

Tillamook County
Port of Garibaldi
Port of Nehalem
Economic Development Council
of Tillamook County

January 2006

Prepared by

PB PARSONS BRINCKERHOFF
PBS
1310 Main Street
Vancouver, WA 98660
360.690.4331 MAIN
360.696.9064 FAX
888.873.7273 TOLL FREE
ENGINEERING AND ENVIRONMENTAL
www.pbsenv.com

EXHIBIT I

Dredged Material Disposal Site Evaluation for Tillamook Bay and Nehalem Bay
Tillamook County, Oregon

Prepared for

Tillamook County
Port of Garibaldi
Port of Nehalem
Economic Development Council of Tillamook County

Prepared by

Ron Rathburn
PBS Engineering and Environmental
1310 Main Street
Vancouver, Washington 98660
(360) 690-4331

Cynthia Lowe, P.E.
Parsons Brinckerhoff
400 S.W. 6th, Suite 802
Portland, Oregon

This project has been funded with Assistance from the Oregon Economic and Community Development Department Port Revolving Fund, under provisions for Port Planning and Marketing, together with assistance from the Port of Garibaldi, Port of Nehalem, Tillamook County Department of Community Development, the Economic Development Council of Tillamook County, and Technical Assistance Funding from the Department of Land Conservation and Development.

January 2006

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APPENDICES

LIST OF FIGURES

TABLES

1.0 INTRODUCTION

PBS Engineering and Environmental (PBS) teamed with Parsons Brinckerhoff to assist Tillamook County in the reevaluation of dredge disposal sites identified within the 1984 version of the Tillamook County Comprehensive Plan (TCCP). This evaluation was deemed necessary to identify acceptable disposal sites to accommodate future dredging needs within the County. Resumes of key members of the technical team for PBS and Parsons Brinckerhoff are presented in Appendix G.

This project, initiated in April 2005, was funded with assistance from the Oregon Economic and Community Development Department Port Revolving Fund, under provisions for Port Planning and Marketing, together with assistance from the Port of Garibaldi, Port of Nehalem, Tillamook County Department of Community Development, the Economic Development Council of Tillamook County, and Technical Assistance Funding from the Department of Land Conservation and Development.

Background. The dredged material disposal plans for Tillamook Bay and Nehalem Bay were adopted in 1984 (Goal 16 Estuarine Resource Section, TCCP) and need updating to reflect the changes in existing environmental regulations, biological sensitivity, economics, and land use. The 1984 TCCP presently identifies 35 sites that were rated as acceptable in Tillamook and Nehalem Bays. Tillamook Bay contains 17 sites rated as acceptable in the 1984 TCCP while Nehalem Bay has 18 acceptable sites. These 35 sites are mainly located on pastures, beaches or sand dunes. A few sites are identified as stockpile or rehandling sites only, and some of the sites are depressions between established structures, such as roads and railroads.

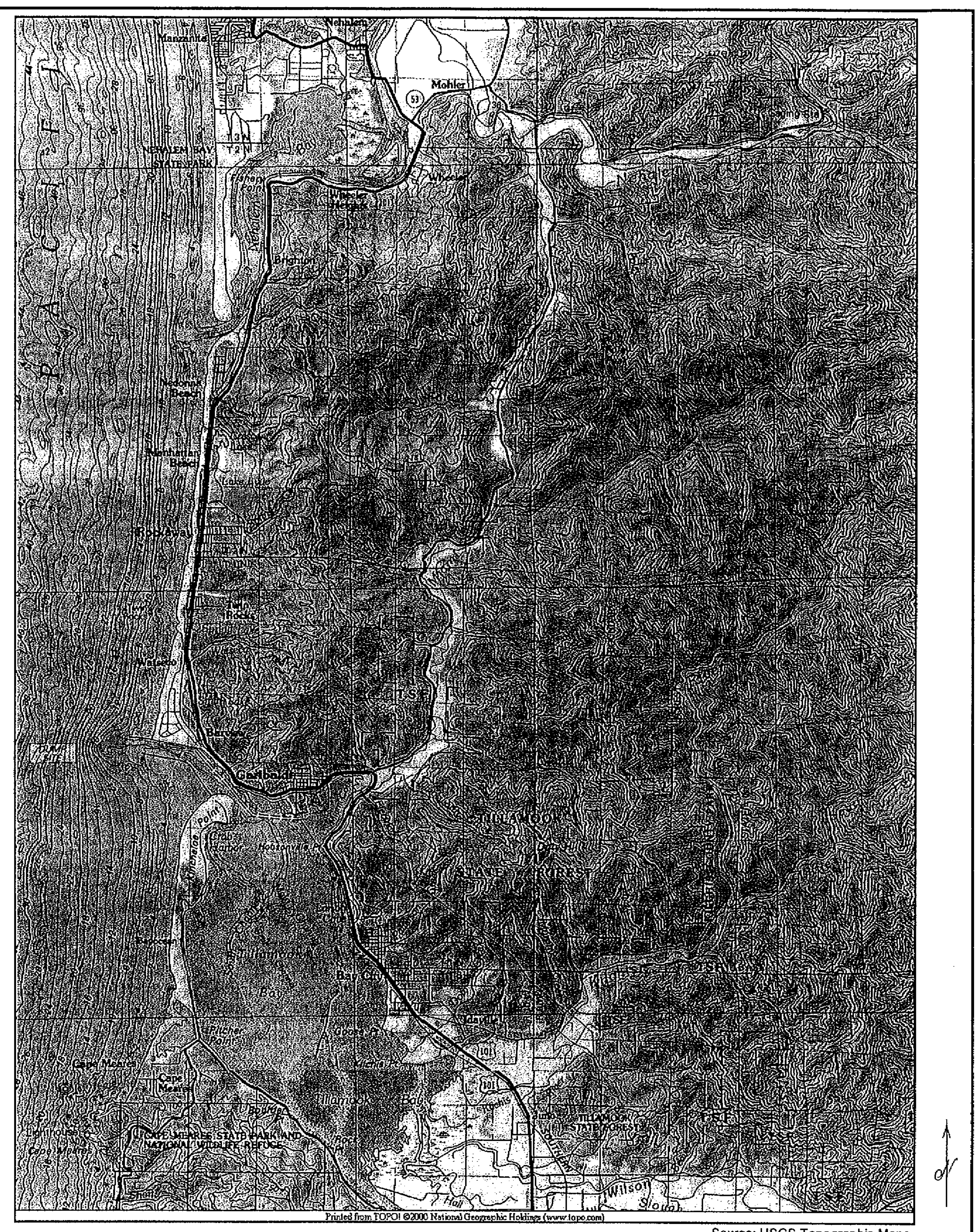
Study Area. This reevaluation of dredged disposal sites included prior disposal sites that were identified either within Tillamook and Nehalem Bays or adjacent to the major riverine drainages that flow into these bays. The general area for these disposal sites is presented in Figure 1.

2.0 METHODOLOGY

This evaluation occurred in three phases that included 1) site screening, 2) site analysis, and 3) site prioritization. The overall analysis of each site included a qualitative evaluation of engineering, economics, land use, resource sensitivity, and permitting considerations.

Prior to the initial site evaluation, a GIS database was developed by Tillamook County for all of the identified disposal sites. This information included 2002 aerial imagery, tax lots, dredged material disposal (DMD) site location, topography, road access, wetlands, floodplains, sensitive species, geologic hazards, and land use. This information will be available for integration into the Tillamook County database to support County permit evaluation.

The site screening phase was intended to identify which of the 35 disposal sites rated acceptable in the 1984 TCCP would be feasible, permittable and represent the least environmental impact to the human and natural environment today. As part of this review, changes in landscape, landform and suitability for use as a DMD site were evaluated. Initial screening factors considered changes in site capacity, distance from dredge location, setback requirements, access via road or right-of-way,



Source: USGS Topographic Maps

PBS Project #: 70384.000 Date: January 2006	Prepared for: Tillamook County Port of Garibaldi Port of Nehalem Economic Development Council of Tillamook County	**Vicinity Map** DMD Site Analysis Tillamook County, Oregon	FIGURE 1

and exclusionary biological or permitting issues. A preliminary site visit was completed to photograph and verify site conditions, property boundaries, and verify any exclusionary information. The detailed screening matrix developed to support the field evaluation is presented in Appendix A and B. Upon completion of the field evaluation during June 2005, initial sites were rejected if resource, engineering, or socio-planning issues were considered a significant deterrent to permitting the site for dredge disposal. As a result of this analysis, the initial 35 sites were reduced to 19 sites that received a detailed field evaluation.

The detailed site analysis of the remaining sites is presented in Appendix C and D. The site analysis included the following: aerial imagery, topography, site location, site boundaries, physical characteristics, (disposal type, capacity, land use, adjacent land use, surface water, impact area, existing terrain), engineering considerations, biological considerations (presence of wetlands and size, habitat type, etc.), economic considerations (construction, maintenance and monitoring costs), permitting considerations and opportunities for beneficial reuse.

Upon completion of the evaluation and prioritization of sites, a few sites, which had previously been rejected during the screening process, were added as reserve sites. These reserve sites were selected to provide additional area within the region of each bay to accommodate future needs.

Based on the criteria discussed above the sites were ranked for dredge material disposal suitability. This site prioritization provided a tool to select optimal disposal areas based upon a numerical analysis of physical, biological, economic, engineering, and permitting considerations. These identified considerations were evaluated from a low to high value and summarized for each site.

Agency Coordination. The coordination of all regulatory agencies within the federal, state, and local jurisdiction was an integral strategy throughout this project. An identification of the participating agencies and staff representatives is presented in Appendix F. Prior to the initiation of the site analysis, an agency coordination meeting was held on May 17 at PBS's Portland office to review the overall evaluation process and obtain feedback regarding the screening matrix and resource sensitivities within the area. The agencies that were contacted included the U.S. Army Corps of Engineers (USACE), U.S. Environmental Protection Agency (EPA), U.S. Fish & Wildlife Service (USFWS), NOAA Fisheries, the Oregon Department of State Lands (DSL), Oregon Department of Environmental Quality (DEQ), Oregon Department of Fish & Wildlife (ODFW), and the Oregon Department of Land Conservation (DLCD), Tillamook Estuaries Partnership, and Oregon State Parks and Recreation. These agencies comprised a working group that was later invited for a field visit to review the recommended updates to the DMD sites. Overall coordination involved: 1) review of sampling design, 2) review of DMD sites via digital imagery and opportunity to identify any sensitive resources within the disposal area, and 3) field verification of consultant evaluation to identify any resource issues that needed to be considered during the permitting process.

3.0 DMD SITE EVALUATION

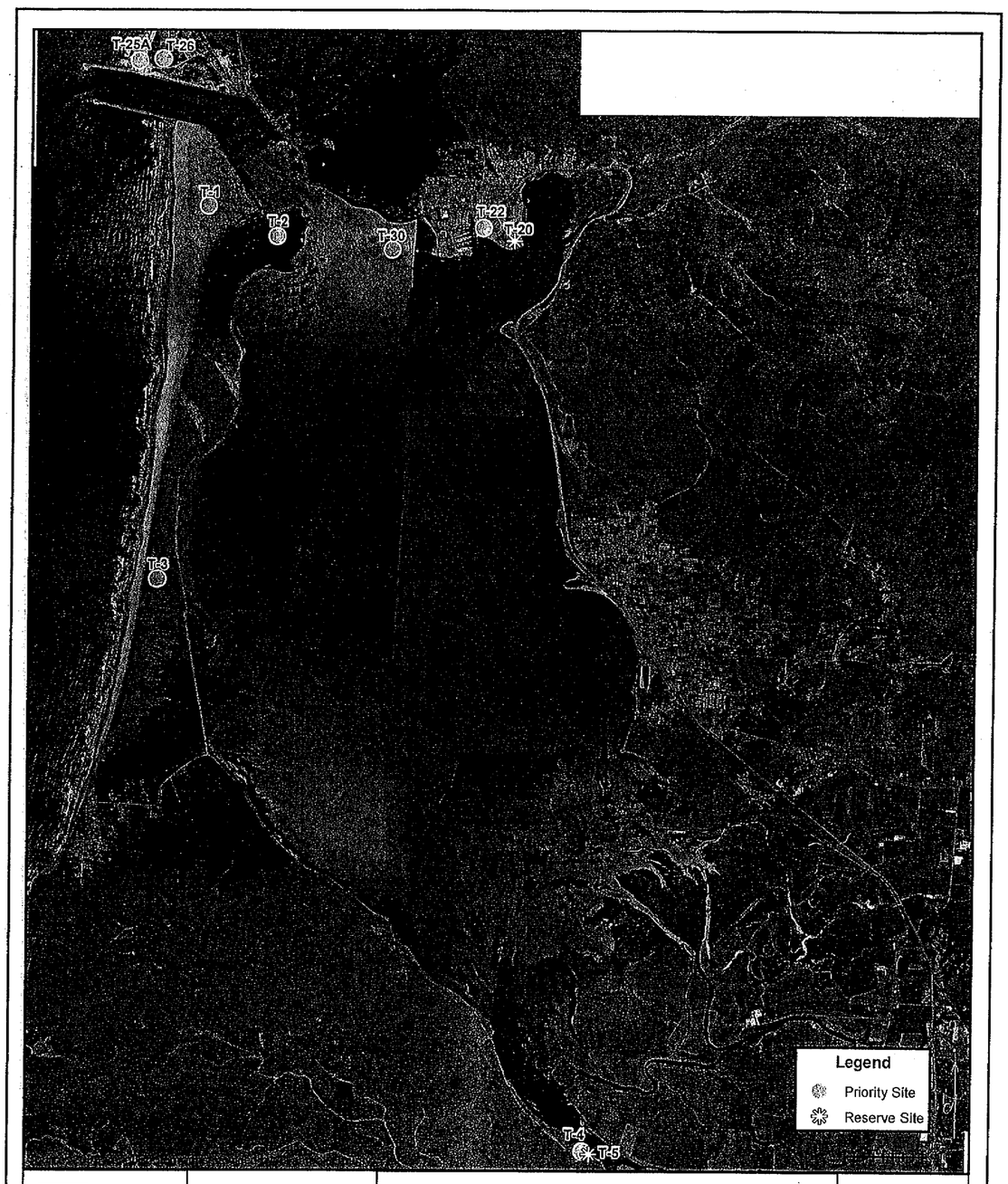
The initial site-screening phase included 35 sites located in Nehalem and Tillamook Bays that had been evaluated prior to 1984. The data collected during the initial site screening is presented in Appendix A for Tillamook Bay and Nehalem Bay. Each screening matrix table corresponds to a dredge material disposal site identified within the 1984 TCCP.

A typical table in Appendix A for a site in Tillamook Bay (Tillamook 1) is separated into three columns that include screening criteria, site evaluation and accept/reject. The screening criteria are separated into Physical Characteristics, Biological Considerations, and Socio-Economic Considerations. Each of these environmental areas was further divided into key issues that affect site suitability. The analysis was brief and abbreviated with the intent of identifying any fatal flaws that would make a site difficult to permit or operate. Our brief analysis is presented under site evaluation. If a fatal flaw or problematic issue was identified, the site was rejected. The major issues for rejection were proximity to dredge material, access, and size of property, sensitive biological issues, large wetlands, economic constraints, or presence of sensitive archaeological sites.

As indicated in the methods section, the sites remaining after the screening phase were identified as either priority or reserve sites. The priority sites were those identified during the screening evaluation as not having any fatal flaws; the reserve sites were added to provide additional disposal area for regional development. The detailed site evaluation of the selected 22 sites is presented Appendix C and D for review. The location of the Priority and Reserve sites is presented in Figures 2 and 3. Site photography is presented in Appendix E and organized by bay and site number. These data sheets provide a detailed description of the environment associated with the tax lot identified for dredge disposal The aerial photograph for each site includes the tax lot boundary and identification of any site constraints, i.e. wetlands, sensitive habitat, etc. During this phase of the evaluation, the most sensitive issues were wetlands and plover habitat, both of which can be avoided.

An additional site was added to the priority sites based upon coordination with the Corps of Engineers and the Port of Garibaldi. This additional site is located in Tillamook Bay near the navigation channel to provide inwater disposal capability. This site has been identified and approved by the state and federal regulatory agencies. It is identified as T30 and is discussed in Appendix B.

An objective of the DMD evaluation was to address the issues of site prioritization to facilitate site selection. Upon completion of the screening phase, it became evident that all of the available sites that passed the screening process, provided specific disposal benefits for each area depending upon disposal requirements. Thus, flexibility was considered an important element of site selection and would be dependent upon proximity to the dredging area, the site's capacity relative to the volume of material being dredged and the kind of material to be dredged. A summary of the different sites and disposal capacity is presented in Table 1 for Nehalem and Tillamook Bay.



PBS

Project #: 70384.000
Date: January 2006

Prepared for:

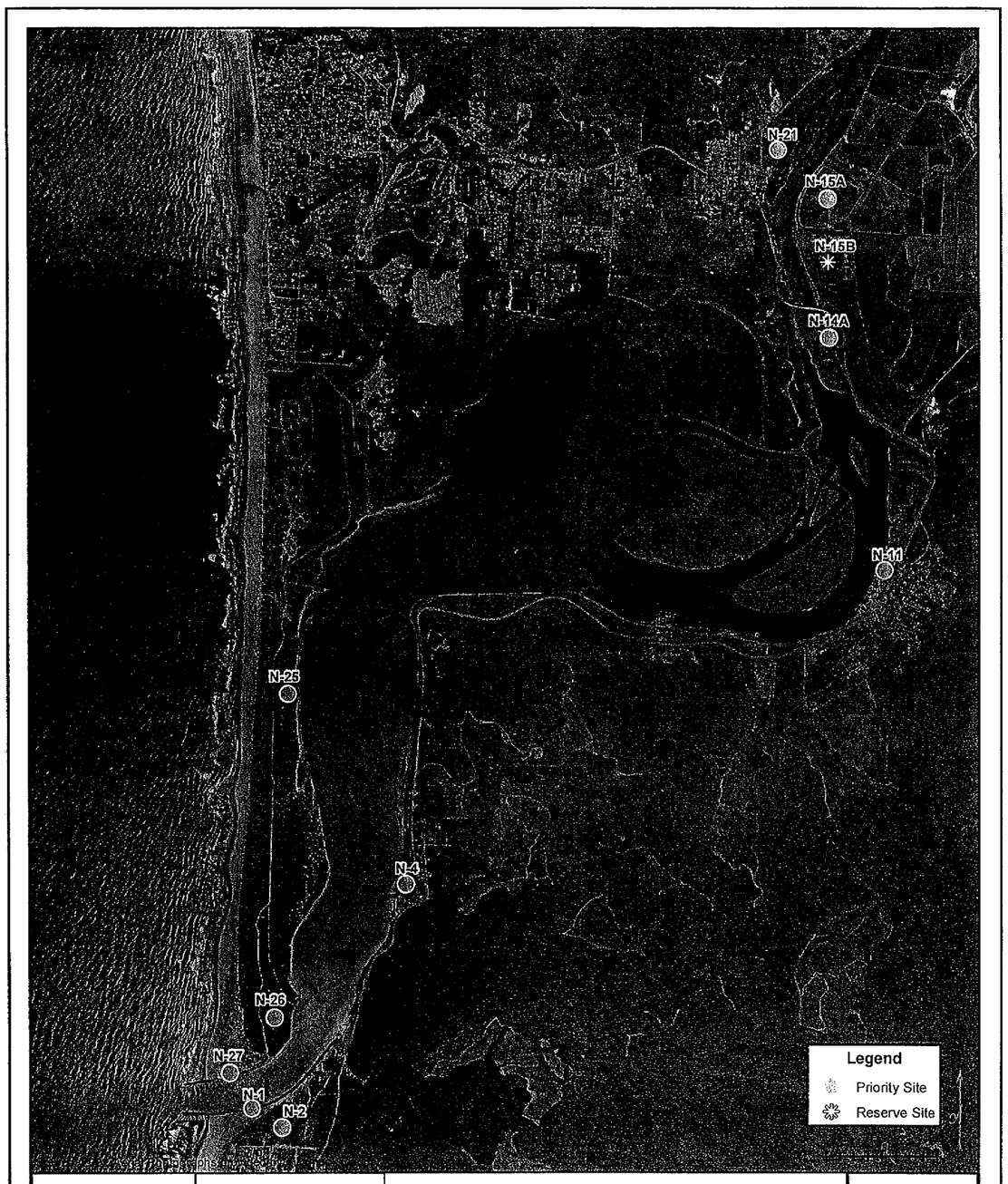
Tillamook County
Port of Garibaldi
Port of Nehalem
Economic Development Council of Tillamook County

Tillamook Bay DMD Sites

DMD Site Analysis
Tillamook County, Oregon

FIGURE

2



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Nehalem Bay DMD Sites

DMD Site Analysis
Tillamook County, Oregon

FIGURE
3

Table 1: DMD Site Summary

ESTUARY	AREA	SITE #	DREDGE DISPOSAL AREA (cubic yards)	COMMENTS
Tillamook	1	T1	1,580,000	Agency Coordination
Tillamook	1	T2	310,000	
Tillamook	1	T25A	13,000	
Tillamook	1	T26	110,000	
Tillamook	1	T20	0**	
Tillamook	1	T22	45,000	Temporary, Storage
Tillamook	2	T3	260,000	
Tillamook	3	T4	4,000	
Tillamook	3	T5	0**	Temporary. Storage
Nehalem	1	N1	75,000	
Nehalem	1	N2	50,000	
Nehalem	1	N4	18,000	
Nehalem	1	N25	1,240,000	
Nehalem	1	N26	80,000	
Nehalem	1	N27	140,000	
Nehalem	2	N11	35,000	
Nehalem	3	N14A	0**	Temporary. Storage
Nehalem	3	N15B	580,000	
Nehalem	3	N15A	20,000	
Nehalem	3	N21	0**	Temporary. Storage

*Note: Areas within estuary identified within TCCP.
Site number identified within TCCP and Figures 2 and 3.
Site capacity determined after adjusting for wetlands, habitat sensitivities, and physical or engineering constraints.
**Note: Available disposal area not calculated.

APPENDIX A

Screening Evaluation

Tillamook 1 - South jetty

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/large area/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/extend 4x4 road	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		prior disposal area	
Biological Considerations			
TES Species Onsite		possible/Plover	
TES Species Adjacent		possible/Plover; yes/fish	
Critical Habitat Onsite		proposed/HCP (?)	
Wildlife Corridor		not identified	
Onsite Wetlands		yes/small/avoidable	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		avoidable	
Critical Habitat/Species Impacts>Runoff		avoidable	
Critical Habitat/Species Impacts>Oceanshore		avoidable	
Sensitive Aquatic Impacts>Shoreline		avoidable	
Mitigation Requirements		wetland, plover habitat	
Site specific Biological Constraints		proposed critical habitat	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low	
Site Acquisition Costs		no	
Ambient Air Quality Issues		unlikely	
Noise Issues		unlikely	
Ownership Issues		unlikely	
Adjacent Landowner Issues		unlikely	
Adjacent Landuse Conflicts		unlikely	
Significant Visual Impacts		unlikely	
Site specific Socio-Economic Constraints			

Tillamook 2 - Northern portion of Bayocean Peninsula

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/large area/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/4x4	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		pond	
Biological Considerations			
TES Species Onsite		not identified/degraded	
TES Species Adjacent		possible/plover; yes/fish	
Critical Habitat Onsite		proposed/limited area	
Wildlife Corridor		not identified	
Onsite Wetlands		yes/small/avoidable	
Offsite Wetland Impacts (hydrology)		avoidable	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		yes/avoidable	
Critical Habitat/Species Impacts>Runoff		yes/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/avoidable	
Mitigation Requirements		avoidable	
Site specific Biological Constraints		proposed critical habitat/plover	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low	
Site Acquisition Costs		no	
Ambient Air Quality Issues		unlikely	
Noise Issues		unlikely	
Ownership Issues		unlikely	
Adjacent Landowner Issues		unlikely	
Adjacent Landuse Conflicts		possible/recreation	
Significant Visual Impacts		unlikely	
Site specific Socio-Economic Constraints			

Tillamook 3 - North of Bayocean Lake on Bayocean Peninsula

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/4x4	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		none	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/fish	
Critical Habitat Onsite		not identified	
Wildlife Corridor		yes/impacted	
Onsite Wetlands		not identified	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		yes/avoidable	
Critical Habitat/Species Impacts>Runoff		yes/avoidable	
Critical Habitat/Species Impacts>Oceanshore		yes/avoidable	
Sensitive Aquatic Impacts>Shoreline		yes/avoidable	
Mitigation Requirements		avoidable	
Site specific Biological Constraints		winter waterfowl (ODFW)	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low	
Site Acquisition Costs		no	
Ambient Air Quality Issues		unlikely	
Noise Issues		unlikely	
Ownership Issues		unlikely	
Adjacent Landowner Issues		unlikely	
Adjacent Landuse Conflicts		possible/recreation	
Significant Visual Impacts		unlikely	
Site specific Socio-Economic Constraints			

Tillamook 4 - Immediately west of the Tillamook County Boat Launch at Memaloose Point

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		limited/clamshell	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		available area/prior disposal	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		no	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		yes/impacted	
Critical Habitat/Species Impacts>ROW		yes/avoidable	
Critical Habitat/Species Impacts>Runoff		yes/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		no/riprapped shoreline	
Mitigation Requirements		no	
Site specific Biological Constraints		Tillamook River	
Socio-Economic Considerations			
Current Zoning		unknown	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low/clamshell	
Site Acquisition Costs		no/County ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		no/County ownership	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		unlikely	
Site specific Socio-Economic Constraints			

Tillamook 5 - Located between Tillamook County boat launch and private oyster processing facilities at Memaloose Point

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/clamshell	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		Highway 101, Tillamook River	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		no	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		yes/impacted	
Critical Habitat/Species Impacts>ROW		yes/avoidable	
Critical Habitat/Species Impacts>Runoff		yes/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		no/riprapped shoreline	
Mitigation Requirements		no	
Site specific Biological Constraints		Tillamook River	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low	
Site Acquisition Costs		yes/private ownership(?)	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		yes/private ownership(?)	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		none anticipated	
Site specific Socio-Economic Constraints			

Tillamook 5B - Residence 1/2 mile from T5, east side of Bayocean Road

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		**no/residential development**	**Reject**
Configuration of Property		unsuitable	
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		residential development	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		yes/small/avoidable	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		yes/wetland fringe habitat	
Critical Habitat/Species Impacts>ROW		yes/avoidable	
Critical Habitat/Species Impacts>Runoff		yes/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/tidal wetland fringe	
Mitigation Requirements		no/avoidable	
Site specific Biological Constraints		Tillamook River	
Socio-Economic Considerations			
Current Zoning		unknown	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		high (residence)	
Site Acquisition Costs		high (residence)	
Ambient Air Quality Issues		likely	
Noise Issues		likely	
Ownership Issues		yes/private ownership	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		none anticipated	
Site specific Socio-Economic Constraints			

Tillamook 6 - Northwest of Tillamook-Cape Meares Bridge crossing the Tillamook River

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/large area/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		yes/avoidable	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		bermed/Tillamook River	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		**yes/large area**	**Reject**
Offsite Wetland Impacts (hydrology)		potentially/avoidable	
Riparian Habitat		yes/wetland fringe habitat	
Critical Habitat/Species Impacts>ROW		yes/may be avoidable	
Critical Habitat/Species Impacts>Runoff		yes/may be avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/wetland fringe/avoidable (?)	
Mitigation Requirements		**yes/large mitigation area**	**Reject**
Site specific Biological Constraints		large wetlands/Tillamook River	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		medium/agric reclamation	
Site Acquisition Costs		yes/private ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		yes/private ownership	
Adjacent Landowner Issues		no/agriculture	
Adjacent Landuse Conflicts		no/agriculture	
Significant Visual Impacts		none anticipated	
Site specific Socio-Economic Constraints			

Tillamook 7 - South of Tillamook-Cape Meares Bridge, on east side of Tillamook River

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/large area/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		yes/avoidable	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		Trask & Tillamook Rivers	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		**yes/most of site**	**Reject**
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		yes/wetland fringe habitat	
Critical Habitat/Species Impacts>ROW		yes/avoidable	
Critical Habitat/Species Impacts>Runoff		yes/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/tidal wetland fringe	
Mitigation Requirements		**yes/large area**	**Reject**
Site specific Biological Constraints		wetland/river	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		medium/agric reclamation	
Site Acquisition Costs		yes/private ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		yes/private ownership	
Adjacent Landowner Issues		no/agriculture	
Adjacent Landuse Conflicts		no/agriculture	
Significant Visual Impacts		no	
Site specific Socio-Economic Constraints			

Tillamook 8 - Northeast and across Tillamook River from Memaloose Point

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/large area/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		yes/irrigation ditches	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		none	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/rivers, slough	
Critical Habitat Onsite		no	
Wildlife Corridor		not identified	
Onsite Wetlands		yes/large wetland/avoidable.	
Offsite Wetland Impacts (hydrology)		avoidable	
Riparian Habitat		yes/wetland fringe habitat	
Critical Habitat/Species Impacts>ROW		possible/rivers, etc.	
Critical Habitat/Species Impacts>Runoff		possible/rivers, etc.	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/may be avoidable	
Mitigation Requirements		yes/wetland/avoidable	
Site specific Biological Constraints		large wetland/rivers, sloughs	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		medium/agric reclamation	
Site Acquisition Costs		no/Tillamook County	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		no	
Adjacent Landowner Issues		no/agriculture	
Adjacent Landuse Conflicts		no/agriculture	
Significant Visual Impacts		no/agriculture	
Site specific Socio-Economic Constraints			

Tillamook 10 - South of Bay City at Goose Point - Kilchis Point

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/large area/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		yes/numerous sloughs	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		Tillamook Bay/sloughs	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/river, slough	
Critical Habitat Onsite		not identified	
Wildlife Corridor		not identified	
Onsite Wetlands		**yes/large area, mudflats**	**Reject**
Offsite Wetland Impacts (hydrology)		yes/may be avoidable	
Riparian Habitat		yes/wetland fringe habitat	
Critical Habitat/Species Impacts>ROW		yes/river, sloughs	
Critical Habitat/Species Impacts>Runoff		yes/river, sloughs	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/may be avoidable	
Mitigation Requirements		**yes/ large wetland area**	**Reject**
Site specific Biological Constraints		wetland/river/slough	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		medium/agric reclamation	
Site Acquisition Costs		yes/private ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		possible/private ownership	
Adjacent Landowner Issues		possible/private ownership	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		none anticipated	
Site specific Socio-Economic Constraints			

Tillamook 12 - At Bay City, east of Highway 101 and adjacent to Patterson Creek

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		**no**	**Reject**
Configuration of Property		**unsuitable/pond**	**Reject**
Water Access		possible/constraints	
Road Access		yes/residential roads	
Distance from Shoreline/Waterways		unacceptable	
Drainage Across Site		yes/Patterson Creek	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		pond/residential area	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		Patterson Creek (?)	
Critical Habitat Onsite		Patterson Creek (?)	
Wildlife Corridor		yes/riparian corridor	
Onsite Wetlands		**yes**	**Reject**
Offsite Wetland Impacts (hydrology)		possible/avoidable	
Riparian Habitat		yes	
Critical Habitat/Species Impacts>ROW		Patterson Creek (?)	
Critical Habitat/Species Impacts>Runoff		Patterson Creek (?)	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes	
Mitigation Requirements		**yes/wetlands**	**Reject**
Site specific Biological Constraints		wildlife habitat/Patterson Creek	
Socio-Economic Considerations			
Current Zoning		unknown	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		high/wetland mitigation	
Site Acquisition Costs		yes/residential (?)	
Ambient Air Quality Issues		yes/residential (?)	
Noise Issues		yes/residential (?)	
Ownership Issues		possible/private ownership	
Adjacent Landowner Issues		yes/residential (?)	
Adjacent Landuse Conflicts		yes/residential (?)	
Significant Visual Impacts		yes/residential & Highway 101	
Site specific Socio-Economic Constraints			

Tillamook 13 - Immediately east of Larson's Cove, east side of railroad tracks and north side of creek

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes	
Configuration of Property		acceptable/limited access	
Water Access		**not reasonable**	**Reject**
Road Access		**no**	**Reject**
Distance from Shoreline/Waterways		unacceptable	
Drainage Across Site		yes/creek	
Groundwater Table		shallow	
Geotechnical Constraints		possible/steep slopes	
Existing Site Contamination		none anticipated	
Floodplain		unlikely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		remote/steep slopes	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		not identified	
Critical Habitat Onsite		not identified	
Wildlife Corridor		yes/riparian corridor	
Onsite Wetlands		yes/along stream	
Offsite Wetland Impacts (hydrology)		yes/may be avoidable	
Riparian Habitat		yes/forested	
Critical Habitat/Species Impacts>ROW		possible/Larson's Cove, stream	
Critical Habitat/Species Impacts>Runoff		possible/Larson's Cove, stream	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		possible/Larson's Cove, stream	
Mitigation Requirements		possible/stream/wetland	
Site specific Biological Constraints		mature forest, stream corridor	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		**high/difficult access**	**Reject**
Site Acquisition Costs		yes/private ownership(?)	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		yes/private ownership(?)	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		none anticipated	
Site specific Socio-Economic Constraints			

Tillamook 15A - Between railroad tracks and Highway 101, extending from north of Larson's Cove to Hobsonville

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/limited/truck	
Configuration of Property		**unsuitable**	**Reject**
Water Access		no/across Highway 101	
Road Access		yes/Highway 101	
Distance from Shoreline/Waterways		**unacceptable**	**Reject**
Drainage Across Site		yes	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		unlikely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		railroad tracks, Highway 101	
Biological Considerations			
TES Species Onsite		**yes, bald eagle**	**Reject**
TES Species Adjacent		yes/fish	
Critical Habitat Onsite		**yes, eagle nest (USFWS)**	**Reject**
Wildlife Corridor		no	
Onsite Wetlands		yes, undefined ditch	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		yes/Tillamook Bay/maybe avoidable	
Critical Habitat/Species Impacts>Runoff		yes/Tillamook Bay/maybe avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		no, shoreline riprapped	
Mitigation Requirements		yes/small wetland	
Site specific Biological Constraints		no	
Socio-Economic Considerations			
Current Zoning		unknown	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		yes/low/truck	
Site Acquisition Costs		possible/public ownership(?)	
Ambient Air Quality Issues		possible/Highway 101	
Noise Issues		possible/Highway 101	
Ownership Issues		possible/public ownership(?)	
Adjacent Landowner Issues		possible/ODOT, RR	
Adjacent Landuse Conflicts		possible/ODOT, RR	
Significant Visual Impacts		yes/Highway 101	
Site specific Socio-Economic Constraints			

Tillamook 16 - Immediately east of Highway 101 and north of Miami River

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/large area/pipeline	
Configuration of Property		acceptable	
Water Access		possible	
Road Access		yes	
Distance from Shoreline/Waterways		unacceptable	
Drainage Across Site		yes	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		Highway 101, Miami River	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Miami River	
Critical Habitat Onsite		yes/Miami River (?)	
Wildlife Corridor		yes/riparian corridor	
Onsite Wetlands		**yes/most of site**	**Reject**
Offsite Wetland Impacts (hydrology)		yes/maybe avoidable	
Riparian Habitat		yes	
Critical Habitat/Species Impacts>ROW		yes/Miami River/maybe avoidable	
Critical Habitat/Species Impacts>Runoff		yes/Miami River/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/Miami River	
Mitigation Requirements		**yes/large area**	**Reject**
Site specific Biological Constraints		wetlands/Miami River	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		medium/agric reclamation	
Site Acquisition Costs		yes/private ownership	
Ambient Air Quality Issues		no/agricultural area	
Noise Issues		no/agricultural area	
Ownership Issues		yes/private ownership	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		yes/Highway 101	
Site specific Socio-Economic Constraints			

Tillamook 17 - North and west of junction of Highway 101 and Miami River Road

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/prior disposal/pipeline	
Configuration of Property		suitable	
Water Access		yes/difficult	
Road Access		yes	
Distance from Shoreline/Waterways		**unacceptable**	**Reject**
Drainage Across Site		**yes/Hobson Creek**	**Reject**
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		unlikely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		none	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Miami River	
Critical Habitat Onsite		no	
Wildlife Corridor		no/impacted corridor	
Onsite Wetlands		**yes/large area**	**Reject**
Offsite Wetland Impacts (hydrology)		yes/avoidable	
Riparian Habitat		yes/impacted	
Critical Habitat/Species Impacts>ROW		yes/Miami River	
Critical Habitat/Species Impacts>Runoff		yes/Miami River	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		no	
Mitigation Requirements		**yes/wetland, stream**	**Reject**
Site specific Biological Constraints		no	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		medium/Hobson Creek	
Site Acquisition Costs		yes/private ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		yes/private ownership	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		yes/Highway 101	
Site specific Socio-Economic Constraints			

Tillamook 20 - Old Mill Marina

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		yes/avoidable	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		settling ponds/buildings	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/fish	
Critical Habitat Onsite		not identified	
Wildlife Corridor		no	
Onsite Wetlands		yes/ponds, tidal fringe	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		no	
Critical Habitat/Species Impacts>Runoff		yes/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/eelgrass, mudflats	
Mitigation Requirements		yes/wetlands/avoidable	
Site specific Biological Constraints		no	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low/available ponds, outfall	
Site Acquisition Costs		yes/private ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		yes/private ownership	
Adjacent Landowner Issues		no/port property	
Adjacent Landuse Conflicts		no/port property	
Significant Visual Impacts		none anticipated	
Site specific Socio-Economic Constraints			

Tillamook 22 - Port of Garibaldi Rehandle site

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		presently filled	
Configuration of Property		acceptable	
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		site developed	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		yes/tidal fringe	
Offsite Wetland Impacts (hydrology)		yes/avoidable	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		no	
Critical Habitat/Species Impacts>Runoff		yes/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/mudflats	
Mitigation Requirements		no	
Site specific Biological Constraints		tidal wetland fringe	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low/clamshell, truck	
Site Acquisition Costs		yes/Port, City(?)	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		yes/Port, City(?)	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		none anticipated	
Site specific Socio-Economic Constraints			

Tillamook 25A - At Barview, immediately north of North jetty

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline, truck	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		likely within	
Site Specific Physical Constraints		jetty, beach	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		not identified	
Critical Habitat Onsite		no/impacted/HCP?	
Wildlife Corridor		no	
Onsite Wetlands		no	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		no	
Critical Habitat/Species Impacts>Runoff		no	
Critical Habitat/Species Impacts>Oceanshore		yes/fish	
Sensitive Aquatic Impacts>Shoreline		no	
Mitigation Requirements		no	
Site specific Biological Constraints		none	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low	
Site Acquisition Costs		no/public ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		no/public ownership	
Adjacent Landowner Issues		possible/USACE, State (?)	
Adjacent Landuse Conflicts		possible/USACE, State (?)	
Significant Visual Impacts		possible/recreation	
Site specific Socio-Economic Constraints			

Tillamook 26 - North of north jetty and west of Jetty Park campgrounds

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/large area/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		camp site boundaries	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		not identified	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		yes/small/avoidable	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		no	
Critical Habitat/Species Impacts>Runoff		no	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		no	
Mitigation Requirements		yes/small wetland	
Site specific Biological Constraints		no	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low	
Site Acquisition Costs		no/public ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		no/public ownership	
Adjacent Landowner Issues		possible/USACE	
Adjacent Landuse Conflicts		possible/recreation	
Significant Visual Impacts		possible/recreation	
Site specific Socio-Economic Constraints			

Nehalem 1 - At South jetty, ocean beachfront

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/beach, 4x4 trail	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		likely within for portions	
Site Specific Physical Constraints		jetty/residential	
Biological Considerations			
TES Species Onsite		not identified/plover(?)	
TES Species Adjacent		yes/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		no	
Offsite Wetland Impacts (hydrology)		yes/avoidable	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		possible/Nehalem Bay/avoidable	
Critical Habitat/Species Impacts>Runoff		possible/Nehalem Bay/avoidable	
Critical Habitat/Species Impacts>Oceanshore		possible/avoidable	
Sensitive Aquatic Impacts>Shoreline		no/riprapped shoreline	
Mitigation Requirements		no	
Site specific Biological Constraints		plover (?)/HCP(?)	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low	
Site Acquisition Costs		no/publicly owned	
Ambient Air Quality Issues		possible/residential	
Noise Issues		possible/residential	
Ownership Issues		no/publicly owned	
Adjacent Landowner Issues		possible/residential	
Adjacent Landuse Conflicts		possible/residential, recreation	
Significant Visual Impacts		possible/residential, recreation	
Site specific Socio-Economic Constraints			

Nehalem 2 - Immediately north of Nedonna Beach residential area

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline disposal	
Configuration of Property		suitable/jetty-creek	
Water Access		yes	
Road Access		yes/4x4 trail	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		yes/creek borders site	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		creek, trees	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Nehalem Bay; ?/plover	
Critical Habitat Onsite		not identified/plover(?)	
Wildlife Corridor		not identified	
Onsite Wetlands		yes/adjacent to stream	
Offsite Wetland Impacts (hydrology)		possible/avoidable	
Riparian Habitat		yes	
Critical Habitat/Species Impacts>ROW		possible/Nehalem Bay	
Critical Habitat/Species Impacts>Runoff		possible/Nehalem Bay	
Critical Habitat/Species Impacts>Oceanshore		not identified	
Sensitive Aquatic Impacts>Shoreline		yes/Nehalem Bay, stream	
Mitigation Requirements		yes/avoidable	
Site specific Biological Constraints		stream, plover	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low	
Site Acquisition Costs		yes/private ownership (?)	
Ambient Air Quality Issues		possible/recreation use	
Noise Issues		possible/recreation use	
Ownership Issues		possible	
Adjacent Landowner Issues		possible/residential	
Adjacent Landuse Conflicts		possible/residential	
Significant Visual Impacts		possible/residential	
Site specific Socio-Economic Constraints			

Nehalem 4 - Immediately north of Ed's (Brighton) Moorage

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/Highway 101	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		historical disposal site	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Nehalem Bay	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		yes/disposal area/non jurisd	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		yes/Nehalem Bay	
Critical Habitat/Species Impacts>Runoff		yes/Nehalem Bay/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		no/riprapped shoreline	
Mitigation Requirements		yes-no/jurisdictional?	
Site specific Biological Constraints		no	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low	
Site Acquisition Costs		yes/private property	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		possible/private property	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		none anticipated	
Site specific Socio-Economic Constraints			

Nehalem 7 - South and west of Paradise Cove, on south side of Highway 101

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		limited	
Configuration of Property		**unsuitable**	**Reject**
Water Access		no	
Road Access		yes/Highway 101	
Distance from Shoreline/Waterways		**unacceptable**	**Reject**
Drainage Across Site		yes	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		unlikely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints			
Biological Considerations			
TES Species Onsite		none identified	
TES Species Adjacent		none identified	
Critical Habitat Onsite		no	
Wildlife Corridor		yes/riparian corridor	
Onsite Wetlands		yes/wetlands and stream	
Offsite Wetland Impacts (hydrology)		possibly	
Riparian Habitat		yes/forested w/snags, etc.	
Critical Habitat/Species Impacts>ROW		possibly/Nehalem River	
Critical Habitat/Species Impacts>Runoff		possibly/Nehalem River	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/stream	
Mitigation Requirements		yes/wetlands and stream	
Site specific Biological Constraints		**stream and wetlands**	**Reject**
Socio-Economic Considerations			
Current Zoning		unknown	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		**yes/high**	**Reject**
Site Acquisition Costs		unknown	
Ambient Air Quality Issues		yes/Highway 101	
Noise Issues		yes/Highway 101	
Ownership Issues		possible	
Adjacent Landowner Issues		possible	
Adjacent Landuse Conflicts		possible	
Significant Visual Impacts		yes/Highway 101	
Site specific Socio-Economic Constraints			

Nehalem 9 - Immediately east and below Wheeler Heights, in City of Wheeler

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/limited	
Configuration of Property		unsuitable	
Water Access		**no/south of Highway 101**	**Reject**
Road Access		yes/Highway 101	
Distance from Shoreline/Waterways		**unacceptable**	**Reject**
Drainage Across Site		yes/east border	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		unlikely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints			
Biological Considerations			
TES Species Onsite		possibly fish	
TES Species Adjacent		yes/Nehalem River	
Critical Habitat Onsite		no	
Wildlife Corridor		yes/riparian corridor	
Onsite Wetlands		yes/forested	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		yes/forested stream	
Critical Habitat/Species Impacts>ROW		yes/Nehalem River	
Critical Habitat/Species Impacts>Runoff		yes/Nehalem River	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/stream and wetlands	
Mitigation Requirements		yes/wetlands and stream	
Site specific Biological Constraints		**forested wetlands and stream**	**Reject**
Socio-Economic Considerations			
Current Zoning		unknown	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		high/distance, berms	
Site Acquisition Costs		yes/private ownership	
Ambient Air Quality Issues		possible/adj residential	
Noise Issues		possible/adj residential	
Ownership Issues		possible/private ownership	
Adjacent Landowner Issues		possible/adj residential	
Adjacent Landuse Conflicts		possible/adj residential	
Significant Visual Impacts		possible/Highway 101	
Site specific Socio-Economic Constraints			

Nehalem 11 - North of Dart's Marina, west of Highway 101 in north part of the City of Wheeler UGB

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/Highway 101	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		Nehalem River, Bott's Marsh	
Biological Considerations			
TES Species Onsite		none identified	
TES Species Adjacent		yes/Nehalem River/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		yes/small pocket & Bott's Marsh	
Offsite Wetland Impacts (hydrology)		not likely/avoidable	
Riparian Habitat		yes/degraded (except Bott's M.)	
Critical Habitat/Species Impacts>ROW		yes/Nehalem River/avoidable	
Critical Habitat/Species Impacts>Runoff		yes/Nehalem River/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/main shoreline not sensitive	
Mitigation Requirements		yes/avoidable	
Site specific Biological Constraints		Nehalem River	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low	
Site Acquisition Costs		possible/private ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		possible/private ownership	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		possible/Highway 101	
Site specific Socio-Economic Constraints		site for sale (6/05)	

Nehalem 13 - Immediately east of the junction of Highway 53 and Highway 101

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		limited	
Configuration of Property		**unsuitable/drainage**	**Reject**
Water Access		yes	
Road Access		yes/Highway 53	
Distance from Shoreline/Waterways		acceptable/long	
Drainage Across Site		yes	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		unlikely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints			
Biological Considerations			
TES Species Onsite		none identified	
TES Species Adjacent		none identified/possibly fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		yes/wetlands and stream	
Offsite Wetland Impacts (hydrology)		yes/avoidable	
Riparian Habitat		yes/small stream riparian	
Critical Habitat/Species Impacts>ROW		none identified	
Critical Habitat/Species Impacts>Runoff		possibly fish downstream	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		no	
Mitigation Requirements		yes/wetland, stream	
Site specific Biological Constraints		wetlands, streams	
Socio-Economic Considerations			
Current Zoning		rural(?)	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		high	
Site Acquisition Costs		possible/private ownership	
Ambient Air Quality Issues		possible	
Noise Issues		possible	
Ownership Issues		possible/private ownership	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		possible/Highway 101	
Site specific Socio-Economic Constraints			

Nehalem 14A - Tillamook County boat ramp & vicinity

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/clamshell, pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/Tideland Rd	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		boat launch, parking lot	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Nehalem River	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		yes/avoidable	
Offsite Wetland Impacts (hydrology)		yes/avoidable	
Riparian Habitat		yes/avoidable	
Critical Habitat/Species Impacts>ROW		yes/Nehalem River	
Critical Habitat/Species Impacts>Runoff		yes/Nehalem River	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		no/developed	
Mitigation Requirements		yes	
Site specific Biological Constraints		Nehalem River, tidal fringe	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low/clamshell	
Site Acquisition Costs		no/Tillamook County	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		no/Tillamook County	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		none anticipated	
Site specific Socio-Economic Constraints			

Nehalem 14B - East of the Tillamook County boat ramp and east of Nehalem Bridge (Highway 101)

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline	
Configuration of Property		suitable	
Water Access		yes/difficult	
Road Access		yes/Tideland Rd	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		Highway 101 separates site	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Nehalem River/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		yes/large areas	
Offsite Wetland Impacts (hydrology)		possible/avoidable	
Riparian Habitat		yes/tidal fringe	
Critical Habitat/Species Impacts>ROW		yes/river, stream	
Critical Habitat/Species Impacts>Runoff		yes/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/tidal fringe/avoidable	
Mitigation Requirements		yes/wetland, stream	
Site specific Biological Constraints		large wetland areas	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		medium/agric reclamation	
Site Acquisition Costs		yes/private ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		yes/private ownership	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		none anticipated	
Site specific Socio-Economic Constraints			

Nehalem 15A - Nehalem/Wheeler Sewage Treatment Facilities

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/Tideland Rd	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		unlikely within - bermed	
High Tide Line		unlikely within - bermed	
Site Specific Physical Constraints		historical disposal site	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Nehalem River/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		yes/ small areas	
Offsite Wetland Impacts (hydrology)		yes/avoidable	
Riparian Habitat		no/available area	
Critical Habitat/Species Impacts>ROW		yes/Nehalem River/avoidable	
Critical Habitat/Species Impacts>Runoff		yes/Nehalem River/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/Nehalem River/avoidable	
Mitigation Requirements		yes/wetlands	
Site specific Biological Constraints		Nehalem River	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low	
Site Acquisition Costs		no/public ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		unlikely	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		none anticipated	
Site specific Socio-Economic Constraints			

Nehalem 15B - Pasture along Nehalem River, south of sewage treatment facilities

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/Tideland Rd	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		unlikely within/bermed	
High Tide Line		unlikely within/bermed	
Site Specific Physical Constraints		bermed along Nehalem River	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Nehalem River/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		yes/large area	
Offsite Wetland Impacts (hydrology)		possible/avoidable	
Riparian Habitat		yes/wetland fringe habitat	
Critical Habitat/Species Impacts>ROW		no	
Critical Habitat/Species Impacts>Runoff		yes/Nehalem River/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/avoidable	
Mitigation Requirements		yes/wetlands	
Site specific Biological Constraints		wetlands, Nehalem River	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		medium/agric reclamation	
Site Acquisition Costs		yes/private ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		yes/private ownership	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		none anticipated	
Site specific Socio-Economic Constraints			

Nehalem 16 - Residential Subdivision, peninsula at mouth of North Fork Nehalem River

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		**none/residential development**	**Reject**
Configuration of Property		**unsuitable/buildings**	**Reject**
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		possible within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		Developed residential subdivision	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Nehalem River/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		probable	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		yes/low quality	
Critical Habitat/Species Impacts>ROW		yes/river/avoidable	
Critical Habitat/Species Impacts>Runoff		yes/river/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/degraded/avoidable	
Mitigation Requirements		yes/wetland	
Site specific Biological Constraints			
Socio-Economic Considerations			
Current Zoning		unknown	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		high/residential development	
Site Acquisition Costs		yes/private ownership	
Ambient Air Quality Issues		yes/residential area	
Noise Issues		yes/residential area	
Ownership Issues		yes/private ownership	
Adjacent Landowner Issues		yes/residential area	
Adjacent Landuse Conflicts		yes/residential area	
Significant Visual Impacts		yes/residential area	
Site specific Socio-Economic Constraints			

Nehalem 17 - East of confluence of North Fork Nehalem River and Nehalem River, ~400 feet

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		Nehalem River, McDonald Rd	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Nehalem River/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		**yes/large wetland**	**Reject**
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		yes/low quality	
Critical Habitat/Species Impacts>ROW		yes/river, slough/avoidable	
Critical Habitat/Species Impacts>Runoff		yes/river, slough/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/degraded/avoidable	
Mitigation Requirements		**yes/wetland**	**Reject**
Site specific Biological Constraints		large wetland area	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		medium/agric reclamation	
Site Acquisition Costs		yes/private ownership	
Ambient Air Quality Issues		yes/residential area	
Noise Issues		yes/residential area	
Ownership Issues		yes/private ownership	
Adjacent Landowner Issues		yes/residential area	
Adjacent Landuse Conflicts		yes/residential area	
Significant Visual Impacts		yes/residential area	
Site specific Socio-Economic Constraints			

Nehalem 19 - 38000 North Fork Road, South and west of the North Fork Nehalem River Bridge within the Nehalem UGB

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/North Fork Road	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		yes/sloughs	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		possible within	
High Tide Line		unlikely within	
Site Specific Physical Constraints			
Biological Considerations			
TES Species Onsite		none identified	
TES Species Adjacent		yes/Nehalem River/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		yes	
Offsite Wetland Impacts (hydrology)		yes/avoidable	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		yes/Nehalem River/fish	
Critical Habitat/Species Impacts>Runoff		yes/Nehalem River/fish	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		no	
Mitigation Requirements		yes/wetlands	
Site specific Biological Constraints		wetlands onsite	
Socio-Economic Considerations			
Current Zoning		acceptable/rural	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low	
Site Acquisition Costs		possible/private ownership	
Ambient Air Quality Issues		possible	
Noise Issues		possible	
Ownership Issues		possible/private ownership	
Adjacent Landowner Issues		possible	
Adjacent Landuse Conflicts		possible	
Significant Visual Impacts		possible	
Site specific Socio-Economic Constraints			

Nehalem 21 - Immediately north of city docks, City of Nehalem

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/limited	
Configuration of Property		suitable for rehandle site/clamshell	
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		possible/small swale	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		possible within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		none	
Biological Considerations			
TES Species Onsite		none identified	
TES Species Adjacent		yes/Nehalem River	
Critical Habitat Onsite		no	
Wildlife Corridor		not onsite	
Onsite Wetlands		yes/between road and river	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		yes/wetland bench along river	
Critical Habitat/Species Impacts>ROW		yes/Nehalem River	
Critical Habitat/Species Impacts>Runoff		yes/Nehalem River	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		potential/avoidable	
Mitigation Requirements		not if wetlands are avoided	
Site specific Biological Constraints		wetlands, Nehalem River	
Socio-Economic Considerations			
Current Zoning		unknown	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		none anticipated	
Site Acquisition Costs		none anticipated	
Ambient Air Quality Issues		possible	
Noise Issues		possible	
Ownership Issues		yes/private ownership(?)	
Adjacent Landowner Issues		possible/commercial & residential	
Adjacent Landuse Conflicts		possible	
Significant Visual Impacts		possible	
Site specific Socio-Economic Constraints			

Nehalem 23 - Nehalem Spit State Park, immediately east of Nehalem airstrip

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/limited	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/through airstrip	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		likely within	
Site Specific Physical Constraints		difficult for truck in or pipeline	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Nehalem Bay/fish	
Critical Habitat Onsite		not identified	
Wildlife Corridor		not identified	
Onsite Wetlands		yes	
Offsite Wetland Impacts (hydrology)		possible/avoidable	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		yes/Nehalem Bay/avoidable	
Critical Habitat/Species Impacts>Runoff		yes/Nehalem Bay/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/Nehalem Bay	
Mitigation Requirements		yes/wetlands/avoidable	
Site specific Biological Constraints		wetlands, Nehalem Bay	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		**yes/identified(OPRD)**	**Reject**
Site Development Costs		yes/medium>high	
Site Acquisition Costs		no	
Ambient Air Quality Issues		none anticipated	
Noise Issues		unlikely	
Ownership Issues		no/OPRD ownership	
Adjacent Landowner Issues		no/OPRD ownership	
Adjacent Landuse Conflicts		possible/recreation use	
Significant Visual Impacts		possible/recreation use	
Site specific Socio-Economic Constraints			

Nehalem 24 - Nehalem Spit State Park, immediately east of Nehalem State Park campground, west of main access road

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/limited	
Configuration of Property		suitable	
Water Access		yes	
Road Access		possible/airstrip conflict	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		possible within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		airport nearby	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Nehalem Bay	
Critical Habitat Onsite		not identified	
Wildlife Corridor		not identified	
Onsite Wetlands		yes/small area	
Offsite Wetland Impacts (hydrology)		possible/avoidable	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		yes/Nehalem Bay/avoidable	
Critical Habitat/Species Impacts>Runoff		yes/Nehalem Bay/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/Nehalem Bay	
Mitigation Requirements		yes/wetlands	
Site specific Biological Constraints		wetlands, Nehalem Bay	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		**yes/identified(OPRD)**	**Reject**
Site Development Costs		yes/low	
Site Acquisition Costs		no/OPRD ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		unlikely	
Ownership Issues		no/OPRD ownership	
Adjacent Landowner Issues		no/OPRD ownership	
Adjacent Landuse Conflicts		yes/OPRD airstrip	
Significant Visual Impacts		no/OPRD ownership	
Site specific Socio-Economic Constraints			

Nehalem 25 - Nehalem Spit State Park, south of the Nehalem State Park lower parking lot

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline, truck	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/4x4	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		possible within	
High Tide Line		unlikely within	
Site Specific Physical Constraints			
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Nehalem Bay/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		not identified	
Onsite Wetlands		none observed	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		yes/Nehalem Bay/avoidable	
Critical Habitat/Species Impacts>Runoff		bay/impacts avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/Nehalem Bay/avoidable	
Mitigation Requirements		no	
Site specific Biological Constraints		Nehalem Bay	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		yes/low	
Site Acquisition Costs		no/OPRD ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		no/OPRD ownership	
Ownership Issues		no/OPRD ownership	
Adjacent Landowner Issues		no/OPRD ownership	
Adjacent Landuse Conflicts		yes/recreation/avoidable	
Significant Visual Impacts		unlikely	
Site specific Socio-Economic Constraints			

Nehalem 26 - South end of Nehalem Spit, Nehalem Spit State Park

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/4x4	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		no	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		ODOT mitigation site	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Nehalem Bay/fish	
Critical Habitat Onsite		proposed/partial area	
Wildlife Corridor		yes	
Onsite Wetlands		yes/avoidable	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		no	
Critical Habitat/Species Impacts>Runoff		yes/Nehalem Bay/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/Nehalem Bay/avoidable	
Mitigation Requirements		yes/wetlands/avoidable	
Site specific Biological Constraints		wetlands, pinnipeds	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		yes/low	
Site Acquisition Costs		no/OPRD ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		unlikely	
Ownership Issues		no/OPRD ownership	
Adjacent Landowner Issues		no/OPRD ownership	
Adjacent Landuse Conflicts		yes/recreation/avoidable	
Significant Visual Impacts		unlikely	
Site specific Socio-Economic Constraints			

Nehalem 27 - Nehalem Spit State Park, immediately north of the north jetty at the mouth of Nehalem Bay

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/large area/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/4x4	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		possible within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		none identified	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Nehalem Bay/fish/Pinniped	
Critical Habitat Onsite		proposed/partial area	
Wildlife Corridor		no	
Onsite Wetlands		yes/small wetland	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		yes/Nehalem Bay/avoidable	
Critical Habitat/Species Impacts>Runoff		yes/Nehalem Bay/avoidable	
Critical Habitat/Species Impacts>Oceanshore		potential/avoidable	
Sensitive Aquatic Impacts>Shoreline		potential/avoidable	
Mitigation Requirements		yes/wetland	
Site specific Biological Constraints		no	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		yes/low	
Site Acquisition Costs		no/OPRD ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		unlikely	
Ownership Issues		no/OPRD ownership	
Adjacent Landowner Issues		no/OPRD ownership	
Adjacent Landuse Conflicts		yes/recreation/avoidable	
Significant Visual Impacts		unlikely	
Site specific Socio-Economic Constraints			

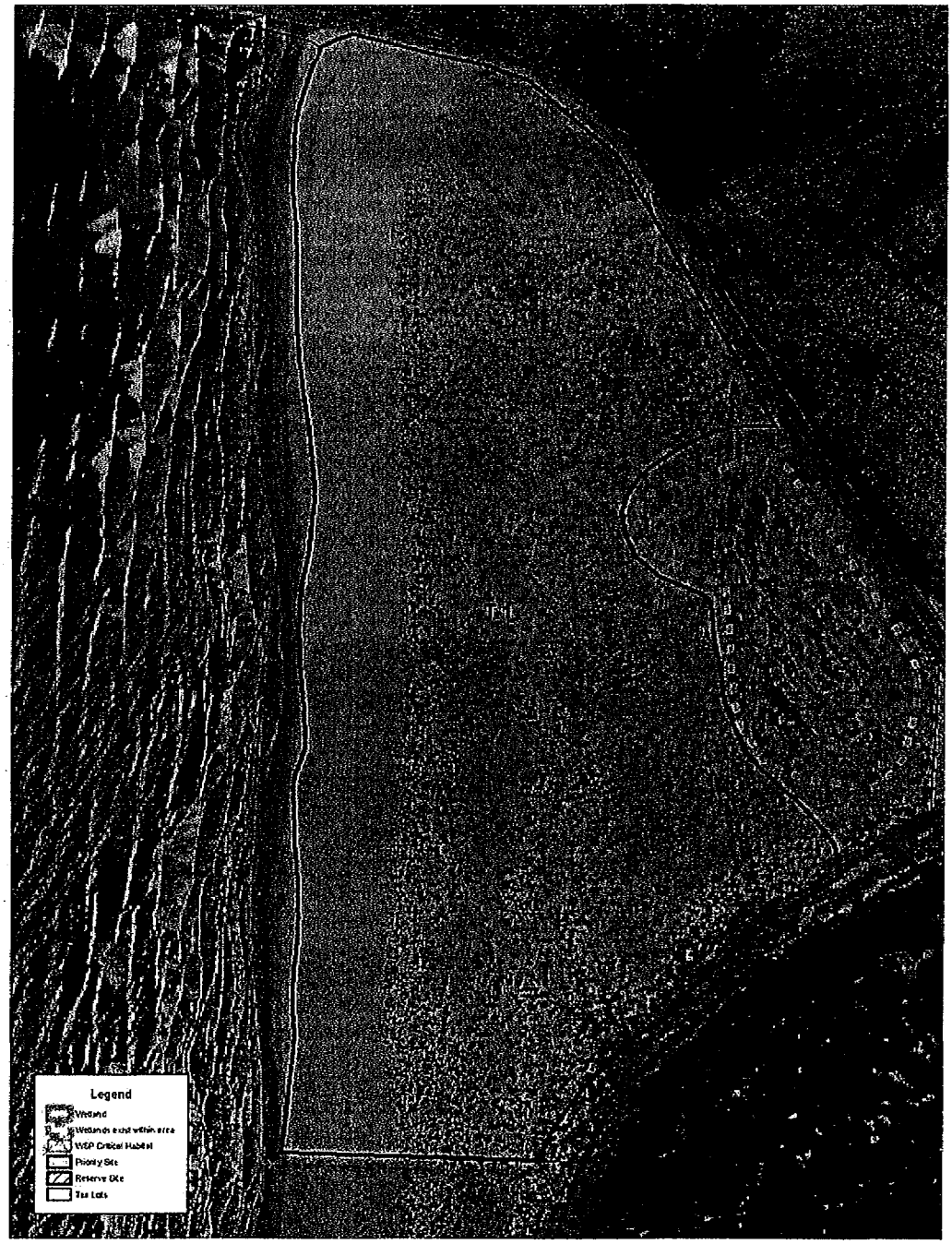
APPENDIX B

Detailed Site Evaluations - Tillamook Bay

Tillamook County Dredged Material Disposal Sites

SITE T-1

Site Location Description:	South Jetty
Bay Segment:	1
Township/Range/Section(s):	T1N, R10W, Sec 20
Tax Lot:	100,200
Size:	163.4 acres
Capacity:	1,580,000 cy at 6' depth



Tillamook County Dredged Material Disposal Sites

PHYSICAL/ENGINEERING CONSIDERATIONS

Topography:	Sandy ocean beachfront and rolling sand dunes along the south jetty at Tillamook Bay.
Access:	Bayocean Road to a dike road at milepost 5, past the gate onto the fire road to the end of Bayocean Peninsula.
Site Drainage:	None
Geotechnical Constraints:	None anticipated
Site Contamination:	None anticipated
Floodplain:	The site is likely within the 100-year floodplain; however, it is not mapped by FEMA.
Tidal Zone:	The oceanfront sections of the site are tidally influenced. The majority of the site is elevated above the typical tidal zone; however, sections of the site are likely inundated during storm surges and flood events.
Dredging Method:	Pipeline dredge
Design Consideration:	Containment berms will need to be constructed from onsite materials with an outflow system required to control turbidity. Revegetation would be required following disposal to minimize dispersion of the material. The disposal site planning would need to avoid on site wetlands, if possible, or provide mitigation. The beach nourishment disposal capacity would be unlimited over the long term. Material disposal could occur within the defined snow plover habitat to create additional suitable habitat for the species; however, agency coordination is required, and the disposal timing will need to avoid impacts to nesting birds.

BIOLOGICAL CONSIDERATIONS

Habitat Overview:	Habitat onsite consists of beach and dune habitats. The beach habitat is wide and sparsely vegetated with plants such as American searocket (*Cakile edentula*). The dune habitat plant community is dominated by European beachgrass (*Ammophila arenaria*). Other plant species include shore pine (*Pinus contorta*), kinnikinnik (*Arctostaphylos uva-ursi*), common velvetgrass (*Holcus lanatus*), coastal strawberry (*Frageria chiloensis)*, salal (*Gaultheria shallon*), pearly everlasting (*Anaphalis margaritacea*), dunegrass (*Elymus mollis*), lupine (*Lupinus sp.*), bighead sedge (*Carex macrocephala var. macrocephala*), Sitka spruce (*Picea sitchensis)*, tansy ragwort (*Senecio jacobaea*), and yarrow (*Achillea millefolium*). Several wetlands are present within depressions between dunes. See the ONSITE WETLANDS section below for wetland information.
TES Species Habitat/On-site:	Western snowy plover nesting habitat present onsite. The Pacific coast population of western snowy plover is federally listed as a threatened species under the Endangered Species Act. The site has been proposed as western snowy plover critical habitat. Snowy plover nesting would be limited to appropriate habitat along the beach and foredunes. There is currently usable space within the site that is not suitable snowy plover nesting habitat. However, expansion of snowy plover nesting habitat may occur in the future by removing European beachgrass. Dredge disposal may be used in conjunction with nesting habitat expansion, since dredge disposal material has been documented as potential nesting habitat. It is also possible that the coastal populations of western snowy plovers may be delisted in the future depending on genetic testing that is currently occurring. If the

	inland populations are not genetically distinct from the coastal populations, delisting may be proposed.
	Concern has been raised over pink sand verbena *(Abronia umbellata ssp. breviflora)* at this site. Pink sand verbena is a federal species of concern and is State-listed as an endangered species. However, there are no existing documented populations within Tillamook County. Pink sand verbena was not observed during site surveys. Yellow sand verbena *(Abronia latifolia)* was observed, but is not a state or federally listed species (ORNHIC List 4; Heritage Rank G5, S3). While the site is within the historical range of the pink sand verbena, the nearest known extant population is in Douglas County.
	Columbian white-tailed deer may also use the site. Columbian white-tailed deer are federally listed as endangered, but only the Columbia River Distinct Population Segment.
TES Species Habitat/Adjacent:	Western snowy plover habitat may continue down the beach to the south. Tillamook Bay is used by TES fish species.
Sensitive Habitat Usage:	Habitat may be used by western snowy plovers.
On-site Wetlands:	Several wetlands are present within a portion of the site. The wetlands are located within depressions between dunes. The wetlands are vegetated with sedges *(Carex spp.)*, Pacific silverweed *(Potentilla anserine ssp. pacifica)*, golden-eyed grass *(Sisyrinchium californicum)*, birds-foot trefoil *(Lotus corniculatus)*, rushes *(Juncus spp.)*, and a variety of other species. Soils are generally coarse sandy light brownish gray (10YR6/2) with dark yellowish brown (10YR4/6) redoximorphic features. Impacts to the onsite wetlands are likely avoidable.
Riparian Corridor:	None
Site Mitigation:	Mitigation may be required for critical habitat encroachment. No wetland mitigation required if wetlands are avoided.
BIOLOGICAL IMPACTS	
Hydrology:	None anticipated.
Wetlands:	Wetlands are avoidable.
Water Quality:	None anticipated. Dredge material is anticipated to be clean sand at this site.
Riparian:	None.

SOCIO-ECONOMIC CONSIDERATIONS

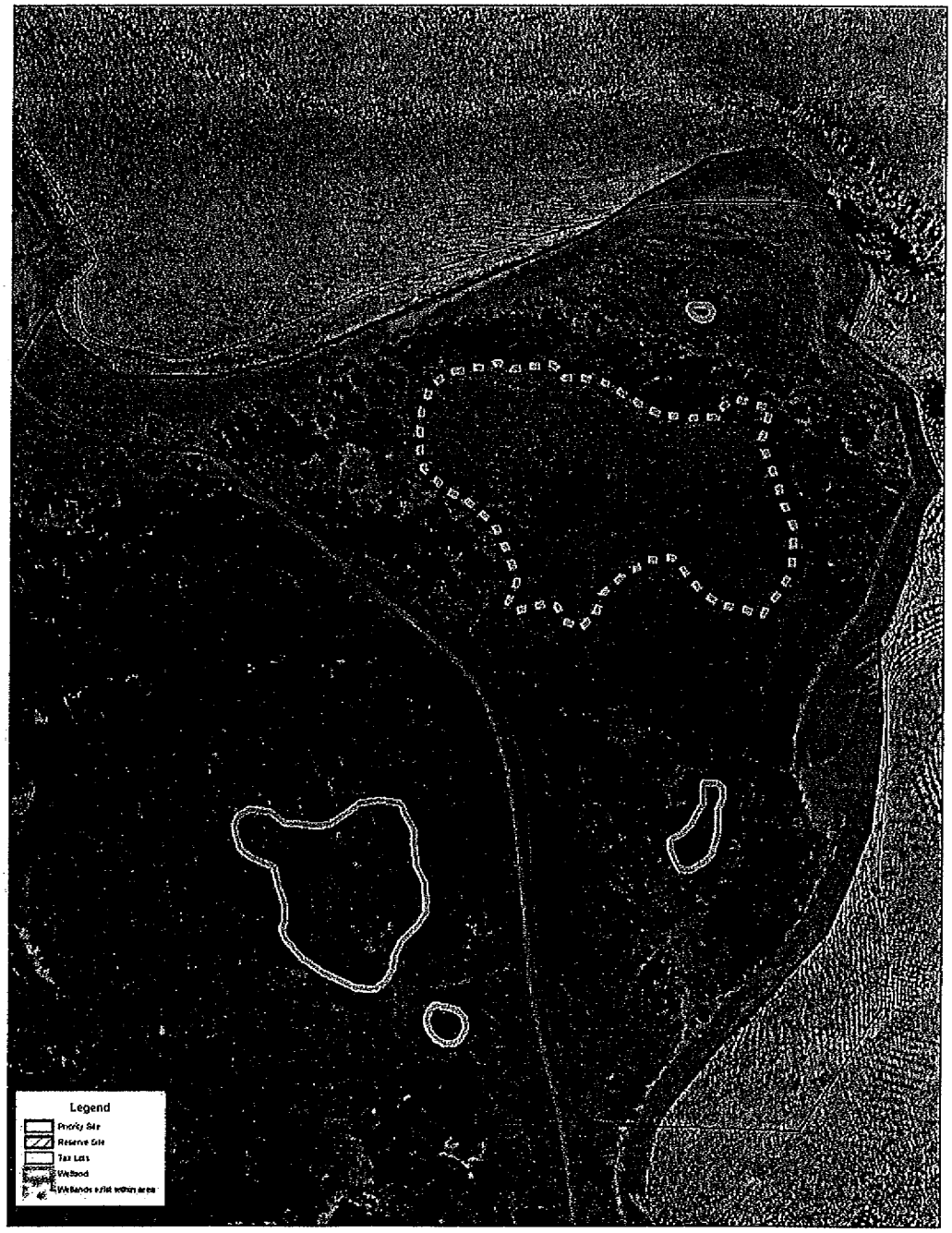
Zoning & Permitting:	Tillamook County
Jurisdiction:	Tillamook County
Site Ownership:	The site is publicly owned.
Adjacent Property Issues:	The adjacent lands are undeveloped sand dunes and the south jetty at Tillamook Bay.
Environmental Issues:	For beach disposal, the dredged material must be clean marine sand to avoid creating turbidity in the Pacific Ocean. For disposal within the sand dunes, the dredged material must be contained to

	prevent the material from re-entering Tillamook Bay and creating turbidity.
Water Quality:	None anticipated. For beach disposal, the dredged material is required to be clean marine sands. For disposal within the sand dunes, the dredged material must be suitably contained to prevent re-entry into Tillamook Bay.
Noise:	None anticipated as residences and businesses are not in close proximity to the site. Recreational uses should not be significantly affected.
Air Quality:	None anticipated as residences and businesses are not in close proximity to the site. Recreational users would not likely be significantly affected.
Future Use Constraints:	None anticipated.
Economic Issues:	None to minimal site preparation costs related to containment berms constructed from native materials and an outflow system for disposal within the sand dunes.
Land Acquisition:	None.
Wetland Mitigation:	None, assuming wetlands are avoided.
Site Development:	None to minimal site development costs related to the construction of containment berms and outflow system for disposal within the sand dunes.

Tillamook County Dredged Material Disposal Sites

SITE T-2

Site Location Description:	Northern portion of Bayocean Peninsula
Bay Segment:	1
Township/Range/Section(s):	T1N, R10W, Sec 20
Tax Lot:	
Size:	32.44 acres
Capacity:	310,000 cy at 6' depth



PHYSICAL/ENGINEERING CONSIDERATIONS

Topography:	
Access:	Northern portion of Bayocean Peninsula.
Site Drainage:	None
Geotechnical Constraints:	None anticipated
Site Contamination:	None anticipated
Floodplain:	The site is likely within the 100-year floodplain; however, it is not mapped by FEMA.
Tidal Zone:	The site is elevated above the typical tidal zone; however it is likely inundated during storm surges and flood events.
Dredging Method:	Pipeline dredge
Design Consideration:	At the northeast corner of the Bayocean Peninsula, the containment berms and outflow system remain from a past dredging episode. Limited capacity remains within the previously diked area; however, rehandling material to another part of the site could increase the capacity. In addition, other suitable areas for disposal exist within the site. Regardless of which disposal site is selected, containment berms will need to be constructed from onsite materials with an outflow system required to control turbidity. Revegetation would be required following disposal to minimize dispersion of the material. The disposal site planning would need to avoid on site wetlands, if possible, or provide mitigation. The disposal site design should maintain vehicular access to the jetty and avoid the undisturbed habitat east of the access road.

BIOLOGICAL CONSIDERATIONS

Habitat Overview:	The site can generally be characterized as two different habitat areas. One is a relatively undisturbed forested area, and the other is a highly disturbed and very large basin that has been used as a DMD site in the past. The forested area is located west of the access road and the DMD basin is located east of the road. The forested area is dominated by shore pines (*Pinus contorta)*, and also includes Sitka spruce (*Picea sitchensis*). The relatively sparse understory is vegetated with evergreen huckleberry (*Vaccinium ovatum*), salal (*Gaultheria shallon*), and European beachgrass (*Ammophila arenaria*). A wetland is located within the forested area, as described in the ONSITE WETLANDS section below. The DMD basin contains wetland and non-wetland areas. The non-wetland areas are dominated by Scotch broom (*Cytisus scoparius*). Other vegetation includes kinnikinnik (*Arctostaphylos uva-ursi*), salal, western sword fern (*Polystichum munitum*), bracken fern (*Pteridium aquilinum*), European beachgrass, hedgehog dogtail (*Cynosurus echinatus*), and common velvetgrass (*Holcus lanatus*).
TES Species Habitat/On-site:	Columbia white-tailed deer may use this site.
TES Species Habitat/Adjacent:	Western snowy plover habitat is present to the west. Tillamook Bay is used by TES fish species.
Sensitive Habitat Usage:	Columbia white-tailed deer may use this site.
On-site Wetlands:	Wetlands are present in two separate areas of the site. One wetland area is mostly a forested wetland dominated by shore pines *(Pinus*

contorta), and Lyngby sedge *(Carex lyngbyei)*. It is also vegetated with a few willows *(Salix sp.)* and Pacific silverweed *(Potentilla anserina ssp. pacifica)*. There is also a small pond adjacent to the wetland.

The other area that contains wetlands is located within a large basin that has been used as a DMD site. The wetlands within the basin are vegetated with soft rush *(Juncus effusus)*, common velvetgrass *(Holcus lanatus)*, small-fruited bulrush *(Scirpus microcarpus)*, reed canarygrass *(Phalaris arundinacea)*, Sitka willow *(Salix sitchensis)*, and red alder *(Alnus rubra)*. They also contain a few shore pines and Sitka spruce *(Picea sitchensis)*. The wetlands are typically surrounded by dense growth of Scotch broom *(Cytisus scoparius)*. Since the wetland areas within the DMD basin were artificially created in the process of dredge material disposal, they may or may not be regulated as jurisdictional wetlands.

Riparian Corridor: None

Site Mitigation: Wetland mitigation may be required if jurisdictional wetlands are filled.

BIOLOGICAL IMPACTS

Hydrology: No impacts to hydrology are anticipated if wetlands are avoided.

Wetlands: There are usable areas within the site that do not contain wetlands; however, the existing DMD basin is highly disturbed and may be the most feasible option for future dredge material disposal while minimizing additional disturbance to the site. The existing DMD basin contains potentially jurisdictional wetlands.

Water Quality: Water quality impacts may occur if sediments are contaminated.

Riparian: None.

SOCIO-ECONOMIC CONSIDERATIONS

Zoning & Permitting: Tillamook County

Jurisdiction: Tillamook County

Site Ownership: The site is publicly owned.

Adjacent Property Issues: The adjacent lands are undeveloped sand dunes and ocean beachfront along Bayocean Peninsula.

Environmental Issues: The dredged material must be contained to prevent the material from re-entering Tillamook Bay and creating turbidity.

Water Quality: None provided the dredged material is suitably contained to prevent re-entry into Tillamook Bay.

Noise: None anticipated as residences and businesses are not in close proximity to the site. Recreational uses should not be significantly affected.

Air Quality: None anticipated as residences and businesses are not in close proximity to the site. Recreational users would not likely be significantly affected.

Future Use Constraints: None anticipated.

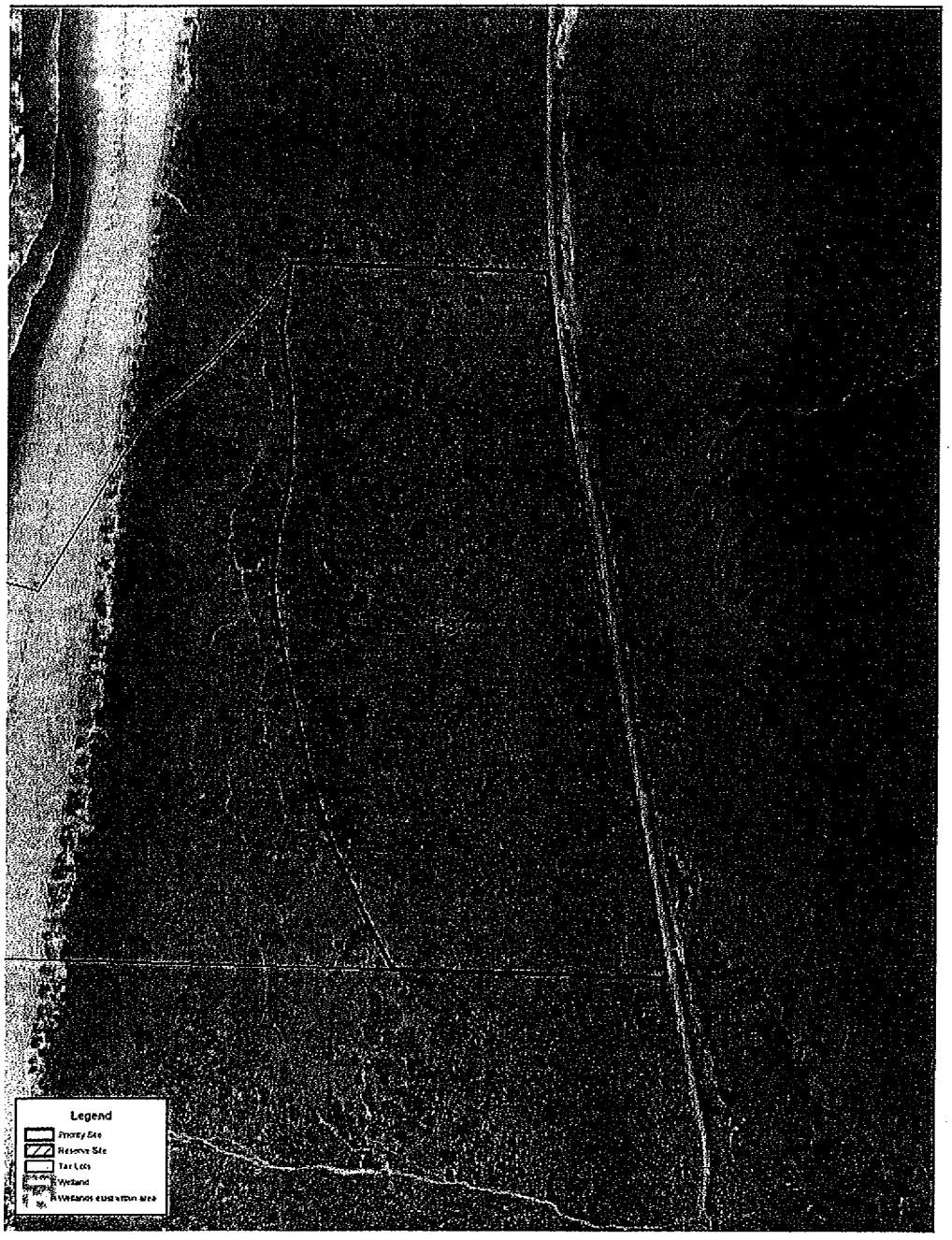
Tillamook County Dredged Material Disposal Sites

Economic Issues:	Minimal site preparation will be needed for the improvement or construction of containment berms and an outflow system.
Land Acquisition:	None.
Wetland Mitigation:	Wetland mitigation may be required if jurisdictional wetlands are filled.
Site Development:	Minimal site development costs, related to the improvement or construction of containment berms and outflow system.

Tillamook County Dredged Material Disposal Sites

SITE T-3

Site Location Description:	North of Bayocean Lake on Bayocean Peninsula
Bay Segment:	2
Township/Range/Section(s):	T1N, R10W, Sec 31, T1S, R10W, Sec. 6
Tax Lot:	
Size:	27.83 acres
Capacity:	260,000 cy at 6' depth



Tillamook County Dredged Material Disposal Sites

PHYSICAL/ENGINEERING CONSIDERATIONS

Topography:	Sand dunes with the terrain varying from relatively flat to sand mounds across the site. The ocean beaches are separated from the site by a sand dune approximately 20 feet high.
Access:	Bayocean Road to a dike road at milepost 5, past the gate onto the fire road along Bayocean Peninsula.
Site Drainage:	None
Geotechnical Constraints:	None anticipated
Site Contamination:	None anticipated
Floodplain:	The site is mapped by FEMA within the 100-year floodplain of the Tillamook Bay.
Tidal Zone:	The site is elevated above the typical tidal zone; however, it is likely inundated during storm surges and flood events.
Dredging Method:	Pipeline dredge
Design Consideration:	Containment berms will need to be constructed from onsite materials with an outflow system required to control turbidity. Revegetation would be required following disposal to minimize dispersion of the material. The disposal site design should avoid impacts to the existing trails.

BIOLOGICAL CONSIDERATIONS

Habitat Overview:	This site includes beach habitat and stabilized dune habitat. The beach habitat is sparely vegetated with plants such as American searocket (*Cakile edentula*). The dune habitat is mostly vegetated with a shrubby plant community, but also includes areas closer to the beach that are vegetated with an herbaceous plant community. The shrubby plant community is dominated by Scotch broom (*Cytisus scoparius*), Sitka spruce (*Picea sitchensis*), and common velvetgrass (*Holcus lanatus*). The herbaceous plant community is dominated by European beachgrass (*Ammophila arenaria*) and dunegrass (*Elymus mollis*).
TES Species Habitat/On-site:	Beach habitat may be used by western snowy plovers. The Pacific coast population of western snowy plover is federally listed as a threatened species under the Endangered Species Act.
TES Species Habitat/Adjacent:	Western snowy plover habitat may be present north of the site.
Sensitive Habitat Usage:	Beach habitat may be used by western snowy plovers.
On-site Wetlands:	No onsite wetlands were observed. Two small depressions were observed that contained Lyngby sedge *(Carex lyngbyei)*, which is a hydrophytic species. However, the plant communities also contained non-hydrophytic species such as western sword fern *(Polystichum munitum)*, salal *(Gaultheria shallon)*, and Scotch broom *(Cytisus scoparius)*. Overall the plant communities do not appear hydrophytic. In addition, hydric soils were not observed. Soils were generally sand, with no redoximorphic features or organic streaking. Therefore, despite the presence of an obligate wetland plant species, the areas did not meet wetland criteria.
Riparian Corridor:	None
Site Mitigation:	No site mitigation is anticipated

BIOLOGICAL IMPACTS

Hydrology:	No impacts to hydrology are anticipated.
Wetlands:	No onsite wetlands were observed.
Water Quality:	Water quality impacts may occur if sediments are contaminated.
Riparian:	None.

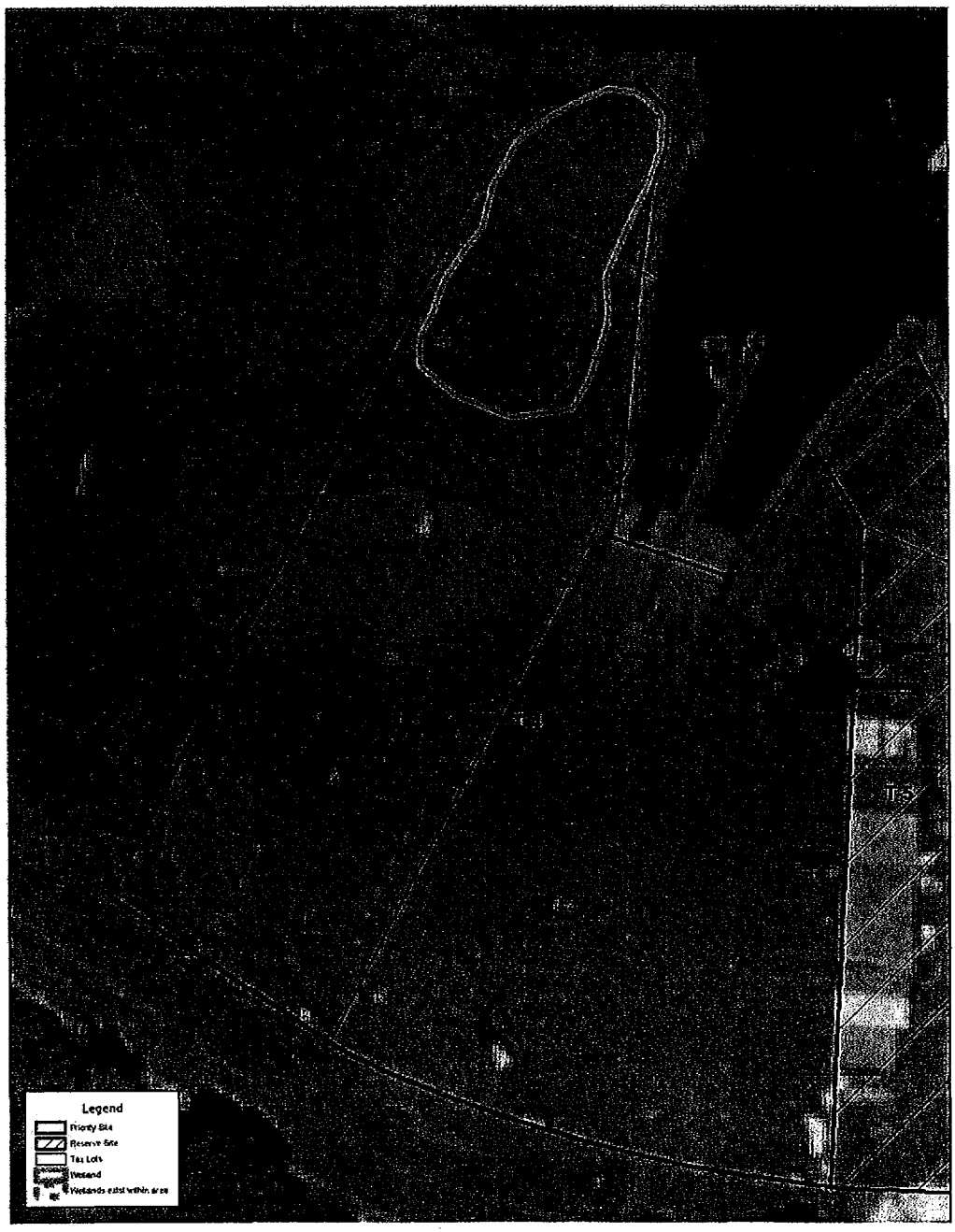
SOCIO-ECONOMIC CONSIDERATIONS

Zoning & Permitting:	Tillamook County
Jurisdiction:	Tillamook County
Site Ownership:	The site is publicly owned.
Adjacent Property Issues:	The adjacent lands are undeveloped sand dunes and ocean beachfront along Bayocean Peninsula.
Environmental Issues:	The dredged material must be contained to prevent the material from re-entering Tillamook Bay and creating turbidity.
Water Quality:	None provided the dredged material is suitably contained to prevent re-entry into Tillamook Bay.
Noise:	None anticipated as residences and businesses are not in close proximity to the site. Recreational uses should not be significantly affected.
Air Quality:	None anticipated as residences and businesses are not in close proximity to the site. Recreational users would not likely be significantly affected.
Future Use Constraints:	None anticipated.
Economic Issues:	Minimal site preparation will be needed in the form of containment berms constructed from native materials and an outflow system.
Land Acquisition:	None.
Wetland Mitigation:	None.
Site Development:	Minimal site development costs, related to the construction of containment berms and outflow system.

Tillamook County Dredged Material Disposal Sites

SITE T-4

Site Location Description:	Immediately west of the Tillamook County Boat Launch at Memaloose Point
Bay Segment:	
Township/Range/Section(s):	T1S, R10W, Sec. 22
Tax Lot:	100, 1600
Size:	1.59 acres
Capacity:	4,000 cy at 6' depth in the existing disposal site. In addition, the site can also use the parking lot for the temporary handling of material.



Tillamook County Dredged Material Disposal Sites

PHYSICAL/ENGINEERING CONSIDERATIONS

Topography:	The upland site immediately adjacent to the boat ramp has been previously used as a dredging disposal site. The berms and outflow structure remain from the previous disposal operation.
Access:	Bayocean Road
Site Drainage:	None
Geotechnical Constraints:	None anticipated
Site Contamination:	None anticipated
Floodplain:	The site is mapped by FEMA within the 100-year floodplain of the Tillamook River.
Tidal Zone:	The disposal site is elevated above the tidal influence of the Tillamook River.
Dredging Method:	Clamshell dredge
Design Consideration:	Suitable for a rehandle site. The material deposited from the most recent dredging episode needs to be removed from the disposal site prior to the next dredging episode. Rehandling and a final disposal site are required for the dredged material. The dredged material must be removed from the site following dredging to accommodate future use of the disposal site.

BIOLOGICAL CONSIDERATIONS

Habitat Overview:	The majority of the site is developed as a public boat launch and associated parking area. One small area adjacent to the boat ramp has been used as a DMD site. The DMD basin remains onsite. The lowest portions of the basin appear to meet wetland criteria, as discussed in the ONSITE WETLANDS section below. The DMD basin is a disturbed area that is vegetated with weedy plant species such as Himalayan blackberry (*Rubus discolor*), Canada thistle (*Cirsium arvense*), reed canarygrass (*Phalaris arundinacea*), tansy ragwort (*Senecio jacobaea*), and birds-foot trefoil (*Lotus corniculatus*). The shoreline is steep with riprapped banks.
TES Species Habitat/On-site:	None onsite
TES Species Habitat/Adjacent:	TES fish species use adjacent Tillamook River.
Sensitive Habitat Usage:	Sensitive fish species use adjacent Tillamook River.
On-site Wetlands:	The previous DMD basin has some wetland characteristics. A hydrophytic plant community is present in the lowest portions of the basin, including reed canarygrass, giant horsetail *(Equisetum telmatiea)*, birds-foot trefoil, and soft rush *(Juncus effusus)*. Higher portions of the basin are vegetated with drier species such as Himalayan blackberry, field morning glory *(Convolvulus arvensis)*, tansy ragwort, and Canada thistle. The basin may receive adequate hydrology to meet wetland criteria. Since this area is a constructed DMD basin, it is possible that it may not be considered a jurisdictional wetland even if it meets wetland criteria.
Riparian Corridor:	There is no intact riparian corridor at this site. The riparian zone is not sensitive. The shoreline has riprapped banks and is vegetated with Himalayan blackberry.
Site Mitigation:	Wetland mitigation may be required if the existing DMD basin is determined to be a jurisdictional wetland.

BIOLOGICAL IMPACTS

Hydrology:	None anticipated.
Wetlands:	The existing DMD basin has some wetland characteristics and may or may not be considered a jurisdictional wetland. However, it is a constructed basin for the purposes of dredge material disposal and is not a sensitive wetland resource.
Water Quality:	Water quality impacts may occur if sediments are contaminated.
Riparian:	The riparian zone is not sensitive. It has riprapped banks and is vegetated with Himalayan blackberry. Impacts to this degraded area are not anticipated.

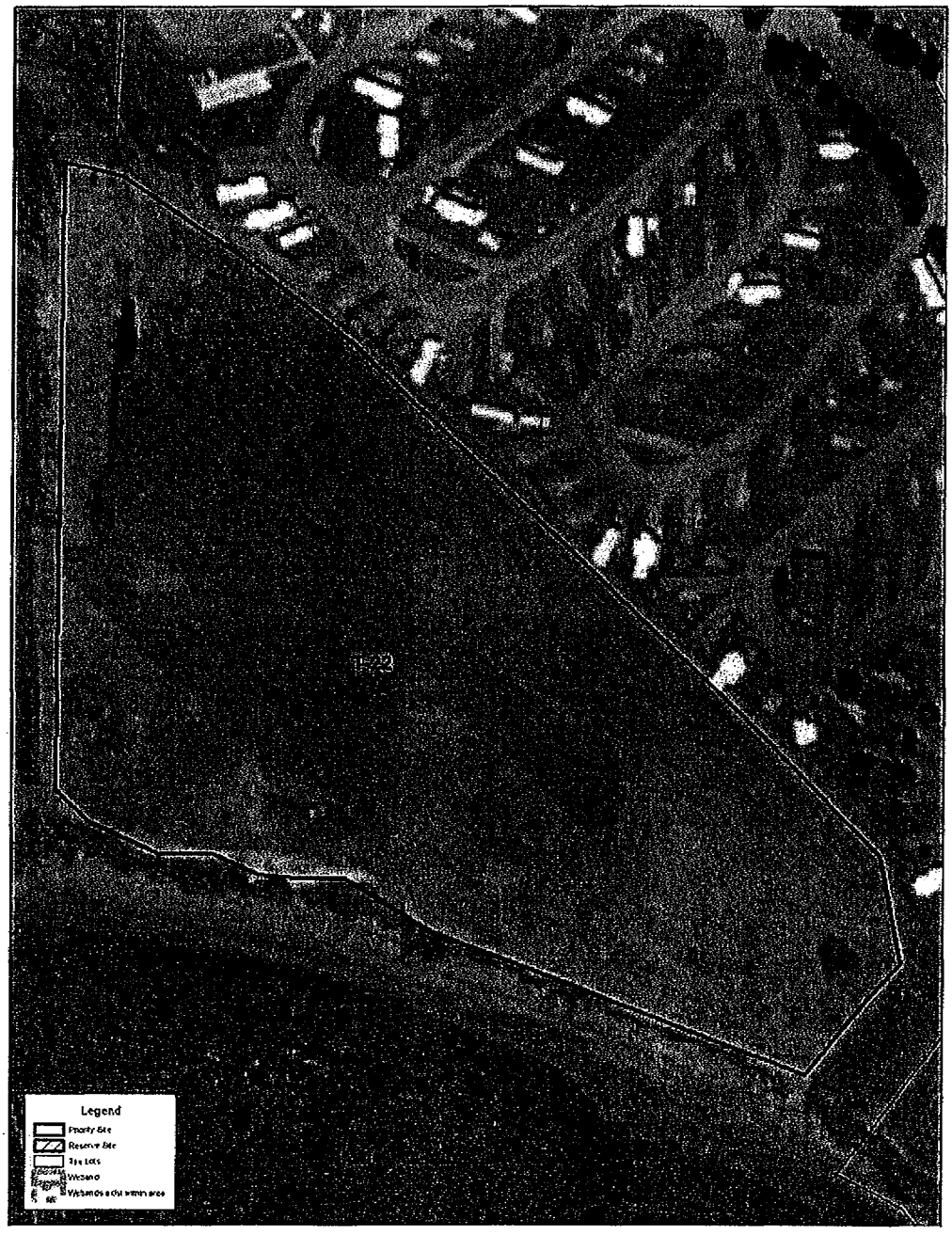
SOCIO-ECONOMIC CONSIDERATIONS

Zoning & Permitting:	Tillamook County
Jurisdiction:	Tillamook County
Site Ownership:	The site is owned by Tillamook County.
Adjacent Property Issues:	The adjacent lands are undeveloped riverbanks, which are tidally influenced. Future development of the adjacent parcels is unlikely.
Environmental Issues:	The dredged material must be contained to prevent the material from re-entering the Tillamook River and creating turbidity.
Water Quality:	None provided the dredged material is suitably contained to prevent re-entry into the Tillamook River.
Noise:	None anticipated as residences and businesses are not in close proximity to the site.
Air Quality:	None anticipated as residences and businesses are not in close proximity to the site. The short-term nature of the dredging work will also help control any potential odor situations.
Future Use Constraints:	None provided the dredged material is removed from the site following dredging.
Economic Issues:	Minimal site preparation will be needed in the improvements to the existing berms and outflow structure. Additional costs will be related to the material rehandling and final disposal site.
Land Acquisition:	None as the County owns the site.
Wetland Mitigation:	Wetland mitigation may be required if the existing DMD basin is determined to be a jurisdictional wetland.
Site Development:	Minimal site development costs, related to removal of the existing material and improvements to the existing berms and outflow structure, as necessary. Additional costs include material rehandling and final disposal.

Tillamook County Dredged Material Disposal Sites

SITE T-22

Site Location Description:	Old Mill Marina Rehandle Site
Bay Segment:	1
Township/Range/Section(s):	T1N, R10W, Sec. 21
Tax Lot:	
Size:	5.24 acres
Capacity:	45,000 cy at 6' depth



PHYSICAL/ENGINEERING CONSIDERATIONS

Topography:	The site is a gently sloping open terrace.
Access:	South end of Jerry Creasy Way at the Port of Garibaldi.
Site Drainage:	None
Geotechnical Constraints:	None anticipated
Site Contamination:	None anticipated
Floodplain:	The site is mapped by FEMA within the 100-year floodplain of the Tillamook Bay.
Tidal Zone:	The site is elevated above the typical tidal zone; however, sections of the site may be inundated during storm surges and flood events.
Dredging Method:	Pipeline dredge
Design Consideration:	The site received 45,000 cubic yards in 2000 and would need to have material removed prior to the next dredging episode. Containment berms will need to be constructed from onsite materials with an outflow system required to control turbidity. The dike exterior may need to be protected from flooding or storm surges.

BIOLOGICAL CONSIDERATIONS

Habitat Overview:	The site consists of a large, open, elevated area that has previously been used as an emergency DMD site. It is vegetated with a mix of weedy herbaceous species and is dominated by perennial ryegrass (*Lolium perenne*). Small, shallow depressions appear to meet wetland criteria, as described in the ONSITE WETLANDS section below. The steep shoreline is vegetated with Himalayan blackberry (*Rubus discolor*) and willows (*Salix sp.*).
TES Species Habitat/On-site:	None
TES Species Habitat/Adjacent:	Tillamook Bay
Sensitive Habitat Usage:	Sensitive fish species use adjacent Tillamook Bay.
On-site Wetlands:	Small pockets with wetland characteristics were observed. These small areas had hydrophytic plant communities that included toad rush *(Juncus bufonius)*, birds-foot trefoil *(Lotus corniculatus)*, salt grass *(Distichlis spicata)*, reed canarygrass *(Phalaris arundinacea)*, and white clover *(Trifolium repens)*. Hydric soils were observed within these small pockets. It is anticipated that the poorly drained soils at the site collect rainwater in these small, shallow depressions. This site was used as an emergency DMD site in 2000, at which time it received approximately 45,000 cubic yards of material. Since the small pocket wetlands are perched on top of this material, they may or may not be jurisdictional wetlands.
Riparian Corridor:	None
Site Mitigation:	Wetland mitigation may be required if jurisdictional wetlands are filled.
BIOLOGICAL IMPACTS	
Hydrology:	None anticipated
Wetlands:	Wetland impacts may occur if jurisdictional wetlands are determined to be present.

Water Quality:	Water quality impacts may occur if sediments or DMD site are contaminated.
Riparian:	None. The Tillamook Bay shoreline is steep and vegetated with Himalayan blackberry *(Rubus discolor)* and some willows *(Salix sp.)*.

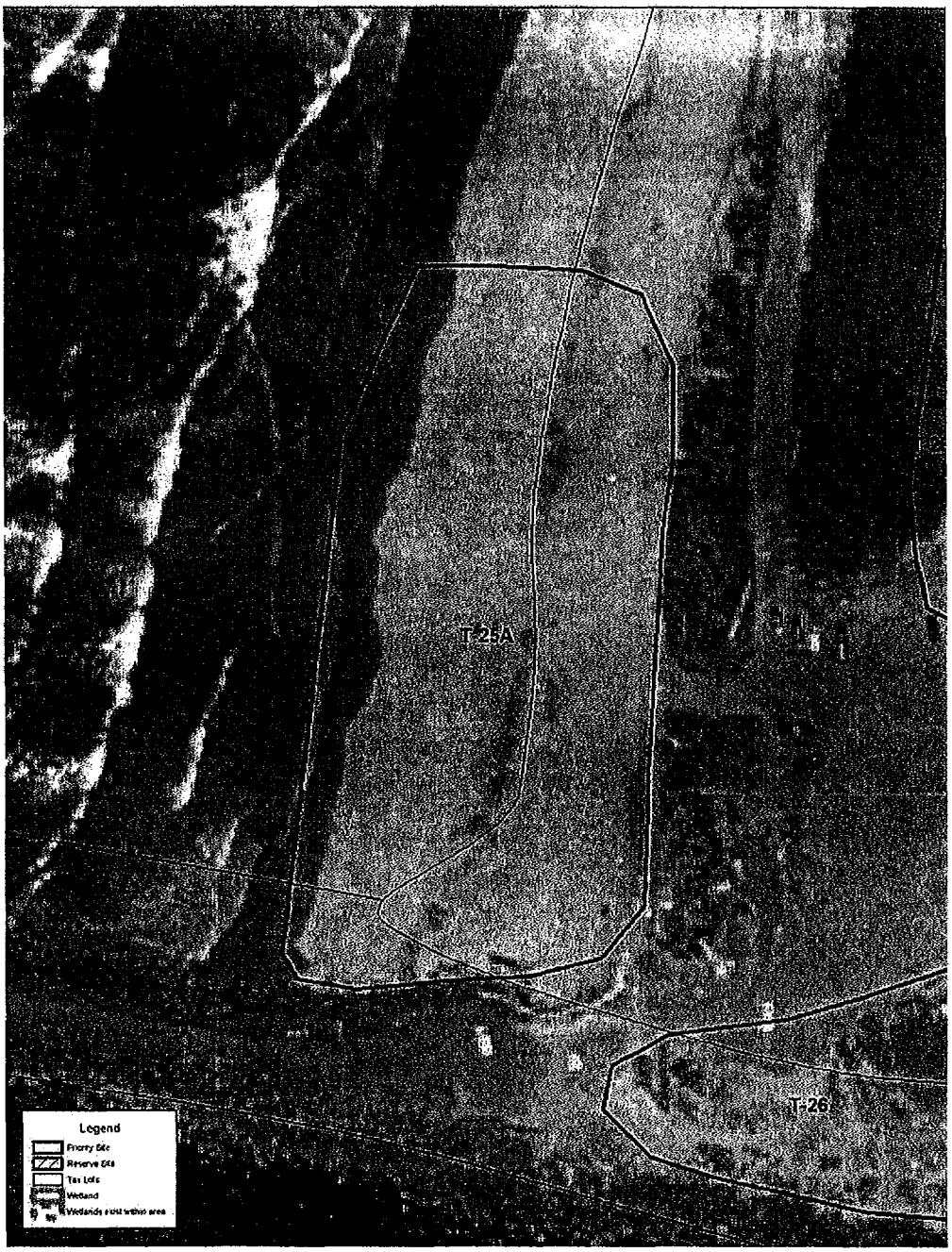
SOCIO-ECONOMIC CONSIDERATIONS

Zoning & Permitting:	Unknown
Jurisdiction:	City of Garibaldi/Tillamook County
Site Ownership:	The Port of Garibaldi owns the site.
Adjacent Property Issues:	None anticipated. The surrounding properties consist of the Old Mill Marina site and other properties owned by the Port.
Environmental Issues:	The dredged material must be contained to prevent the material from re-entering Tillamook Bay and creating turbidity.
Water Quality:	None provided the dredged material is suitably contained to prevent re-entry into Tillamook Bay and the berms are sufficiently protected from flooding and storm surges.
Noise:	None anticipated, as residences are not in close proximity to the site.
Air Quality:	None anticipated, as residences are not in close proximity to the site.
Future Use Constraints:	None anticipated. Material would need to be removed from the site after dredging to maintain the site's capacity.
Economic Issues:	None anticipated. Material would need to be removed from the site after dredging to maintain the site's capacity.
Land Acquisition:	None anticipated
Wetland Mitigation:	Wetland mitigation may be required if jurisdictional wetlands are filled.
Site Development:	Site development costs include the construction of containment berms and outflow system. Additional costs will be related to the material rehandling and final disposal site.

Tillamook County Dredged Material Disposal Sites

SITE T-25A

Site Location Description:	At Barview, immediately north of north jetty
Bay Segment:	1
Township/Range/Section(s):	T1N, R10W, Sec. 18
Tax Lot:	4300
Size:	1.81 acres
Capacity:	13,000 cy at 5' depth The beach nourishment disposal capacity would be unlimited over the long term.



Tillamook County Dredged Material Disposal Sites

PHYSICAL/ENGINEERING CONSIDERATIONS

Topography:	Sandy ocean beachfront north of the north jetty.
Access:	West end of Barview Jetty Park Road.
Site Drainage:	None
Geotechnical Constraints:	None anticipated
Site Contamination:	None anticipated
Floodplain:	The site is predominantly mapped by FEMA within the 100-year floodplain of Tillamook Bay.
Tidal Zone:	The site is tidally influenced.
Dredging Method:	Pipeline dredge
Design Consideration:	This beach nourishment site must receive clean marine sands. No containment system would be constructed, and discharge flow would return to the Pacific Ocean.

BIOLOGICAL CONSIDERATIONS

Habitat Overview:	The site consists of open beach adjacent to the rock jetty. It is located adjacent to a public parking area, and the habitat receives significant disturbance from recreational beach access. The site is not vegetated. The adjacent vegetated dunes are included in Site T26.
TES Species Habitat/On-site:	None. Not suitable western snowy plover habitat due to the level of human presence and disturbance.
TES Species Habitat/Adjacent:	Tillamook Bay
Sensitive Habitat Usage:	Sensitive fish species use adjacent Tillamook Bay.
On-site Wetlands:	None.
Riparian Corridor:	None
Site Mitigation:	None anticipated
BIOLOGICAL IMPACTS Hydrology:	None anticipated
Wetlands:	None
Water Quality:	None. Dredge material is anticipated to be clean sand at this site.
Riparian:	None. Bay shoreline is rock jetty.

SOCIO-ECONOMIC CONSIDERATIONS

Zoning & Permitting:	EN, superimposed by FH
Jurisdiction:	Tillamook County
Site Ownership:	The site is publicly owned.

Tillamook County Dredged Material Disposal Sites

Adjacent Property Issues:	The adjacent lands are undeveloped sand dunes, the north jetty at Tillamook Bay, and the Barview Jetty Park campgrounds. The area has a high recreational use.
Environmental Issues:	The dredged material must be clean marine sand to avoid creating turbidity in the Pacific Ocean.
Water Quality:	None provided the dredged material is clean marine sand.
Noise:	None anticipated, as residences are not in close proximity to the site. As disposal would not likely occur during the night, campers at the Barview Jetty Park campgrounds should not likely be disturbed.
Air Quality:	None anticipated, as residences are not in close proximity to the site. Clean sands would not cause an odor problem for campers at the Barview Jetty Park campgrounds.
Future Use Constraints:	None anticipated.
Economic Issues:	None to minimal site preparation costs.
Land Acquisition:	None
Wetland Mitigation:	None
Site Development:	None to minimal site development costs.

Tillamook County Dredged Material Disposal Sites

SITE T-26

Site Location Description:	North of north jetty and west of Jetty Park campgrounds.
Bay Segment:	
Township/Range/Section(s):	T1N, R10W, Sec 18
Tax Lot:	4300
Size:	9.19 and 4.94 acres. Total of 14.13 acres.
Capacity:	110,000 at 5' depth for both areas

Tillamook County Dredged Material Disposal Sites

PHYSICAL/ENGINEERING CONSIDERATIONS

Topography:	Sand dunes
Access:	Barview Jetty Park Road
Site Drainage:	None
Geotechnical Constraints:	None anticipated
Site Contamination:	None anticipated
Floodplain:	The site is predominantly mapped by FEMA within the 100-year floodplain of Tillamook Bay
Tidal Zone:	The site is elevated above the typical tidal zone; however, sections of the site may be inundated during storm surges and flood events.
Dredging Method:	Pipeline dredge
Design Consideration:	The dike exterior must be protected from flooding or storm surges. Containment berms will need to be constructed from onsite materials with an outflow system required to control turbidity. The disposal site design should maintain a vegetated buffer along the beach and minimize impacts to the recreational use of the area.

BIOLOGICAL CONSIDERATIONS

Habitat Overview:	The site generally consists of stabilized dunes. It also includes salt marsh and freshwater wetland areas as described in the ONSITE WETLANDS section below. The plant community of the upland dunes is dominated by shore pine (*Pinus contorta*), Sitka spruce (*Picea sitchensis*), salal (*Gaultheria shallon*), and European beachgrass (*Ammophila arenaria*). Other vegetation includes California wax-myrtle (*Myrica californica*), evergreen huckleberry (*Vaccinium ovatum*), pearly everlasting (*Anaphalis margaritacea*), coastal strawberry (*Frageria chiloensis*), kinnikinnik (*Arctostaphylos uva-ursi*), and Scotch broom (*Cytisus scoparius*).
TES Species Habitat/On-site:	None. Not suitable western snowy plover habitat due to level of human presence and disturbance.
TES Species Habitat/Adjacent:	Tillamook Bay
Sensitive Habitat Usage:	Tillamook Bay is used by sensitive fish species.
On-site Wetlands:	A salt marsh wetland is present onsite. It is vegetated with halophytes such as salt grass *(Distichlis spicata)*, seaside arrowgrass *(Triglochin maritima)*, fleshy jaumea *(Jaumea carnosa)*, and pickelweed *(Salicornia virginica)*. Also freshwater wetlands are present. The freshwater wetlands are vegetated with Hooker willow *(Salix hookeriana)*, Lyngby sedge *(Carex lyngbyei)*, Pacific silverweed *(Potentilla anserina ssp. pacifica)*, and twinberry *(Lonicera involucrata)*. Wetlands are avoidable and should be avoided.
Riparian Corridor:	None
Site Mitigation:	None anticipated.
BIOLOGICAL IMPACTS	
Hydrology:	None anticipated.
Wetlands:	Wetlands are avoidable, and should be avoided.
Water Quality:	None anticipated. Dredge material is anticipated to be clean sand at this site.
Riparian:	None.

Tillamook County Dredged Material Disposal Sites

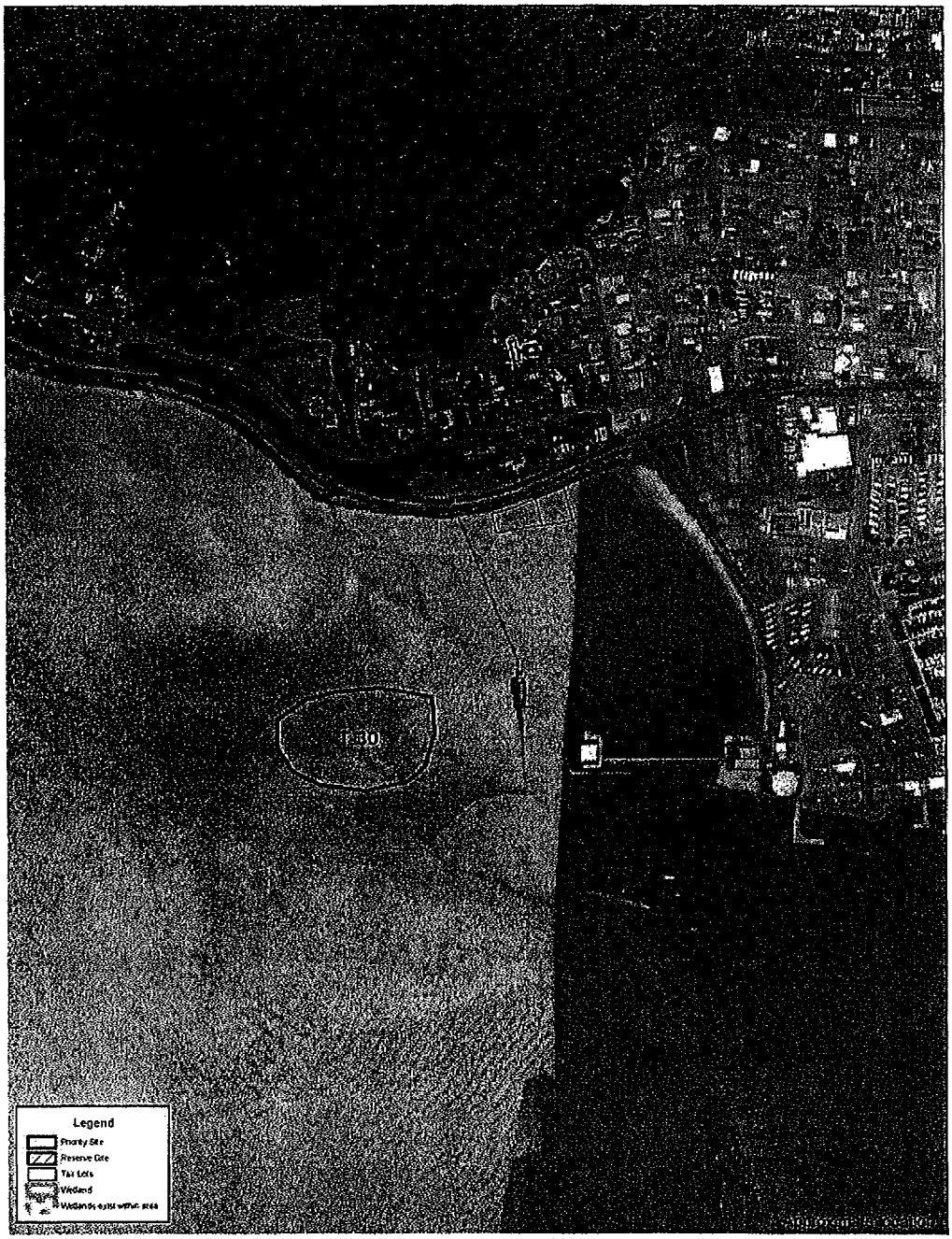
SOCIO-ECONOMIC CONSIDERATIONS

Zoning & Permitting:	R-M, superimposed by SH and FH
Jurisdiction:	Tillamook County
Site Ownership:	The site is publicly owned.
Adjacent Property Issues:	None anticipated. The adjacent lands are ocean beachfront, undeveloped sand dunes, the north jetty at Tillamook Bay and the Barview Jetty Park Campgrounds. The area has a high recreational use.
Environmental Issues:	The dredged material must be contained to prevent the material from re-entering Tillamook Bay and creating turbidity.
Water Quality:	None provided the dredged material is suitably contained to prevent re-entry into Tillamook Bay or the Pacific Ocean and the berms are sufficiently protected from flooding and storm surges.
Noise:	None anticipated, as residences are not in close proximity to the site. As disposal would not likely occur during the night, campers at the Barview Jetty Park campgrounds should not likely be disturbed.
Air Quality:	None anticipated, as residences are not in close proximity to the site. Clean sands would not cause an odor problem for campers at the Barview Jetty Park campgrounds.
Future Use Constraints:	None anticipated.
Economic Issues:	Site preparation costs include clearing, construction of containment berms, and an outflow system.
Land Acquisition:	None.
Wetland Mitigation:	None, assuming wetlands are avoided.
Site Development:	Site development costs include clearing, the construction of containment berms and outflow system.

Tillamook County Dredged Material Disposal Sites

SITE T-30

Site Location Description:	In-water site near navigation channel
Bay Segment:	1
Township/Range/Section(s):	T1N, R10W, Sec 21
Tax Lot:	
Size:	
Capacity:	18,000 cy/year of fine sediment presently permitted by Port of Garibaldi



Tillamook County Dredged Material Disposal Sites

PHYSICAL/ENGINEERING CONSIDERATIONS

Topography: N/A

Access: Via vessel or pipeline

Site Drainage: N/A

Geotechnical Constraints: N/A

Site Contamination: None anticipated

Floodplain: N/A

Tidal Zone: N/A

Dredging Method: Pipeline dredge

Design Consideration: Dredge material would be pumped to site via pipeline and released at outfall below water surface. Dredging will occur during the established in-water work window for Tillamook Bay, which is November through February. Dredging will need to commence at the beginning of ebb tide and continue until one hour before low tide. This is when water velocity at the disposal site is at its greatest, approximately 8.2 to 9.2 feet per second (Baptista et al. 1996). Discharging material during ebb tide ensures that material remains suspended long enough to be carried out of the bay. Site is presently permitted for use by the Corps of Engineers and the Port of Garibaldi.

BIOLOGICAL CONSIDERATIONS

Habitat Overview: The site is an aquatic habitat consisting of estuarine water that circulate between the bay and nearshore marine waters. The water column contains phytoplankton, zooplankton, fish and invertebrates that are transported by the tidal currents.

TES Species Habitat/On-site: The TES species in Tillamook Bay or within the outfall area include the coho salmon (*Oncorhynchus kisutch*), and bald eagles (*Haliaeetus leucocephalus*), which are listed as threatened under the federal Endangered Species Act. In addition, potential effects on steelhead (*Oncorhynchus mykiss*), a candidate for listing under the Endangered Species Act (ESA), and Essential Fish Habitat (EFH), as defined in the Magnuson-Stevens Fishery Conservation and Management Act, are addressed.

Status of fish and wildlife species listed or candidates for listing under the federal Endangered Species Act that occur within Tillamook Bay.

Species	Evolutionarily Significant Unit (ESU)	Listing Status (Reference)	Critical Habitat (Reference)	Biological Information
Coho salmon (*Oncorhynchus kisutch*)	Oregon Coast	Threatened, August 1998 (63 FR 42587)	Yes	Weitkamp et al. 1995
Steelhead (*O. mykiss*)	Oregon Coast	Candidate, March 1998 (63 FR 13347)	None designated	Busby et al. 1996
Bald eagle (*Haliaeetus leucocephalus*)	Not Applicable	Threatened, July 1995 (60 FR 35999)	None designated	USFWS 1986

TES Species Habitat/Adjacent:	None.
Sensitive Habitat Usage:	Tillamook Bay is used by sensitive fish species.
On-site Wetlands:	N/A
Riparian Corridor:	N/A
Site Mitigation:	N/A
BIOLOGICAL IMPACTS	
Hydrology:	None anticipated.
Wetlands:	N/A
Water Quality:	Increased turbidity from within 100' of the outfall. In-water work period for dredging is from November through February when background turbidity is highest in the Bay.
Riparian:	N/A

SOCIO-ECONOMIC CONSIDERATIONS

Zoning & Permitting:	N/A
Jurisdiction:	Oregon Department of State Lands
Site Ownership:	N/A
Adjacent Property Issues:	The U.S. Coast Guard is presently expanding their facility and operation of vessels may affect location of outfall.
Environmental Issues:	The dredged material must be fine material that meets DMEE chemical guidelines. Timing must correspond to inwater work window for Tillamook region which begins in November and extends through February.
Water Quality:	Increased turbidity within the mixing zone which may extend 100' from the outfall.
Noise:	N/A
Air Quality:	N/A
Future Use Constraints:	Development of the US Coast Guard facility.
Economic Issues:	Minimal site preparation will be needed in the improvements to the existing berms and outflow structure. Additional costs will be related to the material rehandling and final disposal site.
Land Acquisition:	None as the County owns the site.
Wetland Mitigation:	N/A
Site Development:	N/A

APPENDIX C

Detailed Site Evaluations -Nehalem Bay

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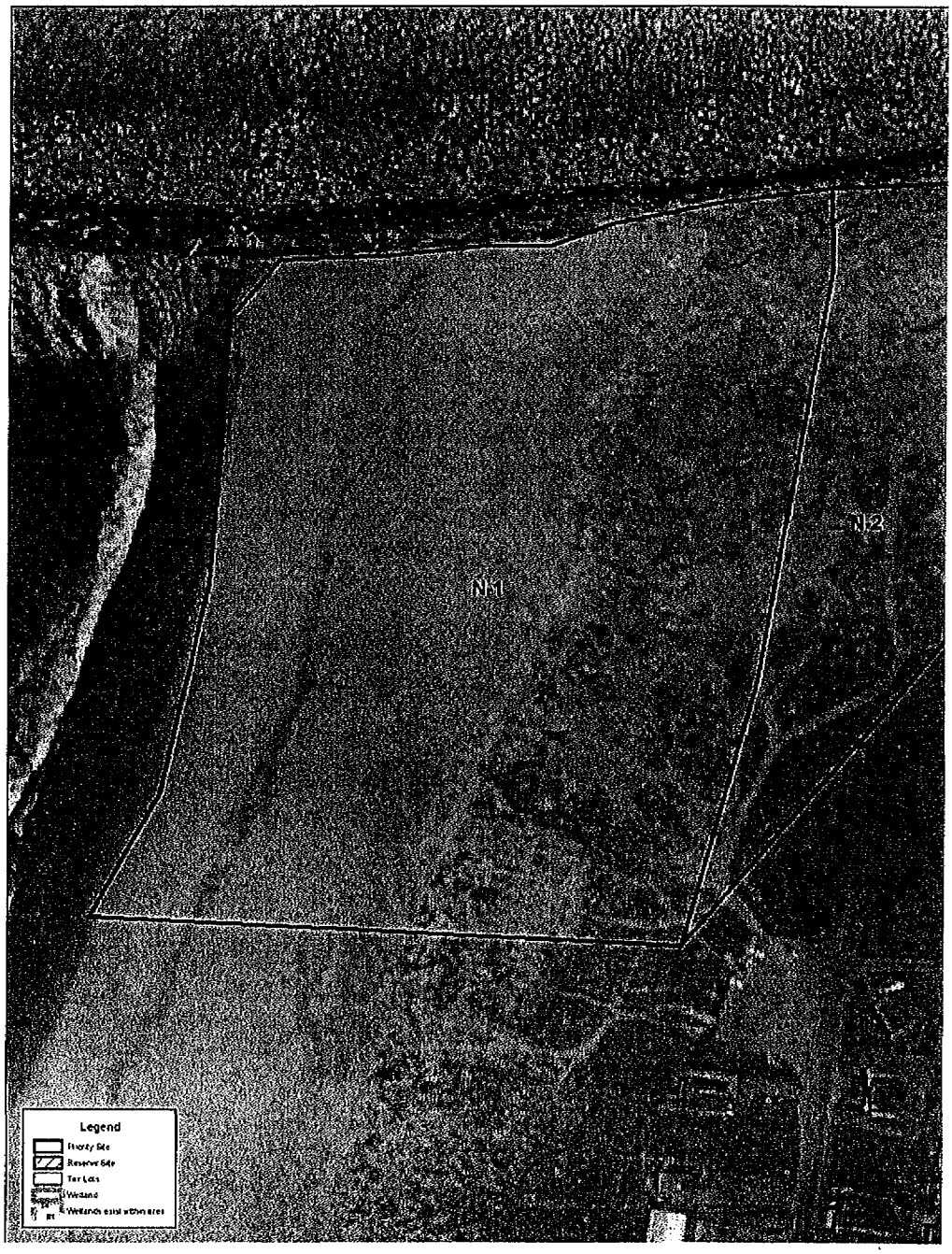
Tillamook County Dredged Material Disposal Sites

SITE N-1

Site Location Description:	South Jetty, ocean beachfront
Bay Segment:	1
Township/Range/Section(s):	T2N, R10W, Sec. 17
Tax Lot:	
Size:	9.92 acres
Capacity:	75,000 cy at 5' depth. The beach nourishment disposal capacity would be unlimited over the long term.



Tillamook County Dredged Material Disposal Sites

PHYSICAL/ENGINEERING CONSIDERATIONS

Topography:	Sandy ocean beachfront
Access:	Through Nedonna Beach residential area in the City of Rockaway, using Beach Street to Beach Drive from Highway 101.
Site Drainage:	None
Geotechnical Constraints:	Through Nedonna Beach residential area in the City of Rockaway, using Beach Street to Beach Drive from Highway 101.
Site Contamination:	None anticipated
Floodplain:	The site is mapped by FEMA within the 100-year floodplain of Nehalem Bay.
Tidal Zone:	The site is tidally influenced.
Dredging Method:	Pipeline or clamshell dredge
Design Consideration:	This beach nourishment site must receive clean marine sands. No containment system would be constructed, and discharge flow would return to the Pacific Ocean.

BIOLOGICAL CONSIDERATIONS

Habitat Overview:	The site consists of open beach adjacent to the rock jetty. It is located near a public parking area, and the habitat receives significant disturbance from recreational beach access. The site is generally not vegetated. The adjacent vegetated dunes are included in Site N2.
TES Species Habitat/On-site:	None. Not suitable western snowy plover habitat due to the level of human presence and disturbance.
TES Species Habitat/Adjacent:	Nehalem Bay is used by TES species.
Sensitive Habitat Usage:	Nehalem Bay is used by TES species.
On-site Wetlands:	None
Riparian Corridor:	None
Site Mitigation:	None anticipated.
BIOLOGICAL IMPACTS	
Hydrology:	None anticipated.
Wetlands:	None
Water Quality:	None anticipated. Dredge material is anticipated to be clean sand at this site.
Riparian:	None.

SOCIO-ECONOMIC CONSIDERATIONS

Zoning & Permitting:	R-M, superimposed by SH and FH
Jurisdiction:	City of Rockaway/Tillamook County
Site Ownership:	The site is publicly owned.

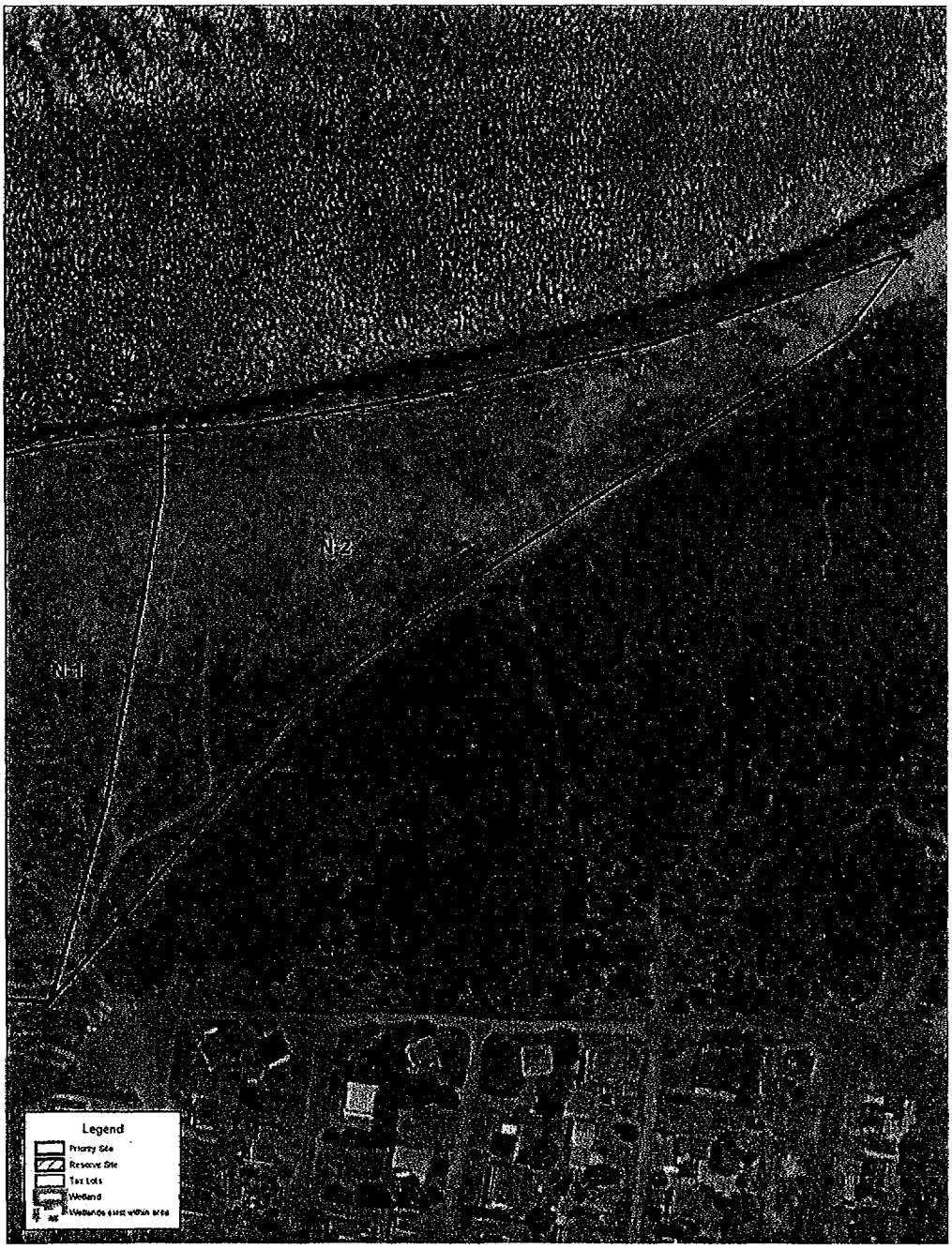
Tillamook County Dredged Material Disposal Sites

Adjacent Property Issues:	Potential for conflicts due to a high recreational use on the beach by tourists and nearby residents. The adjacent lands are ocean beachfront, residences, and an undeveloped upland parcel. The U.S. Army Corps of Engineers would require access to the south jetty for maintenance and upkeep purposes.
Environmental Issues:	The dredged material must be clean marine sand to avoid creating turbidity in the Pacific Ocean.
Water Quality:	None provided the dredged material is clean marine sand.
Noise:	Potential issues are anticipated as residences are in close proximity to the site.
Air Quality:	Potential issues are anticipated as residences are in close proximity to the site and the area sustains a high recreational use.
Future Use Constraints:	None anticipated.
Economic Issues:	None to minimal site preparation costs.
Land Acquisition:	None.
Wetland Mitigation:	None.
Site Development:	None to minimal site preparation costs.

Tillamook County Dredged Material Disposal Sites

SITE N-2

Site Location Description:	Immediately north of Nedonna Beach residential area
Bay Segment:	1
Township/Range/Section(s):	T2N, R10W, Sec. 17
Tax Lot:	100
Size:	6.81 acres
Capacity:	50,000 cy at 5' depth



Tillamook County Dredged Material Disposal Sites

PHYSICAL/ENGINEERING CONSIDERATIONS

Topography:	The site is an open parcel next to the beach and south jetty at Nehalem Bay, which extends from the beach to the railroad tracks. Next to the beach, the sandy area contains large amounts of large woody debris and recreational trails for hiking and walking. As the site becomes more upland, a small drainage bisects the property.
Access:	Through Nedonna Beach residential area in the City of Rockaway, using Beach Street to Beach Drive from Highway 101.
Site Drainage:	A small creek bisects the upland portion of the site and flows towards the northeast into Nehalem Bay.
Geotechnical Constraints:	None anticipated.
Site Contamination:	None anticipated.
Floodplain:	The site is mapped by FEMA within the 100-year floodplain of Nehalem Bay.
Tidal Zone:	The site is elevated above the typical tidal zone; however it is likely inundated during storm surges and flood events.
Dredging Method:	Pipeline dredge
Design Consideration:	The dike exterior must be protected from flooding or storm surges. Drift logs would be stored and replaced after dredging.

BIOLOGICAL CONSIDERATIONS

Habitat Overview:	The site contains a large forested area and dunes. We did not have property access permission, so most of the forested habitat was not observed and additional biological considerations may be present. It appeared to be dominated by shore pine (*Pinus contorta*), salal (*Gaultheria shallon*), Sitka spruce (*Picea sitchensis*), European beachgrass *(Ammophila arenaria*), common velvetgrass (*Holcus lanatus)*, and bentgrass (*Agrostis sp.*). A sensitive stream resource flows through the forested portion of the site. The non-forested portion of the site consists of dunes vegetated with European beachgrass, coastal strawberry (*Frageria chiloensis*), and pearly everlasting (*Anaphalis margaritacea*). This dune habitat also contains extensive large woody debris.
TES Species Habitat/On-site:	None.
TES Species Habitat/Adjacent:	Nehalem Bay is used by TES species.
Sensitive Habitat Usage:	Nehalem Bay is used by TES species.
On-site Wetlands:	Potential wetland areas were observed along the edges of the forested portion of the site. However, we did not have property access permission so wetland conditions were not confirmed. Indicators of potential wetlands included the presence of willow *(Salix sp.)*. The non-forested portion of the site consists of dunes vegetated with European beachgrass. No wetlands were observed in the dunes.
Riparian Corridor:	The riparian corridor associated with the onsite stream is likely a sensitive resource. However, it was not evaluated since we did not have property access permission.
Site Mitigation:	None anticipated, assuming the dune portion of the site is used.

BIOLOGICAL IMPACTS

Hydrology:	None anticipated, assuming the dune portion of the site is used.

Wetlands:	None anticipated, assuming the dune portion of the site is used.
Water Quality:	None anticipated. Dredge material is anticipated to be clean sand at this site.
Riparian:	Sensitive riparian resources exist onsite. However, no impacts are anticipated, assuming the dune portion of the site is used.

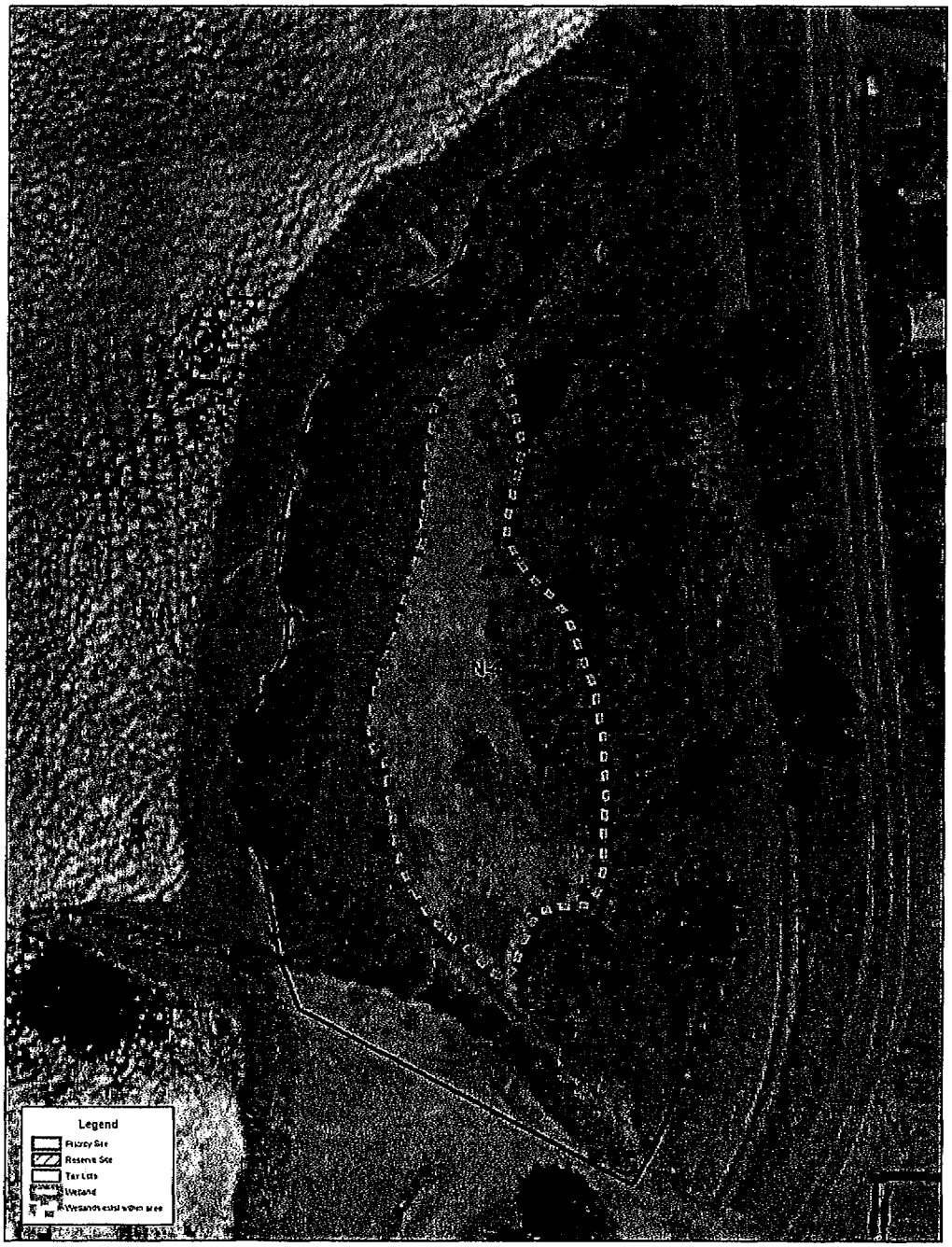
SOCIO-ECONOMIC CONSIDERATIONS

Zoning & Permitting:	R-M, superimposed by SH and FH for Tillamook County R-1 and A-1 for the City of Rockaway
Jurisdiction:	City of Rockaway/Tillamook County
Site Ownership:	The site is privately owned.
Adjacent Property Issues:	The adjacent lands are ocean beachfront and residences.
Environmental Issues:	The dredged material must be contained to prevent the material from re-entering Nehalem Bay or the Pacific Ocean and creating turbidity.
Water Quality:	None provided the dredged material is suitably contained to prevent re-entry into the Nehalem Bay or the Pacific Ocean and the berms are sufficiently protected from flooding and storm surges.
Noise:	Potential issues are anticipated as residences are in close proximity to the site.
Air Quality:	Potential issues are anticipated as residences are in close proximity to the site and the area sustains a high recreational use.
Future Use Constraints:	None anticipated.
Economic Issues:	Site preparation costs include clearing, construction of containment berms, and an outflow system.
Land Acquisition:	Potential issue as the land is in private ownership.
Wetland Mitigation:	None anticipated, assuming the dune portion of the site is used.
Site Development:	Site development costs include clearing, construction of containment berms and outflow system.

Tillamook County Dredged Material Disposal Sites

SITE N-4

Site Location Description:	Open parcel immediately north of the Brighton Marina
Bay Segment:	1
Township/Range/Section(s):	T2N, R10W, Sec. 9
Tax Lot:	4300, 4400
Size:	4.17 acres
Capacity:	18,000 cy at 3' depth



Tillamook County Dredged Material Disposal Sites

PHYSICAL/ENGINEERING CONSIDERATIONS

Topography:	The site is an upland open parcel located north of the Brighton Marina and between the railroad tracks and Nehalem Bay.
Access:	Road access is readily available from Highway 101 at the Brighton Marina
Site Drainage:	None.
Geotechnical Constraints:	None anticipated.
Site Contamination:	None anticipated.
Floodplain:	The site is mapped by FEMA within the 100-year floodplain of Nehalem Bay.
Tidal Zone:	The site is above the tidal zone.
Dredging Method:	Pipeline or clamshell dredge
Design Consideration:	The site received fill from a landslide along Highway 101 in 1999. The existing ground elevations are three to four feet higher than the adjacent marina parking lot. The bank is rocked to provide protection from wave erosion; however, the dike exterior must be protected from flooding or storm surges.

BIOLOGICAL CONSIDERATIONS

Habitat Overview:	The site is mostly open and sparsely vegetated with a shrubby perimeter. The site has been filled with material from a landslide. The sparsely vegetated area is seasonally used for campsites when the adjacent Brighton Marina camping area is full. The site is generally dominated by bentgrass (*Agrostis sp.*) and Scotch broom (*Cytisus scoparius*). The shoreline is dominated by red alder (*Alnus rubra*), and Himalayan blackberry (*Rubus discolor*). The eastern edge of the site is dominated by Himalayan blackberry and Scotch broom. Other vegetation includes orchardgrass (*Dactylis glomerata*), soft rush (*Juncus effusus*), birds-foot trefoil (*Lotus corniculatus*), shore pine (*Pinus contorta*), Sitka spruce (*Picea sitchensis*), and salal (*Gaultheria shallon*). The sparsely vegetated area has some shallow depressions that appear to collect rainwater on the poorly drained soils. These areas appear to potentially meet wetland criteria, as described in the ONSITE WETLANDS section below.
TES Species Habitat/On-site:	None.
TES Species Habitat/Adjacent:	Nehalem Bay is used by TES species.
Sensitive Habitat Usage:	Nehalem Bay is used by TES species.
On-site Wetlands:	The previously filled area has some wetland characteristics. Soils are poorly drained and have a high clay fraction. These poorly drained soils collect rainwater in shallow depressions. The soil matrix was primarily yellowish brown (10YR5/4), but contained dark gray (10YR4/1) inclusions and brownish yellow (10YR6/8) redoximorphic features. The plant community is hydrophytic in the lowest portions of the DMD site, including soft rush, bentgrass, common velvetgrass (*Holcus lanatus*), white clover (*Trifolium repens*), and birds-foot trefoil. Higher portions of the DMD site do not have a hydrophytic plant community and are dominated by Scotch broom. Portions of the previously filled area marginally meet wetland criteria.

	However, since the potential wetland areas are perched on top of fill material, they may or may not be regulated as jurisdictional wetlands. This will need to be resolved through formal wetland delineation and jurisdictional determinations from the regulatory agencies.
Riparian Corridor:	None. Nehalem Bay shoreline is steep with riprap and is vegetated with red alder, Himalayan blackberry, and salmonberry *(Rubus spectabilis)*.
Site Mitigation:	Wetland mitigation may be required if it is determined that jurisdictional wetlands are present, and if they are impacted.
BIOLOGICAL IMPACTS	
Hydrology:	None anticipated.
Wetlands:	Impacts may occur if jurisdictional wetlands are determined to be present, and are filled.
Water Quality:	Water quality impacts may occur if sediments are contaminated.
Riparian:	None. Nehalem Bay shoreline not sensitive. It is steep with riprap and is vegetated with red alder *(Alnus rubra)*, Himalayan blackberry *(Rubus discolor)*, and salmonberry *(Rubus spectabilis)*.

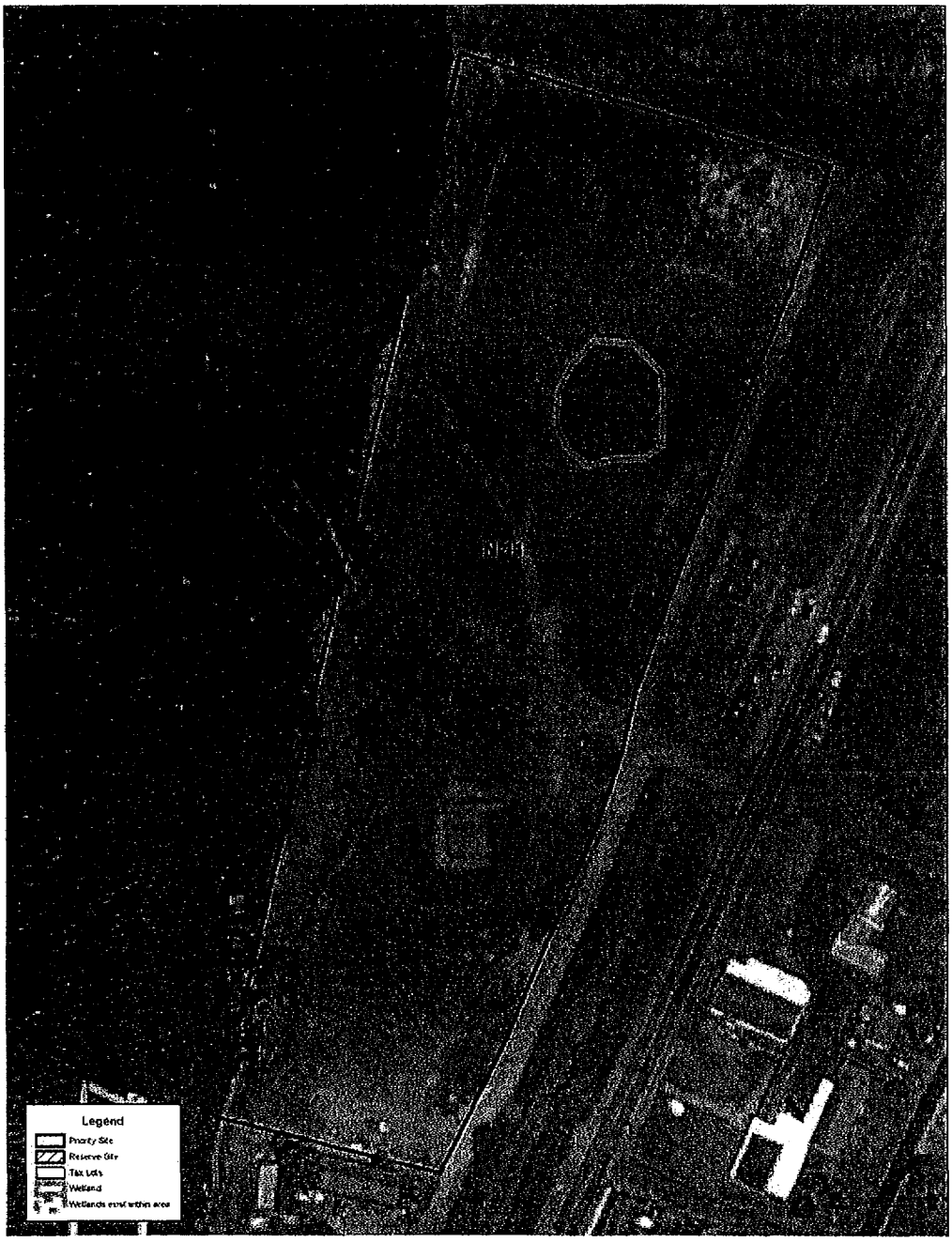
SOCIO-ECONOMIC CONSIDERATIONS

Zoning & Permitting:	WDD, superimposed by SH and FH
Jurisdiction:	Tillamook County
Site Ownership:	Private, with the marina in support of dredging.
Adjacent Property Issues:	The adjacent lands are undeveloped riverbanks to the north and the Brighton Marina to the south.
Environmental Issues:	The dredged material must be contained to prevent the material from re-entering Nehalem Bay and creating turbidity.
Water Quality:	None provided the dredged material is suitably contained to prevent re-entry into the Nehalem Bay and the berms are sufficiently protected from flooding and storm surges.
Noise:	None anticipated. Residences are not in close proximity to the site, and the Brighton Marina is in support of dredging. Traffic on Highway 101 would not likely be affected.
Air Quality:	None anticipated, as residences are not in close proximity to the site. Traffic on Highway 101 would not likely be affected.
Future Use Constraints:	None anticipated.
Economic Issues:	Site preparation costs include construction of containment berms and an outflow system.
Land Acquisition:	None as the marina supports dredging.
Wetland Mitigation:	Wetland mitigation may be required if it is determined that jurisdictional wetlands are present, and if they are impacted.
Site Development:	Site development costs include construction of containment berms and outflow system.

Tillamook County Dredged Material Disposal Sites

SITE N-11

Site Location Description:	North of Dart's Marina, west of Highway 101 in north part of the City of Wheeler UGB
Bay Segment:	2
Township/Range/Section(s):	T2N, R10W, Sec. 2 (BC)
Tax Lot:	4700, 4800
Size:	6.16 acres
Capacity:	35,000 cy at 4' depth



Tillamook County Dredged Material Disposal Sites

PHYSICAL/ENGINEERING CONSIDERATIONS

Topography:	The site is an upland open parcel with a gravel surface in locations and sparse vegetation located north of Dart's Marina, south of Botts Marsh and between the railroad tracks and Nehalem Bay.
Access:	Road access is readily available from Highway 101
Site Drainage:	None.
Geotechnical Constraints:	None anticipated.
Site Contamination:	None anticipated.
Floodplain:	The site is mapped by FEMA within the 100-year floodplain of Nehalem Bay.
Tidal Zone:	The site is elevated above the tidal zone.
Dredging Method:	Pipeline or clamshell dredge
Design Consideration:	The bank is rocked to provide protection from wave erosion; however, the dike exterior must be protected from flooding or storm surges. Containment berms will need to be constructed from on-site materials with an outflow system required to control turbidity. Concrete pads and a short wall are located in the southern central portion of the site. Dredging schedule needs to avoid nearby habitat sensitivity.

BIOLOGICAL CONSIDERATIONS

Habitat Overview:	The majority of the site has been previously filled, but the extensive Botts Marsh wetland area is located at the north end of the site. Botts marsh is dominated by sedges (*Carex spp.*) saltgrass (*Distichlis spicata*), and tufted hairgrass (*Deschampsia cespitosa*). The filled portion of the site is vegetated with a weedy plant community, including Himalayan blackberry (*Rubus discolor*), evergreen blackberry (*Rubus laciniatus*), Queen Anne's lace (*Daucus carota*), Scotch broom (*Cytisus scoparius*), bentgrass (*Agrostis sp.*), common velvetgrass (*Holcus lanatus*), and birds-foot trefoil (*Lotus corniculatus*). A small potential wetland is located within a portion of the filled area, as described in the ONSITE WETLANDS section below.
TES Species Habitat/On-site:	Botts Marsh area may be used by TES fish species.
TES Species Habitat/Adjacent:	Botts Marsh area extends north of the site and may be used by TES fish species. Nehalem Bay is used by TES fish species. Possible eagle nest and Blue Heron habitat nearby, but not verified.
Sensitive Habitat Usage:	Botts Marsh area extends north of the site and may be used by TES fish species. Nehalem Bay is used by TES fish species.
On-site Wetlands:	Wetlands are present throughout the Botts Marsh area at the north end of the site. In addition, a potentially jurisdictional wetland is present on the filled portion of the site. This area has poorly drained soils and is vegetated with reed canarygrass (*Phalaris arundinacea)*, Lyngby sedge *(Carex lyngbyei)*, and soft rush *(Juncus effusus).*
Riparian Corridor:	None. The Nehalem Bay shoreline is a sensitive resource at the north end of the site (at Botts Marsh), but is not sensitive along the filled portion of the site where it has steep banks and pilings.
Site Mitigation:	Wetland mitigation may be required if jurisdictional wetlands are impacted.
BIOLOGICAL IMPACTS	
Hydrology:	None anticipated, assuming the Botts Marsh area is avoided.

Tillamook County Dredged Material Disposal Sites

Wetlands:	Wetland impacts may occur. The Botts Marsh area is a sensitive wetland area that should be avoided. The small wetland that is perched on the filled portion of the site is not a sensitive resource, but may be a jurisdictional wetland.
Water Quality:	Water quality impacts may occur if sediments or DMD site are contaminated.
Riparian:	None. The Nehalem Bay shoreline is a sensitive resource at the north end of the site (at Botts Marsh), but is not sensitive along the filled portion of the site where it has steep banks and pilings. Impacts to the Botts Marsh shoreline should be avoided.

SOCIO-ECONOMIC CONSIDERATIONS

Zoning & Permitting:	WRC and IND
Jurisdiction:	City of Wheeler
Site Ownership:	Private, with the landowner in support of dredging.
Adjacent Property Issues:	The adjacent lands are an undeveloped cove called Botts Marsh to the north and Dart's Marina to the south.
Environmental Issues:	The dredged material must be contained to prevent the material from re-entering Nehalem Bay or Botts Marsh and creating turbidity.
Water Quality:	None provided the dredged material is suitably contained to prevent re-entry into the Nehalem Bay or Botts Marsh and the berms are sufficiently protected from flooding and storm surges.
Noise:	None anticipated as residences are not in close proximity to the site, and the landowner is supportive of dredging. Traffic on Highway 101 would not likely be affected.
Air Quality:	None anticipated, as residences are not in close proximity to the site. Traffic on Highway 101 would not likely be affected.
Future Use Constraints:	None anticipated.
Economic Issues:	Site preparation costs include construction of containment berms and an outflow system.
Land Acquisition:	None as the landowner supports dredging.
Wetland Mitigation:	Wetland mitigation may be required if it is determined that jurisdictional wetlands are present, and if they are impacted.
Site Development:	Site development costs include construction of containment berms and outflow system.

Tillamook County Dredged Material Disposal Sites

SITE N-14A

Site Location Description:	Tillamook County boat ramp & vicinity
Bay Segment:	
Township/Range/Section(s):	T3N, R10W, Sec. 34
Tax Lot:	
Size:	1.07 acres
Capacity:	The site is used only for the temporary rehandling of material.

Tillamook County Dredged Material Disposal Sites

PHYSICAL/ENGINEERING CONSIDERATIONS

Topography:	The Tillamook County boat ramp is surrounded by an asphalt parking lot. An overflow gravel parking lot is located on the opposite side of Tideland Rd.
Access:	Tideland Road off Highway 101, just south of the Highway 101 bridge over the Nehalem River
Site Drainage:	None.
Geotechnical Constraints:	None anticipated.
Site Contamination:	None anticipated.
Floodplain:	The site is likely within the floodway of the Nehalem River, which would preclude the site from permanently receiving fill.
Tidal Zone:	The parking lot is elevated above the tidal influence of the Nehalem River.
Dredging Method:	Clamshell dredge
Design Consideration:	Suitable for a rehandle site. The dredged material must be removed from the site following dredging to accommodate the ongoing use of the boat ramp. Rehandling and a final disposal site are required for the dredged material

BIOLOGICAL CONSIDERATIONS

Habitat Overview:	The county boat launch is a developed site with a boat ramp and associated parking area. The shoreline is very steep with riprap and a large wooden retaining wall.
TES Species Habitat/On-site:	None.
TES Species Habitat/Adjacent:	Nehalem River is used by TES fish species.
Sensitive Habitat Usage:	Nehalem River is used by TES fish species.
On-site Wetlands:	None.
Riparian Corridor:	None. The Nehalem River shoreline consists of very steep riprapped slopes and a large wooden retaining wall at the boat launch site.
Site Mitigation:	None anticipated.
BIOLOGICAL IMPACTS	
Hydrology:	None anticipated
Wetlands:	None.
Water Quality:	Water quality impacts may occur if sediments or DMD site are contaminated.
Riparian:	None.

SOCIO-ECONOMIC CONSIDERATIONS

Zoning & Permitting:	Tillamook County
Jurisdiction:	Tillamook County
Site Ownership:	The site is owned by Tillamook County.

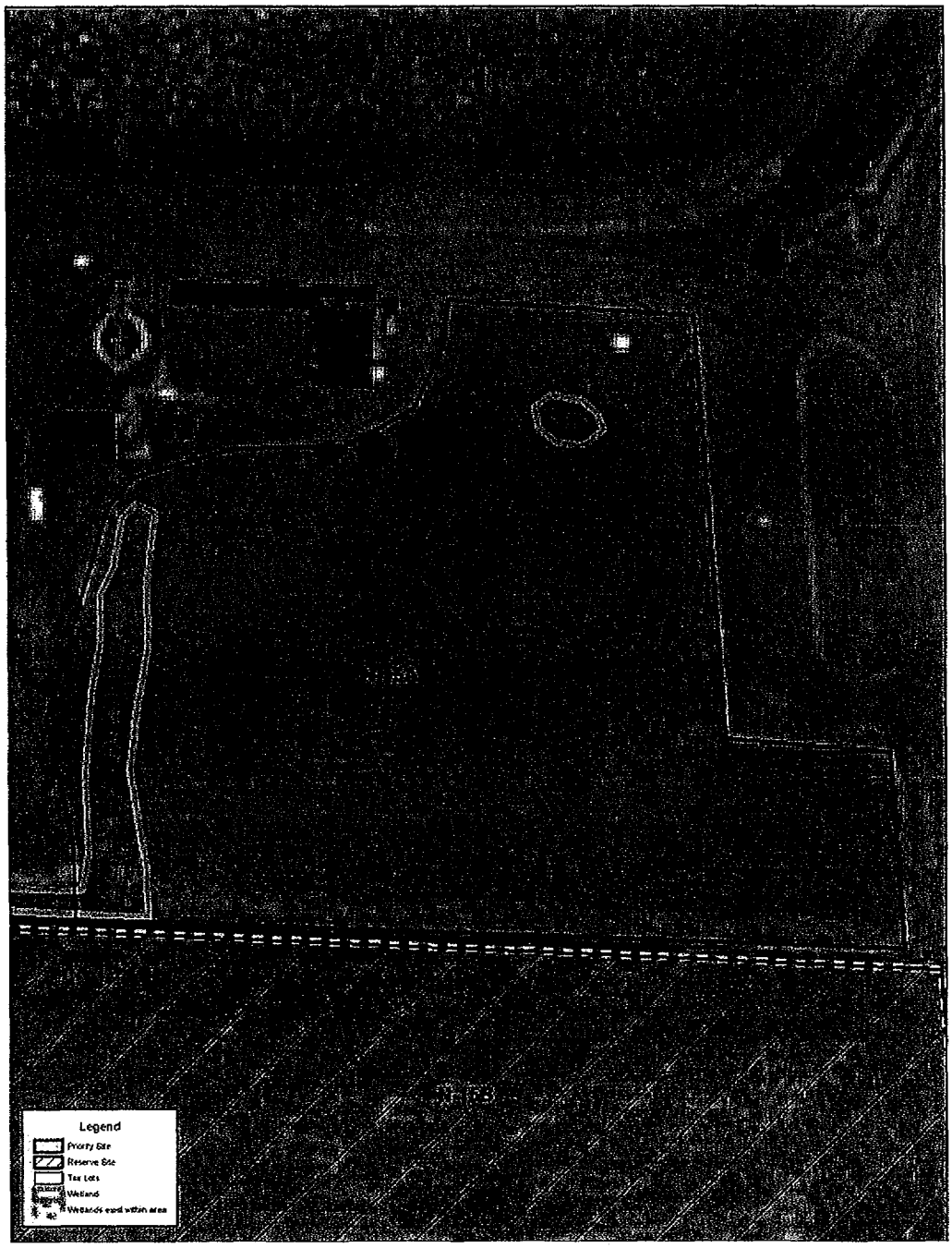
Tillamook County Dredged Material Disposal Sites

Adjacent Property Issues:	The adjacent lands are undeveloped riverbanks, which are tidally influenced, and the Highway 101 bridge over the Nehalem River. Future development of the adjacent parcels is unlikely.
Environmental Issues:	The dredged material must be contained to prevent the material from re-entering the Nehalem River and creating turbidity.
Water Quality:	None provided the dredged material is suitably contained to prevent re-entry into the Nehalem River.
Noise:	None anticipated as residences and businesses are not in close proximity to the site. Traffic on Highway 101 would not likely be disturbed by noise.
Air Quality:	None anticipated as residences and businesses are not in close proximity to the site. Traffic on Highway 101 would not likely be affected by odors. The short-term nature of the dredging work will also help control any potential odor situations.
Future Use Constraints:	None as the dredged material is required to be removed from the site following dredging.
Economic Issues:	Minimal site preparation will be needed in the form of a containment system for dredged material. Additional costs will be related to the material rehandling and final disposal site.
Land Acquisition:	None as the County owns the site.
Wetland Mitigation:	None.
Site Development:	Site development costs include construction of containment berms and outflow system.

Tillamook County Dredged Material Disposal Sites

SITE N-15A

Site Location Description:	Nehalem/Wheeler Sewage Treatment Facilities
Bay Segment:	
Township/Range/Section(s):	T3N, R10W, Sec.27
Tax Lot:	
Size:	1.75 acres
Capacity:	20,000 cy at 8' depth



Tillamook County Dredged Material Disposal Sites

PHYSICAL/ENGINEERING CONSIDERATIONS

Topography:	The site is an upland open parcel located east of the Nehalem/Wheeler Sewage Treatment Facilities.
Access:	Road access is readily available from Tideland Road.
Site Drainage:	None.
Geotechnical Constraints:	None anticipated.
Site Contamination:	None anticipated.
Floodplain:	The site is mapped by FEMA within the 100-year floodplain of the Nehalem River.
Tidal Zone:	The site is outside of the tidal zone.
Dredging Method:	Pipeline dredge.
Design Consideration:	The site has received fill from past dredging episodes in a parcel located closest to the river. The remaining available parcel is located between the sewage treatment facilities and Tideland Road. Pipeline access is readily available along the south boundary of the sewage treatment facilities

BIOLOGICAL CONSIDERATIONS

Habitat Overview:	The usable portion of the site consists of a mowed lawn that is irrigated with treated wastewater effluent. The vegetation is a mix of grasses and herbaceous weeds. Wetland conditions are present onsite, as described in the ONSITE WETLANDS section below.
TES Species Habitat/On-site:	None.
TES Species Habitat/Adjacent:	Nehalem River is used by TES fish species.
Sensitive Habitat Usage:	Nehalem River is used by TES fish species.
On-site Wetlands:	A small wetland area is present within the mowed lawn area that is available for dredge material disposal. The lawn portion of the site is mostly non-wetland, but wetland conditions are present along the toe of a berm, and continue toward the river where a DMD pipe may temporarily be placed. This area receives hydrology from a small pipe outfall, which likely conveys stormwater from the adjacent buildings. Water gradually flows from the pipe outfall, along the toe of the berm, toward a ditch on the adjacent property. Evidence of wetland hydrology included soil saturation and shallow inundation. The plant community is mostly mowed grasses such as common velvetgrass *(Holcus lanatus),* bentgrass *(Agrostis sp.),* and rushes *(Juncus sp.).* Hydric soils were observed with redoximorphic features. The wetland present onsite is artificially influenced by the pipe outfall. It is maintained by mowing, and has limited wetland functions and values. In addition, the lawn area is irrigated with treated wastewater effluent.
Riparian Corridor:	There is no riparian corridor present on the available portion of the DMD site. However, impacts to the Nehalem River riparian corridor should be minimized when transporting the dredge material to the site. The riparian zone is vegetated with willows *(Salix sp.)* and other shrubby vegetation, and native vegetation removal should be minimized.
Site Mitigation:	Wetland mitigation may be required if the small wetland onsite is filled.

BIOLOGICAL IMPACTS

Hydrology:	Impacts to the small, low quality wetland could include hydrology impacts. No other impacts to hydrology are anticipated.
Wetlands:	The small, low quality wetland may be impacted (filled) in the process of dredge material disposal.
Water Quality:	Water quality impacts may occur if sediments or DMD site are contaminated.
Riparian:	Minor impacts to the Nehalem River riparian zone could occur; however, such impacts could be minimized, and may not be significant.

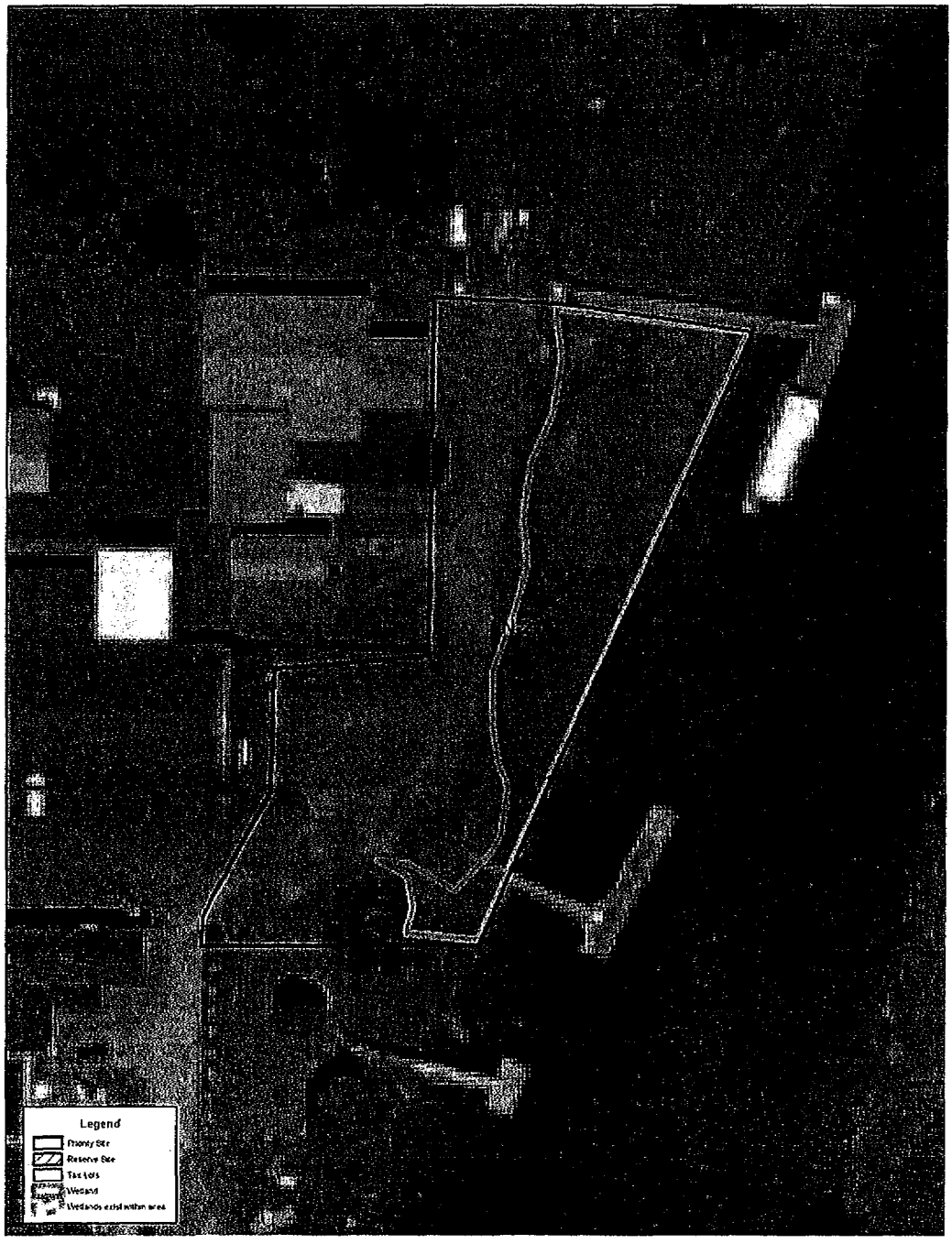
SOCIO-ECONOMIC CONSIDERATIONS

Zoning & Permitting:	F-1, superimposed by SH and FH
Jurisdiction:	Tillamook County
Site Ownership:	North Tillamook County Sanitary Authority
Adjacent Property Issues:	The adjacent lands are agricultural pastures and the Nehalem River.
Environmental Issues:	The dredged material must be contained to prevent the material from re-entering the Nehalem River and creating turbidity.
Water Quality:	None provided the dredged material is suitably contained to prevent re-entry into the Nehalem River.
Noise:	None anticipated as residences or businesses are not in close proximity to the site.
Air Quality:	None anticipated as residences or businesses are not in close proximity to the site.
Future Use Constraints:	None anticipated.
Economic Issues:	Site preparation costs include construction of containment berms and an outflow system for dredged material.
Land Acquisition:	None.
Wetland Mitigation:	Wetland mitigation may be required if the small wetland onsite is filled.
Site Development:	Site development costs include construction of containment berms and outflow system.

Tillamook County Dredged Material Disposal Sites

SITE N-21

Site Location Description:	Immediately north of city docks, City of Nehalem
Bay Segment:	3
Township/Range/Section(s):	T3N, R10W, Sec. 27
Tax Lot:	
Size:	0.60 acres
Capacity:	The site is used only for the temporary rehandling of material.



Tillamook County Dredged Material Disposal Sites

PHYSICAL/ENGINEERING CONSIDERATIONS

Topography:	The area behind the city docks consists of a gravel driveway, which provides access to the Port of Nehalem's docks and a rental property. A grassy area behind the city docks is included within the site boundaries and could potentially also be used. Riverward of the gravel driveway, the river's banks are undeveloped, potentially tidally influenced, and would require a wetland delineation prior to designation as a disposal site.
Access:	At the east end of H Street and east of Highway 101.
Site Drainage:	A small pipe extends from the south pavement edge of H Street, and the discharge runs overland for a short distance into the Nehalem River.
Geotechnical Constraints:	None anticipated.
Site Contamination:	None anticipated.
Floodplain:	The site is mapped by FEMA within the 100-year floodplain of the Nehalem River.
Tidal Zone:	The site boundaries are established outside of the river's tidally influenced zone.
Dredging Method:	Clamshell dredge.
Design Consideration:	Suitable for a rehandle site. The dredged material must be removed from the site following dredging to accommodate the ongoing use of the driveway, which provides access to a rental property and the Port of Nehalem's dock. Rehandling and a final disposal site are required for the dredged material.

BIOLOGICAL CONSIDERATIONS

Habitat Overview:	Much of the site consists of developed paved and graveled roadways. A wetland bench is located along the Nehalem River, as described in the ONSITE WETLANDS section below. Vegetated non-wetland areas contain a mix of grasses and weedy herbaceous species along the roadway shoulder.
TES Species Habitat/On-site:	None.
TES Species Habitat/Adjacent:	Nehalem River is used by TES fish species.
Sensitive Habitat Usage:	Nehalem River is used by TES fish species.
On-site Wetlands:	Wetlands are located on a bench along the Nehalem River shoreline. The wetlands are vegetated with sedges *(Carex spp.)*, cattails *(Typha latifolia)*, and reed canarygrass (Phalaris arundinacea). In addition, there is a small ditch that coveys stormwater runoff from the road to the Nehalem River that may meet wetland criteria. Wetlands are avoidable, but formal wetland delineation should be conducted prior to dredge disposal to prevent impacts (unless the area used is limited to existing roadways).
Riparian Corridor:	The riparian corridor at this site is limited to the wetland bench, which is vegetated with an herbaceous plant community.
Site Mitigation:	Mitigation should be avoidable, assuming no wetland impacts.

BIOLOGICAL IMPACTS

Hydrology:	None anticipated, assuming that there is no activity within the wetland.
Wetlands:	Wetland impacts are avoidable
Water Quality:	Water quality impacts may occur if sediments are contaminated.

Riparian: Impacts to the riparian zone are avoidable.

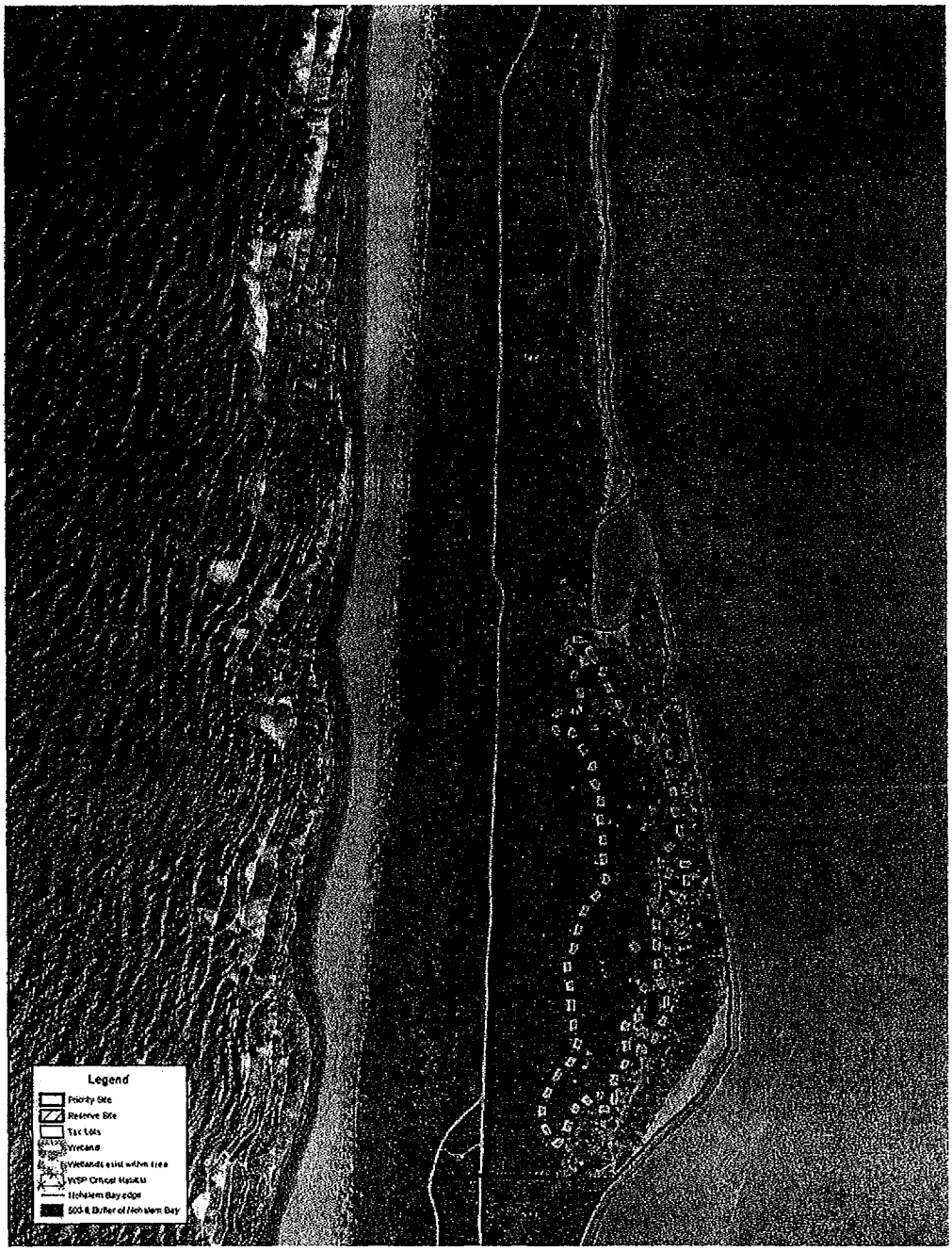
SOCIO-ECONOMIC CONSIDERATIONS

Zoning & Permitting:	City of Nehalem
Jurisdiction:	City of Nehalem
Site Ownership:	The site is owned by the City of Nehalem.
Adjacent Property Issues:	The adjacent lands are undeveloped riverbanks, which are tidally influenced, the Port of Nehalem's dock and businesses and residences in downtown Nehalem.
Environmental Issues:	The dredged material must be contained to prevent the material from re-entering the Nehalem River and creating turbidity.
Water Quality:	None provided the dredged material is suitably contained to prevent re-entry into the Nehalem River.
Noise:	Potential noise issues exist due to the close proximity of residences and businesses; however, the short-term nature of the dredging work will help minimize potential noise situations. Restrictions on the dredging hours of operation could be imposed, if necessary.
Air Quality:	Potential odor issues exist due to the close proximity of residences and businesses. The short-term nature of the dredging work will help control any potential odor situations.
Future Use Constraints:	None as the dredged material is required to be removed from the site following dredging.
Economic Issues:	Minimal site preparation will be needed in the form of a containment system for dredged material. Additional costs will be related to the material rehandling and final disposal site.
Land Acquisition:	None as the city owns the site.
Wetland Mitigation:	None. The site boundaries do not include potential wetlands along the riverbanks.
Site Development:	Minimal site development costs, related to the containment system. Additional costs include material rehandling and final disposal.

Tillamook County Dredged Material Disposal Sites

SITE N-25

Site Location Description:	Nehalem Bay State Park, south of the parking lot
Bay Segment:	1
Township/Range/Section(s):	T2N, R10W, Sec. 5, 8
Tax Lot:	
Size:	128.48 acres
Capacity:	1,240,000 cy at 6' depth



Tillamook County Dredged Material Disposal Sites

PHYSICAL/ENGINEERING CONSIDERATIONS

Topography:	The site is undeveloped sand dunes with some level areas.
Access:	The site is accessible by a 4x4 trail through the state park.
Site Drainage:	None.
Geotechnical Constraints:	None anticipated.
Site Contamination:	None anticipated.
Floodplain:	The site is predominantly mapped by FEMA within the 100-year floodplain.
Tidal Zone:	This site is elevated above the tidal zone.
Dredging Method:	Pipeline dredge.
Design Consideration:	The dredging needs to be coordinated with the State Parks and Recreation Department and avoid impacts to the existing trails. Revegetation would be required following disposal to minimize dispersion of the material. Containment berms would need to be constructed using native materials. The disposal site planning would need to avoid on site wetlands, if possible, or provide mitigation. The disposal site will provide a 50-foot setback from the bay, and the disposal site design will avoid the removal of trees to the maximum extent possible.

BIOLOGICAL CONSIDERATIONS

Habitat Overview:	The majority of the site is dominated by Scotch broom (*Cytisus scoparius*), European beachgrass (*Ammophila arenaria*), and shore pines (*Pinus contorta*). Other vegetation commonly observed included Sitka spruce (*Picea sitchensis*), kinnikinnik (*Arctostaphylos uva-ursi*), evergreen huckleberry (*Vaccinium ovatum*), salal (*Gaultheria shallon*), Himalayan blackberry (*Rubus discolor*), common velvetgrass (*Holcus lanatus*), and coastal strawberry (*Frageria chiloensis*). Large extensive wetlands are present in the southeastern portion of the site, as described in the ONSITE WETLANDS section below. In order to minimize habitat impacts, the areas strongly dominated by Scotch broom and European beachgrass in the northeastern portion of the site could be used for DMD.
TES Species Habitat/On-site:	Columbia white-tailed deer may use the site.
TES Species Habitat/Adjacent:	Nehalem Bay provides habitat for TES fish species.
Sensitive Habitat Usage:	Columbia white-tailed deer may use the site. Nehalem Bay provides habitat for sensitive fish species.
On-site Wetlands:	Large wetland areas are present within the southeastern portion of the site. Some of the areas are reportedly compensatory wetland mitigation sites. The wetlands are generally dominated by sedges (*Carex spp.)*, and are also vegetated with Pacific silverweed *(Potentilla anserina ssp. pacifica)*, golden-eyed grass *(Sisyrinchium californicum)*, three-square bulrush *(Scirpus americanus)*, rushes *(Juncus spp.)*, willows *(Salix sp.)*, and Douglas spirea *(Spiraea douglasii)*.
Riparian Corridor:	None.
Site Mitigation:	No mitigation is anticipated, assuming that wetlands are avoided.

BIOLOGICAL IMPACTS

Hydrology:	No impacts to hydrology are anticipated, assuming wetlands are avoided.
Wetlands:	Wetland impacts are avoidable and should be avoided.
Water Quality:	Water quality impacts may occur if sediments are contaminated.
Riparian:	Impacts to the Nehalem Bay shoreline should be avoided and minimized.

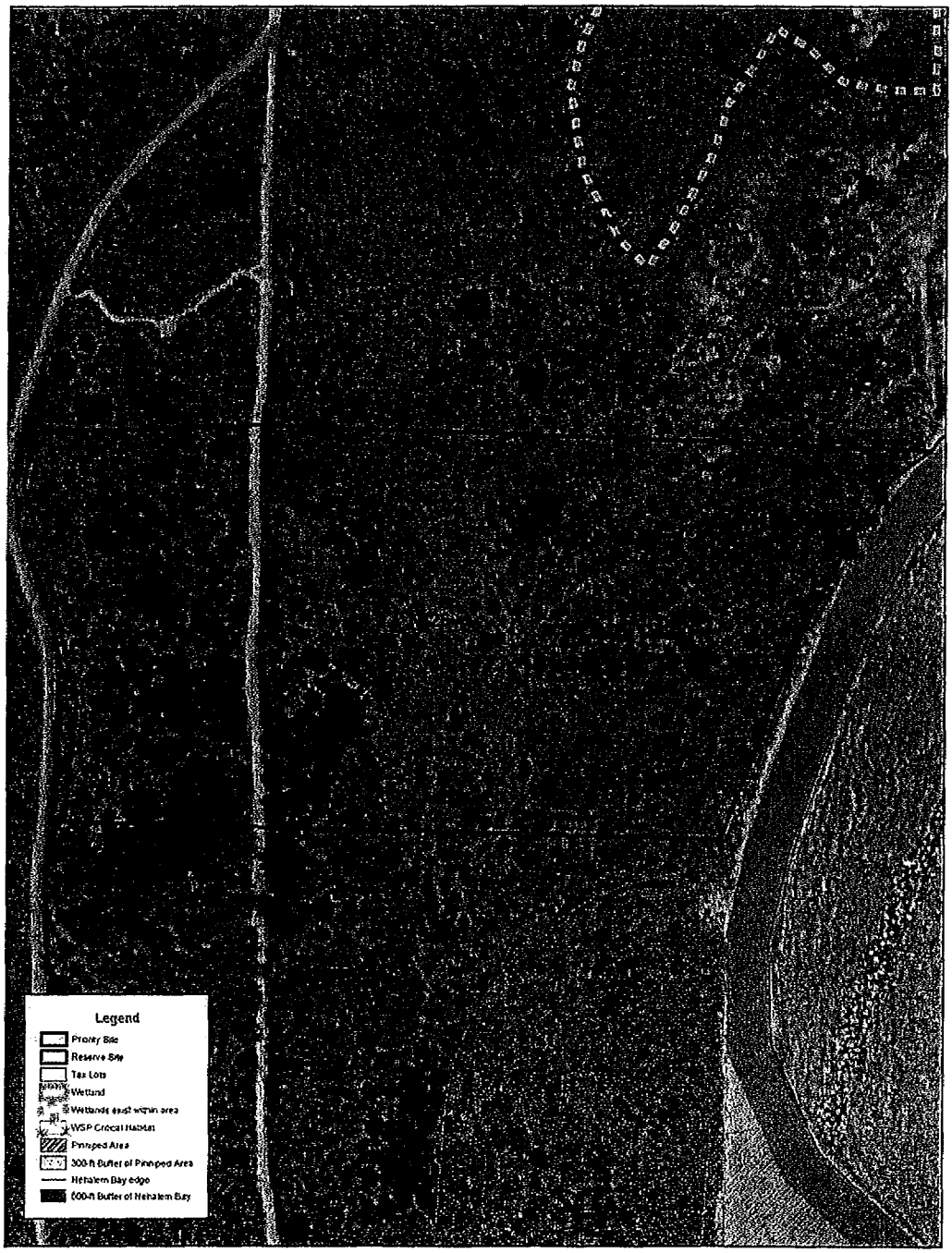
SOCIO-ECONOMIC CONSIDERATIONS

Zoning & Permitting:	R-M, superimposed by SH
Jurisdiction:	Tillamook County
Site Ownership:	The site is owned by the state.
Adjacent Property Issues:	The adjacent lands are undeveloped sand dunes as a part of the state park. Future development of the adjacent parcels is unlikely.
Environmental Issues:	The dredged material must be contained to prevent the material from re-entering Nehalem Bay and creating turbidity.
Water Quality:	None provided the dredged material is suitably contained to prevent re-entry into Nehalem Bay.
Noise:	None anticipated as residences and businesses are not in close proximity to the site. Recreational uses in the state park should not be significantly affected by the short-term nature of the dredging.
Air Quality:	None anticipated as residences and businesses are not in close proximity to the site. Recreational users would not likely be significantly affected.
Future Use Constraints:	None. The dredged material would support the sand dune nature of the state park.
Economic Issues:	Site preparation will be needed in the form of containment berms constructed from native materials and an outflow system.
Land Acquisition:	None as the state owns the site.
Wetland Mitigation:	No mitigation is anticipated, assuming that wetlands are avoided.
Site Development:	Minimal site development costs, related to the construction of containment berms and outflow system.

Tillamook County Dredged Material Disposal Sites

SITE N-26

Site Location Description:	Nehalem Bay State Park, south end of the Nehalem Spit
Bay Segment:	1
Township/Range/Section(s):	T2N, R10W, Sec. 8, 17
Tax Lot:	
Size:	8.84 acres
Capacity:	80,000 cy at 6' depth



Tillamook County Dredged Material Disposal Sites

PHYSICAL/ENGINEERING CONSIDERATIONS

Topography:	The site is undeveloped sand dunes.
Access:	The site is accessible by a 4x4 trail through the state park.
Site Drainage:	None.
Geotechnical Constraints:	None anticipated.
Site Contamination:	None anticipated.
Floodplain:	The site is predominantly mapped by FEMA within the 100-year floodplain.
Tidal Zone:	This site is elevated above the tidal zone.
Dredging Method:	Pipeline dredge.
Design Consideration:	The dredging needs to be coordinated with the State Parks and Recreation Department. The disposal site must be designed to provide a minimum 300-foot setback from the pinniped area, which encompasses the beach along the eastern part of the Nehalem Spit, and not impact the existing trails. Revegetation would be required following disposal to minimize dispersion of the material. Containment berms would need to be constructed using native materials. The disposal site will provide a 50-foot setback from the bay. In addition, the disposal site boundaries are restricted to the area within the existing treelines along the bay and trail. The disposal site design should avoid impacts to trees to the maximum extent possible with the removal of a few interior trees acceptable.

BIOLOGICAL CONSIDERATIONS

Habitat Overview:	The site is generally dominated by Scotch broom (*Cytisus scoparius*), European beachgrass (*Ammophila arenaria*), and shore pines (*Pinus contorta*). Other commonly observed vegetation included Sitka spruce (*Picea sitchensis*), kinnikinnik (*Arctostaphylos uva-ursi*), evergreen huckleberry (*Vaccinium ovatum*), salal (*Gaultheria shallon*), common velvetgrass (*Holcus lanatus*), California wax-myrtle (*Myrica californica*), dune tansy (*Tanacetum bipinnatum ssp. huronense*), and coastal strawberry (*Frageria chiloensis*). A wetland is present onsite, as described in the ONSITE WETLAND section below. A beach along the eastern side of the site is regularly used by pinnipeds (harbor seals) as a haul-out area.
TES Species Habitat/On-site:	Columbia white-tailed deer may use the site.
TES Species Habitat/Adjacent:	Nehalem Bay provides habitat for TES fish species.
Sensitive Habitat Usage:	A pinniped haul-out area is located along the eastern edge of the site. A buffer will be required around this area. Columbia white-tailed deer may use the site. Nehalem Bay provides habitat for sensitive fish species.
On-site Wetlands:	One onsite wetland is present within a depression. It is reportedly a compensatory wetland mitigation site. It is vegetated with sedges *(Carex spp.)*, Pacific silverweed *(Potentilla anserina ssp. pacifica)*, three-square bulrush *(Scirpus americanus)*, softstem bulrush *(Scirpus acutus)*, rushes *(Juncus spp.)*, and willows *(Salix sp.)*.
Riparian Corridor:	None.
Site Mitigation:	No mitigation is anticipated, assuming the wetland is avoided.

BIOLOGICAL IMPACTS

Hydrology:	No impacts to hydrology are anticipated, assuming the wetland is avoided.
Wetlands:	Wetland is avoidable and should be avoided.
Water Quality:	Water quality impacts may occur if sediments are contaminated.
Riparian:	Impacts to the Nehalem Bay shoreline should be avoided and minimized.

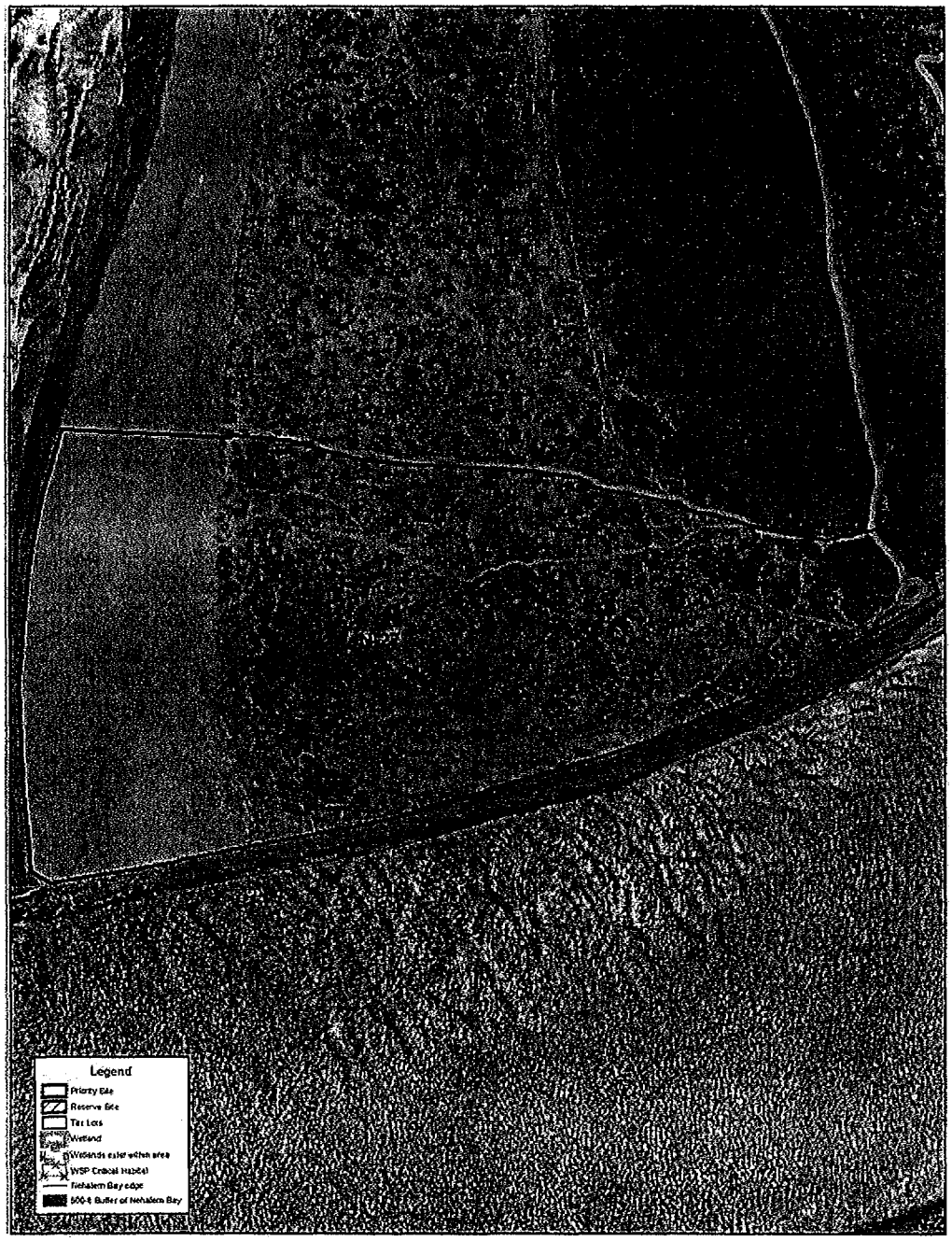
SOCIO-ECONOMIC CONSIDERATIONS

Zoning & Permitting:	R-M, superimposed by SH and FH
Jurisdiction:	Tillamook County
Site Ownership:	The site is owned by the state.
Adjacent Property Issues:	The adjacent lands are undeveloped sand dunes as a part of the state park. Future development of the adjacent parcels is unlikely.
Environmental Issues:	The dredged material must be contained to prevent the material from re-entering Nehalem Bay and creating turbidity.
Water Quality:	None provided the dredged material is suitably contained to prevent re-entry into Nehalem Bay.
Noise:	None anticipated as residences and businesses are not in close proximity to the site. Recreational uses in the state park should not be significantly affected by the short-term nature of the dredging.
Air Quality:	None anticipated as residences and businesses are not in close proximity to the site. Recreational users would not likely be significantly affected.
Future Use Constraints:	None. The dredged material would support the sand dune nature of the state park.
Economic Issues:	Site preparation will be needed in the form of containment berms constructed from native materials and an outflow system.
Land Acquisition:	None as the state owns the site.
Wetland Mitigation:	No mitigation is anticipated, assuming that the wetland is avoided.
Site Development:	Minimal site development costs, related to the construction of containment berms and outflow system.

Tillamook County Dredged Material Disposal Sites

SITE N-27

Site Location Description:	Nehalem Bay State Park, south end of the Nehalem Spit
Bay Segment:	1
Township/Range/Section(s):	T2N, R10W, Sec. 17
Tax Lot:	
Size:	18.3 acres
Capacity:	140,000 cy at 5' depth. Beach nourishment disposal capacity would be unlimited over the long term.



Tillamook County Dredged Material Disposal Sites

PHYSICAL/ENGINEERING CONSIDERATIONS

Topography:	The site is undeveloped sand dunes with large woody debris present. The banks of the bay have been riprapped, but the presence of logs indicates that the area is inundated during storm surges or major flood events.
Access:	The site is accessible by a 4x4 trail through the state park.
Site Drainage:	None.
Geotechnical Constraints:	None anticipated.
Site Contamination:	None anticipated.
Floodplain:	The site is predominantly mapped by FEMA within the 100-year floodplain.
Tidal Zone:	This site is elevated above the tidal zone.
Dredging Method:	Pipeline dredge.
Design Consideration:	The dredging needs to be coordinated with the State Parks and Recreation Department. Revegetation would be required following disposal to minimize dispersion of the material. Containment berms would need to be constructed using native materials. The dredging site would need to be designed such that at least one existing trail to the beach is maintained at the southern end of the spit. The disposal site will provide a 50-foot setback from the bay. Drift logs would be stored to the side during disposal and restored after dredging. Material disposal could occur within the defined snowy plover habitat to create additional suitable habitat for the species; however, agency coordination is required, and the disposal timing will avoid impacts to nesting birds.

BIOLOGICAL CONSIDERATIONS

Habitat Overview:	The usable portion of the site consists of vegetated dunes. The site is generally dominated by European beachgrass (*Ammophila arenaria*). Other vegetation commonly observed included yarrow (*Achillea millefolium*), coastal strawberry (*Frageria chiloensis)*, salal (*Gaultheria shallon*), pearly everlasting (*Anaphalis margaritacea*), dunegrass (*Elymus mollis*), lupine (*Lupinus sp.*), and bighead sedge (*Carex macrocephala var. macrocephala*). One small wetland was observed, as described in the ONSITE WETLANDS section below.
TES Species Habitat/On-site:	Western snowy plover nesting habitat present onsite. The Pacific coast population of western snowy plover is federally listed as a threatened species under the Endangered Species Act. The site has been proposed as western snowy plover critical habitat. Snowy plover nesting would be limited to appropriate habitat along the beach and foredunes. There is currently usable space within the site that is not suitable snowy plover nesting habitat. However, expansion of snowy plover nesting habitat may occur in the future by removing European beachgrass. Dredge disposal may be used in conjunction with nesting habitat expansion, since dredge disposal material has been documented as potential nesting habitat. It is also possible that the coastal populations of western snowy plovers may be delisted in the future depending on genetic testing that is currently occurring. If the inland populations are not genetically distinct from the coastal populations, delisting may be proposed. Columbia white-tailed deer may use the site.

TES Species Habitat/Adjacent:	Nehalem Bay provides habitat for TES fish species.
Sensitive Habitat Usage:	Western snowy plovers and Columbia white-tailed deer may use the site. Nehalem Bay provides habitat for TES fish species.
On-site Wetlands:	One very small wetland was identified near the end of the road. It is sparsely vegetated with rushes *(Juncus spp.)*. The substrate is approximately eight inches of sand with redoximorphic features, on top of rock (it is located along the jetty).
Riparian Corridor:	None.
Site Mitigation:	None anticipated, assuming the small wetland is avoided.
BIOLOGICAL IMPACTS	
Hydrology:	None anticipated assuming the wetland is avoided.
Wetlands:	Wetland is small and avoidable
Water Quality:	Water quality impacts may occur if sediments are contaminated.
Riparian:	The Nehalem Bay shoreline is riprapped and not sensitive.

SOCIO-ECONOMIC CONSIDERATIONS

Zoning & Permitting:	R-M, superimposed by SH and FH
Jurisdiction:	Tillamook County
Site Ownership:	The site is owned by the state.
Adjacent Property Issues:	The adjacent lands are undeveloped sand dunes as a part of the state park. Future development of the adjacent parcels is unlikely.
Environmental Issues:	The dredged material must be contained to prevent the material from re-entering Nehalem Bay or the Pacific Ocean and creating turbidity.
Water Quality:	None provided the dredged material is suitably contained to prevent re-entry into Nehalem Bay or the Pacific Ocean.
Noise:	None anticipated as residences and businesses are not in close proximity to the site. Recreational uses in the state park should not be significantly affected by the short-term nature of the dredging.
Air Quality:	None anticipated as residences and businesses are not in close proximity to the site. Recreational users would not likely be significantly affected.
Future Use Constraints:	None. The dredged material would support the sand dune nature of the state park.
Economic Issues:	Site preparation will be needed in the form of containment berms constructed from native materials and an outflow system.
Land Acquisition:	None as the state owns the site.
Wetland Mitigation:	None anticipated, assuming the small wetland is avoided.
Site Development:	None.

APPENDIX D

Reserve Sites

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Tillamook County Dredged Material Disposal Sites

SITE T-5

Site Location Description:	Located between Tillamook County boat launch and private oyster processing facilities at Memaloose Point
Bay Segment:	3
Township/Range/Section(s):	T1S, R10W, Sec. 22
Tax Lot:	200
Size:	1.10 acres
Capacity:	The site is used only for the temporary rehandling of material.

Tillamook County Dredged Material Disposal Sites

PHYSICAL/ENGINEERING CONSIDERATIONS

Topography:	The site consists of a flat upland parcel, adjacent to the boat launch and private warehouses previously used for oyster processing.
Access:	Bayocean Road
Site Drainage:	None
Geotechnical Constraints:	None anticipated
Site Contamination:	None anticipated
Floodplain:	The site is mapped by FEMA within the 100-year floodplain of the Tillamook River.
Tidal Zone:	The site boundaries are elevated above the tidal influence of the Tillamook River.
Dredging Method:	Clamshell dredge
Design Consideration:	Suitable for a rehandle site. The dredged material must be removed from the site following dredging or relocated to a portion of the site away from the river. Rehandling and a final disposal site are required for the dredged material.

BIOLOGICAL CONSIDERATIONS

Habitat Overview:	The majority of the site is developed with buildings previously used for oyster processing. Small mowed lawn areas remain. The site has been filled and leveled. The shoreline consists of a wooden retaining wall.
TES Species Habitat/On-site:	None onsite
TES Species Habitat/Adjacent:	TES fish species use adjacent Tillamook River.
Sensitive Habitat Usage:	Sensitive fish species use adjacent Tillamook River.
On-site Wetlands:	None
Riparian Corridor:	No riparian corridor onsite. Riparian area is not sensitive. Shoreline consists of wooded retaining wall.
Site Mitigation:	None anticipated.
BIOLOGICAL IMPACTS Hydrology:	None
Wetlands:	None
Water Quality:	Water quality impacts may occur if sediments are contaminated.
Riparian:	The riparian zone is not sensitive. Shoreline consists of a wooden retaining wall.

SOCIO-ECONOMIC CONSIDERATIONS

Zoning & Permitting:	Tillamook County
Jurisdiction:	Tillamook County
Site Ownership:	The site is privately owned.

Tillamook County Dredged Material Disposal Sites

Adjacent Property Issues:	The adjacent lands are undeveloped riverbanks, which are tidally influenced, and the oyster processing facilities. Future development of the warehouses is possible; however, continued use of the parcel of land adjacent to the river as a dredging rehandle site should not be necessarily precluded.
Environmental Issues:	The dredged material must be contained to prevent the material from re-entering the Tillamook River and creating turbidity.
Water Quality:	None provided the dredged material is suitably contained to prevent re-entry into the Tillamook River.
Noise:	None anticipated as residences and businesses are not in close proximity to the site.
Air Quality:	None anticipated as residences and businesses are not in close proximity to the site. The short-term nature of the dredging work will also help control any potential odor situations.
Future Use Constraints:	None provided the dredged material is removed from the site following dredging.
Economic Issues:	Minimal site preparation will be needed in the form of a containment system for dredged material. Additional costs will be related to the material rehandling and final disposal site.
Land Acquisition:	None as the County owns the site.
Wetland Mitigation:	None
Site Development:	Minimal site development costs, related to the containment system. Additional costs include material rehandling and final disposal.

Tillamook County Dredged Material Disposal Sites

SITE T-20

Site Location Description:	Old Mill Marina
Bay Segment:	1
Township/Range/Section(s):	
Tax Lot:	
Size:	22.14 acres
Capacity:	

Tillamook County Dredged Material Disposal Sites

PHYSICAL/ENGINEERING CONSIDERATIONS

Topography:	The terrain for the majority of the Old Mill site is relatively flat with the existing disposal site elevated and located at the southern end of the parcel.
Access:	Through the Old Mill Marina site at Garibaldi.
Site Drainage:	None
Geotechnical Constraints:	None anticipated
Site Contamination:	An oily sheen was observed at the base of the disposal site along the beach. Further evaluation is recommended to assess the chemicals present at the site and the potential impacts of surcharging the site with regards to chemical migration.
Floodplain:	The site is outside of the 100-year floodplain of the Tillamook Bay as mapped by FEMA.
Tidal Zone:	The site is elevated above the typical tidal zone; however, sections of the site are likely inundated during storm surges and flood events.
Dredging Method:	Pipeline dredge
Design Consideration:	The site has an existing containment berm and outfall system, which would need to be evaluated and likely improved prior to the next use. The berm exterior should likely be protected from flooding or storm surges.

BIOLOGICAL CONSIDERATIONS

Habitat Overview:	The majority of the site has been developed (Old Mill site). The south end of the site contains maintained grassy areas with a series of ponds that were apparently previously associated with dredge material disposal.
TES Species Habitat/On-site:	None
TES Species Habitat/Adjacent:	Tillamook Bay
Sensitive Habitat Usage:	Sensitive fish species use adjacent Tillamook Bay.
On-site Wetlands:	Ponds are present onsite that meet wetland criteria. They are well-defined ponds with very steep banks. They appear to have been constructed as DMD basins, and may or may not be considered jurisdictional wetlands.
Riparian Corridor:	None
Site Mitigation:	Wetland mitigation may be required if jurisdictional wetlands are filled.
BIOLOGICAL IMPACTS	
Hydrology:	Impacts to hydrology may occur if existing ponds are used as DMD sites.
Wetlands:	Impacts to wetlands may occur if the existing ponds are filled. However, the ponds appear to be constructed DMD basins and may of may not be jurisdictional wetlands. Wetland impacts may be avoidable
Water Quality:	Water quality impacts may occur if sediments or DMD sites are contaminated.
Riparian:	None. Tillamook Bay shoreline is steep.

Tillamook County Dredged Material Disposal Sites

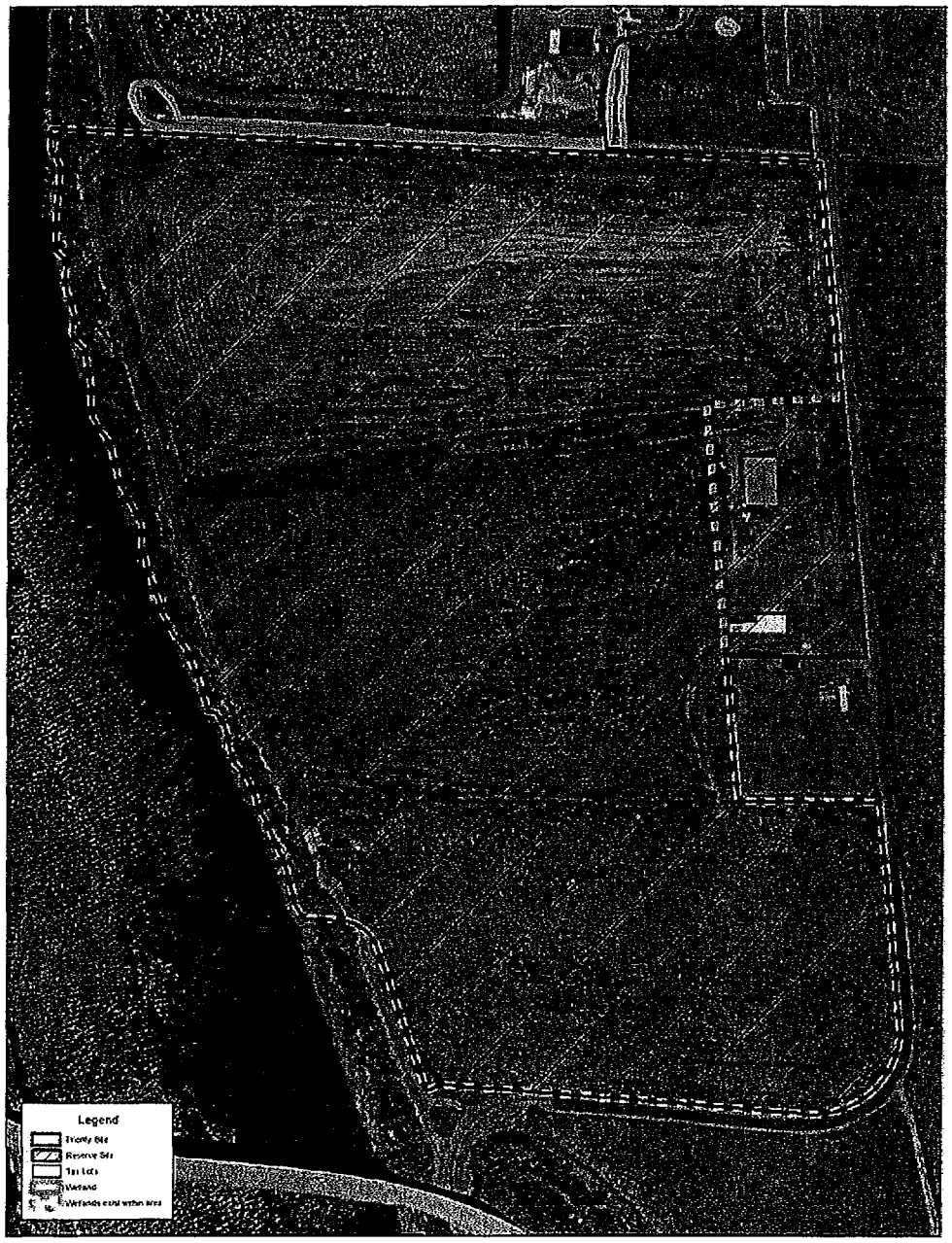
SOCIO-ECONOMIC CONSIDERATIONS

Zoning & Permitting:	City of Garibaldi/Tillamook County
Jurisdiction:	City of Garibaldi/Tillamook County
Site Ownership:	Private Ownership
Adjacent Property Issues:	None at this time as the surrounding properties include the Old Mill site and land owned by the Port of Garibaldi. Depending upon the redevelopment plan for the Old Mill site, the potential exists for conflicts in the future. The site is visible from Highway 101 and Nehalem Bay; however, the visual impact is not considered significant.
Environmental Issues:	The dredged material must be contained to prevent the material from re-entering Tillamook Bay and creating turbidity.
Water Quality:	None provided the dredged material is suitably contained to prevent re-entry into Tillamook Bay.
Noise:	None anticipated as residences and businesses are not in close proximity to the site at this time. Depending upon the future redevelopment of the Old Mill site, the noise impacts may need to be re-evaluated or conditions applied to dredging.
Air Quality:	None anticipated as residences and businesses are not in close proximity to the site at this time. Depending upon the redevelopment of the Old Mill site, the impacts may need to be re-evaluated in the future.
Future Use Constraints:	None as the site has been previously used as a disposal site.
Economic Issues:	Minimal site preparation will likely be needed to improve the existing containment berms and outflow system.
Land Acquisition:	Potentially likely as the site is privately owned.
Wetland Mitigation:	Wetland mitigation may be required if existing ponds are filled.
Site Development:	The site contains an existing disposal site with development limited to improving the existing berms and outflow system as necessary.

Tillamook County Dredged Material Disposal Sites

SITE N-15B

Site Location Description:	Pasture along Nehalem River, south of sewage treatment facilities
Bay Segment:	3
Township/Range/Section(s):	T3N, R10W, Sec.27
Tax Lot:	
Size:	45.45 acres
Capacity:	580,000 cy at 8' depth



Tillamook County Dredged Material Disposal Sites

PHYSICAL/ENGINEERING CONSIDERATIONS

Topography:	Flat agricultural land
Access:	Road access is readily available from Tideland Road.
Site Drainage:	None
Geotechnical Constraints:	None anticipated
Site Contamination:	None anticipated
Floodplain:	Site is located within the 100-year floodplain of the Nehalem River.
Tidal Zone:	The site is outside of the tidal zone.
Dredging Method:	Pipeline dredge
Design Consideration:	For pipeline dredging, access to property could occur through tidegate structures along the Nehalem River. May be desirable to strip and stockpile existing topsoil.

BIOLOGICAL CONSIDERATIONS

Habitat Overview:	Did not have landowner permission to access the site. The site is a large wetland pasture with a lot of soft rush (*Juncus effusus).*
TES Species Habitat/On-site:	None.
TES Species Habitat/Adjacent:	Nehalem River is used by TES fish species.
Sensitive Habitat Usage:	Nehalem River is used by TES fish species.
On-site Wetlands:	Yes, extensive wetland pasture with a lot of soft rush (*Juncus effusus).*
Riparian Corridor:	Not evaluated. There is a berm on the river side of the site.
Site Mitigation:	Yes.
BIOLOGICAL IMPACTS	
Hydrology:	Impacts to the wetland could include hydrology impacts. No other impacts to hydrology are anticipated.
Wetlands:	Yes.
Water Quality:	Water quality impacts may occur if sediments or DMD site are contaminated.
Riparian:	Impacts to riparian are likely avoidable.

SOCIO-ECONOMIC CONSIDERATIONS

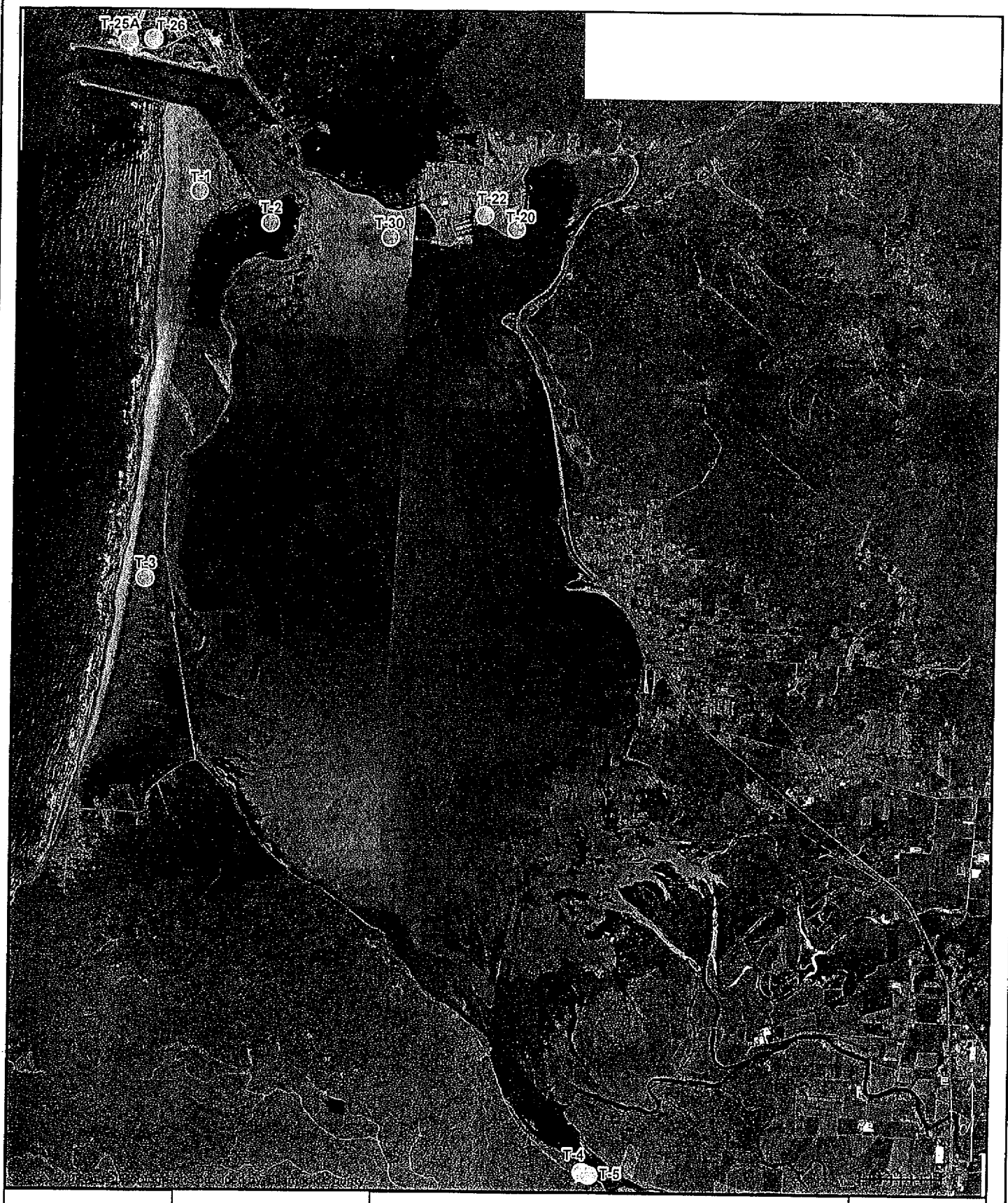
Zoning & Permitting:	F-1, superimposed by SH and FH
Jurisdiction:	Tillamook County
Site Ownership:	Private
Adjacent Property Issues:	Adjacent lands are agricultural pastures and the Nehalem River.

Tillamook County Dredged Material Disposal Sites

Environmental Issues:	Dredged material must be contained to prevent the material from re-entering the Nehalem River and creating turbidity.
Water Quality:	None provided the dredged material is suitably contained to prevent re-entry into the Nehalem River.
Noise:	Potential impacts as a residence is in close proximity to the site.
Air Quality:	Potential impacts as a residence is in close proximity to the site.
Future Use Constraints:	Potential impacts to agricultural use unless soil amendments and improvements are employed.
Economic Issues:	Site preparation costs include construction of containment berms and an outflow system for dredged material and soil amendments for continued agricultural use.
Land Acquisition:	Potential as private ownership/
Wetland Mitigation:	High potential
Site Development:	Site development costs include construction of containment berms and outflow system and soil amendments for continued agricultural use.

APPENDIX E

Site Photographs



PBS

Project #: 70384.000
Date: January 2006

Prepared for:

Tillamook County
Port of Garibaldi
Port of Nehalem
Economic Development Council
of Tillamook County

Tillamook Bay Photograph Locations

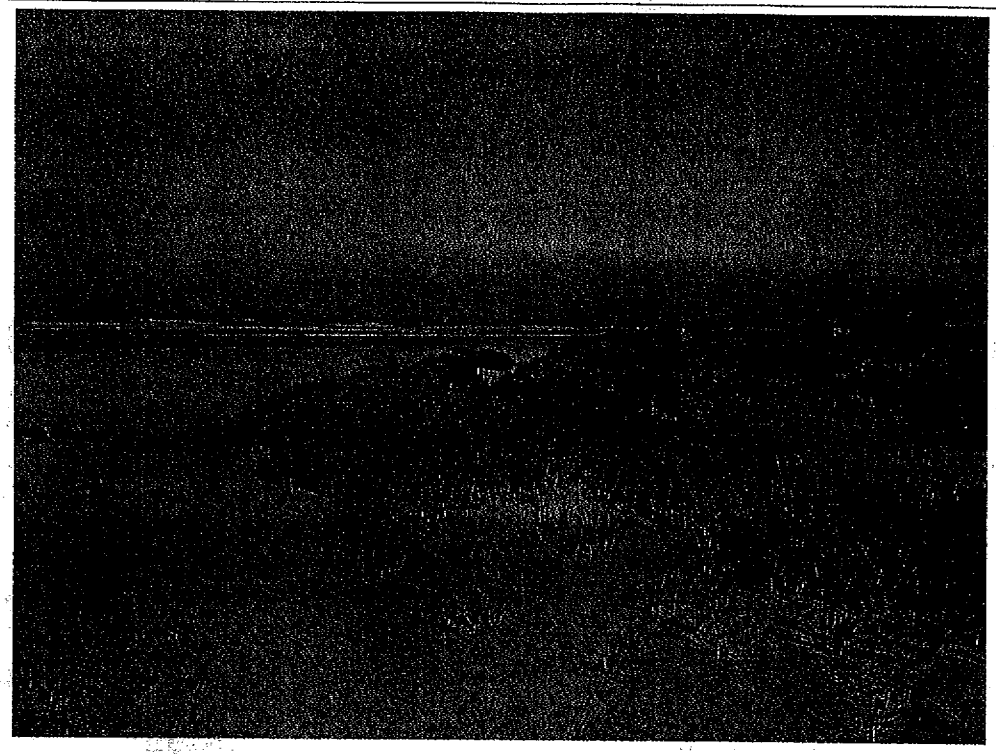


PHOTO 1: T-1

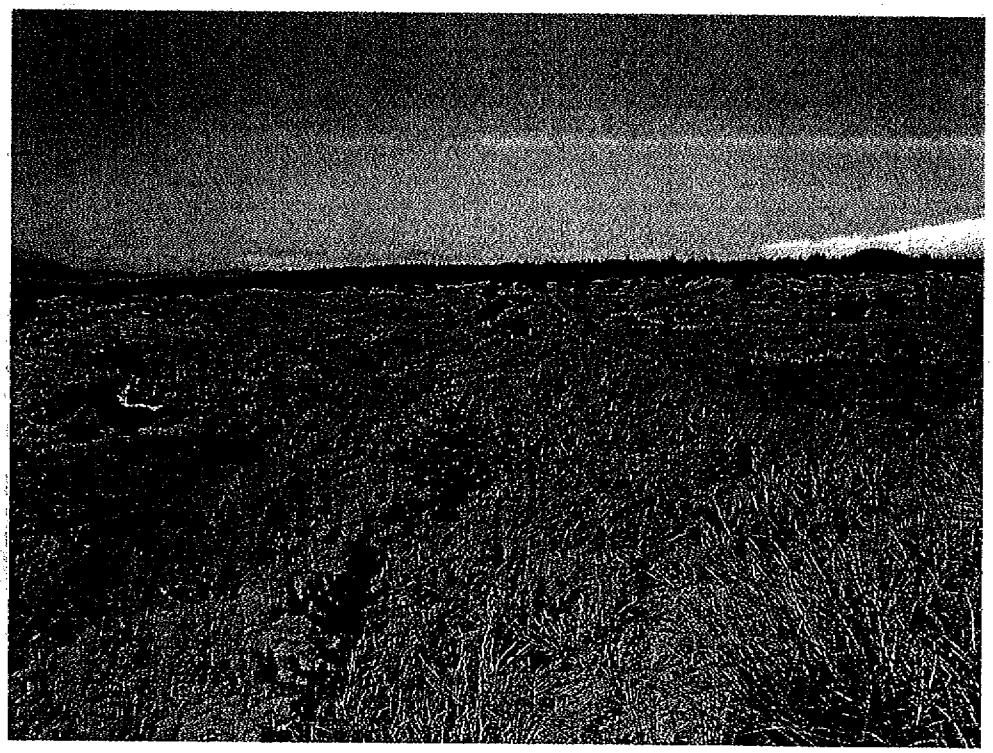


PHOTO 2: T-1

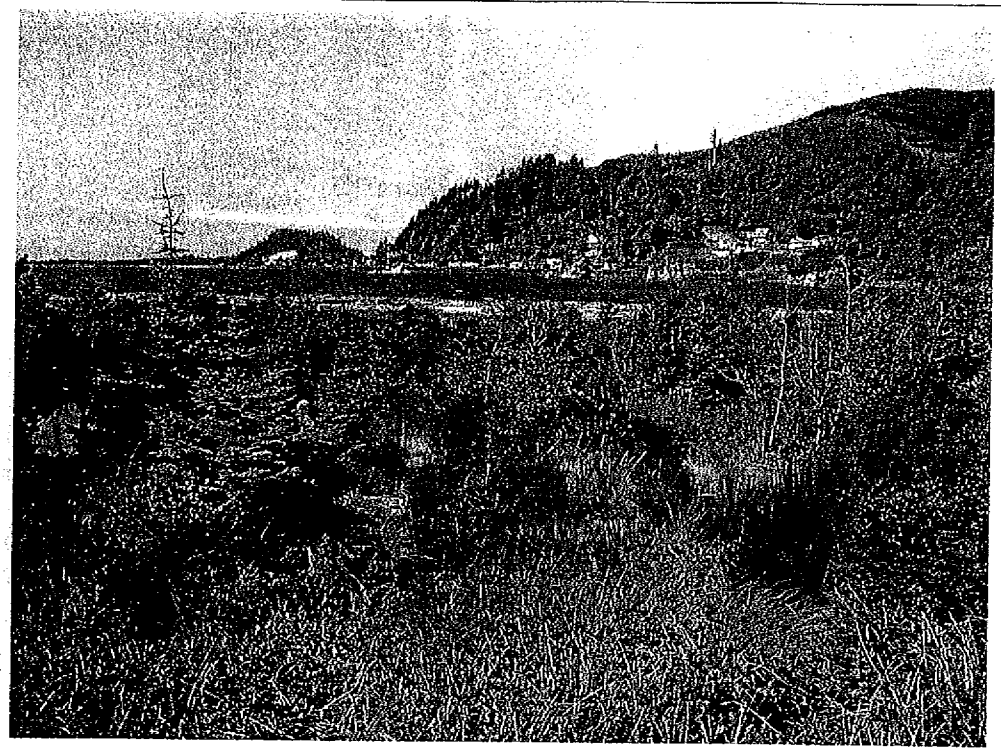


PHOTO 3: T-2

PHOTO 4: T-2

PHOTO 5: T-3

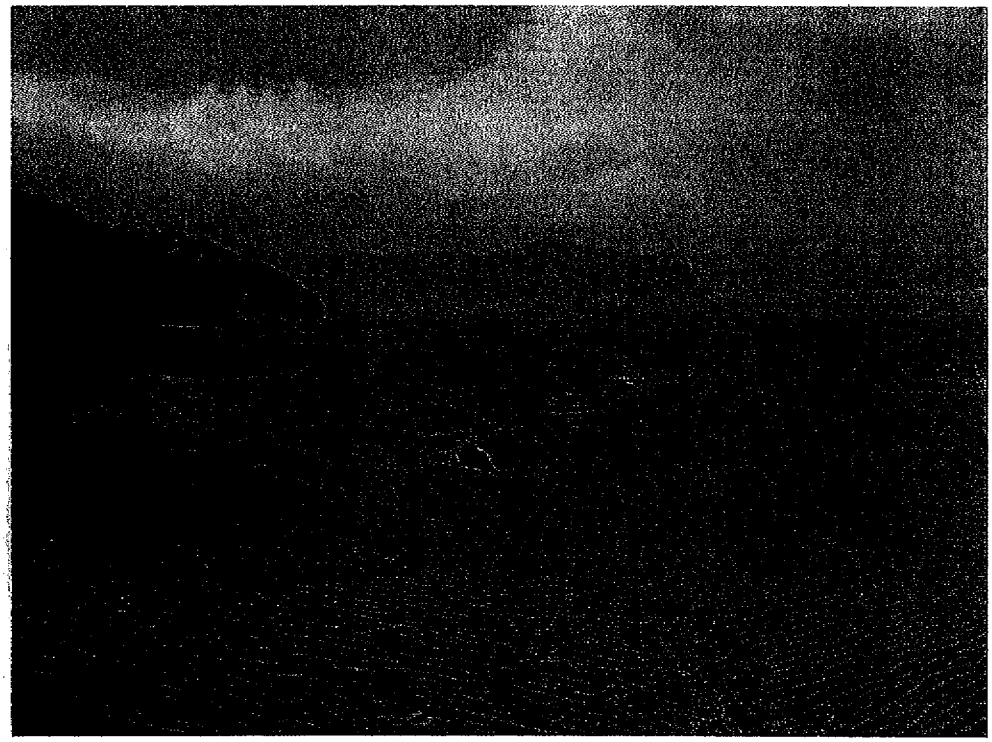


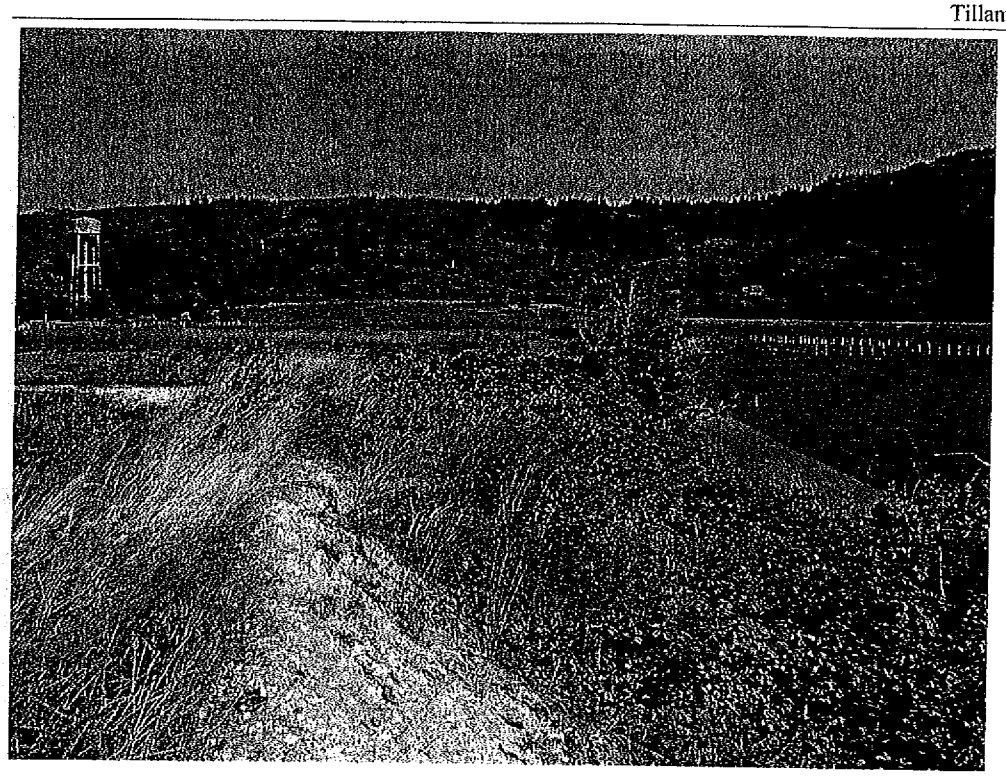
PHOTO 6: T-3

PHOTO 7: T-4

PHOTO 8: T-4

PHOTO 9: T-5

PHOTO 10: T-5



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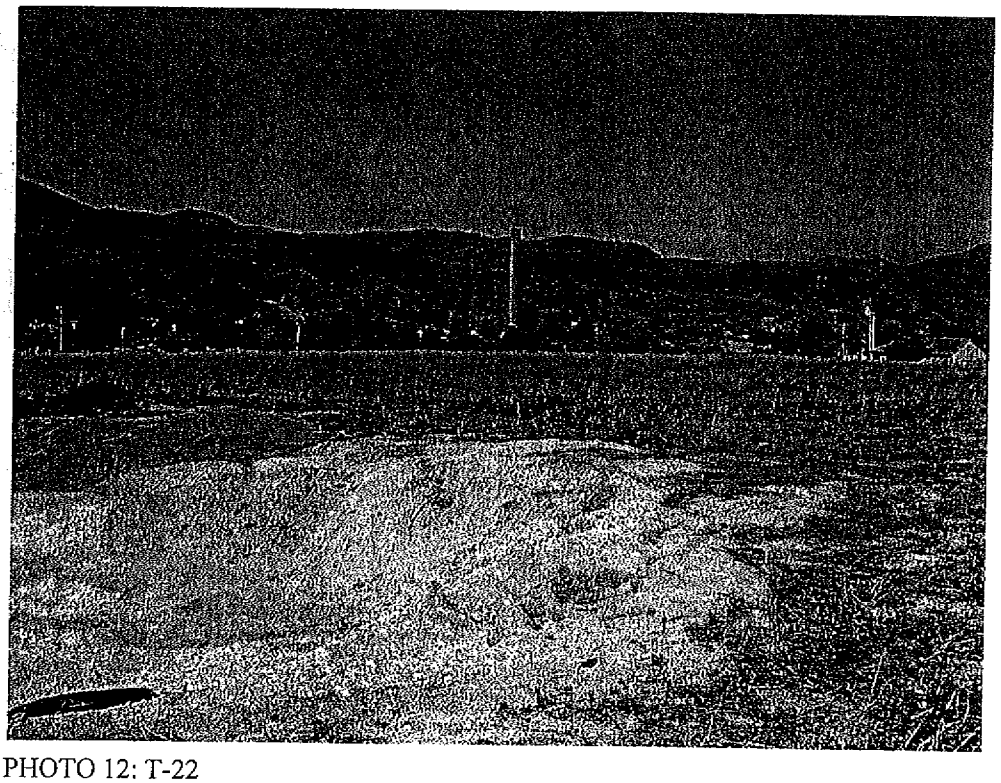


PHOTO 12: T-22

PHOTO 13: T-25A

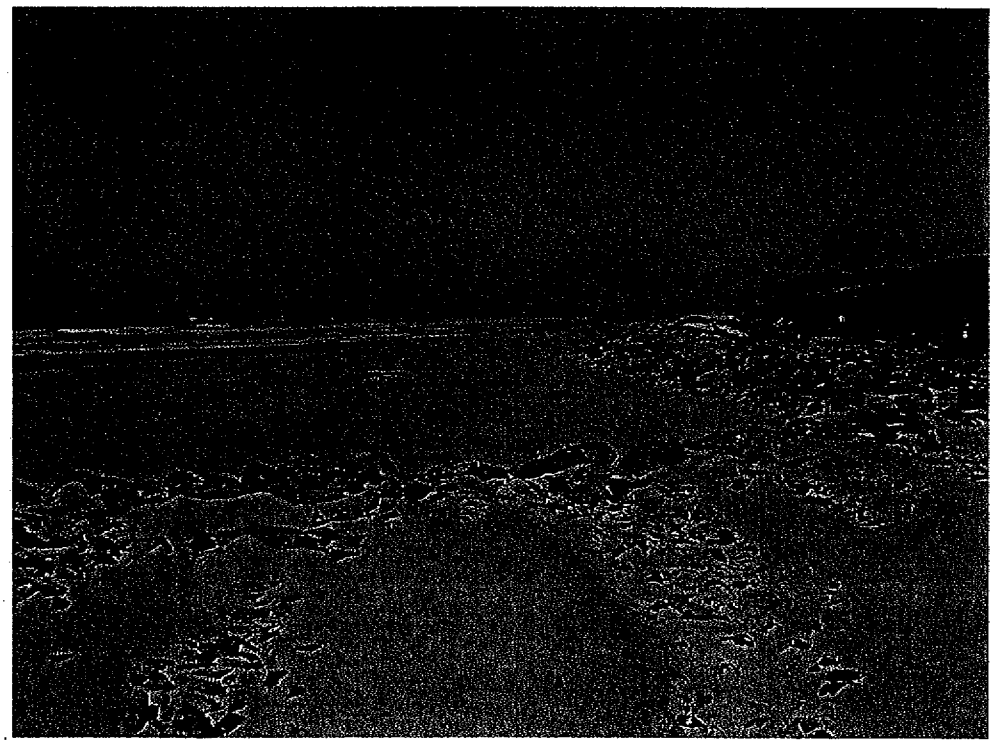
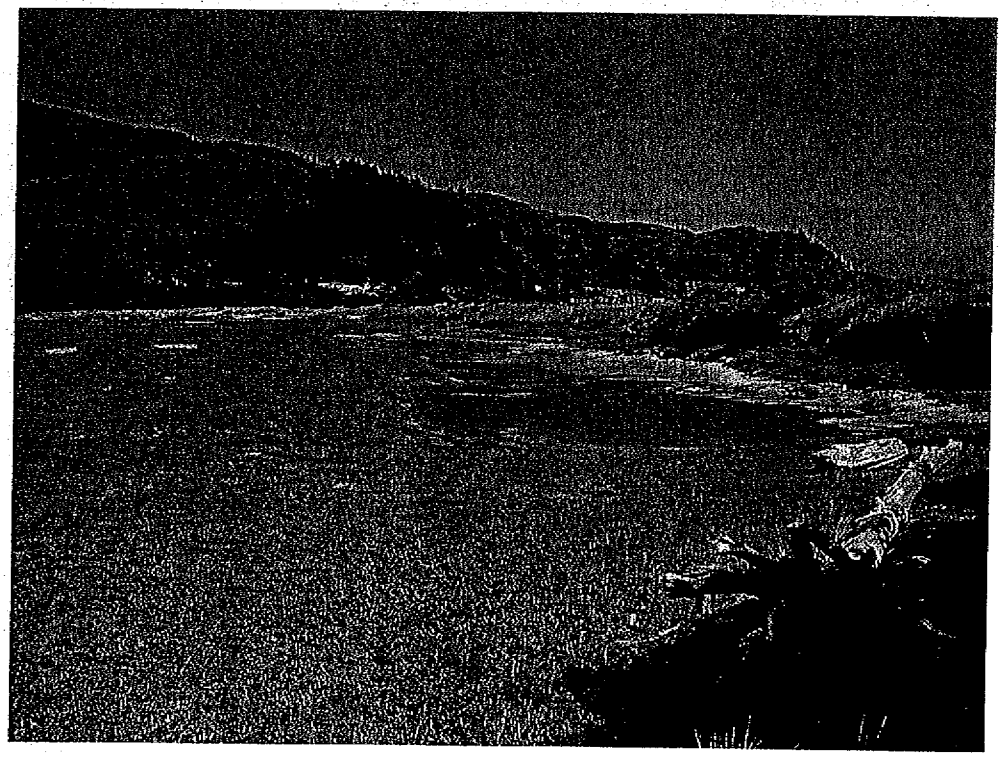


PHOTO 14: T-25A

PHOTO 15: T-26



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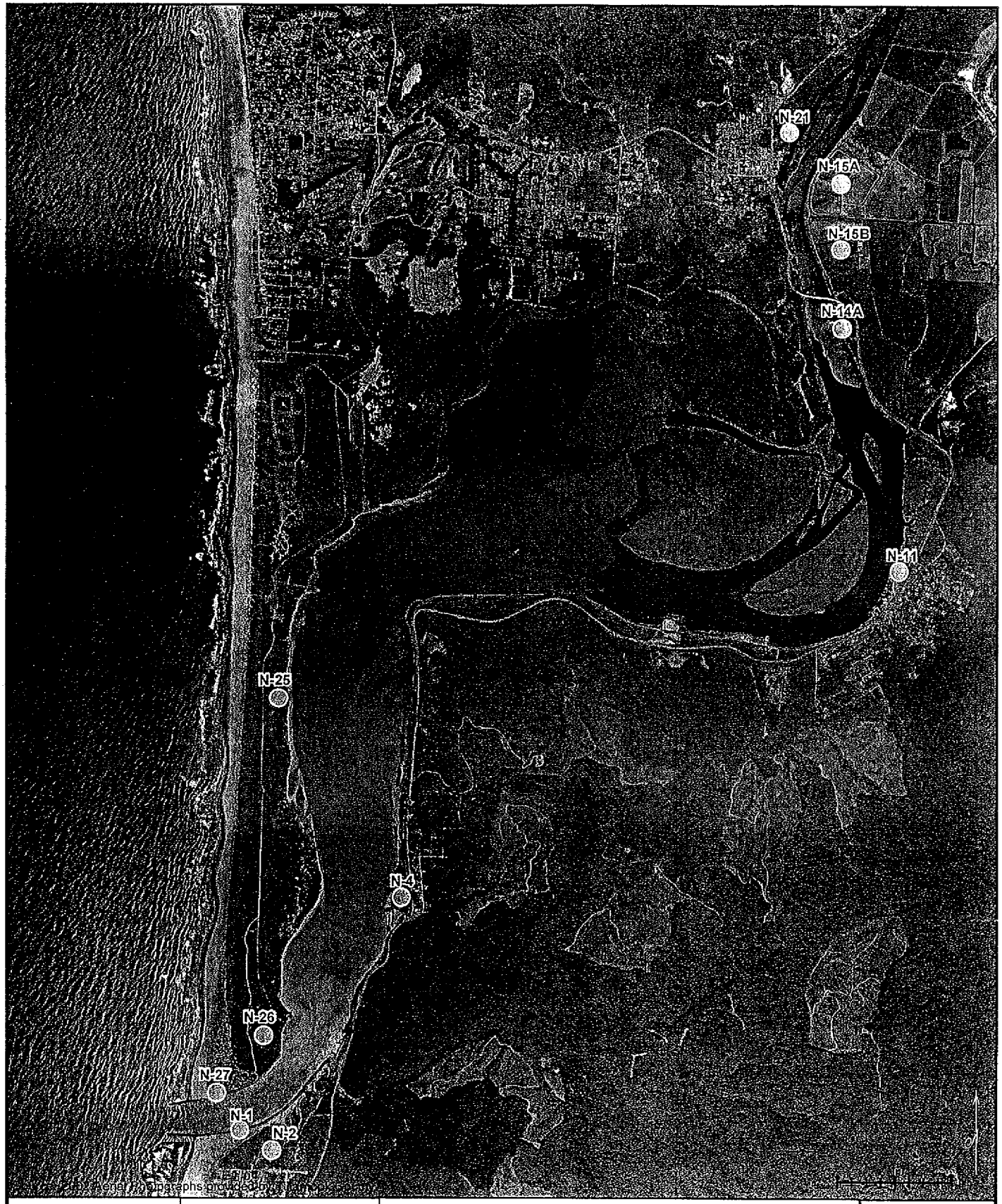


PBS

Project #: 70384.000
Date: January 2006

Prepared for:

Tillamook County
Port of Garibaldi
Port of Nehalem
Economic Development Council
of Tillamook County

Nehalem Bay Photograph Locations

PHOTO 17: N-1

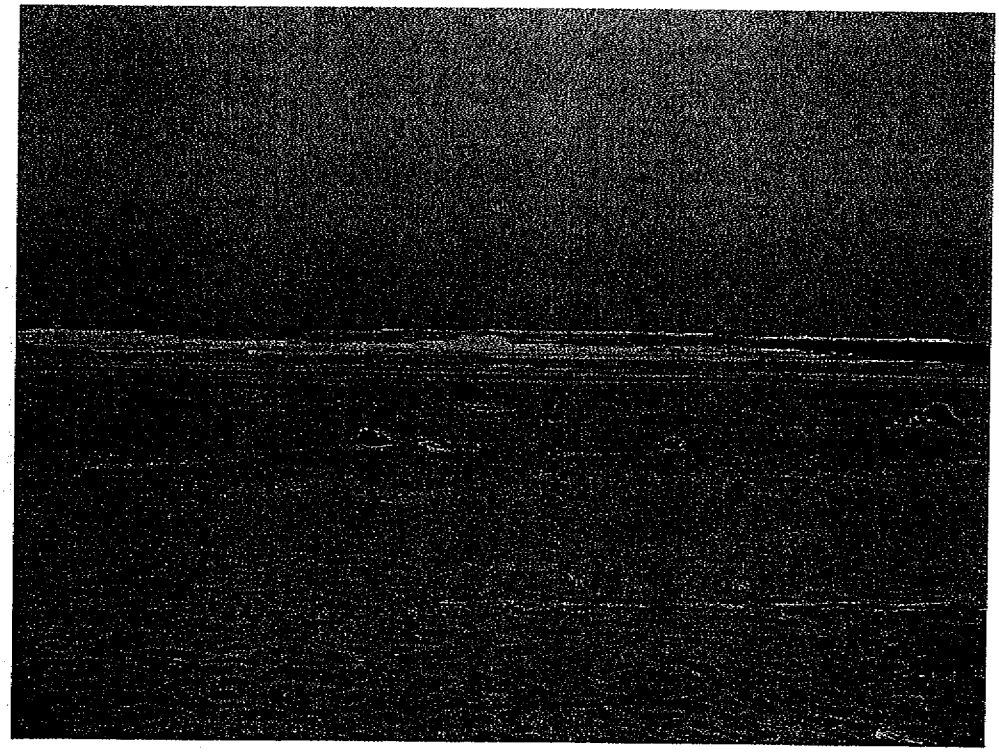
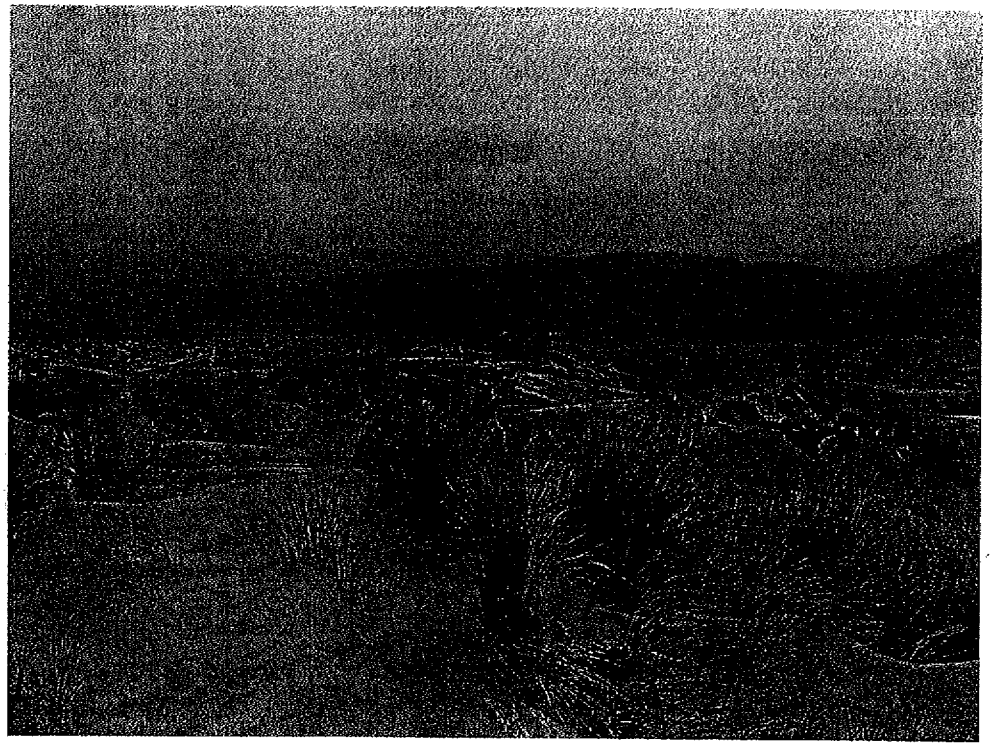


PHOTO 18: N-1

PHOTO 19: N-2



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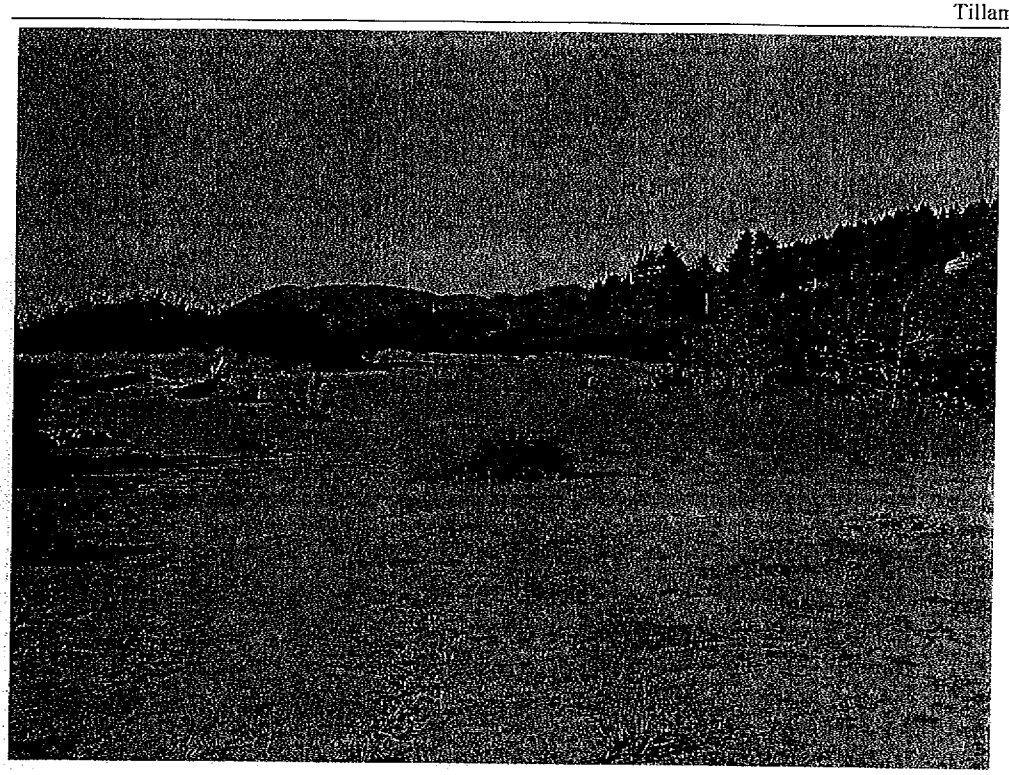

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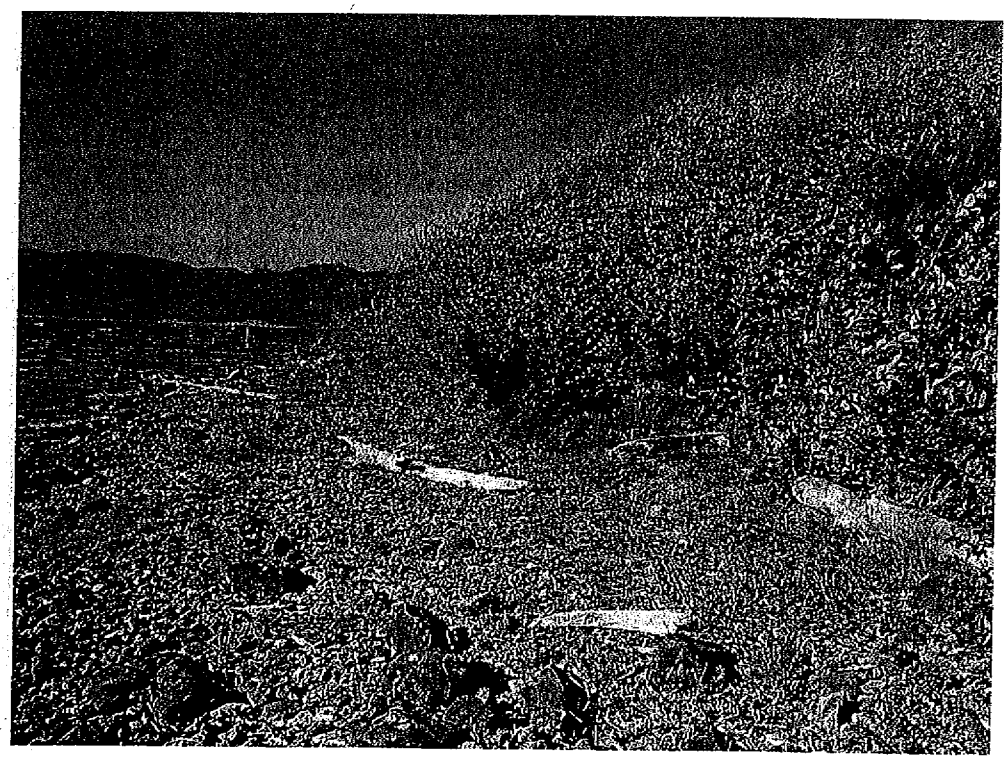

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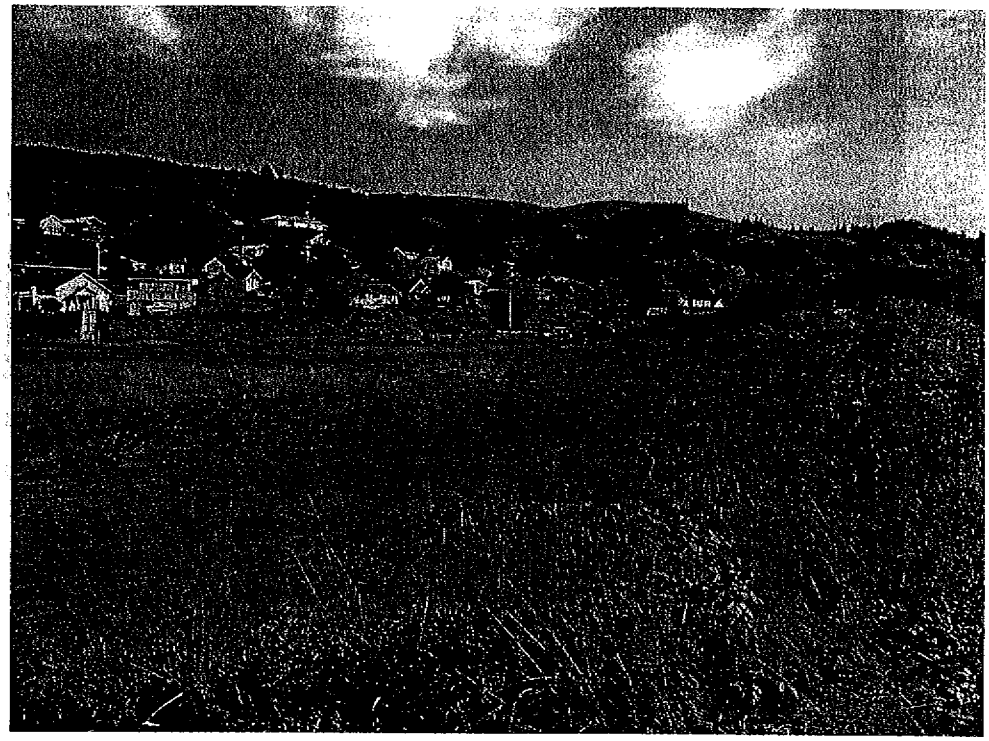

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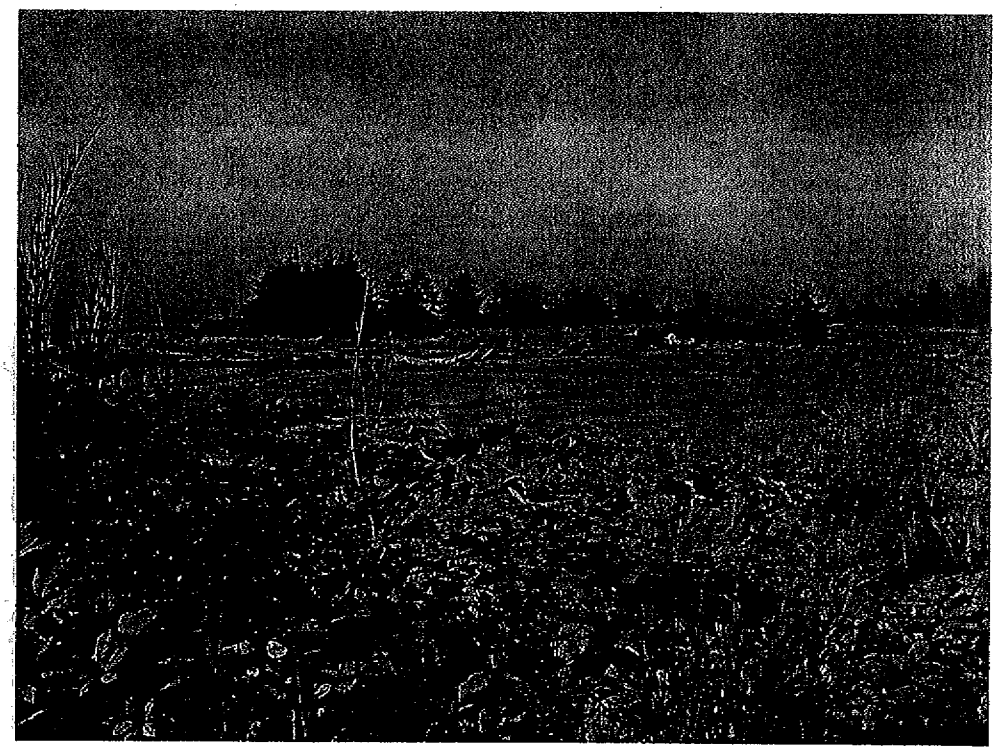

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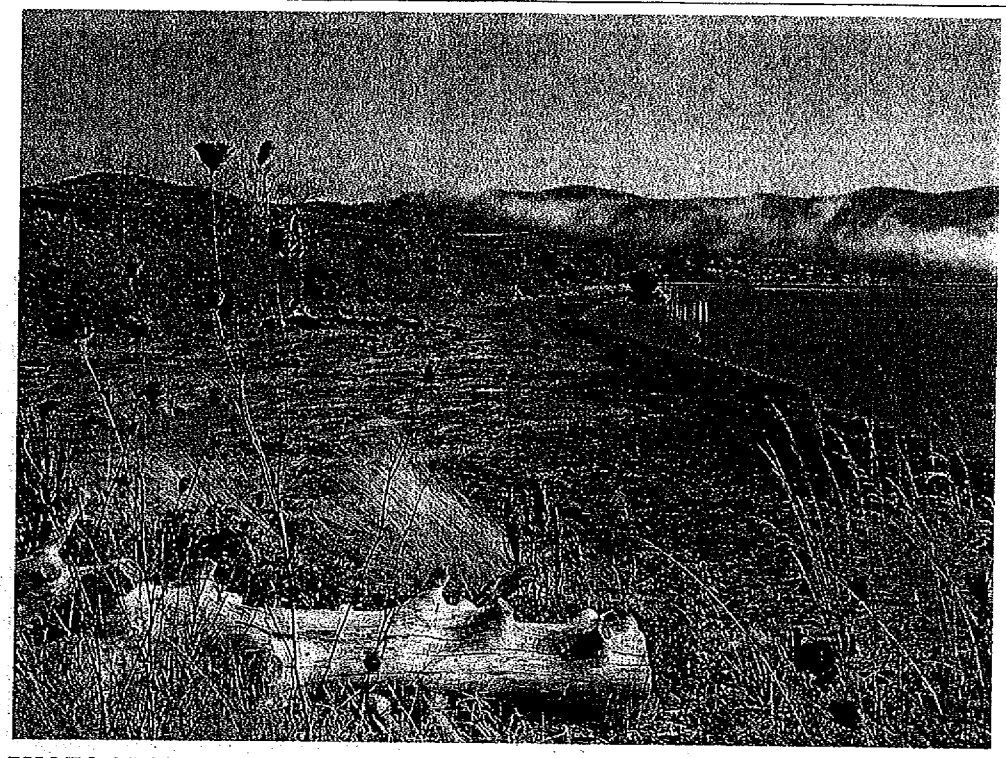

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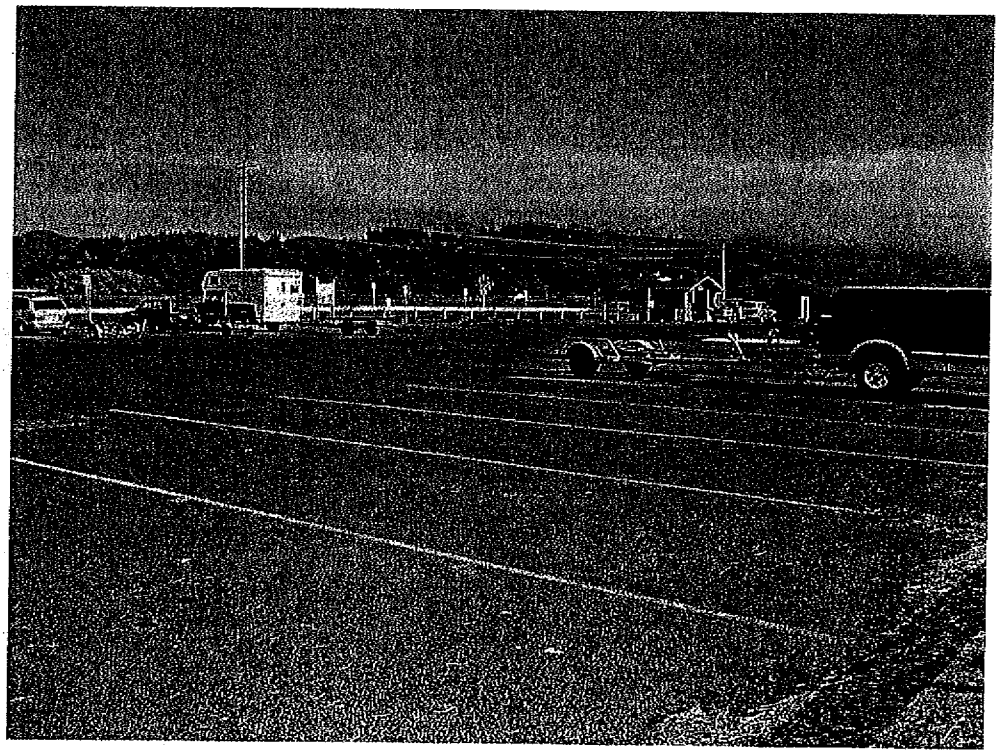


PHOTO 26: N-14A

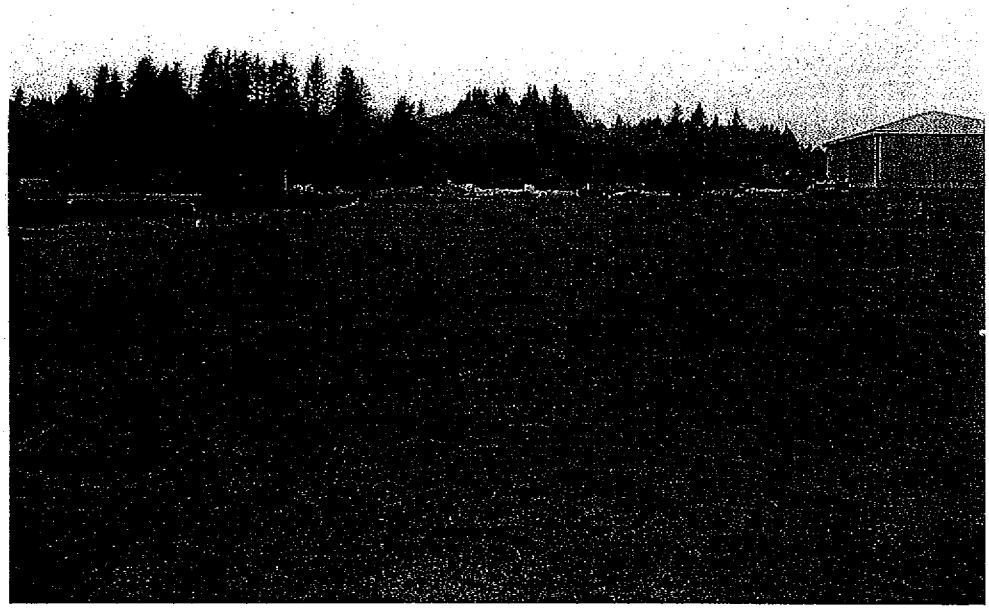
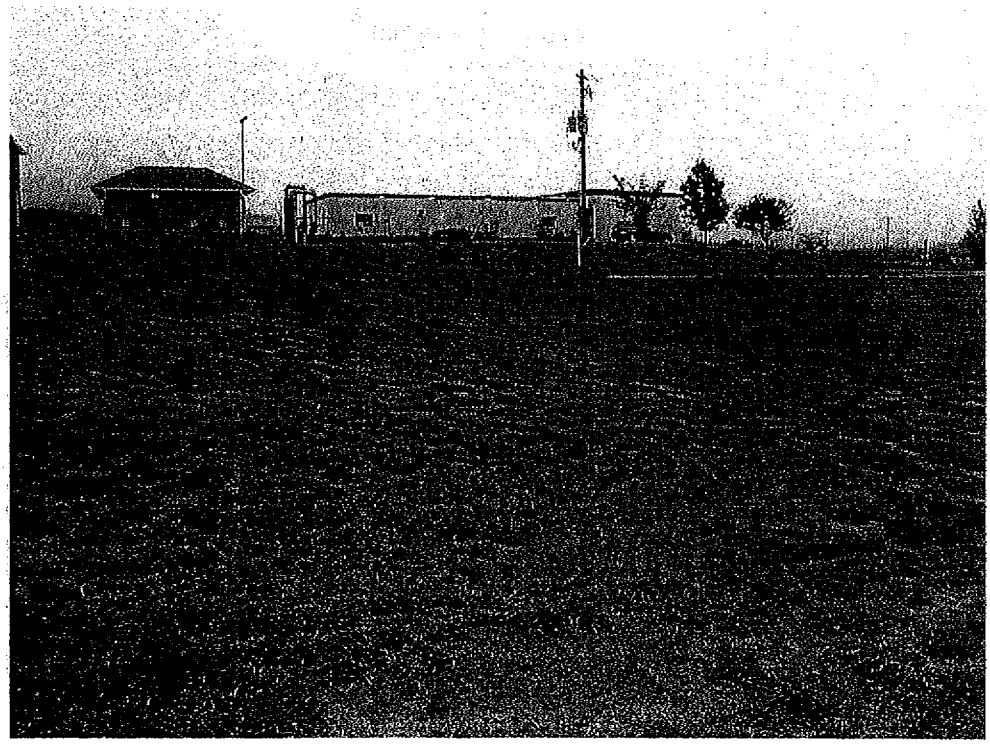


PHOTO 27: N-15A



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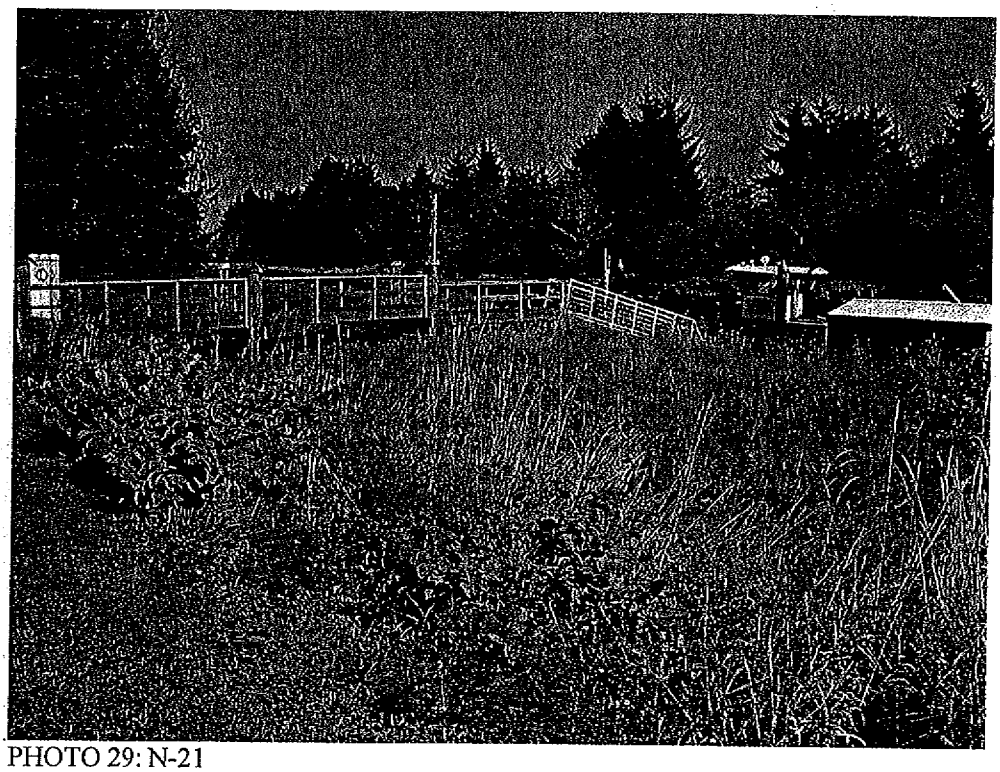

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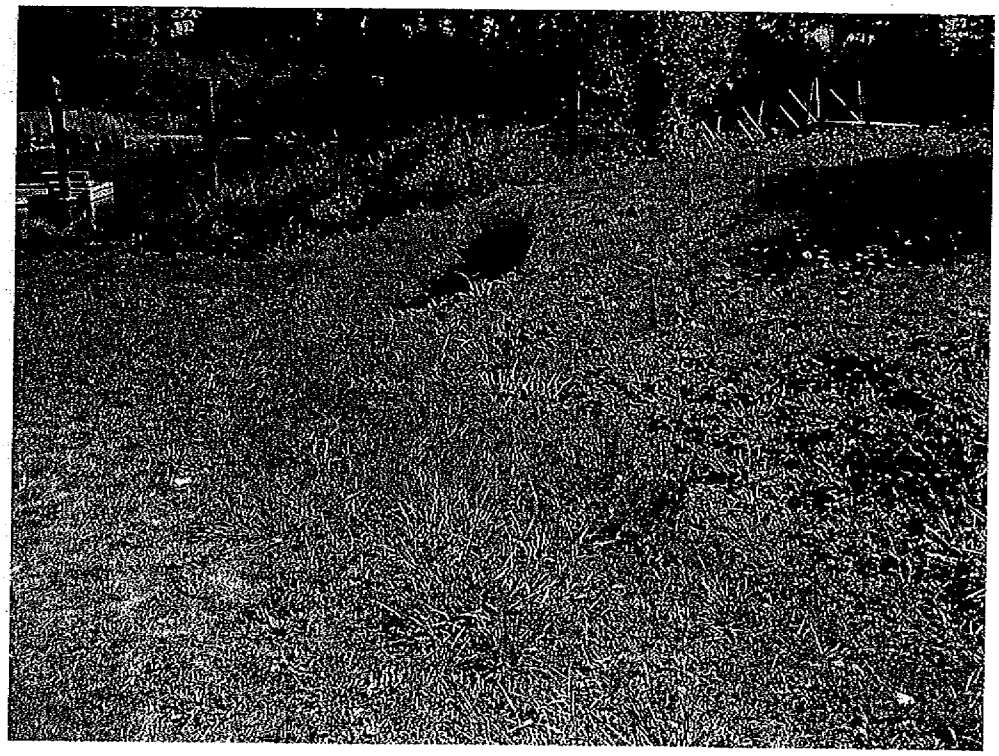
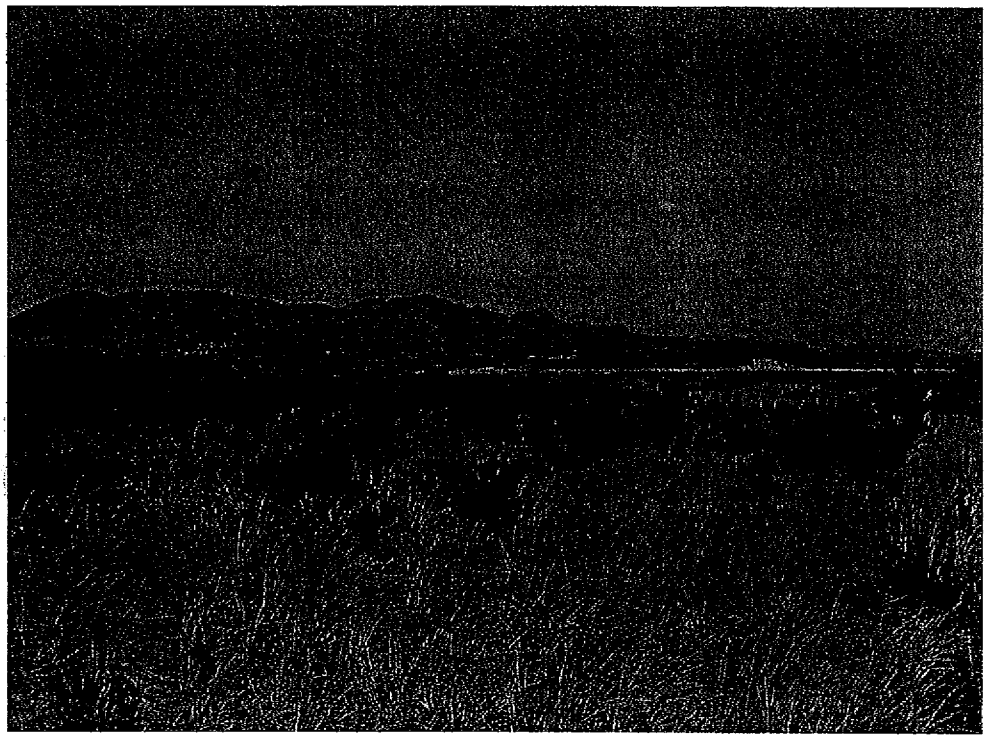


PHOTO 30: N-21



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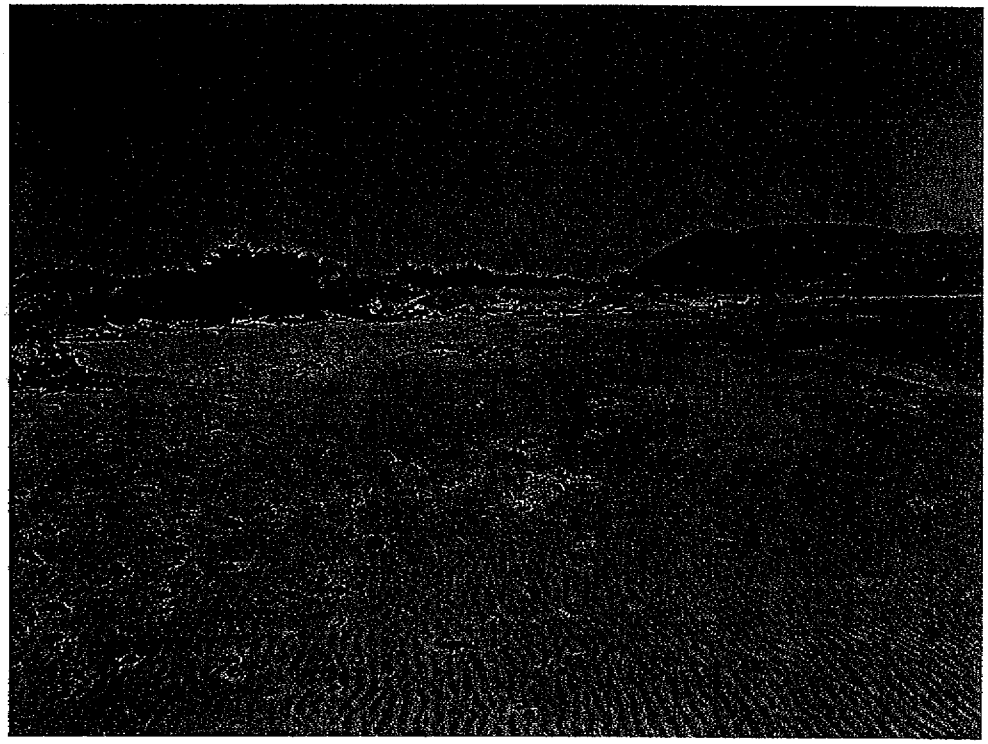

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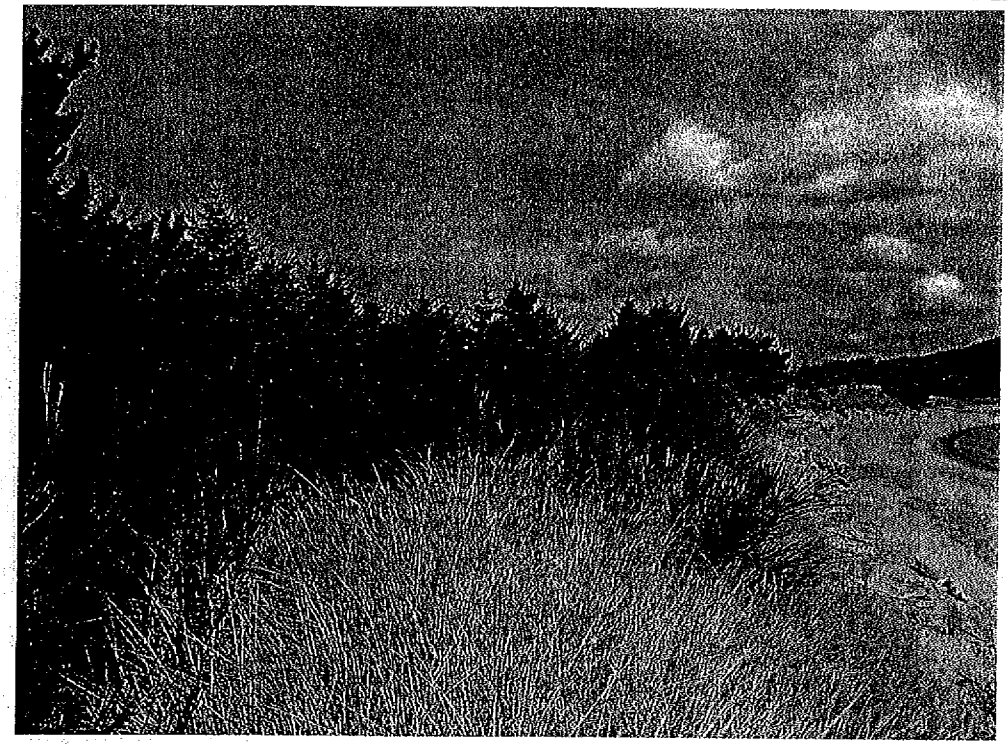

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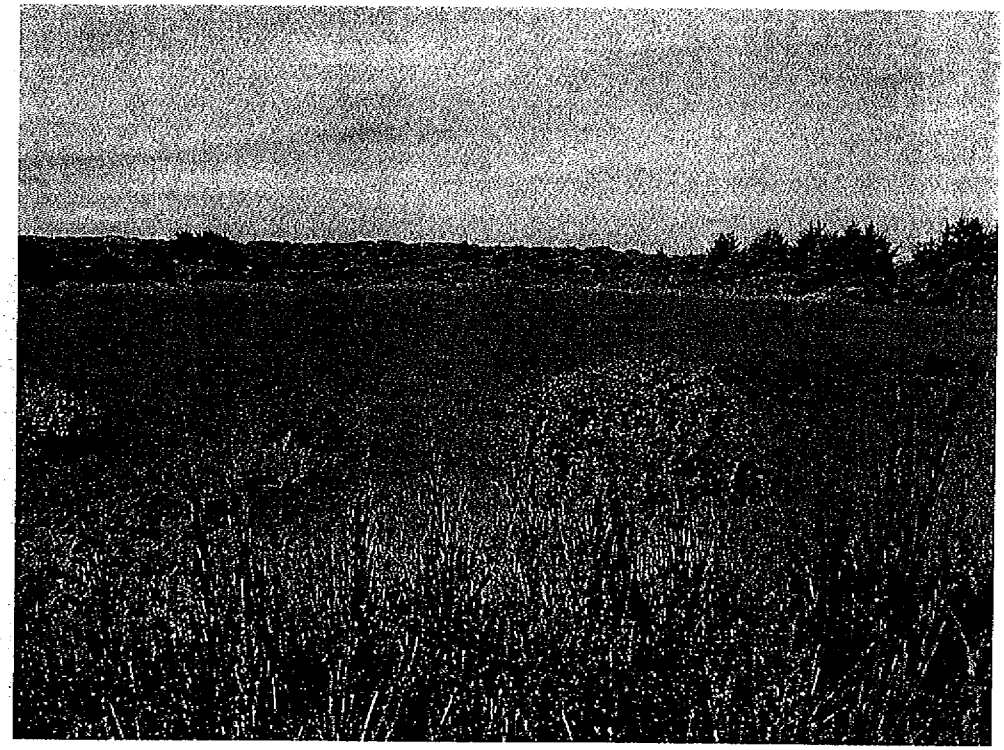

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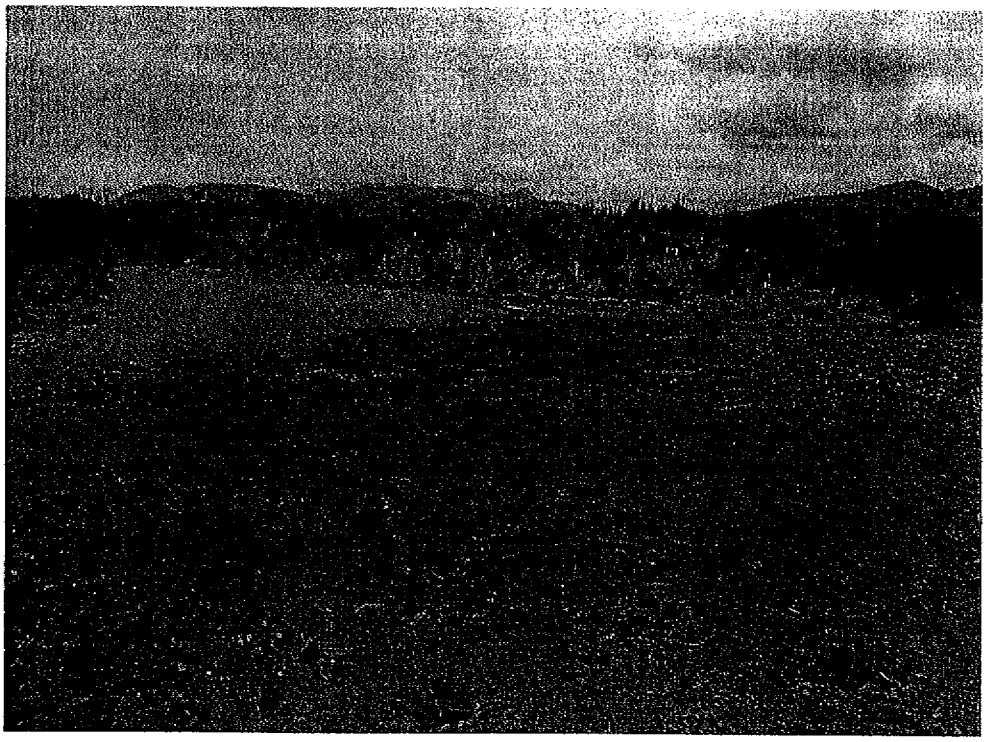

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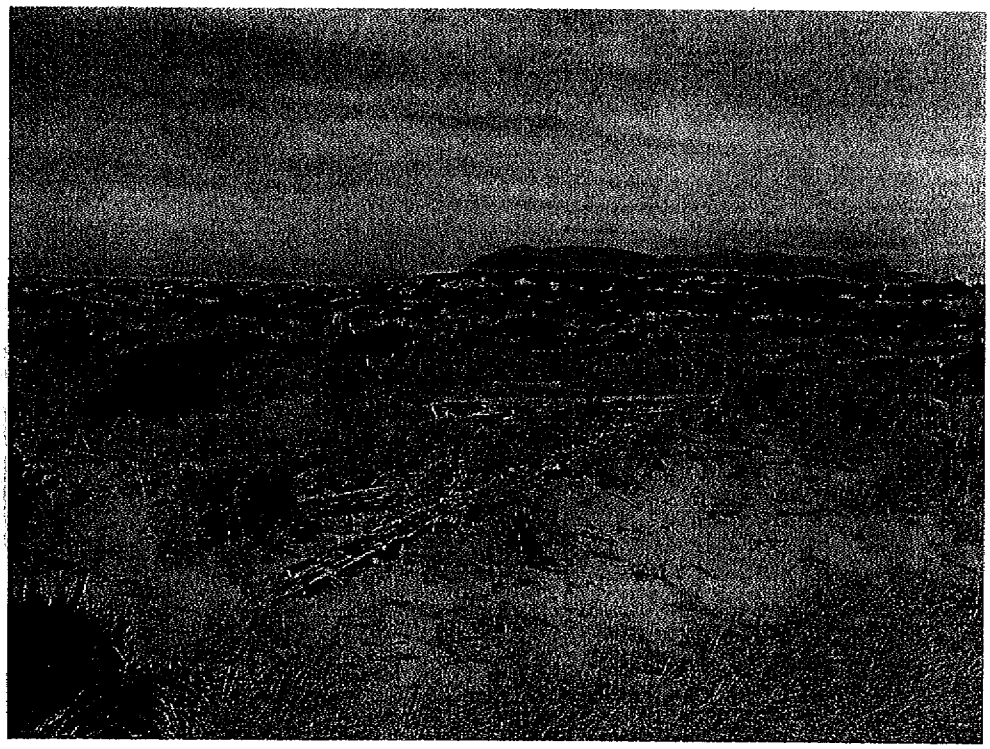


PHOTO 36: N-27

APPENDIX F

Agency Contacts

AGENCY CONTACTS DURING DMD SITE EVALUATION

Oregon Parks and Recreation Department
Attn: Mark Smith
P.O. Box 366
Nehalem, Oregon 97131

Oregon Department of State Lands
Attn: Lori Warner-Dickason
775 Summer Street, NE
Salem, Oregon 97301-1279

Environmental Protection Agency
Attn: Yvonne Vallette
811 SW Sixth Avenue
Portland, Oregon 97204

NOAA -Fisheries
Attn: Robert Anderson
525 NE Oregon Street
Suite 500
Portland, Oregon 97232

Oregon Department of Fish and Wildlife
Attn: Ron Rehn
Dave Nuzum
4907 Third Street
Tillamook, Oregon 97141

Oregon Parks and Recreation Department
Attn: Tony Stein
5580 S. Coast Hwy
Newport, Oregon 97366

Tillamook Estuaries Partnership
Attn: Mark Trenholm
P.O Box 493
Garibaldi, Oregon 97118

US Army Corps of Engineers
Attn: Kathryn Harris
P.O. Box 2946
Portland, Oregon 97208-2946

Department of Land Conservation and Development
Attn: Jane Bacchieri
Dale Blanton
635 Capitol Street, NE
Suite 150
Salem, Oregon 97310-2540

DLCD
Attn: Laren Woolley
P.O. Box 451
Waldport, Oregon 97394

Oregon Department of Environmental Quality
Attn: Christine Svetkovich
811 SW Sixth Avenue
Portland, Oregon 97204

Stephen A. Wille
Fish and Wildlife Biologist
U.S.D.I. - Fish and Wildlife Service
Oregon Fish and Wildlife Office
2600 S.E. 98th Avenue, Suite 100
Portland, Oregon 97266-1398

APPENDIX G

Project Resumes'

PBS

Key Personnel

RON RATHBURN
PRINCIPAL/SENIOR SCIENTIST

Education Doctoral Studies (Ecology) University of California
Post Graduate Studies (Ecology) University of California
M.S., (Ecology), University of California
B.S., (Zoology), California State University

Professional Memberships: Society of Natural Resources, National Association of Environmental Professionals, Ecological Society of America, American Fishery Society, Society of Ecological Restoration, Wildlife Society, International Association of Impact Assessment

Certification-Training: *Certified Senior Ecologist* – Ecological Society of America; *Certified Fisheries Professional* – American Fisheries Society; Riparian & Water Quality Certification – State of Washington; EPA Toxicological Training; NEPA Instructional Training

Ron Rathburn is a Principal and Senior Aquatic Ecologist for PBS Environmental. He has had 11 years of academic training and 25 years of consulting experience in aquatic and terrestrial ecology. His responsibilities associated with the project involve the evaluation of dredge sites and the development of optimal locations to support the Goal 16 analysis.

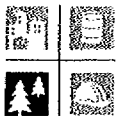
Ron's combined technical and management experience in aquatic projects encompasses the coastal and riverine habitats of California, Oregon, Washington and Alaska. He has participated as a principal scientist, manager and editor in excess of 300 projects with budgets ranging from $5,000 to $2.5 million. Although his dissertation focused on aquatic ecology, his technical familiarity extends to sedimentology, fisheries and hydrographic processes in freshwater and marine habitats. He has had extensive regulation experience with NEPA, ESA, Section 10/404 permits and mitigation techniques as well as NPDES and other state permit requirements. As a result of his extensive consulting experience in freshwater ecology, he is familiar with the ecology of wetland plants, anadromous fishery, and representative benthic biota within Oregon and Washington. His riverine experience in the Pacific Northwest includes the Tillamook Estuary, Columbia River, Snake River, Willamette River, Umpqua, Cowlitz and Toutle River, and numerous tributaries throughout the region.

His dredging, permitting and natural resource assessment experience in Tillamook Bay has ranged from an overall natural resource assessment of fish, wildlife and water quality to multi-year monitoring programs to assess impacts from dredge disposal operations. These projects are identified below and involved the Port of Garibaldi, Old Mill Marina, OCZMA, and the Port of Tillamook. These studies have involved a detailed sampling of sediments, fishery, macrobenthic communities, and wetland resources within the region.

Representative experience to document Ron. Rathburn's familiarity of aquatic ecology, dredging, regulatory permitting, wetlands, and water quality assessments for shoreline projects are presented below.

Representative Experience

- Environmental Assessment of NOAA facility at Hatfield Marine Science Center on Newport Bay and surrounding environment. This report adhered to NEPA guidelines and involved extensive literature review and public involvement.
- Environmental Planning and Resource Assessment of Tillamook Estuary to support the development of recreation and industrial sites while protecting sensitive natural resources. Basis for preparing grant to obtain national estuarine status.



- Inventory and seasonal monitoring of benthic invertebrates within the Columbia River Estuary to assess impacts from dredging and in-water disposal operations.
- Two- year investigation evaluated biota, water quality, suspended and bottom sedimentary conditions.
- Environmental evaluation of flowlane disposal within the Columbia River Estuary on anadromous and benthic fisheries for the Port of Astoria. Information was utilized to assess the Port's dredge disposal program.
- Identification of resource sensitivities and impacts of inwater disposal to the Tillamook Estuary. Preliminary assessment for the Port of Bay City to identify alternative disposal options.
- Environmental assessment of dredge and fill activities at 12 industrial areas along the Columbia River for the Department of Economic Development. Resources included currents, water quality, salmonid habitat usage and benthic organisms.
- Environmental assessment for 15-acre fill and dredging project within the Columbia River Estuary at Tongue Point. Project evaluated upland and inwater disposal impacts to salmonid and benthic species from project development.
- Cowlitz and Toutle River Dredging Study for the U.S. Army Corps. Evaluated the impacts on water quality and aquatic biota of disposing 150 million cy of sediment along 47 miles of shoreline. Project involved extensive coordination with agencies and review of Dredge/Fill Guidelines.
- Industrial site evaluation for proposed molybdenum roasting facility in the Columbia River Estuary for U.S. Borax Corporation. Project included a review of dredging requirements, evaluation of wetland habitats and associated estuarine biota affected by the project.
- Environmental impact assessment of coal handling facilities at Port of Astoria Docks. Investigation included literature searches, impact and mitigation assessment of dredging and fill activities on fisheries, benthic organisms, plankton, water quality and human population issues.
- A comparative environmental assessment of industrial sites and dredging requirements within the Columbia River Estuary. Project identified invertebrate, fishery resources and wetland habitats affected by proposed Port developments.
- Prepared an illustrated guide to invertebrates and fish found in the Lower Columbia River for the Columbia River Estuary Data Development Project.
- Impact assessment of docking and storage facilities for oil transfer at Port Angeles, Washington, for the Northern Tier Pipeline. Project evaluated demersal and nektonic fisheries, trajectory of oil spills and effects on wetland habitats.
- Impact assessment of Starkist fish processing facilities in San Pedro Harbor, California. Investigation evaluated effects of processing wastes on water quality and benthic biota.
- Resource assessment of shellfish population within estuarine habitats in southeastern Alaska. Study focused on Dungeness crab productivity, recruitment and distribution during a two-year baseline study (Project Manager).
- An assessment of temporal and spatial changes of soft-bottom benthic populations within an estuarine and marine ecosystem in southeast Alaska. Investigation encompassed design and collection of 250 benthic grab samples, analysis and inclusion into an impact assessment of U.S. Borax's proposed molybdenum mine (Project Manager).
- Stream survey of salmonids in various streams in southeast Alaska to assess habitat utilization, abundance and fry out-migration (Project Manager).
- Inventory and seasonal monitoring of benthic invertebrates in the Columbia River Estuary to evaluate impact of sediments on aquatic habitat in Cowlitz River.
- Principal Scientist on hazardous evaluation of sediments within Garibaldi Boat Basin for the Port of Garibaldi to support dredging and permit application to EPA and Corps of Engineers.
- Principal Scientist in impact assessment of sediments on high energy and quiet depositional environments to support fishery and benthic habitat.
- Multi-year sampling of sediments and biota to assess impacts of dredging on fishery and aquatic habitats. Project coordinated with EPA, DSL, and ODFW to support permit application of Port in Tillamook Estuary.

- Multi-year sampling of sediments and biota to assess impacts of dredging on fishery and aquatic habitats. Project coordinated with EPA, DSL, and ODFW to support permit application of Port in Columbia River.
- Evaluation of sediment conditions in moorage facility to assess level of hazardous impacts and clean-up requirements for Columbia River.
- Studied impacts of dredging operations on sediment deposition and benthic environment to support municipal flood control measures.
- Hazardous assessment of sediments within marina boat basin to support ongoing dredging operations and in-water disposal in Tillamook Bay.

CYNTHIA LOWE, P.E.

Project Manager
Senior Civil Engineer

Years of Experience
11 (5 with PB; 6 with others)

Education
M.S., Civil Engineering (Coastal Emphasis), Oregon State University, 1993; B.S., Ocean Engineering, Texas A&M University, 1992

Professional Affiliations
American Council of Engineering Companies of Oregon: President (2004-2005), Board of Directors; Society of American Military Engineers: President (2002-2003), Fellow; Western Dredging Association; American Society of Civil Engineers

Professional Registrations
Oregon, 1998 (58014); Alaska, 1999 (10037); Washington, 2001 (38151)

Key Qualifications
Cynthia Lowe is a civil engineer with Parsons Brinckerhoff (PB), with extensive planning and engineering experience in water resource, dredging, and permitting projects and port and marine facility work. She assists both public and private clients on a wide variety of projects, such as floodway analysis, marine facility planning, dredging permits, and coastal engineering.

Cynthia provides a broad range of expertise on dredging projects, including planning, permitting, disposal site coordination, dredge plan development, and monitoring construction activities. Her experience planning dredging projects includes estimating dredged material quantities, gathering sediment samples, and coordinating disposal sites. She has prepared several federal and state permit applications for dredging projects and routinely serves as the agency liaison during permit negotiations. In addition, she serves as a dredging construction liaison, monitoring dredging operations.

Dredging

- Federal and State Permits for Maintenance Dredging, City of Clatskanie, Clatskanie River, Oregon: prepared permit applications, gathered sediment samples, and served as agency liaison during permit negotiations until the permits were issued. Continued to provide liaison assistance during post-dredging agency negotiations regarding mitigation and during revisions to the federal permit conditions.
- Federal and State Permits for Maintenance Dredging, Port of Kalama, Kalama, Washington: prepared permit applications for maintenance dredging at three deep draft terminals and a marina. Served as agency liaison during permit negotiations. The permits were successfully obtained within a tight timeframe.
- Dredging Technical Assistance, Port of Kalama, Kalama, Washington: collected sediment samples at three deep draft terminals and a marina, and developed a sediment characterization report. Prepared dredging plans and specifications for the United Harvest site.
- Dredging Construction Liaison, City of Clatskanie, Clatskanie River, Oregon: coordinated disposal sites and performed dredging construction monitoring.
- Federal and State Permits for Maintenance Dredging, Portland Golf Club, Junor Lake and Woods Creek, Portland, Oregon: prepared permit applications and served as the agency liaison during the permit negotiations until the permits were issued.

- PROSPECT Dredging Fundamentals Course, FY00, Huntsville Division COE: assisted in the management of this course, which teaches the basics of dredging equipment and operations to COE personnel.
- Analyses of Waves and Dock Operations, Pacific Ocean, Portland District COE, Port of Port Orford, Oregon: analyzed wave data to determine operational wave constraints, and reviewed dock operations and dredging methods.
- Dredging Volume Calculations for Puget Sound Naval Shipyard, Sinclair Inlet, Bremerton, Washington: developed a digital terrain model to estimate dredged material quantities for homeport berthing options.
- Dredging Volume Calculations for Tidewater Cove, Columbia River, Vancouver, Washington: conducted sediment sampling and developed a digital terrain model to estimate dredged material quantities for alternative marina development options for a proposed major waterfront development.
- Dredging Equipment Research for Black Sea Coastal Dredging: under U.S. Trade & Development Agency EcoLinks program, assisted Black Sea Coastal Association by researching dredging equipment, software programs, and associated costs to dredge contaminated sediments.
- Dredging Case Studies, Fox River, Wisconsin: researched and developed dredging case studies involving the remediation of contaminated sediments.

Open Channel Hydraulics and Floodway Evaluations

- Post-Dredge Assessment Study, City of Clatskanie, Lower Clatskanie River, Oregon: performed hydraulic modeling to determine the impacts of dredging and subsequent shoaling on flood water elevations and developed a report assessing the need for future maintenance dredging.
- HEC-2 Analysis for Flood-Level Reduction Measures, City of Clatskanie, Clatskanie River, Oregon: revised an existing flood study to include recent hydrosurvey data and to model the impacts of proposed dredging channels on flood levels.

Publications

- "Clatskanie Pays Penalty; Unable to Carry out Mitigation Project," published in *International Dredging Review,* June/July 2000.
- "The Clatskanie River: One Community's Experiences with Dredging," published in *International Dredging Review,* January 1999.
- "Chapter 13—Flood Damage and Flood Fighting Activities," published in the *February 1996 Post-Flood Report*, COE, Portland District (through Northwest Hydraulics), Oregon and Southern Washington, 1997.

Speeches and Presentations

- "A Case Study: Problems Encountered in Dredging the Clatskanie River," for the Western Dredging Association, Pacific Chapter Meeting, October 28-30, 1998, Portland, Oregon.
- "Developing Along Waterways in Accordance with FEMA's `No-Rise' Criteria," for the American Society of Civil Engineers, Oregon Section Fall Seminar—Floodplain Management and Drainage Law, November 9, 2001, Portland, Oregon.
- "Hydraulic Analysis: McCormick & Baxter Creosoting Company Portland Plant," for the Society of American Military Engineers, Portland Post, May 1, 2002, Portland, Oregon.

Nehalem 1 - At South jetty, ocean beachfront

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/beach, 4x4 trail	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		likely within for portions	
Site Specific Physical Constraints		jetty/residential	
Biological Considerations			
TES Species Onsite		not identified/plover(?)	
TES Species Adjacent		yes/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		no	
Offsite Wetland Impacts (hydrology)		yes/avoidable	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		possible/Nehalem Bay/avoidable	
Critical Habitat/Species Impacts>Runoff		possible/Nehalem Bay/avoidable	
Critical Habitat/Species Impacts>Oceanshore		possible/avoidable	
Sensitive Aquatic Impacts>Shoreline		no/riprapped shoreline	
Mitigation Requirements		no	
Site specific Biological Constraints		plover (?)/HCP(?)	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low	
Site Acquisition Costs		no/publicly owned	
Ambient Air Quality Issues		possible/residential	
Noise Issues		possible/residential	
Ownership Issues		no/publicly owned	
Adjacent Landowner Issues		possible/residential	
Adjacent Landuse Conflicts		possible/residential, recreation	
Significant Visual Impacts		possible/residential, recreation	
Site specific Socio-Economic Constraints			

Nehalem 2 - Immediately north of Nedonna Beach residential area

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline disposal	
Configuration of Property		suitable/jetty-creek	
Water Access		yes	
Road Access		yes/4x4 trail	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		yes/creek borders site	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		creek, trees	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Nehalem Bay; ?/plover	
Critical Habitat Onsite		not identified/plover(?)	
Wildlife Corridor		not identified	
Onsite Wetlands		yes/adjacent to stream	
Offsite Wetland Impacts (hydrology)		possible/avoidable	
Riparian Habitat		yes	
Critical Habitat/Species Impacts>ROW		possible/Nehalem Bay	
Critical Habitat/Species Impacts>Runoff		possible/Nehalem Bay	
Critical Habitat/Species Impacts>Oceanshore		not identified	
Sensitive Aquatic Impacts>Shoreline		yes/Nehalem Bay, stream	
Mitigation Requirements		yes/avoidable	
Site specific Biological Constraints		stream, plover	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low	
Site Acquisition Costs		yes/private ownership (?)	
Ambient Air Quality Issues		possible/recreation use	
Noise Issues		possible/recreation use	
Ownership Issues		possible	
Adjacent Landowner Issues		possible/residential	
Adjacent Landuse Conflicts		possible/residential	
Significant Visual Impacts		possible/residential	
Site specific Socio-Economic Constraints			

Nehalem 4 - Immediately north of Ed's (Brighton) Moorage

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/Highway 101	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		historical disposal site	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Nehalem Bay	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		yes/disposal area/non jurisd	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		yes/Nehalem Bay	
Critical Habitat/Species Impacts>Runoff		yes/Nehalem Bay/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		no/riprapped shoreline	
Mitigation Requirements		yes-no/jurisdictional?	
Site specific Biological Constraints		no	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low	
Site Acquisition Costs		yes/private property	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		possible/private property	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		none anticipated	
Site specific Socio-Economic Constraints			

Nehalem 7 - South and west of Paradise Cove, on south side of Highway 101

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		limited	
Configuration of Property		**unsuitable**	**Reject**
Water Access		no	
Road Access		yes/Highway 101	
Distance from Shoreline/Waterways		**unacceptable**	**Reject**
Drainage Across Site		yes	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		unlikely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints			
Biological Considerations			
TES Species Onsite		none identified	
TES Species Adjacent		none identified	
Critical Habitat Onsite		no	
Wildlife Corridor		yes/riparian corridor	
Onsite Wetlands		yes/wetlands and stream	
Offsite Wetland Impacts (hydrology)		possibly	
Riparian Habitat		yes/forested w/snags, etc.	
Critical Habitat/Species Impacts>ROW		possibly/Nehalem River	
Critical Habitat/Species Impacts>Runoff		possibly/Nehalem River	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/stream	
Mitigation Requirements		yes/wetlands and stream	
Site specific Biological Constraints		**stream and wetlands**	**Reject**
Socio-Economic Considerations			
Current Zoning		unknown	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		**yes/high**	**Reject**
Site Acquisition Costs		unknown	
Ambient Air Quality Issues		yes/Highway 101	
Noise Issues		yes/Highway 101	
Ownership Issues		possible	
Adjacent Landowner Issues		possible	
Adjacent Landuse Conflicts		possible	
Significant Visual Impacts		yes/Highway 101	
Site specific Socio-Economic Constraints			

Nehalem 9 - Immediately east and below Wheeler Heights, in City of Wheeler

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/limited	
Configuration of Property		unsuitable	
Water Access		**no/south of Highway 101**	**Reject**
Road Access		yes/Highway 101	
Distance from Shoreline/Waterways		**unacceptable**	**Reject**
Drainage Across Site		yes/east border	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		unlikely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints			
Biological Considerations			
TES Species Onsite		possibly fish	
TES Species Adjacent		yes/Nehalem River	
Critical Habitat Onsite		no	
Wildlife Corridor		yes/riparian corridor	
Onsite Wetlands		yes/forested	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		yes/forested stream	
Critical Habitat/Species Impacts>ROW		yes/Nehalem River	
Critical Habitat/Species Impacts>Runoff		yes/Nehalem River	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/stream and wetlands	
Mitigation Requirements		yes/wetlands and stream	
Site specific Biological Constraints		**forested wetlands and stream**	**Reject**
Socio-Economic Considerations			
Current Zoning		unknown	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		high/distance, berms	
Site Acquisition Costs		yes/private ownership	
Ambient Air Quality Issues		possible/adj residential	
Noise Issues		possible/adj residential	
Ownership Issues		possible/private ownership	
Adjacent Landowner Issues		possible/adj residential	
Adjacent Landuse Conflicts		possible/adj residential	
Significant Visual Impacts		possible/Highway 101	
Site specific Socio-Economic Constraints			

Nehalem 11 - North of Dart's Marina, west of Highway 101 in north part of the City of Wheeler UGB

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/Highway 101	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		Nehalem River, Bott's Marsh	
Biological Considerations			
TES Species Onsite		none identified	
TES Species Adjacent		yes/Nehalem River/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		yes/small pocket & Bott's Marsh	
Offsite Wetland Impacts (hydrology)		not likely/avoidable	
Riparian Habitat		yes/degraded (except Bott's M.)	
Critical Habitat/Species Impacts>ROW		yes/Nehalem River/avoidable	
Critical Habitat/Species Impacts>Runoff		yes/Nehalem River/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/main shoreline not sensitive	
Mitigation Requirements		yes/avoidable	
Site specific Biological Constraints		Nehalem River	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low	
Site Acquisition Costs		possible/private ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		possible/private ownership	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		possible/Highway 101	
Site specific Socio-Economic Constraints		site for sale (6/05)	

Nehalem 13 - Immediately east of the junction of Highway 53 and Highway 101

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		limited	
Configuration of Property		**unsuitable/drainage**	**Reject**
Water Access		yes	
Road Access		yes/Highway 53	
Distance from Shoreline/Waterways		acceptable/long	
Drainage Across Site		yes	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		unlikely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints			
Biological Considerations			
TES Species Onsite		none identified	
TES Species Adjacent		none identified/possibly fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		yes/wetlands and stream	
Offsite Wetland Impacts (hydrology)		yes/avoidable	
Riparian Habitat		yes/small stream riparian	
Critical Habitat/Species Impacts>ROW		none identified	
Critical Habitat/Species Impacts>Runoff		possibly fish downstream	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		no	
Mitigation Requirements		yes/wetland, stream	
Site specific Biological Constraints		wetlands, streams	
Socio-Economic Considerations			
Current Zoning		rural(?)	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		high	
Site Acquisition Costs		possible/private ownership	
Ambient Air Quality Issues		possible	
Noise Issues		possible	
Ownership Issues		possible/private ownership	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		possible/Highway 101	
Site specific Socio-Economic Constraints			

Nehalem 14A - Tillamook County boat ramp & vicinity

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/clamshell, pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/Tideland Rd	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		boat launch, parking lot	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Nehalem River	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		yes/avoidable	
Offsite Wetland Impacts (hydrology)		yes/avoidable	
Riparian Habitat		yes/avoidable	
Critical Habitat/Species Impacts>ROW		yes/Nehalem River	
Critical Habitat/Species Impacts>Runoff		yes/Nehalem River	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		no/developed	
Mitigation Requirements		yes	
Site specific Biological Constraints		Nehalem River, tidal fringe	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low/clamshell	
Site Acquisition Costs		no/Tillamook County	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		no/Tillamook County	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		none anticipated	
Site specific Socio-Economic Constraints			

Nehalem 14B - East of the Tillamook County boat ramp and east of Nehalem Bridge (Highway 101)

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline	
Configuration of Property		suitable	
Water Access		yes/difficult	
Road Access		yes/Tideland Rd	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		Highway 101 separates site	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Nehalem River/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		**yes/large areas**	**Reject**
Offsite Wetland Impacts (hydrology)		possible/avoidable	
Riparian Habitat		yes/tidal fringe	
Critical Habitat/Species Impacts>ROW		yes/river, stream	
Critical Habitat/Species Impacts>Runoff		yes/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/tidal fringe/avoidable	
Mitigation Requirements		yes/wetland, stream	
Site specific Biological Constraints		**large wetland areas**	**Reject**
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		medium/agric reclamation	
Site Acquisition Costs		yes/private ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		yes/private ownership	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		none anticipated	
Site specific Socio-Economic Constraints			

Nehalem 15A - Nehalem/Wheeler Sewage Treatment Facilities

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/Tideland Rd	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		unlikely within - bermed	
High Tide Line		unlikely within - bermed	
Site Specific Physical Constraints		historical disposal site	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Nehalem River/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		yes/ small areas	
Offsite Wetland Impacts (hydrology)		yes/avoidable	
Riparian Habitat		no/available area	
Critical Habitat/Species Impacts>ROW		yes/Nehalem River/avoidable	
Critical Habitat/Species Impacts>Runoff		yes/Nehalem River/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/Nehalem River/avoidable	
Mitigation Requirements		yes/wetlands	
Site specific Biological Constraints		Nehalem River	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low	
Site Acquisition Costs		no/public ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		unlikely	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		none anticipated	
Site specific Socio-Economic Constraints			

Nehalem 15B - Pasture along Nehalem River, south of sewage treatment facilities

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/Tideland Rd	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		unlikely within/bermed	
High Tide Line		unlikely within/bermed	
Site Specific Physical Constraints		bermed along Nehalem River	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Nehalem River/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		yes/large area	
Offsite Wetland Impacts (hydrology)		possible/avoidable	
Riparian Habitat		yes/wetland fringe habitat	
Critical Habitat/Species Impacts>ROW		no	
Critical Habitat/Species Impacts>Runoff		yes/Nehalem River/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/avoidable	
Mitigation Requirements		yes/wetlands	
Site specific Biological Constraints		wetlands, Nehalem River	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		medium/agric reclamation	
Site Acquisition Costs		yes/private ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		yes/private ownership	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		none anticipated	
Site specific Socio-Economic Constraints			

Nehalem 16 - Residential Subdivision, peninsula at mouth of North Fork Nehalem River

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		**none/residential development**	**Reject**
Configuration of Property		**unsuitable/buildings**	**Reject**
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		possible within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		Developed residential subdivision	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Nehalem River/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		probable	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		yes/low quality	
Critical Habitat/Species Impacts>ROW		yes/river/avoidable	
Critical Habitat/Species Impacts>Runoff		yes/river/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/degraded/avoidable	
Mitigation Requirements		yes/wetland	
Site specific Biological Constraints			
Socio-Economic Considerations			
Current Zoning		unknown	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		high/residential development	
Site Acquisition Costs		yes/private ownership	
Ambient Air Quality Issues		yes/residential area	
Noise Issues		yes/residential area	
Ownership Issues		yes/private ownership	
Adjacent Landowner Issues		yes/residential area	
Adjacent Landuse Conflicts		yes/residential area	
Significant Visual Impacts		yes/residential area	
Site specific Socio-Economic Constraints			

Nehalem 17 - East of confluence of North Fork Nehalem River and Nehalem River, ~400 feet

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		Nehalem River, McDonald Rd	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Nehalem River/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		**yes/large wetland**	**Reject**
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		yes/low quality	
Critical Habitat/Species Impacts>ROW		yes/river, slough/avoidable	
Critical Habitat/Species Impacts>Runoff		yes/river, slough/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/degraded/avoidable	
Mitigation Requirements		**yes/wetland**	**Reject**
Site specific Biological Constraints		large wetland area	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		medium/agric reclamation	
Site Acquisition Costs		yes/private ownership	
Ambient Air Quality Issues		yes/residential area	
Noise Issues		yes/residential area	
Ownership Issues		yes/private ownership	
Adjacent Landowner Issues		yes/residential area	
Adjacent Landuse Conflicts		yes/residential area	
Significant Visual Impacts		yes/residential area	
Site specific Socio-Economic Constraints			

Nehalem 19 - 38000 North Fork Road, South and west of the North Fork Nehalem River Bridge within the Nehalem UGB

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/North Fork Road	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		yes/sloughs	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		possible within	
High Tide Line		unlikely within	
Site Specific Physical Constraints			
Biological Considerations			
TES Species Onsite		none identified	
TES Species Adjacent		yes/Nehalem River/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		**yes**	**Reject**
Offsite Wetland Impacts (hydrology)		yes/avoidable	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		yes/Nehalem River/fish	
Critical Habitat/Species Impacts>Runoff		yes/Nehalem River/fish	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		no	
Mitigation Requirements		yes/wetlands	
Site specific Biological Constraints		**wetlands onsite**	**Reject**
Socio-Economic Considerations			
Current Zoning		acceptable/rural	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low	
Site Acquisition Costs		possible/private ownership	
Ambient Air Quality Issues		possible	
Noise Issues		possible	
Ownership Issues		possible/private ownership	
Adjacent Landowner Issues		possible	
Adjacent Landuse Conflicts		possible	
Significant Visual Impacts		possible	
Site specific Socio-Economic Constraints			

Nehalem 21 - Immediately north of city docks, City of Nehalem

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/limited	
Configuration of Property		suitable for rehandle site/clamshell	
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		possible/small swale	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		possible within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		none	
Biological Considerations			
TES Species Onsite		none identified	
TES Species Adjacent		yes/Nehalem River	
Critical Habitat Onsite		no	
Wildlife Corridor		not onsite	
Onsite Wetlands		yes/between road and river	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		yes/wetland bench along river	
Critical Habitat/Species Impacts>ROW		yes/Nehalem River	
Critical Habitat/Species Impacts>Runoff		yes/Nehalem River	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		potential/avoidable	
Mitigation Requirements		not if wetlands are avoided	
Site specific Biological Constraints		wetlands, Nehalem River	
Socio-Economic Considerations			
Current Zoning		unknown	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		none anticipated	
Site Acquisition Costs		none anticipated	
Ambient Air Quality Issues		possible	
Noise Issues		possible	
Ownership Issues		yes/private ownership(?)	
Adjacent Landowner Issues		possible/commercial & residential	
Adjacent Landuse Conflicts		possible	
Significant Visual Impacts		possible	
Site specific Socio-Economic Constraints			

Nehalem 23 - Nehalem Spit State Park, immediately east of Nehalem airstrip

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/limited	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/through airstrip	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		likely within	
Site Specific Physical Constraints		difficult for truck in or pipeline	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Nehalem Bay/fish	
Critical Habitat Onsite		not identified	
Wildlife Corridor		not identified	
Onsite Wetlands		yes	
Offsite Wetland Impacts (hydrology)		possible/avoidable	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		yes/Nehalem Bay/avoidable	
Critical Habitat/Species Impacts>Runoff		yes/Nehalem Bay/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/Nehalem Bay	
Mitigation Requirements		yes/wetlands/avoidable	
Site specific Biological Constraints		wetlands, Nehalem Bay	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		**yes/identified(OPRD)**	**Reject**
Site Development Costs		yes/medium>high	
Site Acquisition Costs		no	
Ambient Air Quality Issues		none anticipated	
Noise Issues		unlikely	
Ownership Issues		no/OPRD ownership	
Adjacent Landowner Issues		no/OPRD ownership	
Adjacent Landuse Conflicts		possible/recreation use	
Significant Visual Impacts		possible/recreation use	
Site specific Socio-Economic Constraints			

Nehalem 24 - Nehalem Spit State Park, immediately east of Nehalem State Park campground, west of main access road

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/limited	
Configuration of Property		suitable	
Water Access		yes	
Road Access		possible/airstrip conflict	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		possible within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		airport nearby	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Nehalem Bay	
Critical Habitat Onsite		not identified	
Wildlife Corridor		not identified	
Onsite Wetlands		yes/small area	
Offsite Wetland Impacts (hydrology)		possible/avoidable	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		yes/Nehalem Bay/avoidable	
Critical Habitat/Species Impacts>Runoff		yes/Nehalem Bay/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/Nehalem Bay	
Mitigation Requirements		yes/wetlands	
Site specific Biological Constraints		wetlands, Nehalem Bay	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		**yes/identified(OPRD)**	**Reject**
Site Development Costs		yes/low	
Site Acquisition Costs		no/OPRD ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		unlikely	
Ownership Issues		no/OPRD ownership	
Adjacent Landowner Issues		no/OPRD ownership	
Adjacent Landuse Conflicts		yes/OPRD airstrip	
Significant Visual Impacts		no/OPRD ownership	
Site specific Socio-Economic Constraints			

Nehalem 25 - Nehalem Spit State Park, south of the Nehalem State Park lower parking lot

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline, truck	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/4x4	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		possible within	
High Tide Line		unlikely within	
Site Specific Physical Constraints			
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Nehalem Bay/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		not identified	
Onsite Wetlands		none observed	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		yes/Nehalem Bay/avoidable	
Critical Habitat/Species Impacts>Runoff		bay/impacts avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/Nehalem Bay/avoidable	
Mitigation Requirements		no	
Site specific Biological Constraints		Nehalem Bay	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		yes/low	
Site Acquisition Costs		no/OPRD ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		no/OPRD ownership	
Ownership Issues		no/OPRD ownership	
Adjacent Landowner Issues		no/OPRD ownership	
Adjacent Landuse Conflicts		yes/recreation/avoidable	
Significant Visual Impacts		unlikely	
Site specific Socio-Economic Constraints			

Nehalem 26 - South end of Nehalem Spit, Nehalem Spit State Park

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/4x4	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		no	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		ODOT mitigation site	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Nehalem Bay/fish	
Critical Habitat Onsite		proposed/partial area	
Wildlife Corridor		yes	
Onsite Wetlands		yes/avoidable	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		no	
Critical Habitat/Species Impacts>Runoff		yes/Nehalem Bay/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/Nehalem Bay/avoidable	
Mitigation Requirements		yes/wetlands/avoidable	
Site specific Biological Constraints		wetlands, pinnipeds	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		yes/low	
Site Acquisition Costs		no/OPRD ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		unlikely	
Ownership Issues		no/OPRD ownership	
Adjacent Landowner Issues		no/OPRD ownership	
Adjacent Landuse Conflicts		yes/recreation/avoidable	
Significant Visual Impacts		unlikely	
Site specific Socio-Economic Constraints			

Nehalem 27 - Nehalem Spit State Park, immediately north of the north jetty at the mouth of Nehalem Bay

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/large area/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/4x4	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		possible within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		none identified	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Nehalem Bay/fish/Pinniped	
Critical Habitat Onsite		proposed/partial area	
Wildlife Corridor		no	
Onsite Wetlands		yes/small wetland	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		yes/Nehalem Bay/avoidable	
Critical Habitat/Species Impacts>Runoff		yes/Nehalem Bay/avoidable	
Critical Habitat/Species Impacts>Oceanshore		potential/avoidable	
Sensitive Aquatic Impacts>Shoreline		potential/avoidable	
Mitigation Requirements		yes/wetland	
Site specific Biological Constraints		no	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		yes/low	
Site Acquisition Costs		no/OPRD ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		unlikely	
Ownership Issues		no/OPRD ownership	
Adjacent Landowner Issues		no/OPRD ownership	
Adjacent Landuse Conflicts		yes/recreation/avoidable	
Significant Visual Impacts		unlikely	
Site specific Socio-Economic Constraints			

Tillamook 1 - South jetty

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/large area/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/extend 4x4 road	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		prior disposal area	
Biological Considerations			
TES Species Onsite		possible/Plover	
TES Species Adjacent		possible/Plover; yes/fish	
Critical Habitat Onsite		proposed/HCP (?)	
Wildlife Corridor		not identified	
Onsite Wetlands		yes/small/avoidable	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		avoidable	
Critical Habitat/Species Impacts>Runoff		avoidable	
Critical Habitat/Species Impacts>Oceanshore		avoidable	
Sensitive Aquatic Impacts>Shoreline		avoidable	
Mitigation Requirements		wetland, plover habitat	
Site specific Biological Constraints		proposed critical habitat	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low	
Site Acquisition Costs		no	
Ambient Air Quality Issues		unlikely	
Noise Issues		unlikely	
Ownership Issues		unlikely	
Adjacent Landowner Issues		unlikely	
Adjacent Landuse Conflicts		unlikely	
Significant Visual Impacts		unlikely	
Site specific Socio-Economic Constraints			

Tillamook 2 - Northern portion of Bayocean Peninsula

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/large area/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/4x4	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		pond	
Biological Considerations			
TES Species Onsite		not identified/degraded	
TES Species Adjacent		possible/plover; yes/fish	
Critical Habitat Onsite		proposed/limited area	
Wildlife Corridor		not identified	
Onsite Wetlands		yes/small/avoidable	
Offsite Wetland Impacts (hydrology)		avoidable	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		yes/avoidable	
Critical Habitat/Species Impacts>Runoff		yes/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/avoidable	
Mitigation Requirements		avoidable	
Site specific Biological Constraints		proposed critical habitat/plover	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low	
Site Acquisition Costs		no	
Ambient Air Quality Issues		unlikely	
Noise Issues		unlikely	
Ownership Issues		unlikely	
Adjacent Landowner Issues		unlikely	
Adjacent Landuse Conflicts		possible/recreation	
Significant Visual Impacts		unlikely	
Site specific Socio-Economic Constraints			

Tillamook 3 - North of Bayocean Lake on Bayocean Peninsula

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes/4x4	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		none	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/fish	
Critical Habitat Onsite		not identified	
Wildlife Corridor		yes/impacted	
Onsite Wetlands		not identified	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		yes/avoidable	
Critical Habitat/Species Impacts>Runoff		yes/avoidable	
Critical Habitat/Species Impacts>Oceanshore		yes/avoidable	
Sensitive Aquatic Impacts>Shoreline		yes/avoidable	
Mitigation Requirements		avoidable	
Site specific Biological Constraints		winter waterfowl (ODFW)	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low	
Site Acquisition Costs		no	
Ambient Air Quality Issues		unlikely	
Noise Issues		unlikely	
Ownership Issues		unlikely	
Adjacent Landowner Issues		unlikely	
Adjacent Landuse Conflicts		possible/recreation	
Significant Visual Impacts		unlikely	
Site specific Socio-Economic Constraints			

Tillamook 4 - Immediately west of the Tillamook County Boat Launch at Memaloose Point

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		limited/clamshell	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		available area/prior disposal	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		no	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		yes/impacted	
Critical Habitat/Species Impacts>ROW		yes/avoidable	
Critical Habitat/Species Impacts>Runoff		yes/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		no/riprapped shoreline	
Mitigation Requirements		no	
Site specific Biological Constraints		Tillamook River	
Socio-Economic Considerations			
Current Zoning		unknown	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low/clamshell	
Site Acquisition Costs		no/County ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		no/County ownership	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		unlikely	
Site specific Socio-Economic Constraints			

Tillamook 5 - Located between Tillamook County boat launch and private oyster processing facilities at Memaloose Point

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/clamshell	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		Highway 101, Tillamook River	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		no	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		yes/impacted	
Critical Habitat/Species Impacts>ROW		yes/avoidable	
Critical Habitat/Species Impacts>Runoff		yes/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		no/riprapped shoreline	
Mitigation Requirements		no	
Site specific Biological Constraints		Tillamook River	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low	
Site Acquisition Costs		yes/private ownership(?)	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		yes/private ownership(?)	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		none anticipated	
Site specific Socio-Economic Constraints			

Tillamook 5B - Residence 1/2 mile from T5, east side of Bayocean Road

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		**no/residential development**	**Reject**
Configuration of Property		unsuitable	
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		residential development	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		yes/small/avoidable	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		yes/wetland fringe habitat	
Critical Habitat/Species Impacts>ROW		yes/avoidable	
Critical Habitat/Species Impacts>Runoff		yes/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/tidal wetland fringe	
Mitigation Requirements		no/avoidable	
Site specific Biological Constraints		Tillamook River	
Socio-Economic Considerations			
Current Zoning		unknown	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		high (residence)	
Site Acquisition Costs		high (residence)	
Ambient Air Quality Issues		likely	
Noise Issues		likely	
Ownership Issues		yes/private ownership	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		none anticipated	
Site specific Socio-Economic Constraints			

Tillamook 6 - Northwest of Tillamook-Cape Meares Bridge crossing the Tillamook River

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/large area/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		yes/avoidable	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		*likely within*	
High Tide Line		unlikely within	
Site Specific Physical Constraints		bermed/Tillamook River	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		*no*	
Onsite Wetlands		**yes/large area**	**Reject**
Offsite Wetland Impacts (hydrology)		potentially/avoidable	
Riparian Habitat		yes/wetland fringe habitat	
Critical Habitat/Species Impacts>ROW		yes/may be avoidable	
Critical Habitat/Species Impacts>Runoff		yes/may be avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/wetland fringe/avoidable (?)	
Mitigation Requirements		**yes/large mitigation area**	**Reject**
Site specific Biological Constraints		large wetlands/Tillamook River	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		medium/agric reclamation	
Site Acquisition Costs		yes/private ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		yes/private ownership	
Adjacent Landowner Issues		no/agriculture	
Adjacent Landuse Conflicts		no/agriculture	
Significant Visual Impacts		none anticipated	
Site specific Socio-Economic Constraints			

Tillamook 7 - South of Tillamook-Cape Meares Bridge, on east side of Tillamook River

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/large area/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		yes/avoidable	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		Trask & Tillamook Rivers	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		**yes/most of site**	**Reject**
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		yes/wetland fringe habitat	
Critical Habitat/Species Impacts>ROW		yes/avoidable	
Critical Habitat/Species Impacts>Runoff		yes/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/tidal wetland fringe	
Mitigation Requirements		**yes/large area**	**Reject**
Site specific Biological Constraints		wetland/river	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		medium/agric reclamation	
Site Acquisition Costs		yes/private ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		yes/private ownership	
Adjacent Landowner Issues		no/agriculture	
Adjacent Landuse Conflicts		no/agriculture	
Significant Visual Impacts		no	
Site specific Socio-Economic Constraints			

Tillamook 8 - Northeast and across Tillamook River from Memaloose Point

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/large area/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		yes/irrigation ditches	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		none	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/rivers, slough	
Critical Habitat Onsite		no	
Wildlife Corridor		not identified	
Onsite Wetlands		yes/large wetland/avoidable.	
Offsite Wetland Impacts (hydrology)		avoidable	
Riparian Habitat		yes/wetland fringe habitat	
Critical Habitat/Species Impacts>ROW		possible/rivers, etc.	
Critical Habitat/Species Impacts>Runoff		possible/rivers, etc.	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/may be avoidable	
Mitigation Requirements		yes/wetland/avoidable	
Site specific Biological Constraints		large wetland/rivers, sloughs	
		mitigation/conservation site unsuitable for DMD	**Reject**
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		medium/agric reclamation	
Site Acquisition Costs		no/Tillamook County	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		no	
Adjacent Landowner Issues		no/agriculture	
Adjacent Landuse Conflicts		no/agriculture	
Significant Visual Impacts		no/agriculture	
Site specific Socio-Economic Constraints			

Tillamook 10 - South of Bay City at Goose Point - Kilchis Point

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/large area/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		yes/numerous sloughs	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		Tillamook Bay/sloughs	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/river, slough	
Critical Habitat Onsite		not identified	
Wildlife Corridor		not identified	
Onsite Wetlands		**yes/large area, mudflats**	**Reject**
Offsite Wetland Impacts (hydrology)		yes/may be avoidable	
Riparian Habitat		yes/wetland fringe habitat	
Critical Habitat/Species Impacts>ROW		yes/river, sloughs	
Critical Habitat/Species Impacts>Runoff		yes/river, sloughs	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/may be avoidable	
Mitigation Requirements		**yes/ large wetland area**	**Reject**
Site specific Biological Constraints		wetland/river/slough	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		medium/agric reclamation	
Site Acquisition Costs		yes/private ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		possible/private ownership	
Adjacent Landowner Issues		possible/private ownership	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		none anticipated	
Site specific Socio-Economic Constraints			

Tillamook 12 - At Bay City, east of Highway 101 and adjacent to Patterson Creek

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		**no**	**Reject**
Configuration of Property		**unsuitable/pond**	**Reject**
Water Access		possible/constraints	
Road Access		yes/residential roads	
Distance from Shoreline/Waterways		unacceptable	
Drainage Across Site		yes/Patterson Creek	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		pond/residential area	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		Patterson Creek (?)	
Critical Habitat Onsite		Patterson Creek (?)	
Wildlife Corridor		yes/riparian corridor	
Onsite Wetlands		**yes**	**Reject**
Offsite Wetland Impacts (hydrology)		possible/avoidable	
Riparian Habitat		yes	
Critical Habitat/Species Impacts>ROW		Patterson Creek (?)	
Critical Habitat/Species Impacts>Runoff		Patterson Creek (?)	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes	
Mitigation Requirements		**yes/wetlands**	**Reject**
Site specific Biological Constraints		wildlife habitat/Patterson Creek	
Socio-Economic Considerations			
Current Zoning		unknown	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		high/wetland mitigation	
Site Acquisition Costs		yes/residential (?)	
Ambient Air Quality Issues		yes/residential (?)	
Noise Issues		yes/residential (?)	
Ownership Issues		possible/private ownership	
Adjacent Landowner Issues		yes/residential (?)	
Adjacent Landuse Conflicts		yes/residential (?)	
Significant Visual Impacts		yes/residential & Highway 101	
Site specific Socio-Economic Constraints			

Tillamook 13 - Immediately east of Larson's Cove, east side of railroad tracks and north side of creek

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes	
Configuration of Property		acceptable/limited access	
Water Access		**not reasonable**	**Reject**
Road Access		**no**	**Reject**
Distance from Shoreline/Waterways		unacceptable	
Drainage Across Site		yes/creek	
Groundwater Table		shallow	
Geotechnical Constraints		possible/steep slopes	
Existing Site Contamination		none anticipated	
Floodplain		unlikely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		remote/steep slopes	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		not identified	
Critical Habitat Onsite		not identified	
Wildlife Corridor		yes/riparian corridor	
Onsite Wetlands		yes/along stream	
Offsite Wetland Impacts (hydrology)		yes/may be avoidable	
Riparian Habitat		yes/forested	
Critical Habitat/Species Impacts>ROW		possible/Larson's Cove, stream	
Critical Habitat/Species Impacts>Runoff		possible/Larson's Cove, stream	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		possible/Larson's Cove, stream	
Mitigation Requirements		possible/stream/wetland	
Site specific Biological Constraints		mature forest, stream corridor	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		**high/difficult access**	**Reject**
Site Acquisition Costs		yes/private ownership(?)	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		yes/private ownership(?)	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		none anticipated	
Site specific Socio-Economic Constraints			

Tillamook 15A - Between railroad tracks and Highway 101, extending from north of Larson's Cove to Hobsonville

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/limited/truck	
Configuration of Property		**unsuitable**	**Reject**
Water Access		no/across Highway 101	
Road Access		yes/Highway 101	
Distance from Shoreline/Waterways		**unacceptable**	**Reject**
Drainage Across Site		yes	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		unlikely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		railroad tracks, Highway 101	
Biological Considerations			
TES Species Onsite		**yes, bald eagle**	**Reject**
TES Species Adjacent		yes/fish	
Critical Habitat Onsite		**yes, eagle nest (USFWS)**	**Reject**
Wildlife Corridor		no	
Onsite Wetlands		yes, undefined ditch	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		yes/Tillamook Bay/maybe avoidable	
Critical Habitat/Species Impacts>Runoff		yes/Tillamook Bay/maybe avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		no, shoreline riprapped	
Mitigation Requirements		yes/small wetland	
Site specific Biological Constraints		no	
Socio-Economic Considerations			
Current Zoning		unknown	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		yes/low/truck	
Site Acquisition Costs		possible/public ownership(?)	
Ambient Air Quality Issues		possible/Highway 101	
Noise Issues		possible/Highway 101	
Ownership Issues		possible/public ownership(?)	
Adjacent Landowner Issues		possible/ODOT, RR	
Adjacent Landuse Conflicts		possible/ODOT, RR	
Significant Visual Impacts		yes/Highway 101	
Site specific Socio-Economic Constraints			

Tillamook 16 - Immediately east of Highway 101 and north of Miami River

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/large area/pipeline	
Configuration of Property		acceptable	
Water Access		possible	
Road Access		yes	
Distance from Shoreline/Waterways		unacceptable	
Drainage Across Site		yes	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		Highway 101, Miami River	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Miami River	
Critical Habitat Onsite		yes/Miami River (?)	
Wildlife Corridor		yes/riparian corridor	
Onsite Wetlands		**yes/most of site**	**Reject**
Offsite Wetland Impacts (hydrology)		yes/maybe avoidable	
Riparian Habitat		yes	
Critical Habitat/Species Impacts>ROW		yes/Miami River/maybe avoidable	
Critical Habitat/Species Impacts>Runoff		yes/Miami River/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/Miami River	
Mitigation Requirements		**yes/large area**	**Reject**
Site specific Biological Constraints		wetlands/Miami River	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		medium/agric reclamation	
Site Acquisition Costs		yes/private ownership	
Ambient Air Quality Issues		no/agricultural area	
Noise Issues		no/agricultural area	
Ownership Issues		yes/private ownership	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		yes/Highway 101	
Site specific Socio-Economic Constraints			

Tillamook 17 - North and west of junction of Highway 101 and Miami River Road

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/prior disposal/pipeline	
Configuration of Property		suitable	
Water Access		yes/difficult	
Road Access		yes	
Distance from Shoreline/Waterways		**unacceptable**	**Reject**
Drainage Across Site		**yes/Hobson Creek**	**Reject**
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		unlikely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		none	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/Miami River	
Critical Habitat Onsite		no	
Wildlife Corridor		no/impacted corridor	
Onsite Wetlands		**yes/large area**	**Reject**
Offsite Wetland Impacts (hydrology)		yes/avoidable	
Riparian Habitat		yes/impacted	
Critical Habitat/Species Impacts>ROW		yes/Miami River	
Critical Habitat/Species Impacts>Runoff		yes/Miami River	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		no	
Mitigation Requirements		**yes/wetland, stream**	**Reject**
Site specific Biological Constraints		no	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		medium/Hobson Creek	
Site Acquisition Costs		yes/private ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		yes/private ownership	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		yes/Highway 101	
Site specific Socio-Economic Constraints			

Tillamook 20 - Old Mill Marina

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		yes/avoidable	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		settling ponds/buildings	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/fish	
Critical Habitat Onsite		not identified	
Wildlife Corridor		no	
Onsite Wetlands		yes/ponds, tidal fringe	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		no	
Critical Habitat/Species Impacts>Runoff		yes/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/eelgrass, mudflats	
Mitigation Requirements		yes/wetlands/avoidable	
Site specific Biological Constraints		no	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low/available ponds, outfall	
Site Acquisition Costs		yes/private ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		yes/private ownership	
Adjacent Landowner Issues		no/port property	
Adjacent Landuse Conflicts		no/port property	
Significant Visual Impacts		none anticipated	
Site specific Socio-Economic Constraints			

Tillamook 22 - Port of Garibaldi Rehandle site

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		presently filled	
Configuration of Property		acceptable	
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		site developed	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		yes/fish	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		yes/tidal fringe	
Offsite Wetland Impacts (hydrology)		yes/avoidable	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		no	
Critical Habitat/Species Impacts>Runoff		yes/avoidable	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		yes/mudflats	
Mitigation Requirements		no	
Site specific Biological Constraints		tidal wetland fringe	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low/clamshell, truck	
Site Acquisition Costs		yes/Port, City(?)	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		yes/Port, City(?)	
Adjacent Landowner Issues		none anticipated	
Adjacent Landuse Conflicts		none anticipated	
Significant Visual Impacts		none anticipated	
Site specific Socio-Economic Constraints			

Tillamook 25A - At Barview, immediately north of North jetty

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/pipeline, truck	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		likely within	
Site Specific Physical Constraints		jetty, beach	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		not identified	
Critical Habitat Onsite		no/impacted/HCP?	
Wildlife Corridor		no	
Onsite Wetlands		no	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		no	
Critical Habitat/Species Impacts>Runoff		no	
Critical Habitat/Species Impacts>Oceanshore		yes/fish	
Sensitive Aquatic Impacts>Shoreline		no	
Mitigation Requirements		no	
Site specific Biological Constraints		none	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low	
Site Acquisition Costs		no/public ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		no/public ownership	
Adjacent Landowner Issues		possible/USACE, State (?)	
Adjacent Landuse Conflicts		possible/USACE, State (?)	
Significant Visual Impacts		possible/recreation	
Site specific Socio-Economic Constraints			

Tillamook 26 - North of north jetty and west of Jetty Park campgrounds

Screening Criteria		Site Evaluation	Accept/Reject
Physical Characteristics			
Land Available for Material Storage		yes/large area/pipeline	
Configuration of Property		suitable	
Water Access		yes	
Road Access		yes	
Distance from Shoreline/Waterways		acceptable	
Drainage Across Site		none	
Groundwater Table		shallow	
Geotechnical Constraints		none anticipated	
Existing Site Contamination		none anticipated	
Floodplain		likely within	
High Tide Line		unlikely within	
Site Specific Physical Constraints		camp site boundaries	
Biological Considerations			
TES Species Onsite		not identified	
TES Species Adjacent		not identified	
Critical Habitat Onsite		no	
Wildlife Corridor		no	
Onsite Wetlands		yes/small/avoidable	
Offsite Wetland Impacts (hydrology)		no	
Riparian Habitat		no	
Critical Habitat/Species Impacts>ROW		no	
Critical Habitat/Species Impacts>Runoff		no	
Critical Habitat/Species Impacts>Oceanshore		no	
Sensitive Aquatic Impacts>Shoreline		no	
Mitigation Requirements		yes/small wetland	
Site specific Biological Constraints		no	
Socio-Economic Considerations			
Current Zoning		acceptable	
Possible Ordinance Amendments		N/A	
Cultural/Historical/Archaeological Value		N/A	
Site Development Costs		low	
Site Acquisition Costs		no/public ownership	
Ambient Air Quality Issues		none anticipated	
Noise Issues		none anticipated	
Ownership Issues		no/public ownership	
Adjacent Landowner Issues		possible/USACE	
Adjacent Landuse Conflicts		possible/recreation	
Significant Visual Impacts		possible/recreation	
Site specific Socio-Economic Constraints			

NEHALEM ESTUARY

The Nehalem Estuary occupies approximately 2985 surface acres. Tidelands represent 61% (1771 acres) and submerged lands (39%). Less than 10% of the total estuarine intertidal area is classified as Estuary Conservation and Estuary Development. Less than 1% of the total subtidal area is classified as Estuary Natural. Over 98% of the subtidal surface area in the estuary is represented by subtidal unconsolidated bottom habitat.

ESTUARY DEVELOPMENT MANAGEMENT UNITS

Of the 2,985 acres in the Nehalem Estuary, 244.2 acres, or 8.2% are in development management units. Most of this acreage is included in 21ED, the Nehalem channel (141.7 acres, 70%). Predominantly subtidal habitat is included in the development management units (151.6 acres, 67.6%). The 72.6 acres of intertidal habitat included in these management units is only 4.1% of the total acreage of intertidal habitat in the estuary.

1. Dredge and Fill

Dredging needs are discussed in Sections 3.4b.1, 3.4c.1 and 3.4d.1 of this element. About half of the dredging (224,000 cubic yards) is for establishing navigable depths in the main channel. Since almost all of this is to occur in subtidal areas and materials can be disposed of in nonaquatic areas, the effects of dredging the channel on the estuarine ecology will not be adverse. The remaining half of the dredging (228,000 cubic yards) will occur at the present and proposed marinas in the estuary. Most of this, 180,000 cubic yards or 79%, is for the proposed marine harbor north of Wheeler (See exception for 13ED). 6.5% is for maintenance and expansion of Paradise Cove, and the remaining 14.5% is for maintenance dredging of existing facilities. Except for 13ED, most of this dredging will occur in subtidal areas. In 13ED, 9.77 acres of intertidal habitat will be dredged. The approved Exception in 13ED included the placement of materials from dredging on 14.48 acres of predominantly tidal marsh also in 13ED. However, based upon current local, state and federal regulations, dredged material from this potential project are to be placed in the upland DMD site, #11. The effects of dredging in 13ED are discussed in the exception for that management unit.

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Deleted: Since the maintenance dredging of existing projects involves mostly subtidal habitats and spoils can be placed in nonaquatic areas, the effects on the estuarine ecology will not be adverse.

Except for 13ED no filling is proposed for the development management units in the Nehalem Estuary. The effect of placing fill in 13ED are described in the exception for that management unit.

2. NAVIGATION AND WATER-DEPENDENT COMMERCIAL ENTERPRISES AND ACTIVITIES

Marina expansions are planned for Jetty Fishery, Brighton Moorage, Paradise Cove and Dart's Marina. New marina facilities are planned for 13ED. The cumulative effects of dredging and filling for these facilities are described under 1 above. The cumulative effect of new piling and docks on the estuary will be minimal because of the small area that will be affected. Increased development at Jetty Fishery and Brighton Moorage will add congestion to the stretch of Highway 101 to which these marinas have access. Similarly, expansion of Dart's Marina and construction of a new marina at 13ED will increase congestion in the Wheeler downtown. Increases use of these facilities will also bring more money into Tillamook

EXHIBIT II

County's economy.

Some water dependent and related commercial development is proposed at the Paradise Cove marina. All new construction in the management unit will be on piling. No fill is proposed. Water-dependent, water-related, and non-dependent or related development is proposed for 13ED. This development is consistent with the use of adjacent upland areas and is not expected to place excessive burdens on community services. The effects of the uses in 13ED on the estuarine ecology are discussed in the exception for that management unit. The effects of the Paradise Cove development on the estuarine ecology are acceptable because no major estuarine alterations have been proposed.

3. DISPOSAL OF DREDGED MATERIAL

Dredged material disposal is only proposed in 13ED in conjunction with the development of a harbor. Its effects are discussed in the exception for this management unit.

ESTUARY CONSERVATION 2 MANAGEMENT UNITS

Approximately 27% of the total estuarine surface area is within EC2 management units. Most of this area, 95% is subtidal. The 36.0 acres of intertidal habitat that is included represents only 2% of intertidal habitat in the estuary and the majority of habitat is represented by intertidal beach bar.

Most of the EC2 acreage is included in 22 EC2, the subtidal area along which most of the developed shorelines are located, including Brighton, Wheeler, Nehalem, and Upper Town Nehalem. Included in 22WC2 are over 75% of the subtidal areas of the estuary below the junction of the Nehalem River and the North Fork of the Nehalem River. Other than the maintenance and repair of existing facilities, and the installation of additional private docks and moorages, no projects that would require major impacts are envisioned in this section of the Nehalem estuary.

ESTUARY CONSERVATION 1 MANAGEMENT UNITS

Approximately 11% of the total estuarine surface area is within EC1 management units. Most of this area, 76.3% is subtidal. The 77.0 acres of tidal habitat included represents only 4.2% of the total intertidal habitat in the estuary.

Most of the EC1 acreage, 80.7% is included in 27EC1, the subtidal navigation channel of the North Fork of the Nehalem River. There is currently no demand for maintenance dredging in this section of the estuary. Cumulative impacts in this section of the estuary will be the result of activities from water-dependent recreation and maintenance and repair of existing structures and facilities.

ESTUARY NATURAL MANAGEMENT UNITS

Approximately 55% of the total estuarine surface area is within EN management units. Most of this area, 99%, is intertidal and composed of intertidal aquatic bed (36.7%), tidal flats (23.9%), tidal shores (9.8%), and tidal marsh (29.6%) habitats.

The majority of EN acreage (59%), is included in 7EN, a major intertidal aquatic bed and intertidal flat in the estuary.

Alterations within 7EN are limited to the Nehalem Bay State Park boat ramp and

remnants of a pile dike. Principle activities envisioned in other EN management units relate to the maintenance and repair of highway and railroad bridge crossings and other uses allowed by the zone.

NESTUCCA ESTUARY

The Nestucca Estuary occupies approximately 1413 surface acres. Tideland represent 59% (827 acres) and submerged lands 41% (586 acres). Less than 2% of the total estuarine intertidal area is classified as Estuary Conservation. Less than 2% of the total subtidal area is classified as Estuary Natural. More than 97% of the total subtidal surface area is represented by subtidal unconsolidated bottom habitat in the estuary.

ESTUARY CONSERVATION 2 MANAGEMENT UNITS

Approximately 5% of the total estuarine surface area is within EC2 management units. Most of this area, 97%, is subtidal. The main navigation channel of the Big Nestucca River is represented by the EC2 management unit. In this unit, most of the shoreline has been altered by docks, bulkheads, piling, and riprap. This management unit is adjacent to the most developed shorelands in the estuary, from the community of Woods to Pacific City. 9 EC2 contains man-made canals which were created in conjunction with a residential subdivision on adjacent shorelands. Maintenance dredging activities within these canals, and the maintenance and repair of existing structures are cumulative impact activities envisioned in this section of the estuary.

ESTUARY CONSERVATION 1 MANAGEMENT UNITS

Approximately 41% of the total estuarine surface area is within EC1 management units. Most of this area, 97%, is subtidal. The 14.7 acres of intertidal habitat that is included represents only 1.8% of the intertidal habitat in the estuary. The subtidal navigation channel of the Nestucca River from the mouth of the estuary up to the head of tide, in both the Little Nestucca and Big Nestucca Rivers, is represented by EC1 management units. These subtidal channels are principal fishing areas and several recreational boat moorages and public boat ramps are located in EC1 units. Three of the EC1 management units include fringing intertidal marshes adjacent to developed shorelands in Pacific City. Since the navigation channels are naturally maintained, of cumulative impacts envisioned in EC1 management units are results of water-dependent recreation activities, impacts from additional private docks, and degradation of intertidal marshes from shoreline development at Pacific City.

ESTUARY NATURAL MANAGEMENT UNITS

Approximately 59% of the total estuarine surface area is within EN management units. Most of this area, 98%, is intertidal. The major intertidal habitat is tidal flats (49%), followed by intertidal aquatic beds (26%) and tidal marsh (25%0. The 812 acres of intertidal habitat represents 98% of the tidelands in the estuary. 38% of the intertidal habitat in EN management units is located at the mouth of the bay, adjacent to the Nestucca sandspit. The shorelands of this sandspit are included with Nestucca Bay State Park and have been included within the State Parks □Primary Resource Protection□ land use category. Other large tracts of tidelands are adjacent to shorelands zoned for agriculture purposes. Water-dependent recreation activities and grazing pressure from livestock are the major impacts envisioned in EN management units.

NETARTS ESTUARY

Netarts Estuary occupies approximately 2744 surface acres. Tidelands represent 87% (2393 acres) and submerged lands 13% (351 acres).

Approximately 88.4% of the total estuarine surface area is within EN management units. Most of this area, 93% (2258 acres), is intertidal, and represented by intertidal aquatic bed (43%) and tidal flat Conservation management unit areas are subtidal and represented by subtidal unconsolidated bottom habitat.

Cumulative impacts to estuary management units in Netarts estuary will result from the following activities: water-dependent recreation, small scale aquaculture, commercial crabbing and clamming, and estuarine research. The western shoreline, Netarts Bay Spit, is part of Cape Lookout State Park. Netarts Spit and the associated fringing tidal marshes, are within a State Park Natural Land Use Classification. Most of the shoreline development in the estuary has occurred along the eastern and northern shorelines. The Netarts County Boat Basin and a small boat basin at Rice Creek are scheduled for maintenance dredging in the near future. Since dredging will occur in subtidal EC2 areas and spoils will be placed in upland, non-aquatic areas, the impacts are considered minimal.

SANDLAKE ESTUARY

Sandlake Estuary is classified as a Natural Estuary (OAR-660-17-010) and therefore all estuarine management units are Natural. Agricultural and water-dependent recreational uses are the major activities near and in the estuary that could contribute in time to cumulative resource degradation. Shoreland development is at a low density and other than riprap for structural shoreline stabilization, no major development projects are anticipated in the future that would impact the estuarine ecosystem at Sand Lake.

TILLAMOOK ESTUARY

The Tillamook Estuary occupies approximately 9766 surface acres. Tidelands represent 76% (7404 acres) and submerged lands 24% (2362 acres). Less than 4% (292 acres) of the total estuarine intertidal area is classified as Estuary Conservation and Development. Less than 7% (169 acres) of the total estuarine subtidal area is classified as Estuary Natural or Estuary Conservation Aquaculture.

ESTUARY DEVELOPMENT MANAGEMENT UNITS

Approximately 1.2% of the total estuarine surface area is within Estuary Development management units. Most of this area, 58%, is subtidal. The 48.3 acres of intertidal habitat that is included represents only 0.7% of this habitat in the estuary. The federally authorized navigation channel and turning basin includes 56% of the area in Development management units.

1. Dredge and Fill

Dredging in development management units in Tillamook Bay is described in Sections 3.2b1 and 3.2c1 of this element of the plan. It is anticipated that 1,746,000 cubic yards of material will be dredged form development management units over the next 20 years. Of this, approximately two thirds will be dredging to maintain depths in the authorized channel and turning basin. An additional 29% will be for maintaining depths in the Garibaldi Boat Basin. 103,000 cubic yards, 7.4 percent, will be removed to expand the

Garibaldi Boat Basin and maintain that expansion. 23,000 cubic yards will be removed in maintenance of the Bay City Boat Basin.

A small amount of the materials generated from the Garibaldi Boat Basin expansion will be used for that project. An estimated one half to one acre of estuarine surface area will be lost as a result. All other materials from dredging in development management units will be disposed on land, in the flowlane, or in approved ocean disposal sites.

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Except for the expansion of the Garibaldi Boat Basin, no fill is proposed for development management units in Tillamook Bay.

The cumulative impact of dredging or filling in development management units is small and acceptable. Approximately 20 acres of intertidal habitat twill be dredged. This is only 0.3 percent of the intertidal habitat in the estuary. Fifty-three percent of this habitat is in the authorized turning basin. At most, one acre of intertidal habitat will be filled. This is less than 0.1 percent of the intertidal habitat in the estuary. The exception for the Garibaldi Boat Basin expansion included in the Garibaldi Comprehensive Plan describes the impacts of dredge and fill in more detail.

2. Navigation and Water-dependent Commercial Enterprises and Activities

The anticipated effects of expansion of the Garibaldi Boat Basin are discussed in the exception for that management units. The amount of expansion of the Hayes Oyster facility in 23ED is presently unknown.

Although the effects of such expansion on the estuary or the community are uncertain, their relative magnitude is probably small because of the small area involved.

3. Disposal of Dredged Material

Disposal of dredged materials will be on land or in approved ocean disposal sites except for a small amount of in-water disposal associated with the Garibaldi Boat Basin expansion. This is discussed in the exception for that project.

ESTUARY CONSERVATION 2 MANAGEMENT UNITS

Approximately 15% of the total estuarine surface area is within EC2 management units. Most of this area, 60%, is subtidal. The 59.5 acres of intertidal habitat that is included represents only 0.8% of intertidal habitat in the estuary.

The main navigation channels south of the Garibaldi Boat Basin includes 71% of the area in EC2 management units. Other than infrequent maintenance of boat slips and boat ramps, these navigation channels are not scheduled for maintenance dredging in the near future. The remaining EC2 management units included the area between the Tillamook jetties and the western boundary of Miami Cove, near the Old Mill Marina at the City of Garibaldi. Spoils are deposited upland in non-aquatic sites for maintenance dredging of the Garibaldi Boat Basin and Old Mill Marina. The channel between the Tillamook jetties has not been dredged since reconstruction, but when dredging is required, a hopper dredge is used and the cumulative impacts are considered minimal.

ESTUARY CONSERVATION 1 MANAGEMENT UNITS

Approximately 9% of the total estuarine surface area is within EC1 management units. Most of this area, 79.3%, is subtidal. The 184.4 acres if intertidal habitat that is included represents only 2.5% of intertidal habitat in the estuary. From the head of tide to where the Trask, Tillamook, Wilson, Kilchis and Miami Rivers enter Tillamook Bay represents almost 60% of the estuarine surface area in EC1 management units. Navigable depths are naturally maintained in major sections of these rivers and only boat ramps have need for maintenance dredging. Pilings have been placed in nearly all of the EC1 management units, wither for pile dikes, piers or for bridge crossings. Minor dredging occurs for a small marina at the confluence of the Tillamook and Trask Rivers. The expansion of Highway 101 in the City of Tillamook will require additional bridge crossing support structures in the sloughs of the Trask and Wilson Rivers. The impacts of this project and the maintenance and repair of existing facilities is considered minimal.

ESTUARY CONSERVATION AQUACULTURE MANAGEMENT UNITS

Approximately 23% of the total estuarine surface area is within ECA management units. Most of this area, 97%, is intertidal and represented by intertidal flats (58.3%), tidal marsh (0.4%), intertidal aquatic bed (38.4%), the 221.1 acres of intertidal habitat that is included represents 30% of the intertidal habitat in the estuary.

Past and present uses and activities associated with this zone that could potentially impact the estuary are oyster production, including the use of Sevin or other pesticides to control Ghost Shrimp populations, and riprap for structural shoreline stabilization along Bayocean Road.

ESTUARY NATURAL MANAGEMENT UNITS

Approximately 51% of the total estuarine surface area is within EN management units. Most of this area, 98%, is intertidal and represented by intertidal flat (57.4%), tidal marsh (17.5%), tidal shore (1.1%) and intertidal aquatic bed (22%) habitat. The 4901 acres of intertidal habitat that is included represents 66% of the intertidal habitat in the estuary.

One EN management unit (8EN) is presently under consideration for use as a dredged material disposal area. This area is represented by Miami Cove. Miami Cove is within pumping distance by dredging equipment from the Old Mill Marina. There could be cumulative impacts to the estuary as a result of filling all of 8 EN; this determination is being sought by the County as part of their review of the Tillamook Bay Dredged Material Disposal Plan. Cumulative impacts in the remaining EN management areas will be restricted to activities associated with the maintenance and repair of existing facilities.

3. DREDGED MATERIAL DISPOSAL PLAN ELEMENT

3.1 Introduction

The purpose of a dredged material disposal plan is to estimate the amount of dredged material disposal which will be generated by both existing and proposed dredging projects, to identify economically and environmentally feasible sites for disposal of dredged material, and to develop mechanisms for preserving a sufficient number of feasible sites to accommodate identified dredged material disposal needs. The greater the level of development provided for within a given estuary, the greater is the need for dredged material disposal plans. The need for dredged material disposal plans is greatest in Development estuaries such as Tillamook and Nehalem, for two reasons:

(1) A more intensive level of development is provided for within Development estuaries; and

(2) Dredged material disposal sites within shorelands adjacent to these estuaries are likely to be limited by existing recreational, commercial or industrial development.

Tillamook and Nehalem Estuary Dredged Material Disposal Plans were completed in the 1980's by Wilsey and Ham. The plans resulted in the classification of 59 sites as Priority, Reserve and Inventory (acceptable and unacceptable). The intent of the designations was to provide protection for viable sites. At the time the Plans were completed, 35 sites were deemed to be acceptable. With increased regulations, maintaining sites that were deemed acceptable in the mid-1980's required additional review of these sites for protection. As a result, Tillamook County contracted with the consulting firm of Parsons and Brinkerhoff and PBS Engineering and Environmental in 2005 to prepare the dredged material disposal plans which are contained within this section.

Since the completion of the Dredged Material Site Evaluation for Tillamook and Nehalem Bay by Parsons and Brinkerhoff and PBS Engineering and Environmental in January 2006, a final determination on the classification of existing dredged material disposal sites as Priority and Reserve has been made by Tillamook County.

Dredged material disposal plans were not prepared in the mid-1980's or 2005 as part of the overall estuary management plans for Netarts and Nestucca estuaries due to the limited need for dredged material disposal sites at this time. This determination was based on 1) analysis of historic alterations (including dredging) within Netarts and Nestucca Estuaries which was conducted during the preparation of the mitigation and restoration plans contained in Section 4 of this element; and 2) discussions on the need for future dredging by the Tillamook County Estuary Council and citizen advisory groups during the preparation of management unit designation maps. At this time, future dredging needs appear to be limited to possible maintenance dredging of existing recreational boating facilities in Netarts Bay (the Tillamook County Boat Basin and the marina at Rice Creek in Netarts Bay), and periodic dredging to maintain boating access within Nestucca Estuary Management Unit 9EC2.

Tillamook County has developed policy statements and implementation mechanisms which require that dredged material disposal plans be prepared for Netarts and Nestucca Estuaries prior to approval of dredging projects which would create substantial needs for dredged material disposal sites. (See policies for Dredging and Dredged Material Disposal in Section 5 of this element, and standards for Dredging and Dredged Material Disposal in Section 3.140 of the Tillamook County Zoning Ordinance.)

Deleted: In recognition of the need for detailed dredged material disposal plans for Tillamook and Nehalem Estuaries, Tillamook County contracted with the consulting firm of Wilsey and Ham to prepare the dredged material disposal plans which are contained within this section.¶
¶
Since the completion of the Tillamook and Nehalem Estuary Dredged Material Disposal Plans by Wilsey and Ham in mid-1980, a final determination on the classification of dredged material disposal sites as Priority, Reserve or Inventory has been made by the Tillamook County Estuary Council, and the Tillamook County Comprehensive Plan and implementing ordinances have been completed. To maintain consistency between the Tillamook and Nehalem Estuary dredged material disposal plans, other elements of the Comprehensive Plan and implementing ordinances, additions and modifications have been made to the dredged material disposal plan prepared by Wilsey and Ham.

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3.2 Tillamook and Nehalem Estuary Dredged Material Disposal Plan Overview

3.2a Introduction

Coastal waterways in the Pacific Northwest have provided important means of transportation since the first human inhabitants. As populations grew and towns became established along the rivers and bays, the significance of the waterways increased. Bonds became established between economic integrity and water related transportation systems. As navigational demand grew, forms of shipment evolved through various modes and sizes. Economic parameters dictated that larger barges and ships be used for the movement of goods, which often required deeper water depths for uninterrupted transport. In order to allow for the proper movement of these vessels, dredging (the removal of bottom materials from below the water surface) came into practice along most of the major waterways. By removing bottom sediments and deepening the river channel, both commercial and recreational vessels could gain access to the ocean upriver ports, riverside docks, moorages and marinas, thus enhancing the usability of both the waterway and the adjacent land areas.

The upland areas are continuously involved in the natural geologic processes or erosion creating sediment loads within the drainage systems. As sediments accumulate in the major waterways, measurable volumes are deposited within river shoals, slow moving bays, and ocean entrance channels. Shoaling (the accumulation of sediments in a specific area) often threatens river and bay navigation, thus regular dredging becomes mandatory.

Tillamook County experiences comparable navigation trends and the inherent shoaling problems. The two major bays, Tillamook Bay and Nehalem Bay, have established recreational, commercial, and industrial enterprises along their shorelines. Within these water systems, both public and private investments in navigational improvements have been made in order to facilitate the movement of goods and people between bay and upriver areas and the ocean. Major public navigation improvements have included the construction of jetties at the mouths of each bay, and a navigation channel in Tillamook Bay to Miami Cove. Public ports (Port of Garibaldi, Port of Tillamook Bay, and Port of Nehalem) have constructed improvements to these bays to benefit the public use of these resources. Private enterprise have built various moorage and marina facilities as well. The continued use of the existing facilities, and future development of more facilities, will require an appropriate maintenance program for the navigation systems.

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Before bottom sediments can be dredged from the bay and river, it is necessary to locate areas upon which those materials can be placed (disposal sites). Disposal can occur in-water (ocean or bay/river) or on upland areas, depending on the location of the materials to be dredged, the adequacies of the potential disposal sites, and accessibility. Tillamook Bay presently has ocean disposal for part of its dredging, and upland disposal for the majority of its dredging requirements. Nehalem Bay, with only limited, isolated dredging presently occurring, utilizes upland disposal sites at this time.

In order for either a land or in-water area to be judged suitable for the disposal of dredged materials, it must meet a wide range of environmental, engineering, and cost criteria. Because of the difficulty in satisfying all of these criteria, acceptable dredged material disposal sites are considered to be a limited, significant resource. In recognition of the potential scarcity of suitable dredged material disposal sites, the State of Oregon (through its coastal goals) and Tillamook County (through its comprehensive planning process) have developed a dredged material disposal plan

to identify areas which will be adequate to meet the disposal needs for the next twenty years. In addition to the selection of sites which meet the environmental and engineering criteria, this dredged material disposal plan must also outline the policies and procedures governing the use of the sites as well as to outline a program for plan implementation.

This "dredge plan" was undertaken during 1979 and 1980 to accomplish the above mentioned objectives. Local, state, and federal agencies participated with citizens in the identification and evaluation of future dredging needs and disposal options for the two estuaries. A federal and state agency task force was utilized to comply with LCDC Goal #16, Implementation Requirement #5, which states:

> "Local government and state and federal agencies shall develop comprehensive programs, including specific sites and procedures for disposal and stockpiling of dredged materials."

Project steering committees made up of local jurisdiction representatives and residents, were utilized to help develop a dredge plan that would meet the local development needs for each estuary. Local ports helped to contact potential disposal site property owners to receive input and incorporate specific concerns and recommendations into the disposal site discussions.

The dredged material disposal plans for Tillamook Bay and Nehalem Bay have been prepared as a portion of Tillamook County's efforts to develop its Comprehensive Plan and estuarine management plan under the provision contained in Goal #16.

The current study evaluated the 35 sites identified for the Tillamook and Nehalem Bays. Agency personnel from local, state, and federal agencies participated in the review process. The intent of the review was to identify those sites that were "shovel ready", minimized environmental impacts and would require minimal additional permitting. Sites that would require extensive regulatory reviews as part of a permitting process for a dredging project were eliminated from the list of acceptable sites and are no longer protected under Goal 16.

3.2b Dredging Methods and Constraints

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Dredging Technology

Various types of dredging equipment have been utilized over the years in the Tillamook and Nehalem Bays. The equipment used in these bays include hopper dredges, pipeline dredges, bucket and clamshell dredges, and "sleds." The selection of such equipment depends upon economics, which in turn, is determined by the quantities and characteristics of the dredged material, channel restrictions, weather, environmental protection, configuration of the dredging site, and the availability and location of the disposal areas. Each type of dredge has characteristic efficiencies of operation, production and cost under specific situations.

In the development of both short-range and long-range dredged disposal plans, costs of dredging are very dependent upon the quantity of materials moved and the disposal site preparation required. Further development or advances in dredging technology could also have significant impact on plan selection and cost. However, current dredging methods and anticipated methods identified in this report for the use in the next 15-20 years must be based on current technology.

Most dredging work considered for Tillamook Bay or Nehalem Bay would be accomplished by one of three methods: clamshell or bucket dredging, hopper

dredging, or pipeline dredging. Maintenance dredging at the mouth of the Tillamook Bay is generally completed by hopper dredge while hydraulic pipeline and bucket dredges would be used for the remainder of the dredging. Any of the three methods may be commonly used for new construction depending upon the constraints of the particular project.

Bucket or Clamshell Dredges

The bucket or clamshell dredges are well suited to working in confined areas. These dredges operate efficiently and minimize water quality problems as long as the dredged materials are firm and of medium to heavy grain size. They are most economical when dredging small quantities; when quantities exceed several thousand cubic yards, other methods are generally more economical.

When using bucket or clamshell dredges, dredged material can either be placed on dump barges or directly onto trucks, if the dredge is operating close to shore. Both of these techniques constitute "re-handling" of the material but do allow transportation of the dredged materials to disposal sites some distance from the dredging location.

Bucket and clamshell dredges are also generally utilized for digging in gravel or rock and for the removal of stumps and debris. The available sizes for these dredges range from capacities of 2 to 18 cubic yards. Buckets and clamshells have been used in both bays, primarily for small private projects.

Clamshell dredges would likely be used to maintain access to existing boat launches, such as the Memaloose Point Boat Launch, the City of Nehalem docks and the Tillamook County Boat Launch on the Nehalem River near the Highway 101 Bridge. Permanent disposal sites are not located adjacent to any of the boat launches listed above.

Pipeline Dredge

The pipeline dredge method consists of a large centrifugal pump which is mounted on a specifically designed barge. The lower end of the pipeline is equipped with a revolving cutterhead that breaks up the bottom materials so they can be drawn into the suction pipe. The cutterhead is lowered to the bottom on a large hinged ladder that extends forward from the front, or bow, of the barge. The cutterhead depth can be controlled by cables attached to the ladders. The pipeline, which extends from the edge of the barge to the shore or to an area of in-water disposal, floats on pontoons.

The pipeline dredge is held in position during dredging by anchors, swing lines, and spuds. (Spuds are long heavy shafts that are hung from masts near each corner of the stern of the dredge.) Pipeline dredges are identified by the diameter of the discharge line and generally are available from 8 to 20 inches in size. The chief advantages of pipeline dredge use include: 1) movement of large volumes of material in a short period of time, 2) ease of transport of the pipeline, and 3) simultaneous dredging and disposal operations. Major limitations to the use of pipeline dredges are as follows: 1) disposal areas must be relatively close to the dredging operations since costs escalate rapidly as the pipeline length is increased or the disposal area is elevated; 2) pipeline dredges are unable to operate in open or rough water areas; 3) buried logs, large boulders and discarded wastes, such as

cable, present serious obstacles to the operation of the impeller; and 4) the anchoring cables and pipeline can present a temporary obstruction to navigation in confined channels.

Pipeline dredges have been used extensively in the Tillamook Bay inner channel for the federal maintenance project, the boat basin, and marina development.

Hopper Dredge

A hopper dredge is a self-contained ocean-going vessel that is designed for both hydraulic dredging and the transport of the dredged material to a dumping area. Dredging is accomplished while the vessel is in motion. Dredged materials are stored in the hopper dredge until the hoppers are filled; the dredge is then moved to another water area (generally in the open ocean) for disposal. Dredging is accomplished through suction pipes which are lowered to "vacuum" bottom materials. Hopper dredges can operate where rough water would make other methods of dredging impractical. However, these dredges cannot operate in confined areas where either depth or area width is limited.

Hopper dredges have been used in the Tillamook Bay mouth and inner channel. The inner channel areas have not been dredged by hopper for several years because of the depth limitations and time delays related to hopper maneuverability. A variation of the hopper dredge is the hopper barge, a barge equipped with dredge pumps and hoppers similar to the hopper dredge but powered by a tug. The hopper barge, due to its smaller size and shallower draft, is more suitable for work in confined and limited draft areas such as the Tillamook inner channel.

Sleds

"Sled" dredging is not a common practice, though it has been used in Nehalem Bay in the past. This method uses a large metal plate dragged behind a tug, which literally knocks the top off of shoals in the channel. In Nehalem, this method of dredging worked because the bay has limited shoaling and good hydraulic characteristics. The tops of shoals could be dislodged, with the material resettling downstream in deeper water. This method has not been used in several years.

3.2.c Material Characteristics

The characteristics of the material to be dredged is a critical factor in determining the most appropriate disposal options. Chemical characteristics are a primary concern for water quality considerations and physical characteristics are a primary concern for future site (or material) use considerations. Re-use considerations for Tillamook Bay and Nehalem Bay include industrial or commercial development, road fill, beach enhancement, recreational use, aggregate stockpiling, and agricultural land enhancement. Not all dredge materials will be suitable for these various applications or future uses, though appropriate estimates for use potentials have been identified.

Test of the physical and chemical properties of bottom sediments in both bays have been undertaken as a part of this plan. In Tillamook Bay, sampling stations were established at 1) The federal channel just west of the Old Mill Marina, 2) a location north of the Pacific Oyster company, within the channel between Bay City and Sandstone Point, and 3) a location in the Trask River just upstream of Dry Stocking

Deleted: Dredging Technology¶
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Various types of dredging equipment have been utilized over the years in the Tillamook and Nehalem Bays. The equipment used in these bays include hopper dredges, pipeline dredges, bucket and clamshell dredges, and "sleds." The selection of such equipment depends upon economics, which in turn, is determined by the quantities and characteristics of the dredged material, channel restrictions, weather, environmental protection, configuration of the dredging site, and the availability and location of the disposal areas. Each type of dredge has characteristic efficiencies of operation, production and cost under specific situations. ¶
¶
In the development of both short-range and long-range dredged disposal plans, costs of dredging are very dependent upon the quantity of materials moved, and disposal site preparation. Further development or advances in dredging technology could also have significant impact on plan selection and cost. However, current dredging methods and anticipated methods identified in this report for the use in the next 15-20 years must be based on current technology.¶
¶
Costs presented through the discussion are for relative comparison and are not intended to be preliminary engineering estimates for actual work. Reasonable assumptions as to costs are defined under the section on Unit Cost Criteria.¶
¶
Most dredging work considered for Tillamook Bay or Nehalem Bay would be accomplished by one of three methods: clamshell or bucket dredging, hopper dredging, or pipeline dredging. Maintenance dredging at the mouth of the Tillamook Bay is generally completed by hopper dredge, while hydraulic pipeline and bucket dredges would be used for the remainder of the dredging. Any of the three methods may be commonly used for new construction depending upon the constraints of the particular project.¶
¶
Bucket or Clamshell Dredges¶
¶
The bucket or clamshell dredges are well suited to working in confined areas. These dredges operate efficiently and minimize water quality problems as long as the dredged materials are firm and of medium to [1]

Deleted: Tillamook Bay

Island. Two sampling stations were used in Nehalem Bay: 1) at the Fishery Point Shoal, Bay Mile 3.0 at mid-channel, and 2) the Dean Point Shoal, River Mile 0.5 at mid-channel. These sampling stations were determined to be the most representative of the areas to be dredged, and the types of materials to be found. Except for the Trask River sample, mechanical classification tests and chemical analysis tests (elutriate test) were performed on the samples. From this laboratory work, it was possible to assess the water quality aspects and the reuse potentials of the materials that may be dredged.

Physical Characteristics

Tillamook Bay

The Garibaldi sample is classified at ML (silty sand) according to the Unified Soil Classification System. This soil is problematic in terms of resource value and upland disposal. Because of poor strength, hid compressibility, and high sensitivity to moisture, this material is poorly suited for use as structural fill or as a pavement subbase. Certain low-bearing uses, however, such as fill for parks, parking lots, or agricultural land can be accomplished with this material if it is mixed with sands and gravels (SP Classification). The materials would have to be either mixed on site, or disposal should occur in alternating layers of the two materials. The ML material would have to be dewatered at the various stages of disposal, as its fine-grained nature and consequent high capillary forces made it a very slow draining material.

Ideally, pipeline dredging would be scheduled to allow sufficient time for the ML (silty sand) soil to dewater, then a low quality fill can be hydraulically constructed by placing alternating layers of SP (sands and gravel) and ML soils as the fill is accomplished. Its content and the expected retention of salts in the soil. As pasture land it could be considered as good, given appropriate structural considerations during disposal. The dredged slurry of ML soil will have a very slow settling rate, and will require a long retention time.

Bottom sediments from the rest of the bay appear to be fairly uniform SP soils, described as poorly graded fine sands. The primary resource value for this material is its potential for use as structural, foundation fill material. It compacts easily and will serve as an excellent subbase material for structural foundations or pavement construction. The -free-draining nature of this soul makes it particularly suitable for use as fill during wet weather periods or in areas that are subject to a fluctuating water table.

The SP soil may be of value in agricultural applications if soil amendments and topsoil are added to supply nutrients. The soil would lend itself well as a fill material underlying a cover coat of topsoil particularly in areas subject to a fluctuating water table or periodic inundation. This soil, particularly the finer sands, is highly susceptible to wind erosion and should be stabilized by seeding with grass in open areas. If suitably fertilized the soil can be seeded without a cover of topsoil, though topsoil would provide a greater degree of success.

For agricultural uses the sediments rate low in organic content,

requiring soil amendments for both crop production and pasture land. This material would settle out quickly, have a short retention period, and work well with equipment; if worked in with existing local soils it could be properly amended to achieve agricultural value.

Nehalem Bay

The Fishery Point sample and the Dean Point sample are almost identical in their mechanical classification. They are both considered medium sands, with the upriver sample showing more coarseness in material. As SP (sand and gravel) soils their primary resource values will be the potential for use as structural foundation fill material. As with the Tillamook Bay SP soils, they will compact easily and serve as excellent subbase materials, for development purposes. Drainage characteristics are favorable, especially for wet weather periods or fluctuating water tables.

Agricultural requirements for these SP soils are the same for the Tillamook SP soils, except that wind erosion is not quite the concern for the Nehalem Bay materials. Soil amendments would be required for most plant production purposes.

Chemical Characteristics

Sediment samples were tested according to Department of Environmental Quality (DEQ) and Environmental Protection Agency (EPA) standards. These tests primarily relate to water quality conditions, and sometimes dictate special requirements for the handling of dredged materials.

Tillamook Bay

Of the samples tested all had acceptable levels of heavy metals in the ellutriate, or suspended, form. Measurements of oil, grease and sulfides also proved acceptable. The only area of concern is the oxygen demand and turbidity characteristics of the Garibaldi materials. Upland disposal of these sediments will require adequate retention designs for sufficient settling of the materials and reduction in oxygen demand of the effluent before its release. In addition, levels of arsenic exceeding the US Environmental Protection Agency standards have been detected in the dredged materials at the Port of Garibaldi re-handle site. However, background analyses in the Tillamook Bay strongly suggest that those levels occur naturally within the system. Adequate retention should not be a problem for clamshell disposal, due to the low production rate of disposal. However, pipeline disposal in limited areas may cause a problem because of the lack of sufficient area to allow the material to settle. EPA has indicated upon review of the chemical analysis of the Garibaldi sample that this material is acceptable for ocean disposal, which remains a viable option for disposal.

Nehalem Bay

All samples had acceptable levels of heavy metals in the elutriate, or suspended form. Measurements of oil, grease and sulfides were also acceptable. These materials are acceptable for in-water

disposal, given an approved disposal site. Nehalem Bay materials are expected to continue meeting state and federal water quality standards in the future.

Following are two tables which illustrate the results of the laboratory tests of the bay and river sediments. The Soils Analysis Table discusses the various aspects of structural , agricultural, and disposal area requirement properties. As mentioned earlier, the soils characteristics are comparable for all samples taken except the Garibaldi station sample (minor exceptions are noted in the Properties column for Nehalem Bay differences.

TABLE
WATER QUALITY ANALYSIS – A

	Parameter	Station			
		Tillamook		Nehalem	
		Garibaldi	Bay City	Fishery	Dean
Bulk Analysis % Dry Weight	Volatile Solids	13.7	6.0	8.2	8.0
	Chemical Oxygen Demand	39.6	4.3	3.4	6.2
	Sulfides	0.039	0.0018	0.0018	0.00095
	Oil and Grease	0.0275	0.0080	0.0110	0.0024
Sediments	Copper	70	70	70	70
	Lead	5	5	5	5
	Mercury	0.2	0.5	0.3	7
	Zinc	20	40	20	40
Elutriate Analysis Parts/Billing Receiving Water	Copper	70	70	70	70
	Lead	5	5	5	5
	Mercury	0.2	0.2	0.2	0.2
	Zinc	20	20	30	30

NOTE: Specific comparisons to state and federal standards are not given because dredge disposal analysis is made comparing the aggregate of parameters with the characteristics of the receiving waters.

TABLE
SOILS ANALYSIS – B

Classification & Characteristic Category			Properties
		Garibaldi Sample	A. Bay City B. Fishery Point C. Dean Point D. All of the above
Structural Properties	Description	Silty Sand	A. Poorly grade fine sand B. Poorly grade medium sand C. Course to medium sand
	Unified Soil Classification	ML	A. S.P. B. S.P. C. S.W/S.P.
	Value as fill material for structural or pavement foundations	Not suitable	D. Excellent
	Compressibility/Settlement Potential	High potential	D. No potential if compacted
	Drainage Characteristics	Very Impervious	D. Free draining
	Estimated field CBR*	5	A. 10-25 B. 10-25 C. 10-15
	Presumptive allowable bearing pressure	Not suitable	D. 1500 PSF
Agricultural Properties	Organic Content	Low	D. Negligible
	Value as soil for pastureland	Good	D. Poor without amendment
	Value as soils for crops	Poor due to low organic content and salts held in soils	D. Poor without amendment
	Settling rate	Very slow	D. Rapid
	Wind erosion potential	Moderate	D. High
	Dewatering	Very slow	D. Rapid
	Workability with Equipment	Poor	D. Excellent
	Retention time required	Long	D. Very short

* CBR = California Bearing Ratio

Radioactivity

The environs of Tillamook Bay have been monitored for radioactivity since 1961, primarily as a result of radioactive discharges into the Columbia River by the Hanford Atomic Products Operation. Through this surveillance the Oregon Health Division has identified radioactivity arising from three distinct sources that may have appeared in waters of Tillamook Bay or Nehalem Bay:

1. Natural: long lived isotopes contained primarily in sedimentary material (geologic formations).

2. Fallout: fission product radionuclides arising from atmospheric weapons testing (as done by China).

3. Neutron Activation: radio nuclides originating from the old single pass Hanford Reactors prior to their complete phase out in 1971 (these materials came down the Columbia River, were picked up in the coastal littoral drift, and residuals deposited in North Coast estuaries).

Levels of radioactivity in Tillamook Bay have never posed a threat to human life, or measurable forms of other life, during the course of this monitoring program. Levels of radioactivity have changed, and these changes have been directly correlated with the Hanford discharge practices or the weapons testing programs. At this time, the radioactivity found in the bay is elusively from natural sources, primarily the slow decomposition of geologic formations (earth). Such levels of radioactivity are far below the state and federal standards considered □safe□ for life forms. The radioactive content to be found in dredged materials from either bay is expected to be negligible, if even measurable.

3.2d Engineering Criteria

Site Selection

The selection of dredged material disposal sites is dependent upon an inventory of all possible disposal areas, an evaluation of the various characteristics of each site, and a cost assessment and design requirements analysis for each potential site. Existing state and federal laws related to dredging and dredged material disposal activities require an additional analysis of the environmental considerations related to disposal site use (see ENVIRONMENTAL CRITERIA discussion).

The inventory of potential sites is developed by looking at the bay in its aggregate form and identifying all areas that could possibly retain dredged materials. At a closer look, the sites are scrutinized according to their topography (on-site and relative to the estuary surface), existing physical features (hydrology, vegetation, structures), and distance to the dredging activity. This analysis eliminates sites which are impractical because of features that exceed engineering feasibility. The remaining inventory of sites are then further assessed according to Site Preparation requirements, Design Criteria, and Cost Criteria.

Site Preparation

Disposal sites can vary substantially in terms of their preparation requirements, or "construction needs," for proper disposal use. The general considerations include: leveling of the site to ensure uniform application for maximum dewatering, the clearing of vegetation for structural benefits, dike material requirements, surface drainage compensation, utility relocation, dredge equipment positioning (pipelines, etc.), and return flow or outfall options. Several of these items are temporary, and some are more permanent in nature (depending on the site).

Temporary removal of structures, soils, roads, and other features may also be a site preparation requirement. In Nehalem and Tillamook, there are opportunities for enhancing agricultural lands, given that the existing topsoils are temporarily removed until disposal activity has been completed and materials graded. Structures and roads, such as barns ad driveways, may require temporary relocation during major disposal projects.

Design Criteria

Specification for the actual design of disposal construction on a site is typically undertaken in the actual permit or contract necessary for the individual projects. However, general requirements have been identified that will apply to disposal actions in these two bays.

Dikes may be constructed to serve as either perimeter, interior or training dikes. Perimeter dikes require the greatest care in construction to provide long term stability and to avoid accidental breaks or spills. Training dikes are sometimes constructed from the fill material to direct inflow and to prevent short circuiting of the disposal material and runoff.

Dikes can (in most cases) be constructed using native on-site materials. In the case of SP (sands and gravels) materials from hydraulic dredging, initial toe diking of the site will generally be sufficient. A toe dike is a low dike, 2 to 3 feet high, used to contain and direct the effluent slurry. As the fill proceeds, these two dikes may be raised using the fill material.

In the case of the ML (silty sands) materials, the perimeter of the site should be diked to several feet above the anticipated ultimate site elevation. Dike slopes should not be steeper than 1.5 horizontal to 1.0 vertical and the top of the dike should generally be wide enough for vehicle access *8 feet). The dike slopes above ordinary high water should be planted, and the slope below ordinary high water should be protected with rep-rap to prevent erosion.

An outfall structure should be constructed to control and direct the return of the dredging effluent to the river channel or bay. The outfall structure basically consists of an overflow weir with provision for height adjustment, a collection chamber downstream of the weir and a discharge pipe downstream of the collection chamber. The configuration of these structures ranges from the simple half-culvert with stop-log weir, to the more elaborate rectangular timber box having a weir length of 40 feet or more and incorporating several discharge pipes. From a functional standpoint, the most important feature of the outfall structure is control over the surface area of the settling basin impounded behind the structure.

The spillway pond area required is a function of a number of variables each unique to the individual dredging operation. These variables are discharge rate of effluent, solids concentration of slurry, particle size gradation of solids, effluent temperature, action of wind and currents in the pond, and allowable solids content in slurry. The size of the spillway pond required for the proposed operation can be determined upon knowledge of these variables, or on the basis of past successful experience with similar materials. The spillway pond area may be sized proportionately to the dredge discharge rate, so that the ratio of discharge to surface area of spillway pond is comparable to that used successfully in the past. For example, assuming an allowable effluent solids concentration of 1%, a

Executive Order 11990, signed by President Carter, May 24, 1977, further strengthened the laws protection wetland areas.

> "Section 2. (a) In furtherance of Section 101 (b) (3) of the National Environmental Policy Act of 1969 to improve and coordinate Federal plans, functions, programs and resources to the end that the Nation may attain the widest range of beneficial uses of the environment without degradation and risk to health or safety, each agency, to the extent permitted by law, shall avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds (1) that there is no practicable alternative to such construction, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use."

State Guidelines

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Disposal activity is further regulated in estuaries by state laws principally LCDC Goal 16. Goal 16, in its overall statement declares that:

> "Dredge, fill or other reduction or degradation of these natural values by man shall be allowed only:
>
> (1) If required for navigation or other water dependent uses that require an estuarine location; and
>
> (2) If a public need is demonstrated; and
>
> (3) If no alternative upland locations exist; and
>
> (4) If adverse impacts are minimized as much as feasible."

The Goal 16 Implementation Requirement (4) states that mitigation will be required when dredge or fill activities are permitted in inter-tidal or tidal marsh areas.

Goal 16 Implementation Requirement (5) further declares:

"These programs shall encourage the disposal of dredge material in uplands or ocean waters, and shall permit disposal in estuary waters only where such disposal will clearly be consistent with the objectives of this goal and state and federal law. Dredged material shall not be disposed inter-tidal or tidal marsh estuarine areas unless part of an approved fill project."

The state Fill and Removal Law (ORS 541.605), further conditions dredging or filling in waters of the state, to minimize adverse impacts to the waters, and limit filling to projects that are for the public good.

Site Acceptability

Each potential dredged disposal site is thus evaluated according to its "acceptability," or conformance to state and federal regulations. This evaluation is much like the engineering feasibility analysis, except that the above mentioned state and federal standards are the evaluation criteria, along with resource agency policies concerning wildlife and fishery protection.

single cell spillway pond, and a slurry of SP material, an 8-inch dredge would require approximately 1.5 acres and a 24-inch dredge approximately 4 acres of spillway pond. The ML material will probably have to be dredged into holding cells to achieve the much longer retention times needed to achieve sedimentation of the finer solids.

The disposal area should be revegetated upon completion of the fill as protection against wind and water erosion. The SP soil will require fertilization and possibly a cover of topsoil to establish a stable growth of vegetation. The fill area should be gradual to minimize ponding and to direct drainage water toward existing drainage courses.

Cost Criteria

Costs for dredging activities are estimated by calculating the cost of removal of the material (dredging) and its placement on the designated site (disposal). Equipment requirements for dredging are determined by a) the quantity of dredge soils to be moved, B) the proximity of the disposal site to the area being dredged, c) the specific characteristics of the disposal site, and d) the type of material being moved. Although actual dredging operations can vary widely due to equipment availability and a host of other factors, the costs associated with dredging operations can be useful in determining the economic comparison of selected sites.

3.2e Environmental Criteria

Federal Guidelines for Disposal

The last decade has seen a number of legislative acts, both federal and state, which influence the disposal of materials in and near waters of the United States. The single most influential law is Public Law 92-500, the Federal Water Pollution control Act of 1972 (amended in 1977). Under Section 404 of this law, the Corps of Engineers issues permits for the discharge of dredged or fill material in navigable waters of the United States (including wetlands, lakes, and tributary streams of 5 cfs or more). Permits must be authorized based upon the Guidelines developed by the Environmental Protection Agency in conjunction with the Corps of Engineers. These "Guidelines," summarized below, are regulatory in nature as permit issuance is based upon compliance with these stipulations.

The Section 404 (b) (1) Guidelines specifically address the "findings" requirements of proposed dredged disposal or fill activity in "navigable waters."

The following are the "tests" of these Guidelines which must be demonstrated prior to issuance of a federal permit:

1) That no practicable alternatives are available that would have less damaging environmental impacts;

2) That the fill is for a water dependent use or otherwise proved to be for the public good;

3) That the environmental impacts cased by the filling will be identified, and minimized or mitigated.

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¶
Clamshell or bucket dredge mobilization costs run about $15,000 to $16,000** (mobilization is the locating, setting up, and removing of the dredge equipment). If the material is to be barged to the ocean, costs will run about $4.00 per cubic yard. If it is deposited locally on land, costs will run in the range of $5.00 to $7.00 per cubic yard (this estimate includes the cost of truck handling).¶
¶
¶
Pipeline Dredging¶
¶
Pipeline equipment costs are broken into per-day estimates and mobilization costs. Per-day operating costs for a 10-inch pipeline dredge will cost about $8,000, whereas a 16-inch dredge will cost $12,000 per day. Mobilization for the 10-inch would be $30,000, and the 16-inch would be $75,000. Booster pumps for a 10-inch pipeline would cost about $15,000 for mobilization and $4,000 per day for operation. Booster pumps for a 16-inch pipeline would be about $40,000 for mobilization and $6,000 per day for operation.¶
¶
Hopper Dredging¶
¶
Hopper dredge mobilization costs are estimated at $16,000 for small hopper equipment. The per-yard costs to transport the materials 4-5 miles (5 is the case for Tillamook's ocean disposal site) average about $3.50 per yard.¶
¶
Land Costs¶
¶
The acquisition of land, rights-of-way or easements is subject to appraised market value. In the event of purchase for purposes of preserving and developing disposal sites, a cost of $2,5000 per acre is assumed. Where leased land is reclaimed or enhanced through filling, no significant cost is assumed.¶
¶
Clearing and Stripping¶
¶
Cost of preparing a site by removing timber, brush, structures and general grading is assumed to cost approximately $200 - $1,000 per gross acre. Such needs will vary dramatically in both bays.¶
¶
Surface Drainage and Relocation¶
¶
... [2]

Once an inventory of potential sites is developed from an engineering feasibility assessment of the various potential areas, then the environmental criteria are applied. State and federal agencies with regulatory authority over dredged material disposal participate in a field review of the sites. They are asked to directly participate in this review because:

1) Goal 16 specifically states that the state and federal agencies shall be involved in the development of the dredged material disposal plan; and

2) These agencies are the same agencies that will be involved in the permit review process for dredge projects in the future, and therefore can provide predictability to the approval process.

The agencies that have been directly involved in the development of this dredge plan are:

Environmental Protection Agency
U.S. Fish and Wildlife Service
National Marine Fisheries Service
U.S. Army Corps of Engineers
Oregon Department of Fish and Wildlife
Oregon Department of State Lands
Oregon Department of Environmental Quality
Oregon Parks and Recreation Department
Oregon Department of Land Conservation and Development
Tillamook Estuaries Partnership

The application of the state and federal criteria divided the "inventory" of potential disposal sites into two categories.

Priority - The disposal of dredged materials on these sites would presently meet approval by the state and federal agencies during a permit review process (dredging projects, versus disposal, were not evaluated in this planning effort and would therefore require separate review).

Reserve – The Reserve sites were selected to provide additional area within the region of each bay to accommodate future needs. The disposal of dredged materials on these sites may require additional site review and analysis.

Every site included in this dredge plan for Tillamook and Nehalem Bays is identified as either Priority or Reserve. Environmental impacts anticipated from disposal on "Priority" sites are nominal, as a return of the site to its pre-disposal conditions could easily be achieved. Those sites identified as "Reserve" would need to undergo further site analysis. All sites at this time have been identified as "acceptable" subject to potential conditions to be defined at the time a project is proposed.

Many of the "priority" sites will require a level of review at the local, state, and federal level. Floodplain issues and wetlands will be the two issues most likely to trigger permit reviews. In developing a dredged material disposal plan proposal, applicants will need to contact the Oregon Department of State Lands and the US Army Corps of Engineers if sites have been identified in the Plan as having wetlands present or will impact the estuaries. All attempts should be made to construct the sites to avoid

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Deleted: 1. . Section 404 (b) (1) Guidelines of the Federal Water Pollution control Act requiring that disposal occur in wetland or mudflat areas only when there is proven to be no practicable alternatives for disposal. All practicable alternatives to the use of that site for disposal must be explored and evaluated.¶
¶
2. . Goal 16 Overall Statement, requiring that:¶
¶
"Dredge, fill, or other reduction or degradation of these natural values by man shall be allowed only:¶
¶
(1) . If required for navigation or other water-dependent uses that require an estuarine location; and¶
¶
(2) . If a public need is demonstrated; and¶
¶
(3) . If no alternative upland locations exist; and¶
¶
(4) . If adverse impacts are minimized as much as feasible."¶
¶
3. . Goal 16 Implementation Requirement (5), disposal in the estuary waters must be consistent with the objectives of this goal and state and federal law, and must be part of an approved fill project.¶
¶
4. . Goal 16 Implementation Requirement (4), miligation must be undertaken to compensate for losses of the estuarine habitat, unless the public benefit is determined to offset the need for mitigation (to be determined by the Department of State Lands).¶
¶
5. . Goal 2 Exception Requirements. If disposal of dredged material on a "presently Unacceptable" site requires an exception to Goal 16 require ... [3]

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resource issues. Clean Water standards will be addressed by the Oregon Department of Environmental Quality in conjunction with the permitting process through the Department of State Lands and the US Army Corps of Engineers.

Changes to Policies in Goal 16

7. POLICIES FOR ESTUARY ACTIVITY

7.1 Dredged Material Disposal Policies

1. Dredged material disposal (DMD) plans shall be developed for Tillamook and Nehalem Bay, and shall be adopted as part of the Tillamook County Comprehensive Land Use Plan. Coordination with affected state and federal resource agencies shall occur during the development, implementation and future amendment of DMD plans.

2. Tillamook County shall develop dredged material disposal (DMD) plans for Nestucca and Netarts Estuary prior to approval of new and maintenance dredging projects if the total of the initial and 5-year dredged material disposal requirements exceeds 500 cubic yards.

3. Tillamook County dredged material disposal plans shall evaluate dredging needs over a five-year period, and shall establish priorities on areas for dredged material disposal based on the following economic, engineering and environmental considerations:

   a. engineering feasibility;

   b. probable method of dredging;

   c. distance from dredging project;

   d. elevation;

   e. cost of site acquisition, preparation, and containment of dredged materials;

   f. size of site;

   g. cost of, ability, or necessity to revegetate or develop on top of the dredged material;

   h. impacts on biological productivity, aquatic communities and habitats, water quality, wetlands and floodplain;

   i. ownership (public or private);

   j. conformity of the final use, after dredged material disposal, to the Tillamook County Comprehensive Plan;

   k. habitat, scenic, recreational, archaeological or historic values of the site.

4. Whenever practicable, ocean disposal in an approved ocean disposal site shall be the preferred method of disposal of dredged materials. The designation of additional ocean disposal sites shall occur only after a formal site review and impact analysis by all federal and state agencies with regulatory authority, and is subject to final approval by the U.S. Army Corps of Engineers and the Environmental Protection Agency. Copies of site review and impact analysis shall be made available to

EXHIBIT II

local governments.

5. When engineering or economic considerations preclude the use of approved ocean disposal sites for dredged material disposal, sites identified in the Tillamook and Nehalem Bay DMD plan elements of the Tillamook County Comprehensive Plan as "Presently Acceptable" shall be used for dredged material disposal.

6. Flow-lane disposal of dredged material shall be limited to ED zones and monitored to assure that estuarine sedimentation is consistent with the resource capabilities and purposes of the affected natural and conservation management units.

7. Sites identified in the future to be included in the Tillamook and Nehalem Bay DMD plan element of the Tillamook County Comprehensive Plan shall be used for disposal of dredged material only after an amendment to the Tillamook County Comprehensive Plan and zoning map. If rezoning of an area to provide for dredged material disposal involves an exception to the Statewide Land Use planning Goals, the exception shall be included as part of the amendment:

   a. why these other uses should be provided for;

   b. what alternative locations within the area could be used for the proposed use;

   c. what are the long-term environmental, economic, social and energy consequences to the locality, the region or the state from not applying the goal or permitting the alternative use;

   d. a finding that the proposed uses will be compatible with other adjacent uses.

   Coordination with affected state and federal resource agencies shall occur during this amendment process. State and federal permits must be obtained prior to disposal of dredged material.

8. As needs arise, additional disposal sites shall be approved for dredged material disposal. Designation of additional dredged material disposal sites shall be coordinated with state and federal resource agencies with regulatory authority over dredged material disposal. An amendment shall be taken to the Tillamook County Comprehensive Plan and zoning map if rezoning of an area is necessary in order to provide for dredged material disposal. If rezoning of an area to provide for dredged material disposal involves an exception to the Statewide Land Use Planning Goals, the exception shall be included as part of the amendment.

9. Disposal of dredged material on ocean beaches for purposes of beach nourishment should be utilized, whenever practicable. Beach areas suitable for nourishment shall be identified in the DMD plan. The use of dredged material for beach nourishment shall be coordinated with the Oregon Parks and Recreation Department or the Department of State Lands, if the practice could impact their lands, and with the Oregon Department of Fish and Wildlife and the National Marine Fisheries Service if the practice could impact subtidal or intertidal clam beds, eelgrass beds or fish spawning substrates.

10. Disposal of dredged material within state parks shall be coordinated with the Oregon Parks and Recreation Department to ensure consistency with the State Park Master Plan, and with the maintenance of significant wildlife habitat and other natural and aesthetic resources.

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11. Tillamook County shall identify a sufficient number of dredged material disposal sites to accommodate dredged material disposal needs identified in the Tillamook and Nehalem Bay DMD plans. Sites identified as priority sites shall be preserved for future dredged material disposal use. Tillamook County shall cooperate with local ports and affected local jurisdictions to preserve these sites for future disposal use.

12. Tillamook County, in conjunction with local ports, affected local jurisdictions and state and federal resource agencies, shall review the dredged material disposal plans for Tillamook and Nehalem Bay at no more than five year intervals to reexamine dredging needs, site availability, new permit requirements and degree of plan implementation.

13. Use of dredged material from navigational or other dredging actions as fill for approved fill projects shall be encouraged. Prior determination shall be made to ensure that the structural characteristics of the material are suitable for this use.

14. Whenever practicable, stockpile sites of dredged material suitable for use as fill shall be established and the dredged material sold. Particular emphasis shall be given to establishing stockpile sites in areas where acceptable disposal sites are presently, or likely to be limited.

15. Dredged material disposal is subject to the requirements of the Clean Water Act of 1977 (P.L. 95-217, the State Fill or Removal Law and other state and federal laws which regulate the disposal of dredged materials).

8. IMPLEMENTATION POLICIES

1. Estuaries of Tillamook County shall be managed through implementation of the Tillamook County Comprehensive Plan by means of the Tillamook County Land Use Ordinance, which shall contain estuary development standards, estuary zone descriptions and zoning maps.

2. Tillamook County shall review state and federal permit applications for uses and activities within the estuaries for consistency with the Tillamook County Comprehensive Plan and Land Use Ordinance.

Removed: b) A-95 project pre-application notification, by mneans of referral from and comment to the Clatsop-Tillamook Intergovernmental Council.

Where applicable, procedures for review shall be developed as part of the Tillamook County Land Use Ordinance. The review of actions which would potentially alter the integrity of the estuarine ecosystem shall include an impact assessment and a demonstration that the public's need and gain warrants the modification or loss unless this is already part of the comprehensive plan.

3. Tillamook County shall coordinate with local, state and federal agencies and citizen advisory groups implementation of the Estuarine Resources element of the Tillamook County Comprehensive Plan. Tillamook County may convene an

implementation conference as a means of coordination during the following:

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a. preparation of post-acknowledgment amendments to the Comprehensive Plan, or Land Use Ordinance;

b. periodic updates of the Tillamook County Comprehensive Plan;

c. review of recommendations and/or findings of fact for state or federal permit applications as a form for discussion or resolution of disputes over regulatory functions;

d. establishment of mitigation banks.

4. Tillamook County shall involve the following state and federal agencies in the review of regulated activities: Oregon Department of Fish and Wildlife, Oregon Department of State Lands, Oregon Department of Land Conservation and Development, Oregon Economic and Community Development Department, U.S. Fish and Wildlife Service, National Marine Fisheries Service, Environmental Protection Agency, U.S. Army Corps of Engineers.

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5. Dredge and or filling shall be allowed only if:

a. required for navigation or other water-dependent uses that require an estuarine location or is specifically allowed by the management unit or zone; and

b. a need (i.e. a substantial public benefit) is demonstrated and the use or alteration does not unreasonably interfere with public trust rights; and

c. no feasible alternative upland locations exist; and

d. adverse impacts to aquatic life and habitat, recreation and aesthetic uses, water quality and other physical characteristics of the estuary are minimized.

6. Significant degradations or reductions of estuarine natural values include dredging, fill, in-water structures, riprap, log storage, application of pesticides and herbicides, flow-lane disposal of dredged material, water-intake or withdrawal and effluent discharge and other activities which will cause significant offsite impacts as determined by an impact assessment.

7. Dredging, fill piling/dolphin installation, navigational structures, shoreline stabilization and dredged material disposal associated with an estuarine use or uses shall be reviewed as a whole subject to the respective policies for these activities and uses.

CHANGES TO GOALS 17 and 18

Goal 17, Coastal Shorelands Element

Section 3.3b, Nehalem Estuary Shorelands (Nm)

(3)(a). Areas within 1000 feet of the south bank of the Nehalem River between the Port of Tillamook Bay Railroad bridge and Foley Creek (areas of steep slopes and landslide hazard); and

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(4). From the Mohler Bridge on the South Fork of the Nehalem River to the junction of the North and South Forks of the Nehalem River at Fork Island, the boundary line includes:...

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Section 3.3c, Tillamook Estuary Shorelands (Tk)

(5). Between the intersection of the Miami River Road and U.S. Highway 101 and Ekroth Road (T 1N, R 10W, S 22, SW ¼, NE ¼, S 23, NW ¼) the boundary line includes:

a. Areas within 50 feet of the Miami River channel up to head of tide; or
b. MIT site 1, or
c. Areas within 50 feet of Illingsworth Creek up to head of tide.

(original 5(b) was removed as it referenced DMD site 16 which is no longer included in the inventory)

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(7). From the northern end of Larson Cove to the northern Bay City city limits, the boundary line extends 50 feet around the Cove, and shall include the parcel designated as Tax Lot 201 in Section 22A of Township 1 North, Range 10 West, W.M., at the southeastern end of the Cove.

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(8). From the southern city limits of Bay City to the point where the Southern Pacific Railroad crosses Vaughn Creek, the boundary line follows the Port of Tillamook Bay Railroad.

(9). From the point where the Port of Tillamook Bay Railroad crosses Vaughn Creek to the intersection of U.S. Highway 101 with the State Highway 131, the boundary line includes all of the following areas which are outside of the Tillamook City UGB:

Section 4.5 Dredged Material Disposal and Mitigation Sites

Policy

Shoreland areas suitable as dredged material disposal (DMD) or mitigation sites shall be identified in the Tillamook County Comprehensive Plan. Sites identified as priority dredged material disposal (DMD 1) or priority mitigation (M 1) sites shall be protected from uses or activities which conflict with disposal or mitigation.

Goal 18, Beaches and Dune Element

Section 4.4g In selecting sites for the disposal of dredged materials, sites that allow for the nourishment of eroding beaches shall be preferred. Whenever appropriate, dredged materials should be placed on beachfront Dredged Material Disposal Sites adjacent to the Tillamook Bay and Nehalem Bay jetties as identified in Goal 16.

EXHIBIT II

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3.3 TILLAMOOK BAY DREDGED MATERIAL RESOURCE PLAN

3.3a Tillamook Bay Segments

When possible, land disposal sites should occur in close proximity to the dredge areas. Because of this relationship between dredge sites and disposal sites, Tillamook Bay has been divided into three segments. These segments indicate areas in which dredging is expected to occur and where the sites are located that would be suitable for disposal of those specific materials. This presentation allows dredging needs and options to be viewed in concert, and provides a mechanism for establishing which sites should be utilized and what the priorities for their use should be. Each segment is discussed separately, including a description of the past and future expected dredging requirements and an analysis of the individual sites that dredging requirement and an analysis of the individual sites that are available to meet those needs.

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BAY SEGMENT BOUNDARIES

Segment	Approximate Mile Location
1	Entrance to Mile 3
2	Mile 3 to Mile 7
3	Mile 7 to Mile 12

The discussion within each bay segment is broken into two major categories: Dredging Needs and Disposal Options. Within the Dredging Needs discussion, the geographic areas in which dredging will occur, quantities of materials to be moved, and the basic characteristics of the materials are identified.

Both public and private dredging activities are inventoried, including both maintenance of existing projects and proposed construction of new facilities. The dredging options portion of each bay segment discussion outlines the sites that are available to meet the identified needs and provides the following information relative to each site.

Description of the Site: The site description includes data on the size, location, capacity use, and physical and biological characteristics of each site.

Disposal Use of the Site: This Section includes a discussion of both the engineering and environmental considerations which provide guidelines for the use of the sites. For each site, engineering considerations concerning site capacity, design criteria, land preparation, economic considerations and future use potential are presented. In addition, the environmental impacts of site use are also evaluated.

A summary discussion for each river segment compares the dredging needs with the disposal options and outlines the available alternative actions.

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BAY SEGMENTS

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TILLAMOOK BAY SEGMENT 1,

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3.3b Tillamook Bay 1

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3.3b.1 Dredging Needs

EXHIBIT II

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Maintenance of Existing Projects

The federally authorized channel project generates the majority of the dredging needs in this segment. The federal project is typically divided into the entrance channel, the inner channel and the channel extension to the Old Mill Marina. The entrance channel is dredged exclusively by hopper equipment, and jetty restoration work has significantly decreased the dredged needs. The inner channel (from the Coast Guard dock to the Garibaldi Boat Basin) is usually dredged by pipeline. The channel extension to the Old Mill Marina was also dredged by pipeline.

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In addition to the federal project, two other potential projects exist in Segment 1. Dredging at the Garibaldi Boat Basin, operated by the Port of Garibaldi, is irregular at this time. The Old Mill Marina is expected to yield variable quantities depending on winter runoff patterns on the Miami River. Pipeline dredging has occurred in both these projects, and clamshell equipment has been used in the boat basin. Equipment options will be further discussed in relation to disposal operations.

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Construction of New Projects

The federal channel project is authorized at 18-foot depths to a turning basin at Miami Cove. However, the federal project is presently maintained at only 10-foot depths at the Old Mill Marina. If shipping activity was to be expanded in this area, deeper drafts may become necessary, and federal maintenance dredging may increase to 16 feet or 18 feet. If the inner channel to the Miami Cove turning basin were dredged to 16 feet, this would produce some 620,000 c.y. at construction and about 100,000 c.y./year for maintenance.

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Historically, the Port of Garibaldi planned to expand their facilities to handle larger fishing boats (See exception for Management Unit 3ED in Garibaldi Comprehensive Plan). If this action is implemented, the project could produce an estimated 33,000 c.y. at construction and 3,500 c.y./year for maintenance.

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The Old Mill Marina previously planned to further expand the facilities, estimated to produce 50,000 c.y. at construction and 10,000 c.y./year for maintenance. However, the removal of the Old Mill Marina disposal site at the request of the owners from the inventory and additional environmental concerns with both the upland and adjacent estuarine areas would make any expansion challenging. The Coast Guard facility at Garibaldi is the only other identified new project. Dredging has occurred at the boat basin to maintain access and boater safety.

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3.3b.2 Disposal Options

Ocean Disposal

As has been stated, the entrance channel is dredged by hopper and is oceans disposed. The hopper equipment has not gone

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into the inner channel areas (Garibaldi, etc.) because of the lack of appropriate draft and the cost effectiveness (maneuverability in such restricted areas is time consuming). Hopper dredging may play a more significant role in channel maintenance in the future, as economics evolve and possible deeper channels are developed.

Land Disposal

Listed below are the identified Priority disposal sites.

SEGMENT 1 LAND DISPOSAL OPTIONS

Priority Site No.	Approximate Capacity
1	1,580,000 c.y. at 6' depth
2	310,000 c.y. at 6' depth
5	45,000 c.y. at 6' depth
6	8,000 c.y. per year
7	110,000 c.y. at 5' depth
8	13,000 c.y. at 5' depth
TOTAL	2,076,000 C.Y.

TOTAL CAPACITY OF ALL POTENTIAL SITES 2,076,000 c.y.

Discussions of individual sites are given in the following pages. Aerial photo illustrations are available that depict actual site locations and dimensions.

3.3b.3 Site 1 Comprehensive Plan designation – PRIORITY DMD SITE
Resource agency evaluation – PRESENTLY ACCEPTABLE

Site Description

Location:	At south jetty
Size:	163.4acres
Capacity:	1,580,000 c.y. at 6' depth
Physical Characteristics:	Sandy ocean beachfront and rolling sand dunes along the south jetty at Tillamook Bay.
Floodplain:	The site is likely within the 100-year floodplain; however it is not mapped by FEMA.
Biological Characteristics:	Open beach areas habitat of snowy plovers and variety of shorebirds. Recently stabilized areas experience limited animal use. There is currently usable space within the site that is not suitable snowy plover nesting habitat.

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Site No. . . Approximate Capacity¶
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Site No. . . Approximate Capacity¶
15 . . 290,000 c.y.¶
18 . . 199,000 c.y.¶
19 . . 387,000 c.y.¶
23 . . 122,000 c.y.¶
24 . . 145,000 c.y.¶
25b . . 338,000 c.y.¶
TOTAL . . 1,481,000 c.y.¶
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	Several wetlands are present within depressions between dunes but are avoidable.
Comprehensive Plan/Zoning:	R-M zone, superimposed by the SH zone
Ownership:	The site is publicly owned.
Tax Lot:	T1N, R10W, Sec. 20.
Engineering Considerations	
Method of Dredging/Filling:	Pipeline dredge.
Site Preparation:	Minimal
Design Criteria:	Containment berms will need to be constructed and revegetated to minimize dispersion. Avoid wetlands. Possibility to create snowy plover habitat. Aesthetic considerations. Material should be contoured appropriately. Outfall to ocean.
Future Use Constraints:	None
Environmental Considerations:	For beach disposal, the dredged material must be clean marine sand to avoid creating turbidity in the Pacific Ocean. Disposal should comply with existing aesthetic qualities (i.e. contouring and revegetation where appropriate). Wind stabilization required (revegetation) for lighter materials. Disposal should not jeopardize plover nesting; could be used to enhance habitat if disposal occurs just prior to breeding season.
Economic Considerations:	Minimal site use costs.
Other Considerations:	Disposal can be compatible with Unique Ecosystems classifications given proper timing and disposal care. Potential conflicts with R-M designations though mitigation and through design could be resolved through coordination with ODFW and USFW. Dredge disposal may be used in conjunction with nesting snowy plover habitat expansion, since dredge disposal material has been documented as potential nesting habitat. Dredged material disposal on this site must comply with the requirements of

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the Tillamook County Zoning Ordinance.

PRIORITY site because of size and proximity to Tillamook Bay navigation channel.

3.3b.4 Site 2 Comprehensive Plan designation - PRIORITY DMD SITE
Resource agency evaluation PRESENTLY ACCEPTABLE

Site Description

Location:	Northern portion of Bayocean Peninsula
Size:	32.44 acres
Capacity:	310,000 c.y. at 6' depth
Physical Characteristics:	Recently stabilized dunes and beachfront; including foredunes and deflation plains. Site has been drawn to avoid wetland areas.
Floodplain:	The site is likely within the 100-year floodplain; however it is likely inundated during storms surges and flood events.
Biological Characteristics:	Some wetlands present. There are usable areas within the site that do not contain wetlands; however, the existing DMD basin is highly disturbed and may be the most feasible option for future dredge material disposal while minimizing additional disturbances to the site.
Comprehensive Plan/Zoning:	R-M zone, superimposed by SH zone.
Ownership:	The site is publicly owned.
Tax Lot:	T1N, R10, Sec. 20

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Deleted: Identified as a potential Unique Wildlife Ecosystems site. Snowy Plover, Bald Eagle, and the rare plant, Golden-eyed grass have been observed in this area.

Engineering Considerations

Method of Dredging/Filling:	Pipeline dredge.
Site Preparation:	Grading requirements
Design Criteria:	Outfall to existing natural channel, avoiding tideflats, or to ocean.
Future Use Constraints:	None
Environmental Considerations:	Disposal should avoid wetland areas and pine thickets, keeping within the recently stabilized dune areas and beachfront where necessary. The

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dredged material must be contained to prevent the material from re-entering Tillamook Bay. Scheduling should promote Plover habitat (disposal before breeding season), and aesthetics should be retained (contouring).

Economic Considerations: Minimal site preparation.

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Other Considerations: Site is acceptable, given that wetland areas are avoided and wildlife habitat is protected. Potential conflicts with R-M designation, though mitigation through design could occur by coordination with ODFW and USFW.

Dredged material disposal at this site must comply with the requirements of the Tillamook County Zoning Ordinance.

This has been designated as a PRIORITY site because of its size and proximity to the Tillamook Bay navigation channel.

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3.3b.16 Site 6 Comprehensive Plan designation – PRIORITY DMD SITE
Resource agency evaluation – PRESENTLY ACCEPTABLE

Site Description

Location: In-water site near navigation channel.

Size: N/A

Capacity: 18,000 c.y. per year of fine sediment presently permitted by the Port of Garibaldi

Physical Characteristics: N/A

Floodplain: N/A

Biological Characteristics: The site is an aquatic habitat consisting of estuarine water that circulates between the bay and nearshore marine waters. Coho salmon and bald eagles are currently listed as threatened species under the federal Endangered Species Act.

Comprehensive Plan/Zoning: N/A

Ownership: N/A

Engineering Considerations

Method of Dredging: Pipeline dredge.

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Site Preparation:	Minimal site preparation will be needed in the improvements to the existing berms and outflow structure.
Design Criteria:	Dredged material would be pumped to site via pipeline and released at outfall below water surface. Dredging will occur during the established in-water work window for Tillamook Bay. Dredging will need to commence at the beginning of the ebb tide and continue until one hour before low tide.
Future Use Constraints:	Development of the U.S. Coast Guard facility.
Environmental Considerations:	The dredged material must be fine material that meets DMEE chemical guidelines. Timing must correspond to in-water work window for Tillamook region which begins in November and extends through February.
Economic Considerations:	Minimal site preparation will be needed in the improvements to the existing berms and outflow structure.
Other Considerations:	

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3.3b.16 Site 7 Comprehensive Plan designation – PRIORITY DMD SITE
Resource agency evaluation – PRESENTLY ACCEPTABLE

Site Description

Location:	North of north jetty and west of Barview Jetty Park Campgrounds
Size:	9.19 acres and 4.94 acres. Total of 14.13 acres.
Capacity:	110,000 c.y. at 5' depth for both areas.
Physical Characteristics:	Stabilized dunes.
Floodplain:	The site predominately mapped by FEMA within the 100-year floodplain of Tillamook Bay.
Biological Characteristics:	Beach grass/shrub vegetation, with some wetland areas scattered about. Wetlands are avoidable. Wildlife use light because of openness and light vegetation cover.

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Comprehensive Plan/Zoning:	R-M, superimposed by SH and FH
Ownership:	The site is publicly owned.
Tax Lot:	T1N, R10W, Sec. 18,
Engineering Considerations	
Method of Dredging/Filling:	Pipeline dredge.
Site Preparation:	Some site clearing and construction of containment berms and outflow system.
Design Criteria:	Containment berms will need to be constructed from onsite materials with an outflow system required to control turbidity. Design should maintain a vegetated buffer along the beach and minimize impacts to recreational use.
Future Use Constraints:	None
Environmental Considerations:	Disposal material should be contained. Aesthetic contouring should be undertaken when disposal interferes with visual resources of park.
Economic Considerations:	May prove valuable for moving materials from stockpile sites #20 and #22.
Other Considerations:	Dredged material disposal on this site must comply with the requirements of the Tillamook County Zoning Ordinance. A Tillamook County Development Permit is required prior to disposal of dredged material on this site. PRIORITY site for transfer of dredged materials from stockpile sties.

3.3b.15 Site 8

8 Comprehensive Plan designation – PRIORITY DMD SITE
Resource agency evaluation – PRESENTLY ACCEPTABLE

Site Description

Location: At Barview, immediately north of North Jetty

Size:	1.81 acres;
Capacity:	13,000 c.y. at 5' depth; the beach nourishment disposal capacity would be unlimited over the long term.

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15 . Comprehensive Plan Designation – UNSUITABLE¶
Resource agency evaluation – PRESENTLY UNACCEPTABLE¶
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Site Description¶
¶
Location: . Immediately north of Hobsonville Point, extending along the north side of Highway 101.¶
¶
Size: . 12 acres¶
¶
Capacity: . 290,000 c.y. at 15' depth¶
¶
Physical Characteristics: . Tide flats bordered by highway berm and riprap to south.¶
¶
Biological Characteristics: . Tideflat habitat with benthic communities and shorebird use.¶
¶
Ownership: . T1N, R10W, Sec. 22 T.L. 400¶
¶
Engineering Considerations¶
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Method of Dredging/Filling: . Pipeline, or clamshell/bucket directly onto site ... [1]

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Physical Characteristics:	Sandy ocean beachfront north of the north jetty. High erosion area where jetty degradation has allowed the erosion of the beachfront area.
Floodplain:	The site is predominately mapped by FEMA within the 100-year floodplain of Tillamook Bay.
Biological Characteristics:	The site consists of open beach adjacent to the rock jetty. The habitat receives significant disturbance from recreational beach access. Not suitable snowy plover habitat due to disturbance.
Comprehensive Plan/Zoning:	EN, superimposed by FH
Ownership:	The site is publicly owned.
Tax Lot:	T1N, R10W, Sec. 18
Engineering Considerations	
Method of Dredging/Filling:	Pipeline dredge.
Site Preparation:	Minimal . Beach nourishment site. Filter Screen needed along jetty
Design Criteria:	Site must receive clean marine sands. No containment system would be constructed.
Future Use Constraints:	None
Environmental Considerations:	The dredged material must be clean sand. Disposal activity in the wetland portion of this site (25a) would require compliance with state and federal laws, particularly: a) a determination that the 404 (b)(1) guidelines of the Federal Water Pollution Control Act have been met; b) findings that Goal 16 overall requirements for dredge, fill or other reduction or degradation of estuarine natural values have been met, or an exception to this Goal 16 requirement; c) an exception to Goal 16 requirements for Natural management units; d) mitigation for loss of estuarine habitat (unless otherwise

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determined by DSL).

Economic Considerations: Disposal has been approved by agencies in 25a, the area immediately behind jetty. 25a totals 1.81 acres, holding some 13,000 c.y. at 5' depth.

Dredged material disposal on 25a must also comply with the requirements of the Tillamook County Zoning Ordinance. A Tillamook County Development Permit is required prior to disposal of dredged material on this site.

3.3b.17 Summary and Conclusions

Segment 1 is the most developed stretch of waterway in Tillamook County. The federal channel, the port boat basin, the Coast Guard boat basin, and the Old Mill Marina have the potential to generate substantial quantities of material annually. These quantities are presently expected to remain at existing levels, or possibly increase, in the next 20 years. The 5-year and 20-year projection of annual dredging needs for this segment reflects the uncertainty in its future dredging needs.

The most dependable and long-lasting disposal option for this segment is ocean disposal. The site approved by the EPA in the 1980's has an unlimited capacity. Hopper dredging and inner channel materials could be disposed of at the ocean site. Costs for this method of dredging will continue to rise significantly. This method of dredging would require timing and flexibility in the dredging permits, and may require a cost evaluation of the projects before the Corps could undertake the additional expenses. However, ocean disposal will continue to be the best long-range option available for the lower bay. The economics should be re-evaluated annually, as costs to use upland sites become increasingly greater.

Upland disposal sites are scarce. Two were present on the port property and the Old Mill Marina property, and both were used for stockpile. However, at the property owners request the Old Mill Marina site will be removed as a result of the Dredged Material Disposal site update completed in 2006. Site #5 will continue as a stockpile site. Site 5 is to have much of its dredged materials removed each year, to allow for constant reuse in the years ahead. The local sponsors will have to remove that material: a) by commercially selling the materials, b) by depending upon sufficient voluntary removal, or c) by trucking the materials to Sites #7 or 8, or other disposal areas. Site #5 is an approved site and can be made available for disposal at short notice. Therefore, it should be kept available for future stockpiling until a dependable and more cost-effective disposal option is formalized.

Two types of material will be coming out of the inner channel, boat basin

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and marina areas. These are the ML soils and the SP soils. The SP soils are valuable for fill material and other commercial uses, whereas the ML (silts) are not structurally sound and are difficult to work with equipment. If possible, these soils should be kept separate to enhance the commercial value of the SP (majority) soils. Pre-dredge sampling may help to determine quantities and timing for the moving of the ML materials, so separation measures could be accomplished in the disposal cells. This may require further exploration before practical applications could be seriously considered.

3.3c TILLAMOOK BAY SEGMENT 2

3.3c.1 Dredging Needs

Maintenance of Existing Projects

There is no channel maintenance project for this segment of the bay. The federal project ends at Miami Cove, and the navigation channel has not been used for shipping traffic for many years. There is one existing project at Bay City: the Pacific Oyster facilities.

The Pacific Oyster site has dredged irregularly in the past. It is assumed that dredging for the oyster company facilities will minimize the dredging need at the boat launch. The launch is heavily used, and poor back-up facilities give it a higher priority. The channel has been dredged by pipeline in the past. The boat launch could be clam-dredged and trucked away.

Construction of New Projects

The Tillamook Bay Restoration Project has been presented to various agencies and local authorities as a preliminary draft study plan. This project includes the dredging of a navigation/all purpose channel from Garibaldi to the City of Tillamook. Within Bay Segment 2, this represents approximately four miles of channel dredging. Proposed dimensions for this channel have been taken from the Development Program for Tillamook Bay report of 1972, as the restoration project has not yet identified possible channel dimensions. The channel was proposed in the 1972 report to be 16 feet deep and 150 feet wide. Construction of such a channel would produce approximately 2 million c.y. of material. Maintenance of such a channel is expected to average about 200,000 c.y. annually at least for the first five years. While identified as a historic channel, there have been no efforts to implement this Plan since 1972.

TILLAMOOK BAY
SEGMENT 2

TABLE
SEGMENT 2 DREDGING NEEDS

Project	Construction	Maintenance	20-Year Total

Deleted: East of the Old Mill Marina are potential sites #16, #18, #19, and #15 (south). Sites #15 and #19 were strongly opposed by the regulatory agencies, and future disposal in these sites is unlikely at this time.¶

Deleted: Sites #16 and #18 are important disposal options to explore at this time. Site #16 has been approved for disposal, omitting the southern portion from the site boundaries. This area could handle a substantial amount of material (220,000 c.y.) and could be used for stockpile or permanent fill. Dredging projects over 100,000 c.y. would price it at $3,20/c.y., more reasonable than clamshell and barging to the ocean. Site #18 has not been approved by the resource agencies because of the existing saltmarsh. Disposal use approval would require the demonstration of compliance with Sec. 404 (b) Guidelines and Goal 16 criteria. This site would also require mitigation because of the removal of estuarine habitat, which may be accomplished by the removal of berms in the area south of Site #16. Berm removal and limited grading should create saltmarsh habitat comparable or in excess of that found at Site #18, and could improve the floodplain. /site #18, if considered for disposal, would probably best remain as a stockpile site. To commit the site to fill for future non-water ... [23]

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Hays Oyster Company		1,000	20,000
Tillamook County Boat Launch		150	3,000
Bay Restoration	2,000,000	100,000	4,000,000
Total Dredging Needs	2,000,000	101,150	4,023,000

3.3c.2 Disposal Options

Ocean Disposal

Ocean disposal of materials dredged in Segment 2 could occur by hopper dredge or large pipeline. Hopper dredge is unlikely at this time because of long distances and shallow drafts. However, if the restoration channels were dredged to sufficient depth with pipeline equipment, hoppers could come in and operate within the wider areas.

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Large pipeline equipment could pump over Bayocean Spit and into the surf. This would provide for an unlimited disposal site capacity.

Land Disposal

The following is the Priority land disposal site found in Segment 2.

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SEGMENT 2 LAND DISPOSAL OPTIONS

Priority Site	Approximate Capacity
3	260,000 c.y. at 6' depth
TOTAL	260,000 C.Y.

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12 . . . 5,000 c.y.¶
13 . . . 30,000 c.y.¶
15a . . . 60,000 c.y.¶

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Site . . . Approximate Capacity¶
10a . . . 1,667,000 c.y.¶
11 . . . 110,000 c.y.¶
11a . . . 30,000 c.y.¶
14 . . . 62,000 c.y.¶
TOTAL . . . 1,879,000 C.Y.¶

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TOTAL CAPACITY OF ALL POTENTIAL SITES 260,000 c.y.

Discussions of individual sites are given in the following pages. Aerial photo illustrations of the sites are available to depict actual locations and dimension.

3.3c.3 Site 3 Comprehensive Plan designation – PRIORITY DMD SITE
Resource Agency evaluation – PRESENTLY ACCEPTABLE

Site Description

Location:	North of Bayocean Lake on Bayocean Peninsula
Size:	27.83 acres
Capacity:	260,000 c.y. at 6' depth.
Physical Characteristics:	Open sand and dunes. Road dike along entire east border.
Floodplain:	The site is mapped by FEMA within the 100-year floodplain of Tillamook Bay. A

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	Development Permit application would be required prior to placement of materials.
Biological Characteristics:	Beachgrass and shrub mixture. No onsite wetlands. Two small depressions were observed. Western snowy plover may be present north of the site.
Comprehensive Plan/Zoning:	R-M, superimposed by SH
Ownership:	The site is publicly owned.
Tax Lot:	T1N, R10W, Sec. 31, T1S, R10W, Sec. 6
Engineering Considerations	
Method of Dredging/Filling:	Pipeline dredge
Site Preparation:	Minimal site preparation will be needed in the form of containment berms from native materials and an outflow system.
Design Criteria:	The disposal design should avoid impacts to the existing trails. Containment berms will need to be constructed from onsite materials. Revegetation would be required following disposal.
Future Use Constraints:	None
Environmental Considerations:	The dredged material must be contained to prevent the material from re-entering Tillamook Bay.
Economic Considerations:	Site may play a key role in bay restoration dredging, as it is the only large size disposal site in "mid-bay" area. Minimal site development costs.
Other Considerations:	The beach areas can be used for beach nourishment purposes, especially those areas west of Cape Meares Lake. Beach enhancement looks particularly promising where the ocean has eroded away much of the dune area between the surf and Cape Meares Lake. Dredged material disposal on this site must comply with the requirements of the Tillamook County Zoning Ordinance.

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Deleted: Site boundaries have been drawn to avoid wetland areas. Disposal must comply with aesthetic values (contouring) and should be used to enhance Snowy Plover habitat (disposal of material prior to breeding season).

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Deleted: Large pipeline equipment could reach it, though boosters would probably be necessary for much of the mid-bay dredging. Such dredging only becomes economical when large quantities are being moved.

Deleted: RESERVE site for possible future use in conjunction with a potential bay restoration project.¶

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Resource agency evaluation - PRESENTLY ACCEPTABLE¶
¶
Site Description¶
¶
Location: . South of Bay City at Goose Point - Kilchis Point¶
¶
Size: . 60 acres¶
¶
Capacity: . 484,000 c.y. at 5' depth¶
¶
Physical Characteristics: . Upland grasses with limited brush¶
¶
Biological Characteristics: . Diked pastureland in limited agricultural use. There are no farm structures on the acreage. The tip and southern edge of Kilchis Point is a pigeon watering area.¶
¶
Comprehensive Plan/Zoning: . SFW-20, superimposed by SH and FH¶
¶
Ownership: . T1S, R10W, Sec. 11 T.L. 300, 400, 2100¶
¶
Engineering Considerations¶
¶ ... [26]

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3.3c.12 SUMMARY AND CONCLUSIONS

Segment 2 has minimal existing disposal needs.

A future Bay Restoration project would require substantial quantities of dredging in the middle portions of Tillamook Bay, where disposal options are few. No disposal sites were identified along the east shoreline.

Disposal of dredged materials into the middle-bay area (or comparable places) for the development of islands, saltmarshes, wildlife habitat, etc., was not deemed feasible at this time. State and federal laws appear to be adverse to such activities, because of the long-range negative impact potentials. Hydraulic and floodplain problems arise from such activities as well, further decreasing the practicality of exploring that option. No agency involved in this planning effort supported the middle-bay disposal of dredged materials. The environmental impacts caused by middle-bay disposal are considered to be substantial at this time.

3.3d TILLAMOOK BAY SEGMENT 3

3.3d.1 Dredging Needs

Maintenance of Existing Projects

Three identified projects exist in Segment 3 that might require dredging. The Tillamook County Boat Ramp, located at Memaloose Point (at the mouth of Tillamook River) requires infrequent dredging for recreational use of the site. Dredging in 1986 removed 3,000 c.y., otherwise the estimated need is 200 – 400 c.y. per year. The boat ramp at Carnahan Park on the Trask River and the marine park at Hoquarton Slough require infrequent dredging.

Construction of New Projects

The Bay Restoration project proposes to restore the channels of the bay and upper bay reaches to previous (historical) dimensions. Actual channel configurations are not presently known, but this paper will discuss a 16-foot deep by 150-foot wide channel through the upper bay to the Burton Bridge on the Tillamook River. Smaller channels would be restored in the Wilson River (8 feet deep by 100 feet wide), Hoquarton Slough (6 feet deep by 80 feet wide), Kilchis River (6 feet deep by 80 feet wide), and other minor channels in the south bay (Murray Report, 1972). Estimates for dredging these channel improvements are approximately 5,000,000 c.y./year for the first several years, then decreased somewhat over the long term. (Note: These channels are not presently consistent with the Comprehensive Plan designations for the upper bay areas).

Dredging maintenance estimates do not imply that dredging will be required every year. The figure is used as an estimate for the annual or periodic amount of sediment accumulation occurring in the dredging location.

.3d.2 Disposal Options

Deleted: 3.3c.11 Site 15(a) . Comprehensive Plan designation – RESERVE DMD SITE¶ Resource Agency evaluation – PRESENTLY ACCEPTABLE¶ ¶ Site Description¶ ¶ Location: . Between railroad tracks and Highway 101, extending from north of Larson's Cove to Hobsonville.¶ ¶ Size: . Approximately 2,500' in length, varying in width between 10 and 50 feet.¶ ¶ Capacity: . Approximately 60,000 c.y. at 8' depth.¶ ¶ Physical Characteristics: . Narrow depression left as a result of fill and riprap constructed for railroad and highway.¶ ¶ Biological Characteristics: . Predominantly a "waste" area. Limited tidal activity in small portions of site, but no well-established functioning systems.¶ ¶ Comprehensive Plan/Zoning: . RR, superimposed by SH; RM, superimposed by SH.¶ ¶ Ownership: . T1N, R10W, Sec. 27 SPRR, ODOT, and Co.¶ ¶ ... [27]

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Ocean Disposal

Disposal in the authorized ocean disposal site becomes increasingly impracticable, because of costs and time requirements the further the dredging is from the bay mouth. Segment 3 dredged materials would be very costly to dispose in the ocean, and hopper dredges could not come into the upper bay segment until substantial dredging was undertaken to permit sufficient draft depths.

However, ocean disposal by large pipeline to the beach front should not be omitted from consideration. As discussed in Segment 2, large pipeline equipment could pump over the Bayocean Peninsula to dispose in the surf zone. Areas such as Cape Meares Lake could benefit from a replenishment of beach sands. However, not all materials that would be found in the upper bay area, particularly in the sloughs, would be compatible with beachfront materials. Beachfront disposal should be limited to clean sands.

Land Disposal

The following site is identified as a Priority site.

SEGMENT 3 LAND DISPOSAL OPTIONS

Priority Site No.	Approximate Capacity
4	4,000 c.y. at 6' depth

TOTAL CAPACITY ALL POTENTIAL SITES VARIABLE c.y.

Each site is individually described in the following pages. Aerial photo illustrations are available to depict site locations and dimensions.

TILLAMOOK BAY SEGMENT 3

3d.3 Site 4 Comprehensive Plan designation – PRIORITY DMD SITE
Resource Agency evaluation -

Site Description

Location: Immediately west of the Tillamook County Boat Launch at Memaloose Point, near the mouth of Tillamook River.

Size: 1.59 acres

Capacity: 4,000 c.y. at 6' depth in the existing disposal site. In addition, the site can also use the parking lot for the temporary handling of material.

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Physical Characteristics:	Tideflat area bordered by road berm to south and boat launch berm to east. Floodplain extends throughout site.
Floodplain:	The site is mapped by FEMA within the 100-year floodplain of the Tillamook River
Biological Characteristics:	Tideflat and marsh mixture. Benthic communities and shorebird use.
Comprehensive Plan/Zoning:	EN, superimposed by FH
Ownership:	Tillamook County.
Tax Lot:	T1S, R10W, Sec. 22 DA 100 (County)
Engineering Considerations	
Method of Dredging/Filling:	Clamshell dredge.
Site Preparation:	No special requirements.
Design Criteria:	Outfall to main channel. Cells may be necessary to ensure proper de-watering.
Future Use Constraints:	Possible structural limitations may exist because of existing soils (tideflats).
Environmental considerations:	Disposal activity on this site would require compliance with state and federal laws, particularly: a) a determination that the 404 (b)(1) guidelines of the Federal Water Pollution Control Act have been met; b) findings that Goal 16 overall requirements for dredge, fill or other reduction or degradation of estuarine natural values have been met, or an exception to this Goal 16 requirement; c) an exception to Goal 16 requirements for Natural management units; d) mitigation for loss of estuarine habitat (unless otherwise determined by DSL).
Economic Considerations:	Once filled, the disposal site could provide for additional parking/back-up space or developable land.
Other Considerations:	Site should be reviewed as a fill project, with dredge disposal use potential.

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3.3d.9 Summary and Conclusions

Segment 3 has minimal dredge disposal needs at this time. The County boat ramp at Memaloose Point is the only identified existing project, requiring very small quantities of dredging irregularly. Disposal is best suited in Site #4, using clamshell equipment and loading onto trucks to be taken to upland sites. It is most practical as a short-term disposal site and should not be considered as a long-range option. If Site #4 were not preserved for stockpiling (committed to some other use), the County parking lot could be used, though this may not be a preferred option.

Other local lands could be considered as well, if large pipeline equipment is used requiring large disposal sites. The use of these sites, as determined during the course of this study, will depend on:

1) Proof of no practical alternatives if site includes estuarine areas or wetlands.

2) *Mitigation if disposal occurs in estuarine areas.*

3) Floodplain analysis to identify potential impacts and mitigation measures to minimize any floodplain impacts.

4) Provisions for rehabilitation of farmlands for all those sites that are planned for future agricultural use.

5) Exceptions to Goal 3, if the lands are not returned to agricultural uses.

6) Exceptions to Goal 16 requirements, if dredged material disposal in an estuarine area is not consistent with Goal 16 overall requirements for dredge, fill or other reduction or degradation of estuarine natural values, or if dredged material disposal involves areas which Goal 16 require to be included within a natural or Conservation management units.

Large pipeline equipment could reach portions of Bayocean Spit, including Site #3. Beach nourishment could occur, particularly in the area of Cape Meares Lake where the shoreline is threatened by ocean wave-action. Booster pumps may be required to reach these areas. Dredged materials would have to be consistent with beach-front materials when disposing in beach areas.

NEHALEM BAY

BAY SEGMENTS

3.4 NEHALEM BAY DREDGED MATERIAL DISPOSAL PLAN

3.4a Nehalem Bay Segments

Equipment Options

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Nehalem Bay has seen relatively little dredging in its history. The only federally authorized project for the bay is the jetties at the mouth. The Corps did some entrance bar dredging in 1933, but otherwise no federal work has been done for navigation. Maintenance work on the navigation channel has never been formalized. When fishing helped to maintain appropriate navigation depths, as did the large boats that historically used the waterway (by the scouring of their propellers). Sled dredging informally occurred through the 1950's, by dragging a metal plate behind a tug to knock the tops off of the shoals. The Port of Nehalem up until the mid 1970's cleaned the channels of snags and debris, until the cost became prohibitive.

The Nehalem, however, has naturally maintained navigation depths (10 foot plus) for the majority of its length to North Fork. Today there is only one significant shoal that impedes navigation (unfortunately, these shoals have practically eliminated boat traffic at low tide except for the smallest of craft). If channel dredging is to occur, two main shoals are expected to require all of the dredging. These shoals would most likely be dredged by pipeline, as fairly large volumes would have to be moved and clamshell/bucket equipment would prove too costly.

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All other dredging in Nehalem Bay is for small private projects, requiring clamshell or bucket equipment. One proposed new project in the Wheeler area would probably require pipeline equipment because of the large volume estimated to be moved.

NEHALEM BAY SEGMENTS

Nehalem Bay has been divided into three segments. These segments indicate areas in which dredging will need to occur, and where the sites are located that would be suitable for disposal of those specific materials. This presentation allows dredging needs and options to be viewed in comparison, and provides a mechanism for establishing which sites should be used. Each segment is discussed separately, including a description of the past and future expected dredging requirements and an analysis of the individual sites that are available to meet those needs.

Bay Segment Boundaries

Segment	Approximate Mile Location
1	Entrance to Bay Mile 2.75
2	Bay Mile 2.75 (downriver) to River Mile 0.35 (downriver)
3	River Mile 0.35 (upriver) to River Mile 2.80 (upriver)

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The discussion within each bay segment is broken into two major categories: Dredging Needs and Disposal Options. Within the Dredging Needs discussion the geographic areas in which dredging will occur and the quantities of materials to be moved are identified.

Both public and private dredging activities are inventoried including both maintenance of existing projects and proposed construction of new facilities. The dredging options portion of each bay segment discussion outlines the sites that are available to meet the identified needs, and provides the following information relative to each site:

Description of Site: The site description includes data on the size, location, tax lot, capacity, floodplain, and physical and biological characteristics of each site.

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Disposal use of the Site: This section includes a discussion of the engineering, economic and environmental considerations which provide guidelines for the use of the sites. Engineering considerations include site capacity, design criteria, land preparation, cost and future use potential. Environmental and economic considerations are discussed in terms of projected impacts or relative importance to future projects or uses.

A summary discussion for each river segment compares the dredging needs which the options and outlines the available alternative actions.

3.4b Nehalem Bay Segment 1

3.4b.1 Dredging Needs

Maintenance of Existing Projects

One maintenance requirement has been identified in Segment 1, that being the Brighton Moorage. Though not regularly maintained, the moorage has lost use of portions of its facilities because of shoaling. An estimated 2,600 c.y. would be removed to attain adequate depths for future use. The Jetty Fisheries Marina and the Nehalem Bay State Park boat ramp are the only other existing facilities in this segment, and both areas experience sufficient natural scouring.

Construction of New Projects

The rehabilitation of the jetties may require some dredging for construction access; this could total up to XXX,000 c.y. of material coming from the entrance bar and staging areas.

If a channel maintenance program were initiated, the only potential requirement for dredging would be at the entrance bar. However, the entrance bar is expected to self-scour after jetty rehabilitation.

TABLE
SEGMENT 1 DREDGING NEEDS

Project	Construction	Maintenance	20-Year Total
Brighton Moorage		2,600	8,000
Total Dredging Needs			8,000 c.y.

3.4b.2 Disposal Options

If a channel were to be maintained in Nehalem Bay, ocean disposal may become an option. The materials to be dredged would be acceptable for ocean disposal given the existing federal (EPA) standards. However, equipment problems may put greater limitations on ocean disposal than an actual site location. There is not a hopper dredge available on the west coast that could work the entrance channel given the existing, or rehabilitated, jetty alignment.

Land Disposal

Land disposal sites that have been identified in Segment 1 are listed below:

SEGMENT 1 LAND DISPOSAL OPTIONS

Priority Site No.	Approximate Capacity
1	75,000 c.y. at 5' depth
2	50,000 c.y. at 5' depth
3	18,000 c.y. at 3' depth
9	1,240,000 c.y. at 6' depth
10	80,000 c.y. at 6' depth
11	140,000 c.y. at 5' depth
TOTAL	1, 603,000 c.y.

TOTAL CAPACITY ALL PRIORITY SITES 1,603,000 c.y.

Following are discussions about each potential disposal site. Aerial photo illustrations are available to depict site locations and dimensions.

3.4b.3. Site 1 Comprehensive Plan designation – PRIORITY DMD SITE
Resource Agency evaluation – PRESENTLY ACCEPTABLE

Site Description

Location:	At south jetty, ocean beachfront.
Size:	9.92 acres
Capacity:	75,000 c.y. at 5' depth. The beach nourishment disposal capacity would be unlimited over the long term.
Physical Characteristics:	Ocean beachfront, subject to waves and wind erosion.
Floodplain:	The site is mapped by FEMA within the 100-year floodplain of Nehalem Bay.
Biological Characteristics:	Open sand with no vegetation cover. Limited habitat use. Not suitable for western snowy plover due to the level of human presence and disturbance.
Comprehensive Plan/Zoning:	R-M, superimposed by SH and FH
Ownership:	Public
Tax Lot:	

Engineering Considerations

Method of Dredging/Filling:	Pipeline or clamshell dredge
Site Preparation:	None required.

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Resource Agency evaluation – PRESENTLY ACCEPTABLE¶
¶
Site Description¶
¶
Location: . At south jetty, ocean beachfront.¶
¶
Size: . 27.5 acres¶
¶
Capacity: . 225,000 c.y. at 5' depth¶
¶
Physical Characteristics: . Ocean beachfront, subject to waves and wind erosion.¶
¶
Biological Characteristics: . Open sand with no vegetation cover. Limited habitat use, except for shorebird feeding.¶ ... [58]
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Design Criteria:	Beach nourishment must receive clean marine sands.
Future Use Constraints:	None
Environmental Considerations:	Disposal on site would cause nominal impact. Material must be marine sands, blending well with the existing materials.
Economic Considerations:	Use of site may be helpful in protecting the existing development of Nedonna Beach. Minimal site preparation costs.
Other Considerations:	Site would only be used in relation to jetty work or possible bar dredging, and done by clamshell or pipeline. Such disposal would probably be minimal over a 20-year period. Dredged material disposal on this site must comply with the requirements of the Tillamook County Zoning Ordinance. A Tillamook County Development Permit is required prior to dredged material disposal on this site. PRIORITY site for possible use during jetty rehabilitation work.

Deleted: No special requirements unless sediment transport analysis identifies necessary actions.

3.4b.4 Site 2 Comprehensive Plan designation – PRIORITY DMD SITE
Resource Agency evaluation – PRESENTLY ACCEPTABLE

Site Description

Location:	Immediately north of Nedonna Beach residential area.
Site:	6.81 acres
Capacity:	50,000 c.y. at 5' depth.
Physical Characteristics:	Recently stabilized sand dunes.
Floodplain:	The site is mapped by FEMA within the 100-year floodplain of Nehalem Bay.
Biological Characteristics:	Beachgrass and shorepine vegetation growing on dunes. Wildlife limited to various upland birds and small mammals. No special concentration of flora or fauna.
Comprehensive Plan/Zoning:	RM, superimposed by SH and FH for Tillamook County. City of Rockaway - R-1 and A-1.

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Ownership:	Private
Tax Lot:	T2N, R10W, Sec. 17, T.L. 100
Engineering Considerations	
Method of Dredging/Filling:	Pipeline dredge.
Site Preparation:	Land clearing and grading. Pipeline disposal would require adequate berming to protect drainage through middle of site.
Design Criteria:	The dike exterior must be protected from flooding and storm surges. Drift logs would be stored and replaced after dredging.
Future Use Constraints:	None
Environmental Considerations:	Use of site would temporarily eliminate pine/beachgrass vegetation, thus displacing small number of wildlife Dredged material must be contained to prevent the material from re-entering Nehalem Bay or the Pacific Ocean creating turbidity.
Economic Considerations:	A good site for disposal of locally dredged materials. Minimal site preparation costs.
Other Considerations:	Use of site would probably only occur for jetty project work, as other dredging requirements are minimal in area. If pipeline were proposed for use associated with this site, and involved large quantities at one time, further study should be done to determine possible impacts to aquifer.

Deleted: or truck dumped from clamshell dredging.¶

Deleted: Possible impacts to groundwater must be assessed if extensive disposal is to occur on site. Special de-watering may be required.

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Deleted: Some aesthetic impacts to local residents. Revegetation required, and wildlife should return in 4-6 years. Possible impact to groundwater resources that is presently being developed by City of Rockaway. However, if disposal is by clamshell or bucket (as is expected) then impact should be minimal given proper precautions.

Dredged material disposal on the portion of this site within Tillamook County must comply with the requirements of the Tillamook County Zoning Ordinance. A Tillamook County Development Permit is required prior to disposal of dredged materials on this site. Dredged material disposal on the portion of this site within the city of Rockaway must be in compliance with the requirements of the Rockaway Zoning Ordinance.

PRIORITY site for possible use during jetty rehabilitation work.

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3.4b.6 Site 3 Comprehensive Plan designation – PRIORITY DMD SITE
Resource Agency evaluation – PRESENTLY ACCEPTABLE

Site Description	
Location:	Immediately north of Brighton Marina
Size:	4.17 acres
Capacity:	18,000 c.y. at 3' depth.
Physical Characteristics:	Upland site. Old fill area used for open storage. Occasional wave erosion at banks during high flows.
Floodplain:	The site is mapped by FEMA within the 100-year floodplain of Nehalem Bay.
Biological Characteristics:	None
Comprehensive Plan/Zoning:	WDD, superimposed by SH and FH
Ownership:	Private
Tax Lot:	T2N, R10W, Sec. 9 T.L. 4300, 4400
Engineering Considerations	
Method of Dredging/Filling:	Pipeline or clamshell dredge
Site Preparation:	Pipeline dredging would require containment berms and outflow system
Design Criteria:	Exterior of dikes must be protected from flooding/storm surges.
Future Use Constraints:	None
Environmental Considerations:	Disposal materials must be properly contained and protected from soughing into water area. Site received fill from a landslide in 1999. Portions of the previously filled are marginally meet wetland criteria. May or may not be regulated as jurisdictional wetlands. This would need to be resolved through formal wetland delineation and jurisdictional determinations from the regulatory agencies.
Economic Considerations:	Good stockpile site for local dredging requirements, but such use will limit development potential of site.

Deleted: 3.4b.5 Site 3 . Comprehensive Plan designation – UNSUITABLE¶
Resource Agency evaluation – PRESENTLY UNACCEPTABLE¶
¶
Site Description¶
¶
Location: . South of Jetty Fishery, at confluence of Jetty Creek and Nehalem River.¶
¶
Size: . 14.7 acres¶
¶
Capacity: . 95,000 c.y. at 4' depth.¶
¶
Physical Characteristics: . Sand substrate, tidally influenced area with two freshwater creeks entering from east. Existing jetty allows high water flushing area (bay overtopping of jetty).¶
Page Break
Biological Characteristics: . Intertidal area with shorebird and fishery use. Small marshes beginning to develop in area. More saltmarsh is expected to develop.¶
¶
Comprehensive Plan/Zoning: . EC-1, superimposed by FH¶
¶
Ownership: . T2N, R10W, 17 T.L. 100, 102.¶
¶
Engineering Considerations¶
¶
Method of Dredging/Filling: . Pipeline; clamshell dredge offloading from barge, or truck dumped.¶
¶
Site Preparation: . Design diking to avoid filling of two major drainage ways. Protect diking along drainage way with riprap slope protection.¶
¶
Design Criteria: . Filter blanket required along jetty.¶
¶ ... [62]

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Other Considerations: Dredged material disposal on this site must comply with the requirements of the Tillamook County zoning ordinance. A Tillamook County Development Permit is required prior to dredged material disposal on this site.

Deleted: RESERVE site for use as an interim DMD stockpile site prior to site development.¶

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3.4b.7 Site 9 Comprehensive Plan designation – PRIORITY DMD SITE
Resource Agency evaluation – PRESENTLY ACCEPTABLE

Site Description

Location: Nehalem Bay State Park, south of the Nehalem State Park lower parking lot.

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Size: 128.48 acres

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Capacity: 1,240,000 at a 6' depth

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Physical Characteristics: Open dune with some level areas.

Floodplain: The site is predominately mapped by FEMA with the 100-year floodplain.

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Biological Characteristics: Predominantly beachgrass and scotch broom, with some shorepine. Low intensity bird and small mammal use.

Comprehensive Plan/Zoning: R-M, superimposed by SH

Ownership: State of Oregon

Tax Lot: T2N, R10W, Sec. 5, 8

Engineering Considerations

Method of Dredging/Filling: Pipeline dredging,

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Site Preparation: Minor land leveling with containment berms and outflow system.

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Design Criteria: Design to be coordinated with State Parks and Recreation Department. Revegetation to avoid impacts to existing trails. Revegetation would be required after disposal use to minimize dispersion of material.

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Environmental Considerations: Dredged material must be contained to prevent the material from re-entering Nehalem Bay. Disposal use will temporarily eliminate vegetation, thus displacing resident birds and mammals. After revegetation (3-6 years), wildlife will return to site. Possible aesthetic

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impacts to park users, but it would be temporary and could be mitigated by design. The disposal site plan would need to avoid on site wetlands, if possible, or provide mitigation. The disposal site would provide 50-foot setback from the bay and the disposal design will avoid the removal the trees to the maximum extent possible.

Economic Considerations: This site can be reached by pipeline equipment from the Fishery Point Shoal. Presently this is the closest acceptable site to the Fishery Point Shoal, and could handle over half of the materials expected to come from construction dredging of that shoal.

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Other Considerations: This site has been designed to minimize the potential impacts to the state park (for recreation).

Deleted: This site has been scaled down from its original size, because of potential use conflicts within the state park.

Deleted: Future use of this site should be considered during the state park master planning effort, and shall be subject to the approval of the Oregon Department of Transportation.

3.4b.8 Site 10 Comprehensive Plan designation - PRIORITY DMD SITE
Resource Agency evaluation - PRESENTLY ACCEPTABLE

Deleted: PRIORITY site because of possible use for Fishery Point dredging if Sites #23 and #24 cannot be used.¶

Site Description

Location: Nehalem Bay State Park, south end of Nehalem Spit

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Size: 8.84 acres

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Capacity: 80,000 c.y. at 6' depth

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Physical Characteristics: Predominantly undeveloped sand dunes.

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Floodplain: The site predominately mapped by FEMA within the 100-year floodplain.

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Biological Characteristics: Vegetation comprised of beachgrass, scotch broom and shorepine. Wildlife use low intensity, mostly small birds and some mammals. A wetland is present onsite. Beach along the eastern side of the site is regularly used by pinnipeds as a haul-out area.

Comprehensive Plan/Zoning: R-M, superimposed by SH and FH

Ownership: State of Oregon

Tax Lot: T2N, R10W, Sec. 8 17

Engineering Considerations

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Method of Dredging/Filling:	Pipeline dredge.
Site Preparation:	Minimal with containment berm construction accomplished with local materials.
Design Criteria:	The dredging needs to be coordinated with Oregon Parks and Recreation Department. The disposal site must be designed to provide a minimum 300-foot setback from the pinniped area and not impact the existing trails. Revegetation would be required following disposal. The disposal site would provide a 50-foot setback to the bay. In addition, the disposal site boundaries are restricted to the area within the existing treelines along the bay and the trail. Tree areas should be protected from disposal impacts. Wetland is avoidable and should be avoided.
Future Use Constraints:	None
Environmental Considerations:	Temporary impact to vegetation and wildlife. Quick revegetation would minimize any impacts, and would encourage stabilization of materials.
Economic Considerations:	Except for jetty restoration work, site has no near-term uses for disposal.
Other Considerations:	This site has been designed to minimize potential impacts to park recreation use. Dredged material disposal on this site must comply with the requirements of the Tillamook County zoning ordinance. A Tillamook County Development Permit is required prior to dredged material disposal on this site. PRIORITY site because of possible use during jetty rehabilitation project.

Deleted: ing for large projects, if need where identified in future. Near-term use would be for clamshell/bucket from jetty work.

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3.4b.9 Site 11 Comprehensive Plan designation – PRIORITY DMD SITE
Resource Agency evaluation – PRESENTLY ACCEPTABLE

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Site Description

Location:	Nehalem Spit State Park, immediately north of the north jetty at the mouth of Nehalem Bay.

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Size:	18.3 acres
Capacity:	140,000 c.y. at 5' depth. Beach nourishment disposal capacity would be unlimited over the long term.
Physical Characteristics:	Open beach area comprised of sands and intertidal ocean front. Subject to ocean wave action and storm surges.
Floodplain:	The site is predominately mapped by FEMA within the 100-year floodplain.
Biological Characteristics:	Western snowy plover nesting habitat present onsite. There is opportunity to create additional habitat with dredge materials. One small wetland was observed but is avoidable.
Comprehensive Plan/Zoning:	R-M. Superimposed by SH and FH
Ownership:	State of Oregon
Tax Lot:	T2N, R10W, Sec. 17
Engineering Considerations	
Method of Dredging/Filling:	Pipeline dredge.
Site Preparation:	Stockpile large woody debris for replacement when dredging is complete.
Design Criteria:	Materials must be clean marine sands, properly spread to avoid unnatural mound etc. Dredging needs to be coordinated with Oregon Parks and Recreation Department. Revegetation would be required following disposal. Containment berms would need to be constructed of native materials. The dredging site would need to be designed such that at least one existing trail to the beach is maintained at the southern end of the spit. 50-foot setback from bay. Drift logs would need to be replaced. Material disposal could occur within the defined snowy plover habitat to create additional suitable habitat for the species; agency coordination is required, and the disposal timing will avoid impacts to nesting birds.
Future Constraints:	None
Environmental Considerations:	The dredged material must be contained to prevent the material from re-entering

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Nehalem Bay or the Pacific Ocean and creating turbidity.

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Economic Considerations: None.

Other Considerations: Site use must be coordinated with the state park planning efforts.

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Dredged material disposal on this site must comply with the requirements of the Tillamook County zoning ordinance. Tillamook County Development Permit is required prior to dredged material disposal on this site.

Deleted: RESERVE site because of possible use during jetty rehabilitation work.¶

3.4b.10 Summary and Conclusions

Future dredging requirements will be minimal in this segment, hydraulic conditions provide for sufficient scouring to minimize shoaling. The jetty restoration project will further enhance this process.

Jetty restoration work may require dredging to gain access to the proposed staging areas by barge, requiring a maximum 150,000 c.y. to be dredged. This could be disposed in the existing approved Sites #1, #2, or #4. Dredging at Brighton Moorage can be disposed at Site #3, as it is close to the dredging area and could be used for stockpiling and later transport or commercial distribution.

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Disposal sites on the Nehalem Spit may be well matched to dredging activity on the Fishery Point Shoal in Segment 2. No need is presently identified for these sites within Segment 1.

3.4c Nehalem Bay Segment 2

3.4c.1 *Dredging Needs*

Maintenance of Existing Projects

There is one existing maintenance project in Segment 2, at Dart's Marina in Wheeler. Because of shoaling inside the marina area Dart's will require maintenance dredging of approximately 1,400 c.y.

Construction of New Projects

If a navigation channel were to be maintained in Nehalem Bay, a major shoal would require dredging in Segment 2. The Fishery Point Shoal, located at Bay Mile 3.0, extends approximately 6,000 linear feet and would require the removal of 115,560 c.y. to attain a Mean Lower Low Water (MLLW) depth of 8 feet (2 foot overdredge). From the estimates of deposition rates in this area over the past five years, it is calculated that future maintenance dredging requirements would be about 5,400 c.y./year.

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Construction at Paradise Cove included the expansion of the existing marina facilities, requiring the removal of approximately 11,000 c.y. of material. The Scovell Industrial Park proposed development includes a channel north of Wheeler for commercial and recreational craft. This channel with docking areas, etc., would require the dredging of about 150,000 c.y. of material at construction. Maintenance has been estimated at approximately 1,500 c.y./year.

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TABLE
SEGMENT 2 DREDGING NEEDS

Project	Construction	Maintenance	20-Year Total
Dart's Marina		250 c.y.	5,000 c.y.
Navigation Channel (Fishery Point Shoal)	115,000	5,400 c.y.	223,600 c.y.
Paradise Cove	11,000	200 c.y.	15,000 c.y.
Scovell Industrial Site	150,000	1,500 c.y.	180,000 c.y.
Total Dredging Needs			820,000 c.y.

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ZONES . NEHALEM ZONES . . . .¶
C-1 . Neighborhood and Rural Commercial . C . Commercial¶
EC1 . Estuary Conservation 1 . EC1 . Estuary Conservation ¶
EC2 . Estuary Conservation 2 . FHO . Flood Hazard¶
EN . Estuary Natural . MR . Marine Residential¶
ED . Estuary Development¶
F-1 . Farm . ROCKAWAY ZONES¶
FH . Flood Hazard . R-1 . Single Family-Duplex¶
L-M . Light Industrial . A-1 . Low Density Resident, Agricultural.¶
RM . Recreation Management . . Forest, Recreation¶
RR . Rural Residential¶
SFW-10 . Small Farm and Woodlot 10 . WHEELER ZONES¶
SH . Shoreland Overlay . N . Natural Retention¶
WDD . Water Dependent Development . ED . Estuary Development¶
. . FHO . Flood Hazard¶
. . GC . General Commercial¶
. . IND . Water Related Industrial¶
. . R-1 . Residential 1¶
. . R-2 . Residential 2¶
. . WRC . Water Related Commercial¶
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NEHALEM BAY SEGMENT 2

3.4c.2 Disposal Options

Ocean Disposal

Ocean disposal becomes less likely as one moves further from the mouth of bay. However, if a channel was maintained in Nehalem Bay in the future, and local disposal sites were not available, ocean disposal could be an option. Presently, there is not a hopper dredge available that could navigate the entrance jetties alignment. A specific ocean disposal site would have to be authorized prior to any ocean disposal activity. Authorization would be contingent upon the study of possible sites and alternatives by the Corps of Engineers and EPA. Sediment materials found in this segment are presently acceptable for ocean disposal.

Ocean disposal from the beach front may be a viable option for the Fishery Point dredging. Beachfront disposal of clean materials must be further explored with state parks personnel.

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Land Disposal

The land disposal site identified in Segment 2 is listed below.

SEGMENT 2
LAND DISPOSAL OPTIONS

Priority Site No.	Approximate Capacity
4	35,000 c.y. at 4' depth
TOTAL	35,000 c.y.

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9 . . . . 11,000 c.y.¶

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23 . . . . 629,000 c.y.¶
24 . . . . 510,000 c.y.¶

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TOTAL CAPACITY ALL PRIORITY SITES 35,000 c.y.

Following is a discussion about the potential disposal site. Aerial photo illustrations are available that depict actual site locations and dimensions.

3.4c.9 Site 4 Comprehensive Plan designation – PRIORITY DMD SITE
Resource Agency evaluation - PRESENTLY ACCEPTABLE

Site Description

Location:	North of Dart's Marina, west of Highway 101 in north part of the City of Wheeler UGB.
Size:	6.16 acres
Capacity:	35,000 c.y. at 4' depth.
Physical Characteristics:	Open parcel with a gravel surface in locations and sparse vegetation.
Floodplain:	The site is mapped by FEMA within the 100-year floodplain of Nehalem Bay.
Biological Characteristics:	Minimal wildlife use. Vegetation sparse.
Comprehensive Plan/Zoning:	WRC and IND
Ownership:	T2N, R10W, Sec. 2(BC) T.L. 4700, 4800
Engineering Considerations	
Method of Dredging/Filling:	Pipeline or clamshell dredge.
Site Preparation:	Protect slough and wetland from fill.
Design Criteria:	Containment berms will need to be constructed from on-site materials with an outflow system to control turbidity. Dredging schedule needs to avoid nearby habitat sensitivity.
Future Use Constraints:	None
Environmental Considerations:	Disposal materials must not be allowed to slough into waterway. Small wetland in northeast corner should be protected from materials.
Economic Considerations:	Use of site for stockpiling will limit future development potentials of site. Site is a waterfront, developable parcel, and a limited resource in area. Disposal of dredged material on the site must comply with the requirements of the

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Site No. . . . . Approximate Capacity¶
5 . . . . 338,000 c.y.¶
6 . . . . 58,000 c.y.¶
8 . . . . 20,000 c.y.¶
10 . . . . 1,800 c.y.¶
12 . . . . 220,000 c.y.¶
TOTAL . . . . 637,800 c.y.¶
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3.4c.3 . Site 5 . Comprehensive Plan designation – RESERVE DMD SITE¶
Resource Agency evaluation – PRESENTLY UNACCEPTABLE¶
¶
Site Description¶
¶
Location: . Immediately northeast of Fishery Point, between Highway 101 and railroad tracks.¶
¶
Size: . 15 acres¶
¶
Capacity: . 338,000 c.y. at 14' depth¶
¶
Physical Characteristics: . Tideflat *area bordered by natural slopes and* railroad berm. Small drainage enters *from* south. Causeway with railroad ... [63]

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Wheeler City zoning ordinance.

3.4c.14 Summary and Conclusion

The only identified existing dredging project for this segment, Dart's Marina, could be disposed of at Site #4. This site is immediately adjacent to the dredging area, and is part of the owners overall marina improvement plan. State and federal agencies recommend that Site #4 be proposed as a fill project (for review purposes) and could be tied to the dredging project.

Future navigation channel development would depend on the dredging of the Fishery Point Shoal. At construction this would produce approximately 320,000 c.y. of material, and a total of about 620,000 c.y. over the 20-year period. Site #9 could accommodate materials from the Fishery Point Shoal.

Dredged Material Disposal Policy 9 commits Tillamook County to coordinate with the Oregon Parks and Recreation Department on future use of dredged material disposal sites within state parks.

The Paradise Cove dredging (15,000 c.y. total) could be trucked to Site #4 if the City of Wheeler and the County have an approved coordinated approach. The Scovell Industrial Park will require 150,000 c.y. dredging at construction. Former Site #12 was identified as the potential location for these materials. However, Site #12 is no longer a part of the inventory because it is part of the estuarine system. As a result, the material will have to be trucked off the site to an approved upland location.

3.4d NEHALEM BAY SEGMENT 3

3.4d.1 Dredging Needs

Maintenance of Existing Projects

There are no existing maintenance projects in this segment. Small moorages and ramps exist between River Mile 2.35 and the North Fork (L & L Moorage, Milburn's Moorage, county boat ramp), but all occur in natural scour areas. Historically, these areas have not required dredging, and they are not expected to have any needs in the future.

Construction of New Projects

If a navigation channel were to be maintained to the North Fork (RM 2.80), a major shoal would require dredging in this segment. The Dean Point Shoal, located at mile RM 0.40, extends some 3,830 linear feet and would require the removal of 170,000 c.y. to attain a MLLW depth of 12 feet (2 foot overdredge). ** Maintenance dredging is expected to be nominal, especially if some minor hydraulic improvements were installed (wing jetties or pile dikes in key places). These concepts should be conceptually engineered and tested to determine their expected success. The construction of the new Highway 101 Bridge will remove in-water piers, and removal of associated rock and

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¶

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12a . Comprehensive Plan designation – UNSUITABLE¶
Resource Agency evaluation – PRESENTLY UNACCEPTABLE¶
12b . Comprehensive Plan designation – RESERVE DMD SITE¶
Resource Agency evaluation – PRESENTLY UNACCEPTABLE¶
¶
Site Description:¶
¶
Location: . Immediately south of junction of Highway 53 and Highway ... [66]

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concrete materials from the channel is expected. These actions should improve the hydraulic flows through the shoal area, thus further decreasing future dredge maintenance needs.

The construction of the City of Nehalem docks required dredging to gain proper access in the channel area at the city waterfront. Expected dredging requirements for maintenance are 500 c.y./year for maintenance. At the mouth of North Fork Nehalem River, the Scovell facilities will require a one-time construction dredging effort, to remove about 10,000 c.y. (no maintenance will be required because of local hydraulics).

TABLE
SEGMENT 3 DREDGING NEEDS

Project	Construction	Maintenance	20-Year Total
Nehalem City Docks		500/year	10,000
Scovell Dock	10,000		10,000
Total Dredging Needs			220,000

3.4d.2 Disposal Options

Ocean Disposal

Ocean disposal of these materials would be costly and time consuming. The potential for ocean disposal is remote at this time. The materials to be dredged, however, could be disposed (according to existing state and federal criteria).

Land Disposal

Land disposal sites identified in Segment 3 are listed below.

SEGMENT 3 LAND DISPOSAL OPTIONS

Priority

Site No.	Approximate Capacity
5	Temporary Rehandling
7	20,000 c.y. at 8' depth
8	Temporary Rehandling
TOTAL	20,000 c.y.

Reserve

Site No.	Approximate Capacity
6B	580,000 c.y. at 8' depth

TOTAL CAPACITY ALL SITES 600,000 c.y.

NEHALEM BAY SEGMENT 3 MAP

3.4d.3 Sites 5 Comprehensive Plan designation - PRIORITY DMD SITE
Resource Agency evaluation - PRESENTLY ACCEPTABLE

Site Description

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** Note: . The Deans Point Shoal have been removed. Dredge spoils have been placed at site #14 and used as fill for the new Nehalem River Bridge approach.¶
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17 . . . . 70,000 c.y.¶
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Site No. . . . . Approximate Capacity¶
18 . . . . 27,000 c.y.¶
20 . . . . 150,000 c.y.¶
TOTAL . . . . 177,000 c.y.¶
¶
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Deleted: 995,000
Deleted: 743,000 c.y.
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Deleted: a/14b
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Deleted: 14b . Comprehensive Plan ... [83]
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Location:	Tillamook County boat ramp and vicinity.
Size:	1.07 acres;
Capacity:	The site is used only for the temporary rehandling of material.
Physical Characteristics:	Tillamook County boat ramp is surrounded by an asphalt parking lot. An overflow parking lot is located on the opposite side of Tideland Road.
Floodplain:	The site is likely within the floodway of the Nehalem River, which would preclude the site from permanently receiving fill.
Biological Characteristics:	None.
Comprehensive Plan/Zoning:	Tillamook County superimposed by SH and FH
Ownership:	Tillamook County
Tax Lot:	T3N, R10W, Sec. 23
Engineering Considerations	
Method of Dredging/Filling:	Clamshell dredge.
Site Preparation:	Containment berms and outflow system.
Design Criteria:	Suitable for a rehandle site. The material must be removed following dredging to accommodate the ongoing use of the boat ramp. Rehandling and final disposal site are required for the dredged material.
Future Use Constraints:	None as the dredged material is required to be removed from the site following dredging.
Environmental Considerations:	The dredged material must be contained to prevent the material from re-entering the Nehalem River and creating turbidity.
Economic Considerations:	Minimal site preparation will be needed. Additional costs will be related to the material rehandling and final disposal site.

Deleted: East of the Tillamook County boat ramp, and east of the Nehalem Bridge.

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Deleted: 14b - 98.6 acres¶

Deleted: 14a - 83,000 c.y. at 10' depth; 14b - 1,516,920 c.y. at 10' depth.

Deleted: Pastureland subject to seasonal high water table and periodic flooding. Bermed on all sides.

Deleted: Open pastureland with limited wildlife use.

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Deleted: T.L.202, 303¶

Deleted: Fill by pipeline dredge or truck dumping.

Deleted: For pipeline dredging crossing under road is required for access and discharge. May be desirable to strip and stockpile existing topsoil.

Deleted: Restore sites' agricultural value by covering fill with topsoil.

Deleted: Without topsoil cover fill, the spoil area would have minimal agricultural value.

Deleted: Minimal impact to wildlife habitat. Possible problems with flood storage displacement. Proposed new Highway 101 bridge crossing will extend into this site. Disposal material could be utilized in fill requirements.

Deleted: Dredge material disposal would disrupt agricultural use of the site. Disposal materials would have to be properly mixed with existing soils to maintain or enhance existing productivity. Mixing of topsoil may be costly; property owner may require compensation.¶

¶

Site is best disposal area for Dean Point Shoal dredging because of proximity and size. Large or small pipeline could work shoal and spread materials around site. Materials would raise site, thus helping alleviate seasonal high water table.

Other Considerations:

Dredged material disposal on this site must comply with the requirements of the Tillamook County zoning ordinance. A Tillamook County Development Permit is required prior to dredged material disposal on this site.

PRIORITY site because of its proximity and size relative to the Dean Point Shoal.

3.4d.4 Site 7 Comprehensive Plan designation - PRIORITY DMD SITE
Resource Agency evaluation - PRESENTLY ACCEPTABLE

Site Description:

Location:	Nehalem-Wheeler sewage treatment facilities.
Size:	1.75 acres;
Capacity:	20,000 c.y. at 8' depth;
Physical Characteristics:	Flat, mowed lawn used by the wastewater treatment facility. The usable parcel is located between the sewage treatment facilities and Tideland Road.
Floodplain:	The site is mapped by FEMA within the 100-year floodplain of the Nehalem River.
Biological Characteristics:	A small wetland is present within the mowed lawn area that is available for dredge material. Low wildlife use. Vegetation consists of a mix of grasses and herbaceous weeds.
Comprehensive Plan/Zoning:	F-1, superimposed by SH and FH
Ownership:	Private
Tax Lot:	T3N, R10W, Sec. 27

Engineering Considerations

Method of Dredging/Filling:	Pipeline dredge
Site Preparation:	Construct containment berms and outflow system.
Design Criteria:	The site has received fill from past dredging episodes in a parcel located

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Deleted: 14a is being condemned by the State Highway Department to provide for the new Highway 101 bridge crossing. It is anticipated all spoils from the Dean Point Shoal can be used as fill for highway bridge construction. "Dead" areas around ramps could be filled, limiting amount of land adversely impacted. Construction of new Highway 101 bridge is expected to occur in fiscal year 1982, therefore the use of dredged materials for grade filling would have to precede that schedule.¶
¶
14b is productive agricultural land which would require an exception to Goal 3 prior to disposal of dredged material disposal on this site. For these reasons, 14b is considered an unsuitable site for dredged material disposal.

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15

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Resource Agency evaluation - PRESENTLY ACCEPTABLE¶

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Deleted: 15b - 51.4 acres

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Deleted: 15a - 330,750

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Deleted: 15b - 769,250 c.y. at 10' depth.

Deleted: : . Flat agricultural land; [84]

Deleted: , as land is intensively [85]

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Deleted: T.L. 380

Deleted: Fill by p

Deleted: or truck dumping.¶

Deleted: Maintain existing drainage [86]

Deleted: Restore site's agricultural [87]

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closest to the river. Pipeline access is readily available along the south boundary of the sewage treatment facilities.

Future Use Constraints: None anticipated.

Environmental Considerations: The small, low quality wetland may be impacted in the process.

Economic Considerations: None

Other Considerations: The site is owned by the North Tillamook County Sanitary Authority (NTCSA). The south portion of the site has been scraped of upper layer of soil to make berms for existing sewage facilities. Initial fill should occur in this area to build back original level of land. NTCSA has expressed an interest in using the site for dredged material disposal. A priority classification is appropriate because of the size of the site and its proximity to the Nehalem Waterfront.

Dredged material disposal on this site must comply with the requirement of the Tillamook County zoning ordinance. A Tillamook County Development permit is required prior to disposal of dredged materials on this site.

Deleted: Without topsoil cover fill, the spoil area would have minimal agricultural value.

Deleted: Minimal impact to wildlife habitat. Possible problems with floodplain displacement.

Deleted: Use for disposal would disrupt agricultural use of site. Disposal of materials would have to be properly mixed with existing soils to maintain or enhance existing productivity. Mixing of topsoil may be costly; property owner may require compensation.

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Deleted: Since the dredged spoils form the Dean point Shoal have been disposed of at Site 14a,

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Deleted: unnecessary. A "Reserve" classification i

Deleted: 15b is productive agricultural land which would require an exception to Goal 3 prior to disposal of dredged materials. The property owner is not now interested in receiving dredged materials. For these reasons, 15b is considered an unsuitable site for dredged material disposal.¶
¶

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15B .

3.4d.4 Site 6b Comprehensive Plan designation – RESERVE DMD SITE
Resource Agency evaluation - PRESENTLY ACCEPTABLE

Site Description:

Location: Pasture along Nehalem River, south of sewage treatment facilities.

Size: 45.45 acres

Capacity: 580,000 c.y. at 8' depth.

Physical Characteristics: Flat agricultural land

Floodplain: The site is located within the 100-year floodplain of the Nehalem River.

Biological Characteristics: Low wildlife use, as land is intensively farmed.

Comprehensive Plan/Zoning: F-1, superimposed by SH and FH

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Ownership: Private

Tax Lot: T3N, R10W, Sec. 27,

Engineering Considerations

Method of Dredging/Filling: Pipeline dredge.

Site Preparation: Construction of containment berms and outflow system and soil amendments for continued agricultural use.

Design Criteria: Access to property could occur through tidegate structures along the Nehalem River. May be desirable to strip and stockpile existing topsoil.

Future Use Constraints: Without topsoil cover fill, the spoil area would have minimal agricultural value.

Environmental Considerations: Minimal impact to wildlife habitat. Possible problems with floodplain displacement. Material must be contained to prevent the material from re-entering the Nehalem River and creating turbidity.

Economic Considerations: Use for disposal would disrupt agricultural use of site. Disposal of materials would have to be properly mixed with existing soils to maintain or enhance existing productivity.

Other Considerations: Site is a productive agricultural land which would require an exception to Goal 3 prior to disposal of dredged materials.

Dredged material disposal on this site must comply with the requirement of the Tillamook County zoning ordinance. A Tillamook County Development permit is required prior to disposal of dredged materials on this site.

3.4d.10 Site 8 Comprehensive Plan designation – PRIORITY DMD SITE
Resource Agency evaluation – PRESENTLY ACCEPTABLE

Site Description

Location: Immediately north of city docks, City of Nehalem.

Deleted: 3.4d.5 . Site 16¶
¶
Site Description¶
¶
Location: . Peninsula at mouth of North Fork Nehalem River.¶
¶
Size: . 1,3 acres¶
¶
Capacity: . 5,000 c.y. at a 4' depth¶
¶
Physical Characteristics: . Old fill area, presently riprapped and bermed.¶
¶
Biological Characteristics: . Alder/scotch broom mix. Wildlife limited to some birds and small mammals.¶
¶
Comprehensive Plan/Zoning: . R-R, Superimposed by SH and FH¶
¶
Ownership: . T3N, R10W, Sec. 23(AC), T.L. 200 –1800¶
¶
Engineering Considerations¶
¶
Method of Dredging/Filling: . Fill by pipeline dredge, or truck dumping, or clam/barge.¶
¶
Site Preparation: . No special requirements.¶
¶ ... [88]

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Deleted: 3.4d.6 Site 17 . Comprehensive Plan designation – INVENTORY DMD SITE¶
Resource Agency evaluation – PRESENTLY ACCEPTABLE¶
¶ ... [89]

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Resource Agency evaluation – PRESENTLY UNACCEPTABLE¶
¶ ... [90]

Deleted: 3.4d.8 . Site 19 . Comprehensive Plan designation – RESERVE DMD SITE¶
Resource Agency evaluation – PRESENTLY ACCEPTABLE¶
¶ ... [91]

Deleted: 3.4d.9 . Site 20 . Comprehensive Plan designation – UNSUITABLE¶
Resource Agency evaluation – PRESENTLY UNACCEPTABLE¶
¶ ... [92]

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Size:	0.60 acres
Capacity:	The site is used only for the temporary rehandling of material.
Physical Characteristics:	Fill area, sloping in all directions.
Floodplain:	The site is mapped by FEMA within the 100-year floodplain of the Nehalem River.
Biological Characteristics:	Wetlands are located along the Nehalem River. Vegetated non-wetland areas contain a mix of grasses and weedy herbaceous species along roadway shoulder.
Comprehensive Plan/Zoning:	C, superimposed by FHO
Ownership:	City of Nehalem
Engineering Considerations	
Method of Dredging/Filling:	Clamshell dredge
Site Preparation:	Appropriate containment of materials required.
Design Criteria:	The dredged material must be removed from the site following dredging to accommodate the ongoing use of the driveway, which provides access to a rental property and the Port of Nehalem's dock. Rehandling and final disposal site are required fro the dredged material.
Future Use Constraints:	None as material will be removed.
Environmental Considerations:	Material must be contained to prevent sloughing into waterway.
Economic Considerations:	Additional costs will be related to the material rehandling and final disposal site.
Other Considerations:	This is only locally available sit for clamshell/bucket dredging of dock area. Would be a good staging area for truck material. Dredged material disposal on this site must comply with the requirements of the Nehalem City zoning ordinance.

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Deleted: Rehandle site, 1,000 c.y. at a time.

Deleted: None

Deleted: No special requirements.

Deleted: Use of site for rehandling will restrict future developability of site. Owner may require compensation if alternative site cannot be used.

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PRIORITY site for use as a rehandling site for dredged materials from the City dock project.

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3.4d.11 Summary and Conclusions

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The Nehalem River experiences excellent flushing in this segment as demonstrated by a lack of maintenance needs at the various moorages and ramps. The Highway 101 Bridge included the removal of the existing bridge pier (at midstream). This removal should enhance local hydraulics, further minimizing the dredging needs.

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Deleted: planned for this area would

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Soil mixing would be required to maintain agricultural productivity for Site #6b, a Reserve Site.

The Nehalem City Docks will require occasional maintenance dredging. Bucket or clamshell dredges would be suitable for this location. The materials could be temporarily stored at Site #8 and then removed to an appropriate upland location. The County Boat Ramp will require occasional maintenance dredging. The rehandle site located on in the parking lot should be sufficient to meet maintenance needs.

Deleted: A navigation channel development project would require the dredging of Dean Point Shoal (approximately 170,000 c.y.). Disposal of this material should be best in Site #14a, especially if it were coordinated with the bridge project. Site #15a is the only alternative site. Both options are within easy reach of the shoal.** Maintenance of this shoal is not expected to be required, especially if pile dikes or wing jetties are properly constructed. Existing property owners of sites 14b and 15b are not now favorable to receiving large quantities of materials.

The Scovell docks dredging is small (10,000 c.y.) and one-time (no maintenance is expected). Disposal of this material should not be a problem, as local sites are available.

Deleted: some dredging to clear a channel into the new facilities

Deleted: If pipeline dredged, this material could be disposed in Site #15.

Deleted: Site #20 would be enhanced for development purposes if used for disposal of materials, raising it above a high water table and regular flooding. Additional waterfront developable land would be beneficial to, the City of Nehalem. However, Site #20 is presently unacceptable for disposal use because of wetland habitat. Site #19 could serve as an alternative disposal site for trucked in dredged materials from the Nehalem City Dock project but costs for disposal would be increased due to the distance of the site from the dredging project.¶
¶

3.5 IMPLEMENTATION

The ability to dredge is dependent upon the availability of adequate sites for the disposal of dredged materials. In both Tillamook Bay and Nehalem Bay, the supply of land disposal sites which meet the necessary environmental and engineering criteria is limited. Those sites that are presently acceptable must be considered as a scare resource, worthy of careful allocation in order to maximize the public benefit. Therefore, two key questions must be explored regarding an implementation program.

1. Planning Options: How should the proposed sites be designated in the comprehensive plan and zoning ordinance?
2. Site Use Options: What kind of arrangements for site use should be made between the applicable public agencies and the private property owner?

3.5a Planning Options

Placing dredged materials on a land site must be viewed as a short-term use of that land resource. Once the disposal has been completed and the necessary settling, compaction and stabilization has occurred, the land becomes available for a variety of land uses depending on the specific site characteristics and location. Therefore, although a specific site may be utilized for the disposal of dredged materials throughout a 20-year period, the disposal use is only temporary and the land may be converted to a more permanent use after the disposal has been completed.

The loss of dredge disposal sites to other permanent uses prior to the placement of dredged materials would result in increased public costs and could potentially inhibit not only the maintenance of the existing navigation routes, but the development of new economic enterprises as well.

It is recommended that the dredged material disposal sites determined to be

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necessary for future use should be reserved in a special overlay zone in the comprehensive plan. Since disposal use is a short-term use of the land, it is recommended that the comprehensive plan land use designation for the sites reflect the long-term desired use such as residential, agricultural, commercial, industrial or recreational. By that action, the property owner is aware of the county's long-term policies for the particular parcel. In the short-term however, it is recommended that a "dredged disposal site overlay zone" be placed on all acceptable sites, in essence reserving those sites for the possible disposal of dredged materials. Use of the site would be allowed if it did not result in the construction of permanent facilities and was consistent with other policies of the comprehensive plan. Once the site was filled, the overlay zone would be removed, and the land would be available for permanent use designated in the comprehensive plan.

A variety of factors will place pressure on dredged disposal sites for conversion to other uses prior to their need and use as a disposal site. Planning controls through overlay zones and other techniques must be made sufficient to restrain those pressures. Since through this plan the county is determining that the use of these sites for disposal of dredged materials is in the public interest, implementation measures other than normal planning regulations are warranted.

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All potential disposal sites discussed in this plan have been evaluated according to their relationship to proposed dredging projects. The sites have been prioritized, to rate the sites according to their importance to future dredging needs.

PRIORITY SITES are sites that will play an important role in future dredged disposal needs. These sites are designated on the Tillamook County zoning maps as "DMD-1" sites. All non-aquatic Priority Sites have been included within the Shoreland Overlay (SH) zone. All uses proposed within DMD-1 sites are conditional uses within the SH zone and are subject to Planning Commission review. A plan amendment i.e., a formal decision by the Board of Commissioners, to remove the DMD-1 designation from these sites is required prior to approval of a conflicting, permanent use on the site.

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RESERVE SITES may be important to future dredging, but still have unresolved issues which prohibit their "full protection". A single site has been set aside as a Reserve Site; Site #6b in Nehalem. This site is not presently acceptable, and will require detailed justification before "acceptability" can be realized. Reserve sites should be carefully reevaluated during each periodic update of the dredged material disposal plan. As priority sites are filled to capacity, sites identified as Reserve sites shall be reevaluated as potential Priority DMD sites. Highest priority should be given to conversion of Reserve sites to Priority sites (subject to State and Federal permit requirements).

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Deleted: Other sites may be presently acceptable, but the dredging projects they are related to are only in a concept stage. R

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Deleted: UNSUITABLE SITES are all other sites discussed in this plan. These sites have environmental, engineering or economic constraints which limit their future sue as dredged material disposal sites. These sites are lowest priority for future conversion to Priority sites

A variety of implementation options are available for use by the ports and Tillamook County in order to acquire use of the necessary disposal sites. The specific option chosen for each site should be dependent upon the site conditions, discussion with the property owner and the potential future use of the site. The following discussion describes a wide range of methods that are available to implement the proposed plan. These include property acquisition, easements, purchase of development rights, property exchanges and other regulated methods. Any one or combination of these options may be used based on the preferences of the local implementing agencies.

3.5a.1 Easements

The property owner and port district may enter into an easement agreement whereby the property owner grants the right to place dredged materials on his/her land. The owner retains full use and ownership rights to the land, but allows materials to be placed on the property under the conditions outlined in the easement. When disposal is completed, full use of the site reverts to the owner.

The method is most applicable when the private property owner either desires full material to be placed on the land to enhance the site's future potential, or at least has no objection to the placement of the material. Because the owner maintains direct use of the site during and after disposal, the cost of acquiring easements is generally less than many other methods. Use of easements is common practice among port districts. Easement acquisition may or may not be accompanied by financial reimbursement to the private property owner depending on the contract agreement reached between the port district and the owner.

3.5a.2 Fee Purchase

The port district has the option of purchasing outright the sites on which dredged materials are to be placed. Although this option entails higher costs than does easement acquisition, it has several advantages. Many of the sites identified in this plan would not receive all of the necessary disposal materials for a period of 10 to 20 years and permanent use of the site would not be available until after that time. If the port districts and the county believe that the property owner will not be willing to wait for that period of time, they may wish to purchase the property and absorb the expense of holding the land.

By use of a land banking program, the port district could purchase disposal sites in unimproved form and retain ownership until the disposal has occurred. After settling and compaction, the port district could resell the property, thus returning it to the private sector. Although this method would result in increased front end costs, the future sale of the improved property could result in long-term financial gain to the port district. Use of public bond funds or creation of a local revolving fund would be possible means of generating the necessary revenue. Again, this implementation method could be used in combination with other methods, thus decreasing the quantity of land to be acquired.

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As previously mentioned, if Tillamook County determined that sufficient public benefit could be gained from site acquisition, the county could purchase selected disposal sites and reserve them for future public use.

After the disposal activities were completed, the county would make the necessary additional improvements to implement the planned public use of the site.

3.5a.3 Purchase of Development Rights

This implementation method assumes that property ownership carries with it a certain amount of development rights. These rights are transferable and they can be purchased either on a temporary or a

permanent basis. If the port district were to purchase the development rights of a piece of property, just compensation would be required for use of the owner's land. Although the property owner would retain full ownership of the land, the use would be restricted to those activities spelled out in the purchase agreement.

Since purchase of development rights can be for a temporary period, the port districts could buy those rights until the disposal actions were completed. At that time, the development rights contract could be cancelled and full use of the site would revert to the property owner.

3.5a.4 Property Exchange

In some instances, the port district may wish to acquire disposal sites through the exchange of property with the disposal site owner. In effect, the port would trade title to a parcel of land they currently own for title of the disposal site they wish to acquire. This method is feasible if the port district owns land that would be desirable to disposal site owners.

3.5a.5 Tax Limitation

When sites are held for use as dredged material disposal sites through zoning or other methods not involving site acquisition, the issue or property taxation must be resolved. If use of a privately owned site prohibits the land owner from making full use of the site, the question remains: Should the property owner carry the tax burden? To deal with this question, it may be possible to defer or fix the taxes on the property over a limited period of time. Such a concept could be done through means similar to the "special assessment" provisions of Section 5 and 6 of ORS 308.370, dealing with Exclusive Farm Use Zones, or, under concepts of a "frozen assessed valuation" as provided for in Urban Renewal Areas under ORS 457. While the legal precedent for such tax actions is clear, the specific enabling authority may not exist for the county to take such actions on dredged material disposal sites. The county should aggressively pursue the establishment of such authority either through interpretation of its current authority or through new legislation. Deleted: ht

If it is not possible to implement tax actions, the ports should be prepared to negotiate tax payments for those sites on which use is restricted until disposal has been completed.

3.5b Site Use and Permit Review

Prior to actual use of the sites for the disposal of dredged materials, the ports and the Corps of Engineers must prepare specific design materials and determine when and how the sites will be utilized. At that time, it will be necessary to apply for the applicable Section 10, Section 404 and Fill and Removal permits at both the federal and state level. After approval of the permits, the sites will be available for use, subject, however, to any conditions placed on the permit approval.

3.5c Dredged Material Disposal Plan Review

Tillamook County, in conjunction with local ports, the Corps of Engineers and other relevant state and federal resource agencies shall review the dredged

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material disposal plan if:

a) dredging projects which were not considered in the DMD plan and which involve disposal of dredged materials in Priority dredged material disposal (DMD 1) sites are proposed; or if

b) the capacity of Reserve and Inventory DMD sites is reduced by 25%. due to the commitment of the sites to uses which preclude their ultimate use as DMD sites; or if;

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c) requests for amendment s to the Tillamook County Comprehensive Plan and zoning maps to delete DMD 1 sites are made; or if

d) a period of five years has elapsed since the last DMD plan review. The first DMD plan review shall be conducted no later than five years after the date of adoption of the Tillamook County Comprehensive Plan.

A public hearing shall be held to review the information generated by the DMD plan review. Notification of this public hearing shall be made to all affected property owners, jurisdictions and state and federal agencies at least 30 days prior to the public hearing.

At least 7 days prior to the public hearing, the Planning Director shall make available to the public a report indicating at a minimum:

a) the number and volume of Priority and Reserve DMD sites which have been used for dredged material disposal since the last DMD plan review;

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b) the number and volume of the remaining Priority and Reserve DMD sites;

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Deleted: and Inventory

c) an analysis of dredged material disposal needs for the next 5 years, including existing, new or proposed projects;

d) the location and volume of addition DMD sites which could be used to meet expected dredge material disposal needs;

e) an analysis of the acceptability of each additional dredge material disposal site. This analysis should separate the additional dredged material disposal sites in (d) above into the following categories:

Priority – Disposal of dredged material on these sites would be in compliance with state and federal permit requirements, and with the requirements of Goal 16.

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Reserve – Disposal of dredged material on these sites would require further site analysis.

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Deleted: not be in compliance with state and federal permit requirements and/or with the requirements of Goal 16.

An opportunity shall be provided during the public hearing for public testimony on the information presented in the report. Based on the testimony received at the public hearing, the Planning Director shall recommend to the Board of County Commissioners any additions or deletions of "Presently Acceptable" DMD 1 sites which are necessary to maintain a total DMD 1 site capacity which is adequate to accommodate the dredged material disposal needs of approved navigation and development projects involving dredging for the next five years.

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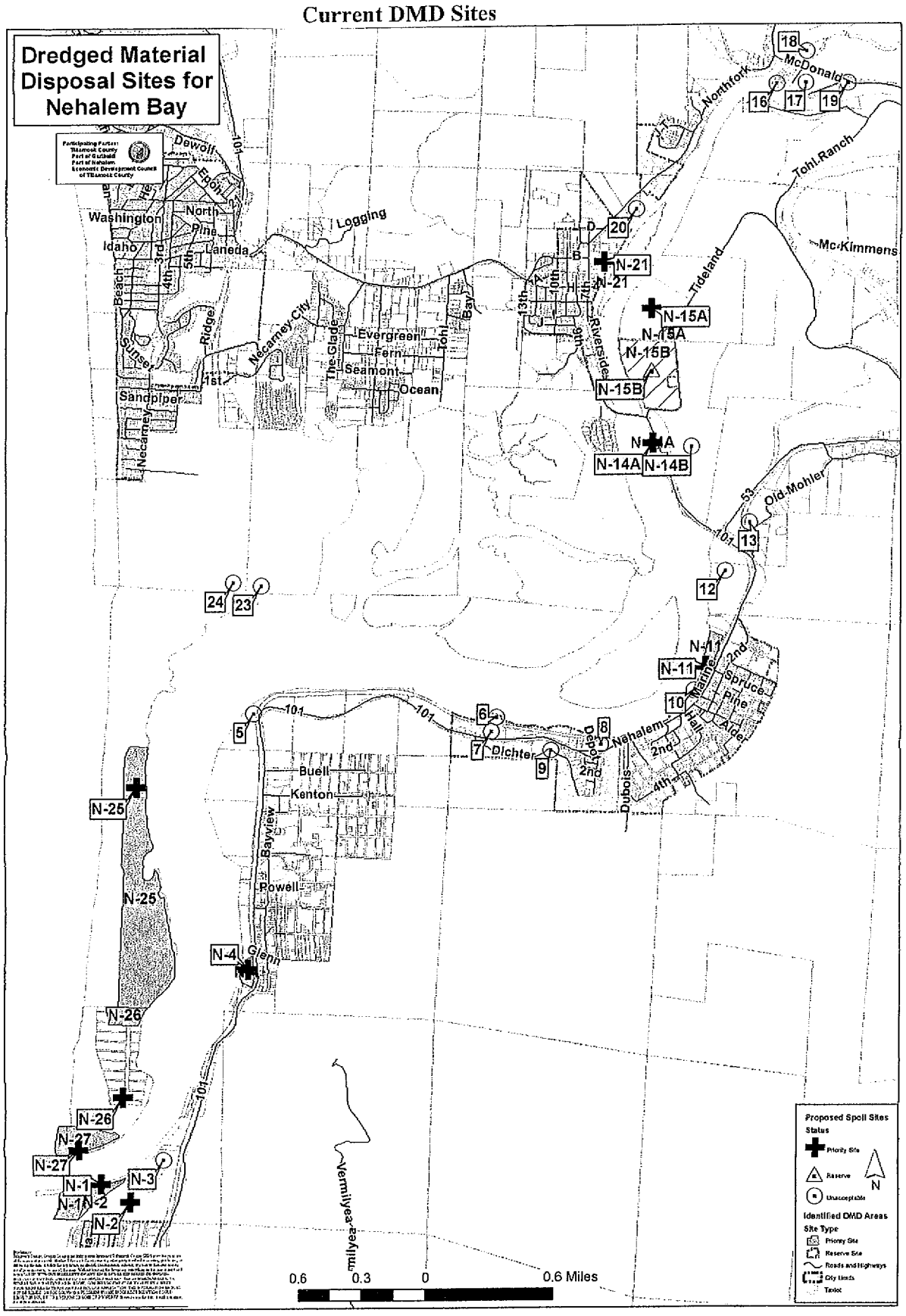
Additions or deletions of DMD 1 sites shall require an amendment to the Tillamook County comprehensive Plan and zoning maps. These amendments shall be made according to the amendment procedure provided in Article IX.

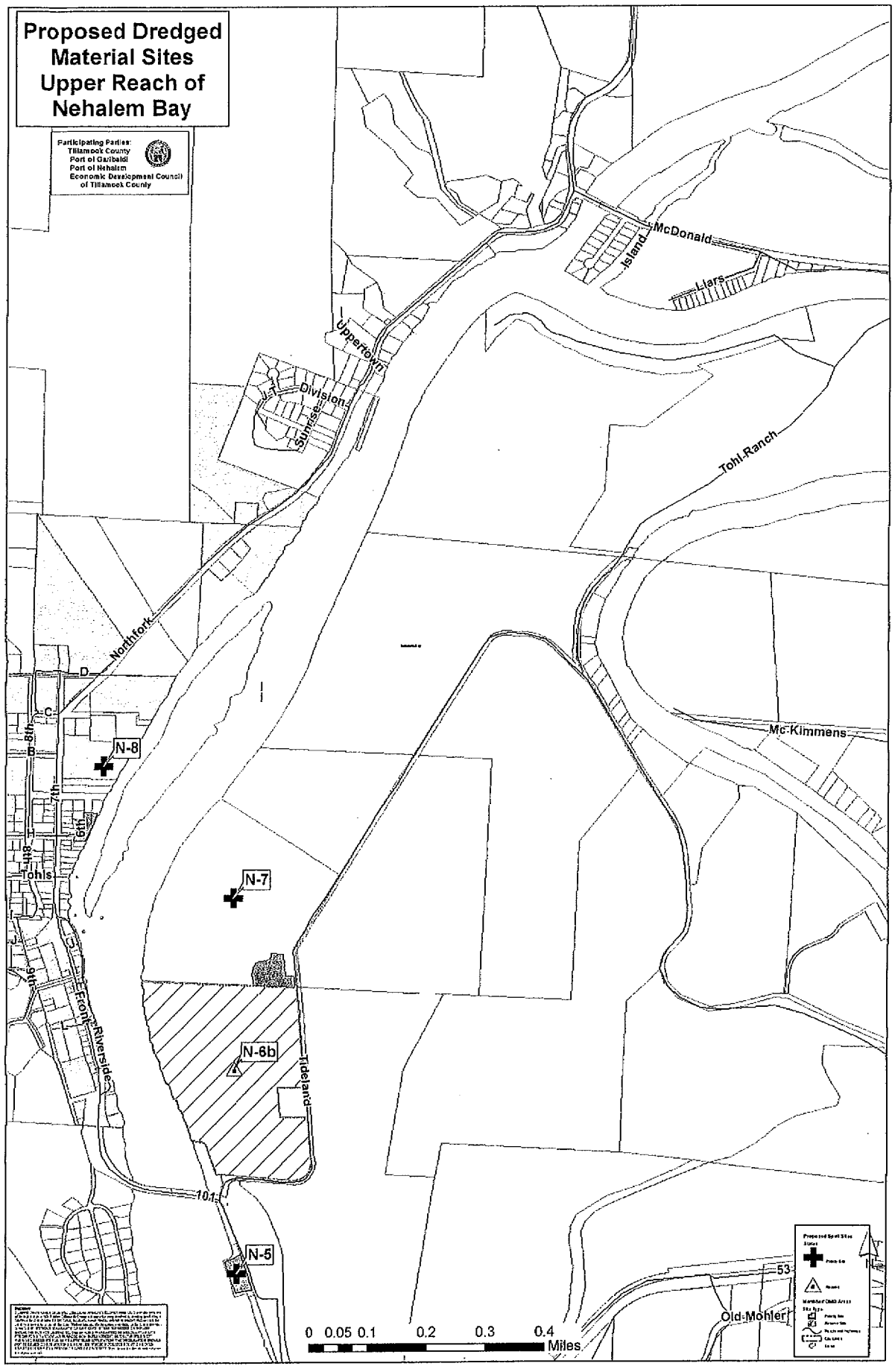
Current DMD Sites



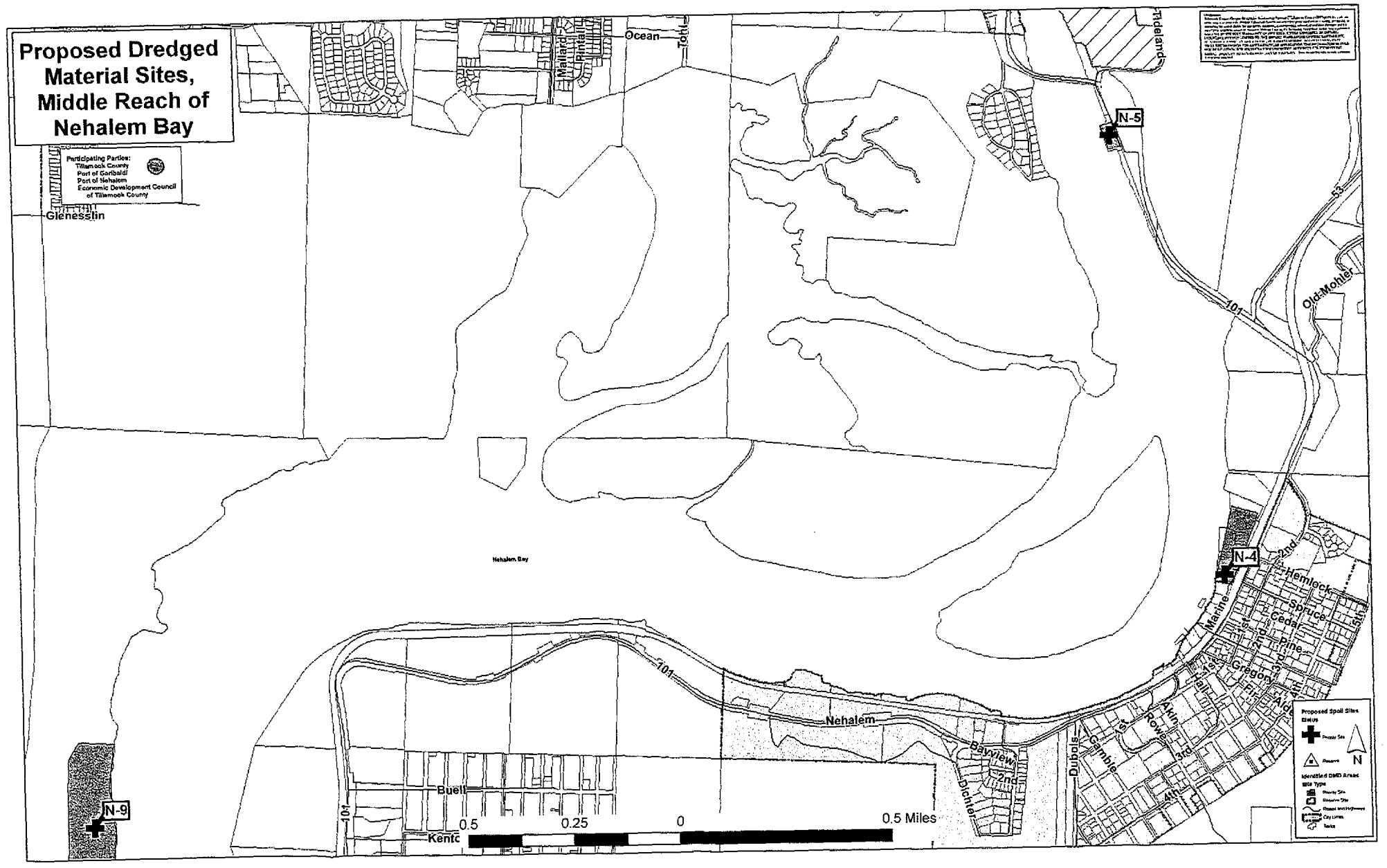
NEHALEM BAY MAPS

(6 total)

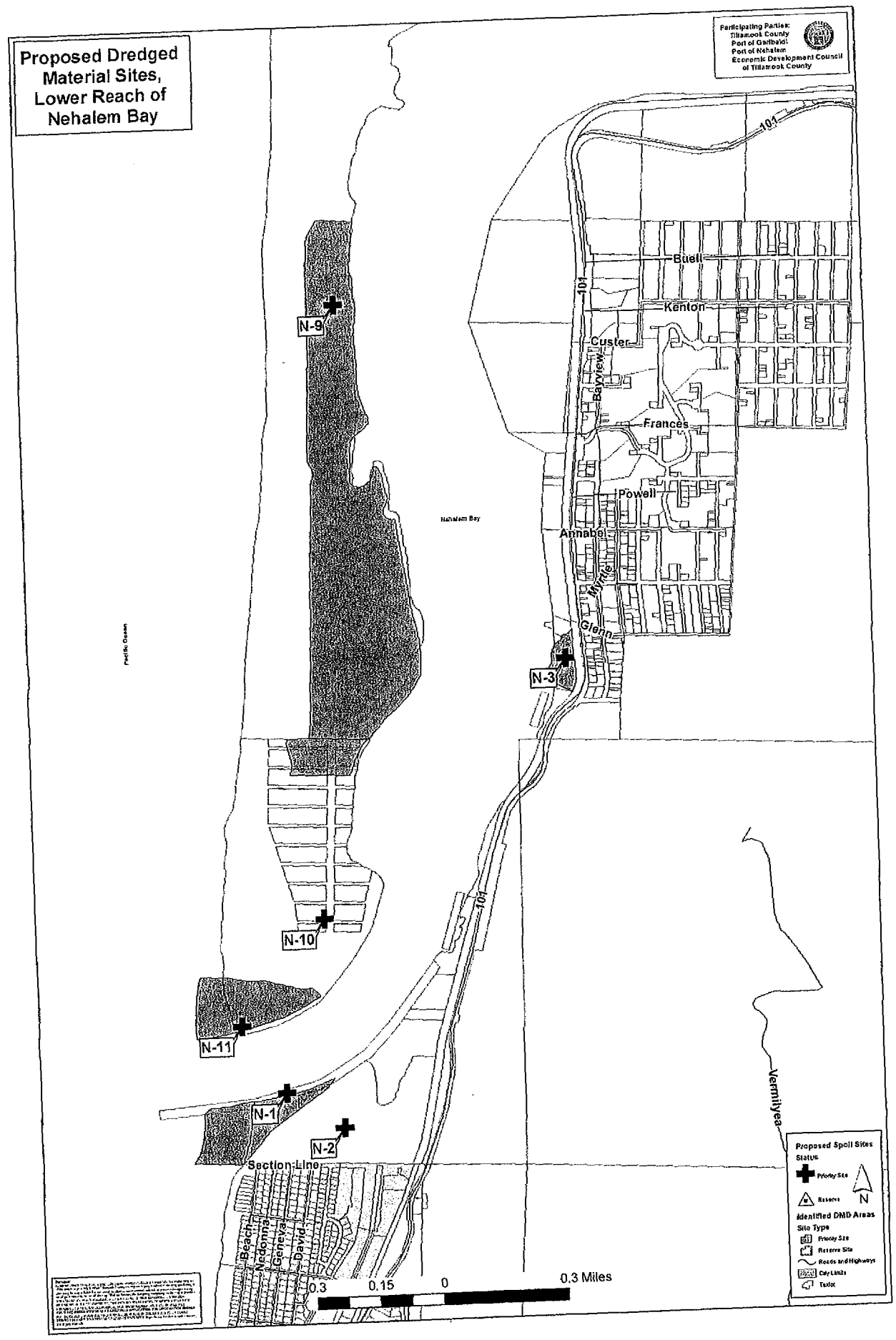
EXHIBIT III


Proposed Dredged Material Sites Upper Reach of Nehalem Bay
Participating Parties:
Tillamook County
Port of Garibaldi
Port of Nehalem
Economic Development Council of Tillamook County
McDonald
Island
Liars
Upperlown
Division
Sunset
Tohl Ranch
Northfork
D
C
B
8th
7th
6th
Ohls
N-8
N-7
N-6b
N-5
Tideland
From Riverside
101
McKimmens
53
Old-Mohler
0 0.05 0.1 0.2 0.3 0.4
Miles

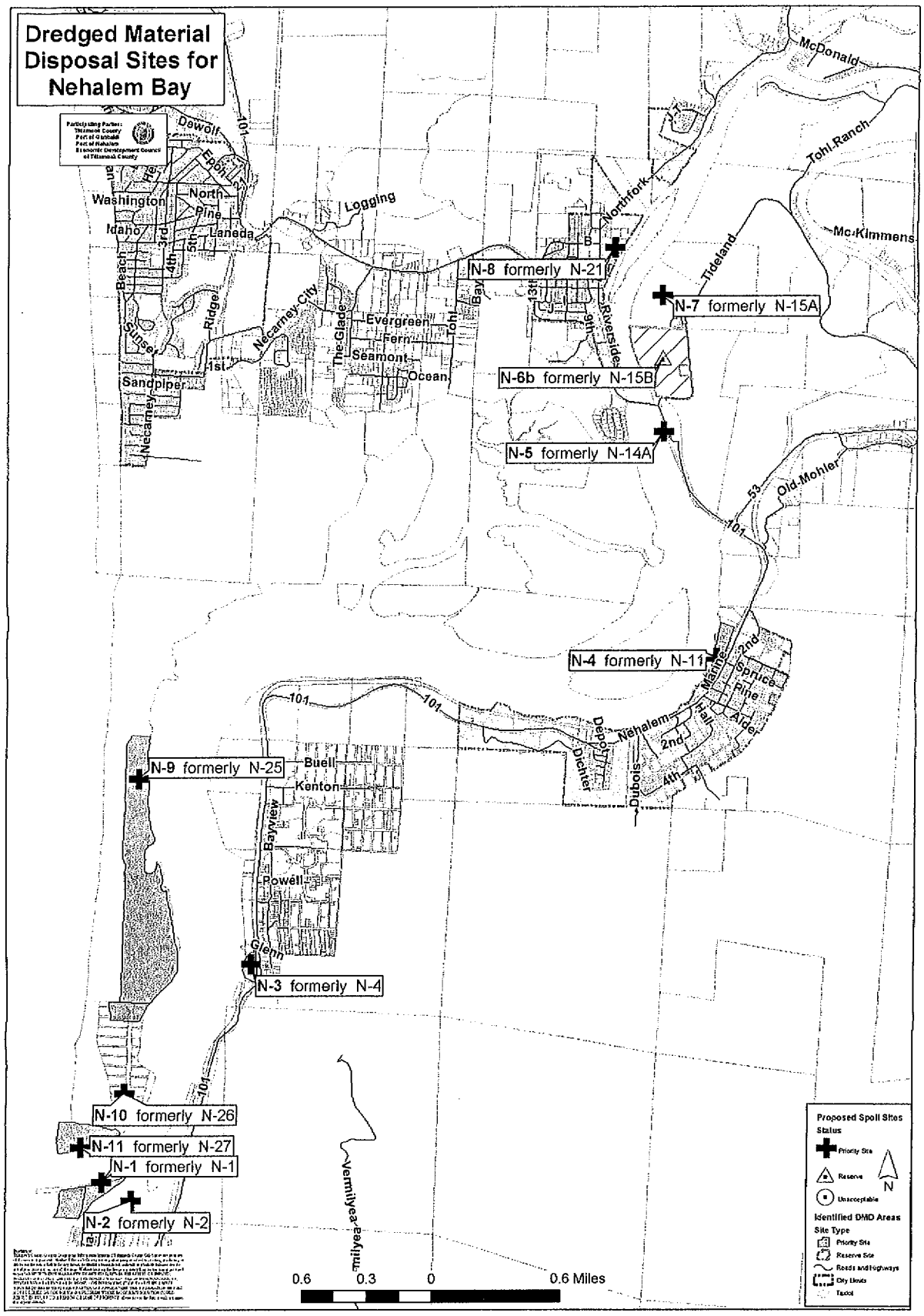
Proposed Dredged Material Sites, Middle Reach of Nehalem Bay



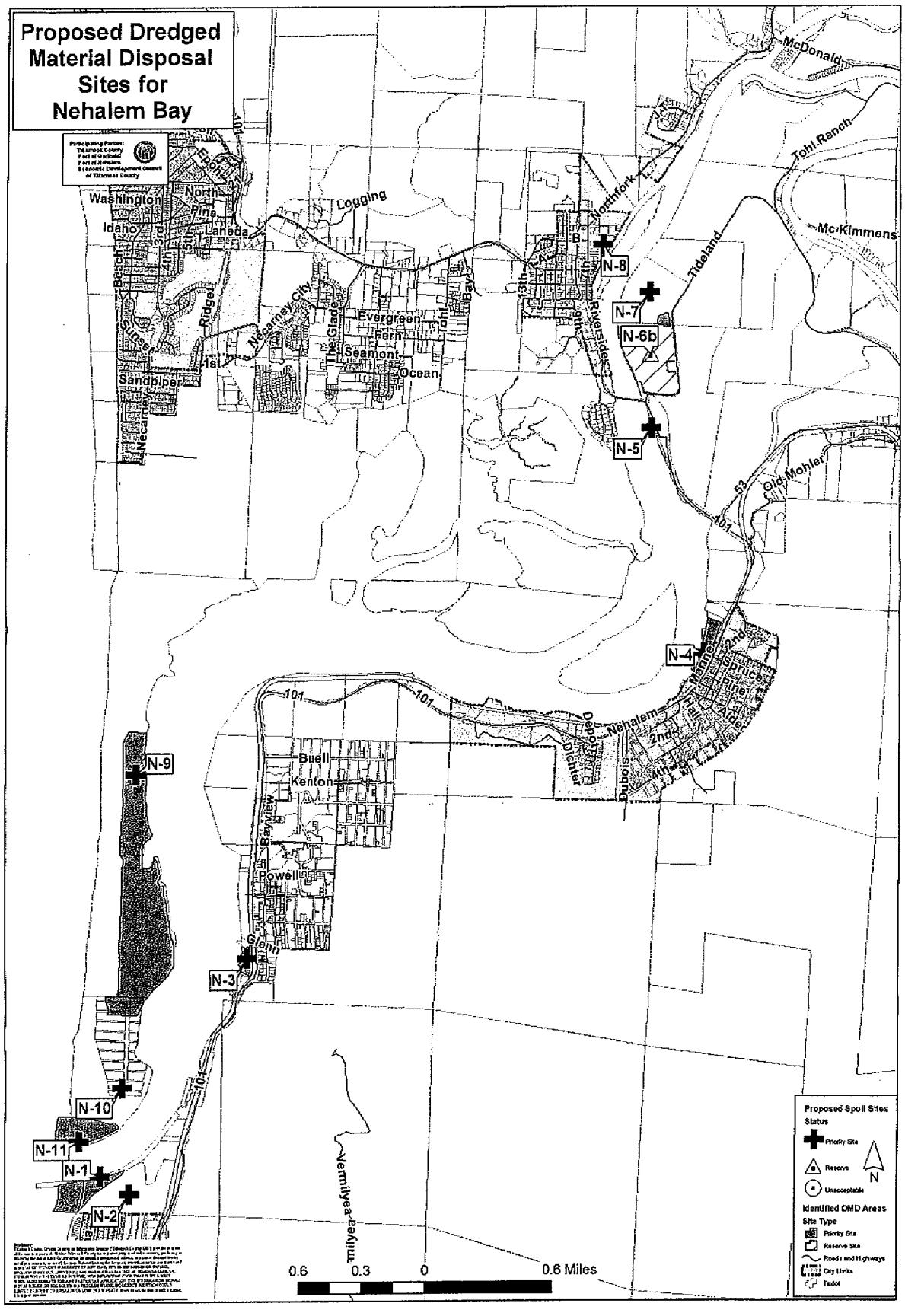
Proposed Dredged Material Sites, Lower Reach of Nehalem Bay



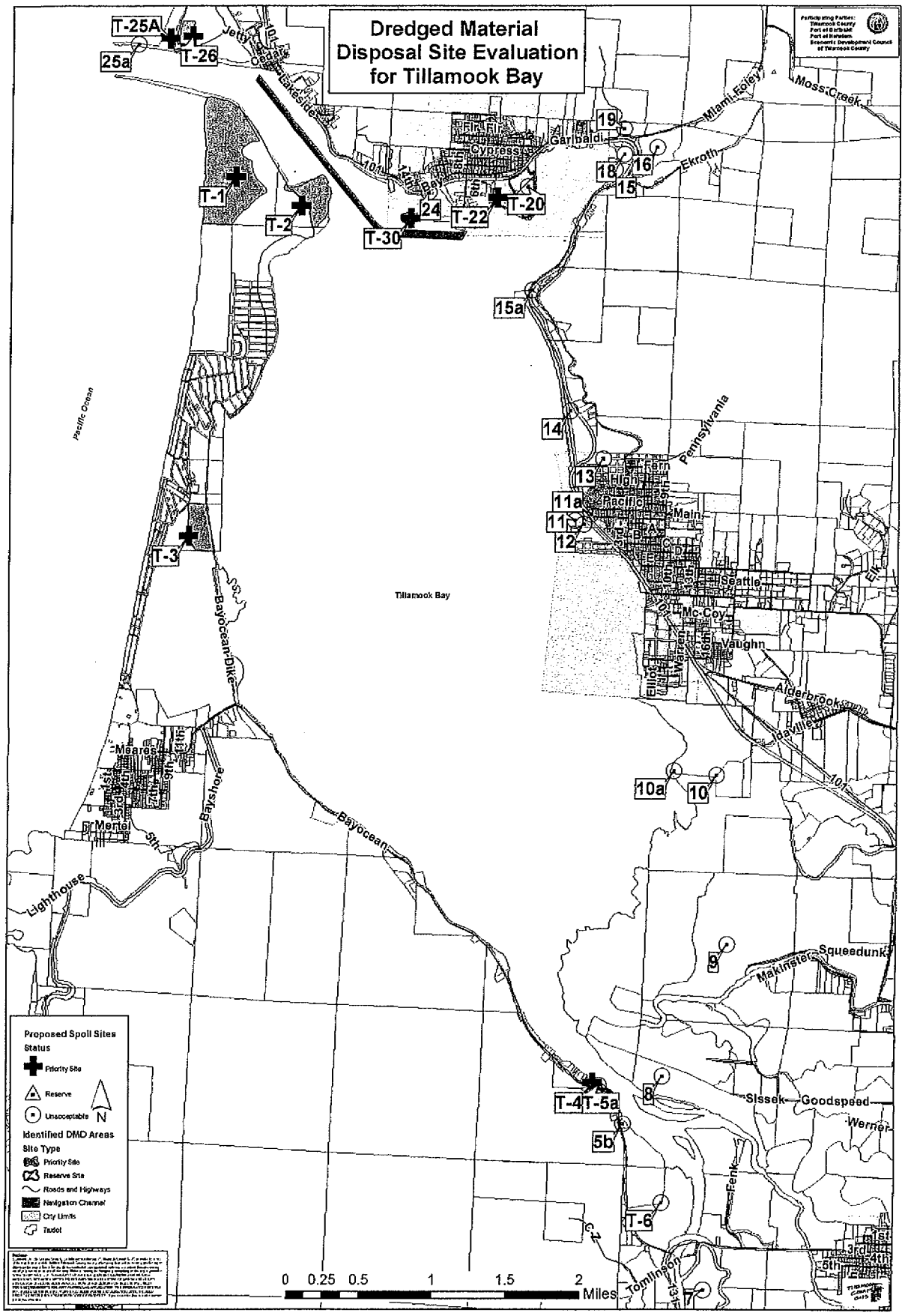
Proposed Revisions with former numbering to relate to the sites



Proposed Revisions (how map will look if adopted)



Current DMD Sites

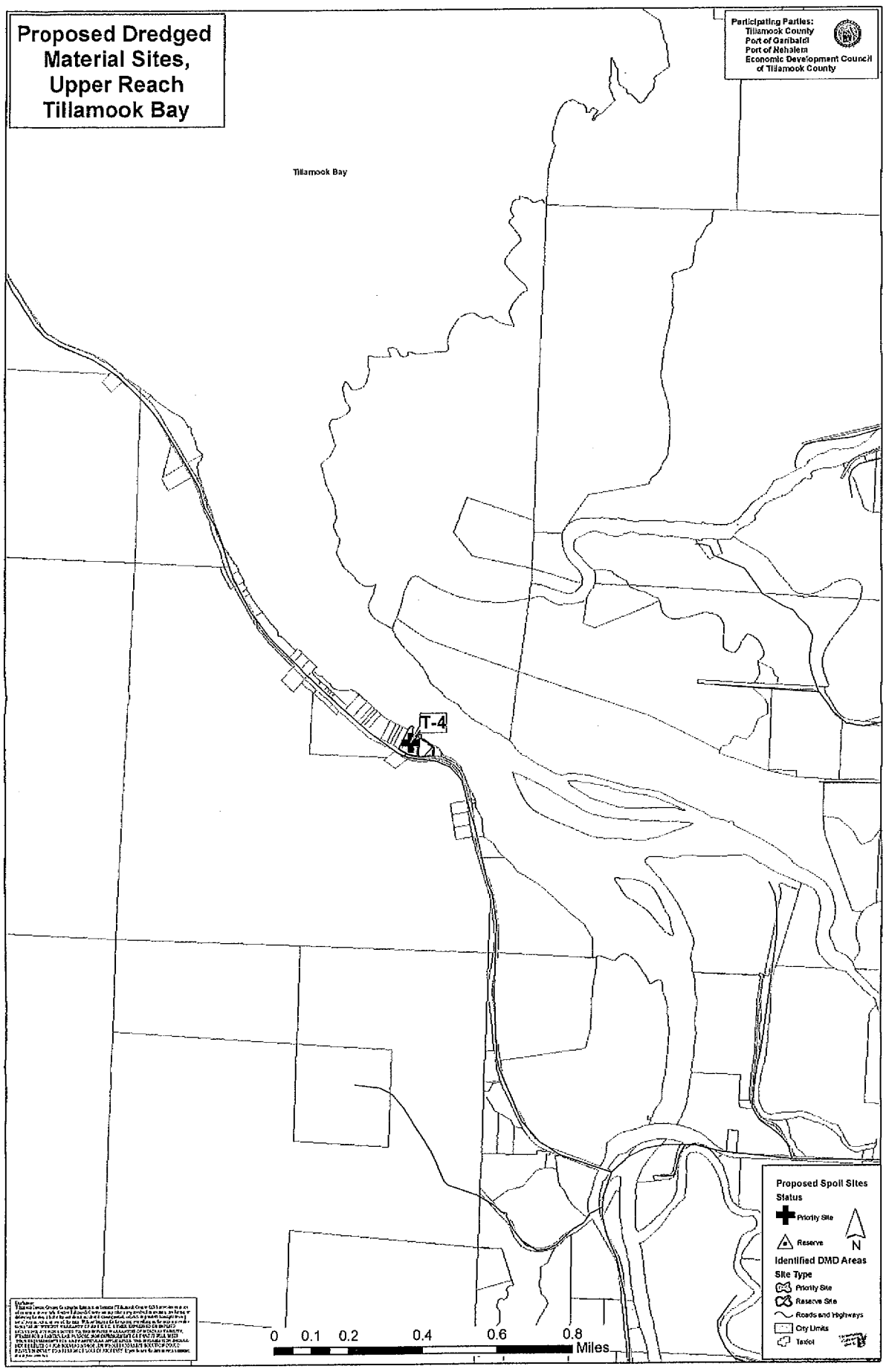


TILLAMOOK BAY MAPS

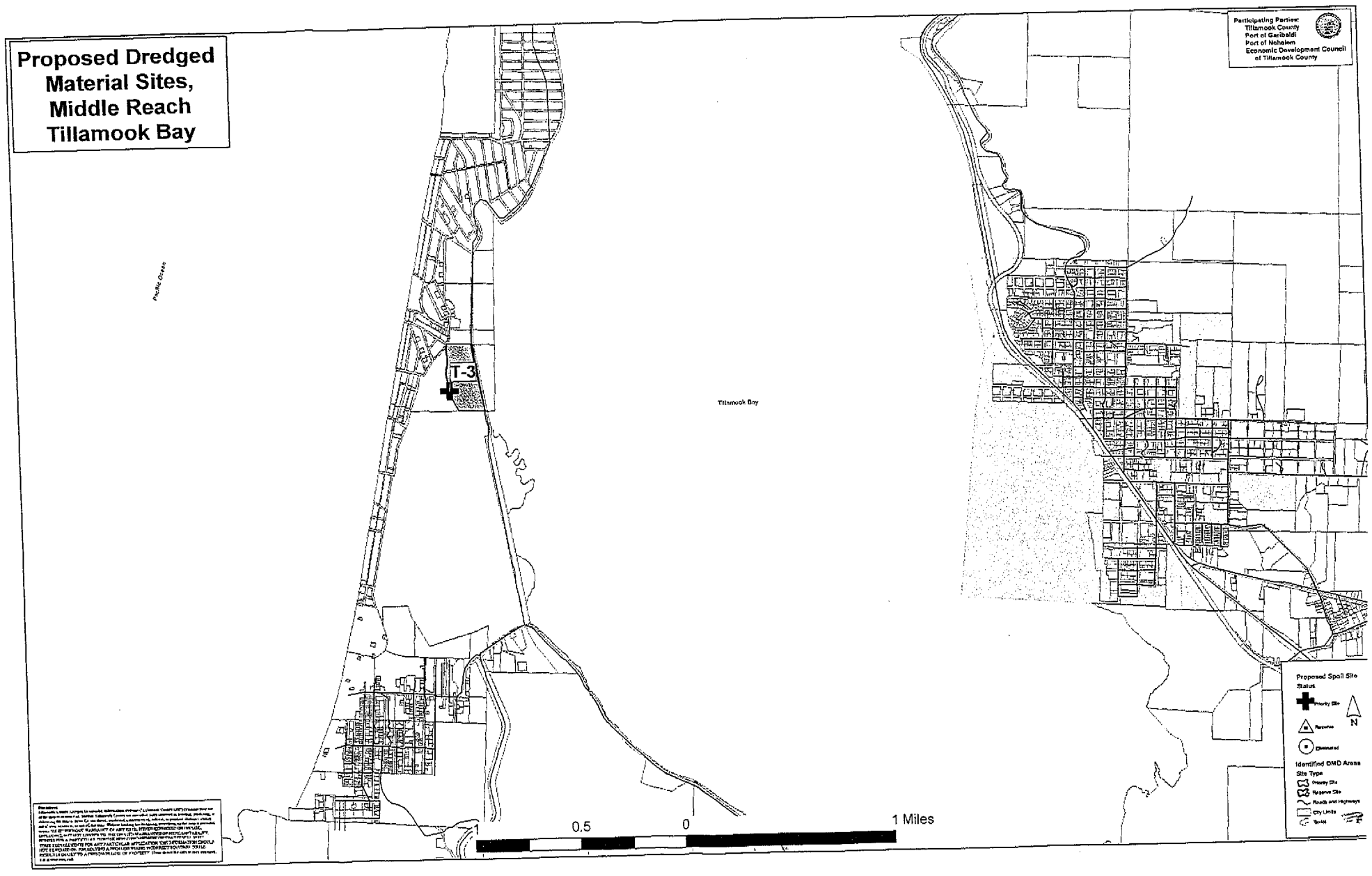
(6 total)

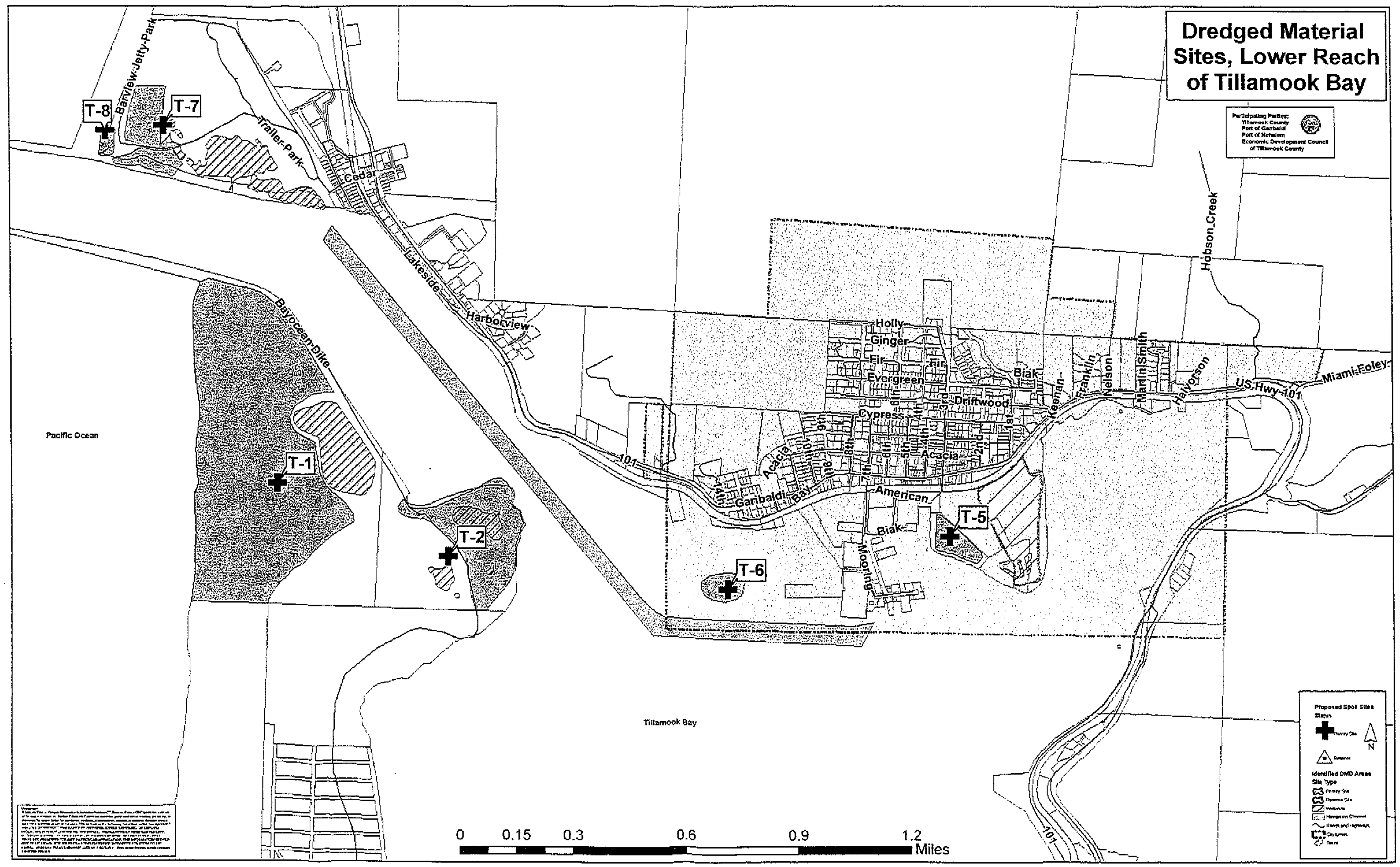
EXHIBIT III

Proposed Dredged Material Sites, Upper Reach Tillamook Bay



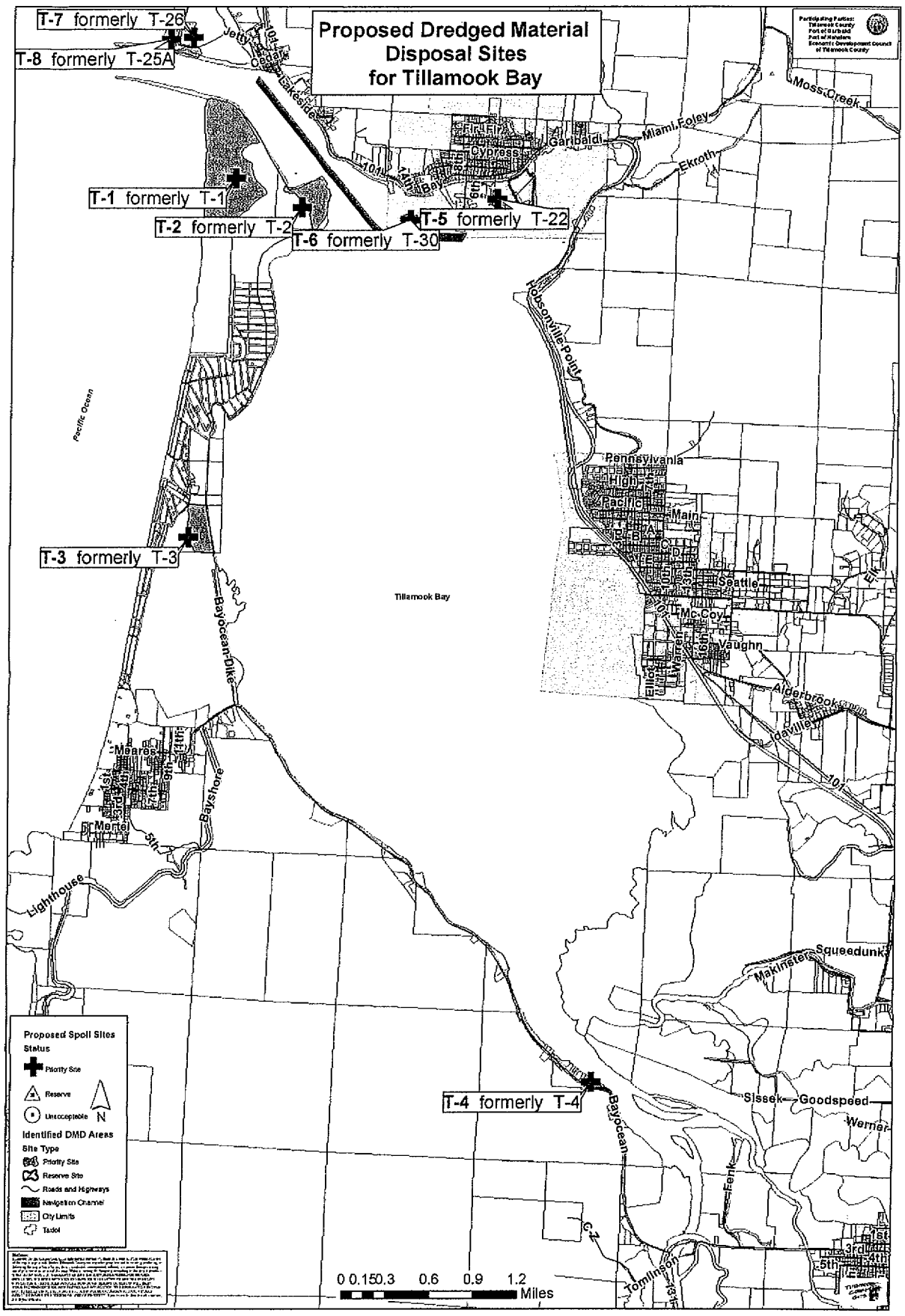
Proposed Dredged Material Sites, Middle Reach Tillamook Bay



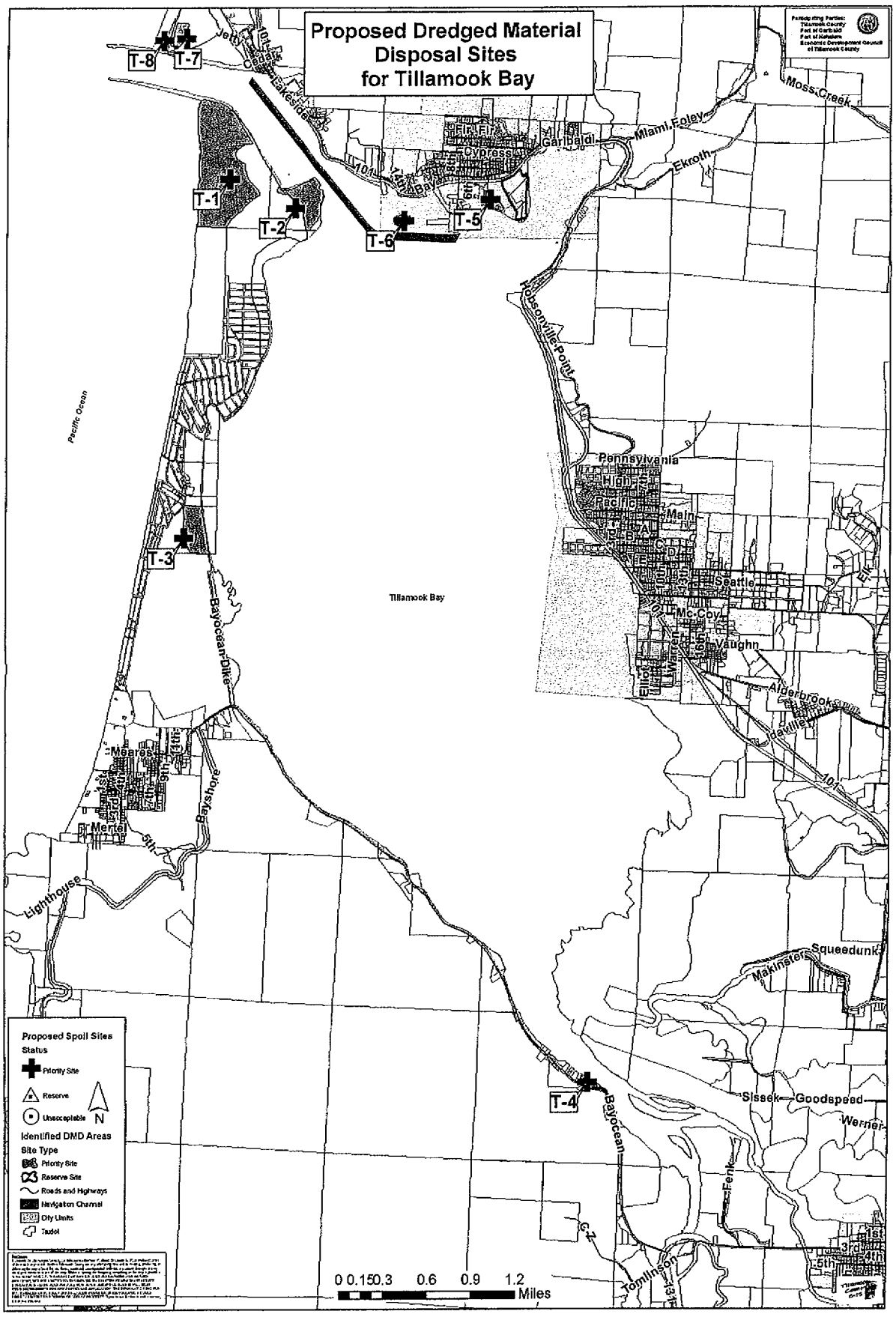


Dredged Material Sites, Lower Reach of Tillamook Bay
Participating Parties: Tillamook County, Port of Garibaldi, Port of Nehalem, Economic Development Council of Tillamook County
T-1
T-2
T-5
T-6
T-7
T-8
Pacific Ocean
Tillamook Bay
Bayocean-Dike
Barview-Jetty-Park
Trailer-Park
Cedar
Lakeside
Harborview
Hobson-Creek
US-Hwy-101
Miami-Foley
101
Holly
Ginger
Fir
Evergreen
Cypress
Driftwood
Biak
Keenan
Franklin
Nelson
Martin Smith
Halvorson
Acacia
Garibaldi
Bay
American
Mooring
14th
0 0.15 0.3 0.6 0.9 1.2 Miles

Proposed Revisions with former numbering to relate to the sites



Proposed Revisions (how map will look if adopted)



Oregon
Theodore R. Kulongoski, Governor

Department of Fish and Wildlife
North Coast Watershed District
4907 Third Street
Tillamook, OR 97141
(503) 842-2741
FAX (503) 842-8385
www.dfw.state.or.us

May 31, 2006

Lisa M. Phipps
Tillamook County Dept. of Community Development
201 Laurel Ave.
Tillamook, Oregon 97141

Ms. Phipps:

Thank you for the opportunity to review and provide comments to Ordinance Review Application #06-01, the Dredged Material Disposal Sites for Tillamook County. The Oregon Department of Fish and Wildlife (ODFW) has been involved throughout this process including field evaluations of each site. During this process some of these sites were removed or reduced in size based on the presence of sensitive habitat and/or wildlife. One site (T-1 South Jetty) has increased to 163.4 acres (see attachment A) from 110 acres (see attachment B) even after excluding wetlands within this area. ODFW approves of the sites listed within this application provided clarification on the size of site T-1 is presented, or if this area is to be increased by 53.4 acres the opportunity review the additional acreage. Again thank you for the opportunity to provide comment on this subject.

Sincerely,

Ron Rehn
Habitat Conservation Biologist, ODFW
4907 East Third Street
Phone (503) 842-2741
Fax (503) 842-8385
Email ron.f.rehn@state.or.us

Cc. Nuzum - ODFW

EXHIBIT IV

Search Results: Dredged Material Disposal Site Evaluation (1 of 3)

Date: Wed, 24 May 2006 16:26:18 -0700

From: Dale BLANTON <Dale.Blanton@state.or.us>

To: bcampbel@co.tillamook.or.us, lphipps@co.tillamook.or.us, Jane Bacchieri <Jane.Bacchieri@state.or.us>, Bob BAILEY <Bob.Bailey@state.or.us>, Laren WOOLLEY <Laren.Woolley@state.or.us>

Subject: Dredged Material Disposal Site Evaluation

Greetings All!

I appreciate the opportunity to be involved in this project. I believe the work represents a significant improvement in the overall planning for dredged material disposal in Tillamook County. The results of the project better implement the dredged material management requirements of statewide planning goals 16 (estuarine resources) and 17 (coastal shorelands). I only have minor comments at this point:

1. The document does not describe the regulatory framework for permitting by state and federal agencies that will be asked to issue permits for individual dredging projects that will make use of the designated disposal sites. There is no description of the local, state and federal permitting process or the relative roles of local, state and federal agencies. Some of this information may be contained in other planning documents, but should be added in a section that describes how the inventory relates to these regulatory authorities.

2. The socio-economic section contains a description of "Zoning & Permitting" that typically indicates "Tillamook County" as the authority for such actions. I suggest that this section be expanded to describe the state and federal authorities that will likely be involved in any approval of a dredging project making use of the prospective site. You should also describe any anticipated issues associated with applicable state and federal review authorities (State permitting authorities may include DSL, DEQ, OPRD, ODFW, depending on location of the site. Federal permitting authorities may include the Corps, NMFS, USFWS, EPA).

3. For the Tillamook Bay in water site (Site T-30), there should be clear linkage to the estuary planning and zoning requirements of Goal 16. As I have indicated before, the County needs to apply a development management unit and then apply the appropriate impact analysis and dredge and fill test standards to any dredging making use of this site. Impact assessment requirements can be applied at the site designation (planning) stage or at the time a specific project is proposed. You should note that flow lane disposal requires monitoring to assure that the activity is consistent with the resource capabilities of the area (i.e. Either the impacts of the use on estuarine species, habitats, biological productivity and water quality are not significant or that the resources of the area are able to assimilate the use and activity and their effects and continue to function in a manner to protect significant wildlife habitats, natural biological productivity, and values for scientific research and education.) and the purpose of affected natural and conservation management units. "Site Ownership" should be listed as the State of Oregon since this is submerged lands subject to a lease and other regulatory approvals from the Department of State Lands. "Zoning and Permitting" will require local approval pursuant to Goal 16, state approvals by DSL and DEQ and federal approval by the Corps (See comment 2 above).

Dale

EXHIBIT IV

Dale Blanton, AICP
Ocean/Coastal Program
635 Capitol Street NE, Suite 150
Salem, Oregon 97301-2540
(503) 373-0050 ext. 260

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Delete | Reply | Reply to All | Forward | Redirect | Blacklist | Message Source | Save as | Print

Back to Search Results

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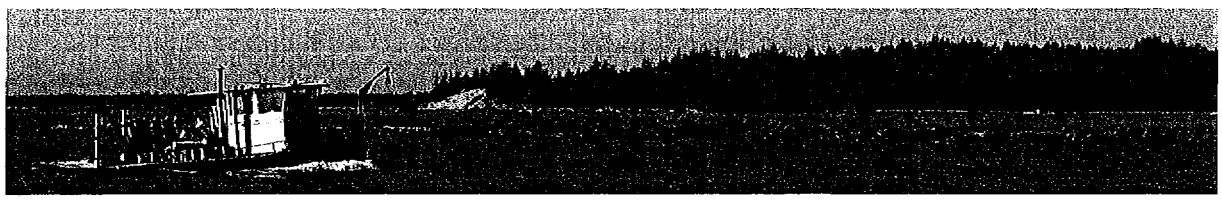

May 19, 2006

Bill Campbell Director
Department of Community Development
201 Laurel Avenue
Tillamook, Oregon 97141

The Port of Nehalem wishes to express special concerns in regard to the DMD study that was recently done on the Nehalem Estuary.

With three exceptions [(1) County Boat Ramp; (2) City/Port of Nehalem; (3) the sites by the Nehalem Bay Wastewater Agency Docks], all other approved disposal sites are in the lower regions of the bay. This effectively precludes any dredging in the upper problem areas, as the distance involved does not make it economically feasible to transport the spoils to the approved disposal sites.

We question the rejection of site 13. We believe that it has been wrongfully identified in that it was stated there is a house on it. There is not. Why was N14B eliminated? Nothing detrimental was in the evaluation. Same comment applies to Site 15B. Sites 17 and 19 are in close proximity to a lagoon on the east side of Fork Island. They are the only economically feasible sites for disposal of dredge material that has infilled this lagoon. Site 19, no detrimental comments in the evaluation report, yet it, as others, has been eliminated.

The Commissioners of the Port of Nehalem, as well as residents and neighbors of adjacent lands, have a major concern that if these sites are eliminated they will have no chance of any consideration by the agencies. The Corps' response to any permit application will be to "close the book" on an application because there is no disposal area designated. What if a perceived need arises to dredge an area not previously identified? Will these sites be determined to be off limits to permitting?

We urge Tillamook County to reevaluate the study and include these special sites.

We urge your consideration to our concerns, that they will be appreciated, and a reply will be welcome and forthcoming.

EXHIBIT V

503-368-7212 - *Fax* 503-368-7234 - portofnehalem@nehalemtel.net

Respectfully submitted,
Port of Nehalem Commissioners

Dale Stockton, President

Charles Collin, Vice-President

Don Cameron, Secretary

Ken Upshaw, Treasurer,

Deslee Kahrs, Commissioner

cc: Tim Josi, County Commissioner
Charles Hurliman, County Commissioner
Mark Labhart, County Commissioner

ds/bc

503-368-7212 - *Fax* 503-368-7234 - portofnehalem@nehalemtel.net

Old Mill Investment LLC

Post Office Box 116, Oceanside, Oregon 97134
9510 Whiskey Creek Road, Tillamook, OR 97141
TEL: 503-842-8810 FAX: 503-842-6066 E-mail rtrost@oregoncoast.com

April 7, 2006

Mr. Bill Campbell, Director of Community Development
Ms. Lisa Phipps, Coastal Resource Planner
Tillamook County
201 Laurel Avenue
Tillamook, Oregon 97141

RE: Proposed Dredged Material Disposal Site Evaluation for Tillamook and Nehalem Bays as it relates to property commonly known as the Old Mill Marina, Garibaldi, Oregon

Dear Bill and Lisa,

As you know, we are the owners of certain property commonly known as The Old Mill Marina located in Garibaldi which include:

Tax Lots 1N10 21D 00200 & 00500

I understand a portion of the above referenced property has been inventoried in the most recent draft of the proposed DMD Site Evaluation as a "reserve dredged material disposal site" or for some similar use (refer to a document entitled TILLAMOOK BAY DMD SITES, Site Identification: T20, dated September 30, 2005).

We do not want our property identified as a dredged material disposal site. All reference to said site should be removed from the inventory of resource lands in the final draft of the report.

Thank you for your cooperation. Please don't hesitate to call if you have any questions.

Very Truly Yours,

Robert F. Trost

EXHIBIT VI

April 29, 2006

To: Lisa Phipps
c/o Department of Community Development
201 Laurel Avenue
Tillamook, Oregon 97141

From: Glenn Harris

Subject: Dredge Disposal Sites:

Dear Lisa:

Thank you for the informative meeting at the Garibaldi City Hall, Thursday, April 27, discussing the dredge disposal sites.

This is a written notice to you stating that I Do Not wish to participate in the dredge material disposal site plan. Our site is next to the Memaloose county boat ramp.

Thank you,

Glenn M. Harris

EXHIBIT VI

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3.3 TILLAMOOK BAY DREDGED MATERIAL RESOURCE PLAN

3.3a Tillamook Bay Segments

When possible, land disposal sites should occur in close proximity to the dredge areas. Because of this relationship between dredge sites and disposal sites, Tillamook Bay has been divided into three segments. These segments indicate areas in which dredging is expected to occur and where the sites are located that would be suitable for disposal of those specific materials. This presentation allows dredging needs and options to be viewed in concert, and provides a mechanism for establishing which sites should be utilized and what the priorities for their use should be. Each segment is discussed separately, including a description of the past and future expected dredging requirements and an analysis of the individual sites that dredging requirement and an analysis of the individual sites that are available to meet those needs.

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BAY SEGMENT BOUNDARIES

Segment	Approximate Mile Location
1	Entrance to Mile 3
2	Mile 3 to Mile 7
3	Mile 7 to Mile 12

The discussion within each bay segment is broken into two major categories: Dredging Needs and Disposal Options. Within the Dredging Needs discussion, the geographic areas in which dredging will occur, quantities of materials to be moved, and the basic characteristics of the materials are identified.

Both public and private dredging activities are inventoried, including both maintenance of existing projects and proposed construction of new facilities. The dredging options portion of each bay segment discussion outlines the sites that are available to meet the identified needs and provides the following information relative to each site.

Description of the Site: The site description includes data on the size, location, capacity use, and physical and biological characteristics of each site.

Disposal Use of the Site: This Section includes a discussion of both the engineering and environmental considerations which provide guidelines for the use of the sites. For each site, engineering considerations concerning site *capacity, design criteria, land preparation, economic considerations and future* use potential are presented. In addition, the environmental impacts of site use are also evaluated.

A summary discussion for each river segment compares the dredging needs with the disposal options and outlines the available alternative actions.

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BAY SEGMENTS

TILLAMOOK BAY SEGMENT 1

3.3b Tillamook Bay 1

3.3b.1 Dredging Needs

EXHIBIT B

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Maintenance of Existing Projects

The federally authorized channel project generates the majority of the dredging needs in this segment. The federal project is typically divided into the entrance channel, the inner channel and the channel extension to the Old Mill Marina. The entrance channel is dredged exclusively by hopper equipment, and jetty restoration work has significantly decreased the dredged needs. The inner channel (from the Coast Guard dock to the Garibaldi Boat Basin) is usually dredged by pipeline. The channel extension to the Old Mill Marina was also dredged by pipeline.

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In addition to the federal project, two other potential projects exist in Segment 1. Dredging at the Garibaldi Boat Basin, operated by the Port of Garibaldi, is irregular at this time. The Old Mill Marina is expected to yield variable quantities depending on winter runoff patterns on the Miami River. Pipeline dredging has occurred in both these projects, and clamshell equipment has been used in the boat basin. Equipment options will be further discussed in relation to disposal operations.

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Construction of New Projects

The federal channel project is authorized at 18-foot depths to a turning basin at Miami Cove. However, the federal project is presently maintained at only 10-foot depths at the Old Mill Marina. If shipping activity was to be expanded in this area, deeper drafts may become necessary, and federal maintenance dredging may increase to 16 feet or 18 feet. If the inner channel to the Miami Cove turning basin were dredged to 16 feet, this would produce some 620,000 c.y. at construction and about 100,000 c.y./year for maintenance.

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Historically, the Port of Garibaldi planned to expand their facilities to handle larger fishing boats (See exception for Management Unit 3ED in Garibaldi Comprehensive Plan). If this action is implemented, the project could produce an estimated 33,000 c.y. at construction and 3,500 c.y./year for maintenance.

The Old Mill Marina previously planned to further expand the facilities, estimated to produce 50,000 c.y. at construction and 10,000 c.y./year for maintenance. However, the removal of the Old Mill Marina disposal site at the request of the owners from the inventory and additional environmental concerns with both the upland and adjacent estuarine areas would make any expansion challenging. The Coast Guard facility at Garibaldi is the only other identified new project. Dredging has occurred at the boat basin to maintain access and boater safety.

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3.3b.2 Disposal Options

Ocean Disposal

As has been stated, the entrance channel is dredged by hopper and is oceans disposed. The hopper equipment has not gone

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into the inner channel areas (Garibaldi, etc.) because of the lack of appropriate draft and the cost effectiveness (maneuverability in such restricted areas is time consuming). Hopper dredging may play a more significant role in channel maintenance in the future, as economics evolve and possible deeper channels are developed.

Land Disposal

Listed below are the identified Priority disposal sites.

SEGMENT 1 LAND DISPOSAL OPTIONS

Priority Site No.	Approximate Capacity
1	1,580,000 c.y. at 6' depth
2	310,000 c.y. at 6' depth
8	45,000 c.y. at 6' depth
9	8,000 c.y. per year
10	110,000 c.y. at 5' depth
11	13,000 c.y. at 5' depth
TOTAL	2,076,000 C.Y.

TOTAL CAPACITY OF ALL POTENTIAL SITES 2,076,000 c.y.

Discussions of individual sites are given in the following pages. Aerial photo illustrations are available that depict actual site locations and dimensions.

3.3b.3 Site 1 Comprehensive Plan designation – PRIORITY DMD SITE
Resource agency evaluation – PRESENTLY ACCEPTABLE

Site Description

Location:	At south jetty
Size:	163.4acres
Capacity:	1,580,000 c.y. at 6' depth
Physical Characteristics:	Sandy ocean beachfront and rolling sand dunes along the south jetty at Tillamook Bay.
Floodplain:	The site is likely within the 100-year floodplain; however it is not mapped by FEMA.
Biological Characteristics:	Open beach areas habitat of snowy plovers and variety of shorebirds. Recently stabilized areas experience limited animal use. There is currently usable space within the site that is not suitable snowy plover nesting habitat.

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Site No. . . Approximate Capacity¶
15 . . 290,000 c.y.¶
18 . . 199,000 c.y.¶
19 . . 387,000 c.y.¶
23 . . 122,000 c.y.¶
24 . . 145,000 c.y.¶
25b . . 338,000 c.y.¶
TOTAL . . 1,481,000 c.y.¶
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Deleted: Beach front and adjacent dunes. Open sand and recently established sands that are subject to high winds and storm waves.
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	Several wetlands are present within depressions between dunes but are avoidable.
Comprehensive Plan/Zoning:	R-M zone, superimposed by the SH zone
Ownership:	The site is publicly owned.
Tax Lot:	T1N, R10W, Sec. 20.
Engineering Considerations	
Method of Dredging/Filling:	Pipeline dredge.
Site Preparation:	Minimal
Design Criteria:	Containment berms will need to be constructed and revegetated to minimize dispersion. Avoid wetlands. Possibility to create snowy plover habitat. Aesthetic considerations. Material should be contoured appropriately. Outfall to ocean.
Future Use Constraints:	None
Environmental Considerations:	For beach disposal, the dredged material must be clean marine sand to avoid creating turbidity in the Pacific Ocean. Disposal should comply with existing aesthetic qualities (i.e. contouring and revegetation where appropriate). Wind stabilization required (revegetation) for lighter materials. Disposal should not jeopardize plover nesting; could be used to enhance habitat if disposal occurs just prior to breeding season.
Economic Considerations:	Minimal site use costs.
Other Considerations:	Disposal can be compatible with Unique Ecosystems classifications given proper timing and disposal care. Potential conflicts with R-M designations though mitigation and through design could be resolved through coordination with ODFW and USFW. Dredge disposal may be used in conjunction with nesting snowy plover habitat expansion, since dredge disposal material has been documented as potential nesting habitat. Dredged material disposal on this site must comply with the requirements of

Deleted: As a part of Bayocean Spit, this area has been studied as a possible Unique Wildlife Ecosystem by U.S. Fish and Wildlife. A status determination is not expected in the near future.¶

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the Tillamook County Zoning Ordinance.

PRIORITY site because of size and proximity to Tillamook Bay navigation channel.

3.3b.4 Site 2 Comprehensive Plan designation - PRIORITY DMD SITE
Resource agency evaluation PRESENTLY ACCEPTABLE

Site Description

Location:	Northern portion of Bayocean Peninsula
Size:	32.44 acres
Capacity:	310,000 c.y. at 6' depth
Physical Characteristics:	Recently stabilized dunes and beachfront; including foredunes and deflation plains. Site has been drawn to avoid wetland areas.
Floodplain:	The site is likely within the 100-year floodplain; however it is likely inundated during storms surges and flood events.
Biological Characteristics:	Some wetlands present. There are usable areas within the site that do not contain wetlands; however, the existing DMD basin is highly disturbed and may be the most feasible option for future dredge material disposal while minimizing additional disturbances to the site.
Comprehensive Plan/Zoning:	R-M zone, superimposed by SH zone.
Ownership:	The site is publicly owned.
Tax Lot:	T1N, R10, Sec. 20

Engineering Considerations

Method of Dredging/Filling:	Pipeline dredge.
Site Preparation:	Grading requirements
Design Criteria:	Outfall to existing natural channel, avoiding tideflats, or to ocean.
Future Use Constraints:	None
Environmental Considerations:	Disposal should avoid wetland areas and pine thickets, keeping within the recently stabilized dune areas and beachfront where necessary. The

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Deleted: Identified as a potential Unique Wildlife Ecosystems site. Snowy Plover, Bald Eagle, and the rare plant, Golden-eyed grass have been observed in this area.

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	dredged material must be contained to prevent the material from re-entering Tillamook Bay. Scheduling should promote Plover habitat (disposal before breeding season), and aesthetics should be retained (contouring).
Economic Considerations:	Minimal site preparation.
Other Considerations:	Site is acceptable, given that wetland areas are avoided and wildlife habitat is protected. Potential conflicts with R-M designation, though mitigation through design could occur by coordination with ODFW and USFW.
	Dredged material disposal at this site must comply with the requirements of the Tillamook County Zoning Ordinance.
	This has been designated as a PRIORITY site because of its size and proximity to the Tillamook Bay navigation channel.

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3.3b.5 Site 8 Comprehensive Plan designation – PRIORITY DMD SITE
Resource agency evaluation – PRESENTLY ACCEPTABLE

Site Description

Location:	Port of Garibaldi Rehandle Site.
Size:	5.24 acres
Capacity:	45,000 c.y. at 6' depth
Physical Characteristics:	Gently sloping open terrace previously used as an emergency DMD site.
Floodplain:	The site is mapped by FEMA within the 100-year floodplain of Tillamook Bay.
Biological Characteristics:	The site consists of a large, open, elevated area that has previously been used as an emergency DMD site. It is vegetated with a mix of weedy herbaceous species and is dominated by perennial ryegrass. Small, shallow depressions may meet wetland criteria.
Comprehensive Plan/Zoning:	WD1 superimposed by SH and FH
Ownership:	Port of Garibaldi
Tax Lot:	T1N, R10W, Sec. 21

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Engineering Considerations

Method of Dredging/Filling:	Pipeline dredge
Site Preparation:	Existing material would need to be removed prior to the next dredging episode. Material must be contained to prevent the material from re-entering Tillamook Bay and creating turbidity.
Design Criteria:	Containment berms will need to constructed from onsite materials with an outflow system required to control turbidity. The dike exterior may need to be protected from flooding or storm surges.
Future Use Constraints:	None anticipated. Material would need to be removed from the site after dredging to maintain the site's capacity.
Environmental Considerations:	The dredged material must be contained to prevent the material from re-entering Tillamook Bay.
Economic Considerations:	None anticipated the material is removed from the site after dredging. Additional costs will be related to the material rehandling and final disposal site.
Permit Considerations:	Dredged material disposal on this site must comply with the requirements of the Tillamook County Zoning Ordinance. A Tillamook County Development Permit shall be required subject to the standards of the flood hazard overlay. If disposal plan avoids wetland then a permit will not be required from the Department of State Lands and the United States Army Corps of Engineers. If wetland is not avoided, permits will likely be required.

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3.3b.6 Site 9 Comprehensive Plan designation – PRIORITY DMD SITE
Resource agency evaluation – PRESENTLY ACCEPTABLE

Site Description

Location:	In-water site near navigation channel.
Size:	N/A
Capacity:	18,000 c.y. per year of fine sediment

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presently permitted by the Port of Garibaldi

Physical Characteristics: N/A

Floodplain: N/A

Biological Characteristics: The site is an aquatic habitat consisting of estuarine water that circulates between the bay and nearshore marine waters. Coho salmon and bald eagles are currently listed as threatened species under the federal Endangered Species Act.

Comprehensive Plan/Zoning: N/A

Ownership: N/A

Engineering Considerations

Method of Dredging: Pipeline dredge.

Site Preparation: Minimal site preparation will be needed in the improvements to the existing berms and outflow structure.

Design Criteria: Dredged material would be pumped to site via pipeline and released at outfall below water surface. Dredging will occur during the established in-water work window for Tillamook Bay. Dredging will need to commence at the beginning of the ebb tide and continue until one hour before low tide.

Future Use Constraints: Development of the U.S. Coast Guard facility.

Environmental Considerations: The dredged material must be fine material that meets DMEE chemical guidelines. Timing must correspond to in-water work window for Tillamook region which begins in November and extends through February.

Economic Considerations: Minimal site preparation will be needed in the improvements to the existing berms and outflow structure.

Other Considerations:

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3.3b.7 Site 10 Comprehensive Plan designation – PRIORITY DMD SITE
Resource agency evaluation – PRESENTLY ACCEPTABLE

Site Description

Location:	North of north jetty and west of Barview Jetty Park Campgrounds
Size:	9.19 acres and 4.94 acres. Total of 14.13 acres.
Capacity:	110,000 c.y. at 5' depth for both areas.
Physical Characteristics:	Stabilized dunes.
Floodplain:	The site predominately mapped by FEMA within the 100-year floodplain of Tillamook Bay.
Biological Characteristics:	Beach grass/shrub vegetation, with some wetland areas scattered about. Wetlands are avoidable. Wildlife use light because of openness and light vegetation cover.
Comprehensive Plan/Zoning:	R-M, superimposed by SH and FH
Ownership:	The site is publicly owned.
Tax Lot:	T1N, R10W, Sec. 18,
Engineering Considerations	
Method of Dredging/Filling:	Pipeline dredge.
Site Preparation:	Some site clearing and construction of containment berms and outflow system.
Design Criteria:	Containment berms will need to be constructed from onsite materials with an outflow system required to control turbidity. Design should maintain a vegetated buffer along the beach and minimize impacts to recreational use.
Future Use Constraints:	None
Environmental Considerations:	Disposal material should be contained. Aesthetic contouring should be undertaken when disposal interferes with visual resources of park.
Economic Considerations:	May prove valuable for moving materials from stockpile sites #8.
Other Considerations:	Dredged material disposal on this site must comply with the requirements of the Tillamook County Zoning Ordinance. A Tillamook County Development Permit is required prior to disposal of

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dredged material on this site.

PRIORITY site for transfer of dredged materials from stockpile sties.

3.3b.8. Site 11. Comprehensive Plan designation – PRIORITY DMD SITE
Resource agency evaluation – PRESENTLY ACCEPTABLE

Site Description

Location: At Barview, immediately north of North Jetty

Size: 1.81 acres;

Capacity: 13,000 c.y. at 5' depth; the beach nourishment disposal capacity would be unlimited over the long term.

Physical Characteristics: Sandy ocean beachfront north of the north jetty. High erosion area where jetty degradation has allowed the erosion of the beachfront area.

Floodplain: The site is predominately mapped by FEMA within the 100-year floodplain of Tillamook Bay.

Biological Characteristics: The site consists of open beach adjacent to the rock jetty. The habitat receives significant disturbance from recreational beach access. Not suitable snowy plover habitat due to disturbance.

Comprehensive Plan/Zoning: EN, superimposed by FH

Ownership: The site is publicly owned.

Tax Lot: T1N, R10W, Sec. 18,

Engineering Considerations

Method of Dredging/Filling: Pipeline dredge.

Site Preparation: Minimal . Beach nourishment site. Filter Screen needed along jetty

Design Criteria: Site must receive clean marine sands. No containment system would be constructed.

Future Use Constraints: None

Environmental Considerations: The dredged material must be clean

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sand. Disposal activity in the wetland portion of this site would require compliance with state and federal laws, particularly:

a) a determination that the 404 (b)(1) guidelines of the Federal Water Pollution Control Act have been met;
b) findings that Goal 16 overall requirements for dredge, fill or other reduction or degradation of estuarine natural values have been met, or an exception to this Goal 16 requirement;
c) an exception to Goal 16 requirements for Natural management units;
d) mitigation for loss of estuarine habitat (unless otherwise determined by DSL).

Economic Considerations: Disposal has been approved by agencies in the area immediately behind jetty. Site 11 totals 1.81 acres, holding some 13,000 c.y. at 5' depth.

Dredged material disposal on this site must also comply with the requirements of the Tillamook County Zoning Ordinance. A Tillamook County Development Permit is required prior to disposal of dredged material on this site.

3.3b.9 Summary and Conclusions

Segment 1 is the most developed stretch of waterway in Tillamook County. The federal channel, the port boat basin, the Coast Guard boat basin, and the Old Mill Marina have the potential to generate substantial quantities of material annually. These quantities are presently expected to remain at existing levels, or possibly increase in the next 20 years. The 5-year and 20-year projection of annual dredging needs for this segment reflects the uncertainty in its future dredging needs.

The most dependable and long-lasting disposal option for this segment is ocean disposal. The site approved by the EPA in the 1980's has an unlimited capacity. Hopper dredging and inner channel materials could be disposed of at the ocean site. Costs for this method of dredging will continue to rise significantly. This method of dredging would require timing and flexibility in the dredging permits, and may require a cost evaluation of the projects before the Corps could undertake the

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additional expenses. However, ocean disposal will continue to be the best long-range option available for the lower bay. The economics should be re-evaluated annually, as costs to use upland sites become increasingly greater.

Upland disposal sites are scarce. Two were present on the port property and the Old Mill Marina property, and both were used for stockpile. However, at the property owners request the Old Mill Marina site will be removed as a result of the Dredged Material Disposal site update completed in 2006. Site #8 will continue as a stockpile site. Site 8 is to have much of its dredged materials removed each year, to allow for constant reuse in the years ahead. The local sponsors will have to remove that material: a) by commercially selling the materials, b) by depending upon sufficient voluntary removal, or c) by trucking the materials to Sites #10 or 11, or other disposal areas. Site #8 is an approved site and can be made available for disposal at short notice. Therefore, it should be kept available for future stockpiling until a dependable and more cost-effective disposal option is formalized.

Two types of material will be coming out of the inner channel, boat basin and marina areas. These are the ML soils and the SP soils. The SP soils are valuable for fill material and other commercial uses, whereas the ML (silts) are not structurally sound and are difficult to work with equipment. If possible, these soils should be kept separate to enhance the commercial value of the SP (majority) soils. Pre-dredge sampling may help to determine quantities and timing for the moving of the ML materials, so separation measures could be accomplished in the disposal cells. This may require further exploration before practical applications could be seriously considered.

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3.3c TILLAMOOK BAY SEGMENT 2

3.3c.1 Dredging Needs

Maintenance of Existing Projects

There is no channel maintenance project for this segment of the bay. The federal project ends at Miami Cove, and the navigation channel has not been used for shipping traffic for many years. There is one existing project at Bay City; the Pacific Oyster facilities.

The Pacific Oyster site has dredged irregularly in the past. It is assumed that dredging for the oyster company facilities will minimize the dredging need at the boat launch. The launch is heavily used, and poor back-up facilities give it a higher priority. The channel has been dredged by pipeline in the past. The boat launch could be clam-dredged and trucked away.

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Construction of New Projects

The Tillamook Bay Restoration Project has been presented to various agencies and local authorities as a preliminary draft study plan. This project includes the dredging of a navigation/all

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purpose channel from Garibaldi to the City of Tillamook. Within Bay Segment 2, this represents approximately four miles of channel dredging. Proposed dimensions for this channel have been taken from the Development Program for Tillamook Bay report of 1972, as the restoration project has not yet identified possible channel dimensions. The channel was proposed in the 1972 report to be 16 feet deep and 150 feet wide. Construction of such a channel would produce approximately 2 million c.y. of material. Maintenance of such a channel is expected to average about 200,000 c.y. annually at least for the first five years. While identified as a historic channel, there have been no efforts to implement this Plan since 1972.

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TILLAMOOK BAY
SEGMENT 2

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TABLE
SEGMENT 2 DREDGING NEEDS

Project	Construction	Maintenance	20-Year Total
Hays Oyster Company		1,000	20,000
Tillamook County Boat Launch		150	3,000
Bay Restoration	2,000,000	100,000	4,000,000
Total Dredging Needs	2,000,000	101,150	4,023,000

3.3c.2 Disposal Options

Ocean Disposal

Ocean disposal of materials dredged in Segment 2 could occur by hopper dredge or large pipeline. Hopper dredge is unlikely at this time because of long distances and shallow drafts. However, if the restoration channels were dredged to sufficient depth with pipeline equipment, hoppers could come in and operate within the wider areas.

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Large pipeline equipment could pump over Bayocean Spit and into the surf. This would provide for an unlimited disposal site capacity.

Land Disposal

The following are the Priority and Reserve land disposal sites found in Segment 2.

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SEGMENT 2 LAND DISPOSAL OPTIONS

Priority

Site	Approximate Capacity
3	260,000 c.y. at 6' depth
TOTAL	260,000 C.Y.

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12 . . . 5,000 c.y.¶
13 . . . 30,000 c.y.¶
15a . . . 60,000 c.y.¶
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Reserve

Site	Approximate Capacity
7B	The site requires re-characterization

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prior to an application being made to determine the suitability of the site based on physical, environmental, economic, and social constraints.

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Site . . . Approximate Capacity¶
10a . . . 1,667,000 c.y.¶
11 . . . 110,000 c.y.¶
11a . . . 30,000 c.y.¶
14 . . . 62,000 c.y.¶
TOTAL . . . 1,879,000 C.Y.¶

TOTAL CAPACITY OF ALL POTENTIAL SITES VARIABLE

Discussions of individual sites are given in the following pages. Aerial photo illustrations of the sites are available to depict actual locations and dimension.

3.3c.3 Site 3 Comprehensive Plan designation – PRIORITY DMD SITE
Resource Agency evaluation – PRESENTLY ACCEPTABLE

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Site Description

Location:	North of Bayocean Lake on Bayocean Peninsula
Size:	27.83 acres
Capacity:	260,000 c.y. at 6' depth.
Physical Characteristics:	Open sand and dunes. Road dike along entire east border.
Floodplain:	The site is mapped by FEMA within the 100-year floodplain of Tillamook Bay. A Development Permit application would be required prior to placement of materials.
Biological Characteristics:	Beachgrass and shrub mixture. No onsite wetlands. Two small depressions were observed. Western snowy plover may be present north of the site.
Comprehensive Plan/Zoning:	R-M, superimposed by SH
Ownership:	The site is publicly owned.
Tax Lot:	T1N, R10W, Sec. 31, T1S, R10W, Sec. 6

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Deleted: Some wetland areas in south portion near Biggs Cove/Cape Meares Lake. Area has been under consideration as a Unique Wildlife Ecosystem by U.S. Fish and Wildlife, though future status is not known.

Engineering Considerations

Method of Dredging/Filling:	Pipeline dredge
Site Preparation:	Minimal site preparation will be needed in the form of containment berms from native materials and an outflow system.
Design Criteria:	The disposal design should avoid impacts to the existing trails. Containment berms will need to be constructed from onsite materials.

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Revegetation would be required following disposal.

Future Use Constraints: None

Environmental Considerations: The dredged material must be contained to prevent the material from re-entering Tillamook Bay.

Economic Considerations: Site may play a key role in bay restoration dredging, as it is the only large size disposal site in "mid-bay" area. Minimal site development costs.

Other Considerations: The beach areas can be used for beach nourishment purposes, especially those areas west of Cape Meares Lake. Beach enhancement looks particularly promising where the ocean has eroded away much of the dune area between the surf and Cape Meares Lake.

Dredged material disposal on this site must comply with the requirements of the Tillamook County Zoning Ordinance.

3.3c.4 Site 7B Comprehensive Plan designation – RESERVE DMD SITE
Resource Agency evaluation – UNKNOWN

Site Description

Location: South of Bay City at Goose Point – Kilchis Point

The site requires re-characterization prior to an application being made to determine the suitability of the site based on physical, environmental, economic, and social constraints.

3.3c.4 SUMMARY AND CONCLUSIONS

Segment 2 has minimal existing disposal needs.

A future Bay Restoration project would require substantial quantities of dredging in the middle portions of Tillamook Bay, where disposal options are few. One disposal site was identified along the east shoreline.

Disposal of dredged materials into the middle-bay area (or comparable places) for the development of islands, saltmarshes, wildlife habitat, etc., was not deemed feasible at this time. State and federal laws appear to be adverse to such activities, because of the long-range negative impact potentials. Hydraulic and floodplain problems arise from such activities as well, further decreasing the practicality of exploring that option. No agency involved in this planning effort supported the middle-bay disposal of dredged materials. The environmental impacts caused by middle-bay disposal are considered to be substantial at this time.

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3.3d TILLAMOOK BAY SEGMENT 3

3.3d.1 Dredging Needs

Maintenance of Existing Projects

Three identified projects exist in Segment 3 that might require dredging. The Tillamook County Boat Ramp, located at Memaloose Point (at the mouth of Tillamook River) requires infrequent dredging for recreational use of the site. Dredging in 1986 removed 3,000 c.y., otherwise the estimated need is 200 – 400 c.y. per year. The boat ramp at Carnahan Park on the Trask River and the marine park at Hoquarton Slough require infrequent dredging.

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Construction of New Projects

The Bay Restoration project proposes to restore the channels of the bay and upper bay reaches to previous (historical) dimensions. Actual channel configurations are not presently known, but this paper will discuss a 16-foot deep by 150-foot wide channel through the upper bay to the Burton Bridge on the Tillamook River. Smaller channels would be restored in the Wilson River (8 feet deep by 100 feet wide), Hoquarton Slough (6 feet deep by 80 feet wide), Kilchis River (6 feet deep by 80 feet wide), and other minor channels in the south bay (Murray Report, 1972). Estimates for dredging these channel improvements are approximately 5,000,000 c.y./year for the first several years, then decreased somewhat over the long term. (Note: These channels are not presently consistent with the Comprehensive Plan designations for the upper bay areas). While the Bay Restoration project identified in the 1970's, there have been no efforts to implement the plan.

Dredging maintenance estimates do not imply that dredging will be required every year. The figure is used as an estimate for the annual or periodic amount of sediment accumulation occurring in the dredging location.

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3.3d.2 Disposal Options

Ocean Disposal

Disposal in the authorized ocean disposal site becomes increasingly impracticable, because of costs and time requirements the further the dredging is from the bay mouth. Segment 3 dredged materials would be very costly to dispose in the ocean, and hopper dredges could not come into the upper bay segment until substantial dredging was undertaken to permit sufficient draft depths.

However, ocean disposal by large pipeline to the beach front should not be omitted from consideration. As discussed in Segment 2, large pipeline equipment could pump over the Bayocean Peninsula to dispose in the surf zone. Areas such as

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Cape Meares Lake could benefit from a replenishment of beach sands. However, not all materials that would be found in the upper bay area, particularly in the sloughs, would be compatible with beachfront materials. Beachfront disposal should be limited to clean sands.

Land Disposal

The following sites have been identified as Priority and Reserve sites.

SEGMENT 3 LAND DISPOSAL OPTIONS

Priority

Site No.	Approximate Capacity
4	4,000 c.y. at 6' depth

Reserve

Site No.	Approximate Capacity
5B	Unknown
6B	Unknown

TOTAL CAPACITY ALL POTENTIAL SITES VARIABLE c.y.

Each site is individually described in the following pages. Aerial photo illustrations are available to depict site locations and dimensions.

TILLAMOOK BAY SEGMENT 3

3.3d.3 Site 4 Comprehensive Plan designation – PRIORITY DMD SITE
Resource Agency evaluation -

Site Description

Location:	Immediately west of the Tillamook County Boat Launch at Memaloose Point, near the mouth of Tillamook River.
Size:	1.59 acres
Capacity:	4,000 c.y. at 6' depth in the existing disposal site. In addition, the site can also use the parking lot for the temporary handling of material.
Physical Characteristics:	Tideflat area bordered by road berm to south and boat launch berm to east. Floodplain extends throughout site.
Floodplain:	The site is mapped by FEMA within the 100-year floodplain of the Tillamook River

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Biological Characteristics:	Tideflat and marsh mixture. Benthic communities and shorebird use.
Comprehensive Plan/Zoning:	EN, superimposed by FH
Ownership:	Tillamook County.
Tax Lot:	T1S, R10W, Sec. 22 DA 100 (County)

Engineering Considerations

Method of Dredging/Filling:	Clamshell dredge.
Site Preparation:	No special requirements.
Design Criteria:	Outfall to main channel. Cells may be necessary to ensure proper de-watering.
Future Use Constraints:	Possible structural limitations may exist because of existing soils (tideflats).
Environmental considerations:	Disposal activity on this site would require compliance with state and federal laws, particularly:

a) a determination that the 404 (b)(1) guidelines of the Federal Water Pollution Control Act have been met;
b) findings that Goal 16 overall requirements for dredge, fill or other reduction or degradation of estuarine natural values have been met, or an exception to this Goal 16 requirement;
c) an exception to Goal 16 requirements for Natural management units;
d) mitigation for loss of estuarine habitat (unless otherwise determined by DSL).

Economic Considerations:	Once filled, the disposal site could provide for additional parking/back-up space or developable land.
Other Considerations:	Site should be reviewed as a fill project, with dredge disposal use potential.

3.3d.4 Site 5B Comprehensive Plan designation – RESERVE DMD SITE
Resource Agency evaluation - UNKNOWN

Site Description

Location:	Northwest of Tillamook-Cape MEares Bridge Crossing the Tillamook River.

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The site requires re-characterization prior to an application being made to determine the suitability of the site based on physical, environmental, economic, and social constraints.

3.3d.5 Site 6B Comprehensive Plan designation – RESERVE DMD SITE
Resource Agency evaluation - UNKNOWN

Site Description

Location: South of Tillamook-Cape Meares Bridge on the east side of the Tillamook River.

The site requires re-characterization prior to an application being made to determine the suitability of the site based on physical, environmental, economic, and social constraints.

3.3d.6 Summary and Conclusions

Segment 3 has minimal dredge disposal needs at this time. The County boat ramp at Memaloose Point is the only identified existing project, requiring very small quantities of dredging irregularly. Disposal is best suited in Site #4, using clamshell equipment and loading onto trucks to be taken to upland sites. It is most practical as a short-term disposal site and should not be considered as a long-range option. If Site #4 were not preserved for stockpiling (committed to some other use), the County parking lot could be used, though this may not be a preferred option.

Other local lands could be considered as well, if large pipeline equipment is used requiring large disposal sites. The use of these sites, as determined during the course of this study, will depend on:

1) Proof of no practical alternatives if site includes estuarine areas or wetlands.

2) Mitigation if disposal occurs in estuarine areas.

3) Floodplain analysis to identify potential impacts and mitigation measures to minimize any floodplain impacts.

4) Provisions for rehabilitation of farmlands for all those sites that are planned for future agricultural use.

5) Exceptions to Goal 3, if the lands are not returned to agricultural uses.

6) Exceptions to Goal 16 requirements, if dredged material disposal in an estuarine area is not consistent with Goal 16 overall requirements for dredge, fill or other reduction or degradation of estuarine natural values, or if dredged material disposal involves areas which Goal 16 require to be included within a natural or Conservation management units.

Large pipeline equipment could reach portions of Bayocean Spit,

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including Site #3. Beach nourishment could occur, particularly in the area of Cape Meares Lake where the shoreline is threatened by ocean wave-action. Booster pumps may be required to reach these areas. Dredged materials would have to be consistent with beach-front materials when disposing in beach areas.

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NEHALEM BAY

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BAY SEGMENTS

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3.4 NEHALEM BAY DREDGED MATERIAL DISPOSAL PLAN

3.4a Nehalem Bay Segments

Equipment Options

Nehalem Bay has seen relatively little dredging in its history. The only federally authorized project for the bay is the jetties at the mouth. The Corps did some entrance bar dredging in 1933, but otherwise no federal work has been done for navigation. Maintenance work on the navigation channel has never been formalized. When fishing helped to maintain appropriate navigation depths, as did the large boats that historically used the waterway (by the scouring of their propellers). Sled dredging informally occurred through the 1950's, by dragging a metal plate behind a tug to knock the tops off of the shoals. The Port of Nehalem up until the mid 1970's cleaned the channels of snags and debris, until the cost became prohibitive.

The Nehalem, however, has naturally maintained navigation depths (10 foot plus) for the majority of its length to North Fork. Today there is only one significant shoal that impedes navigation (unfortunately, these shoals have practically eliminated boat traffic at low tide except for the smallest of craft). If channel dredging is to occur, two main shoals are expected to require all of the dredging. These shoals would most likely be dredged by pipeline, as fairly large volumes would have to be moved and clamshell/bucket equipment would prove too costly.

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All other dredging in Nehalem Bay is for small private projects, requiring clamshell or bucket equipment. One proposed new project in the Wheeler area would probably require pipeline equipment because of the large volume estimated to be moved.

NEHALEM BAY SEGMENTS

Nehalem Bay has been divided into three segments. These segments indicate areas in which dredging will need to occur, and where the sites are located that would be suitable for disposal of those specific materials. This presentation allows dredging needs and options to be viewed in comparison, and provides a mechanism for establishing which sites should be used. Each segment is discussed separately, including a description of the past and future expected dredging requirements and an analysis of the individual sites that are available to meet those needs.

Bay Segment Boundaries

Segment	Approximate Mile Location

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1 Entrance to Bay Mile 2.75
2 Bay Mile 2.75 (downriver) to River Mile 0.35 (downriver)
3 River Mile 0.35 (upriver) to River Mile 2.80 (upriver)

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The discussion within each bay segment is broken into two major categories: Dredging Needs and Disposal Options. Within the Dredging Needs discussion the geographic areas in which dredging will occur and the quantities of materials to be moved are identified.

Both public and private dredging activities are inventoried including both maintenance of existing projects and proposed construction of new facilities. The dredging options portion of each bay segment discussion outlines the sites that are available to meet the identified needs, and provides the following information relative to each site:

Description of Site: The site description includes data on the size, location, tax lot, capacity, floodplain, and physical and biological characteristics of each site.

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Disposal use of the Site: This section includes a discussion of the engineering, economic and environmental considerations which provide guidelines for the use of the sites. Engineering considerations include site capacity, design criteria, land preparation, cost and future use potential. Environmental and economic considerations are discussed in terms of projected impacts or relative importance to future projects or uses.

A summary discussion for each river segment compares the dredging needs which the options and outlines the available alternative actions.

3.4b Nehalem Bay Segment 1

3.4b.1 Dredging Needs

Maintenance of Existing Projects

One maintenance requirement has been identified in Segment 1, that being the Brighton Moorage. Though not regularly maintained, the moorage has lost use of portions of its facilities because of shoaling. An estimated 2,600 c.y. would be removed to attain adequate depths for future use. The Jetty Fisheries Marina and the Nehalem Bay State Park boat ramp are the only other existing facilities in this segment, and both areas experience sufficient natural scouring.

Construction of New Projects

The rehabilitation of the jetties may require some dredging for construction access; this could total up to an unknown amount of material coming from the entrance bar and staging areas.

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If a channel maintenance program were initiated, the only potential requirement for dredging would be at the entrance bar. However, the entrance bar is expected to self-scour after jetty rehabilitation.

TABLE
SEGMENT 1 DREDGING NEEDS

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Project	Construction	Maintenance	20-Year Total
Brighton Moorage		2,600	8,000
Total Dredging Needs			8,000 c.y.

3.4b.2 Disposal Options

If a channel were to be maintained in Nehalem Bay, ocean disposal may become an option. The materials to be dredged would be acceptable for ocean disposal given the existing federal (EPA) standards. However, equipment problems may put greater limitations on ocean disposal than an actual site location. There is not a hopper dredge available on the west coast that could work the entrance channel given the existing, or rehabilitated, jetty alignment.

Land Disposal

Land disposal sites that have been identified in Segment 1 are listed below:

SEGMENT 1 LAND DISPOSAL OPTIONS

Priority Site No.	Approximate Capacity
1	75,000 c.y. at 5' depth
2	50,000 c.y. at 5' depth
3	18,000 c.y. at 3' depth
12	1,240,000 c.y. at 6' depth
13	80,000 c.y. at 6' depth
14	140,000 c.y. at 5' depth
TOTAL	1, 603,000 c.y.

TOTAL CAPACITY ALL PRIORITY SITES 1,603,000 c.y.

Following are discussions about each potential disposal site. Aerial photo illustrations are available to depict site locations and dimensions.

3.4b.3. Site 1 Comprehensive Plan designation – PRIORITY DMD SITE
Resource Agency evaluation – PRESENTLY ACCEPTABLE

Site Description

Location:	At south jetty, ocean beachfront.
Size:	9.92 acres
Capacity:	75,000 c.y. at 5' depth. The beach nourishment disposal capacity would be unlimited over the long term.
Physical Characteristics:	Ocean beachfront, subject to waves and wind erosion.
Floodplain:	The site is mapped by FEMA within the 100-year floodplain of Nehalem Bay.

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3 . . . 95,000 c.y.¶
TOTAL . . . 95,000 c.y.¶
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Resource Agency evaluation -- PRESENTLY ACCEPTABLE¶
¶
Site Description¶
¶
Location: . At south jetty, ocean beachfront.¶
¶
Size: . 27.5 acres¶
¶
Capacity: . 225,000 c.y. at 5' depth¶
¶
Physical Characteristics: . Ocean beachfront, subject to waves and wind erosion.¶
¶
Biological Characteristics: . Open sand with no vegetation cover. Limited habitat use, except for shorebird feeding.¶
¶
Comprehensive Plan/Zoning: . R-M, superimposed by SH and FH¶
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Biological Characteristics:	Open sand with no vegetation cover. Limited habitat use. Not suitable for western snowy plover due to the level of human presence and disturbance.
Comprehensive Plan/Zoning:	R-M, superimposed by SH and FH
Ownership:	Public
Tax Lot:	

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Engineering Considerations

Method of Dredging/Filling:	Pipeline or clamshell dredge
Site Preparation:	None required.
Design Criteria:	Beach nourishment must receive clean marine sands.
Future Use Constraints:	None
Environmental Considerations:	Disposal on site would cause nominal impact. Material must be marine sands, blending well with the existing materials.
Economic Considerations:	Use of site may be helpful in protecting the existing development of Nedonna Beach. Minimal site preparation costs.
Other Considerations:	Site would only be used in relation to jetty work or possible bar dredging, and done by clamshell or pipeline. Such disposal would probably be minimal over a 20-year period.

Deleted: No special requirements unless sediment transport analysis identifies necessary actions.

Dredged material disposal on this site must comply with the requirements of the Tillamook County Zoning Ordinance. A Tillamook County Development Permit is required prior to dredged material disposal on this site.

PRIORITY site for possible use during jetty rehabilitation work.

3.4b.4 Site 2 Comprehensive Plan designation – PRIORITY DMD SITE
Resource Agency evaluation – PRESENTLY ACCEPTABLE

Site Description

Location:	Immediately north of Nedonna Beach residential area.
Site:	6.81 acres

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Capacity:	50,000 c.y. at 5' depth.
Physical Characteristics:	Recently stabilized sand dunes.
Floodplain:	The site is mapped by FEMA within the 100-year floodplain of Nehalem Bay.
Biological Characteristics:	Beachgrass and shorepine vegetation growing on dunes. Wildlife limited to various upland birds and small mammals. No special concentration of flora or fauna.
Comprehensive Plan/Zoning:	RM, superimposed by SH and FH for Tillamook County. City of Rockaway - R-1 and A-1.
Ownership:	Private
Tax Lot:	T2N, R10W, Sec. 17, T.L. 100
Engineering Considerations	
Method of Dredging/Filling:	Pipeline dredge.
Site Preparation:	Land clearing and grading. Pipeline disposal would require adequate berming to protect drainage through middle of site.
Design Criteria:	The dike exterior must be protected from flooding and storm surges. Drift logs would be stored and replaced after dredging.
Future Use Constraints:	None
Environmental Considerations:	Use of site would temporarily eliminate pine/beachgrass vegetation, thus displacing small number of wildlife Dredged material must be contained to prevent the material from re-entering Nehalem Bay or the Pacific Ocean creating turbidity.
Economic Considerations:	A good site for disposal of locally dredged materials. Minimal site preparation costs.
Other Considerations:	Use of site would probably only occur for jetty project work, as other dredging requirements are minimal in area. If pipeline were proposed for use associated with this site, and involved large quantities at one time, further study should be done to determine

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Deleted: Some aesthetic impacts to local residents. Revegetation required, and wildlife should return in 4-6 years. Possible impact to groundwater resources that is presently being developed by City of Rockaway. However, if disposal is by clamshell or bucket (as is expected) then impact should be minimal given proper precautions.

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possible impacts to aquifer.

Dredged material disposal on the portion of this site within Tillamook County must comply with the requirements of the Tillamook County Zoning Ordinance. A Tillamook County Development Permit is required prior to disposal of dredged materials on this site. Dredged material disposal on the portion of this site within the city of Rockaway must be in compliance with the requirements of the Rockaway Zoning Ordinance.

PRIORITY site for possible use during jetty rehabilitation work.

3.4b.5 Site 3 Comprehensive Plan designation – PRIORITY DMD SITE
Resource Agency evaluation – PRESENTLY ACCEPTABLE

Site Description

Location:	Immediately north of Brighton Marina
Size:	4.17 acres
Capacity:	18,000 c.y. at 3' depth.
Physical Characteristics:	Upland site. Old fill area used for open storage. Occasional wave erosion at banks during high flows.
Floodplain:	The site is mapped by FEMA within the 100-year floodplain of Nehalem Bay.
Biological Characteristics:	None
Comprehensive Plan/Zoning:	WDD, superimposed by SH and FH
Ownership:	Private
Tax Lot:	T2N, R10W, Sec. 9 T.L. 4300, 4400

Engineering Considerations

Method of Dredging/Filling:	Pipeline or clamshell dredge.
Site Preparation:	Pipeline dredging would require containment berms and outflow system.
Design Criteria:	Exterior of dikes must be protected from flooding/storm surges.
Future Use Constraints:	None

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Resource Agency evaluation – PRESENTLY UNACCEPTABLE¶
¶
Site Description¶
¶
Location: . South of Jetty Fishery, at confluence of Jetty Creek and Nehalem River.¶
¶
Size: . 14.7 acres¶
¶
Capacity: . 95,000 c.y. at 4' depth.¶
¶
Physical Characteristics: . Sand substrate, tidally influenced area with two freshwater creeks entering from east. Existing jetty allows high water flushing area (bay overtopping of jetty).¶
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Biological Characteristics: . Intertidal area with shorebird and fishery use. Small marshes beginning to develop in area. More saltmarsh is expected to develop.¶
¶
Comprehensive Plan/Zoning: . EC-1, superimposed by FH¶
¶
Ownership: . T2N, R10W, 17 T.L. 100, 102.¶
¶
Engineering Considerations¶
¶
Method of Dredging/Filling: . Pipeline; clamshell dredge offloading from barge, or truck dumped.¶
¶
Site Preparation: . Design diking to avoid filling of two major drainage ways. Protect diking along drainage way with riprap slope protection.¶
¶
Design Criteria: . Filter blanket ... [66]

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Environmental Considerations:	Disposal materials must be properly contained and protected from soughing into water area. Site received fill from a landslide in 1999. Portions of the previously filled are marginally meet wetland criteria. May or may not be regulated as jurisdictional wetlands. This would need to be resolved through formal wetland delineation and jurisdictional determinations from the regulatory agencies.
Economic Considerations:	Good stockpile site for local dredging requirements, but such use will limit development potential of site.
Other Considerations:	Dredged material disposal on this site must comply with the requirements of the Tillamook County zoning ordinance. A Tillamook County Development Permit is required prior to dredged material disposal on this site.

3.4b.6 Site 12 Comprehensive Plan designation – PRIORITY DMD SITE
Resource Agency evaluation – PRESENTLY ACCEPTABLE

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Site Description

Location:	Nehalem Bay State Park, south of the Nehalem State Park lower parking lot.
Size:	128.48 acres
Capacity:	1,240,000 at a 6' depth
Physical Characteristics:	Open dune with some level areas.
Floodplain:	The site is predominately mapped by FEMA with the 100-year floodplain.
Biological Characteristics:	Predominantly beachgrass and scotch broom, with some shorepine. Low intensity bird and small mammal use.
Comprehensive Plan/Zoning:	R-M, superimposed by SH
Ownership:	State of Oregon
Tax Lot:	T2N, R10W, Sec. 5, 8

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Engineering Considerations

Method of Dredging/Filling:	Pipeline dredging

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Site Preparation: Minor land leveling with containment berms and outflow system.

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Design Criteria: Design to be coordinated with State Parks and Recreation Department. Revegetation to avoid impacts to existing trails. Revegetation would be required after disposal use to minimize dispersion of material.

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Environmental Considerations: Dredged material must be contained to prevent the material from re-entering Nehalem Bay. Disposal use will temporarily eliminate vegetation, thus displacing resident birds and mammals. After revegetation (3-6 years), wildlife will return to site. Possible aesthetic impacts to park users, but it would be temporary and could be mitigated by design. The disposal site plan would need to avoid on site wetlands, if possible, or provide mitigation. The disposal site would provide 50-foot setback from the bay and the disposal design will avoid the removal the trees to the maximum extent possible.

Economic Considerations: This site can be reached by pipeline equipment from the Fishery Point Shoal. Presently this is the closest acceptable site to the Fishery Point Shoal, and could handle over half of the materials expected to come from construction dredging of that shoal.

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Other Considerations: This site has been designed to minimize the potential impacts to the state park (for recreation).

Deleted: This site has been scaled down from its original size, because of potential use conflicts within the state park.

Deleted: Future use of this site should be considered during the state park master planning effort, and shall be subject to the approval of the Oregon Department of Transportation.

3.4b.7 Site 13 Comprehensive Plan designation - PRIORITY DMD SITE
Resource Agency evaluation - PRESENTLY ACCEPTABLE

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Site Description

Location: Nehalem Bay State Park, south end of Nehalem Spit

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Size: 8.84 acres

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Capacity: 80,000 c.y. at 6' depth

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Physical Characteristics: Predominantly undeveloped sand dunes.

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Floodplain: The site predominately mapped by

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	FEMA within the 100-year floodplain.
Biological Characteristics:	Vegetation comprised of beachgrass, scotch broom and shorepine. Wildlife use low intensity, mostly small birds and some mammals. A wetland is present onsite. Beach along the eastern side of the site is regularly used by pinnipeds as a haul-out area.
Comprehensive Plan/Zoning:	R-M, superimposed by SH and FH
Ownership:	State of Oregon
Tax Lot:	T2N, R10W, Sec. 8 17
Engineering Considerations	
Method of Dredging/Filling:	Pipeline dredge.
Site Preparation:	Minimal with containment berm construction accomplished with local materials.
Design Criteria:	The dredging needs to be coordinated with Oregon Parks and Recreation Department. The disposal site must be designed to provide a minimum 300-foot setback from the pinniped area and not impact the existing trails. Revegetation would be required following disposal. The disposal site would provide a 50-foot setback to the bay. In addition, the disposal site boundaries are restricted to the area within the existing treelines along the bay and the trail. Tree areas should be protected from disposal impacts. Wetland is avoidable and should be avoided.
Future Use Constraints:	None
Environmental Considerations:	Temporary impact to vegetation and wildlife. Quick revegetation would minimize any impacts, and would encourage stabilization of materials.
Economic Considerations:	Except for jetty restoration work, site has no near-term uses for disposal.
Other Considerations:	This site has been designed to minimize potential impacts to park recreation use. Dredged material disposal on this site must comply with the requirements of

Deleted: Erosion problems on east side of spit; possible storm flooding.¶

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the Tillamook County zoning ordinance. A Tillamook County Development Permit is required prior to dredged material disposal on this site.

PRIORITY site because of possible use during jetty rehabilitation project.

3.4b.8 Site 14 Comprehensive Plan designation – PRIORITY DMD SITE
Resource Agency evaluation – PRESENTLY ACCEPTABLE

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Site Description

Location:	Nehalem Spit State Park, immediately north of the north jetty at the mouth of Nehalem Bay.
Size:	18.3 acres
Capacity:	140,000 c.y. at 5' depth. Beach nourishment disposal capacity would be unlimited over the long term.
Physical Characteristics:	Open beach area comprised of sands and intertidal ocean front. Subject to ocean wave action and storm surges.
Floodplain:	The site is predominately mapped by FEMA within the 100-year floodplain.
Biological Characteristics:	Western snowy plover nesting habitat present onsite. There is opportunity to create additional habitat with dredge materials. One small wetland was observed but is avoidable.
Comprehensive Plan/Zoning:	R-M. Superimposed by SH and FH
Ownership:	State of Oregon
Tax Lot:	T2N, R10W, Sec. 17

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Engineering Considerations

Method of Dredging/Filling:	Pipeline dredge.
Site Preparation:	Stockpile large woody debris for replacement when dredging is complete.
Design Criteria:	Materials must be clean marine sands, properly spread to avoid unnatural mound etc. Dredging needs to be coordinated with Oregon Parks and Recreation Department. Revegetation would be required following disposal. Containment berms would need to be

Deleted: and/or clamshell.¶
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Deleted: Sand transport must be considered to avoid migration of sands back into mouth of bay.

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constructed of native materials. The dredging site would need to be designed such that at least one existing trail to the beach is maintained at the southern end of the spit. 50-foot setback from bay. Drift logs would need to be replaced. Material disposal could occur within the defined snowy plover habitat to create additional suitable habitat for the species; agency coordination is required, and the disposal timing will avoid impacts to nesting birds.

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Future Constraints: None

Environmental Considerations: The dredged material must be contained to prevent the material from re-entering Nehalem Bay or the Pacific Ocean and creating turbidity.

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Economic Considerations: None.

Other Considerations: Site use must be coordinated with the state park planning efforts.

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Dredged material disposal on this site must comply with the requirements of the Tillamook County zoning ordinance. Tillamook County Development Permit is required prior to dredged material disposal on this site.

Deleted: RESERVE site because of possible use during jetty rehabilitation work.¶

3.4b.9. Summary and Conclusions

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Future dredging requirements will be minimal in this segment, hydraulic conditions provide for sufficient scouring to minimize shoaling. The jetty restoration project will further enhance this process.

Jetty restoration work may require dredging to gain access to the proposed staging areas by barge, requiring a maximum 150,000 c.y. to be dredged. This could be disposed in the existing approved Sites #1, #2, or #14. Dredging at Brighton Moorage can be disposed at Site #3, as it is close to the dredging area and could be used for stockpiling and later transport or commercial distribution.

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Deleted: However, the ocean disposal site presents problems with certain equipment use (hoppers could not effectively work in entrance channel) and distance (5-7 miles to ocean site).

Disposal sites on the Nehalem Spit may be well matched to dredging activity on the Fishery Point Shoal in Segment 2. No need is presently identified for these sites within Segment 1.

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3.4c Nehalem Bay Segment 2

3.4c.1 Dredging Needs

Maintenance of Existing Projects

There is one existing maintenance project in Segment 2, at Dart's Marina in Wheeler. Because of shoaling inside the marina area Dart's will require maintenance dredging of approximately 1,400 c.y.

Construction of New Projects

If a navigation channel were to be maintained in Nehalem Bay, a major shoal would require dredging in Segment 2. The Fishery Point Shoal, located at Bay Mile 3.0, extends approximately 6,000 linear feet and would require the removal of 115,560 c.y. to attain a Mean Lower Low Water (MLLW) depth of 8 feet (2 foot overdredge). From the estimates of deposition rates in this area over the past five years, it is calculated that future maintenance dredging requirements would be about 5,400 c.y./year.

Construction at Paradise Cove included the expansion of the existing marina facilities, requiring the removal of approximately 11,000 c.y. of material. The Scovell Industrial Park proposed development includes a channel north of Wheeler for commercial and recreational craft. This channel with docking areas, etc., would require the dredging of about 150,000 c.y. of material at construction. Maintenance has been estimated at approximately 1,500 c.y./year.

TABLE
SEGMENT 2 DREDGING NEEDS

Project	Construction	Maintenance	20-Year Total
Dart's Marina		250 c.y.	5,000 c.y.
Navigation Channel (Fishery Point Shoal)	115,000	5,400 c.y.	223,600 c.y.
Paradise Cove	11,000	200 c.y.	15,000 c.y.
Scovell Industrial Site	150,000	1,500 c.y.	180,000 c.y.
Total Dredging Needs			820,000 c.y.

Ocean Disposal

Ocean disposal becomes less likely as one moves further from the mouth of bay. However, if a channel was maintained in Nehalem Bay in the future, and local disposal sites were not available, ocean disposal could be an option. Presently, there is not a hopper dredge available that could navigate the entrance jetties alignment. A specific ocean disposal site would have to be authorized prior to any ocean disposal activity. Authorization would be contingent upon the study of possible sites and alternatives by the Corps of Engineers and EPA. Sediment materials found in this segment are presently acceptable for ocean disposal.

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Ocean disposal from the beach front may be a viable option for the Fishery Point dredging. Beachfront disposal of clean materials must be further explored with state parks personnel.

Land Disposal

The land disposal site, Priority, identified in Segment 2 is listed below.

SEGMENT 2
LAND DISPOSAL OPTIONS

Priority Site No.	Approximate Capacity
4	35,000 c.y. at 4' depth
TOTAL	35,000 c.y.

TOTAL CAPACITY ALL PRIORITY SITES 35,000 c.y.

Following is a discussion about the potential disposal site. Aerial photo illustrations are available that depict actual site locations and dimensions.

3.4c.3 Site 4 Comprehensive Plan designation – PRIORITY DMD SITE
Resource Agency evaluation - PRESENTLY ACCEPTABLE

Site Description

Location:	North of Dart's Marina, west of Highway 101 in north part of the City of Wheeler UGB.
Size:	6.16 acres
Capacity:	35,000 c.y. at 4' depth.
Physical Characteristics:	Open parcel with a gravel surface in locations and sparse vegetation.
Floodplain:	The site is mapped by FEMA within the 100-year floodplain of Nehalem Bay.
Biological Characteristics:	Minimal wildlife use. Vegetation sparse.
Comprehensive Plan/Zoning:	WRC and IND
Ownership:	T2N, R10W, Sec. 2(BC) T.L. 4700, 4800

Engineering Considerations

Method of Dredging/Filling:	Pipeline or clamshell dredge.
Site Preparation:	Protect slough and wetland from fill.
Design Criteria:	Containment berms will need to be

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¶
TILLAMOOK COUNTY ZONES . NEHALEM ZONES . . . .¶
C-1 . Neighborhood and Rural Commercial . C . Commercial¶
EC1 . Estuary Conservation 1 . EC1 . Estuary Conservation ¶
EC2 . Estuary Conservation 2 . FHO . Flood Hazard¶
EN . Estuary Natural . MR . Marine Residential¶
ED . Estuary Development¶
F-1 . Farm . ROCKAWAY ZONES¶
FH . Flood Hazard . R-1 . Single Family-Duplex¶ ... [67]
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constructed from on-site materials with an outflow system to control turbidity. Dredging schedule needs to avoid nearby habitat sensitivity.

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Future Use Constraints: None

Environmental Considerations: Disposal materials must not be allowed to slough into waterway. Small wetland in northeast corner should be protected from materials.

Deleted: RESERVE site for interim use as a DMD site prior to site development.¶
¶

Economic Considerations: Use of site for stockpiling will limit future development potentials of site. Site is a waterfront, developable parcel, and a limited resource in area. Disposal of dredged material on the site must comply with the requirements of the Wheeler City zoning ordinance.

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12a . Comprehensive Plan designation – UNSUITABLE¶
Resource Agency evaluation – PRESENTLY UNACCEPTABLE¶
12b . Comprehensive Plan designation – RESERVE DMD SITE¶
Resource Agency evaluation – PRESENTLY UNACCEPTABLE¶ ... [76]

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3.4c.4 Summary and Conclusion

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The only identified existing dredging project for this segment, Dart's Marina, could be disposed of at Site #4. This site is immediately adjacent to the dredging area, and is part of the owners overall marina improvement plan. State and federal agencies recommend that Site #4 be proposed as a fill project (for review purposes) and could be tied to the dredging project.

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Future navigation channel development would depend on the dredging of the Fishery Point Shoal. At construction this would produce approximately 320,000 c.y. of material, and a total of about 620,000 c.y. over the 20-year period. Site #9 could accommodate materials from the Fishery Point Shoal.

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Dredged Material Disposal Policy 9 commits Tillamook County to coordinate with the Oregon Parks and Recreation Department on future use of dredged material disposal sites within state parks.

The Paradise Cove dredging (15,000 c.y. total) could be trucked to Site #4 if the City of Wheeler and the County have an approved coordinated approach. The Scovell Industrial Park will require 150,000 c.y. dredging at construction. Former Site #12 was identified as the potential location for these materials. However, Site #12 is no longer a part of the inventory because it is part of the estuarine system. As a result, the material will have to be trucked off the site to an approved upland location.

3.4d NEHALEM BAY SEGMENT 3

3.4d.1 Dredging Needs

Maintenance of Existing Projects

There are no existing maintenance projects in this segment. Small moorages and ramps exist between River Mile 2.35 and

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the North Fork (L & L Moorage, Milburn's Moorage, county boat ramp), but all occur in natural scour areas. Historically, these areas have not required dredging, and they are not expected to have any needs in the future.

Construction of New Projects

If a navigation channel were to be maintained to the North Fork (RM 2.80), a major shoal would require dredging in this segment. The Dean Point Shoal, located at mile RM 0.40, extends some 3,830 linear feet and would require the removal of 170,000 c.y. to attain a MLLW depth of 12 feet (2 foot overdredge). ** Maintenance dredging is expected to be nominal, especially if some minor hydraulic improvements were installed (wing jetties or pile dikes in key places). These concepts should be conceptually engineered and tested to determine their expected success. The construction of the new Highway 101 Bridge will remove in-water piers, and removal of associated rock and concrete materials from the channel is expected. These actions should improve the hydraulic flows through the shoal area, thus further decreasing future dredge maintenance needs.

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The construction of the City of Nehalem docks required dredging to gain proper access in the channel area at the city waterfront. Expected dredging requirements for maintenance are 500 c.y./year for maintenance. At the mouth of North Fork Nehalem River, the Scovell facilities will require a one-time construction dredging effort, to remove about 10,000 c.y. (no maintenance will be required because of local hydraulics).

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** Note: . The Deans Point Shoal have been removed. Dredge spoils have been placed at site #14 and used as fill for the new Nehalem River Bridge approach.¶

TABLE
SEGMENT 3 DREDGING NEEDS

Project	Construction	Maintenance	20-Year Total
Nehalem City Docks		500/year	10,000
Scovell Dock	10,000		10,000
Total Dredging Needs			220,000

3.4d.2 Disposal Options

Ocean Disposal

Ocean disposal of these materials would be costly and time consuming. The potential for ocean disposal is remote at this time. The materials to be dredged, however, could be disposed (according to existing state and federal criteria).

Land Disposal

Land disposal sites identified in Segment 3 are listed below.

SEGMENT 3 LAND DISPOSAL OPTIONS

Priority		
Site No.	Approximate Capacity	
6	Temporary Rehandling	

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8	20,000 c.y. at 8' depth
9	Unknown
10	Unknown
11	Temporary Rehandling
TOTAL	20,000 c.y.

Reserve Site No.	Approximate Capacity
5B	Unknown
7B	580,000 c.y. at 8' depth

TOTAL CAPACITY ALL SITES VARIABLE

NEHALEM BAY SEGMENT 3 MAP

3.4d.3 Sites 6 Comprehensive Plan designation - PRIORITY DMD SITE
Resource Agency evaluation - PRESENTLY ACCEPTABLE

Site Description

Location:	Tillamook County boat ramp and vicinity.
Size:	1.07 acres.
Capacity:	The site is used only for the temporary rehandling of material.
Physical Characteristics:	Tillamook County boat ramp is surrounded by an asphalt parking lot. An overflow parking lot is located on the opposite side of Tideland Road.
Floodplain:	The site is likely within the floodway of the Nehalem River, which would preclude the site from permanently receiving fill.
Biological Characteristics:	None.
Comprehensive Plan/Zoning:	Tillamook County superimposed by SH and FH
Ownership:	Tillamook County
Tax Lot:	T3N, R10W, Sec. 23

Engineering Considerations

Method of Dredging/Filling:	Clamshell dredge.
Site Preparation:	Containment berms and outflow system.
Design Criteria:	Suitable for a rehandle site. The

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20 . . . . 150,000 c.y.¶
TOTAL . . . . 177,000 c.y.¶
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material must be removed following dredging to accommodate the ongoing use of the boat ramp. Rehandling and final disposal site are required for the dredged material.

Future Use Constraints: None as the dredged material is required to be removed from the site following dredging.

Environmental Considerations: The dredged material must be contained to prevent the material from re-entering the Nehalem River and creating turbidity.

Economic Considerations: Minimal site preparation will be needed. Additional costs will be related to the material rehandling and final disposal site.

Other Considerations:

Dredged material disposal on this site must comply with the requirements of the Tillamook County zoning ordinance. A Tillamook County Development Permit is required prior to dredged material disposal on this site.

PRIORITY site because of its proximity and size relative to the Dean Point Shoal.

3.4d.4 Site 8 Comprehensive Plan designation - PRIORITY DMD SITE
Resource Agency evaluation - PRESENTLY ACCEPTABLE

Site Description:

Location: Nehalem-Wheeler sewage treatment facilities.

Size: 1.75 acres;

Capacity: 20,000 c.y. at 8' depth;

Physical Characteristics: Flat, mowed lawn used by the wastewater treatment facility. The usable parcel is located between the sewage treatment facilities and Tideland Road.

Floodplain: The site is mapped by FEMA within the 100-year floodplain of the Nehalem River.

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Deleted: Restore sites' agricultural value by covering fill with topsoil.

Deleted: Without topsoil cover fill, the spoil area would have minimal agricultural value.

Deleted: Minimal impact to wildlife habitat. Possible problems with flood storage displacement. Proposed new Highway 101 bridge crossing will extend into this site. Disposal material could be utilized in fill requirements.

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¶
Site is best disposal area for Dean Point Shoal dredging because of proximity and size. Large or small pipeline could work shoal and spread materials around site. Materials would raise site, thus helping alleviate seasonal high water table.

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Biological Characteristics:	A small wetland is present within the mowed lawn area that is available for dredge material. Low wildlife use. Vegetation consists of a mix of grasses and herbaceous weeds.
Comprehensive Plan/Zoning:	F-1, superimposed by SH and FH
Ownership:	Private
Tax Lot:	T3N, R10W, Sec. 27
Engineering Considerations	
Method of Dredging/Filling:	Pipeline dredge
Site Preparation:	Construct containment berms and outflow system.
Design Criteria:	The site has received fill from past dredging episodes in a parcel located closest to the river. Pipeline access is readily available along the south boundary of the sewage treatment facilities.
Future Use Constraints:	None anticipated.
Environmental Considerations:	The small, low quality wetland may be impacted in the process.
Economic Considerations:	None
Other Considerations:	The site is owned by the North Tillamook County Sanitary Authority (NTCSA). The south portion of the site has been scraped of upper layer of soil to make berms for existing sewage facilities. Initial fill should occur in this area to build back original level of land. NTCSA has expressed an interest in using the site for dredged material disposal. A priority classification is appropriate because of the size of the site and its proximity to the Nehalem Waterfront. Dredged material disposal on this site must comply with the requirement of the Tillamook County zoning ordinance. A Tillamook County Development permit is required prior to disposal of dredged materials on this site.

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Deleted: Restore site's agricultural value by covering fill with topsoil.

Deleted: Without topsoil cover fill, the spoil area would have minimal agricultural value.

Deleted: Minimal impact to wildlife habitat. Possible problems with floodplain displacement.

Deleted: Use for disposal would disrupt agricultural use of site. Disposal of materials would have to be properly mixed with existing soils to maintain or enhance existing productivity. Mixing of topsoil may be costly; property owner may require compensation.

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¶

3.4d.5 Site 9 Comprehensive Plan designation - PRIORITY DMD SITE

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Resource Agency evaluation - UNKNOWN

Site Description:

Location:	East of Confluence of the North Fork Nehalem River and Nehalem River ~ 400 feet.

The site requires re-characterization prior to an application being made to determine the suitability of the site based on physical, environmental, economic, and social constraints.

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3.4d.6 Site 10 Comprehensive Plan designation - PRIORITY DMD SITE
Resource Agency evaluation - UNKNOWN

Site Description:

Location:	38000 North Fork Road, South and West of the North Fork Nehalem River Bridge within the Nehalem UGB.

The site requires re-characterization prior to an application being made to determine the suitability of the site based on physical, environmental, economic, and social constraints.

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3.4d.7 Site 11 Comprehensive Plan designation – PRIORITY DMD SITE
Resource Agency evaluation – PRESENTLY ACCEPTABLE

Site Description

Location:	Immediately north of city docks, City of Nehalem.
Size:	0.60 acres
Capacity:	The site is used only for the temporary rehandling of material.
Physical Characteristics:	Fill area, sloping in all directions.
Floodplain:	The site is mapped by FEMA within the 100-year floodplain of the Nehalem River.
Biological Characteristics:	Wetlands are located along the Nehalem River. Vegetated non-wetland areas contain a mix of grasses and weedy herbaceous species along roadway shoulder.
Comprehensive Plan/Zoning:	C, superimposed by FHO
Ownership:	City of Nehalem

Engineering Considerations

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Method of Dredging/Filling:	Clamshell dredge
Site Preparation:	Appropriate containment of materials required.
Design Criteria:	The dredged material must be removed from the site following dredging to accommodate the ongoing use of the driveway, which provides access to a rental property and the Port of Nehalem's dock. Rehandling and final disposal site are required fro the dredged material.
Future Use Constraints:	None as material will be removed.
Environmental Considerations:	Material must be contained to prevent sloughing into waterway.
Economic Considerations:	Additional costs will be related to the material rehandling and final disposal site.
Other Considerations:	This is only locally available sit for clamshell/bucket dredging of dock area. Would be a good staging area for truck material. Dredged material disposal on this site must comply with the requirements of the Nehalem City zoning ordinance. PRIORITY site for use as a rehandling site for dredged materials from the City dock project.

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3.4d.8 Site 5b Comprehensive Plan designation – RESERVE DMD SITE
Resource Agency evaluation - UNKNOWN

Site Description:

Location:	East of the Tillamook County Boat Ramp and east of the Nehalem Bridge (Highway 101).

The site requires re-characterization prior to an application being made to determine the suitability of the site based on physical, environmental, economic, and social constraints.

3.4d.9 Site 7b Comprehensive Plan designation – RESERVE DMD SITE
Resource Agency evaluation - PRESENTLY ACCEPTABLE

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Site Description:

Location:	Pasture along Nehalem River, south of sewage treatment facilities.
Size:	45.45 acres
Capacity:	580,000 c.y. at 8' depth.
Physical Characteristics:	Flat agricultural land
Floodplain:	The site is located within the 100-year floodplain of the Nehalem River.
Biological Characteristics:	Low wildlife use, as land is intensively farmed.
Comprehensive Plan/Zoning:	F-1, superimposed by SH and FH
Ownership:	Private
Tax Lot:	T3N, R10W, Sec. 27,
Engineering Considerations	
Method of Dredging/Filling:	Pipeline dredge.
Site Preparation:	Construction of containment berms and outflow system and soil amendments for continued agricultural use.
Design Criteria:	Access to property could occur through tidegate structures along the Nehalem River. May be desirable to strip and stockpile existing topsoil.
Future Use Constraints:	Without topsoil cover fill, the spoil area would have minimal agricultural value.
Environmental Considerations:	Minimal impact to wildlife habitat. Possible problems with floodplain displacement. Material must be contained to prevent the material from re-entering the Nehalem River and creating turbidity.
Economic Considerations:	Use for disposal would disrupt agricultural use of site. Disposal of materials would have to be properly mixed with existing soils to maintain or enhance existing productivity.
Other Considerations:	Site is a productive agricultural land which would require an exception to Goal 3 prior to disposal of dredged materials. Dredged material disposal on this site

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must comply with the requirement of the Tillamook County zoning ordinance. A Tillamook County Development permit is required prior to disposal of dredged materials on this site.

3.4d.10 Summary and Conclusions

The Nehalem River experiences excellent flushing in this segment as demonstrated by a lack of maintenance needs at the various moorages and ramps. The Highway 101 Bridge included the removal of the existing bridge pier (at midstream). This removal should enhance local hydraulics, further minimizing the dredging needs.

Soil mixing would be required to maintain agricultural productivity for Site #6b, a Reserve Site.

The Nehalem City Docks will require occasional maintenance dredging. Bucket or clamshell dredges would be suitable for this location. The materials could be temporarily stored at Site #8 and then removed to an appropriate upland location. The County Boat Ramp will require occasional maintenance dredging. The rehandle site located on in the parking lot should be sufficient to meet maintenance needs.

The Scovell docks dredging is small (10,000 c.y.) and one-time (no maintenance is expected). Disposal of this material should not be a problem, as local sites are available.

3.5 IMPLEMENTATION

The ability to dredge is dependent upon the availability of adequate sites for the disposal of dredged materials. In both Tillamook Bay and Nehalem Bay, the supply of land disposal sites which meet the necessary environmental and engineering criteria is limited. Those sites that are presently acceptable must be considered as a scare resource, worthy of careful allocation in order to maximize the public benefit. Therefore, two key questions must be explored regarding an implementation program.

1. Planning Options: How should the proposed sites be designated in the comprehensive plan and zoning ordinance?
2. Site Use Options: What kind of arrangements for site use should be made between the applicable public agencies and the private property owner?

3.5a Planning Options

Placing dredged materials on a land site must be viewed as a short-term use of that land resource. Once the disposal has been completed and the necessary settling, compaction and stabilization has occurred, the land becomes available for a variety of land uses depending on the specific site characteristics and location. Therefore, although a specific site may be utilized for the disposal of dredged materials throughout a 20-year period, the disposal use is only temporary and the land may be converted to a more permanent use after the disposal has been completed.

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¶
Site Description¶
¶
Location: . Peninsula at mouth of North Fork Nehalem River.¶
¶
Size: . 1.3 acres¶
¶
Capacity: . 5,000 c.y. at a 4' depth¶
¶
Physical Characteristics: . Old fill area, presently riprapped and bermed.¶ ... [103]
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The loss of dredge disposal sites to other permanent uses prior to the placement of dredged materials would result in increased public costs and could potentially inhibit not only the maintenance of the existing navigation routes, but the development of new economic enterprises as well.

It is recommended that the dredged material disposal sites determined to be necessary for future use should be reserved in a special overlay zone in the comprehensive plan. Since disposal use is a short-term use of the land, it is recommended that the comprehensive plan land use designation for the sites reflect the long-term desired use such as residential, agricultural, commercial, industrial or recreational. By that action, the property owner is aware of the county's long-term policies for the particular parcel. In the short-term however, it is recommended that a "dredged disposal site overlay zone" be placed on all acceptable sites, in essence reserving those sites for the possible disposal of dredged materials. Use of the site would be allowed if it did not result in the construction of permanent facilities and was consistent with other policies of the comprehensive plan. Once the site was filled, the overlay zone would be removed, and the land would be available for permanent use designated in the comprehensive plan.

A variety of factors will place pressure on dredged disposal sites for conversion to other uses prior to their need and use as a disposal site. Planning controls through overlay zones and other techniques must be made sufficient to restrain those pressures. Since through this plan the county is determining that the use of these sites for disposal of dredged materials is in the public interest, implementation measures other than normal planning regulations are warranted.

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All potential disposal sites discussed in this plan have been evaluated according to their relationship to proposed dredging projects. The sites have been prioritized, to rate the sites according to their importance to future dredging needs.

PRIORITY SITES are sites that will play an important role in future dredged disposal needs. These sites are designated on the Tillamook County zoning maps as "DMD-1" sites. All non-aquatic Priority Sites have been included within the Shoreland Overlay (SH) zone. All uses proposed within DMD-1 sites are conditional uses within the SH zone and are subject to Planning Commission review. A plan amendment i.e., a formal decision by the Board of Commissioners, to remove the DMD-1 designation from these sites is required prior to approval of a conflicting, permanent use on the site.

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RESERVE SITES may be important to future dredging, but still have unresolved issues which prohibit their "full protection". These sites may not be presently acceptable, and will require detailed justification before "acceptability" can be realized. Reserve sites should be carefully reevaluated during each periodic update of the dredged material disposal plan. As priority sites are filled to capacity, sites identified as Reserve sites shall be reevaluated as potential Priority DMD sites. Highest priority should be given to conversion of Reserve sites to Priority sites (subject to State and Federal permit requirements).

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A variety of implementation options are available for use by the ports and Tillamook County in order to acquire use of the necessary disposal sites. The specific option chosen for each site should be dependent upon the site

conditions, discussion with the property owner and the potential future use of the site. The following discussion describes a wide range of methods that are available to implement the proposed plan. These include property acquisition, easements, purchase of development rights, property exchanges and other regulated methods. Any one or combination of these options may be used based on the preferences of the local implementing agencies.

3.5a.1 Easements

The property owner and port district may enter into an easement agreement whereby the property owner grants the right to place dredged materials on his/her land. The owner retains full use and ownership rights to the land, but allows materials to be placed on the property under the conditions outlined in the easement. When disposal is completed, full use of the site reverts to the owner.

The method is most applicable when the private property owner either desires full material to be placed on the land to enhance the site's future potential, or at least has no objection to the placement of the material. Because the owner maintains direct use of the site during and after disposal, the cost of acquiring easements is generally less than many other methods. Use of easements is common practice among port districts. Easement acquisition may or may not be accompanied by financial reimbursement to the private property owner depending on the contract agreement reached between the port district and the owner.

3.5a.2 *Fee Purchase*

The port district has the option of purchasing outright the sites on which dredged materials are to be placed. Although this option entails higher costs than does easement acquisition, it has several advantages. Many of the sites identified in this plan would not receive all of the necessary disposal materials for a period of 10 to 20 years and permanent use of the site would not be available until after that time. If the port districts and the county believe that the property owner will not be willing to wait for that period of time, they may wish to purchase the property and absorb the expense of holding the land.

By use of a land banking program, the port district could purchase disposal sites in unimproved form and retain ownership until the disposal has occurred. After settling and compaction, the port district could resell the property, thus returning it to the private sector. Although this method would result in increased front end costs, the future sale of the improved property could result in long-term financial gain to the port district. Use of public bond funds or creation of a local revolving fund would be possible means of generating the necessary revenue. Again, this implementation method could be used in combination with other methods, thus decreasing the quantity of land to be acquired.

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As previously mentioned, if Tillamook County determined that sufficient public benefit could be gained from site acquisition, the county could purchase selected disposal sites and reserve them for future public use.

After the disposal activities were completed, the county would make the necessary additional improvements to implement the planned public use of the site.

3.5a.3 Purchase of Development Rights

This implementation method assumes that property ownership carries with it a certain amount of development rights. These rights are transferable and they can be purchased either on a temporary or a permanent basis. If the port district were to purchase the development rights of a piece of property, just compensation would be required for use of the owner's land. Although the property owner would retain full ownership of the land, the use would be restricted to those activities spelled out in the purchase agreement.

Since purchase of development rights can be for a temporary period, the port districts could buy those rights until the disposal actions were completed. At that time, the development rights contract could be cancelled and full use of the site would revert to the property owner.

3.5a.4 Property Exchange

In some instances, the port district may wish to acquire disposal sites through the exchange of property with the disposal site owner. In effect, the port would trade title to a parcel of land they currently own for title of the disposal site they wish to acquire. This method is feasible if the port district owns land that would be desirable to disposal site owners.

3.5a.5 Tax Limitation

When sites are held for use as dredged material disposal sites through zoning or other methods not involving site acquisition, the issue of property taxation must be resolved. If use of a privately owned site prohibits the land owner from making full use of the site, the question remains: Should the property owner carry the tax burden? To deal with this question, it may be possible to defer or fix the taxes on the property over a limited period of time. Such a concept could be done through means similar to the "special assessment" provisions of Section 5 and 6 of ORS 308.370, dealing with Exclusive Farm Use Zones, or, under concepts of a "frozen assessed valuation" as provided for in Urban Renewal Areas under ORS 457. While the legal precedent for such tax actions is clear, the specific enabling authority may not exist for the county to take such actions on dredged material disposal sites. The county should aggressively pursue the establishment of such authority either through interpretation of its current authority or through new legislation.

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If it is not possible to implement tax actions, the ports should be prepared to negotiate tax payments for those sites on which use is restricted until disposal has been completed.

3.5b Site Use and Permit Review

Prior to actual use of the sites for the disposal of dredged materials, the ports and the Corps of Engineers must prepare specific design materials and determine when and how the sites will be utilized. At that time, it will be necessary to apply for the applicable Section 10, Section 404 and Fill and Removal permits at both the federal and state level. After approval of the permits, the sites will be available for use, subject, however, to any conditions

placed on the permit approval.

3.5c Dredged Material Disposal Plan Review

Tillamook County, in conjunction with local ports, the Corps of Engineers and other relevant state and federal resource agencies shall review the dredged material disposal plan if:

a) dredging projects which were not considered in the DMD plan and which involve disposal of dredged materials in Priority dredged material disposal (DMD 1) sites are proposed; or if
b) the capacity of Reserve Sites is reduced by 25%. due to the commitment of the sites to uses which preclude their ultimate use as DMD sites; or if;
c) requests for amendments to the Tillamook County Comprehensive Plan and zoning maps to delete DMD 1 sites are made; or if
d) a period of five years has elapsed since the last DMD plan review. The first DMD plan review shall be conducted no later than five years after the date of adoption of the Tillamook County Comprehensive Plan.

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A public hearing shall be held to review the information generated by the DMD plan review. Notification of this public hearing shall be made to all affected property owners, jurisdictions and state and federal agencies at least 30 days prior to the public hearing.

At least 7 days prior to the public hearing, the Planning Director shall make available to the public a report indicating at a minimum:

a) the number and volume of Priority and Reserve DMD sites which have been used for dredged material disposal since the last DMD plan review;
b) the number and volume of the remaining Priority and Reserve DMD sites;
c) an analysis of dredged material disposal needs for the next 5 years, including existing, new or proposed projects;
d) the location and volume of addition DMD sites which could be used to meet expected dredge material disposal needs;
e) an analysis of the acceptability of each additional dredge material disposal site. This analysis should separate the additional dredged material disposal sites in (d) above into the following categories:

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Priority - Disposal of dredged material on these sites would be in compliance with state and federal permit requirements, and with the requirements of Goal 16.

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Reserve - Disposal of dredged material on these sites would require further site analysis.

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An opportunity shall be provided during the public hearing for public testimony on the information presented in the report. Based on the testimony received at the public hearing, the Planning Director shall recommend to the Board of County Commissioners any additions or deletions of "Presently Acceptable" DMD 1 sites which are necessary to maintain a total DMD 1 site capacity which is adequate to accommodate the dredged material disposal needs of approved navigation and development projects involving dredging for the next five years.

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Additions or deletions of DMD 1 sites shall require an amendment to the Tillamook County comprehensive Plan and zoning maps. These amendments shall be made according to the amendment procedure provided in Article IX.

NEHALEM ESTUARY

The Nehalem Estuary occupies approximately 2985 surface acres. Tidelands represent 61% (1771 acres) and submerged lands (39%). Less than 10% of the total estuarine intertidal area is classified as Estuary Conservation and Estuary Development. Less than 1% of the total subtidal area is classified as Estuary Natural. Over 98% of the subtidal surface area in the estuary is represented by subtidal unconsolidated bottom habitat.

ESTUARY DEVELOPMENT MANAGEMENT UNITS

Of the 2,985 acres in the Nehalem Estuary, 244.2 acres, or 8.2% are in development management units. Most of this acreage is included in 21ED, the Nehalem channel (141.7 acres, 70%). Predominantly subtidal habitat is included in the development management units (151.6 acres, 67.6%). The 72.6 acres of intertidal habitat included in these management units is only 4.1% of the total acreage of intertidal habitat in the estuary.

1. Dredge and Fill

Dredging needs are discussed in Sections 3.4b.1, 3.4c.1 and 3.4d.1 of this element. About half of the dredging (224,000 cubic yards) is for establishing navigable depths in the main channel. Since almost all of this is to occur in subtidal areas and materials can be disposed of in nonaquatic areas, the effects of dredging the channel on the estuarine ecology will not be adverse. The remaining half of the dredging (228,000 cubic yards) will occur at the present and proposed marinas in the estuary. Most of this, 180,000 cubic yards or 79%, is for the proposed marine harbor north of Wheeler (See exception for 13ED). 6.5% is for maintenance and expansion of Paradise Cove, and the remaining 14.5% is for maintenance dredging of existing facilities. Except for 13ED, most of this dredging will occur in subtidal areas. In 13ED, 9.77 acres of intertidal habitat will be dredged. The approved Exception in 13ED included the placement of materials from dredging on 14.48 acres of predominantly tidal marsh also in 13ED. However, based upon current local, state and federal regulations, dredged material from this potential project are to be placed in the upland DMD site, #4. The effects of dredging in 13ED are discussed in the exception for that management unit.

Except for 13ED no filling is proposed for the development management units in the Nehalem Estuary. The effect of placing fill in 13ED are described in the exception for that management unit.

2. NAVIGATION AND WATER-DEPENDENT COMMERCIAL ENTERPRISES AND ACTIVITIES

Marina expansions are planned for Jetty Fishery, Brighton Moorage, Paradise Cove and Dart's Marina. New marina facilities are planned for 13ED. The cumulative effects of dredging and filling for these facilities are described under 1

EXHIBIT B

above. The cumulative effect of new piling and docks on the estuary will be minimal because of the small area that will be affected. Increased development at Jetty Fishery and Brighton Moorage will add congestion to the stretch of Highway 101 to which these marinas have access. Similarly, expansion of Dart's Marina and construction of a new marina at 13ED will increase congestion in the Wheeler downtown. Increases use of these facilities will also bring more money into Tillamook County's economy.

Some water dependent and related commercial development is proposed at the Paradise Cove marina. All new construction in the management unit will be on piling. No fill is proposed. Water-dependent, water-related, and non-dependent or related development is proposed for 13ED. This development is consistent with the use of adjacent upland areas and is not expected to place excessive burdens on community services. The effects of the uses in 13ED on the estuarine ecology are discussed in the exception for that management unit. The effects of the Paradise Cove development on the estuarine ecology are acceptable because no major estuarine alterations have been proposed.

3. DISPOSAL OF DREDGED MATERIAL

Dredged material disposal is only proposed in 13ED in conjunction with the development of a harbor. Its effects are discussed in the exception for this management unit.

ESTUARY CONSERVATION 2 MANAGEMENT UNITS

Approximately 27% of the total estuarine surface area is within EC2 management units. Most of this area, 95% is subtidal. The 36.0 acres of intertidal habitat that is included represents only 2% of intertidal habitat in the estuary and the majority of habitat is represented by intertidal beach bar.

Most of the EC2 acreage is included in 22 EC2, the subtidal area along which most of the developed shorelines are located, including Brighton, Wheeler, Nehalem, and Upper Town Nehalem. Included in 22WC2 are over 75% of the subtidal areas of the estuary below the junction of the Nehalem River and the North Fork of the Nehalem River. Other than the maintenance and repair of existing facilities, and the installation of additional private docks and moorages, no projects that would require major impacts are envisioned in this section of the Nehalem estuary.

ESTUARY CONSERVATION 1 MANAGEMENT UNITS

Approximately 11% of the total estuarine surface area is within EC1 management units. Most of this area, 76.3% is subtidal. The 77.0 acres of tidal habitat included represents only 4.2% of the total intertidal habitat in the estuary.

Most of the EC1 acreage, 80.7% is included in 27EC1, the subtidal navigation channel of the North Fork of the Nehalem River. There is currently no demand for maintenance dredging in this section of the

estuary. Cumulative impacts in this section of the estuary will be the result of activities from water-dependent recreation and maintenance and repair of existing structures and facilities.

ESTUARY NATURAL MANAGEMENT UNITS

Approximately 55% of the total estuarine surface area is within EN management units. Most of this area, 99%, is intertidal and composed of intertidal aquatic bed (36.7%), tidal flats (23.9%), tidal shores (9.8%), and tidal marsh (29.6%) habitats.

The majority of EN acreage (59%), is included in 7EN, a major intertidal aquatic bed and intertidal flat in the estuary.

Alterations within 7EN are limited to the Nehalem Bay State Park boat ramp and remnants of a pile dike. Principle activities envisioned in other EN management units relate to the maintenance and repair of highway and railroad bridge crossings and other uses allowed by the zone.

NESTUCCA ESTUARY

The Nestucca Estuary occupies approximately 1413 surface acres. Tideland represent 59% (827 acres) and submerged lands 41% (586 acres). Less than 2% of the total estuarine intertidal area is classified as Estuary Conservation. Less than 2% of the total subtidal area is classified as Estuary Natural. More than 97% of the total subtidal surface area is represented by subtidal unconsolidated bottom habitat in the estuary.

ESTUARY CONSERVATION 2 MANAGEMENT UNITS

Approximately 5% of the total estuarine surface area is within EC2 management units. Most of this area, 97%, is subtidal. The main navigation channel of the Big Nestucca River is represented by the EC2 management unit. In this unit, most of the shoreline has been altered by docks, bulkheads, piling, and riprap. This management unit is adjacent to the most developed shorelands in the estuary, from the community of Woods to Pacific City. 9 EC2 contains man-made canals which were created in conjunction with a residential subdivision on adjacent shorelands. Maintenance dredging activities within these canals, and the maintenance and repair of existing structures are cumulative impact activities envisioned in this section of the estuary.

ESTUARY CONSERVATION 1 MANAGEMENT UNITS

Approximately 41% of the total estuarine surface area is within EC1 management units. Most of this area, 97%, is subtidal. The 14.7 acres of intertidal habitat that is included represents only 1.8% of the intertidal habitat in the estuary. The subtidal navigation channel of the Nestucca River from the mouth of the estuary up to the head of tide, in both the Little Nestucca and Big Nestucca Rivers, is represented by EC1 management units. These subtidal channels are principal fishing areas and several recreational boat moorages and public boat ramps are located in EC1 units. Three of the EC1 management units include fringing intertidal marshes adjacent to developed shorelands in Pacific City. Since the navigation channels are naturally maintained, of

cumulative impacts envisioned in EC1 management units are results of water-dependent recreation activities, impacts from additional private docks, and degradation of intertidal marshes from shoreline development at Pacific City.

ESTUARY NATURAL MANAGEMENT UNITS

Approximately 59% of the total estuarine surface area is within EN management units. Most of this area, 98%, is intertidal. The major intertidal habitat is tidal flats (49%), followed by intertidal aquatic beds (26%) and tidal marsh (25%0. The 812 acres of intertidal habitat represents 98% of the tidelands in the estuary. 38% of the intertidal habitat in EN management units is located at the mouth of the bay, adjacent to the Nestucca sandspit. The shorelands of this sandspit are included with Nestucca Bay State Park and have been included within the State Parks □Primary Resource Protection□ land use category. Other large tracts of tidelands are adjacent to shorelands zoned for agriculture purposes. Water-dependent recreation activities and grazing pressure from livestock are the major impacts envisioned in EN management units.

NETARTS ESTUARY

Netarts Estuary occupies approximately 2744 surface acres. Tidelands represent 87% (2393 acres) and submerged lands 13% (351 acres).

Approximately 88.4% of the total estuarine surface area is within EN management units. Most of this area, 93% (2258 acres), is intertidal, and represented by intertidal aquatic bed (43%) and tidal flat Conservation management unit areas are subtidal and represented by subtidal unconsolidated bottom habitat.

Cumulative impacts to estuary management units in Netarts estuary will result from the following activities: water-dependent recreation, small scale aquaculture, commercial crabbing and clamming, and estuarine research. The western shoreline, Netarts Bay Spit, is part of Cape Lookout State Park. Netarts Spit and the associated fringing tidal marshes, are within a State Park Natural Land Use Classification. Most of the shoreline development in the estuary has occurred along the eastern and northern shorelines. The Netarts County Boat Basin and a small boat basin at Rice Creek are scheduled for maintenance dredging in the near future. Since dredging will occur in subtidal EC2 areas and spoils will be placed in upland, non-aquatic areas, the impacts are considered minimal.

SANDLAKE ESTUARY

Sandlake Estuary is classified as a Natural Estuary (OAR-660-17-010) and therefore all estuarine management units are Natural. Agricultural and water-dependent recreational uses are the major activities near and in the estuary that could contribute in time to cumulative resource degradation. Shoreland development is at a low density and other than riprap for structural shoreline stabilization, no major development projects are anticipated in the future that would impact the estuarine ecosystem at Sand Lake.

TILLAMOOK ESTUARY

The Tillamook Estuary occupies approximately 9766 surface acres. Tidelands represent 76% (7404 acres) and submerged lands 24% (2362 acres). Less than 4% (292 acres) of the total estuarine intertidal area is classified as Estuary Conservation and Development. Less than 7% (169 acres) of the total estuarine subtidal area is classified as Estuary Natural or Estuary Conservation Aquaculture.

ESTUARY DEVELOPMENT MANAGEMENT UNITS

Approximately 1.2% of the total estuarine surface area is within Estuary Development management units. Most of this area, 58%, is subtidal. The 48.3 acres of intertidal habitat that is included represents only 0.7% of this habitat in the estuary. The federally authorized navigation channel and turning basin includes 56% of the area in Development management units.

1. Dredge and Fill

Dredging in development management units in Tillamook Bay is described in Sections 3.2b1 and 3.2c1 of this element of the plan. It is anticipated that 1,746,000 cubic yards of material will be dredged form development management units over the next 20 years. Of this, approximately two thirds will be dredging to maintain depths in the authorized channel and turning basin. An additional 29% will be for maintaining depths in the Garibaldi Boat Basin. 103,000 cubic yards, 7.4 percent, will be removed to expand the Garibaldi Boat Basin and maintain that expansion. 23,000 cubic yards will be removed in maintenance of the Bay City Boat Basin.

A small amount of the materials generated from the Garibaldi Boat Basin expansion will be used for that project. An estimated one half to one acre of estuarine surface area will be lost as a result. All other materials from dredging in development management units will be disposed on land, in the flowlane, or in approved ocean disposal sites.

Except for the expansion of the Garibaldi Boat Basin, no fill is proposed for development management units in Tillamook Bay.

The cumulative impact of dredging or filling in development management units is small and acceptable. Approximately 20 acres of intertidal habitat twill be dredged. This is only 0.3 percent of the intertidal habitat in the estuary. Fifty-three percent of this habitat is in the authorized turning basin. At most, one acre of intertidal habitat will be filled. This is less than 0.1 percent of the intertidal habitat in the estuary. The exception for the Garibaldi Boat Basin expansion included in the Garibaldi Comprehensive Plan describes the impacts of dredge and fill in more detail.

2. Navigation and Water-dependent Commercial Enterprises and Activities

The anticipated effects of expansion of the Garibaldi Boat Basin are discussed in the exception for that management units. The amount of expansion of the Hayes Oyster facility in 23ED is presently unknown.

Although the effects of such expansion on the estuary or the community are uncertain, their relative magnitude is probably small because of the small area involved.

3. Disposal of Dredged Material

Disposal of dredged materials will be on land or in approved ocean disposal sites except for a small amount of in-water disposal associated with the Garibaldi Boat Basin expansion. This is discussed in the exception for that project.

ESTUARY CONSERVATION 2 MANAGEMENT UNITS

Approximately 15% of the total estuarine surface area is within EC2 management units. Most of this area, 60%, is subtidal. The 59.5 acres of intertidal habitat that is included represents only 0.8% of intertidal habitat in the estuary.

The main navigation channels south of the Garibaldi Boat Basin includes 71% of the area in EC2 management units. Other than infrequent maintenance of boat slips and boat ramps, these navigation channels are not scheduled for maintenance dredging in the near future. The remaining EC2 management units included the area between the Tillamook jetties and the western boundary of Miami Cove, near the Old Mill Marina at the City of Garibaldi. Spoils are deposited upland in non-aquatic sites for maintenance dredging of the Garibaldi Boat Basin and Old Mill Marina. The channel between the Tillamook jetties has not been dredged since reconstruction, but when dredging is required, a hopper dredge is used and the cumulative impacts are considered minimal.

ESTUARY CONSERVATION 1 MANAGEMENT UNITS

Approximately 9% of the total estuarine surface area is within EC1 management units. Most of this area, 79.3%, is subtidal. The 184.4 acres if intertidal habitat that is included represents only 2.5% of intertidal habitat in the estuary. From the head of tide to where the Trask, Tillamook, Wilson, Kilchis and Miami Rivers enter Tillamook Bay represents almost 60% of the estuarine surface area in EC1 management units. Navigable depths are naturally maintained in major sections of these rivers and only boat ramps have need for maintenance dredging. Pilings have been placed in nearly all of the EC1 management units, wither for pile dikes, piers or for bridge crossings. Minor dredging occurs for a small marina at the confluence of the Tillamook and Trask Rivers. The expansion of Highway 101 in the City of Tillamook will require additional bridge crossing support structures in the sloughs of the Trask and Wilson Rivers. The impacts of this project and the maintenance and repair of existing facilities is considered minimal.

ESTUARY CONSERVATION AQUACULTURE MANAGEMENT UNITS

Approximately 23% of the total estuarine surface area is within ECA

management units. Most of this area, 97%, is intertidal and represented by intertidal flats (58.3%), tidal marsh (0.4%), intertidal aquatic bed (38.4%), the 221.1 acres of intertidal habitat that is included represents 30% of the intertidal habitat in the estuary.

Past and present uses and activities associated with this zone that could potentially impact the estuary are oyster production, including the use of Sevin or other pesticides to control Ghost Shrimp populations, and riprap for structural shoreline stabilization along Bayocean Road.

ESTUARY NATURAL MANAGEMENT UNITS

Approximately 51% of the total estuarine surface area is within EN management units. Most of this area, 98%, is intertidal and represented by intertidal flat (57.4%), tidal marsh (17.5%), tidal shore (1.1%) and intertidal aquatic bed (22%) habitat. The 4901 acres of intertidal habitat that is included represents 66% of the intertidal habitat in the estuary.

One EN management unit (8EN) is presently under consideration for use as a dredged material disposal area. This area is represented by Miami Cove. Miami Cove is within pumping distance by dredging equipment from the Old Mill Marina. There could be cumulative impacts to the estuary as a result of filling all of 8 EN; this determination is being sought by the County as part of their review of the Tillamook Bay Dredged Material Disposal Plan. Cumulative impacts in the remaining EN management areas will be restricted to activities associated with the maintenance and repair of existing facilities.

3. DREDGED MATERIAL DISPOSAL PLAN ELEMENT

3.1 Introduction

The purpose of a dredged material disposal plan is to estimate the amount of dredged material disposal which will be generated by both existing and proposed dredging projects, to identify economically and environmentally feasible sites for disposal of dredged material, and to develop mechanisms for preserving a sufficient number of feasible sites to accommodate identified dredged material disposal needs. The greater the level of development provided for within a given estuary, the greater is the need for dredged material disposal plans. The need for dredged material disposal plans is greatest in Development estuaries such as Tillamook and Nehalem, for two reasons:

(1) A more intensive level of development is provided for within Development estuaries; and

(2) Dredged material disposal sites within shorelands adjacent to these estuaries are likely to be limited by existing recreational, commercial or industrial development.

Tillamook and Nehalem Estuary Dredged Material Disposal Plans were completed in the 1980's by Wilsey and Ham. The plans resulted in the classification of 59 sites as Priority, Reserve and Inventory (acceptable and unacceptable). The intent of the designations was to provide protection for viable sites. At the time the Plans were completed, 35 sites were deemed to be acceptable. With increased regulations, maintaining sites that were deemed acceptable in the mid-1980's required additional review of these sites for

protection. As a result, Tillamook County contracted with the consulting firm of Parsons and Brinkerhoff and PBS Engineering and Environmental in 2005 to prepare the dredged material disposal plans which are contained within this section.

Since the completion of the Dredged Material Site Evaluation for Tillamook and Nehalem Bay by Parsons and Brinkerhoff and PBS Engineering and Environmental in January 2006, a final determination on the classification of existing dredged material disposal sites as Priority and Reserve has been made by Tillamook County.

Dredged material disposal plans were not prepared in the mid-1980's or 2005 as part of the overall estuary management plans for Netarts and Nestucca estuaries due to the limited need for dredged material disposal sites at this time. This determination was based on 1) analysis of historic alterations (including dredging) within Netarts and Nestucca Estuaries which was conducted during the preparation of the mitigation and restoration plans contained in Section 4 of this element; and 2) discussions on the need for future dredging by the Tillamook County Estuary Council and citizen advisory groups during the preparation of management unit designation maps. At this time, future dredging needs appear to be limited to possible maintenance dredging of existing recreational boating facilities in Netarts Bay (the Tillamook County Boat Basin and the marina at Rice Creek in Netarts Bay), and periodic dredging to maintain boating access within Nestucca Estuary Management Unit 9EC2.

Tillamook County has developed policy statements and implementation mechanisms which require that dredged material disposal plans be prepared for Netarts and Nestucca Estuaries prior to approval of dredging projects which would create substantial needs for dredged material disposal sites. (See policies for Dredging and Dredged Material Disposal in Section 5 of this element, and standards for Dredging and Dredged Material Disposal in Section 3.140 of the Tillamook County Zoning Ordinance.)

3.2 Tillamook and Nehalem Estuary Dredged Material Disposal Plan Overview

3.2a Introduction

Coastal waterways in the Pacific Northwest have provided important means of transportation since the first human inhabitants. As populations grew and towns became established along the rivers and bays, the significance of the waterways increased. Bonds became established between economic integrity and water related transportation systems. As navigational demand grew, forms of shipment evolved through various modes and sizes. Economic parameters dictated that larger barges and ships be used for the movement of goods, which often required deeper water depths for uninterrupted transport. In order to allow for the proper movement of these vessels, dredging (the removal of bottom materials from below the water surface) came into practice along most of the major waterways. By removing bottom sediments and deepening the river channel, both commercial and recreational vessels could gain access to the ocean upriver ports, riverside docks, moorages and marinas, thus enhancing the usability of both the waterway and the adjacent land areas.

The upland areas are continuously involved in the natural geologic processes or erosion creating sediment loads within the drainage

systems. As sediments accumulate in the major waterways, measurable volumes are deposited within river shoals, slow moving bays, and ocean entrance channels. Shoaling (the accumulation of sediments in a specific area) often threatens river and bay navigation, thus regular dredging becomes mandatory.

Tillamook County experiences comparable navigation trends and the inherent shoaling problems. The two major bays, Tillamook Bay and Nehalem Bay, have established recreational, commercial, and industrial enterprises along their shorelines. Within these water systems, both public and private investments in navigational improvements have been made in order to facilitate the movement of goods and people between bay and upriver areas and the ocean. Major public navigation improvements have included the construction of jetties at the mouths of each bay, and a navigation channel in Tillamook Bay to Miami Cove. Public ports (Port of Garibaldi, Port of Tillamook Bay, and Port of Nehalem) have constructed improvements to these bays to benefit the public use of these resources. Private enterprise have built various moorage and marina facilities as well. The continued use of the existing facilities, and future development of more facilities, will require an appropriate maintenance program for the navigation systems.

Before bottom sediments can be dredged from the bay and river, it is necessary to locate areas upon which those materials can be placed (disposal sites). Disposal can occur in-water (ocean or bay/river) or on upland areas, depending on the location of the materials to be dredged, the adequacies of the potential disposal sites, and accessibility. Tillamook Bay presently has ocean disposal for part of its dredging, and upland disposal for the majority of its dredging requirements. Nehalem Bay, with only limited, isolated dredging presently occurring, utilizes upland disposal sites at this time.

In order for either a land or in-water area to be judged suitable for the disposal of dredged materials, it must meet a wide range of environmental, engineering, and cost criteria. Because of the difficulty in satisfying all of these criteria, acceptable dredged material disposal sites are considered to be a limited, significant resource. In recognition of the potential scarcity of suitable dredged material disposal sites, the State of Oregon (through its coastal goals) and Tillamook County (through its comprehensive planning process) have developed a dredged material disposal plan to identify areas which will be adequate to meet the disposal needs for the next twenty years. In addition to the selection of sites which meet the environmental and engineering criteria, this dredged material disposal plan must also outline the policies and procedures governing the use of the sites as well as to outline a program for plan implementation.

This "dredge plan" was undertaken during 1979 and 1980 to accomplish the above mentioned objectives. Local, state, and federal agencies participated with citizens in the identification and evaluation of future dredging needs and disposal options for the two estuaries. A federal and state agency task force was utilized to comply with LCDC Goal #16, Implementation Requirement #5, which states:

> "Local government and state and federal agencies shall develop comprehensive programs, including specific sites and

procedures for disposal and stockpiling of dredged materials."

Project steering committees made up of local jurisdiction representatives and residents, were utilized to help develop a dredge plan that would meet the local development needs for each estuary. Local ports helped to contact potential disposal site property owners to receive input and incorporate specific concerns and recommendations into the disposal site discussions.

The dredged material disposal plans for Tillamook Bay and Nehalem Bay have been prepared as a portion of Tillamook County's efforts to develop its Comprehensive Plan and estuarine management plan under the provision contained in Goal #16.

The current study evaluated the 35 sites identified for the Tillamook and Nehalem Bays. Agency personnel from local, state, and federal agencies participated in the review process. The intent of the review was to identify those sites that were "shovel ready", minimized environmental impacts and would require minimal additional permitting. Sites that would require extensive regulatory reviews as part of a permitting process for a dredging project were eliminated from the list of acceptable sites and are no longer protected under Goal 16.

3.2b Dredging Methods and Constraints

Dredging Technology

Various types of dredging equipment have been utilized over the years in the Tillamook and Nehalem Bays. The equipment used in these bays include hopper dredges, pipeline dredges, bucket and clamshell dredges, and "sleds." The selection of such equipment depends upon economics, which in turn, is determined by the quantities and characteristics of the dredged material, channel restrictions, weather, environmental protection, configuration of the dredging site, and the availability and location of the disposal areas. Each type of dredge has characteristic efficiencies of operation, production and cost under specific situations.

In the development of both short-range and long-range dredged disposal plans, costs of dredging are very dependent upon the quantity of materials moved and the disposal site preparation required. Further development or advances in dredging technology could also have significant impact on plan selection and cost. However, current dredging methods and anticipated methods identified in this report for the use in the next 15-20 years must be based on current technology.

Most dredging work considered for Tillamook Bay or Nehalem Bay would be accomplished by one of three methods: clamshell or bucket dredging, hopper dredging, or pipeline dredging. Maintenance dredging at the mouth of the Tillamook Bay is generally completed by hopper dredge while hydraulic pipeline and bucket dredges would be used for the remainder of the dredging. Any of the three methods may be commonly used for new construction depending upon the constraints of the particular project.

Bucket or Clamshell Dredges

The bucket or clamshell dredges are well suited to working in confined areas. These dredges operate efficiently and minimize water quality problems as long as the dredged materials are firm and of medium to heavy grain size. They are most economical when dredging small quantities; when quantities exceed several thousand cubic yards, other methods are generally more economical.

When using bucket or clamshell dredges, dredged material can either be placed on dump barges or directly onto trucks, if the dredge is operating close to shore. Both of these techniques constitute "re-handling" of the material but do allow transportation of the dredged materials to disposal sites some distance from the dredging location.

Bucket and clamshell dredges are also generally utilized for digging in gravel or rock and for the removal of stumps and debris. The available sizes for these dredges range from capacities of 2 to 18 cubic yards. Buckets and clamshells have been used in both bays, primarily for small private projects.

Clamshell dredges would likely be used to maintain access to existing boat launches, such as the Memaloose Point Boat Launch, the City of Nehalem docks and the Tillamook County Boat Launch on the Nehalem River near the Highway 101 Bridge. Permanent disposal sites are not located adjacent to any of the boat launches listed above.

Pipeline Dredge

The pipeline dredge method consists of a large centrifugal pump which is mounted on a specifically designed barge. The lower end of the pipeline is equipped with a revolving cutterhead that breaks up the bottom materials so they can be drawn into the suction pipe. The cutterhead is lowered to the bottom on a large hinged ladder that extends forward from the front, or bow, of the barge. The cutterhead depth can be controlled by cables attached to the ladders. The pipeline, which extends from the edge of the barge to the shore or to an area of in-water disposal, floats on pontoons.

The pipeline dredge is held in position during dredging by anchors, swing lines, and spuds. (Spuds are long heavy shafts that are hung from masts near each corner of the stern of the dredge.) Pipeline dredges are identified by the diameter of the discharge line and generally are available from 8 to 20 inches in size. The chief advantages of pipeline dredge use include: 1) movement of large volumes of material in a short period of time, 2) ease of transport of the pipeline, and 3) simultaneous dredging and disposal operations. Major limitations to the use of pipeline dredges are as follows: 1) disposal areas must be relatively close to the dredging operations since costs escalate rapidly as the pipeline length is increased or the disposal area is elevated; 2) pipeline dredges are unable to operate in open or rough water areas; 3) buried logs, large boulders and discarded

wastes, such as cable, present serious obstacles to the operation of the impeller; and 4) the anchoring cables and pipeline can present a temporary obstruction to navigation in confined channels.

Pipeline dredges have been used extensively in the Tillamook Bay inner channel for the federal maintenance project, the boat basin, and marina development.

Hopper Dredge

A hopper dredge is a self-contained ocean-going vessel that is designed for both hydraulic dredging and the transport of the dredged material to a dumping area. Dredging is accomplished while the vessel is in motion. Dredged materials are stored in the hopper dredge until the hoppers are filled; the dredge is then moved to another water area (generally in the open ocean) for disposal. Dredging is accomplished through suction pipes which are lowered to "vacuum" bottom materials. Hopper dredges can operate where rough water would make other methods of dredging impractical. However, these dredges cannot operate in confined areas where either depth or area width is limited.

Hopper dredges have been used in the Tillamook Bay mouth and inner channel. The inner channel areas have not been dredged by hopper for several years because of the depth limitations and time delays related to hopper maneuverability. A variation of the hopper dredge is the hopper barge, a barge equipped with dredge pumps and hoppers similar to the hopper dredge but powered by a tug. The hopper barge, due to its smaller size and shallower draft, is more suitable for work in confined and limited draft areas such as the Tillamook inner channel.

Sleds

"Sled" dredging is not a common practice, though it has been used in Nehalem Bay in the past. This method uses a large metal plate dragged behind a tug, which literally knocks the top off of shoals in the channel. In Nehalem, this method of dredging worked because the bay has limited shoaling and good hydraulic characteristics. The tops of shoals could be dislodged, with the material resettling downstream in deeper water. This method has not been used in several years.

3.2.c Material Characteristics

The characteristics of the material to be dredged is a critical factor in determining the most appropriate disposal options. Chemical characteristics are a primary concern for water quality considerations and physical characteristics are a primary concern for future site (or material) use considerations. Re-use considerations for Tillamook Bay and Nehalem Bay include industrial or commercial development, road fill, beach enhancement, recreational use, aggregate stockpiling, and agricultural land enhancement. Not all dredge materials will be suitable for these various applications or future uses, though appropriate

estimates for use potentials have been identified.

Test of the physical and chemical properties of bottom sediments in both bays have been undertaken as a part of this plan. In Tillamook Bay, sampling stations were established at 1) The federal channel just west of the Old Mill Marina, 2) a location north of the Pacific Oyster company, within the channel between Bay City and Sandstone Point, and 3) a location in the Trask River just upstream of Dry Stocking Island. Two sampling stations were used in Nehalem Bay: 1) at the Fishery Point Shoal, Bay Mile 3.0 at mid-channel, and 2) the Dean Point Shoal, River Mile 0.5 at mid-channel. These sampling stations were determined to be the most representative of the areas to be dredged, and the types of materials to be found. Except for the Trask River sample, mechanical classification tests and chemical analysis tests (elutriate test) were performed on the samples. From this laboratory work, it was possible to assess the water quality aspects and the reuse potentials of the materials that may be dredged.

Physical Characteristics

Tillamook Bay

The Garibaldi sample is classified at ML (silty sand) according to the Unified Soil Classification System. This soil is problematic in terms of resource value and upland disposal. Because of poor strength, hid compressibility, and high sensitivity to moisture, this material is poorly suited for use as structural fill or as a pavement subbase. Certain low-bearing uses, however, such as fill for parks, parking lots, or agricultural land can be accomplished with this material if it is mixed with sands and gravels (SP Classification). The materials would have to be either mixed on site, or disposal should occur in alternating layers of the two materials. The ML material would have to be dewatered at the various stages of disposal, as its fine-grained nature and consequent high capillary forces made it a very slow draining material.

Ideally, pipeline dredging would be scheduled to allow sufficient time for the ML (silty sand) soil to dewater, then a low quality fill can be hydraulically constructed by placing alternating layers of SP (sands and gravel) and ML soils as the fill is accomplished. Its content and the expected retention of salts in the soil. As pasture land it could be considered as good, given appropriate structural considerations during disposal. The dredged slurry of ML soil will have a very slow settling rate, and will require a long retention time.

Bottom sediments from the rest of the bay appear to be fairly uniform SP soils, described as poorly graded fine sands. The primary resource value for this material is its potential for use as structural, foundation fill material. It compacts easily and will serve as an excellent subbase material for structural foundations or pavement

construction. The -free-draining nature of this soul makes it particularly suitable for use as fill during wet weather periods or in areas that are subject to a fluctuating water table.

The SP soil may be of value in agricultural applications if soil amendments and topsoil are added to supply nutrients. The soil would lend itself well as a fill material underlying a cover coat of topsoil particularly in areas subject to a fluctuating water table or periodic inundation. This soil, particularly the finer sands, is highly susceptible to wind erosion and should be stabilized by seeding with grass in open areas. If suitably fertilized the soil can be seeded without a cover of topsoil, though topsoil would provide a greater degree of success.

For agricultural uses the sediments rate low in organic content, requiring soil amendments for both crop production and pasture land. This material would settle out quickly, have a short retention period, and work well with equipment; if worked in with existing local soils it could be properly amended to achieve agricultural value.

Nehalem Bay

The Fishery Point sample and the Dean Point sample are almost identical in their mechanical classification. They are both considered medium sands, with the upriver sample showing more coarseness in material. As SP (sand and gravel) soils their primary resource values will be the potential for use as structural foundation fill material. As with the Tillamook Bay SP soils, they will compact easily and serve as excellent subbase materials, for development purposes. Drainage characteristics are favorable, especially for wet weather periods or fluctuating water tables.

Agricultural requirements for these SP soils are the same for the Tillamook SP soils, except that wind erosion is not quite the concern for the Nehalem Bay materials. Soil amendments would be required for most plant production purposes.

Chemical Characteristics

Sediment samples were tested according to Department of Environmental Quality (DEQ) and Environmental Protection Agency (EPA) standards. These tests primarily relate to water quality conditions, and sometimes dictate special requirements for the handling of dredged materials.

Tillamook Bay

Of the samples tested all had acceptable levels of heavy metals in the ellutriate, or suspended, form.

Measurements of oil, grease and sulfides also proved acceptable. The only area of concern is the oxygen demand and turbidity characteristics of the Garibaldi materials. Upland disposal of these sediments will require adequate retention designs for sufficient settling of the materials and reduction in oxygen demand of the effluent before its release. In addition, levels of arsenic exceeding the US Environmental Protection Agency standards have been detected in the dredged materials at the Port of Garibaldi re-handle site. However, background analyses in the Tillamook Bay strongly suggest that those levels occur naturally within the system. Adequate retention should not be a problem for clamshell disposal, due to the low production rate of disposal. However, pipeline disposal in limited areas may cause a problem because of the lack of sufficient area to allow the material to settle. EPA has indicated upon review of the chemical analysis of the Garibaldi sample that this material is acceptable for ocean disposal, which remains a viable option for disposal.

Nehalem Bay

All samples had acceptable levels of heavy metals in the elutriate, or suspended form. Measurements of oil, grease and sulfides were also acceptable. These materials are acceptable for in-water disposal, given an approved disposal site. Nehalem Bay materials are expected to continue meeting state and federal water quality standards in the future.

Following are two tables which illustrate the results of the laboratory tests of the bay and river sediments. The Soils Analysis Table discusses the various aspects of structural , agricultural, and disposal area requirement properties. As mentioned earlier, the soils characteristics are comparable for all samples taken except the Garibaldi station sample (minor exceptions are noted in the Properties column for Nehalem Bay differences.

TABLE
WATER QUALITY ANALYSIS – A

	Parameter	Station			
		Tillamook		Nehalem	
		Garibaldi	Bay City	Fishery	Dean
Bulk Analysis % Dry Weight	Volatile Solids	13.7	6.0	8.2	8.0
	Chemical Oxygen Demand	39.6	4.3	3.4	6.2
	Sulfides	0.039	0.0018	0.0018	0.00095
	Oil and Grease	0.0275	0.0080	0.0110	0.0024
Sediments	Copper	70	70	70	70
	Lead	5	5	5	5
	Mercury	0.2	0.5	0.3	7
	Zinc	20	40	20	40

Elutriate Analysis Parts/Billing Receiving Water	Copper	70	70	70	70
	Lead	5	5	5	5
	Mercury	0.2	0.2	0.2	0.2
	Zinc	20	20	30	30

NOTE: Specific comparisons to state and federal standards are not given because dredge disposal analysis is made comparing the aggregate of parameters with the characteristics of the receiving waters.

TABLE
SOILS ANALYSIS – B

Classification & Characteristic Category			Properties
		Garibaldi Sample	A. Bay City B. Fishery Point C. Dean Point D. All of the above
	Description	Silty Sand	A. Poorly grade fine sand B. Poorly grade medium sand C. Course to medium sand
	Unified Soil Classification	ML	A. S.P. B. S.P. C. S.W/S.P.
Structural Properties	Value as fill material for structural or pavement foundations	Not suitable	D. Excellent
	Compressibility/Settlement Potential	High potential	D. No potential if compacted
	Drainage Characteristics	Very Impervious	D. Free draining
	Estimated field CBR*	5	A. 10-25 B. 10-25 C. 10-15
	Presumptive allowable bearing pressure	Not suitable	D. 1500 PSF
Agricultural Properties	Organic Content	Low	D. Negligible
	Value as soil for pastureland	Good	D. Poor without amendment
	Value as soils for crops	Poor due to low organic content and salts held in soils	D. Poor without amendment
	Settling rate	Very slow	D. Rapid
	Wind erosion potential	Moderate	D. High
	Dewatering	Very slow	D. Rapid
	Workability with Equipment	Poor	D. Excellent
	Retention time required	Long	D. Very short

* CBR = California Bearing Ratio

Radioactivity

The environs of Tillamook Bay have been monitored for radioactivity since 1961, primarily as a result of radioactive

discharges into the Columbia River by the Hanford Atomic Products Operation. Through this surveillance the Oregon Health Division has identified radioactivity arising from three distinct sources that may have appeared in waters of Tillamook Bay or Nehalem Bay:

1. Natural: long lived isotopes contained primarily in sedimentary material (geologic formations).

2. Fallout: fission product radionuclides arising from atmospheric weapons testing (as done by China).

3. Neutron Activation: radio nuclides originating from the old single pass Hanford Reactors prior to their complete phase out in 1971 (these materials came down the Columbia River, were picked up in the coastal littoral drift, and residuals deposited in North Coast estuaries).

Levels of radioactivity in Tillamook Bay have never posed a threat to human life, or measurable forms of other life, during the course of this monitoring program. Levels of radioactivity have changed, and these changes have been directly correlated with the Hanford discharge practices or the weapons testing programs. At this time, the radioactivity found in the bay is elusively from natural sources, primarily the slow decomposition of geologic formations (earth). Such levels of radioactivity are far below the state and federal standards considered □safe□ for life forms. The radioactive content to be found in dredged materials from either bay is expected to be negligible, if even measurable.

3.2d Engineering Criteria

Site Selection

The selection of dredged material disposal sites is dependent upon an inventory of all possible disposal areas, an evaluation of the various characteristics of each site, and a cost assessment and design requirements analysis for each potential site. Existing state and federal laws related to dredging and dredged material disposal activities require an additional analysis of the environmental considerations related to disposal site use (see ENVIRONMENTAL CRITERIA discussion).

The inventory of potential sites is developed by looking at the bay in its aggregate form and identifying all areas that could possibly retain dredged materials. At a closer look, the sites are scrutinized according to their topography (on-site and relative to the estuary surface), existing physical features (hydrology, vegetation, structures), and distance to the dredging activity. This analysis eliminates sites which are impractical because of features that exceed engineering feasibility. The remaining inventory of sites are then further assessed according to Site Preparation requirements, Design Criteria, and Cost Criteria.

Site Preparation

Disposal sites can vary substantially in terms of their preparation requirements, or "construction needs," for proper disposal use. The general considerations include: leveling of the site to ensure uniform application for maximum dewatering, the clearing of vegetation for structural benefits, dike material requirements, surface drainage compensation, utility relocation, dredge equipment positioning (pipelines, etc.), and return flow or outfall options. Several of these items are temporary, and some are more permanent in nature (depending on the site).

Temporary removal of structures, soils, roads, and other features may also be a site preparation requirement. In Nehalem and Tillamook, there are opportunities for enhancing agricultural lands, given that the existing topsoils are temporarily removed until disposal activity has been completed and materials graded. Structures and roads, such as barns ad driveways, may require temporary relocation during major disposal projects.

Design Criteria

Specification for the actual design of disposal construction on a site is typically undertaken in the actual permit or contract necessary for the individual projects. However, general requirements have been identified that will apply to disposal actions in these two bays.

Dikes may be constructed to serve as either perimeter, interior or training dikes. Perimeter dikes require the greatest care in construction to provide long term stability and to avoid accidental breaks or spills. Training dikes are sometimes constructed from the fill material to direct inflow and to prevent short circuiting of the disposal material and runoff.

Dikes can (in most cases) be constructed using native on-site materials. In the case of SP (sands and gravels) materials from hydraulic dredging, initial toe diking of the site will generally be sufficient. A toe dike is a low dike, 2 to 3 feet high, used to contain and direct the effluent slurry. As the fill proceeds, these two dikes may be raised using the fill material.

In the case of the ML (silty sands) materials, the perimeter of the site should be diked to several feet above the anticipated ultimate site elevation. Dike slopes should not be steeper than 1.5 horizontal to 1.0 vertical and the top of the dike should generally be wide enough for vehicle access *8 feet). The dike slopes above ordinary high water should be planted, and the slope below ordinary high water should be protected with rep-rap to prevent erosion.

An outfall structure should be constructed to control and direct the return of the dredging effluent to the river channel or bay. The outfall structure basically consists of an overflow weir with provision for height adjustment, a collection chamber downstream of the weir and a discharge pipe downstream of the collection chamber. The configuration of these structures ranges from the simple half-culvert with stop-log weir, to the more

elaborate rectangular timber box having a weir length of 40 feet or more and incorporating several discharge pipes. From a functional standpoint, the most important feature of the outfall structure is control over the surface area of the settling basin impounded behind the structure.

The spillway pond area required is a function of a number of variables each unique to the individual dredging operation. These variables are discharge rate of effluent, solids concentration of slurry, particle size gradation of solids, effluent temperature, action of wind and currents in the pond, and allowable solids content in slurry. The size of the spillway pond required for the proposed operation can be determined upon knowledge of these variables, or on the basis of past successful experience with similar materials. The spillway pond area may be sized proportionately to the dredge discharge rate, so that the ratio of discharge to surface area of spillway pond is comparable to that used successfully in the past. For example, assuming an allowable effluent solids concentration of 1%, a single cell spillway pond, and a slurry of SP material, an 8-inch dredge would require approximately 1.5 acres and a 24-inch dredge approximately 4 acres of spillway pond. The ML material will probably have to be dredged into holding cells to achieve the much longer retention times needed to achieve sedimentation of the finer solids.

The disposal area should be revegetated upon completion of the fill as protection against wind and water erosion. The SP soil will require fertilization and possibly a cover of topsoil to establish a stable growth of vegetation. The fill area should be gradual to minimize ponding and to direct drainage water toward existing drainage courses.

Cost Criteria

Costs for dredging activities are estimated by calculating the cost of removal of the material (dredging) and its placement on the designated site (disposal). Equipment requirements for dredging are determined by a) the quantity of dredge soils to be moved, B) the proximity of the disposal site to the area being dredged, c) the specific characteristics of the disposal site, and d) the type of material being moved. Although actual dredging operations can vary widely due to equipment availability and a host of other factors, the costs associated with dredging operations can be useful in determining the economic comparison of selected sites.

3.2e Environmental Criteria

Federal Guidelines for Disposal

The last decade has seen a number of legislative acts, both federal and state, which influence the disposal of materials in and near waters of the United States. The single most influential law is Public Law 92-500, the Federal Water Pollution control Act of 1972 (amended in 1977). Under Section 404 of this law, the Corps of Engineers issues permits for the discharge of dredged

or fill material in navigable waters of the United States (including wetlands, lakes, and tributary streams of 5 cfs or more). Permits must be authorized based upon the Guidelines developed by the Environmental Protection Agency in conjunction with the Corps of Engineers. These "Guidelines," summarized below, are regulatory in nature as permit issuance is based upon compliance with these stipulations.

The Section 404 (b) (1) Guidelines specifically address the "findings" requirements of proposed dredged disposal or fill activity in "navigable waters."

The following are the "tests" of these Guidelines which must be demonstrated prior to issuance of a federal permit:

1) That no practicable alternatives are available that would have less damaging environmental impacts;

2) That the fill is for a water dependent use or otherwise proved to be for the public good;

3) That the environmental impacts cased by the filling will be identified, and minimized or mitigated.

Executive Order 11990, signed by President Carter, May 24, 1977, further strengthened the laws protection wetland areas.

> "Section 2. (a) In furtherance of Section 101 (b) (3) of the National Environmental Policy Act of 1969 to improve and coordinate Federal plans, functions, programs and resources to the end that the Nation may attain the widest range of beneficial uses of the environment without degradation and risk to health or safety, each agency, to the extent permitted by law, shall avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds (1) that there is no practicable alternative to such construction, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use."

State Guidelines

Disposal activity is further regulated in estuaries by state laws principally LCDC Goal 16. Goal 16, in its overall statement declares that:

> "Dredge, fill or other reduction or degradation of these natural values by man shall be allowed only:
>
> (1) If required for navigation or other water dependent uses that require an estuarine location; and
>
> (2) If a public need is demonstrated; and

(3) If no alternative upland locations exist; and

(4) If adverse impacts are minimized as much as feasible."

The Goal 16 Implementation Requirement (4) states that mitigation will be required when dredge or fill activities are permitted in inter-tidal or tidal marsh areas.

Goal 16 Implementation Requirement (5) further declares:

"These programs shall encourage the disposal of dredge material in uplands or ocean waters, and shall permit disposal in estuary waters only where such disposal will clearly be consistent with the objectives of this goal and state and federal law. Dredged material shall not be disposed inter-tidal or tidal marsh estuarine areas unless part of an approved fill project."

The state Fill and Removal Law (ORS 541.605), further conditions dredging or filling in waters of the state, to minimize adverse impacts to the waters, and limit filling to projects that are for the public good.

Site Acceptability

Each potential dredged disposal site is thus evaluated according to its "acceptability," or conformance to state and federal regulations. This evaluation is much like the engineering feasibility analysis, except that the above mentioned state and federal standards are the evaluation criteria, along with resource agency policies concerning wildlife and fishery protection.

Once an inventory of potential sites is developed from an engineering feasibility assessment of the various potential areas, then the environmental criteria are applied. State and federal agencies with regulatory authority over dredged material disposal participate in a field review of the sites. They are asked to directly participate in this review because:

1) Goal 16 specifically states that the state and federal agencies shall be involved in the development of the dredged material disposal plan; and

2) These agencies are the same agencies that will be involved in the permit review process for dredge projects in the future, and therefore can provide predictability to the approval process.

The agencies that have been directly involved in the development of this dredge plan are:

Environmental Protection Agency
U.S. Fish and Wildlife Service
National Marine Fisheries Service
U.S. Army Corps of Engineers
Oregon Department of Fish and Wildlife

Oregon Department of State Lands
Oregon Department of Environmental Quality
Oregon Parks and Recreation Department
Oregon Department of Land Conservation and Development

Tillamook Estuaries Partnership

The application of the state and federal criteria divided the "inventory" of potential disposal sites into two categories.

Priority - The disposal of dredged materials on these sites would presently meet approval by the state and federal agencies during a permit review process (dredging projects, versus disposal, were not evaluated in this planning effort and would therefore require separate review).

Reserve – The Reserve sites were selected to provide additional area within the region of each bay to accommodate future needs. The disposal of dredged materials on these sites may require additional site review and analysis.

Every site included in this dredge plan for Tillamook and Nehalem Bays is identified as either Priority or Reserve. Environmental impacts anticipated from disposal on "Priority" sites are nominal, as a return of the site to its pre-disposal conditions could easily be achieved. Those sites identified as "Reserve" would need to undergo further site analysis. All sites at this time have been identified as "acceptable" subject to potential conditions to be defined at the time a project is proposed.

Many of the "priority" sites will require a level of review at the local, state, and federal level. Floodplain issues and wetlands will be the two issues most likely to trigger permit reviews. In developing a dredged material disposal plan proposal, applicants will need to contact the Oregon Department of State Lands and the US Army Corps of Engineers if sites have been identified in the Plan as having wetlands present or will impact the estuaries. All attempts should be made to construct the sites to avoid resource issues. Clean Water standards will be addressed by the Oregon Department of Environmental Quality in conjunction with the permitting process through the Department of State Lands and the US Army Corps of Engineers.

CHANGES TO GOALS 17 and 18

Goal 17, Coastal Shorelands Element

Section 3.3b, Nehalem Estuary Shorelands (Nm)

(3)(a). Areas within 1000 feet of the south bank of the Nehalem River between the Port of Tillamook Bay Railroad bridge and Foley Creek (areas of steep slopes and landslide hazard); and

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(4). From the Mohler Bridge on the South Fork of the Nehalem River to the junction of the North and South Forks of the Nehalem River at Fork Island, the boundary line includes:...

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Section 3.3c, Tillamook Estuary Shorelands (Tk)

(5). Between the intersection of the Miami River Road and U.S. Highway 101 and Ekroth Road (T 1N, R 10W, S 22, SW ¼, NE ¼, S 23, NW ¼) the boundary line includes:

a. Areas within 50 feet of the Miami River channel up to head of tide; or
b. MIT site 1, or
c. Areas within 50 feet of Illingsworth Creek up to head of tide.

(original 5(b) was removed as it referenced DMD site 16 which is no longer included in the inventory)

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(7). From the northern end of Larson Cove to the northern Bay City city limits, the boundary line extends 50 feet around the Cove, and shall include the parcel designated as Tax Lot 201 in Section 22A of Township 1 North, Range 10 West, W.M. at the southeastern end of the Cove.

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Deleted: except at DMD Site 13,

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Deleted: , where the boundary line is extended to include the DMD site.

(8). From the southern city limits of Bay City to the point where the Southern Pacific Railroad crosses Vaughn Creek, the boundary line follows the Port of Tillamook Bay Railroad.

(9). From the point where the Port of Tillamook Bay Railroad crosses Vaughn Creek to the intersection of U.S. Highway 101 with the State Highway 131, the boundary line includes all of the following areas which are outside of the Tillamook City UGB:

Section 4.5 Dredged Material Disposal and Mitigation Sites

Policy

Shoreland areas suitable as dredged material disposal (DMD) or mitigation sites shall be identified in the Tillamook County Comprehensive Plan. Sites identified as priority dredged material disposal (DMD 1) or priority mitigation (M 1) sites shall be protected from uses or activities which conflict with disposal or mitigation.

Goal 18, Beaches and Dune Element

Section 4.4g In selecting sites for the disposal of dredged materials, sites that allow for the nourishment of eroding beaches shall be preferred. Whenever appropriate, dredged materials should be placed on beachfront Dredged Material Disposal Sites adjacent to the Tillamook Bay and Nehalem Bay jetties as identified in Goal 16.

EXHIBIT B

Changes to Policies in Goal 16

7. POLICIES FOR ESTUARY ACTIVITY

7.1 Dredged Material Disposal Policies

1. Dredged material disposal (DMD) plans shall be developed for Tillamook and Nehalem Bay, and shall be adopted as part of the Tillamook County Comprehensive Land Use Plan. Coordination with affected state and federal resource agencies shall occur during the development, implementation and future amendment of DMD plans.

2. Tillamook County shall develop dredged material disposal (DMD) plans for Nestucca and Netarts Estuary prior to approval of new and maintenance dredging projects if the total of the initial and 5-year dredged material disposal requirements exceeds 500 cubic yards.

3. Tillamook County dredged material disposal plans shall evaluate dredging needs over a five-year period, and shall establish priorities on areas for dredged material disposal based on the following economic, engineering and environmental considerations:

a. engineering feasibility;

b. probable method of dredging;

c. distance from dredging project;

d. elevation;

e. cost of site acquisition, preparation, and containment of dredged materials;

f. size of site;

g. cost of, ability, or necessity to revegetate or develop on top of the dredged material;

h. impacts on biological productivity, aquatic communities and habitats, water quality, wetlands and floodplain;

i. ownership (public or private);

j. conformity of the final use, after dredged material disposal, to the Tillamook County Comprehensive Plan;

k. habitat, scenic, recreational, archaeological or historic values of the site.

4. Whenever practicable, ocean disposal in an approved ocean disposal site shall be the preferred method of disposal of dredged materials. The designation of additional ocean disposal sites shall occur only after a formal site review and impact analysis by all federal and state agencies with regulatory authority, and is subject to final approval by the U.S. Army Corps of Engineers and the Environmental Protection Agency. Copies of site review and impact analysis shall be made available to

EXHIBIT B

local governments.

5. When engineering or economic considerations preclude the use of approved ocean disposal sites for dredged material disposal, sites identified in the Tillamook and Nehalem Bay DMD plan elements of the Tillamook County Comprehensive Plan as "Presently Acceptable" shall be used for dredged material disposal.

6. Flow-lane disposal of dredged material shall be limited to ED zones and monitored to assure that estuarine sedimentation is consistent with the resource capabilities and purposes of the affected natural and conservation management units.

7. Sites identified in the future to be included in the Tillamook and Nehalem Bay DMD plan element of the Tillamook County Comprehensive Plan shall be used for disposal of dredged material only after an amendment to the Tillamook County Comprehensive Plan and zoning map. If rezoning of an area to provide for dredged material disposal involves an exception to the Statewide Land Use planning Goals, the exception shall be included as part of the amendment:

   a. why these other uses should be provided for;

   b. what alternative locations within the area could be used for the proposed use;

   c. what are the long-term environmental, economic, social and energy consequences to the locality, the region or the state from not applying the goal or permitting the alternative use;

   d. a finding that the proposed uses will be compatible with other adjacent uses.

   Coordination with affected state and federal resource agencies shall occur during this amendment process. State and federal permits must be obtained prior to disposal of dredged material.

8. As needs arise, additional disposal sites shall be approved for dredged material disposal. Designation of additional dredged material disposal sites shall be coordinated with state and federal resource agencies with regulatory authority over dredged material disposal. An amendment shall be taken to the Tillamook County Comprehensive Plan and zoning map if rezoning of an area is necessary in order to provide for dredged material disposal. If rezoning of an area to provide for dredged material disposal involves an exception to the Statewide Land Use Planning Goals, the exception shall be included as part of the amendment.

9. Disposal of dredged material on ocean beaches for purposes of beach nourishment should be utilized, whenever practicable. Beach areas suitable for nourishment shall be identified in the DMD plan. The use of dredged material for beach nourishment shall be coordinated with the Oregon Parks and Recreation Department or the Department of State Lands, if the practice could impact their lands, and with the Oregon Department of Fish and Wildlife and the National Marine Fisheries Service if the practice could impact subtidal or intertidal clam beds, eelgrass beds or fish spawning substrates.

10. Disposal of dredged material within state parks shall be coordinated with the Oregon Parks and Recreation Department to ensure consistency with the State Park Master Plan, and with the maintenance of significant wildlife habitat and other natural and aesthetic resources.

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11. Tillamook County shall identify a sufficient number of dredged material disposal sites to accommodate dredged material disposal needs identified in the Tillamook and Nehalem Bay DMD plans. Sites identified as priority sites shall be preserved for future dredged material disposal use. Tillamook County shall cooperate with local ports and affected local jurisdictions to preserve these sites for future disposal use.

12. Tillamook County, in conjunction with local ports, affected local jurisdictions and state and federal resource agencies, shall review the dredged material disposal plans for Tillamook and Nehalem Bay at no more than five year intervals to reexamine dredging needs, site availability, new permit requirements and degree of plan implementation.

13. Use of dredged material from navigational or other dredging actions as fill for approved fill projects shall be encouraged. Prior determination shall be made to ensure that the structural characteristics of the material are suitable for this use.

14. Whenever practicable, stockpile sites of dredged material suitable for use as fill shall be established and the dredged material sold. Particular emphasis shall be given to establishing stockpile sites in areas where acceptable disposal sites are presently, or likely to be limited.

15. Dredged material disposal is subject to the requirements of the Clean Water Act of 1977 (P.L. 95-217, the State Fill or Removal Law and other state and federal laws which regulate the disposal of dredged materials).

8. IMPLEMENTATION POLICIES

1. Estuaries of Tillamook County shall be managed through implementation of the Tillamook County Comprehensive Plan by means of the Tillamook County Land Use Ordinance, which shall contain estuary development standards, estuary zone descriptions and zoning maps.

2. Tillamook County shall review state and federal permit applications for uses and activities within the estuaries for consistency with the Tillamook County Comprehensive Plan and Land Use Ordinance.

Removed: b) A-95 project pre-application notification, by mneans of referral from and comment to the Clatsop-Tillamook Intergovernmental Council.

Where applicable, procedures for review shall be developed as part of the Tillamook County Land Use Ordinance. The review of actions which would potentially alter the integrity of the estuarine ecosystem shall include an impact assessment and a demonstration that the public's need and gain warrants the modification or loss unless this is already part of the comprehensive plan.

3. Tillamook County shall coordinate with local, state and federal agencies and citizen advisory groups implementation of the Estuarine Resources element of the Tillamook County Comprehensive Plan. Tillamook County may convene an

implementation conference as a means of coordination during the following:

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a. preparation of post-acknowledgment amendments to the Comprehensive Plan, or Land Use Ordinance;

b. periodic updates of the Tillamook County Comprehensive Plan;

c. review of recommendations and/or findings of fact for state or federal permit applications as a form for discussion or resolution of disputes over regulatory functions;

d. establishment of mitigation banks.

4. Tillamook County shall involve the following state and federal agencies in the review of regulated activities: Oregon Department of Fish and Wildlife, Oregon Department of State Lands, Oregon Department of Land Conservation and Development, Oregon Economic and Community Development Department, U.S. Fish and Wildlife Service, National Marine Fisheries Service, Environmental Protection Agency, U.S. Army Corps of Engineers.

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5. Dredge and or filling shall be allowed only if:

a. required for navigation or other water-dependent uses that require an estuarine location or is specifically allowed by the management unit or zone; and

b. a need (i.e. a substantial public benefit) is demonstrated and the use or alteration does not unreasonably interfere with public trust rights; and

c. no feasible alternative upland locations exist; and

d. adverse impacts to aquatic life and habitat, recreation and aesthetic uses, water quality and other physical characteristics of the estuary are minimized.

6. Significant degradations or reductions of estuarine natural values include dredging, fill, in-water structures, riprap, log storage, application of pesticides and herbicides, flow-lane disposal of dredged material, water-intake or withdrawal and effluent discharge and other activities which will cause significant offsite impacts as determined by an impact assessment.

7. Dredging, fill piling/dolphin installation, navigational structures, shoreline stabilization and dredged material disposal associated with an estuarine use or uses shall be reviewed as a whole subject to the respective policies for these activities and uses.

ESTUARINE RESOURCES

GOAL 16

MAPS

ESTUARINE RESOURCES

GOAL 16

1. OVERVIEW OF ESTUARY PLAN

1.1 Introduction

An estuary is defined as a body of water semi enclosed by land, connected to the open ocean, and within which salt water is usually diluted by fresh water derived from the land. The estuary includes: (a) Estuarine water; (b) Tidelands; (c) Tidal marshes; and (d) Submerged lands. Estuaries extend upstream to the head of tidewater.

Areas which fall within the definition of estuary listed above are subject to the requirements of Goal 16, the Estuarine Resources Goal. Estuarine areas in Tillamook County are shown on Map 1. These include Nehalem, Tillamook, Netarts, Nestucca, Sandlake and Salmon River estuaries, and the tidally-influenced segments of Neskowin and Sutton Creeks in Neskowin.

1.2 State Planning Requirements for Estuaries

1.2a Objective

The objective of Goal 16, Estuarine Resources, is:

> "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."[1]

In order to accomplish this objective, Tillamook County has developed a comprehensive management plan for the County's five major estuaries, the Salmon River, and for the tidally-influenced portions of Neskowin and Sutton Creeks. These comprehensive plans were developed in accordance with three sets of requirements outlined in Goal 16: inventory requirements, comprehensive plan requirements, and implementation requirements.

1.2b Inventory Requirements

Goal 16 Inventory Requirements state that:

> "Inventories shall be conducted to provide information necessary for designating estuary uses and policies. These inventories shall provide information on the nature, location, and extent of physical, biological, social and economic resources in sufficient detail to establish a sound basis for estuarine management and to enable the identification of areas for preservation and areas of exceptional potential for development."[2]

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[1] LCDC Statewide Planning Goals and Guidelines, p. 15
[2] Ibid

1.2c Comprehensive Plan Requirements

Goal 16 Comprehensive Plan Requirements state that:

> "Based upon inventories, the limits imposed by the overall Oregon Estuary Classification, and needs identified in the planning process, comprehensive plans for coastal areas shall:
>
> (1) Identify each estuarine area;
>
> (2) Describe and maintain the diversity of important and unique environmental, economic and social features within the estuary;
>
> (3) Classify the estuary into management units; and
>
> (4) Establish policies and use priorities for each management unit...[1]
>
> (5) Consider and describe in the plan the potential cumulative impacts of the alterations and development activities envisioned. Such a description may be general but shall be based on the best available information and projections."

The overall estuary classification referred to in the Comprehensive Plan Requirements was established in the Administrative Rule Classifying Oregon Estuaries (OAR 660-17-010). OAR 660-17-010 established four estuary classifications: Natural, Conservation, Shallow Draft Development and Deep-Draft Development. The overall estuary classification limits the intensity of development or alteration which may occur by placing limitations on the types of "management units" which may be established within each estuary (See Table 1). A "management unit" is defined as:

> "A discrete geographic area, defined by biophysical characteristics and features, within which particular uses and activities are promoted, encouraged, protected, or enhanced, and others are discouraged, restricted or prohibited."[2]

TABLE 1:
Relationship of overall estuary classification to Management Units Permitted

Overall Classification	Estuary	Management Units Allowed
Natural	Sandlake (1) Salmon (1)	Natural
Conservation	Netarts (1) Nestucca (1) Sutton Creek (2) Neskowin Creek (2)	Natural and Conservation
Shallow-Draft	Tillamook (1) Nehalem (3)	Natural, conservation and Development

[1] LCDC Statewide Planning goals and Guidelines, p 15
[2] Ibid. p 24

NOTES:
(1) Estuaries classified by OAR 660-17-010
(2) Classification development during comprehensive planning process
(3) A shallow-draft development classification for Nehalem Estuary was approved by the LCDC on January 30, 1981.

Estuarine Area

INSERT map

Goal 16 defines three kinds of management units, and specified purposes and permissible uses within each management unit:

"(1) Natural-In all estuaries, areas shall be designated to assure the protection of significant fish and wildlife habitats, of continued biological productivity within the estuary, and of scientific, research, and education needs. These shall be managed to preserve the natural resources in recognition of dynamic, natural, geological and evolutionary processes. Such areas shall include, at a minimum, all major tracts of salt marsh, tideflats, and seagrass and algae beds.

Permissible uses in natural areas shall be undeveloped low-intensity water-dependent recreation; research and educational observation; navigational aides, such as beacons and buoys; protection of habitat, nutrient, fish, wildlife and aesthetic resources; passive restoration measures; dredging necessary for on-site maintenance of existing functional tidegates, associated drainage channels and bridge crossing support structures; riprap for protection of uses existing as of October 7, 1977, unique natural resources, historical and archaeological values, and public facilities; and bridge crossings. Where consistent with the resource capabilities of the area and the purposes of this management unit, aquaculture which does not involve dredge or fill or other estuarine alteration other than incidental dredging for harvest of benthic species or removable in-water structures such as stakes or racks, communication facilities, active restoration, of fish and wildlife habitat or water quality, estuarine enhancement, boat ramps for public use where no dredging or fill for navigational access is needed; pipelines, cables and utility crossings, installation of tidegates in existing functional dikes, temporary alterations, and bridge crossing support structures and dredging necessary for their installation.

A use or activity is consistent with the resource capabilities of the area when either the impacts of the use on estuarine species, habitats, biological productivity and water quality are not significant or that the resources of the area are able to assimilate the use and activity and their effects and continue to function in a manner to protect significant wildlife habitats, natural biological productivity, and values for scientific research and education.

(2) Conservation-In all estuaries, except those in the overall Oregon Estuary Classification which are classed for preservation, areas shall be designated for long-term uses of renewable resources that do not require major alteration of the estuary, except for the purposes of restoration. These areas shall be managed to conserve the natural resources and benefits. These shall include areas needed for maintenance and enhancement of biological productivity, recreational and aesthetic uses, and aquaculture. They shall include tracts of significant habitat smaller or of less biological importance than those in (1) above, and recreational or commercial oyster and calm beds not included in (1) above. Areas that are partially altered and adjacent to existing development of moderate intensity which do not possess the resource characteristics of natural or development units shall also be included in this classification.

Permissible uses in conservation areas shall be all uses listed in (1) above except temporary alterations. Where consistent with resource capabilities of

the area and the purposes of this management unit, high-intensity water-dependent recreation, including boat ramps, marinas and new dredging for boat ramps and marinas; minor navigational improvement; mining and mineral extraction, including dredging necessary for mineral extraction; other water-dependent uses requiring occupation of water surface area by means other than dredge or fill; aquaculture requiring dredge or fill or other alteration of the estuary, active restoration for purposes other than those listed in (1) d above, and temporary alterations shall be appropriate.

A use or activity is consistent with the resource capabilities of the area when either the impacts of the use on estuarine species, habitats, biological productivity, and water quality are not significant or that the resources of the area are able to assimilate the use and activity and their effects and continue to function in manner which conserves long-term renewable resources, natural biologic productivity, recreational and aesthetic values and aquaculture.

(3) Development-In estuaries classified in the overall Oregon Classification for more intense development or alteration, areas shall be designated to provide for navigation and other identified needs for public, commercial, industrial water-dependent uses, consistent with the level of development or alteration allowed by the overall Oregon Estuary Classification. Such areas shall include deep-water areas adjacent or in proximity to the shoreline, navigation channels, subtidal areas for in-water disposal of dredged material and areas of minimal biological significance needed for uses requiring alteration of the estuary not included in (1) and (2) above.

Permissible uses in areas managed for water-dependent activities shall be navigation and water-dependent commercial and industrial uses. As appropriate the following uses shall also be permissible in development management units:

(a) Dredge or fill, as allowed elsewhere in the goal;
(b) Navigation and water-dependent commercial enterprises and activities;
(c) Water transport channels where dredging may be necessary;
(d) Flow-lane disposal of dredged material monitored to assure that estuarine sedimentation is consistent with the resource capabilities and purposes of affected natural and conservation management units.
(e) Water storage areas where needed for products used in or resulting from industry, commerce, and recreation;
(f) Marinas.

Where consistent with the purposes of this management unit and adjacent shorelands designated especially suited for water-dependent uses or designated for waterfront development, water-related and non-dependent, non-related uses not requiring dredge or fill; mining and mineral extraction; and activities identified in (1) and (2) above shall be appropriate."[1]

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[1]

Goal 16 also requires that general priorities be established for management and use of estuarine resources. These use priorities (listed below from highest to lowest) are implemented through the management unit designation and permissible use requirements in each zone.

"(1) Uses which maintain the integrity of the estuarine ecosystem;

(2) Water-dependent uses requiring estuarine location, as consistent with the overall Oregon Estuarine Classification;

(3) Water-related uses which do not degrade or reduce the natural estuarine resources and values; and

(4) Non-dependent, non-related uses which do not alter, reduce or degrade the estuarine resources and values."

1.2d Implementation Requirements

Goal 16 establishes eight implementation requirements, six of which must be implemented by Tillamook County through comprehensive estuary management plans:

Implementation Requirement 1 states that:

"Unless fully addressed during the development and adoption of comprehensive plans, actions which would potentially alter the estuarine ecosystem shall be preceded by a clear presentation of the impacts of the proposed alteration. Such activities include dredging, dill, in-water structures, riprap, log storage, application of pesticides and herbicides, water-intake or withdrawal and effluent discharge, flow-lane which could affect the estuary's physical processes or biological resources.

The impact assessment need not be lengthy or complex, but it should enable reviewers to gain a clear understanding of the impacts to be expected. It shall include information on:

(a) The type and extent of alterations expected;
(b) The type of resource(s) affected;
(c) The expected extent of impacts of the proposed alteration on water quality and other physical characteristics of the estuary, living resources, recreation and aesthetic use, navigation and other existing and potential uses of the estuary; and
(d) The methods which could be employed to avoid or minimize adverse impacts."

Implementation Requirement 2 requires that dredging or fill be allowed only:

(a) If required for navigation or other water-dependent uses that require an estuarine location or if specifically allowed by the applicable management unit requirements of this goal; and
(b) If a need (i.e., a substantial public benefit) is demonstrated and the use or alteration does not unreasonably interfere with public trust rights; and

(c) If no feasible alternative upland locations exist; and
(d) If adverse impacts are minimized.

Implementation Requirement 2 requires that dredging or fill be allowed only:

(a) If required for navigation or other water-dependent uses that require an estuarine location or if specifically allowed by the applicable management unit requirements of this goal; and
(b) If a need (i.e., a substantial public benefit) is demonstrated and the use or alteration does not unreasonably interfere with public trust rights; and
(c) If no feasible alternative upland locations exist; and
(d) If adverse impacts are minimized.

Other uses and activities which could alter the estuary shall be allowed if the requirements in (b), (c) and (d) are met. All or portions of these requirements may be applied at the time of plan development for actions identified in the plan. Otherwise, they shall be applied at the time of permit review.

Implementation Requirement 3 requires local government to maintain water quality and minimize man-induced sedimentation in estuaries by recognizing the management techniques or controls of existing programs or authorities.

Implementation Requirement 5 requires mitigation for the effects of dredging or fill in intertidal or tidal marsh areas. Comprehensive plans are required to designate and protect specific sites for mitigation which generally correspond to the types and quantity of intertidal area proposed for dredging or filling, or make findings demonstrating that it is not possible to do so.

Implementation Requirement 6 requires local governments, in conjunction with state and federal agencies, to develop programs for disposal and stockpiling or dredged material.

Implementation Requirement 7 requires local governments to reduce the proliferation of individual single purpose docks and piers.

Implementation Requirement 8 requires local governments, with the assistance of state and federal agencies, to identify areas suitable for estuarine restoration.

1.3 Organization and Implementation of Estuary Management Plans

1.3a Elements

Estuary management plans are composed of the following elements:

(1) Factual Base;

(2) Management Unit Designation Maps;

(3) Dredged Material Disposal Plans;

(4) Mitigation and Restoration Plans;

(5) Policies for Uses and Activities.

1.3b Factual Base

The factual base used by Tillamook County to address the inventory requirements of Goal 16, the Estuarine Resources Goal, and Goal 17, Coastal Shorelands, consists of a series of color and color infrared aerial photographs (1:24, 000 scale) flown by the U.S. Army Corps of Engineers in 1978, and five coastal resource inventory documents. The five coastal resource inventory documents contain information on the physical, biological, social and economic characteristics of the five major estuaries and their adjacent shorelands (excluding shoreland areas within the Urban Growth Boundary of an incorporated city). The majority of the information contained in these inventories was compiled from existing data by Tillamook County Planning Department staff.

The five coastal resource inventory documents are:

(1) Nehalem Estuary and Shoreland Inventory – This inventory consists of two volumes which contain information on Nehalem Estuary and the coastal shorelands between the northern limits of the Rockaway Urban Growth boundary and the northern boundary of Tillamook County.

(2) Tillamook Estuary and Shoreland Inventory – This inventory consists of two volumes which contain information on Tillamook Estuary and the coastal shorelands between the southern boundary of Section 7 (T 1S, R 10W) and the northern limits of the Rockaway Urban Growth Boundary.

(3) Netarts Estuary and Shoreland Inventory – This inventory consists of one volume which contains information on Netarts Estuary and the coastal shorelands between the southern boundary of Section 1 (T 3S, R 11W) and the southern boundary of Section 7 (T 1S, R 10W).

(4) Sandlake Estuary and Shoreland Inventory – This inventory consists of one volume which contains information on Sandlake Estuary and the coastal shorelands between the half section line of Section 6 (T 4S, R 10W) and the southern boundary of Section 1 (T 3S, R 11 W).

(5) Nestucca Estuary and Shoreland Inventory – This inventory consists of one volume which contains information on Nestucca Estuary and the coastal shorelands between the southern boundary of Tillamook County and the half section line of Section 6 (T 4S, R 10W). The limited information available on Neskowin and Sutton Creeks is also contained within this volume.

(6) Salmon River Inventory – This inventory consists of relevant portions of the following documents;

(a) Final Impact Statement for the Management Plan for the Cascade Head Scenic Research Area, U.S. Department of the Interior, Forest Service, November 16, 1976;

(b) Estuarine Resources of the Oregon Coast, OCC & DC, February 14, 1975;

(c) Oregon's Estuaries, OSU, May, 1974.

1.3c Management Unit Description Maps

Maps showing the management unit classification within the five major estuaries of Tillamook County are contained in Section 2 of this element. The numbers on each management unit correspond to a set of numbered inventory sheets which describe each management unit by summarizing the information contained in the factual base. The inventory sheets are supporting documentation for the plan but are not a part of the plan itself.

The Management Unit Designation Maps will be implemented through the Tillamook County Zoning Maps and Land Use Ordinance. Zoning maps have been prepared for the five major estuaries, the Salmon River, and for the tidally-influenced portions of Neskowin and Sutton Creeks in Neskowin. Each type of management unit, Estuary Natural (EN), Estuary Conservation Aquaculture (ECA), Estuary Conservation 1 (EC1), Estuary Conservation 2 (EC2) and Estuary Development (ED) has been included in a corresponding zone. Section 3.100 of the Tillamook County Land Use Ordinance describes the extent of estuary zones and establishes general priorities for uses within estuary zones. Sections 3.102-3.110 of the Land Use Ordinance describe the five estuary zones.

Each zone description is divided into the following section: Purpose; Areas Included; permitted with Standards Uses; Conditional Uses; and Regulated Activities.

The following two sections of the Land Use Ordinance specify procedures for reviewing Permitted with Standards uses, conditional Uses and Regulated Activities within estuary zones:

a. Section 6.030, Conditional Use Procedures

b. Section 3.120, Regulated Activities and Impact Assessments

Changes in estuary zones are subject to the general procedures for amendments to the Tillamook County Land Use Ordinance described in Section 9.020, Amendment Procedure.

1.3d Dredged Material Disposal Plan Element

Dredged Material Disposal (DMD) plans for Nehalem and Tillamook Estuaries are contained in section 3 of this element.

The DMD plans for Nehalem and Tillamook Estuaries will be implemented through the Tillamook County Zoning Maps and Land Use Ordinance. Priority DMD sites in the DMD plan element are identified on the Tillamook County Zoning Maps by the symbol DMD-1. All DMD-1 sites are located within the Shoreland Overlay (SH) zone. The SH zone requires that all uses within DMD-1 sites be reviewed by the Tillamook County Planning commission through the Conditional Use Procedure. The standards in the SH zone require that:

(1) Uses within the DMD-1 sites be limited to uses which do not preclude the ultimate use of the site for dredged material disposal, and that;

(2) Dredged material disposal within any DMD site (Priority, Reserve or Inventory) be subject to the standards for Dredged Material Disposal in Section 3.140, Estuary Development Standards.

If state or federal permits are required prior to dredged material disposal in DMD-1 sites, the review procedures contained in section 3.120, Regulated Activities and Impact Assessments will be followed.

The procedures outlined in Section 9.020 of the Land Use Ordinance must be followed in order to add or delete DMD-1 sites to the Tillamook County Zoning Maps. If additional DMD-1 sites are designated within estuary zones, the provisions of Section 3.120, Regulated Activities and Impact Assessments, will be used to protect estuarine DMD-1 sites from conflicting uses and activities, and to regulate the disposal of dredged material within these sites.

1.3e Mitigation and Restoration Plan Element

Mitigation and Restoration plans for the five major estuaries of Tillamook County are contained in Section 4 of this element. The mitigation and restoration plans will be implemented through the Tillamook County Zoning Maps and Land Use Ordinance. Sites identified as Priority mitigation sites in the mitigation and restoration plan element are identified on the Tillamook County Zoning Maps by the symbol MIT-1. All MIT-1 sites are located within the Shoreland Overlay (SH) zone. The SH zone requires that all uses within MIT-1 sites be reviewed by the Tillamook County Planning Commission through the Conditional Use Procedure. The standards in the SH zone require that:

(1) Uses within MIT-1 sites be limited to uses which do not preclude the ultimate use of the site as a mitigation site; and that

(2) The use of any mitigation site (Priority or Reserve) be subject to the standards for Mitigation in Section 6.050, Estuary Development Standards.

If the use of a mitigation site involves a regulated activity, the review procedures contained in Section 3.120, Regulated Activities and Impact Assessments, will be followed.

The procedures outlined in Section 9.020 of the Land Use Ordinance must be followed in order to delete identified MIT-1 sites from the Tillamook County Zoning Maps.

Restoration sites identified in the Mitigation and Restoration Plan Element are not prioritized, and are not identified on the Tillamook County Zoning Maps. Restoration sites are located in estuary zones, and within the Shoreland Overlay (SH) zone. The standards for Restoration in Section 6.050 of the Tillamook County Zoning Ordinance apply to all restoration sites. If restoration involves a regulated activity, the review procedures contained in Section 3.120, Regulated Activities and Impact Assessments, will be followed.

1.3f Estuary Policies

Policies which apply to estuarine areas are contained in Sections 5-8 of this element. The policies are separated into four categories;

General Policies (Section 5)

Estuary Use Policies (Section 6)

Estuary Activity Policies (Section 7)

Implementation Policies (Section 8)

The majority of the policies are either Estuary use Policies or Estuary Activity Policies. Estuary Use Policies deal with the purpose for which an estuarine area, or structures occupying an estuarine area are designed, arranged, intended, occupied or maintained. Estuary Activity Policies deal with the activities which are taken in conjunction with a use and which make a use possible. Several activities (dredging, fill or piling installation) may be necessary in conjunction with a given use (marinas). The majority of the activities within estuarine areas are regulated by state and federal agencies through issuance of state and federal permits. Policies which did not separate as Estuary Use Policies or Estuary Activity Policies were included within the General Policy category.

The Implementation Policies in Section 8 state the intent of Tillamook County to implement the policies contained in Section 5-7 through the Tillamook County Land Use Ordinance. Policies which promote, discourage or prohibit certain uses within given estuary zones are implemented through the five estuary zones described in Sections 3.102-3.110 of the Land Use Ordinance. Policies which establish mandatory requirements which must be met prior to approval of uses and activities are implemented through application of the Estuary Development Standards in section 3.140 of the Land Use Ordinance. When activities involve state or federal permits, the Estuary Development Standards are applied through the procedure described in Section 3.120, Regulated Activities and Impact Assessments. Uses and activities which are allowed within a given estuary zone are subject to all policies and standards for that use or activity, except those policies and standards which are written to apply only within specific estuary zones. For example, a policy on marinas would apply within all estuary zones which allow marinas as either a Permitted with Standards or Conditional Use.

1.4 Estuary Management Plan Coordination with Cities

Coordination between Tillamook County and incorporated cities during the preparation of estuary management plans and implementing measures for Nehalem and Tillamook Estuary was necessary since the incorporated cities of Nehalem, Wheeler, Garibaldi, Bay City and Tillamook contain estuarine areas within city limits or in unincorporated areas within Urban Growth Boundaries. Tillamook County assumed the primary responsibility for preparation of estuary management plans and implementing measures for Nehalem and Tillamook Estuary. The affected incorporated cities are including the relevant portions of the Nehalem or Tillamook estuary management plans in their respective comprehensive plans or are adopting the County's plan by reference. They are including estuary zoning ordinance provisions equivalent to the County's provisions.

2. ESTUARY MANAGEMENT UNIT DESIGNATION MAPS

2.1 Procedure

As described in Section 1.2, Goal 16 defines the following kinds of management units, and defines the areas which shall be included within each management unit:

Natural Management Units shall include, at a minimum, all major tracts of salt marsh, tideflats, and seagrass and algae beds.

Conservation Management Units shall include areas needed for maintenance and enhancement of biological productivity, recreational and aesthetic uses, and aquaculture. They shall include tracts of significant habitat smaller or of less biological importance than those in (1) above, and recreational or commercial shellfish beds not included in (1) above. Development Management Units shall include deep-water areas adjacent or in proximity to the shoreline, navigation channels, subtidal areas for in-water disposal of dredged material and areas of minimal biological significance needed for uses requiring alteration of the estuary, not included in Estuary or Conservation Management Units.

The five maps contained in this section classify Nehalem, Tillamook, Netarts, Sandlake and Nestucca Estuaries into management units. To classify these estuaries into management units, it was first necessary to divide each estuary into geographic subareas, using the following sources of information:

(1) Oregon Department of Fish and Wildlife Habitat Maps;

(2) A series of 1:24,000 (1" = 2,000 feet) color and color infrared aerial photographs flown by the U.S. Army Corps of Engineers in 1978.

Subarea boundaries were generally drawn to follow the habitat boundaries delineated on the O.D.F.W. Habitat Maps, which were verified through aerial photo interpretation or field investigation. Habitat boundaries, however, were sometimes bisected by subarea boundaries if adjacent upland characteristics and existing land uses differed along the extent of a habitat boundary.

After subarea boundaries were defined within each estuary, the information now contained in the coastal resource inventory document for each estuary was reviewed to obtain information on individual subareas. The information on each subarea is summarized on inventory sheets contained in Section 2.2.

This inventory information, considered in conjunction with other factors such as adjacent upland characteristics and existing land uses, was used to apply a management unit designation to each subarea. Goal 16 exceptions have been taken in cases where the application of a management unit within a subarea is not consistent with Goal 16 requirements.

Major tracts of salt marsh, tideflats and eelgrass and algae beds were included within an Estuary Natural (EN) management unit. Areas within shallow-draft development estuaries (Tillamook and Nehalem) which fell within the Goal 16 definition of areas to be included within Development management units were included within an Estuary Development (ED) management unit. Areas needed for maintenance or enhancement of biological productivity, recreational and aesthetic uses, and aquaculture were included within one of three aquaculture were included within one of three Conservation management units: Estuary Conservation 1 (EC1), Estuary Conservation 2 (EC2) or Estuary Conservation Aquaculture

(ECA). Although the purpose and use priorities established for each of these three conservation management units is different, each zone is in conformance with the requirements for Conservation management units established in Goal 16.

2.2 NEHALEM ESTUARY MANAGEMENT UNIT DESCRIPTIONS

MANAGEMENT UNIT: 1

ZONING: Estuary Conservation 2 (EC2)

CATEGORY: Deep water areas adjacent to or in proximity to the shoreline.

Estuarine area which is partially altered, or is adjacent to existing development of the moderate intensity and is needed for development.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal beach bar (2.4.1)	16.9	74.1
Intertidal aquatic bed (2.3.19(7))	2.7	0.4
Intertidal shore (2.1.7)	1.7	0.8
Subtidal unconsolidated bottom (1.1)	27.9	2.4

1 EC2 contains the area between the Nehalem jetties exclusive of the main channel. The jetties, originally constructed in 1915 (south jetty) and 1918 (north jetty), are authorized by Congress and have recently been reconstructed by the U.S. Army Corps of Engineers. 1 EC2 contains one sparse bed of gaper (Tresus capax) clams and butter (Saxidomus giganteus) clams. The relative importance of these clam beds is difficult to assess, since clam population surveys are available only for the subtidal areas along the east side of Nehalem Estuary. Communication with area residents, however, indicated that the major clam beds of Nehalem Estuary have historically been located within the intertidal flats of 7EN. In 1978, intertidal algal beds were located along the westernmost end of the south jetty. The westernmost 1,500 feet of the south jetty received the second highest use (for both ours and number of shore angler trips) of three shore fishing sampling stations surveyed in 1971. A Department of Environmental Quality (DEQ) water surveillance station (Station 5) is located within 1 EC2 (See Section B 2.2 of Nehalem Estuary inventory for water quality data).

The EC2 designation for this management unit will provide for navigational improvements (such as jetty repair and maintenance) which become necessary to maintain navigational access through the entrance channel.

MANAGEMENT UNIT: 2

ZONING: Estuary Conservation 1 (EC1)

CATEGORY: Tracts of significant habitat smaller or of less biological importance than those in natural management units.

Partially altered area not needed for preservation or development.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.11)	0.9	0.2
Intertidal aquatic bed (2.3.10(7))	1.2	0.2
Intertidal flat (2.2.1)	8.2	0.2

2 EC1 is an intertidal area immediately behind the south jetty which has been identified as a feeding and resting area for waterfowl and shorebirds. Jetty Creek, which enters into 2 EC1, is a Class 1 salmon stream. 2 EC1 contains 5 sites (including the mouth of Jetty Creek) which were sampled as part of a U.S. Fish and Wildlife Service fish survey initiated in December 1980. This study indicates that 2 EC1 and Jetty Creek are utilized and coho salmon and cutthroat trout (see Section C 4.2 of the Nehalem Estuary Inventory for sampling data). 2 EC1 was evaluated for use as a dredged material disposal site and was determined to be presently unacceptable.

The placement of the south jetty has reduced tidal circulation and exchange within 2 EC1, and has reduced the contribution of this management unit to overall estuarine productivity. A temporary 2 acre fill was in the northern end of 2 EC1 to create a temporary staging area during jetty construction. Given these alterations, 2 EC1 has not been considered a major intertidal tract.

MANAGEMENT UNIT: 3

ZONING: Estuary Development (ED)

CATEGORY: Estuarine area which is partially altered, or is adjacent to existing development of moderate intensity, and is needed for development.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal aquatic bed (2.3.10(6))	1.6	0.3
Intertidal shore (2.1.7)	1.4	0.7
Subtidal unconsolidated bottom (1.1)	0.8	0.1

3 ED contains three commercial marinas, Jetty Fishery, Georges Dock, and Ed's Moorage, which provide moorage, parking, charter boats and associated services. 3 ED has been altered by the placement of 6 fills, covering a total of 10 acres of submerged land and 2.25 acres of submersible land. Additional alterations within this management unit include piling, floating docks, access ramps and boat slips. Sparse beds of native littleneck (Venerupis staminea) and gaper (Tresus capaz) clams and one sparse bed of cockle (Clinocardium nuttallii) clams are located within 3 ED, but their relative importance is difficult to assess (See 1 ED discussion of clam population surveys). Small intertidal aquatic beds within 3 ED include sparse beds of eelgrass (Zostera marina), sea lettuce (Ulva sp.) and unidentified red and brown algae.

Due to the existing development within the area and the proximity of deep water areas and shoreland s zoned for water-dependent development, 3 ED is considered a potential area for expansion of recreational boating facilities.

MANAGEMENT UNIT: 4

ZONING: Estuary Conservation 1 (EC1)

CATEGORY: Tracts of significant habitat smaller or of less biological importance than those in natural management units. Partially altered area not needed for preservation or development.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.11)	4.1	0.7
Intertidal flat (2.2)	11.1	2.7

This area includes Thomas Marsh, a cove located just east of Fishery Point which is bounded on the

north by the southern Pacific Railroad fill. Estimates of the intertidal marsh and intertidal flat habitats within 4 ED were arrived at through aerial photo interpretation, verified by a field investigation in May of 1981. The extent of the intertidal flat, intertidal marsh complex within 4 ED has been previously estimated at 13.5 acres (Eilers, 1975), and 15 acres (Wilsey and Ham, 1980).

This management unit has been altered by the placement of fill for the railroad which reduced the opening of the cove from 2,200 feet to 40 feet and covered approximately 3 acres of submarsh land, reducing tidal circulation within the cove.

Adjacent shorelands are in the Water Dependent Development zone to allow for an outbay aquaculture facility.

MANAGEMENT UNIT: 5

ZONING: Estuary Natural (EN)

CATEGORY: Major tract of tideflat

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal aquatic bed (2.3.10(6), 2.3.9)	38.4	6.3
Intertidal flat (2.2.1)	101.7	24.6
Intertidal shore (2.1.3)	5.6	2.7
Subtidal aquatic bed (1.3.9)	7.5	73.5
Subtidal unconsolidated bottom (1.1)	4.7	0.4

5 EN was identified as a resting and feeding area for waterfowl and shorebirds by the Oregon Department of Fish and Wildlife, and was also identified as a wetland of importance in the Nehalem Wetlands Review. Subtidal aquatic beds, which are limited in Nehalem Estuary occur within this management unit. 5 EN and 7 EN (the portion adjacent to the North Spit) were identified as potential oyster culture areas. 5 EN is considered by Tillamook County to be the most suitable potential area for oyster culture because of the accessibility of the area and the lack of conflicts with adjacent land uses. Oyster culture could be allowed only if found to be consistent with the resource capabilities of the management unit.

MANAGEMENT UNIT: 6

ZONING: Estuary Conservation 1 (EC1)

CATEGORY: Tracts of significant habitat smaller or of less biological importance than those in Natural Management units.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12, 2.5.11)	3.5	0.6

This management unit includes a small cove located west of the Paradise Cove Marina and south of the Southern Pacific Railroad fill.

The railroad fill, which covered approximately 1.6 acres of submersible land, reduced estuarine connection to a 30-foot wide opening. Because of its small size and the railroad fill, this management unit is not considered to be a major intertidal tract. It does have significant enough values, however, to have been determined to be unacceptable as a dredged material disposal site.

MANAGEMENT UNIT: 7

ZONING: Estuary Natural (EN)

CATEGORY: Major tract of tideflat, eelgrass and algae bed.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal aquatic bed (2.3.10(7), 2.3.9/10. 2.3.9, 2.3.10(10))	552.0	90.6
Intertidal flat (2.2.6, 2.2.2, 2.2.1)	287.5	69.5
Intertidal shore (2.1.2, 2.1.1)	127.8	62.6

7 EN contains the majority of intertidal aquatic bed and intertidal flat habitat in Nehalem Estuary. Alterations within 7 EN are limited to the Nehalem Bay State Park boat ramp, and remnants of a pile dike which once extended from Dean Point to the tip of Lazarus Island. Approximately 18 meters of the pile dike was removed and an approximately 12-meter wide channel was dredged to the west of the breach by the Port of Nehalem to reduce sedimentation in the tideflats west of the dike. The location of the remnants of the pile dike has been identified as a potential restoration site. A portion of 7 EN is located within the Nehalem Bay Spit site mentioned in Oregon Natural Areas: Tillamook County Data Summary. With the exception of the intertidal shore north of the State Park boat ramp, 7 EN was designated as a Wetland of Importance in the Nehalem Wetlands Review. The embayment is utilized by several species of fish (see sampling data in Section C 4.2 of the Nehalem Estuary Inventory). Portions of & EN have been identified as feeding and resting sites for waterfowl and shorebirds. The portion of 7 EN south of the State Park boat ramp has been identified as a potential oyster culture area by the Oregon Department of Fish and Wildlife.

The size and extent of the intertidal aquatic bed and intertidal flat habitats within 7 EN and the value of these areas to aquatic organisms and waterfowl justifies the "major tract" designation.

MANAGEMENT UNIT: 8

ZONING: Estuary Natural (EN)

CATEGORY: Major tract of saltmarsh

Area needed for scientific, research or educational needs. Major tract of tidal marsh.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12, 2.5.11)	209.0	37.9

8 EN contains the largest contiguous tract of intertidal marsh in Nehalem Estuary. The intertidal marsh in 8 EN was identified as a wetland of importance in the Nehalem Wetlands Review. 8 EN contains the Sea Garden Road study site described in Transition Zone Vegetation Between Intertidal Mash and Upland in Oregon and Washington, and contains a portion of the Dean Point site mentioned in Oregon Natural Areas: Tillamook County Data Summary. An average increase in the aerial extent of the intertidal marsh in 8 EN and 9 EN of 18 feet per year between 1875 and 1939 and 27 feet per year between 1939 and 1960 was noted by Joahnnessen (1961). 8 EN contains nesting, feeding, and resting areas for waterfowl and shorebirds, and is adjacent to a shoreland area near Alder Creek which has been identified as a significant habitat area for band-tailed pigeon. 8 EN contains a diked area at the tip of Dean Point which has been designated as a priority mitigation site, and is adjacent to a diked marsh area east of Alder Creek which has also been designated as a priority mitigation site.

The size of the intertidal marsh habitat and the importance of intertidal marsh to overall estuarine productivity justify the "major tract" designation.

MANAGEMENT UNIT: 9

ZONING: Estuary Natural (EN)

CATEGORY: Major tract of saltmarsh

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12, 2.5.11)	245.8	44.5

9 EN includes several tidal marsh islands which contain the majority of the tidal marshes in Nehalem Estuary. With the exception of a small marsh adjacent to the southern tip of Dean Point, the tidal marshes in 9 EN were identified as wetlands of importance in the Nehalem Wetlands Review. Salt marsh plant communities and the relationship between production, species diversity and environmental gradients on West Island are described in Ecological Biogeography of an Oregon Coastal Salt Marsh, and Plants, Plant Communities, Net Production and Tide Levels: The Ecological Biogeography of the Nehalem Salt Marshes, Tillamook County, Oregon. The majority of 9 EN contains nesting or feeding or resting areas for waterfowl and shorebirds.

The size of the intertidal marsh habitat and the importance of intertidal marsh to overall estuarine productivity justify the "major tract" designation.

MANAGEMENT UNIT: 10

ZONING: Estuary Development (ED)

CATEGORY: Areas of minimal biological significance needed for uses requiring alteration of the estuary.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.11)	0.9	0.2
Intertidal aquatic bed (2.3.9)	2.3	0.4
Intertidal shore (2.1.6)	8.1	4.0
Subtidal unconsolidated bottom	3.1	0.3

This management unit includes one of the biggest recreational boat marinas on Nehalem Estuary. 10 ED is adjacent to the main channel (21 ED) as well as shorelands zoned for water-related commercial or water-related industrial development in the Wheeler Comprehensive Plan.

Estuarine alterations have occurred in this area. These include fill, piling and docks for the Paradise Cove Marina and fill and piling for a now dismantled mill. Densely placed piling for the former mill occupies approximately 55 percent of this management unit.

This management unit is included in the ED zone because it has a relatively small area of intertidal habitat, it has been extensively altered, and it is adjacent to shorelands that are suitable for associated shoreland development.

Major expansion is planned for the estuary and shorelands of the Paradise Cove Marina. Included is expansion of the number of moorages, and addition of commercial moorage, seafood receiving and processing and dryboat storage and repair. The existing restaurant will be removed and replaced with

another one on the upland portion of the property and boat sales will be offered as well.

MANAGEMENT UNIT: 11

ZONING: Estuary Natural (EN)

CATEGORY: Partially altered area needed for preservation.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.11)	2.9	0.5
Intertidal aquatic bed (2.3.10(6), 2.3.9)	2.1	0.3
Intertidal shore (2.1.3, 2.1.2)	9.2	4.5

Because of the positions of Highway 101 and the Southern Pacific Railroad, there is little or no potential for use of the intertidal area with upland areas. This area is separated from the main channel by 22 EC2. The primary activities that will need to occur in this management unit will relate to the repair and maintenance of the highway and railroad.

MANAGEMENT UNIT: 12

ZONING: Estuary Development (ED)

CATEGORY: Areas of minimal biological significance needed for uses requiring alteration of the estuary.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.11)	1.3	0.2
Intertidal aquatic bed (2.3.9)	4.0	0.7
Intertidal shore (2.1)	8.7	4.3

12 ED was the historic center for water-related and water-dependent development in the City of Wheeler. 12 ED has been altered by the placement of 15 fills totaling 8 acres of submerged land and 45 acres of submersible land, piling for log raft tie-up, and piling, floats, access ramps and a bulkhead for a recreational marina. Currently, water-dependent uses in 12 ED are limited to Dart's Marina and the Wheeler public boat ramp. Shorelands adjacent to 12 ED are zoned for water-related industrial *and water-related commercial development in the Wheeler* comprehensive plan. The largest undeveloped adjacent shoreland parcel is an 11-acre site (the former location of the Lewis Shingle Mill) adjacent to the northern end of 12 ED.

Two sites within 12 ED were evaluated as dredged material disposal sites (Sections 3.4c8, 3.4c 9) and were determined to be presently unacceptable.

Given the existing degree of alteration and the comparatively small size of its intertidal habitat, 12 ED has been considered an area of minimal biological significance. The proximity of deep water areas (21 ED) and shorelands zoned for water-related development, as well as water-dependent/related development along the Wheeler waterfront (provided that these uses and activities are consistent with the requirements of the Wheeler comprehensive plan and zoning ordinance).

MANAGEMENT UNIT: 13

ZONING: Estuary Development (ED)

CATEGORY: Tract of significant habitat needed for uses requiring alteration of the estuary (Goal 16 exception required).

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12, 2.5.11, 2.5.0)	21.0	3.8
Intertidal flat (2.2)	3.2	0.8

This management unit contains an intertidal marsh/intertidal flat complex which is the Bott's Marsh site referenced in Eiler (1975). It is identified as a Wetland of Importance in the Nehalem Wetlands Review, and was identified by the Oregon Department of Fish and Wildlife as a nesting, feeding and resting area for waterfowl and shorebirds.

13 ED was examined as a potential dredged material disposal site (Section 3.4c 10) but was determined to be presently unacceptable.

13 ED has been altered by the placement of fill for dike and highway construction. Fill for dike construction around the perimeter and across the southern portion has reduced the boundary of tidal connection to the rest of the estuary. Fill for the construction of Highway 101 has separated an intertidal marsh on the northern end of the City of Wheeler from Bott's Marsh. At the far southern end, sawdust and other wood debris from the Lewis Shingle Mill had been dumped.

An exception to Goal 16 requirements for conservation management units and fill for a non-water-dependent use is being taken to provide for the development of a marina and associated facilities. This exception is included in the appendix of the Goal 2 element of the comprehensive plan. It includes a more detailed analysis of the characteristics of the management unit.

MANAGEMENT UNIT: 14

ZONING: Estuary Natural (EN)

CATEGORY: Major tract of intertidal marsh

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.11)	4.6	0.8
Intertidal aquatic bed (2.3.10)	2.8	0.5
Intertidal shore (2.1.2)	4.0	2.0

This management unit was identified as a Wetland of Importance in the Nehalem Wetlands Review. It has been altered by the placement of fill for the construction of the Tillamook County boat landing and Highway 101. Another small area is being altered as a result of the construction of the new Highway 101 bridge across the Nehalem. A scenic "nurse log" is located in this management unit. Because of historic loss of intertidal marsh and the comparative scarcity of the habitat in this portion of Nehalem Estuary, this management unit is identified as a major tract of intertidal marsh.

MANAGEMENT UNIT: 15

ZONING: Estuary Natural (EN)

CATEGORY: Major tract of intertidal marsh

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.11)	4.6	0.8
Intertidal marsh (2.5.11)	5.3	1.0

This management unit is a fringing intertidal marsh which was identified as a Wetland of Importance in the Nehalem Wetlands Review. Some alteration within the northern end of this management unit is resulting from construction of the new Highway 101 across the Nehalem river. Because of the historic loss of intertidal marsh and the comparative scarcity of the habitat in this portion of Nehalem Estuary, this management unit is identified as a major tract of intertidal marsh.

MANAGEMENT UNIT: 16

ZONING: Estuary Development (ED)

CATEGORY: Area of minimal biological significance needed for uses requiring alteration to the estuary.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Subtidal unconsolidated bottom (1.1)	6.0	0.5

This management unit includes a 100-foot wide strip adjacent to the Nehalem waterfront. It is one of the most altered areas of Nehalem Estuary. Alterations include piling, floats, access ramps in conjunction with 16 private moorages, 2 public boat docks and one commercial marina. A total of 10 fills have been placed for miscellaneous non-water-dependent uses including fill for erosion control, property extension and construction of private residences. The shoreline is densely developed with primarily non-water-dependent uses, commercial and residential, on a narrow stip of land between Highway 101 and the river.

This management unit is designated for development because of the degree of alteration present and the negligible amount of intertidal marsh. The ED zoning will provide for additional water-related and non-water-dependent development (as conditional uses).

MANAGEMENT UNIT: 17

ZONING: Estuary Natural (EN)

CATEGORY: Area needed for scientific, research or educational needs.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12, 2.5.11)	2.1	0.4
Intertidal shore (2.1.6, 2.1.5, 2.1.2, 2.1)	10.8	5.3

This management unit includes intertidal areas adjacent to Small Island located offshore of the City of Nehalem. Small Island is undeveloped and cannot be developed in the future because it is within the Nehalem River Floodway. 17 EN and Small Island have been identified by the Oregon Department of

Fish and Wildlife as a nesting, feeding and resting area for water fowl and shorebirds.

Small Island is identified as a potential mitigation site (Section 4.4a2).

This management unit is identified as an area needed for scientific, research or educational needs because of the diversity of habitats present including the undeveloped forested area of Small Island.

MANAGEMENT UNIT: 18

ZONING: Estuary Natural (EN)

CATEGORY: Major tract of intertidal marsh

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12)	6.3	1.1

This management unit includes a tract of intertidal marsh adjacent to a forested wetland identified as a significant shoreland wetland (Goal 17 Element Section 3.2a). The Oregon Department of Fish and Wildlife has identified it as a feeding, nesting and resting area for waterfowl and shorebirds. Portions of the area are identified as a mitigation site (Section 4.4a.2). Because of the historic loss of this habitat and its proximity to a significant shoreland wetland, this area is identified as a major tract of intertidal marsh.

MANAGEMENT UNIT: 19

ZONING: Estuary Natural (EN)

CATEGORY: Area needed for scientific, research or educational needs.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12)	1.9	0.3

This management unit includes two small tidal marshes located on either side of the Nehalem North Fork. It has been altered by the placement of fill and piling for the bridge across Bob's Creek. This alteration has not reduced tidal circulation to the marsh because the marsh is located riverward of the bridge. Because of the historic loss of intertidal marsh and the comparative scarcity of the habitat in this portion of Nehalem Estuary, this management unit is identified as an area needed for scientific, research or educational needs.

MANAGEMENT UNIT: 20

ZONING: Estuary Conservation 1 (EC1)

CATEGORY: Tracts of significant habitat smaller or of less biological importance than those in Natural Management units.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5)	4.0	0.7

This management unit includes the northern half of Fork Island. A low dike around the perimeter of the area and McDonald Road have reduced tidal circulation to the marsh. 20 EC1 was evaluated as a

dredged material disposal site but was determined to be presently unacceptable (Section 3.4d.7). The Oregon Department of Fish and Wildlife identifies it as a nesting area for waterfowl and shorebirds. Because of the alterations that have occurred, it is identified as a tract of significant habitat smaller or of less biological importance than those of natural management units.

MANAGEMENT UNIT: 21

ZONING: Estuary Development (ED)

CATEGORY: Navigation Channel

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Subtidal unconsolidated bottom (1.1)	141.7	12.2

This management unit includes the main channel of the estuary terminating at a 500-foot by 750-foot turning basin located just south of Snag Island. The purpose of this management unit is to accommodate a 100-foot wide channel, 8 feet deep with a 2-foot overdraft. Except for the Fishery Point Shoal area, the channel is currently at or near the 8-foot depth. The Shoal is approximately 6,000 feet long and requires the removal of approximately 128,000 cubic yards of material (Section 3.4c.1).

The habitat in this area consists exclusively of subtidal unconsolidated bottom. Part of a sparse bed of unidentified brown algae and sparse beds of butter and gaper clams are located near the lower end of the channel. The relative importance of these resources can not be assessed however because similar information for the Nehalem Estuary north of Brighton is not available. It should be noted that depths in this area are greater than 10 feet.

The upper portion of the channel, from Paradise Cove to its terminus, is a deepwater area adjacent to or in proximity to the shoreline. Past and present levels of development and alteration of the shoreline in this area are high (Section 4.2b). Paradise Cove and Dart's Marina and the Wheeler waterfront are located adjacent to 21 ED in this area. The situation is similar at the lower end of the channel where the moorages of Jetty Fishery and Brighton are adjacent. Navigation charts indicate that depths of 8 feet or greater were historically present in the area between Brighton and Paradise Cove. They are still present in all but the 6,000 foot length near Fishery Point. Depths here had been maintained by commercial fishermen and the Port of Nehalem (Section 4.2b).

This management unit qualifies for a development designation for several reasons. First, it is the main channel of the estuary and has historically been maintained at navigable depths. It includes deep water areas adjacent to developed shorelines at both of its ends. It includes no intertidal areas or other areas that have particular biological significance. Dredging and maintaining channel depths through the Fishery Point Shoal will at most be a temporary disturbance of fish and wildlife values.

MANAGEMENT UNIT: 22

ZONING: Estuary Conservation 2 (EC2)

CATEGORY: Area needed for maintenance and enhancement of biological productivity.

Area needed for recreational and aesthetic uses.

Estuarine area adjacent to existing development of moderate intensity not otherwise needed for preservation or development.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal beach bar (2.4.1)	5.9	2.9
Intertidal flat (2.2)	2.0	0.5
Subtidal unconsolidated bottom (1.1)	733.8	63.1
Intertidal aquatic bed (2.3.9)	0.3	0.1
Intertidal shore (2.1, 2.1.3, 2.15)	6.0	2.9
Intenidal marsh (2.5.11)	0.5	0.1

This management unit is almost exclusively subtidal (93%). Several very small inclusions of intertidal habitats, mostly intertidal shore, were included because of the difficulty of separating these out for mapping and administrative purposes. Included in 22 EC2 are over 75% of the subtidal areas of the estuary below the junction of the Nehalem River and the North Fork. This is the subtidal area along which most of the developed shorelines area located including Brighton, Wheeler, Nehalem and Upper Town Nehalem. Historic alterations are limited to scattered piling and at the upper end, private and public docks and moorages (Section 4.2b). Near the upriver terminus of the management unit is located the dock for the Nehalem River Dredging Company.

Some sparse beds of clams have been identified in the lower end of this management unit. However, the qualifying discussion for 1 EC2 also applies in this case. This management unit does not include any of the relatively scarce subtidal aquatic beds mapped by ODFW.

This management unit qualifies for an Estuary Conservation 2 designation because it does not contain any particularly significant intertidal or subtidal habitats, it is an area needed for recreational and aesthetic uses, and it is proximal to the most heavily developed portions of the estuary and shoreline.

MANAGEMENT UNIT: 23

ZONING: Estuary Conservation 1 (EC1)

CATEGORY: Area needed for maintenance and enhancement of biological productivity, recreational and aesthetic uses.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intenidal aquatic bed (2.3.10 (6))	2.2	0.3
Subtidal aquatic bed (1.3.9)	2.7	26.5

This management unit includes a narrow area bordered by the Southern Pacific Railroad on the east and by development units on the north, south and west. Habitats in the area are entirely subtidal and intertidal aquatic beds. It is included in an Estuary Conservation 1 zone because although it includes important and relatively scarce aquatic beds, it is also heavily impacted by development in the surrounding area.

MANAGEMENT UNIT: 24

ZONING: Estuary Natural (EN)

CATEGORY: Area needed for scientific, research or educational needs.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Tidal marsh (2.5.12)	4.2	0.8

This management unit includes a tidal marsh located east of Highway 101 near the northern border of Wheeler. It is identified in the Wheeler comprehensive plan as Natural Retention. Fill for Highway 101 has reduced tidal circulation to the marsh (Section 2.4b). It is identified as a priority mitigation site in Section 4.4a 2 of this element. Because of community preferences and the value of this site for mitigation, this management unit is needed for scientific, research or educational needs.

MANAGEMENT UNIT: 25

ZONING: Estuary Conservation 1 (EC1)

CATEGORY: Tracts of significant habitat smaller or of less biological importance than those in Natural management units. Area needed for maintenance or enhancement of biological productivity.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Tidal marsh (2.5.12/13)	6.1	1.1

This management unit is surrounded by dikes on the west and south and by Highway 101 and the Southern Pacific Railroad on the northeast. Breaches in the southern dike have restored a limited amount of tidal circulation to this area. It has been identified as a priority mitigation site in Section 4.4a2 of this element. An exception has been taken (Goal 2 element, appendix) to allow the construction of a road along the western boundary of the management unit. This will provide access for the development proposed for 13 ED.

Because of past alterations that have reduced tidal circulation, this management unit is considered to be a tract of significant habitat small or of less biological importance than those in Natural management units. It is an area needed for maintenance or enhancement of biological productivity because of its value for mitigation.

MANAGEMENT UNIT: 26

ZONING: Estuary Conservation 1 (EC1)

CATEGORY: Tracts of significant habitat smaller or of less biological importance than those in natural management units.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Tidal marsh (2.5.14)	18.5	18.5

A number of alterations to this management unit have occurred in the past. A low berm was constructed along the river edge by the placement of material dredged from the Nehalem River channel between Small Island the City of Nehalem. This berm reduces tidal influence within the area but gaps and low spots allow tidal influence on a seasonal basis. Fill was also placed for the construction of a road across the area and cabins along a portion of the riverfront. A large boat canal was excavated into the area with spoils placed on either side (Section 4.2b).

The northern boundary of this management unit was determined through an evaluation by Duncan Thomas, Ph.D. (Appendix A). The other boundaries of the management unit are not distinct and there are pockets of upland among the wetlands. Site investigations will be necessary at the time of permit review to ascertain precise boundaries. Those upland areas unprecisely mapped as part of this management unit will be governed by the requirements of the adjacent upland zone.

This area was identified as nesting, resting and feeding area for waterfowl and shorebirds by the Oregon Department of Fish and Wildlife. For this reason and because the area has been significantly altered, it is identified as a tract of significant habitat smaller or of less biological importance than those in natural management units.

MANAGEMENT UNIT: 27

ZONING: Estuary Conservation 1 (EC1)

CATEGORY: Area needed for recreational and aesthetic uses. Tracts of significant habitat smaller or of less biological importance than those in natural management units.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Subtidal unconsolidated bottom (1.1)	244.8	21.1
Intertidal shore (2.1)	17.2	8.4

This predominantly subtidal area includes the North Fork of the Nehalem and the Nehalem River upriver of its confluence with the North Fork. It also includes several sloughs joining the rivers in this area. A number of private boat docks are located along the Nehalem River in this management unit along several portions that are bordered by residential development.

MANAGEMENT UNIT: 1EN (Estuary Natural)

CATEGORY: Area needed for scientific, research or educational needs.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Intertidal flat (2.21)	9.4	0.2
Tidal marsh (2.5.12)	18.2	1.9

Animals Present
Birds: feeding and resting on adjacent jetty.

Significant Biological Functions
This habitat is not common in the bay; jetty provides a sheltered area for birds.

HISTORICAL ALTERATIONS:
This area was created as sand accreted behind the north jetty and subsequently eroded through gaps in the jetty.

RIPARIAN VEGETATION:
Predominantly beach grass.

WATER QUALITY
HYDRAULIC CHARACTERISTICS
NAVIGATION AND PUBLIC ACCESS TO THE WATER
OTHER

MANAGEMENT UNIT: 2EC2 (Estuary Conservation 2)

CATEGORY: Area needed for recreational and aesthetic uses. Partially altered area not needed for preservation or development. Tract of habitat of less biological importance than those in natural management units. Area adjacent to existing development of moderate intensity not otherwise needed for preservation or development.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Subtidal unconsolidated bottom (1.1, 1.1.11.1.6)	367.3	15.8
Intertidal flat (2.2.1)	9.1	0.2
Intertidal shore (2.1.7,2.1.8)	10.0	8.1

Animals Present
Birds: feeding and resting areas along jetties and particularly Barview Rocks.
Seals: feeding area.
Clams: Gaper (portions of beds primarily in 4EN); Butter (similar to Gaper); Cockle (similar to Gaper); Littleneck (similar to Gaper).
Fish: Northern Anchovy, Surf Smelt and Chinook Salmon near Pitcher Point. Rockfish near jetties and Pitcher Point. Pacific Herring near Pitcher Point and 4EN (spawning).
Crab: Along with 3ED and 14EC2, primary Dungeness Crab habitat.

Significant Biological Functions
Feeding and passage area for seals, birds, fish and crab.

HISTORICAL ALTERATIONS:

Construction of jetties. Riprap along north shoreline. Dredging of authorized channel. A small rock breakwater extends westward from the southwest corner of the Garibaldi boat basin fill. A Coast Guard pier, boathouse, station building and permeable wave barrier have been built in this portion of the management units as well. A barge loading pier was constructed on the south side of the Garibaldi boat basin fill.

RIPARIAN VEGETATION:

Shoreline along this management unit is primarily rocky.

WATER QUALITY
HYDRAULIC CHARACTERISTICS

NAVIGATION AND PUBLIC ACCESS TO THE WATER:

Authorized channel. Boat use between the jetties and across the bar. Public use of the north jetty by way of Barview Park. New coast Guard boat facilities are in this management unit.

OTHER

MANAGEMENT UNIT: 3ED (Estuary Development)

CATEGORY: Navigation channel. Deep water areas adjacent to or in proximity to the shoreline. Tract or significant habitat needed for uses requiring alteration of the estuary.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Subtidal unconsolidated bottom (1.1, 1.1.1)	67.0	2.9
Intertidal flat (2.2, 2.2.3)	8.5	0.2
Intertidal aquatic bed (2.3.9 2.3.10)	10.7	0.5

Animals Present

Seals: feeding area west of turning basin.

Clams: Gaper (small portion of dense bed primarily in 8EN); Cockle (small sparse beds south of Garibaldi harbor); Littleneck (small sparse be south of Garibaldi harbor); Irus (sparse bed east of Garibaldi harbor); Softshell (small sparse bed east of Garibaldi harbor); Baltic (small sparse bed east of Garibaldi harbor); Bentnose (small sparse bed east of Garibaldi harbor); Piddock (dense bed south of Coast Guard dock).

Fish: Shiner Perch, English Sole, and Rock in turning and boat basins. Pacific Herring spawning in boat basin area.

Crab: Highest concentration of Dungeness Crab in the bay in the harbor and turning basin area.

Other: Dense bed of mud or ghost shrimp east of boat basin.

Significant Biological Functions

Seal, fish and crab feeding and passage area.

HISTORICAL ALTERATIONS:

Dredging of authorized channel and turning basin. 45.7 acres of fill was placed for creation of back-up land in conjunction with the Garibaldi Boat Basin. An additional 49.5 acres of submersible land during the development of the Oregon-Washington Plywood facilities. Moorage facilities have been constructed within the boat basin and a commercial fish off-loading pier was constructed south of the basin.

RIPARIAN VEGETATION:
Developed shoreline.

WATER QUALITY
HYDRAULIC CHARACTERISTICS

NAVIGATION AND PUBLIC ACCESS TO THE WATER:
Authorized navigation channel and turning basin. Garibaldi harbor.

OTHER

MANAGEMENT UNIT: 4EN

CATEGORY: Major intertidal habitats.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Intertidal shore (2.1.6, 2.1.8)	21.1	17.2
Intertidal flat (2.2.6)	16.2	0.4
Intertidal aquatic bed (2.3.9, 2.3.10)	17.6	0.9

Animals Present
Birds: Feeding and resting area. Barview Rocks particularly significant resting and shelter area. Birds attracted to herring spawning.
Seals: Feeding area.
Clams: Gaper (sparse and dense beds); Butter (sparse and dense beds); Cockle (sparse and dense beds); Littleneck (sparse and dense beds).
Fish: Northern Anchovy, Surf Smelt, Shiner Perch, English Sole, and Chinook and Chum Salmon in the Garibaldi flats area. Pacific Herring spawning.

Significant Biological Functions
Clam and other invertebrate production. Fish feeding and spawning area. Bird and seal feeding area.

HISTORICAL ALTERATIONS:
The Southern Pacific Railroad runs along the shoreline of this management unit. Most of this shoreline is riprapped.

RIPARIAN VEGETATION:
Little present due to the presence of the railroad.

WATER QUALITY
HYDRAULIC CHARACTERISTICS

NAVIGATION AND PUBLIC ACCESS TO THE WATER:
Public use of the tideflats for clam digging and recreation.

OTHER

MANAGEMENT UNIT: 5EN (Estuary Natural)

CATEGORY: Major intertidal habitat.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Intertidal shore (2.1.1)	10.9	8.9
Intertidal aquatic bed (2.3.10)	7.5	0.4
Tidal marsh (2.5.11)	1.3	0.1

Animals Present
Birds: Feeding and resting along aquatic beds adjacent to the northern shore of Kincheloe Point.
Seals: Feeding area.
Clams: Gaper (sparse bed); Cockle (sparse bed).
Fish: Northern Anchovy, Surf Smelt, Pacific Herring, Chinook Salmon, Rockfish.

Significant Biological Functions
Fish, Bird and seal feeding area.

HISTORICAL ALTERATIONS:
The northern tip of Kincheloe Point and associated tideflats to the north and west of the Point have largely been created by sand accretion due to the position of the north jetty relative to sand movement.

RIPARIAN VEGETATION:
Beach grass.

WATER QUALITY
HYDRAULIC CHARACTERISTICS
NAVIGATION AND PUBLIC ACCESS TO THE WATER
OTHER

MANAGEMENT UNIT: 6EC1 (Estuary conservation 1)

CATEGORY: Estuarine area adjacent to existing development of moderate intensity not otherwise needed for preservation or development.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Subtidal unconsolidated bottom (1.1.1)	3.3	0.1
Intertidal flat (2.2.1)	17.3	0.4
Intertidal aquatic bed (2.3.9)	5.0	0.2

Animals Present
Clams: Gaper (small sparse bed).
Fish: Northern Anchovy, Surf smelt, Shiner Perch, Pacific Herring, Chinook Salmon, Chum Salmon.
Other: Sparse bed of ghost or mud shrimp.

Significant Biological Functions
Invertebrate production. Fish feeding area.

HISTORICAL ALTERATIONS:
A pier and boathouse for the Coast Guard marks the western boundary of the management unit. The new Coast Guard pier is adjacent to the north. The Garibaldi Boat Basin fill is adjacent to the east.

RIPARIAN VEGETATION:
Developed shorelines, little present.

WATER QUALITY
HYDRAULIC CHARACTERISTICS

NAVIGATION AND PUBLIC ACCESS TO THE WATER"
Use of old coast Guard pier for public fishing and recreation.

OTHER

MANAGEMENT UNIT: 7EC2 (Estuary Conservation 2)

CATEGORY: Area needed for recreational use. Tract of significant habitat smaller or of less biological importance than those of natural management units.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Subtidal unconsolidated bottom (1.1.1, 1.1.2)	12.1	0.5
Intertidal flat (2.2.2, 2.2.3)	23.2	0.6
Intertidal aquatic bed (2.3.9/10)	3.0	0.3

Animals Present
Birds: Feeding and resting area.
Clams: Gaper (small portion of dense bed primarily in 8EN); Softshell (small sparse bed at southern end); Baltic (sparse and dense beds).
Fish: Saddleback Gunnel

Significant Biological Functions
Invertebrate production. Bird feeding and resting area.

HISTORICAL ALTERATIONS:
This management unit has been the site of log rafting associated with the Oregon Washington Plywood Company Mill. More recent alterations include dredging, pile placement and dock placement, and riprap for a marina. The Oregon Washington Plywood Mill fill is the eastern boundary of this management unit.

RIPARIAN VEGETATION:
Predominantly developed shorelines. Some trees and shrubs present along the southern shoreline.

WATER QUALITY
HYDRAULIC CHARACTERISTICS

NAVIGATION AND PUBLIC ACCESS TO THE WATER:
Marina facilities including moorages and a boat ramp.

OTHER

MANAGEMENT UNIT: 8EN (Estuary Natural)

CATEGORY: Major tracts of saltmarsh, tideflats, and eelgrass and algae beds.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Intertidal flat (2.2, 2.2.2, 2.2.3, 2.2.5, 2.2.6)	74.2	1.9
Intertidal aquatic bed (2.3.9, 2.3.10)	88.8	4.4
Tidal marsh	33.6	3.5

Animals Present
Birds: Feeding and resting, nesting in 2.5.11. Along with 12EN only place Canvasback Ducks consistently seen in winter.
Clams: Gaper (large dense bed in southern portion); Butter (sparse beds in southern portion); cockle (sparse bed in southern portion); Irus (sparse bed in southern portion); Softshell (large sparse bed in northern and southern portions, several dense beds in northern portions); Baltic (sparse and dense beds in northern portion, small sparse bed in southern portion); Bentnose (large sparse bed in southern portion); California Softshell (small sparse beds in southern portion.
Fish: Saddleback Gunnel.
Other: Sparse and dense beds of ghost or mud shrimp primarily in the southern portion of the cove.

Significant Biological Functions
Primary production. Invertebrate production. Clam beds. Important bird feeding, resting and nesting area.

HISTORICAL ALTERATIONS:
Log rafting occurred in the northwest portion.

RIPARIAN VEGETATION:
Riparian vegetation is limited by Highway 101 on the southeast and by the Southern Pacific Railroad and development on the north. A small stand of trees is located along a portion of the north boundary.

WATER QUALITY
HYDRAULIC CHARACTERISTICS
NAVIGATION AND PUBLIC ACCESS TO THE WATER
OTHER

MANAGEMENT UNIT: 9EC1 (Estuary Conservation 1)

CATEGORY: Partially altered area not needed for preservation or development.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Tidal marsh (2.5.12)	18.2	1.9

Animals Present
Birds: Nesting area.

Significant Biological Functions
Bird nesting area. Primary production.

HISTORICAL ALTERATIONS:
Alterations include fill for the Southern Pacific Railroad, Highway 101 and a dike along the eastern boundary of the management unit. The SCS soils map for the area show an area of Coquille soils adjacent to the east of these fills indicating that this eastern area was probably once part of the estuary. Fill was also placed for a dike, now breached, along the eastern boundary of the management unit. Drainage ditches are dug in this area and it was used for pasture. 1.5 acres in the

northwest corner of the management unit was filled for the placement of an electrical substation.

RIPARIAN VEGETATION:
Limited by the Southern Pacific Railroad. Some clumps of trees, primarily at the north end.

WATER QUALITY
HYDRAULIC CHARACTERISTICS
NAVIGATION AND PUBLIC ACCESS TO THE WATER
OTHER

MANAGEMENT UNIT: 10EC1 (Estuary Conservation 1)

CATEGORY: Area needed for maintenance or enhancement of biological productivity.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Subtidal unconsolidated bottom (1.1.6)	9.5	0.4

Animals Present
Clams: Gaper (portions of beds associated with 8EN); Softshell (same as Gaper); Bentnose (same as Gaper).
Fish: Saddleback Gunnel, Salmonids.

HISTORICAL ALTERATIONS:
A dike on the north side of the management unit east of Highway 1010 removed tidal marsh from the estuary. (See discussion for 9EC1)

RIPARIAN VEGETATION:
A narrow forested corridor flanks much of the management unit.

WATER QUALITY
HYDRAULIC CHARACTERISTICS
NAVIGATION AND PUBLIC ACCESS TO THE WATER
OTHER

MANAGEMENT UNIT: 11EC2 (Estuary Conservation 2)

CATEGORY: Tract of significant habitat smaller or of less biological importance than those in natural management units.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Intertidal flat (2.2.3)	1.6	0.1
Intertidal aquatic bed (2.3.9/10)	5.6	0.2

Animals Present
Clams: Softshell (small sparse bed).
Fish: Saddleback Gunnel.
Other: Sparse bed of ghost or mud shrimp.

Significant Biological Functions
Primary production. Invertebrate production. Fish feeding.

HISTORICAL ALTERATIONS:

The Oregon Washington Plywood Mill fill is adjacent to the north. The authorized turning basin is adjacent to the south.

RIPARIAN VEGETATION:

Little riparian vegetation is present on the man-made shoreline.

WATER QUALITY
HYDRAULIC CHARACTERISTICS
NAVIGATION AND PUBLIC ACCESS TO THE WATER
OTHER

MANAGEMENT UNIT: 12EN (Estuary Natural)

CATEGORY: Major tracts of tideflats, eelgrass and algae beds.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Subtidal unconsolidated bottom (1.1.1, 1.1.2)	25.7	1.1
Intertidal shore (2.1.1)	21.8	17.7
Intertidal flat (2.2, 2.2.2, 2.2.3)	324.6	8.1
Intertidal aquatic bed (2.3.9, 2.3.10)	411.0	20.3
Tidal marsh (2.5.11)	23.5	2.4

Animals Present

Birds: feeding and resting primarily on southern portion. Important habitat for Canvasback Ducks.

Seals: feeding and haul-out in northern portion.

Clams: Gaper (several sparse beds in northern portion); Butter (one small sparse bed south of Crab Harbor); Cockle (similar to Gaper but more extensive); Irus (small sparse bed south of Kincheloe Point); Softshell (several sparse and dense beds in western portion, sparse bed south of Kincheloe Point); Baltic (similar to Softshell but less extensive); Bentnose (similar to Softshell).

Fish: Northern Anchovy and Pacific Herring in the Crab Harbor area. A large Pacific Herring spawning ground is located generally east and south of Crab Harbor. Pacific Staghorn Sculpin and Saddleback Gunnel in the area south of deep hole. Surf Smelt and Shiner Perch north of Pitcher Point.

Other: Large sparse and dense beds of ghost or mud shrimp.

Significant Biological Functions

Diverse area with many important functions including primary production, clam and other invertebrate production, fish feeding and spawning, bird feeding and resting, and seal feeding and haul-out. It is very important habitat for Canvasback Ducks.

HISTORICAL ALTERATIONS:

Riprap and probably fill along Bayocean Road. Piling adjacent to Bayocean Road near Dick Point. Tillamook Bay once extended farther to the west, beyond Pitcher Point, before Bayocean Spit breached as the result of massive erosion. This erosion has been attributed to the construction of the north jetty (Komer p.23). Large quantities of sand were washed into 12EN and 25ECA as a result of the breach. A dike was constructed northward from Pitcher Point to reestablish the integrity of the spit and to prevent this breach from becoming the primary outlet of the bay. Cape Meares Lake, connected to the estuary by a tidegate, was formed as a result.

RIPARIAN VEGETATION:
Limited by Bayocean Road and a road which runs along the eastern shore of the Bayocean Spit. Predominantly grasses and shrubs.

WATER QUALITY
HYDRAULIC CHARACTERISTICS

NAVIGATION AND PUBLIC ACCESS TO THE WATER:
Access available from Bayocean Spit, county property. Uses include clam digging and duck hunting.

OTHER

MANAGEMENT UNIT: 13EC1 (Estuary Conservation 1)

CATEGORY: Area needed for recreational and aesthetic uses. Area needed for maintenance or enhancement of biological productivity.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Subtidal unconsolidated bottom (1.1.1, 1.1.2)	74.8	3.2
Intertidal flat (2.2.3)	10.2	0.3
Intertidal aquatic bed (2.3.9)	1.8	0.1

Animals Present
Birds: Feeding and resting. Deep hole is important because it is sheltered and is a juvenile fish rearing area.
Seals: F eeding area.
Clams: Gaper (sparse bed in northern channel); cockle (sparse beds in most parts); Irus (small portion of sparse bed associated with 12EN); Softshell (several small sparse and dense beds); Baltic (similar to Softshell); Bentnose (small dense bed in southern portion).
Fish: Surf Smelt throughout the management unit. Northern Anchovy, Shiner Perch and Pacific Herring in the Crab Harbor area. English sole and Rockfish in the Deep Hole area.

Significant Biological Functions
Fish feeding and rearing. Bird and seal feeding.

HISTORICAL ALTERATIONS:
An artificial tire reef was placed on the deep hole portion of this management unit.

RIPARIAN VEGETATION
WATER QUALITY
HYDRAULIC CHARACTERISTICS
NAVIGATION AND PUBLIC ACCESS TO THE WATER
OTHER

MANAGEMENT UNIT: 14EC2 (Estuary conservation 2)

CATEGORY: Tract of significant habitat of less biological importance than those in natural management units. Area needed for maintenance or enhancement of biological productivity. Area needed for recreational use.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Subtidal unconsolidated bottom (1.1.1, 1.1.2, 1/1/4)	1035.7	44 .6
Subtidal aquatic bed (1.3.9)	6.5	16.1
Intertidal flat (2.2.1)	15.6	0.4

Animals Present

Seals: feeding area as far south as the Dick Point area.

Clams: Gaper (sparse and dense beds between Garibaldi and Larson Cove); cockle (sparse beds distributed similarly to Caper, one small dense bed south of turning basin); Littleneck (similar to Cockle except that small dense bed is off Hobsonville Point); Irus (portions of beds associated with 19EN, 25ECA, and 27EN); Softshell (small sparse bed near Hobsonville Point and one south of Bay City); Baltic (portions of beds associated with 19EN, 24EN, 25ECA, and 27EC); Bentnose (several small sparse beds between Hobsonville Point and Larson Cove); California Softshell (several small sparse and dense beds between Hobsonville Point and 23ED, small sparse and dense beds adjacent to 24EN).

Fish: Chum Salmon in the main channel from Hobsonville Point south. Saddleback Gunnel in the Ghost Hole area and the Pitcher Point Channel area. Starry Flounder in the Dick Point area of the main channel, the Tillamook River and in the west channel near Rocky Point Flat. Northern Anchovy and Pacific Herring in the Crab Harbor area. Surf Smelt in the Crab Harbor and Mid-West Channel area. Shiner Perch in the Crab Harbor, Pitcher Point Channel, Pitcher Point Flat and Rocky Point Flat areas. English sole in the Mid-West Channel and Pitcher Point Channel areas. Pacific Staghorn Sculpin in the Pitcher Point Channel and Rocky Point Flat areas.

Crab: Along with 2EC2 and 3ED, the predominant Dungeness Crab habitat. Particularly high concentrations found in the Ghost Hole area.

Significant Biological Functions

Fish, crab and seal passage and feeding. Clam production.

HISTORICAL ALTERATIONS:

Two pile dikes, the Dick Point Dike and the Middle Channel Dike, were placed in this management unit to facilitate navigation. Diking along the eastern bank of this management unit where it coincides with the Tillamook River removed tidal marsh from the estuary. Piling, pile dolphins, floats, boat slips, a bulkhead, and a building have been placed in the southern terminus of this management unit for two marinas. One of these marinas is periodically dredged.

RIPARIAN VEGETATION:

The limited shoreline present adjacent to this management unit is cleared for agricultural use.

WATER QUALITY

HYDRAULIC CHARACTERISTICS

NAVIGATION AND PUBLIC ACCESS TO THE WATER:

This management unit includes the main navigation channels south of 3ED. Use of this management unit for fishing is particularly heavy at the Ghost Hole and south of Dick Point. Access is possible from 3ED, the County boat ramp at Memaloose Point, and at two marinas at the southern end of the management unit.

OTHER

MANAGEMENT UNIT: 15EN (Estuary Natural)

CATEGORY: Major tract of tideflat.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Intertidal flat (2.2.1)	332.3	8.3
Intertidal aquatic bed (2.3.10)	7.9	0.4

Animals Present
Birds: feeding and resting on central portion.
Seals: feeding area, haul-out area in center.
Clams: Cockle (small sparse beds on southeast side).
Fish: Surf Smelt and English sole adjacent to the Mid-West Channel area.

Significant Biological Functions
Invertebrate production. Bird feeding and resting. Seal feeding and haul-out.

HISTORICAL ALTERATIONS
RIPARIAN VEGETATION
WATER QUALITY
HYDRAULIC CHARACTERISTICS
NAVIGATION AND PUBLIC ACCESS TO THE WATER
OTHER

MANAGEMENT UNIT: 17EN (Estuary Natural)

CATEGORY: Major tracts of tideflats and eelgrass beds.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Subtidal aquatic bed (1.3.9)	28.0	69.3
Intertidal flat (2.2.1, 2.2.2)	310.8	7.8
Intertidal aquatic bed (2.3.9, 2.3.10)	138.6	6.8

Animals Present
Birds: Feeding and resting on western portion.
Seals: Feeding area, haul-out area on western portion.
Clams: Gaper (several sparse beds); Cockle (several small sparse beds)
Fish: Pacific Herring, Rockfish and Saddleback Gunnel. Surf Smelt in the Mid-West Channel area.

Significant Biological Functions
Invertebrate production. Fish feeding. Bird resting and feeding. Seal feeding and haul-out.

HISTORICAL ALTERATIONS
RIPARIAN VEGETATION
WATER QUALITY
HYDRAULIC CHARACTERISTICS
NAVIGATION AND PUBLIC ACCESS TO THE WATER
OTHER

MANAGEMENT UNIT: 18EN (Estuary Natural)

CATEGORY: Important tracts of saltmarsh.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Tidal marsh (2.5.12, 2.5.14)	16.6	1.7

Animals Present
Birds: Nesting area.

Significant Biological Functions
Bird nesting area fairly isolated from human disturbance.

HISTORICAL ALTERATIONS

RIPARIAN VEGETATION:
Wooded fringe.

WATER QUALITY
HYDRAULIC CHARACTERISTICS
NAVIGATION AND PUBLIC ACCESS TO THE WATER
OTHER

MANAGEMENT UNIT: 19EN (Estuary Natural)

CATEGORY: Major tracts of tideflats and eelgrass beds.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Subtidal aquatic bed (1.3.9)	5.8	14.4
Intertidal flat (2.2.2)	462.1	11.6
Intertidal aquatic bed (2.3.9)	92.4	4.6

Animals Present
Birds: Feeding and resting in northern portion.
Seals: Feeding in portions adjacent to 14EC2.
Clams: Irus (part of a large sparse bed off of Dick Point); Softshell (similar to Irus but with several dense beds as well); Baltic (similar to Softshell); California Softshell (one small sparse bed).
Fish: Shiner Perch and Pacific Staghorn Sculpin in the Pitcher Point Channel and Rocky Point Flat areas. English Sole in the Pitcher Point Channel area. Starry Flounder in the Rocky Point Flat area. Saddleback Gunnel in the Mid-Bay and Pitcher Point Channel areas.
Other: Large sparse bed and several small dense beds of ghost or Mud Shrimp in southern portion.

Significant Biological Functions
Invertebrate production. Clam production. Fish, bird and seal feeding. Bird resting.

HISTORICAL ALTERATIONS:
Portions of the Dick Point and Middle Channel dikes are in this management unit.

RIPARIAN VEGETATION
WATER QUALITY
HYDRAULIC CHARACTERISTICS

NAVIGATION AND PUBLIC ACCESS TO THE WATER
OTHER

MANAGEMENT UNIT: 20EC1 (Estuary Conservation 1)

CATEGORY: Area needed for maintenance or enhancement of biological productivity.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Subtidal unconsolidated bottom (1.1.2)	30.5	1.3

Animals Present
Seals: feeding area.
Fish: Surf Smelt and English Sole.

Significant Biological Functions
Fish and seal feeding area.

HISTORICAL ALTERATIONS
RIPARIAN VEGETATION
WATER QUALITY
HYDRAULIC CHARACTERISTICS
NAVIGATION AND PUBLIC ACCESS TO THE WATER
OTHER

MANAGEMENT UNIT: 21EC1 (Estuary Conservation 1)

CATEGORY: Tract of significant habitat of less biological importance than those in natural management units.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Intertidal flat (2.2.2)	4.2	0.4
Intertidal aquatic bed (2.3.9)	11.5	0.6

Animals Present
Birds: feeding and resting area.

Significant Biological Functions
Invertebrate production. Bird resting and feeding area.

HISTORICAL ALTERATIONS:
A large hydraulic fill for Highway 101 was placed across this management unit. It is riprapped. A box culvert under the highway maintains tidal interchange. The Southern Pacific Railroad runs along the bank of the management unit removing riparian vegetation and possible filling a portion of the management unit.

RIPARIAN VEGETATION:
Limited for most of the shoreline. Some shrubs and trees.

WATER QUALITY
HYDRAULIC CHARACTERISTICS
NAVIGATION AND PUBLIC ACCESS TO THE WATER

MANAGEMENT UNIT: 22EN (Estuary Natural)

CATEGORY: Major tracts of tideflats and algae beds.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Intertidal flat (2.2.2)	30.5	0.8
Intertidal aquatic bed (2.3.9)	40.8	2.0

Animals Present

Birds: Feeding and resting in southern portion. Hobsonville Point area important Band-Tailed Pigeon habitat.

Clams: Gaper (dense and sparse beds between Hobsonville Point and Larson Cove); Cockle (sparse beds distributed similar to Gaper); Littleneck (portions of beds associated with 14EC2); Irus (small sparse bed near 23ED); Softshell (sparse bed near 23ED); Bentnose (several small sparse beds distributed throughout); California Softshell (sparse and dense beds distributed throughout).

Fish: Surf Smelt, Shiner Perch, English Sole, and Chinook Salmon near Hobsonville Point. Chum Salmon near Hobsonville Point and south of Larson Cove. Herring spawning.

Other: Sparse bed of Ghost or Mud Shrimp.

Significant Biological Functions

Clam and other invertebrate production. Primary production. Important fish feeding area. Bird feeding and resting. Important habitat for Band-Tailed Pigeons.

HISTORICAL ALTERATIONS:

Fill and riprap for Highway 101 and turnout.

RIPARIAN VEGETATION:

Because of the Southern Pacific Railroad and Highway 101, there is little riparian vegetation present.

WATER QUALITY

HYDRAULIC CHARACTERISTICS

NAVIGATION AND PUBLIC ACCESS TO THE WATER:

The Highway 101 turnout and Hobsonville Point Wayside provide public access to the tideflats which are used for clamming.

OTHER

MANAGEMENT UNIT: 23ED (Estuary Development)

CATEGORY: Area of minimal biological significance needed for uses requiring alteration of the estuary.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Intertidal flat (2.2.2)	16.6	0.4
Intertidal aquatic bed (2.3.9, 2.3.10)	12.5	0.6

Animals Present
Birds: Feeding and resting area.
Clam: Softshell (sparse bed in northern portion, small dense bed in southeastern portion); Baltic (small sparse bed in southeastern portion); California Softshell (sparse beds in northern and southern portions).
Other: Sparse beds of Ghost or Mud Shrimp.

Biological Function
Clam and other invertebrate production. Bird feeding and resting.

HISTORICAL ALTERATIONS:
Fill was placed for Highway 101 and the Southern Pacific Railroad. East of the highway, several fills were placed for assorted developments. 6.3 acres of this area were used for dredged material disposal. A fill and breakwater were placed west of the railroad in the center of this management unit, creating a small harbor. Also included in this area are some piling and a wharf. The harbor is periodically dredged.

RIPARIAN VEGETATION:
Little or none present because of shoreline development.

WATER QUALITY
HYDRAULIC CHARACTERISTICS

NAVIGATION AND PUBLIC ACCESS TO THE WATER:
Public boat ramp.

OTHER

MANAGEMENT UNIT: 24EN (Estuary Natural)

CATEGORY: Major tracts of tideflats and eelgrass and algae beds.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Subtidal unconsolidated bottom (1.1.2)	11.8	.05
Intertidal flat (2.2, 2.2.2,2.2.3)	524.5	25.9
Intertidal aquatic bed (2.3.9, 2.3.10)	256.4	12.6

Animals Present
Birds: Feeding and resting area.
Seals: Feeding in portions adjacent to 14EC2.
Clams: Irus (small sparse bed); Softshell (extensive sparse and dense beds); Baltic (sparse and dense beds less extensive than Softshell); California Softshell (several sparse beds one large one located adjacent to 23ED).
Fish: Shiner Perch, Pacific Staghorn Sculpin, and Starry Flounder.
Other: Extensive beds of Ghost or Mud Shrimp.

Significant Biological Functions
Clam and other invertebrate production. Fish, bird, and seal feeding area. Bird resting area.

HISTORICAL ALTERATIONS:
Three pile dikes were constructed in this management unit for controlling water flow. One stretched from Goose Point to Kilchis Point. Little remains of this dike. The Kilchis River Dike is situated further offshore. The third dike is located closer to the main channel.

RIPARIAN VEGETATION:

Little riparian vegetation is present on the portions of the shoreline not adjacent to 28EN.

WATER QUALITY
HYDRAULIC CHARACTERISTICS
NAVIGATION AND PUBLIC ACCESS TO THE WATER
OTHER

MANAGEMENT UNIT: 25ECA (Estuary Conservation Aquaculture)

CATEGORY: Oyster beds. Area needed for aquaculture.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Subtidal unconsolidated bottom (1.1.2)	65.4	2.8
Intertidal flat (2.2, 2.2.2,2.2.3)	1327.4	33 .2
Intertidal aquatic bed (2.3.9, 2.3.10)	874.1	43.1
Tidal marsh (2.5.11)	9.2	1.0

Animals Present

Birds: Feeding and resting on southwestern portion.

Seals: Feeding area on portions adjacent to 14EC2, two small haul-out areas.

Clams: Irus (large sparse bed in southern portion as well as 19EN); Softshell (similar to Irus but with several dense beds as well); Baltic (similar to Softshell); Bentnose (portions of sparse and dense beds associated with 12EN).

Fish: Pacific Staghorn Sculpin, Shiner Perch, Saddleback Gunnel. English Sole in the Pitcher Point Channel area. Surf Smelt in the Pitcher Point Flat area. Starry Flounder in the rocky Point Flat area.

Other: Beds of Ghost or Mud Shrimp primarily in the central and southern portions with some in the northeast portion.

Significant Biological Functions

Oyster and Clam production. Other invertebrate production. Primary production. Fish, bird and seal feeding.

HISTORICAL ALTERATIONS:

Alterations include a portion of the Middle Channel Dike, piling along Bayocean Road and also riprap and fill for Bayocean Road. See also the discussion for 12EN regarding breaching of the Bayocean Spit. This management unit has been platted by the legislature for oyster production. All of the oyster plats have been historically used for this purpose. (See Appendix A in this element).

RIPARIAN VEGETATION
WATER QUALITY
HYDRAULIC CHARACTERISTICS
NAVIGATION AND PUBLIC ACCESS TO THE WATER
OTHER

MANAGEMENT UNIT: 26EN (Estuary Natural)

CATEGORY: Important tract of saltmarsh.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Tidal marsh (2.5)	9.5	1.0

Animals Present
Birds: Nesting area.

Biological Function
Bird nesting area. Primary production.

HISTORICAL ALTERATIONS:
Fill for Bayocean Road was placed across the mouths of the marshes in this management unit. Culverts maintain tidal interchange.

RIPARIAN VEGETATION:
Forested fringe.

WATER QUALITY
HYDRAULIC CHARACTERISTICS
NAVIGATION AND PUBLIC ACCESS TO THE WATER
OTHER

MANAGEMENT UNIT: 27EN (Estuary Natural)

CATEGORY: Major tract of tideflats.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Subtidal unconsolidated bottom (1.1, 1.1.1)	32.1	1.4
Intertidal flat (2.2.2)	708.0	17.1
Intertidal aquatic bed (2.3.10)	40.9	2.0

Animals Present
Birds: Feeding and resting area.
Seals: Haul-out on northwest portion of management unit.
Clams: Irus (large sparse beds, two small dense beds); Softshell (large dense bed in western portion, several small sparse beds, on other small dense bed); Baltic (several large dense and sparse beds).
Fish: *Pacific Staghorn Sculpin and Starry Flounder.*
Other: Several large sparse beds of Ghost or Mud Shrimp.

Significant Biological Functions
Primary production. Clam and other invertebrate production. Fish, bird and seal feeding area. Seal haul-out and bird resting area.

HISTORICAL ALTERATIONS
RIPARIAN VEGETATION
WATER QUALITY
HYDRAULIC CHARACTERISTICS
NAVIGATION AND PUBLIC ACCESS TO THE WATER
OTHER

MANAGEMENT UNIT: 28EN (Estuary Natural)

CATEGORY: Major tract of saltmarsh.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Tidal marsh (2.5.12)	41.4	4.3

Animals Present
Birds: Nesting area. Goose Point area most important Band-Tailed Pigeon watering area (only tow in bay).

Significant Biological Functions
Band-Tailed Pigeon watering area. Primary production.

HISTORICAL ALTERATIONS:
This management unit, historically larger, was reduced in size by the placement of the Bay City sewage lagoons, by the access road to the lagoons and probably by development along Spruce and Salmon streets. A dike was constructed along the southern boundary of the southern most marsh in this management unit.

RIPARIAN VEGETATION:
Shoreline is predominantly forested.

WATER QUALITY
HYDRAULIC CHARACTERISTICS
NAVIGATION AND PUBLIC ACCESS TO THE WATER
OTHER

MANAGEMENT UNIT: 29EC1 (Estuary Conservation 1)

CATEGORY: Area needed for maintenance or enhancement of biological productivity. Area needed for recreation use.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Subtidal unconsolidated bottom (1.1, 1.1.1)	186.4	8.0
Tidal marsh (2.5.11)	1.5	0.2

Animals Present
Birds: Nesting, feeding and resting on tideflats and marshes adjacent to this management unit.
Clams: Softshell (portions of beds associated with 24EN); Baltic (portions of beds associated with 27EN); California Softshell (portions of beds associated with 24EN).
Fish: Starry Flounder, Salmonids.

Biological Function
Fish feeding. Salmonid passage.

HISTORICAL ALTERATIONS:
Piling has been placed in this management unit.

RIPARIAN VEGETATION:
Shorelines are predominantly cleared agricultural lands. The shoreline of Kilchis Point is partly forested.

WATER QUALITY
HYDRAULIC CHARACTERISTICS
NAVIGATION AND PUBLIC ACCESS TO THE WATER
OTHER

MANAGEMENT UNIT: 30EN (Estuary Natural)

CATEGORY: Major tracts of saltmarsh.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Tidal marsh (2.5.11, 2.5.12)	236.9	24.7

Animals Present
Birds: Nesting, feeding and resting area.

Significant Biological Functions
Primary production. Bird resting, feeding and nesting area.

HISTORICAL ALTERATIONS:
A dike is located along the southern boundary of this management unit removing a large area of tidal marsh. A dike and fill for the Southern Pacific Railroad probably eliminated a large area of tidal marsh now mapped as Coquille soil by the U.S Soil Conservation Service.

RIPARIAN VEGETATION:
Predominantly cleared agricultural land.

WATER QUALITY
HYDRAULIC CHARACTERISTICS
NAVIGATION AND PUBLIC ACCESS TO THE WATER
OTHER

MANAGEMENT UNIT: 31EC1 (Estuary Conservation 1)

CATEGORY: Area needed for maintenance or enhancement of biological productivity.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Subtidal unconsolidated bottom (1.1)	17.1	0.7

Animals Present
Birds: Nesting, feeding and resting on marshes adjacent to this management unit.
Fish: Chum and Coho Salmon.

Significant Biological Functions
Salmonid passage.

HISTORICAL ALTERATIONS:
A dike is located along a portion of the northern bank of this management unit (see discussion for 30EN). Fill and piers have been placed for the crossing of Highway 101 and the Southern Pacific Railroad.

RIPARIAN VEGETATION:
Predominantly cleared agricultural land with some trees and shrubs.

WATER QUALITY
HYDRAULIC CHARACTERISTICS
NAVIGATION AND PUBLIC ACCESS TO THE WATER
OTHER

MANAGEMENT UNIT: 32EC1 (Estuary Conservation 1)

CATEGORY: Area needed for enhancement of biological productivity.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Subtidal unconsolidated bottom (1.1)	10.3	0.4

Animals Present
Birds: Nesting, feeding and resting on marshes adjacent to management unit.
Fish: Salmonids.

Significant Biological Functions
Salmonid passage.

HISTORICAL ALTERATIONS:
A dike has been constructed along the lower reach of this management unit. Fill and piers have been placed for the crossing of Highway 101 and the Southern Pacific Railroad.

RIPARIAN VEGETATION:
Along portions of this management unit there is a narrow corridor of trees. Other portions are cleared agricultural land.

WATER QUALITY
HYDRAULIC CHARACTERISTICS
NAVIGATION AND PUBLIC ACCESS TO THE WATER
OTHER

MANAGEMENT UNIT: 33EC1 (Estuary Conservation 1)

CATEGORY: Area needed for maintenance or enhancement of biological productivity.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Subtidal unconsolidated bottom (1.1)	15.2	0.7

Animals Present
Birds: Nesting in riparian area adjacent to this management unit.

Significant Biological Functions
Bird feeding. Nesting in adjacent riparian areas and Squeedunk Slough forested freshwater wetland.

HISTORICAL ALTERATIONS:
A dike has been placed along the northern bank of this management unit contributing to the removal of a large tidal marsh from the estuary.

RIPARIAN VEGETATION:
Primarily cleared agricultural lands. Forest at the Squeedunk forested freshwater wetland.

WATER QUALITY
HYDRAULIC CHARACTERISTICS
NAVIGATION AND PUBLIC ACCESS TO THE WATER
OTHER

MANAGEMENT UNIT: 34EN (Estuary Natural)

CATEGORY: Major tracts of saltmarsh.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Tidal marsh (2.5.11, 2.5.12)	420.7	43.8

Animals Present
Birds: Nesting, feeding and resting area.

Significant Biological Functions
Primary and invertebrate production. Bird nesting, feeding and resting area. Largest remaining expanse of tidal marsh in the bay.

HISTORICAL ALTERATIONS
RIPARIAN VEGETATION
WATER QUALITY
HYDRAULIC CHARACTERISTICS
NAVIGATION AND PUBLIC ACCESS TO THE WATER
OTHER

MANAGEMENT UNIT: 35EC1 (Estuary Conservation 1)

CATEGORY: Area needed for maintenance or enhancement of biological productivity.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Subtidal unconsolidated bottom (1.1)	54.8	2.4

Animals Present
Birds: Nesting, feeding and resting in marshes and riparian areas adjacent tot he lower portion of this management unit.
Fish: Starry Flounder, Salmonids.

Significant Biological Functions
Fish feeding. Passage of Salmonids.

HISTORICAL ALTERATIONS:
The lower reach of this management unit was dredged in 1972 by the U.S. Army Corps of Engineers for flood control purposes. Dikes have been constructed along the banks of this management unit removing large areas of tidal marsh from the estuary. A small boat wharf associated with a boat rental and repair shop is located on the river at 101.

RIPARIAN VEGETATION:
A narrow forested corridor lines much of this management unit, otherwise it is cleared agricultural land.

WATER QUALITY
HYDRAULIC CHARACTERISTICS

NAVIGATION AND PUBLIC ACCESS TO THE WATER:
Boat access is available at a private facility adjacent to the Highway 101 bridge. Salmon fishing is the primary use of this management unit.

OTHER

MANAGEMENT UNIT: 36EC1 (Estuary Conservation 1)

CATEGORY: Area needed for maintenance of enhancement of biological productivity.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Subtidal unconsolidated bottom (1.1)	16.4	0.7

Animals Present
Birds: Nesting in riparian area adjacent to the lower portion of this management unit.

Significant Biological Functions
Bird use in conjunction with adjacent riparian areas.

HISTORICAL ALTERATIONS:
Dikes have been constructed along the lower portions of this management unit. Fill and piling have been placed for the Highway 101 crossing.

RIPARIAN VEGETATION:
A narrow forest corridor stretches along most of the management unit. A wider forest belt is present in the Rain River Preserve area.

WATER QUALITY
HYDRAULIC CHARACTERISTICS
NAVIGATION AND PUBLIC ACCESS TO THE WATER
OTHER

MANAGEMENT UNIT: 37EN(Estuary Natural)

CATEGORY: Major tract of tideflat.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Intertidal flat (2.2)	78.0	2.0
Tidal marsh (2.5.11)	11.0	1.1

Animals Present
Fish: Starry Flounder and Chum Salmon
Other: Small dense bed of Ghost or Mud Shrimp.

Significant Biological Functions
Invertebrate production. Fish feeding.

HISTORICAL ALTERATIONS:
Fill and piling have been placed for a County boat ramp. Adjacent to this, fill, piling, and a bulkhead have been placed for the Tillamook Oyster company as well. Numerous piling have been placed in this management unit. Three houseboats are situated at its northern end.

RIPARIAN VEGETATION:
Limited riparian vegetation because of Bayocean Road and shoreline development.

WATER QUALITY
HYDRAULIC CHARACTERISTICS

NAVIGATION AND PUBLIC ACCESS TO THE WATER:
Tillamook County boat ramp adjacent to the southern end of this management unit.

OTHER

MANAGEMENT UNIT: 38EC1 (Estuary Conservation 1)

CATEGORY: Area needed for recreational and aesthetic uses. Tracts of significant habitat smaller or of less biological importance than those in natural management units.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Intertidal shore (2.1)	38.0	30.9
Intertidal aquatic bed (2.3.9)	1.0	0.1
Tidal marsh (2.5.12)	1.6	0.2

Animals Present
Birds: Nesting in marshes and riparian areas adjacent to this management unit.
Fish: Starry Flounder and Chum Salmon.

Significant Biological Functions
Invertebrate production. Fish feeding.

HISTORICAL ALTERATIONS:
A dike along the northern boundary of this management unit has removed a large area of tidal marsh from the estuary. A number of pilings are located in this management unit.

RIPARIAN VEGETATION:
Predominantly cleared agricultural land.

WATER QUALITY
HYDRAULIC CHARACTERISTICS
NAVIGATION AND PUBLIC ACCESS TO THE WATER
OTHER

MANAGEMENT UNIT: 39EN (Estuary Natural)

CATEGORY: Major tract of saltmarsh

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Tidal marsh (2.5.12)	61.8	6.4

Animals Present
Birds: Nesting area.

Significant Biological Functions
Primary production and invertebrate production. Bird nesting.

HISTORICAL ALTERATIONS:
A dike along the southwestern boundary of the southern most marsh in this management unit has removed a large area from the estuary.

RIPARIAN VEGETATION:
Shrubs and cleared agricultural land along the southern boundary.

WATER QUALITY
HYDRAULIC CHARACTERISTICS
NAVIGATION AND PUBLIC ACCESS TO THE WATER
OTHER

MANAGEMENT UNIT: 40 EC1 (Estuary Conservation 1)

CATEGORY: Area needed for maintenance or enhancement of biological productivity. Area needed for recreational use.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Subtidal unconsolidated bottom (1.1)	110.3	4.8
Intertidal shore (2.1)	21.1	17.2
Tidal marsh (2.5.12)	12.6	1.3

Animals Present
Birds: Nesting in marshes and riparian areas adjacent to the lower portion of this management unit.
Fish: Starry Flounder.

Significant Biological Functions
Fish feeding. Bird nesting in adjacent marshes and riparian areas.

HISTORICAL ALTERATIONS:
Diking has occurred along significant stretches of this management unit contributing to the loss of large areas of tidal marsh from the estuary. Fill and piling were place for crossings of Highway 101 and the Southern Pacific Railroad. Fill and a bulkhead were placed in Hoquarton Slough for a public boat ramp and park. Another fill was placed further down stream. Miscellaneous piling was placed in this management unit. The lower reach of the management unit was dredged in 1972 by the U.S. Army Corps of Engineers for flood control purposes.

RIPARIAN VEGETATION:
Primarily cleared agricultural land except where it passes through a major forested fresh water wetland in the shorelands.

WATER QUALITY
HYDRAULIC CHARACTERISTICS

NAVIGATION AND PUBLIC ACCESS TO THE WATER:
Tillamook city public boat ramp near Highway 101.

OTHER

MANAGEMENT UNIT: 41EC1 (Estuary conservation 1)

CATEGORY: Area needed for maintenance or enhancement of biological productivity. Tracts of significant habitat smaller or of less biological importance than those in natural management units.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Intertidal marsh (2.5.12)	7.0	0.7

Animals Present
Birds: Nesting area.

Significant Biological Functions
Bird nesting area.

HISTORICAL ALTERATIONS:
Fill and piling have been placed for a highway crossing. Fill has been placed for dike construction. Two fills have been placed more recently. One was approved by DSL as an out of court settlement in an enforcement action. The other was ordered removed by the Tillamook County Circuit Court as the result of another enforcement action.

RIPARIAN VEGETATION:
Little present.

WATER QUALITY
HYDRAULIC CHARACTERISTICS
NAVIGATION AND PUBLIC ACCESS TO THE WATER
OTHER

MANAGEMENT UNIT: 43EC1 (Estuary conservation 1)

CATEGORY: Area needed for recreational and aesthetic uses. Area needed for recreational use.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Subtidal unconsolidated bottom (1.1)	45.5	2.0

Animals Present
Fish: Salmonids.

Significant Biological Functions
Salmonid passage.

HISTORICAL ALTERATIONS:
Filling for dikes along the banks of this management unit has removed areas from the estuary.

RIPARIAN VEGETATION:
The shoreline is predominantly cleared agricultural land.

WATER QUALITY
HYDRAULIC CHARACTERISTICS

NAVIGATION AND PUBLIC ACCESS TO THE WATER:
Tillamook City boat ramp.

OTHER

MANAGEMENT UNIT: 44EC1 (Estuary Conservation 1)

CATEGORY: Area needed for maintenance or enhancement of biological productivity. Area needed for recreational and aesthetic uses.

HABITATS:

Habitat Classification	Acres	% of Class in Estuary
Subtidal unconsolidated bottom (1.1)	130.6	13.6

Animals Present
Fish: Salmonids.

Significant Biological Functions
Salmonid passage.

HISTORICAL ALTERATIONS:
The primary alteration in this management unit has been diking which has removed substantial areas from the estuary. Numerous piling are also present in this management unit. Dredging for the purpose of creating a boat canal and marina has occurred on the north side of the Tillamook River approximately 4000 feet upriver of the Netarts Highway crossing. Fill and piling were placed for bridge crossings over the Tillamook River and Beaver Creek.

RIPARIAN VEGETATION:
Cleared agricultural lands or a thin forest corridor.

WATER QUALITY
HYDRAULIC CHARACTERISTICS

NAVIGATION AND PUBLIC ACCESS TO THE WATER:
ODFW boat ramp at Tillamook River Loop Road crossing.

OTHER

2.4 NETARTS ESTUARY MANAGEMENT UNIT DESCRIPTIONS

MANAGEMENT UNIT: 1

ZONING: Estuary Conservation 1 (EC1)

CATEGORY: Tract of significant habitat of less biological importance than those in Natural management units.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal beach bar (2.4.1)	20.5	18.3

1 EC1 contains no major tracts of saltmarsh, tideflats, seagrass or algae beds which would require its inclusion within an Estuary Natural management unit.

MANAGEMENT UNIT: 2

ZONING: Estuary Conservation 1 (EC1)

CATEGORY: Tract of significant habitat of less biological importance than those in Natural management units.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal beach bar (2.41)	63.6	56.8

2 EC1 contains no major tracts of saltmarsh, tideflats, seagrass or algae beds which would require its inclusion within an Estuary Natural management unit.

MANAGEMENT UNIT: 3

ZONING: Estuary Conservation (EC1)

CATEGORY: Tract of significant habitat of less biological importance than those in Natural management units.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal beach bar (2.4.1)	27.8	24.8

3 EC1 contains no major tracts of saltmarsh, tideflats, seagrass or algae beds which would require its inclusion within an Estuary Natural management unit.

MANAGEMENT UNIT: 4

ZONING: Estuary Natural (EN)

CATEGORY: Major algae bed.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal aquatic bed (2.3.19 (6))	1.5	.2

Although 4 EN represents a small percentage of the intertidal aquatic bed habitat type, it is one of two intertidal algal beds on a cobble/gravel substrate within Netarts Estuary. Due to the scarcity of algal covered rocky shores within mid and north coast estuaries, 4 EN should be considered a major algal bed.

MANAGEMENT UNIT: 5

ZONING: Estuary Conservation 1 (EC1)

CATEGORY: Area needed for maintenance and enhancement of biological productivity. Areas needed for recreational uses.

Clam bed.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal shore (2.1)	uncal	uncal

5 EC1 is immediately adjacent to Happy Camp, an established resort and small private camping area offering beach access, boat rentals and supplies[1,2]. 5EC1 contains beds of Gaper Clams (Tresus Capax)[3,4], and recreational clamming is a popular activity at the site.

[1] Economic Consultants of Oregon, Commercial and Recreational Boating Facilities in Oregon Estuaries: Inventory and Demand Analysis, 1979, pp. 20, 81.
[2] Oregon State Game Commission, North Coast Access Plan, pp. 40,43.
[3] Hancock et al, Subtidal Clam Populations: Distribution, Abundance and Ecology, p. 55.
[4] Gaumer, et al, (1977), Resource Assessment Maps of Netarts Bay and Tillamook Bay: Distribution of Clam Populations, Substrate Materials, Eel Grass Densities.

TWO 11 X 17 MAPS INSERTED HERE

MANAGEMENT UNIT: 6

ZONING: Estuary Natural (EN)

CATEGORY: Major algae bed.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal aquatic bed (2.3.10 (6))	13.4	1.4

Although 6 EN represents a small percentage of the intertidal aquatic bed habitat type, it is the largest intertidal algal bed on a cobble/gravel substrate within Netarts Estuary. Beds of brown algae and sea lettuce (Ulva sp.) occur within this management unit[1] 5 EC1 also contains beds of Gaper Clams (Tresus Capax)[2,3].

MANAGEMENT UNIT: 7

ZONING: Estuary Conservation 1 (EC1)

CATEGORY: Area needed for recreational and aesthetic uses.

Clam bed.

Estuarine area adjacent to existing development of moderate intensity not otherwise needed for preservation of development (southern tip only).

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Subtidal aquatic bed(1.3.9)	1.2	38.7
Subtidal unconsolidated bottom (1.1.6)	22.1	6.2

The majority of 7 EC1 is a subtidal channel which is used for recreational fishing, boating and crabbing. At the southern tip of 7 EC1, immediately adjacent to the rock breakwater at the County boat basin, is a small subtidal eelgrass bed. Gaper Clams (Tresus Capax) and Cockle Clams (Clinocardium Nuttallii) are located within 5 EC1[4,5].

MANAGEMENT UNIT: 8

ZONING: Estuary conservation 2 (EC2)

CATEGORY: Area needed for recreational and aesthetic uses.

Clam bed.

Partially altered area not needed for preservation or development.

Estuarine area adjacent to existing development of moderate intensity not otherwise needed for preservation or development.

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[1] Hancock et al, pp. 68, 70.
[2] Ibid, p. 55.
[3] Gaumer et al (1977).
[4] Hancock et al, p. 55.
[5] Gaumer et al (1977).

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Subtidal unconsolidated bottom (1.1.3 and 1.1.6)	8.2	2.3

8 EC2 contains the Tillamook County boat landing and moorage, which consists of 20 moorage spaces for boats under 20 feet, a paved 2 lane ramp and (on the adjacent shoreland) 200 parking spaces, restrooms and a garbage disposal area[1]. Construction of this recreational boating facility involved filling five acres of submersible land, and dredging of an intertidal area[2]. Future maintenance dredging may be required to maintain water depths suitable for recreational boat moorage. Beds of Gaper Clams (Tresus Capax) are located in the northeastern corner of this management unit[3,4]. The northeastern corner of this management unit is also a resting and feeding area for waterfowl and shorebirds[5].

MANAGEMENT UNIT: 9

ZONING: Estuary Conservation 1 (EC1)

CATEGORY: Areas needed for maintenance and enhancement of biological productivity.

Area needed for recreational and aesthetic uses.

Clam bed.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Subtidal unconsolidated bottom (1.1)	149.4	42.2

9 EC1 is a subtidal channel which is used for recreational fishing, boating and crabbing. Beds of Gaper Clams (Tresus Capax), Butter Clams (Saxidomus Giganteus) and Cockle Clams (Clinocardium Nuttallii) are located within this management unit[6]. The eastern edge below 8 EC2 is a feeding and resting area for waterfowl and shorebirds. Three Department of Environmental Quality (DEQ) water surveillance stations (Stations 1, 2 & 3) are located within this management unit (See Section B 2.2 of Netarts Estuary inventory for water quality data).

MANAGEMENT UNIT: 10

ZONING: Estuary Natural (EN)

CATEGORY: Major tract of tideflat.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal aquatic bed (2.3.9)	2.2	.2
Intertidal flat (2.2.1)	143.0	13.3
Subtidal unconsolidated bottom (1.1)	23.9	6.7

[1] Economic Consultants of Oregon, p. 19, 23, 81.
[2] Oregon Department of State Lands, An Inventory of Filled Lands in the Netarts River, Appendix B.
[3] Hancock et al, p. 55.
[4] Gaumer et al (1977).
[5] Taylor and Kunkel, Areas of Concentrated Nesting, Feeding and Resting Use by Waterfowl and Shorebirds.
[6] Hancock et al, pp. 55-57.

10 EN contains beds of Cockle Clams (Tresus Capax) and Ghost and Mud Shrimp[1]. 10 EN also contains the only known bed of Bodega Tellin Clams in Netarts Bay[2,3]. 10 EN was identified as a potential oyster culture area[4]. The size of the intertidal flat habitat within 10 EN, and its proximity to other large intertidal flat habitats in 16 EN and 29 EN justify the "major tract" designation for this management unit.

MANAGEMENT UNIT: 11

ZONING: Estuary conservation 1 (EC1)

CATEGORY: Area needed for recreational and aesthetic uses.

Tracts of significant habitat smaller or of less biological importance than those in Natural management units.

Clam bed.

Estuarine area adjacent to existing development of moderate intensity not otherwise needed for preservation or development.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal aquatic bed (2.3.9)	.6	.1
Subtidal unconsolidated bottom (1.1.6)	11.1	3.1

11 EC1 is adjacent to the most developed shorelands of Netarts estuary. Adjacent shorelands are included within the Neighborhood Commercial (C-1) High-Density Residential (R-3) or Residential Mobile Home (RMH) zone. Sparse beds of Gaper Clams (Tresus Capax), Cockle Clams (Clinocordium Nuttallii) and Piddock Clams (Zirfaea Pilsbryi) are located within this management unit.[5,6]. 11 EC1 has been identified as a feeding and resting area for waterfowl and shorebirds[7]. The small intertidal aquatic bed within this management unit contains eelgrass.

MANAGEMENT UNIT: 12

ZONING: Estuary Conservation 2 (EC2)

CATEGORY: Area needed for recreational and aesthetic uses.

Partially altered area not needed for preservation or development.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Subtidal unconsolidated bottom (1.1)	.6	.2

[1] Hancock et al, pp. 57, 66.
[2] Ibid, p. 63.
[3] Gaumer et al (1977).
[4] Osis and Demory, Classification and Utilization of Oyster Lands in Oregon, p. 7, 8.
[5] Hancock et al, p. 55, 57, 65.
[6] Gaumer et al (1977).
[7] Taylor and Kunkel.

12 EC2 (mouth of Rice Creek) contains a small moorage for recreational boats. Access to Netarts Bay is provided by a small culvert in Whiskey Creek Road. Historically, the mouth of Rice Creek has been dredged to facilitate small boat moorage; future dredging may also be necessary.

MANAGEMENT UNIT: 13

ZONING: Estuary Natural (EN)

CATEGORY: Major tract of saltmarsh, tideflat, seagrass and algae beds.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12)	1.3	.5
Intertidal aquatic bed (2.3.9)	13.7	1.4
Intertidal flat (2.2.2)	28.8	2.7

13 EN represents a small percentage of the intertidal marsh, intertidal aquatic bed and intertidal flat habitats within Netarts Estuary. However, 13 EN does represent a total of 43.8 acres, all of which provides a source of primary productivity within Netarts Estuary. 13 EN contains beds of Ghost and Mud Shrimp, Gaper Clams (Tresus Capax), Cockle Clams (Clinocardium Nuttallii), native Littleneck Clams (Venerupis Philippinarium), Manilla Littleneck Clams (V. Staminea) and Bentnose Clams (Macoma Nasuta)[1,2]. The small intertidal aquatic bed within this management unit contains eelgrass.

MANAGEMENT UNIT: 14

ZONING: Estuary Conservation 1 (EC1)

CATEGORY: Tract of significant habitat smaller or of less biological importance than those in Natural management units.

Partially altered area not needed for preservation or development.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12D)	8.7	3.7
Intertidal flat (2.2.3 D)	1.3	.1

14 EC1 contains an intertidal marsh and intertidal flat which have been altered by the construction of Whiskey Creek road. The placement of road fill has restricted tidal inflow[3,4] and has thereby reduced the contribution of this management unit to overall estuarine productivity. 14 EC1 has been identified in the Tillamook County Comprehensive Plan as a potential estuarine restoration site[5]. 14 EC1 has been identified as a nesting area for waterfowl and shorebirds[6].

[1] Hancock et al, p. 55, 57, 58, 62, 65, 66.
[2] Gaumer et al (1977).
[3] Stout, The Natural Resources and Human Utilization of Netarts Bay, Oregon, p. 188.
[4] Kreag, Natural Resources of Netarts Estuary, Vol. 2, No. 1, p. 3.
[5] Tillamook County Comprehensive Plan, p. XVI-216 - XVI-217.
[6] Taylor and Kunkel.

MANAGEMENT UNIT: 15

ZONING: Estuary Conservation 1 (EC1)

CATEGORY: Tract of significant habitat smaller or of less biological importance than those in Natural management units.

Partially altered area not needed for preservation or development.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12 D & 2.5.D)	8.4	3.5
Intertidal flat (2.2.3 D)	.8	.07

15 EC1 contains an intertidal marsh which has been diked by the construction of Whiskey Creek Road, and a diked intertidal flat. The placement of roadfill has restricted tidal inflow[1,2] within the intertidal marsh, and has thereby reduced the contribution of the marsh to overall estuarine productivity. The diked intertidal marsh portion of 15 EC1 has been identified as a potential estuarine restoration site in the Tillamook County Comprehensive Plan[3]. The intertidal flat portion of 15 EC1 has been identified as a feeding and resting area for waterfowl and shorebirds; the intertidal marsh portion has been identified as a nesting area for waterfowl and shorebirds[4].

MANAGEMENT UNIT: 16

ZONING: Estuary Natural (EN)

CATEGORY: Major tract of tideflat.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal aquatic bed (2.3.10)	2.4	.2
Intertidal flat (2.2.1)	82.6	7.7
Subtidal unconsolidated bottom (1.1)	54.3	15.3

16 EN contains beds of Gaper Clams (Tresus Capax), Butter Clams (Saxidomus Giganteus), Cockle Clams (Clinocardium Nuttallii), Native Littleneck Clams (Venerupis Staminea), Softshell Clams (Mya Arenaria), Baltic Clams (Macoma Balthica), Bentnose Clams (Macoma Nasuta) and Piddock Clams (Zirfaea Pilsbryi)[5,6]. Intertidal aquatic beds within 16 EN contain eelgrass. A portion of this management unit has been identified as a feeding and resting area for waterfowl and shorebirds[7]. 16 EN has been identified as a potential oyster culture area[8]. Two DEQ water surveillance stations (Stations 4 & 5) are located within this management unit (See Section B 2.2 of Netarts Estuary inventory for water quality data). The variety of benthic invertebrates which 16 EN contains justify the "major tract" designation for this management unit.

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[1] Stout et al, p. 188.
[2] Kreag, p. 3.
[3] Tillamook County Comprehensive Plan, p. XVI-216 - XVI-217.
[4] Taylor and Kunkel.
[5] Hancock et al, p. 55-58, 60-62, 65.
[6] Gaumer et al (1977).
[7] Taylor and Kunkel.
[8] Osis et al, p. 7, 8.

MANAGEMENT UNIT: 17

ZONING: Estuary Natural (EN)

CATEGORY: Major tract of tideflat.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal flat (2.2.3)	10.9	1.0

17 EN contains beds of Ghost and Mud Shrimp, Gaper clams (Tresus Capax), Baltic Clams (Macoma Balthica), Bentnose Clams (Macoma Nasuta), Softshell Clams (*Mya Arenaria*), *California Softshell* Clams (Cryptomya Californica), and Cockle clams (Clinocardium Nuttallii)[1,2]. The northern tip of this management unit is a feeding and resting area for waterfowl and shorebirds[3]. 17 EN has been identified as a potential oyster culture area[4]. Although the size of the intertidal flat habitat within 17 EN is small, the variety of benthic invertebrates within this management unit and its proximity to the major tracts of intertidal flat in 16 EN justify the "major tract" designation for this management unit.

MANAGEMENT UNIT: 18

ZONING: Estuary Natural (EN)

CATEGORY: Major tract of tideflat.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.11)	2.1	.9
Intertidal flat (2.2.1, 2.2.2,2.2.3)	30.2	2.8
Subtidal unconsolidated bottom (1.1)	2.3	.6

18 EN contains beds of Baltic Clams (Macoma Balthica), Bentnose Clams (Macoma Nasuta), California Softshell Clams (Cryptomya Californica), Cockle clams (Clinocardium Nuttallii) and Ghost and Mud Shrimp[5,6]. Although the size of the intertidal flat habitat within 18 EN is small, the variety of benthic invertebrates within this management unit and its proximity to the major tracts of intertidal flat and aquatic bed in 24 EN justify the "major tract" designation for this management unit.

MANAGEMENT UNIT: 19

ZONING: Estuary Natural (EN)

CATEGORY: Major algae bed.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal aquatic bed (2.3.9)	21.2	2.2
Subtidal aquatic bed (1.3.9)	1.9	61.3

[1] Hancock et al, p. 55, 61, 62, 66.
[2] Gaumer et al (1977).
[3] Taylor and Kunkel.
[4] Osis et al, p. 7, 8.
[5] Hancock et al, p. 61, 62, 64, 66.
[6] Gaumer et al, (1977).

19 EN contains beds of Bentnose Clams (Macoma Nasuta), Baltic Clams (Macoma Balthica), Native Littleneck Clams (Venerupis Philippinarium), Butter Clams (Saxidomus Giganteurs), Piddock Clams (Zirfaea Pilsbryi), and Ghost and Mud Shrimp[1,2]. Intertidal aquatic beds within this management unit contain eelgrass. Although the size of the subtidal aquatic bed within this management unit is small, it represents a high percentage of the subtidal aquatic bed habitat type, and should be considered a major algal bed.

MANAGEMENT UNIT: 20

ZONING: Estuary Natural (EN)

CATEGORY: Major tract of intertidal flat.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal flat (2.2.1)	44.9	4.2
Subtidal unconsolidated bottom (1.1)	45.8	12.9

20 EN contains beds of Cockle Clams (Clinocardium Nuttallii), Softshell Clams (Mya Arenaria), Bentnose Clams (Macoma Nasuta), and Piddock Clams (Zirfaea Pilsbryi)[3,4]. The size of the intertidal flat within 20 EN and its proximity to major intertidal flats in 20 EN and 29 EN justify the major tract designation for this management unit.

MANAGEMENT UNIT: 21

ZONING: Estuary Conservation 1 (EC1)

CATEGORY: Tract of significant habitat smaller or of less biological importance than those in Natural management units.
Partially altered area not needed for preservation or development.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12 D,2.5.12)	3.3	1.4

21 EC1 contains an intertidal marsh which has been altered by the construction of Whiskey Creek Road. The placement of roadfill has restricted tidal inflow[5,6] and has thereby reduced the contribution of this management unit to overall estuarine productivity. 21 EC1 has been identified in the Tillamook County Comprehensive Plan as a potential estuarine restoration site[7]. 21EC has also been identified as a resting area for waterfowl and shorebirds[8].

MANAGEMENT UNIT: 22

ZONING: Estuary Natural (EN)

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[1] Hancock et al, p. 56, 58, 61, 62, 66.
[2] Gaumer et al, (1977).
[3] Hancock et al, p. 57, 60.
[4] Gaumer et al, (1977).
[5] Stout et al, p. 188.
[6] Kreag, p. 3.
[7] Tillamook County Comprehensive Plan, p. XVI-216 - XVI-217.
[8] Taylor and Kunkle.

CATEGORY: Major tract of intertidal marsh.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.11,2.5.12)	3.9	1.6

Because of the relatively low abundance of intertidal marsh habitat within Netarts Estuary (approximately 8.5% of the total area of the estuary) and the importance of intertidal marshes as fish and wildlife habitat, filters for nutrients, sediments and pollutants, and as contributors to detrital food chains, the "major tract" designation is justified.

MANAGEMENT UNIT: 23

ZONING: Estuary Natural (EN)

CATEGORY: Major tract of intertidal flat.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal flat (2.2.3)	138.6	12.9

23 EN contains sparse beds of Bentnose Clams (Macoma Nasuta), California Softshell Clams (Cryptomya Californica) and Ghost and Mud Shrimp[1,2] Part of the Oregon Department of Fish and Wildlife experimental shellfish reserve is located within this management unit[3]. The southern tip of 23 EN has been identified as a feeding, resting and nesting area for waterfowl and shorebirds[4]. The size of the intertidal flat habitat within 13 EN and the use of the area for shellfish research justify the "major tract" designation for this management area.

MANAGEMENT UNIT: 24

ZONING: Estuary Natural (EN)

CATEGORY: Major tract of tideflat and seagrass bed.

Area needed for scientific, research or educational needs.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal aquatic bed (2.3.9)	911.7	93.4
Intertidal flat (2.2.2,2.2.1)	125.0	11.6
Subtidal unconsolidated bottom (1.1)	32.1	9.1

24 EN contains the majority of seagrass beds in Netarts Estuary. This management unit is a feeding and resting area for waterfowl and shorebirds,[5] including the Black Brant, which feeds almost exclusively on eelgrass. 24 EN contains beds of Gaper Clams (Tresus Capax), Butter Clams (Saxidomus Giganteus), Cockle Clams (Clinocardium Nuttallii), Manilla Littleneck Clams (Venerupis Philippinarium), Native Littleneck Clams (V. Staminea), Irus Clams (Macoma Irus), Softshell Clams (Mya Arenaria), Baltic Clams (Macoma Balthica), Bentnose Clams (Macoma Nasuta) and California

[1] Hancock et al, p. 62, 64, 66.
[2] Gaumer et al, (1977).
[3] Gaumer and Osis, (1973), 1971 Netarts Bay Estuary Resource Study, p. 27.
[4] Taylor and Kunkle.
[5] Taylor and Kunkle.

Softshell Clams (Cryptomya Californica) and Ghost and Mud Shrimp[1,2]. 24 EN is identified as a potential oyster culture area[3]. Part of the Oregon Department of Fish and Wildlife experimental shellfish reserve is located within this management unit, as well as several private oyster leases[4]. A DEQ water surveillance station (Station 6) is located within this management unit (See Section B 2.2 of Netarts Estuary inventory for water quality data). The size of the intertidal flat and intertidal aquatic bed habitats within 24 EN and the use of the area for shellfish research justify the "major tract" designation.

MANAGEMENT UNIT: 25

ZONING: Estuary Natural (EN)

CATEGORY: Major tract of intertidal marsh.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.11)	1.0	.4

Because of the relatively low abundance of intertidal marsh habitat within Netarts Estuary (approximately 8.5% of the total area of the estuary) and the importance of intertidal marshes as fish and wildlife habitat, filters for nutrients, sediments and pollutants, and as contributors to detrital food chains, the "major tract" designation is justified.

MANAGEMENT UNIT: 26

ZONING: Estuary Natural (EN)

CATEGORY: Major tract of intertidal marsh.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12,2.5.11) 108.2	45.5	

26 EN contains the largest tract of intertidal marsh within Netarts Estuary. 26 EN is located within the Netarts Spit site inventoried in Oregon Natural Areas: Tillamook County Data Summary[5]. 26 EN is included within the boundary of Cape Lookout State Park, and has been included within the "Primary Resource Protection" land use classification[6]. 26 EN has been identified as a nesting, feeding and resting area for waterfowl and shorebirds[7]. The large size of the intertidal marshes within 26 EN justifies the "major tract" designation.

MANAGEMENT UNIT: 27

ZONING: Estuary Natural (EN)

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[1] Hancock et al, p. 58-62, 64, 66.
[2] Gaumer et al (1977).
[3] Osis et al (1977).
[4] Gaumer et al (1973), p. 27.60.
[5] Nature Conservancy, Oregon natural Areas: Tillamook County Data Summary, T1-72.
[6] Oregon Department of Transportation, Cape Lookout State Park Master Plan, p. 3, 4.
[7] Taylor and Kunkel.

CATEGORY: Major tract of intertidal marsh.

Area needed for scientific, research and educational needs.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal flat (2.2.2,2.2.1)	100.9	9.4

27 EN contains beds of California Softshell Clam (Cryptomya Californica), Manilla Littleneck Clam (Venerupis Philippinarium), and Ghost and Mud Shrimp[1,2]. 27 EN is located within the Netarts Spit site inventoried in Oregon Natural Areas: Tillamook County Data Summary[3]. Part of the Oregon State University shellfish reserve is located within this management unit[4]. 27 EN has been identified as a feeding and resting area for waterfowl and shorebirds[5]. 27 EN is located within the boundary of Cape Lookout State Park. The large size of the intertidal flat habitat and the use of the area for shellfish research justify the "major tract" designation for this management unit.

MANAGEMENT UNIT: 28

ZONING: Estuary Natural (EN)

CATEGORY: Major tract of intertidal marsh.

Area needed for scientific, research or educational needs.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12,2.5.11)	100.9	42.4

29 EN contains one of the two largest tracts of intertidal salt marsh within Netarts Estuary. 28 EN is located within the Netarts Spit site inventoried in Oregon Natural Areas: Tillamook County Data Summary[6]. 28 EN is included within the boundary of Cape Lookout State Park; the majority of this management unit is included within the Netarts Sandspit Research Natural Preserve[7]. In August of 1979, this area was recommended by the Oregon Natural Area Preserves Advisory committee for inclusion into the Oregon Natural Area Preserve system[8]. The marshes within this area were described in Preserve Analysis: Netarts Sand Spit[9]. 28 EN contains an Environmental Protection Agency (EPA) salt marsh study site. Annual biomass graphs for the following salt marsh plant species within 28 EN are contained in the Field Guide to Evaluate Net Primary Production of Wetlands: Diostichlis Spicata (p. 25, Juncul Balticus (p. 27), Potentilla Pacifica (p. 32), Triglochin Maritima (p. 51)[10]. The area has been identified as nesting area for waterfowl and shorebirds[11].

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[1] Hancock et al, p. 58, 64, 66.
[2] Gaumer et al (1977).
[3] Nature Conservancy, T1-72.
[4] Gaumer et al, (1973), p. 27.
[5] Taylor and Kunkel.
[6] Nature Conservancy, T1-72.
[7] Oregon Department of Transportation, p. 3, 4.
[8] Bonacker, Martin and Frenkel, Preserve Analysis: Netarts Sand Spit, p. 56.
[9] Ibid, p. 33-44.
[10] Kibby, Gallagher and Sanville, Field Guide to Evaluate net Primary Production of Wetlands, p. 25, 27, 32, 34, 36, 51.
[11] Taylor and Kunkel.

MANAGEMENT UNIT: 29

ZONING: Estuary Natural (EN)

CATEGORY: Major tract of intertidal flat.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal aquatic bed(2.3.9)	10.1	1.0
Intertidal flat (2.2.1)	369.0	34.3
Subtidal unconsolidated bottom (1.1)	5.9	1.7

29 EN contains beds of Gaper Clams (Tresus Capax), Butter Clams (Saxidomus Giganteus), Cockle Clams (Clinocardium Nuttallii), Manilla Littleneck Clams (Venerupis Philippinarium), Native Littleneck Clams (V. Staminea), Softshell Clams (Mya Arenaria), Bentnose Clams (Macoma Nasuta) and Ghost and Mud Shrimp[1,2]. Intertidal aquatic beds within this management unit contain eelgrass. 29 EN contains a feeding and resting area for waterfowl and shorebirds[3]. 29 EN was identified as a potential oyster culture area[4].

The size of the intertidal flat habitat within 29 EN justifies the "major tract" designation.

FOOTNOTES

1. The Habitat Map of Netarts Estuary (Natural Resources of Netarts Estuary, p. 28, and a larger 1:1000 scale version) was the primary reference used to identify habitat types within Netarts Estuary. Based on aerial photograph interpretation, Soil Conservation Service soils map interpretation and/or field investigation, the habitat boundaries shown on the Habitat Map of Netarts Estuary were adjusted as follows: the boundaries of the intertidal marsh habitats in the lower sections of 14 EC1 and 15 EC1, and in 21 EC1 were enlarged to reflect the boundaries shown on aerial photographs and soils maps; 12 EC2 was determined to be subtidal unconsolidated bottom rather than intertidal flat. Planimetric measurements were made to determine the area of each individual habitat subclass. Habitat subclass acreages were then used to determine the percentage of each of the following habitat classes within Netarts estuary: intertidal tidal marsh (2.5; intertidal beach bar (2.4); intertidal aquatic bed (2.3); intertidal flat (2.2); subtidal aquatic bed (1.3); subtidal rock bottom (1.2) and subtidal unconsolidated bottom (1.1). Acres and percentages were not calculated for intertidal shore classes and subclasses because the width of these habitats was not always delineated on the habitat maps for each of the Tillamook County estuaries.

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[1] Hancock et al, p. 55-58, 60, 62, 66.
[2] Gaumer et al, (1977).
[3] Taylor and Kunkel.
[4] Osis et al, p. 7, 8.

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2.5 SANDLAKE ESTUARY MANAGEMENT UNITS

MANAGEMENT UNIT: 1

ZONING: Estuary Natural (EN)[1]

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal flat (2.2)	4.2	1.6
Subtidal aquatic bed (1.3.10, 1.3.9)	19.2	69.4
Subtidal unconsolidated bottom (1.1)	53.9	45.0

1 EN contains the largest subtidal aquatic (seagrass) bed in Sandlake Estuary, and a small algal bed. The principal boat fishing area for Crab, Perch and Flounder is located within this management unit[2]. A portion of 1 EN immediately adjacent to the Whalen Island bridge has been identified as a feeding and resting area for waterfowl and shorebirds[3].

MANAGEMENT UNIT: 2

ZONING: Estuary Natural (EN)

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12, 2.5.11)	31.4	5.7
Intertidal aquatic bed(2.3.10, 2.3.9/10)	29.1	77.9
Intertidal flat (2.2.3, 2.2, 2.2.1)	107.8	42.0
Intertidal shore (2.1.1)	uncal.	uncal.
Subtidal unconsolidated bottom(1.1)	2.0	1.7

2 EN contains the largest intertidal aquatic beds (algae and eelgrass) and the largest intertidal flat in Sandlake Estuary. A bed of Cockle Clams is located within this management unit[4]. Reneke Creek, identified as a significant natural areas in Oregon Natural Areas: Tillamook County Data Summary, empties into 2 EN[5]. The majority of 2 EN was also identified as a critical habitat on the beaches and dunes of the Oregon Coast[6]. 2 EN contains feeding, resting and nesting areas for waterfowl and shorebirds[7]. 2 EN is adjacent to the Beltz Farm wetland, a former intertidal marsh diked for food control purposes[8]. The Beltz Farm wetland has been designated as a "major marsh" and a "significant wildlife habitat" within coastal shorelands[9].

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[1] The Administrative Rule Classifying Oregon Estuaries (OAR 660-17-010) classified Sandlake Estuary as a Natural Estuary. OAR 660-17-010 states that "Natural estuaries shall contain only natural management units as provided in the Estuarine Resources Goal." For this reason, all estuarine management units within Sandlake Estuary are zoned Estuary Natural.
[2] Gaumer et al, Sand Lake Estuary Resource Use Study, p. 21.
[3] Taylor and Kunkel, Areas of Concentrated Nesting, Feeding and Resting Use by Waterfowl and Shorebirds.
[4] Kreag, *Natural Resources of Sandlake Estuary*, Vol. 2, No. 2, p. 17.
[5] The Nature Conservancy, Oregon Natural Areas: Tillamook County Data Summary, T1 - 22.
[6] Burley, "Critical Species and Habitats of Oregon's coastal Beaches and Dunes," p. 45 in: *Chapter 3 of Beaches and Dunes Handbook for the Oregon Coast.*
[7] Taylor and Kunkel.
[8] Kreag, p. 17.
[9] Tillamook County Comprehensive Plan, p. XVII - 47.

MANAGEMENT UNIT: 3

ZONING: Estuary Natural (EN)

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.11)	1.3	.2
Intertidal aquatic bed(2.3.10, (6), 2.3.9)	5.8	15.6
Intertidal flat (2.2.1)	53.0	20.6
Intertidal shore (2.1)	uncal.	uncal.
Subtidal unconsolidated bottom (1.1.1)	1.5	1.2

The southeast end of 3 EN is adjacent to the Whalen Island County Park. The shorelands of the County Park are used for shore fishing.

The intertidal areas adjacent to the park are a tideflat use areas[1]. Hydraulic pumping of shrimp occurs throughout the intertidal flats in 3 EN. The South County Citizens Advisory committee is opposed to the hydraulic pumping of shrimp, and voted to request that this activity be eliminated[2].

MANAGEMENT UNIT: 4

ZONING: Estuary Natural (EN)

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12)	3.2	.6
Intertidal aquatic bed (2.3.9)	1.4	3.7
Intertidal flat (2.2)	8.6	3.3
Subtidal aquatic bed (1.3.9)	8.5	30.6
Subtidal unconsolidated bottom (1.1)	10.3	8.6

4 EN contains one of two subtidal aquatic (seagrass) beds in Sandlake Estuary. 4 EN also contains feeding, resting and nesting areas for waterfowl and shorebirds[3]. Circulation patterns within this management unit were altered by the installation of the Whalen Island Bridge and associated road fill by Tillamook County in 1940. The narrow bridge span and the rock fill beneath the bridge restricts both inflowing and outflowing tides, and has resulted in high velocity turbulent flow through the bridge span[4]. In 1977, rip-rap was placed along a 300 foot strip immediately north of the bridge span in an attempt to combat the erosion caused by this turbulent flow[5].

MANAGEMENT UNIT: 5

ZONING: Estuary Natural (EN)

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal flat (2.2.1)	35.0	13.6

[1] Gaumer et al, p. 20.
[2] Minutes of the South County Citizens Advisory Committee, Nov. 27, 1979, p. 3.
[3] Taylor and Kunkel.
[4] Harbert, Investigation at Sandlake Estuary, p. 4.
[5] Tillamook County Planning Department, Inventory of Alterations in Sandlake Estuary, Section D. 7, *Sandlake Estuary Inventory.*

5 EN is an intertidal flat adjacent to the U.S. Forest Service Park which has been identified as a tideflat use area[1]. The southern end of 5 EN is a feeding and resting area for waterfowl and shorebirds[2]. The shorelands adjacent to this feeding and resting area have been identified as significant habitat for the Snowy Plover[3].

MANAGEMENT UNIT: 6

ZONING: Estuary Natural (EN)

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12, 2.5.11)	11.8	2.1

MANAGEMENT UNIT: 7

ZONING: Estuary Natural (EN)

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12, 2/5/11)	181.2	32.7
Intertidal flat (2.2, 2.2.1)	46.2	18.0
Subtidal unconsolidated bottom (1.1.1)	36.4	30.4

7 EN contains feeding, resting and nesting areas for waterfowl and shorebirds[4].

MANAGEMENT UNIT: 8

ZONING: Estuary Natural (EN)

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12)	111.7	20.2

8 EN consists of approximately 112 acres of intertidal marsh on the east side of Whalen Island which is inundated by high tides from mid October – mid April. The intertidal marsh is currently used for livestock grazing. The intertidal marsh boundaries on Whalen Island were delineated in Coastal Wetlands of Oregon[5] and the Habitat Map of Sandlake Estuary[6]. The intertidal marsh boundary identified in these reports corresponds to the boundary of TF (tidal flat) soils identified in the Soil Survey of Tillamook Area, Oregon[7]. The Tillamook County Flood Insurance Rate Maps indicate that the intertidal marsh area is included within the V-4 flood zone (Areas of 100-year coastal flood with velocity (wave) action)[8]. Because the identified intertidal marsh boundaries were disputed by the property owner, Tillamook County requested a reevaluation of the intertidal marsh boundaries from the Division of State Lands in October, 1979. The DSL report, Investigation at Sandlake Estuary, confirmed the intertidal marsh boundary identified in the previously listed information sources[9].

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[1] Gaumer et al, p. 20.
[2] Taylor and Kunkel.
[3] Tillamook County Comprehensive Plan, p. XVII 45.
[4] Taylor and Kunkel.
[5] Akins and Jefferson, Coastal Wetlands of Oregon, p. 89.
[6] Kreag, p. 13.
[7] Bowlsby et al, Soil Survey of Tillamook Area Oregon, Sheet 24.
[8] CH2 M Hill, Flood Boundary and Floodway Maps, Tillamook County, Oregon Unincorporated Areas), Map No. 410196 0305 A.
[9] Harbert, 7 pp.

MANAGEMENT UNIT: 9

ZONING: Estuary Natural (EN)

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12, 2.5D)	76.3	13.8
Subtidal unconsolidated bottom (1.1 D)	15.7	13.1

The intertidal marshes within 9 EN have historically been used for cattle grazing. The diked intertidal marshes on the northern end of 9 EN also contained Cranberry Bogs at one time. The dikes within 9 EN were breached approximately 5-6 years ago[1]. The intertidal marsh boundaries in 9 EN were delineated in Coastal Wetlands of Oregon[2] and the Habitat Map of Sandlake Estuary[3]. The intertidal marsh boundary identified in these reports corresponds to the boundary of TF (tidal flat) soils identified in the Soil Survey of Tillamook, Oregon[4]. The Tillamook County Flood Insurance Rate Maps indicate that the westernmost diked area is included within the A-3 flood zone (Areas of 100-year flood); the remainder of 9 EN is included within the V-4 flood zone (Areas of 100-year coastal flood with velocity (wave) action)[5]. Because the inclusion of the diked intertidal marshes within the Sandlake Estuary planning boundary was disputed by the property owner, Tillamook County requested a reevaluation of the limits of tidal influence within the diked areas from the Department of State Lands (DSL) in October, 1979. The DSL report, Investigation at Sandlake Estuary, confirmed that the areas behind the dikes are subject to tidal influence[6].

MANAGEMENT UNIT: 10

ZONING: Estuary Natural (EN)

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12)	118.1	21.3
Intertidal shore (2.1.2)	uncal.	uncal.

10 EN contains the second largest tract of intertidal marsh in Sandlake Estuary. Livestock grazing occurs within the portions of 10 EN which are adjacent to shorelands in the F-1 (Farm) zone. Shorelands adjacent to the southern portion of 10 EN contain residential development, and have been included in the Rural Residential (RR) zone.

MANAGEMENT UNIT: 11

ZONING: Estuary Natural (EN)

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12, 2.5.11)	18.8	3.4
Intertidal aquatic bed (2.3.9)	1.0	2.8
Intertidal flat (2.2.1)	2.2	.8

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[1] Personal Communication, Bill Myers.
[2] Akins and Jefferson, p. 89.
[3] Kreag, p. 13.
[4] Bowlsby, et al, Sheet 24.
[5] CH2 M Hill, Map No. 410096 0305 A.
[6] Harbert, p. 5.

11 EN contains feeding, resting and nesting areas for waterfowl and shorebirds[1]. Reneke Creek, identified as a significant natural area in Oregon Natural Areas: Tillamook County Data Summary, runs through the southern portion of 11 EN[2]. The southern portion of 11 EN was also identified as a critical habitat on the beaches and dunes of the Oregon Coast[3].

FOOTNOTES

2. The Habitat Map of Sandlake Estuary (Natural Resources of Sandlake Estuary, p. 13 and a larger 1:1000 scale version) was the primary reference used to identify habitat types within Sandlake Estuary. Based on aerial photograph interpretation and/or field investigation the habitat boundaries shown on the habitat Map of Sandlake Estuary were adjusted as follows: the boundaries of the intertidal flat (2.2.1), intertidal aquatic bed (2.3.10 (6)), subtidal aquatic bed (1.3.10 (6), 1.3.9) and subtidal unconsolidated bottom (1.1) habitat types in 1 EN, 2 EN, 3 EN, and 5 EN were revised to reflect the 1981 extent of these habitat types; two diked intertidal marshes on the northern end of Sandlake Estuary were determined to be subject to tidal influence due to breaches in the dikes, and were designated as estuarine management units. Planimetric measurements were made to determine the area of each individual habitat subclass identified on the Sandlake Estuary Habitat Map. Habitat subclass acreages were used to determine the percentage of each of the following habitat classes within Sandlake Estuary: intertidal tidal marsh (2.5) (excluding diked intertidal marshes behind functional dikes which do not allow tidal inundation); intertidal aquatic bed (2.3); intertidal flat (2.2); subtidal aquatic bed (1.3) and subtidal unconsolidated bottom (1.1). Acreages and percentages were not calculated for intertidal shore classes and subclasses because the width of these habitats was not delineated on the habitat maps for each of the Tillamook County estuaries.

25. Tillamook County Comprehensive Plan, pp II-135 - 11-141.

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[1] Taylor and Kunkel.
[2] The Nature Conservancy, T1-22.
[3] Burley, p. 45.

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2.6 NESTUCCA ESTUARY MANAGEMENT UNIT DESCRIPTIONS

MANAGEMENT UNIT: 1

ZONING: Estuary Conservation 1 (EC1)

CATEGORY: Area needed for maintenance and enhancement of biological productivity.

Area needed for recreation and aesthetic uses.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal shore (2.1)	uncal.	uncal.
Subtidal unconsolidated bottom (1.1)	216.7	38.2

1 EC1 is the subtidal channel of the Big Nestucca River from the Woods Bridge to head of tide[1]. 1 EC1 is a biologically important aquatic area which receives heavy anadromous fish use[2]. This management unit is one of the principle boat fishing areas for Salmon and Sea Run Cutthroat Trout[3]. Two recreational boat moorages (Raine's Resort and Riverview Lodge) and one public boat ramp (Cloverdale Landing) are Located within 1 EC1[4]. Two Department of Environmental Quality (DEQ) water surveillance stations (Stations 5 & 6) are located within this management unit. (See Section B.2.2. of Nestucca Estuary Inventory for water quality data). The majority of shorelands adjacent to 1EC1 are included within the Farm (F-1) zone.

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[1] Oregon Department of State Lands, Heads of Tide for Coastal Streams.
[2] Oregon Department of Transportation 1972, Final Environmental Impact Statement, Green Timber Road - Neskowin Section, Oregon Coast Highway, U.S. Highway 101, Tillamook County, Oregon, Map 25.
[3] Gaumer et al, 1971 Nestucca River Estuary Resource use Study, p. 21.
[4] Economic Consultants of Oregon, *commercial and Recreational Boating Facilities in Oregon Estuaries: Inventory and Demand* Analysis, 1979, pp 21-23, 81.

MANAGEMENT UNIT: 2

ZONING: Estuary Conservation 2 (EC2)

CATEGORY: Area needed for maintenance and enhancement of biological productivity.

Estuarine area adjacent to existing development of moderate intensity not otherwise needed for preservation or development.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal shore (2.1)	uncal.	uncal.
Subtidal unconsolidated bottom (.1.1)	61.7	9.8
Intertidal beach bar (2.4.1)	2.4	10.6

2 EC2 is the subtidal channel of the Big Nestucca River from the Woods Bridge to Fishers Bend. 2 EC2 is a biologically important aquatic area which receives heavy anadromous fish use[1]. 2 EC2 is one of the principle boat fishing areas for Salmon and Sea Run Cutthroat Trout[2]. This management unit contains the largest recreational boat marina in Nestucca Estuary (Nestucca Marina), and two boat ramps (Fisher Tract Ramp and Nestucca Spit Ramp)[3]. 2 EC2 is adjacent to the most developed shorelands in Nestucca Estuary. The majority of physical alterations in Nestucca Estuary (excluding diked tidelands) occur within this management unit[4]. 2 EC2 is considered to be the most suitable estuarine location for any necessary expansion or creation of water-dependent commercial or industrial uses.

MANAGEMENT UNIT: 3

ZONING: Estuary Conservation 1 (EC1)

CATEGORY: Area needed for maintenance and enhancement of biological productivity.

Partially altered area not needed for preservation or development.

Estuarine area adjacent to existing development of moderate intensity not otherwise needed for preservation or development.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12)	2.4	1.2

3 EC1 is a fringing intertidal marsh adjacent to developed shorelands in Pacific City. Adjacent shorelands are included within the Medium Density Urban Residential (R-2) and Small Farm and Woodlot 10 (SFW-10) zones. The intertidal marsh in 3 EC1 has been altered in two locations by the placement of fill to repair flood damage, and by fill, dredging, piling and floating wharf installation in conjunction with a private boat moorage[5].

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[1] Oregon Department of Transportation (1972), Map 25.
[2] Gaumer et al, p. 21.
[3] Economic Consultants of Oregon, pp 22, 81.
[4] Tillamook County Planning Department, Inventory of Alterations in Nestucca Estuary, Section D. 7, Nestucca Estuary Inventory.
[5] Ibid.

MANAGEMENT UNIT: 4

ZONING: Estuary Natural (EN)

CATEGORY: Major algae bed.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Subtidal aquatic bed(1.3.10)	3.0	23.1

4 EN is the second largest subtidal aquatic (algae) bed in Nestucca Estuary. The scarcity of subtidal algae beds in Nestucca (13 acres), and the importance of algae beds as a source of organic detritus and as a habitat for fish and invertebrates justify the "major tract" designation for 4EN.

MANAGEMENT UNIT: 5

ZONING: Estuary Conservation 1 (EC1)

CATEGORY: Area needed for maintenance and enhancement of biological productivity.

Estuarine area adjacent to existing development of moderate intensity not otherwise needed for preservation or development.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.11)	.6	.3

5 EC1 is a fringing intertidal marsh adjacent to developed shorelands in Pacific City. Adjacent shorelands are included within a Neighborhood Commercial (C-1) zone.

MANAGEMENT UNIT: 6

ZONING: Estuary conservation 1 (EC1)

CATEGORY: Area needed for maintenance and enhancement of biological productivity.

Estuarine area adjacent to existing development of moderate intensity not otherwise needed for preservation or development.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.11)	1.10	.5

6 EC1 is a fringing marsh adjacent to developed shorelands in Pacific City. Adjacent shorelands are included within a Neighborhood Commercial (C-1) and a High Density Urban Residential (R-3) zone.

MANAGEMENT UNIT: 7

ZONING: Estuary Natural (EN)

CATEGORY: Major tract of salt marsh and tideflat.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12, 2.5.11)	9.6	4.6
Intertidal flat (2.2.1)	7.0	1.7

7 EN contains the largest tracts of intertidal marsh and intertidal flat between Pacific City and Woods. Although 7 EN is adjacent to developed shorelands zoned Neighborhood Commercial (C-1). High Density Urban Residential (R-3) and Medium Density Urban Residential (R-2), the adjacent development has not impacted this management unit. The large size of the intertidal marsh and intertidal flat habitats within 7 EN (compared to other intertidal marsh and intertidal flat habitats between Pacific City and Woods) justifies the "major tract" designation.

MANAGEMENT UNIT: 8

ZONING: Estuary Natural (EN)

CATEGORY: Major algae bed.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal aquatic bed (2.3.10)	2.6	1.2

The scarcity of the intertidal aquatic bed habitat type within Nestucca Estuary (approximately 15.1% of the total area of the estuary) and the importance of algae beds as a source of organic detritus and as habitat for fish invertebrates justify the "major tract" designation.

MANAGEMENT UNIT: 9

ZONING: Estuary Conservation 2 (EC2)

CATEGORY: Area needed for recreational uses.

Partially altered area not needed for preservation or development. Estuarine area adjacent to existing development of moderate intensity not otherwise needed for preservation or development.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Subtidal unconsolidated bottom (1.1)	5.9	1.0

9 EC2 contains man-made canals which were created in conjunction with a residential development on the adjacent shorelands. Maintenance dredging within the canals has occurred in the past, and may be necessary in the future to maintain access to private docks within this management unit[1].

MANAGEMENT UNIT: 10

ZONING: Estuary Natural (EN)

CATEGORY: Major tract of salt marsh.

[1] Ibid.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12)	.5	.2

10 EN is a small intertidal marsh adjacent to shorelands which have been included within the High Density Urban Residential (R-3) zone. The shorelands immediately adjacent to 10 EN are undeveloped; existing residential development is confined to the area adjacent to Brooten Road. 10 EN has been identified as a feeding and resting area for waterfowl and shorebirds[1]. The relative scarcity of the intertidal marsh habitat type within Nestucca Estuary (approximately 14.4% of the total area of the estuary) and the unaltered nature of the adjacent shorelands justify the "major tract" designation.

MANAGEMENT UNIT: 11

ZONING: Estuary Conservation 1 (EC1)

CATEGORY: Tracts of significant habitat smaller than those in Natural Management Units.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal flat (2.2.1)	1.8	.4

11 EC1 is a small intertidal flat located within Nestucca Spit State Park. 11 EC1 and the adjacent shorelands have been included within State Parks "Secondary Resource Protection" land use category[2]. The small size of the intertidal flat, and the abundance of the intertidal flat habitat type within Nestucca Estuary justify the EC1 designation for this management unit.

MANAGEMENT UNIT: 12

ZONING: Estuary Conservation 1 (EC1)

CATEGORY: Tract of significant habitat of less biological importance than those in Natural Management Units.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal shore (2.1.1)	uncal.	uncal.

12 EC1 contains no major tracts of salt marsh, tideflats, seagrass or algae beds which would require its inclusion within an Estuary Natural (EN) management unit.

MANAGEMENT UNIT: 13

ZONING: Estuary Natural (EN)

CATEGORY: Major tract of salt marsh and algae bed.

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[1] Taylor and Kunkel, Areas of Concentrated Nesting, Feeding and Resting Use by Waterfowl and Shorebirds.
[2] Oregon Department of Transportation (1974), Nestucca Spit State Park Master Plan, pp 45, 46.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12)	43.0	20.8
Intertidal aquatic bed (2.3.10(1))	8.9	4.1

13 EN contains a large intertidal marsh and an intertidal aquatic (algal) bed. The intertidal marsh and adjacent shorelands are located within Nestucca Spit State Park, and have been included within State Parks "Primary Resource Protection" land use category[1]. The intertidal marsh within 13 EN has been identified as a nesting area for waterfowl and shorebirds[2]. The size of the intertidal marsh and intertidal aquatic bed justifies the "major tract" designation.

MANAGEMENT UNIT: 14

ZONING: Estuary Conservation; 1 (EC1)

CATEGORY: Area needed for maintenance and enhancement of biological productivity.

Area needed for recreational and aesthetic uses.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Subtidal unconsolidated bottom (1.1)	145.1	25.6
Intertidal beach bar (2.4.1)	8.3	36/7

14 EC1 contains the subtidal channel of Nestucca River from Nestucca keys to the mouth of Nestucca Estuary and several small intertidal beach bars. Portions of 14 EC1 have been identified as a principle boat fishing area for Salmon, Carp and Perch[3]. Two DEQ water surveillance stations (Stations 1 & 3) are located within this management unit (See Section B.2.2 of Nestucca Estuary Inventory for water quality data). 14 EC2 is not considered to be a suitable estuarine location for water-dependent commercial or industrial uses, since it is adjacent to the major tract of intertidal flat in 17 EN and the major tract of intertidal aquatic bed in 19 EN.

MANAGEMENT UNIT: 15

ZONING: Estuary Natural (EN)

CATEGORY: Major algae bed.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal aquatic bed (2.3.10)	3.4	1.6

The scarcity of the intertidal aquatic bed habitat type within Nestucca Estuary (approximately 15.1% of the total area of the estuary) and the importance of intertidal algal beds as a source of organic detritus and as habitat for fish and invertebrates justify the "major tract" designation.

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[1] Ibid.
[2] Taylor and Kunkel.
[3] Gaumer et al, p. 21.

MANAGEMENT UNIT: 16

ZONING: Estuary Natural (EN)

CATEGORY: Major tract of salt marsh.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.11)	5.5	2.6

16 EN is an intertidal marsh which has been identified as a feeding and resting area for waterfowl and shorebirds[1]. The relative scarcity of the intertidal marsh habitat type within Nestucca Estuary (approximately 14.4% of the total area of the estuary) and the proximity of 16 EN to the major tracts of intertidal marsh and intertidal flat in 13 EN and 17 EN justify the "major tract" justification.

MANAGEMENT UNIT: 17

ZONING: Estuary Natural (EN)

CATEGORY: Major tract of tideflat.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal beach bar (2.4.1)	12.0	52.7
Intertidal flat (2.2.1)	185.9	45.8

17 EN contains beds of Softshell Clams (Mya Arenaria), Baltic Clams (Macoma Balthica), Irus Clams (Macoma Irus), and Ghost and Mud Shrimp[2]. 17 EN was identified as a potential oyster culture area by the Oregon Department of Fish and Wildlife[3]. A portion of 17 EN has been identified as a feeding and resting area for waterfowl and shorebirds[4]. The shorelands west of 17 EN are included within Nestucca Spit State Park, and have been included within State Parks "Primary Resource Protection" land use category[5]. The size of the intertidal flat habitat within this management unit justifies the "major tract" designation.

MANAGEMENT UNIT: 18

ZONING: Estuary Natural (EN)

CATEGORY: Major algae bed.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal aquatic bed (2.3.10)	56.1	26.0
Intertidal sand flat (2.2.1)	3.0	.7

[1] Taylor and Kunkel.
[2] Hancock et al, Subtidal Clam Populations: Distribution, Abundance and Ecology, pp. 73-75.
[3] Osis and Demory, Classification and Utilization of Oyster Lands in Oregon, pp 11, 12.
[4] Taylor and Kunkel.
[5] Oregon Department of Transportation (1974), pp 45, 46.

18 EN contains beds of Softshell Clams (Mya Arenaria), Baltic Clams (Macoma Balthica), and Ghost and Mud Shrimp[1]. Intertidal aquatic beds in 18 EN contain Sea Lettuce (Ulva sp.) and Enteromorpha[2]. 18 EN has been identified as a feeding and nesting area for waterfowl and shorebirds[3]. The size of the intertidal aquatic bed within 18 EN, and its proximity to the major intertidal flat in 17 EN justify the "major tract" designation.

MANAGEMENT UNIT: 19

ZONING: Estuary Natural (EN)

CATEGORY: Major tract of seagrass and algae bed.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.11)	1.2	.6
Intertidal aquatic bed (2.3.10 (6, 7) 2.3.9)	8.1	3.8
Intertidal shore (2.1.1, 2.1.6, 2.1.7))	uncal.	uncal.
Subtidal aquatic bed (1.3.9)	.9	6.9

19 EN contains beds of Softshell Clams (Mya Arenearia), Baltic Clams (Macoma Balthica), Irus Clams (Macoma Irus), and Ghost and Mud Shrimp[4]. Intertidal aquatic beds within this management unit contain eelgrass (Zostera Marina) and algae (Rockwees (Fucus sp.), Sea Lettuce (Ulva sp., and Enteromorpha.)[5] Subtidal eelgrass beds are also located within 19 EN. The scarcity of algae and eelgrass covered rocky shores in mid and north coast estuaries, and the high species diversity within these habitat types justify the "major tract" designation[6].

MANAGEMENT UNIT: 20

ZONING: Estuary Natural (EN)

CATEGORY: Major tract of saltmarsh, tideflat, eelgrass and algae bed.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12, 2.5.11)	88.3	42.7
Intertidal flat (2.2, 2.2.1)	95.4	23.5
Intertidal aquatic bed (2.3.10, 2.3.9, 2.3.9/10)	7.4	3.4

20 EN contains a large intertidal flat, an intertidal aquatic bed, and the largest undisturbed tract of intertidal marsh in Nestucca Estuary. The intertidal marsh within 20 EN was inventoried in Oregon Natural Areas: Tillamook County Data Summary[7]. Preservation of this remaining large tract of intertidal marsh is important, since approximately 42% of the original surface area of the estuary has been diked for pasture[8]. 20 EN contains nesting, feeding, and resting areas for waterfowl and shorebirds[9]. The size of the intertidal marsh, intertidal flat and intertidal aquatic bed habitats justifies the "major tract" designation.

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[1] Hancock et al, pp 73-75.
[2] Hancock et al, pp 73-75.
[3] Taylor and Kunkel.
[4] Hancock et al, pp 73-75.
[5] Ibid, pp 76-68.
[6] Starr, Natural Resources of Nestucca Estuary, Vol. 2, No. 3, pp 18, 19.
[7] Nature conservancy, Oregon Natural Areas: Tillamook County Data Summary, T1 - 75.
[8] Starr, p. 19.
[9] Taylor and Kunkel.

MANAGEMENT UNIT: 21

ZONING: Estuary Conservation 1 (EC1)

CATEGORY: Area needed for maintenance and enhancement of biological productivity.

Area needed for recreational and aesthetic uses.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12)	.6	.3
Intertidal shore (2.1.7)	uncal.	uncal.
Subtidal unconsolidated bottom (1.1)	68.8	12.1

21 EC1 contains the subtidal channel of the Nestucca River form Cannery Point to the old U.S. Highway 101 bridge over the Little Nestucca River, and a small fringing intertidal marsh between the old and new U.S. Highway 101 bridges. The shorelands adjacent to the intertidal marsh are zoned Neighborhood Commercial C-1 (Goal 3 exception required). The subtidal channel within 21 EC1 is a principle boat fishing area for Salmon, Perch, Flounder and Sea Run Cutthroat Trout[1]. A DEQ water surveillance station (Station 2) is located within the subtidal channel of 21 EC1 (See Section B.2.2 of Nestucca Estuary Inventory for water quality data).

MANAGEMENT UNIT: 22

ZONING: Estuary Natural (EN)

CATEGORY: Manor tract of salt marsh, tideflat and algae bed.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.11)	5.5	2.6
Intertidal flat (2.2.1)	6.6	1.6
Subtidal aquatic bed (1.3.9)	9.1	70.0

22 EN contains the largest subtidal aquatic (Seagrass) bed in Nestucca estuary. Immediately adjacent to this aquatic bed is an intertidal flat which separates the aquatic bed from 21 EC1. The remainder of 22 EN consists of fringing intertidal marsh along the east side of Cannery Pint. The size of the subtidal aquatic bed and intertidal marsh habitats in 22 EN justifies the "major tract" designation. Although the intertidal flat habitat within 22 EN is small, its proximity to the major algal bed in 22 EN justifies the "major tract" designation.

MANAGEMENT UNIT: 23

ZONING: Estuary Natural (EN)

CATEGORY: Major tract of salt marsh, tideflat, seagrass and algae beds.

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[1] Gaumer et al, p. 21.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal marsh (2.5.12, 2.5.11)	49.2	23.5
Intertidal flat (2.2, 2.22, 2.21)	105.8	26.1
Intertidal aquatic bed (2.3.10, 2.3.9)	129.4	60.0
Subtidal unconsolidated bottom (1.1)	6.9	1.2

23 EN contains the largest intertidal aquatic (algae and seagrass) bed, and the second largest tract of intertidal marsh and intertidal flat in Nestucca Estuary. The intertidal marsh is a nesting area for waterfowl and shorebirds; the intertidal flat and intertidal aquatic bed habitats are feeding and resting areas for waterfowl and shorebirds[1]. The size of the intertidal marsh, intertidal aquatic bed and intertidal flat habitats justifies the "major tract" designation.

MANAGEMENT UNIT: 24

ZONING: Estuary Conservation 1 (EC1)

CATEGORY: Area needed for maintenance and enhancement of biological productivity.

Area needed for recreational and aesthetic uses.

DISCUSSION:

Habitat Type	Acres	% Habitat Type By Class
Intertidal shore (2.1.7)	uncal.	uncal.
Subtidal unconsolidated bottom (1.1)	68.1	12.0

24 EC1 is the subtidal channel of the Little Nestucca River form the old Highway 101 bridge to head of tide[2]. *33 24 EC1 is a biologically important aquatic area which receives heavy anadromous fish use[3]. *34 This management unit is one of the principle boat fishing areas for Salmon and Sea Run Cutthroat Trout[4]. *35 One public boat ramp (the Little Nestucca River Ramp) is located within this management unit[5]. *36 The majority of shorelands adjacent to 24 EC1 are in the Farm (F-1) zone.

FOOTNOTES

1. The Habitat Map of Nestucca Estuary (Natural Resources of Nestucca Estuary, p. 11, and a larger 1:1000 scale version) was the primary reference used to identify habitat types within Nestucca Estuary. Based on aerial photograph interpretation and/or field investigation the habitat boundaries shown on the habitat Map of Nestucca Estuary were adjusted as follows: The boundaries of the intertidal flat (2.2.1) and subtidal unconsolidated bottom (1.1) habitat types in the lower end of the west arm of the estuary were revised to reflect the 1981 extent of these habitat types; the large intertidal marsh (2.5) habitat adjacent to 9 EC2 was determined to be non-estuarine; the small intertidal marsh (2.5) at the northern end of 9 EC2 was determined to be a diked marsh. Planimetric measurements were made to determine the area of each individual habitat subclass identified on the Nestucca estuary habitat map. Habitat subclass acreages were then used to determine the percentage of each of the following habitat classes within Nestucca Estuary: intertidal tidal marsh (2.5) (excluding diked intertidal marshes, which were not designated as estuarine management units); intertidal beach bar (2.4); intertidal aquatic bed (2.3); intertidal flat (2.2); subtidal aquatic bed (1.3); subtidal rock bottom (1.2) and subtidal unconsolidated bottom (1.1). Acres and percentages were not

[1] Taylor and Kunkel.
[2] Oregon Department of State Lands.
[3] Oregon Department of Transportation (1972), Map 25.
[4] Gaumer et al, p. 21.
[5] Economic Consultants of Oregon, p. 22, 81.

calculated for intertidal shore classes and subclasses because the width of these habitats was not always delineated on the Nestucca estuary habitat map.

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2.7 DESCRIPTION OF CUMULATIVE IMPACTS

Goal 16 requires that the potential cumulative effects of uses, activities and alterations allowed in all estuarine management units be considered and described during plan development and adoption. Activities, as allowed by Goal 16, which would potentially alter the estuarine ecosystem includes:

1) dredge and fill;
2) in-water structures;
3) log storage;
4) application of pesticides and herbicides;
5) water intake or withdrawal and effluent;
6) flow lane disposal of dredged material;
7) and other activities which could affect the estuary's physical processes or biological resources.

Permissible uses and activities which are allowed within an estuary management unit are described in Sections 3.102 - 3.110 of the Land Use Ordinance. For each type of management unit there is a corresponding estuary zone. The five estuary zones include: Estuary Natural (EN, Estuary Conservation Aquaculture (ECA), Estuary Conservation 1 (EC1), Estuary Conservation 2 (EC2), and Estuary Development (ED).

To describe the cumulative impacts envisioned for the estuaries in Tillamook County, the total acreage of tidal and subtidal habitat represented in each type of management unit was first summarized for the whole estuary. The description of cumulative impacts was then guided by the amount of subtidal and tidal habitat in each zone compared to the uses and activities allowed by the zone. Consideration was also given using the best available information, to cumulative impacts potentially generated by future or proposed projects in the estuary. For reference in the following discussion, activities and uses allowed within each estuary zone, according to Sections 3.102 - 3/110 of the Land Use Ordinance, are briefly summarized below.

Permissible uses in all estuary zones includes the maintenance and repair of existing structures or facilities not involving a regulated activity; dike maintenance and repair for either damaged or existing serviceable dikes low intensity water-dependent recreation; research and educational observation; grazing of livestock; fencing (provided it is not placed across public-owned tidal lands; and passive restoration.

Permissible uses and activities allowed in the Estuary Natural zone are navigational aides; protection of habitat, nutrient, fish and wildlife, and aesthetic resources; vegetative shoreline stabilization; temporary dikes for emergency flood protection; dredging necessary for on-site maintenance of existing functional tidegates, associated drainage channels and bridge support structures; and riprap to protect uses allowed by the zone and natural resources; historical and archaeological values, and public facilities. Where consistent with the resource capabilities of the area and the purposes of the management unit, aquaculture which does

not involve dredge or fill or other estuarine alteration other than incidental dredging for the harvest of benthic species or removal of in-water structures; communication facilities; active restoration of fish and wildlife habitat or water quality; estuarine enhancement; boat ramps for public use where no dredging or fill for navigational access is needed; pipelines, cables, and utility crossings; installation of tidegates in existing functional dikes; temporary alterations; and bridge crossing support structures and dredging necessary for their installation may be allowed.

Permissible uses and activities in Conservation Aquaculture management units are aquaculture facilities and incidental dredging for harvesting or removal of in-water structures such as stakes or racks; and navigational aids. Where consistent with the resource capabilities of the area and the purposes of the management unit active restoration; estuarine enhancement; riprap for structural shoreline stabilization; and temporary alterations may be appropriate.

Permissible uses in Conservation 2 and Conservation 1 Management areas includes uses and activities identified in Estuary Natural areas. Additional uses and activities allowed in EC1 management areas includes private boat docks; and signs. Where consistent with resource capabilities of the area and the purposes of this management unit, water-dependent recreation; minor navigational improvement; mining and mineral extraction including dredging necessary for mineral extraction; storm water and treated sewage outfalls; bulkheads for structural shoreline stabilization; water-dependent portions of aquaculture requiring dredge or fill or other alteration of the estuary; active restoration for purposes other than those listed in Estuary Natural areas listed above, and temporary alteration shall be appropriate.

Permissible uses in development management areas shall be navigation and water-dependent commercial and industrial uses. As development management units;

(a) Dredge or fill, as allowed elsewhere in the goal;
(b) Navigation and water-dependent commercial enterprises and activities;
(c) Water transport channels where dredging may be necessary;
(d) Flow-lane disposal of dredged material monitored to assure that estuarine sedimentation is consistent with the resource capabilities and purposes of affected natural and conservation management units;
(e) Water storage areas where needed for products used in or resulting from industry, commerce, and recreation;
(f) Marinas;
(g) New dike construction if required for a water-dependent use;
(h) and log storage.

Where consistent with the purposes of this management unit and adjacent shorelands designated especially suited for water-dependent uses or designated for waterfront development, water-related and non-dependent, non-related uses not requiring dredge or fill; and activities identified in Estuary Natural and Estuary Conservation management areas listed above shall be appropriate.

4. RESTORATION AND MITIGATION PLAN ELEMENT

4.1 Introduction

The term restoration refers to actions which serve to revitalize, return or replace prior or original attributes within an estuary which have been diminished or lost by past alterations, activities or catastrophic events. The term mitigation refers to actions which compensate for the adverse impacts to functional characteristics and processes of the estuary which result

Deleted: NEHALEM ESTUARY¶
¶
The Nehalem Estuary occupies approximately 2985 surface acres. Tidelands represent 61% (1771 acres) and submerged lands (39%). Less than 10% of the total estuarine intertidal area is classified as Estuary Conservation and Estuary Development. Less than 1% of the total subtidal area is classified as Estuary Natural. Over 98% of the subtidal surface area in the estuary is represented by subtidal unconsolidated bottom habitat.¶
¶
ESTUARY DEVELOPMENT MANAGEMENT UNITS¶
¶
Of the 2,985 acres in the Nehalem Estuary, 244.2 acres, or 8.2% are in development management units. Most of this acreage is included in 21ED, the Nehalem channel (141.7 acres, 70%). Predominantly subtidal habitat is included in the development management units (151.6 acres, 67.6%). The 72.6 acres of intertidal habitat included in these management units is only 4.1% of the total acreage of intertidal habitat in the estuary.¶
¶
1. . Dredge and Fill¶
¶
Dredging needs are discussed in Sections 3.4b.1, 3.4c.1 and 3.4d.1 of this element. About half of the dredging (224,000 cubic yards) is for establishing navigable depths in the main channel. Since almost all of this is to occur in subtidal areas and spoils can be disposed of in nonaquatic areas, the effects of dredging the channel on the estuarine ecology will not be adverse. The remaining half of the dredging (228,000 cubic yards) will occur at the present and proposed marinas in the estuary. Most of this, 180,000 cubic yards or 79% is for the proposed marine harbor north of Wheeler (See exception for 13ED). 6.5% is for maintenance and expansion of Paradise Cove, and the remaining 14.5% is for maintenance dredging of existing facilities. Except for 13ED, most of this dredging will occur in subtidal areas. In 13ED, 9.77 acres of intertidal habitat will be dredged. Spoils from maintenance sites. Spoils from dredging in 13ED will be placed on 14.48 acres of predominantly tidal marsh also in 13ED. Since the maintenance dredging of existing projects involves mostly subtidal habitats and spoils can be placed in nonaquatic areas, the effects on the estuarine ecology will not be adverse. The effects of ... [1]

from dredging or fill in intertidal areas or tidal marshes. The objective of mitigation is to create, restore or enhance an estuarine area in order to replace or compensate for an intertidal area or tidal marsh which is lost or adversely impacted by dredging or fill.

Goal 16, Estuarine Resources, and Goal 17 Coastal Shorelands contain the following requirements for restoration and mitigation.

Goal 16 Implementation Requirement 8 - requires state and federal agencies to assist local government in identifying areas for restoration.

Goal 16 Implementation Requirement 5 - requires that the effects of dredging or fill of intertidal areas or tidal marshes be mitigated. comprehensive plans shall designate and protect specific sites for mitigation which generally correspond to the types and quantity of intertidal area proposed for dredging or filling, or make findings demonstrating that it is not possible to do so.

Goal 17 Implementation Requirement - requires local governments (with the assistance of state and federal agencies) to identify coastal shoreland areas which may be used to fulfill the mitigation requirements of Goal 16, and to protect these areas from uses and activities which would prevent their restoration or addition to the estuary.

In addition to the requirements for mitigation contained in Statewide Land Use Planning Goals 16 and 17, mitigation for dredging and fill in intertidal areas or tidal marshes is also mandated by the State Fill and Removal Law (ORS 541.695).

The provision of the State Fill and Removal Law are implemented through State Fill and Removal Permits. The issuance of a Department of State Lands Fill and Removal permit is contingent upon approval by the Director of the Department of State Lands of a mitigation site which will compensate for the adverse impacts of dredge or fill in an intertidal area or tidal marsh.

Restoration and mitigation are closely related, since restoration actions which eliminate or reduce past alterations within an estuary may also serve as mitigation for dredge or fill in intertidal areas or tidal marshes. For example, an abandoned diked marsh could be restored to the estuary by breaching or removal of the dike. The intertidal marsh area created by the restoration action of dike removal could serve as mitigation for another intertidal marsh are which had been eliminated by dredging or by the placement of fill.

The Mitigation Policies in Section 610 of this element define the actions which can serve as mitigation for dredge or fill in intertidal areas or tidal marshes, and reference the requirements of the State Fill and Removal Law. The Restoration policies in Section 6.12 of this element define the actions which can serve as restoration.

4.2 Summary of Historic Alterations

4.2a Methodology

An inventory of man-made alterations in Nehalem, Tillamook, Netarts, Nestucca, and Sandlake Estuary is contained in the Coastal Resource Inventory Document for each estuary. The inventory consists of a map of each estuary showing the location of dredging, fill or other structural alterations, and a list which briefly describes each alteration. The inventory does not specify the location of outfalls, subpipes, subcables or riprapped banks, since these alterations involve minimal occupation of estuarine surface area, and do not generally provide opportunities for restoration or

mitigation. The following sources of information were used to compile this inventory.

U.S. Army Corps of Engineers Section 10 and Section 404 permits a computer printout listing Section 10 and Section 404 permits issued in Tillamook County between December 1969 and March 1981, and two reports (Kennedy report and Reuss report) listing Section 10 permits issued for fills in navigable waterway between 1960 and 1970 were obtained from the Portland District Office of the U.S. Corps of Engineers. Copies of permit applications listed on the computer printout were obtained from the Corps of Engineers and were used to provide the exact location of the alteration.

Inventory of Filled Lands in Nehalem River, Tillamook Bay, Netarts Bay, Sandlake and Nestucca River Estuaries.

This series of reports prepared by the Oregon Department of State Lands which occurred prior to 1972.

U.S. Coast and Geodetic Survey Navigation Charts

The following navigation charts were obtained from the Department of State Lands and were used to identify navigational structures such as jetties, pile dikes, piling and dolphins: Nehalem Estuary 1881, 1916, 1932, 1938, 1962, 1966 and 1970; Tillamook Estuary 1867, 1904, 1919, 1930, 1958, 1964 and 1972; Netarts Estuary 1972 and Nestucca Estuary 1907 and 1904.

Soil Survey of Tillamook Area, Oregon

This report, published in 1962 by the Soil Conservation Service of the U.S. Department of Agriculture, provided information on the location of dikes and tideland soil boundaries. The Coquille soils boundaries indicated in this report were considered to the best indication of the historic extent of tidal marshes provided that at least one other source of information (such as aerial photographs indicating the present of old tidal leads, or historic navigation charts indicating the historic marsh boundaries) supported the boundary determination.

Natural Habitats and Resources of Netarts, Sandlake and Nestucca Estuaries

This series of estuary inventory reports prepared by the Oregon Department of Fish and Wildlife in 1978-1979 were used to identify historic alterations.

Aerial Photographs

A series of black and white aerial photographs shot in 1953, 1954, 1960, 1965, and 1970 obtained from the Tillamook County Surveyors office, and a series of color and color infrared aerial photographs from the Tillamook County Planning Department were used to verify the information contained in the information sources listed above, and to identify miscellaneous alterations such as dikes constructed after 1962, and highway and railroad crossings and other structures constructed prior to 1969.

Although the inventory of man-made alterations provides a general overview of alterations within Tillamook County estuaries, it is limited in the respect that it does not provide a record of illegal activities for which U.S. Army Corps of Engineers

permits were not obtained, or of gravel removal and other alterations for which U.S. Army Corps of Engineers permits were not always required. In addition, the inventory provides an incomplete record of alterations authorized by U.S. Army Corps permits which were not listed on the computer printout, and of the historical loss of tidal marsh, since the historical extent of tidal marsh areas which were converted to upland by means other than diking could not always be determined.

Areas of erosion and sedimentation were also identified as part of the factual base for the mitigation and restoration plan element. Eroding areas or areas in which additional riparian vegetation could be established are identified through aerial photo interpretation, with the assistance of the local branches of the Oregon Department of Fish and Wildlife and the U.S. Soil Conservation Service. Historic navigation charts and the following sources of information were used to identify areas of heavy sedimentation in estuaries or to estimate sedimentation rates: Dredged Material Disposal Plan (Section 4.0 of this element) provided information on the location and extent of shoals in Nehalem Estuary; Natural Resources and Human Utilization of Netarts Bay, Oregon (Stout et al., 1976); Principal Flood Problems of the Tillamook Bay Drainage Basin (Levesque, 1980).

4.2b Nehalem Estuary

Historic alterations in Nehalem Estuary were examined by dividing the estuary into three segments, shown on Map 1. The major alteration within Segment 1 is the jetties at the mouth of the estuary, which were originally authorized in 1912, and are currently undergoing restoration. Between the end of the south jetty and the community of Brighton, several fills, floating docks and access ramps have been installed in conjunction with commercial marinas. The largest occupation of estuarine surface are due to commercial marina development that occurs at the site of Ed's Moorage, where four fills totaling 8.65 acres of submerged land and 2.25 acres of submersible land were placed to create the marina and to provide for land development.[1] The only other structural alteration of the estuary within this segment is the public boat ramp in Nehalem Spit Park.

Areas of erosion with Segment 1 are limited to the interior of Nehalem Spit, which is subject to wind and wave erosion. Attempts have been made by State Parks to stabilize this area by planting additional vegetation.

In Segment 2, the majority of altered estuarine areas are located along the Wheeler waterfront. At least 19 fills totaling 9.08 acres of submerged land and 4.72 acres of submersible land material was placed in conjunction with the construction of the old Lewis Shingle Mill on the north end of the City of Wheeler. Development of the Lewis Shingle Mill involved the filling of 5.33 acres of submerged land and 3.04 acres of submersible land. Many of the old pilings which line the Wheeler waterfront were historically uses to tie up rafts of logs which were processed at the Lewis Mill. Segment 2 also contains piling, bulkheads, floats and access ramps in conjunction with two commercial marinas: the Paradise Cove Marina and Dart's Marina. Other alterations within this segment have occurred in conjunction with the construction of U.S. Highway 101 and the Southern Pacific Railroad. Fill and piles for railroad bridges were placed across the entrance to the Fishery

[1] Unless otherwise noted, all estimates of filled lands are taken from the Department of State Land Inventory of Filled Lands.

BAY SEGMENTS
Map 1

Point Cove and a smaller cove to the east. Fill in conjunction with Highway 101 has restricted tidal influence within a 4.2 acre marsh immediately north of the City of Wheeler, and has contributed to the elimination of tidal influence within an 4.5 acre area immediately east of the junction of Highway 101 and Highway 53.

Alteration of intertidal marshes by diking or other agricultural improvements is limited to three locations within Segment 2. Two of these historically diked marshes, a 24.3 acre area immediately to the west of the junction of Highway 101 and Highway 53, and a 9.9 acre area at the tip of Dean's Point, have reverted to intertidal marsh and are included within the Nehalem Estuary planning boundary. Another 38.3 acre area of former intertidal marsh is located west of Dean's Point where Alder Creek enters Nehalem Estuary. Currently, this site contains approximately 15.2 acres of diked freshwater marsh and 23 acres of pastureland.

Navigational structures within Section 2 are limited to scattered individual piling, and the remnants of a former pile dike which extended between the tip of Dean's Point and Lazarus Island.

Sedimentation within Segment 2 is indicated by the high rate of progradation of the West Island and Dean Point salt marsh. Eilers (1975) estimated that the West Island and Dean Point salt marsh have been prograding at a rate of .5 to 1.5 meters per year.[1] One of the two major shoals in the Nehalem Estuary, The Fishery Point Shoal, is located within Segment 2. The shoal location and extent, and estimates of initial and maintenance dredging necessary for shoal removal are discussed on pp XVI-205 of this element. Historically, "scalping" of this shoal has been conducted by commercial fishermen and the Port of Nehalem but the quantity of material removed is unknown.

In Segment 3, the greatest loss of estuarine surface area has resulted from the diking of intertidal marsh. The largest area of diked intertidal marsh is located within the Sunset Drainage District, which contains most of the land north of Highway 53 and east of Highway 101 between the Nehalem River and the South Fork of the Nehalem River. The 1978 Oregon Department of Fish and Wildlife Habitat Map of the Nehalem Estuary delineates an approximately 52 acre area of diked intertidal marsh within the Sunset drainage district. The historic tidal influence within this area is indicated by the presence of a large tidal lagoon and tidal slough which appear on old navigation charts of Nehalem Estuary. Remnants of the lagoon, slough ant tidal leads are most apparent on 1953 and 1954 aerial photographs. Historical tidal influence is also indicated by the extent of Coquille and tidal flat soils within the area, as shown on Sheet 3 of the Soil Survey for Tillamook Area Oregon. If Coquille soil boundaries were used to estimate the historical extent of tidal marsh, a figure considerably greater than the 528 acres shown on the Oregon Department of Fish and Wildlife Habitat Map would be obtained, since there are additional areas which contain Coquille soils within the Sunset drainage district and along the North and South Forks of the Nehalem River which were not designated by the Oregon Department of Fish and Wildlife as diked tidelands. For this reason, the 528 acre figure should be considered a conservative estimate which probably under estimates the historic extent of tidal marsh within Segment 3.

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[1] H.P. Eilers (1975). Plants, Plant Communities, net Production and tide Levels: The Ecological Biogeography of the Nehalem Salt Marshes, Tillamook County, Oregon. PhD Dissertation, OSU, Corvallis.

Alteration of tidal wetlands for non-agricultural use has occurred within a large wetland which extends north and south of C Street in the City of Nehalem (the Werst-Cardwell property), and within the southern end of Fork Island at the junction of the north and south fork of the Nehalem River. A low berm which reduces tidal influence within a portion of the Werst-Cardwell property was constructed by the placement of material dredged from the Nehalem River channel between Small Island and the City of Nehalem. The berm is not continuous along the length of the wetland, and allows tidal influence within the wetland on a seasonal basis. The wetland was further altered by the creation of a roadway through the wetland in 1944. Several cabins and a boat dock were located along the riverfront at the end of the road in the late 1940's and early 1950's. Prior to 1953, the area was further altered by the excavation of a large boat canal which provides recreational boating moorage and access to the Nehalem River. Dredged material from the excavation of the boat basin was placed on either side of the boat canal to create another low berm. Between 1970 and 1980, excavation of another boat canal was initiated in the northern end of this wetland area. This excavation was not completed, and the canal is not presently connected to the Nehalem River.

A former intertidal wetland on the southern end of Fork Island was filled with dredged material obtained from dredging the adjacent Nehalem River channel. This dredging adjacent to Fork Island is the largest dredging project in this segment of the Nehalem Estuary. A residential development is currently located within the filled portion of Fork Island.

The majority of structures within Segment 3 are single purpose private docks and moorages. The Commercial and Recreational Boating Facilities in Oregon Estuaries: Inventory and Demand Analysis (Economic Consultants Oregon, Ltd., 1979) estimated that 73 private docks were located within Nehalem Estuary. Seventy of these docks occur within Segment 3, primarily along the Nehalem waterfront and along the northern bank of the South Fork of the Nehalem River (Sections 23 and 24). Two commercial marinas and four public boat launches are also located within this bay Segment. The U.S. Army Corps of Engineer Permits and the 1972 Department of State Lands Inventory in the Nehalem River note several small fills which have been placed in conjunction with these facilities. The largest of these fills is located at the site of the public boat launch south of the Nehalem River bridge. Other small fills within this Segment have been placed in conjunction with several highway bridges and one railroad bridge. The most extensive highway fill was placed in conjunction with the Highway 101 bridge across the Nehalem River. Removal and replacement of this bridge is scheduled for 1982.

Navigational structures within this Segment are limited to miscellaneous piling for creation of log rafts and log booms.

Several areas along the North and South Forks of the Nehalem River were identified as either eroding areas or areas which could be enhanced by establishment of additional riparian vegetation. The second of the two major shoals in the Nehalem River, the Dean's Point Shoal, is located within Segment 3. The shoal location and extent, and initial and maintenance dredging estimates necessary for shoal removal are discussed on pp XVI-152 - XVI-153 of this element. Historically, some "scalping" of this shoal has occurred, but no estimates of the amount of material removed are available.

4.2c Tillamook Estuary

Historic alterations in Tillamook Estuary were examined by dividing the estuary into three Segments, shown on Map 2. Segment 1 contains the most extensively developed area within Tillamook Estuary. Major alterations within Segment 1 include the jetties at the mouth of the estuary, and extensive dredging and fill in conjunction with development in and adjacent to the City of Garibaldi. Historical dredging within Segment 1 has occurred within the authorized navigation channel and turning basin of Tillamook Estuary, and within the Garibaldi small boat basin. Dredging at the site of the Old Mill Marina has occurred for marina maintenance, and for maintenance of the Oregon Washington Plywood Company which was formerly located at this site. Examination of 1881 and 1904 navigation charts of Tillamook Estuary suggests that the majority of these dredged areas (with the exception of much of the authorized navigation channel and turning basin) were historically intertidal areas.

BAY SEGMENTS
Map 2

The largest filled estuarine areas within Tillamook Estuary are located in Segment 1. The Inventory of Filled Lands in Tillamook Bay Estuary notes a total of 95.4 acres of filled submersible land within Segment 1. Three separate fills totaling 45.7 acres were placed for creation of back-up land in conjunction with the Garibaldi Boat Basin. An additional 49.7 acres of submersible land was filled during the development of the Oregon-Washington Plywood facilities. An undetermined amount of fill and piers were installed during the construction of the Southern Pacific Railroad and Highway 101 across the Miami River.

Structures within Segment 1 include piling, wharves, floats and access ramps in conjunction with the old Coast Guard dock, the new Coast Guard Station, several fish handling and barge unloading facilities, the Garibaldi Boat Basin and the old Mill Marina. Numerous old piling installed in conjunction with the Oregon-Washington Plywood Company are located within Miami Cove.

Loss of estuarine surface area due to diking of intertidal marsh is not extensive within Segment 1. One 44 acre area of diked tidal marsh is located along either side of the Miami River east of Highway 101. The 10 acre portion of this site along the south bank of the Miami River is currently a freshwater marsh. Historically, a 10.3 acre of intertidal marsh west of Highway 101 in Miami cove was also diked, but the area has since reverted to intertidal marsh. Alterations within Tillamook Estuary due to sedimentation are discussed at the end of this section, after the discussion of historic alterations within each of the three bay segments.

The majority of the alterations within Segment 2 are located in or adjacent to the City of Bay City. In Inventory of Filled Lands in Tillamook Bay Estuary notes a total of 6.3 acres of filled submersible land within Bay City. This acreage figure does not include fills placed during the construction of the Southern Pacific Railroad and Highway 101. The most extensive roadway fill within Segment 2 occurs just north of the City of Bay City at Larson Cove, where a large hydraulic full was placed across Larson Cove. A 15X12 foot culvert within this roadway fill provides for tidal exchange within Larson Cove. Roadway fill has also been placed within several small intertidal marshes along Bayocean Road, but tidal exchange within these areas does not appear to be restricted (personal communication, Tillamook Branch of the Oregon Department of Fish and Wildlife).

Dredging within Segment 2 has occurred within the Bay City moorage basin and within Crab Harbor (adjacent to Bayocean Spit). Historic navigation charts of Tillamook Estuary (1881 and 1904) indicate that both areas were historically intertidal. An artificial tire reef is now located within Crab Harbor.

Loss of estuarine surface area due to diking of intertidal marsh is not extensive within Segment 2. One formerly diked area between Goose Point and Kilchis Point has since reverted to intertidal marsh. A dike installed along the base of Bayocean Spit after the breaching of the spit has eliminated tidal influence within Biggs Cove and has created a freshwater lake (Bayocean Lake).

Structures within Segment 2 include the piling and wharf at Hayes Oyster Company, four pile dikes installed to control water flow, and an artificial tire reef within Crab Harbor. Numerous old piling are located along Bayocean Road.

Eroding areas within Segment 2 are limited to a long strip along the interior of Bayocean Spit. A length of shoreline south of Bay City was identified as an area which could benefit from establishment of additional riparian vegetation.

In Segment 3, the greatest loss of estuarine surface has resulted from the diking of intertidal marsh. This conclusion is based on the extent of Coquille soils (as shown on the Soil Survey of Tillamook Area, Oregon) within this bay segment. It should be noted that the historical extent of tidal marsh within the areas containing coquille soils can not be verified on old navigation charts and aerial photographs. The old navigation charts do not delineate the marsh boundaries within this bay segment, and the oldest available aerial photographs of the area were flown decades after the majority of the diking within the area occurred.

Dredging has occurred within three known locations in Segment 3. Dredging to maintain access to the Tillamook Bay Oyster Company and the Tillamook County boat launch adjacent to Bayocean Road has occurred. Dredging has also occurred within the lower 9,000 feet of the Wilson River and the lower 5,000 feet of the Trask River in 1972, when the U.S. Army Corps of Engineers removed approximately 108,000 c.y. of material from these river segments to provide a uniform channel bottom at about -6 feet M.S.L. and thereby enhance the capacity of the river channels to carry future flood flows.[1]

Other alterations within Segment 3 are scattered piling within river channels and along Bayocean Road, piling and walkways and small fills in conjunction with houseboats and residential development between Memaloose Point and Dick Point, fill for three public boat launches and fill and piles for railroad and/or highway bridges across river channels. Two commercial marinas, the Pacific Pines Marina and the Old Barn Marina, are also located within this bay segment. Adjacent to the Highway 32 bridge over the Tillamook River is a tidal slough which has been tidegated to create a log pond for an adjacent log mill, and a 12.5 acre tidal marsh area which has been historically altered by diking and by roadfill placed in conjunction with the old Highway 131 bridge over the Tillamook River.

Loss of riparian vegetation within Segment 3 due to streambank erosion and structural shoreline stabilization has occurred along the Tillamook Trask, Wilson and Kilchis Rivers and several of their tributary sloughs.

All segments of Tillamook Estuary have been subject to high sedimentation rates. Stembridge (1979) estimated that the sedimentation rate in Tillamook Estuary between 1867 and 1927 averaged one yard per 100 years. This sedimentation rate was five times greater than the average sedimentation rate of one yard per 500 years estimated over the last 7,000 years by the U.S. Geological Survey. Stembridge estimated that this high sedimentation rate produced an estimated decrease of 11% in the are of Tillamook Estuary, and a 52% decrease in the in-water volume of the estuary. Stembridge estimated that these high rates of sedimentation have decreased the areas within the bay with depths greater than six feet, and have produced a 14% increase in intertidal areas.

The following chart summarizing the date in Stembridge's 1979 report was taken from p. 25 of the Principal Flood Problems of the Tillamook Bay Drainage Basin. (Levesque, 1980)

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[1] Paul Levesque (1980). Principal Flood Problems of the Tillamook Bay Drainage Basin, p. 272.

TABLE
TILLAMOOK ESTUARY AREA AND VOLUME CHANGES – 1867 TO 1977

Area	2 Yd (Million)		
Depth	1867	1977	%Remaining
6 ft. to 12 ft.	6.7	205	37
0 ft. to 6 ft.	17.5	16.5	94
Total (in-water)	26.9	19.9	74
Intertidal	16.2	18.6	114 (14% increase)
Total	43.1	38.6	89%
Volume	3 Yd (Million)		
Depth	1867	1977	%Remaining
Greater than 12 ft.	7.8	3.4	43
6 ft. to 12 ft.	14.3	4.3	30
0 ft. to 6 ft.	30.4	17.8	58
Total (in-water)	52.5	25.4	48%

TILLAMOOK ESTUARY SEDIMENTATION RATE
1867 TO 1977

SEDIMENTATION RATE	Since 1867
Water volume 1867	52.5 YD (3) (million)
Less water volume 1977	-25.4 YD (3)
Sediment deposited 1867 –1977	27.1 YD (3) (million)

27.1 YD (3) (million) Sediment deposited 1867-1977
26.9 YD (2) (million) Area total, 1867
1 YD per century average sedimentation rate since 1867

(Compares with 1 YD. per 500 years average, last 7000 years, as determined by USGS.)

Source: Calculated from charted depth contours, U.S. Coast Survey (1867) + NOS (1977) J. Stembridge, 26 Feb. 79

4.2d Netarts Estuary

The primary alterations within Netarts Estuary are the alteration of tidal marshes, dredge and fill for creation of recreational boating facilities, and high sedimentation rates due to erosion within the watershed. Tidal marshes within Netarts Estuary have been altered by placement of roadway fill and by diking. In the mid-1950's, Whiskey Creek Road was constructed along the eastern shore of Netarts Estuary. The roadway fill was placed across four intertidal marshes (Netarts Estuary Management Units 14 EC1. 15 EC1, and 21 EC1),thereby restricting tidal flushing and accelerating sedimentation within these areas[1]. An intertidal marsh adjacent to Yager Creek was diked to form a seasonal lake (Yager Lake) during the development of the Whiskey Creek Ranch Subdivision in the 1960's. Historically, tidal marshes on the southern end of Netarts Estuary were dike and tidegated, but the areas have reverted to intertidal marsh.

[1] Stout et.al. (1976) Natural Resources and Human Utilization of Netarts Bay. Oregon State University, p. 188

High sedimentation rates within Netarts Estuary are indicated by the high rate of progradation of intertidal marshes, and by a decrease in the Mean High Water (MHW) volume of Netarts Bay. The Natural Resources and Human Utilization of Netarts Bay. (p. 188) cites two examples of high rates of marsh progradation in Netarts Estuary, based on planimetric measurements of aerial photographs. A 55% increase (from 73.8 acres to 164 acres) was noted in one marsh between 1939 and 1962, while an immature marsh just south of Whiskey Creek showed an approximate increase in area of 30% over the same time span. The same study (p. 185) reports that Glanzman (1971) estimated that the MHW volume of Netarts Bay decreased 10% between 1957 and 1969. The study attributes the high rate of sedimentation to logging practices and other activities within the Netarts Estuary watershed.

The Oregon Department of Fish and Wildlife Natural Resources of Netarts Estuary (p. 3) reports that the drainage of Jackson Creek was historically diverted into the southern end of Netarts Estuary. The effect of this diversion is unknown. Most of Jackson Creek once again drains into the ocean.

4.2e Sandlake Estuary

The major historic alteration within Sandlake Estuary is the diking and channelization of intertidal marshes on the southern and northern ends of the estuary. On the southern end of Sandlake Estuary (Section 31), an approximately 54.5 acre area of intertidal marsh has been removed from tidal influence by a dike constructed for the purpose of flood control. The area behind the dike is a freshwater wetland which is considered an important waterfowl habitat area by the Oregon Department of Fish and Wildlife. This wetland area (called the Beltz Farm Wetland) has been designated as a major marsh within coastal shorelands (see XVII). An approximately 19.4 acre intertidal marsh on the northern end of Sandlake Estuary was diked in 1951, although smaller dikes within this area were constructed prior to 1918. (Personal communication, Bill Myers.) The dike has been breached for at least 5-6 years, and the area behind the dike has reverted to intertidal marsh. Although the 1978 Oregon Department of Fish and Wildlife Habitat Map of Sandlake Estuary indicates that two small diked intertidal marsh areas exist along the northeast shore of Sandlake Estuary, the Soil Survey of Tillamook Area Oregon indicates that the soils within the area are not tideland soils. Field observations and personal communication with area residents indicate that these areas are not diked. Alteration of the historic circulation patterns in Sandlake Estuary has occurred as a result of the bridge and associated roadfill installed by Tillamook County in 1940 to provide access to the east side of Whalen Island. The narrow bridge span and the rock fill beneath the bridge acts as a restriction to both inflowing and outflowing tides, and has resulted in high velocity turbulent flow through the bridge span which has caused erosion of Whalen Island. Documentation of this effect is contained in the 1979 Department of State Lands Report Investigation at Sandlake Estuary. In 1977, riprap was placed along a 300 foot strip immediately north of the bridge span in an attempt to combat this erosion.

4.2f Nestucca Estuary

The major historic alteration within Nestucca Estuary is the loss of estuarine surface area due to diking of intertidal marsh. Planimetric measurements of the 1978 Oregon Department of Fish and Wildlife Habitat Map of Nestucca Estuary indicates that approximately 588 acres of intertidal marsh has been diked; 474 acres along the Little Nestucca River and 114 acres along the Big Nestucca River. Examination of

the 1904 and 1907 navigation charts of Nestucca Estuary indicate that tidal marsh also extended east of the present location of Highway 101. There is good correspondence between the marsh boundary shown on the 1904 and 1907 navigation charts and the Coquille soils boundary shown in the /soil Survey of the Tillamook Area, Oregon. This suggests that tidal marshes adjacent to the Little Nestucca were even more extensive than the Habitat Map of Nestucca Estuary indicates.

Along the Big Nestucca River, the boundary of Coquille soils is also more extensive than the diked marsh area shown on the Oregon Department of Fish and Wildlife Habitat Map, but it was not possible to verify the historic boundary of tidal marsh by using old navigation charts or old aerial photographs. Old navigation charts do not show the boundary of tidal marsh within this area, and the oldest available aerial photographs were taken after the majority of diking within this area occurred. Given the good agreement between the Coquille soils boundary and the historic extent of intertidal marsh along the Little Nestucca River, the extent of diked tidal marsh along the Big Nestucca River is probably in excess of 114 acres.

The majority of the remaining alterations within Nestucca Estuary have occurred along the Big Nestucca River between the Woods Bridge and the Woods Bridge boat ramp. The Inventory of Filled Lands in Nestucca River Estuary notes 18 separate fills within this area totaling less than one acre of submerged and submersible land. The majority of these fills were placed for the purpose of erosion control. Additional fills placed after the completion of the Inventory of Filled Lands include one small fill for flood control and several small fills in association with either bridge crossings or public and private boat ramps and moorages.

Together these additional fills total less than .5 acres. Another larger fill for residential development has been placed throughout most of an approximately four acre area (surrounded by Nestucca Estuary Management Unit 9 EC2) which was designated as tidal marsh on the Habitat Map of Nestucca Estuary. A Tillamook County development permit was issued for fill within this area prior to the development of the Nestucca Estuary Management Plan.

Only two incidences of dredging within Nestucca Estuary were discovered during the inventory of historic alterations. Artificial boat canals were dredged in the lower end of Nestucca Estuary Management Unit 9 EC2, and some dredging occurred in conjunction with a boat moorage near the Pacific City bridge.

Structures within Nestucca Estuary are limited to piling, floats and access ramps in association with private docks or commercial moorages, and piling in conjunction with bridge crossings. Loss of riparian vegetation in Nestucca Estuary due to streambank erosion and structural shoreline stabilization has occurred along the Big and Little Nestucca Rivers.

4.3 ANALYSIS OF MITIGATION NEEDS

4.3a Methodology

Mitigation needs were estimated by calculating the total acreage of intertidal area within each estuary which is included within an Estuary Conservation 2 (EC2) or Estuary Development (ED) management unit. An acreage figure was obtained for each of five intertidal habitat classes through planimetric measurements of the Oregon Department of Fish and Wildlife habitat maps for each estuary, and/or 1978

aerial photographs. The habitat map prepared as part of the Goal 16 exception for Nehalem Estuary Management Unit 13 ED was also used to calculate acreages of intertidal habitat.

The need for mitigation sites exists only in Nehalem and Tillamook estuaries, which have been classified as "Shallow Draft development." In Conservation and Natural estuaries (Netarts, Sandlake, Nestucca, Neskowin Creek and Sutton Creek), ED management units have not been applied and EC2 management units have been limited to subtidal areas. It should be noted that the analysis of mitigation needs for Nehalem and Tillamook Estuaries in Section 3.32 and 3.33 present a "worst possible case" estimate of mitigation needs by assuming that every intertidal area within each EC2 and ED zone will be developed in a manner which will require mitigation. Given the limitations placed on dredging and fill within intertidal areas by state and federal permit requirements, and by the standards for dredging and fill in the Tillamook County Zoning Ordinance, such an eventuality is unlikely to occur.

4.3b Nehalem

A total of 88.00 acres of intertidal area are included within EC2 or ED zones in Nehalem Estuary. This tidal includes approximately 22 acres of intertidal flat; 10.9 acres of intertidal aquatic bed; and 23.2 acres of intertidal marsh. The distribution of these intertidal habitat classes within each EC2 and ED management unit is listed in the chart below.

Management Unit	Acreage and Habitat Class of Intertidal Area
1EC	116.9 acres intertidal beach bar 2.7 acres intertidal aquatic bed 1.7 acres intertidal shore
3ED	1.6 acres intertidal aquatic bed 1.4 acres intertidal shore
10ED	2.3 acres intertidal aquatic bed 0.9 acres intertidal marsh 8.1 acres intertidal shore
12ED	4.0 acres intertidal aquatic bed 1.3 acres intertidal marsh 8.7 acres intertidal shore
13 ED[1,2]	3.2 acres intertidal flat 21.0 acres intertidal marsh
22 EC2	5.9 acres intertidal beach bar 2.0 acres intertidal flat 6.0 acres intertidal shore 0.3 acres intertidal aquatic bed

[1] Goal exception for Mismanagement unit is included in the Goal 2 element of the Tillamook County Plan.
[2] The McCoy Marsh, a tidally influenced freshwater marsh has been included in the total of intertidal marsh acreage at this site.

4.3c Tillamook Estuary

A total of 116.4 acres of intertidal habitat are included within EC2 and ED zones in Tillamook Estuary. This total includes 74.6 acres of intertidal flat, and 31.8 acres of intertidal aquatic bed, and 10.0 acres of intertidal shore. This distribution of these intertidal habitat classes within each EC2 and ED management unit is listed in the chart below.

Management Unit	Acreage and Habitat class of Intertidal Area
2EC2	9.1 acres intertidal flat 10.0 acres intertidal shore
3ED	10.7 acres intertidal aquatic bed 8.5 acres intertidal flat
7EC2	3.0 acres intertidal aquatic bed 23.2 acres intertidal flat
11 EC2	1.6 acres intertidal flat 5.6 acres intertidal aquatic bed
14 EC2	15.6 acres intertidal flat
23 ED	16.6 acres intertidal flat 12.5 acres intertidal aquatic bed

4.4 Restoration and Mitigation Sites

4.4a Nehalem Estuary

4.4a.1 Restoration Sites

Ten restoration sites have been identified within Nehalem Estuary (Map 3). Five of these sites (sites 5, 6, 7, 9 and 10) are banklines along the upper reaches of the estuary (primarily along the North and South Forks of the Nehalem River) which could benefit from establishment of additional riparian vegetation. Site 1, which runs along the interior length of Nehalem Spit, is an area which could result from the establishment of additional riparian vegetation include:

1. Shading of aquatic areas and reduction of increases in water temperatures which could be detrimental to aquatic life;

2. Reduction of streambank erosion (or wind and wave erosion along Nehalem Spit); and

3. Reduction of sedimentation in adjacent aquatic areas.

Site 2 marks the location of a 5.8-acre diked area containing mostly freshwater marsh species although one saltwater species has been noted. The area is subject to seasonal tidal influence through breaches in the dikes which surround it. Restoration would consist of removing larger portions of these dikes. Adjacent to this area to the south is another marsh area

partially surrounded by dikes. This area, known as Botts Marsh, is not suitable for restoration because of plans for a marina to be located there (see Botts Marsh exception).

Site 3 contains the remnants of an old pile dike which once extended between Dean Point and Lazarus Island. Removal of the remnants of this pile dike could enhance water flows between Dean Point and West Island and possible reduce the rate of sedimentation in this region of the estuary.

Site 8 is an approximately 164-acre forested freshwater wetland which has been suggested by the Oregon Department of Fish and Wildlife as a site for waterfowl habitat enhancement. The value of this area to waterfowl could be increased by excavating shallow ponds within the area.

The potential for restoration at Thomas marsh was also evaluated. The alteration which has occurred here is the placement of fill and piling for the Southern Pacific Railway. Restoration would involve removal of the fill and replacement with a bridge. This is clearly infeasible given the cost of such a project.

NEHALEM BAY RESTORATION SITES
MAP 3

4.4a.2 Mitigation Sites

The six mitigation sites which have been identified within Nehalem Estuary are discussed below. Sites 1, 2 and 3 are discussed in more detail in the Natural Resources of Botts Mars, Nehalem Bay, a report prepared as part of the Goal 16 exception for Botts Marsh (Nehalem Estuary Management Unit 13ED) contained in the Goal 2 element of the Tillamook County Comprehensive Plan. Any future use of the sites listed below as mitigation sites must meet with the approval of the landowner and any affected incorporated cities.

Site – 1
Classification – Priority
Discussion – A 10-acre area of diked intertidal marsh at the tip of Dean Point (see Natural Resources of Botts Marsh, Nehalem Bay, p.9).

Site – 2
Classification – Priority
Discussion – An approximately 4.2-acre degraded intertidal salt marsh on the northern end of the City of Wheeler (see Natural Resources of Botts Marsh, Nehalem Bay, p. 10).

Site –3
Classification – Priority
Discussion – A 5.8 acre area which contains mostly freshwater marsh species, although one-saltwater species, Scirpus Maritimus, has been noted within the area[1]. This 5.8-acre area is subject to seasonal tidal influence, and has been included within the Nehalem Estuary planning boundary. This site is extensively discussed in the Natural Resources of Botts Marsh, Nehalem Bay.

Site – 4
Classification – Priority
Discussion – An approximately 38.3 acre area which contains approximately 15.3 acres of diked freshwater wetland on the eastern end of the property, and 23 acres of pasture on either side of Alder Creek. Existing tidegates on either side of Alder Creek could be removed and the pasture regraded to a lower elevation to create additional marsh, but would result in the loss of the existing freshwater marsh which is, in itself, a valuable habitat. The information contained in Eilers (1975) could be used to determine the species composition of marsh communities which would occur at various tidal elevations[2].

This site could serve as a mitigation for the development proposed in Nehalem Management Unit 4ED (Thomas Marsh) or 13ED (Botts Marsh).

[1] Personal communication, Ted Boss, Environmental Protection Agency.
[2] Eilers, H. Peter (1975) Plants, Plant Communities, Net Production and Tide levels: The Ecological Biography of the Nehalem Salt Marshes, Tillamook County, Oregon. PhD dissertation, Oregon State University, Corvallis.

This site is also identified in the Coastal Shorelands Element as significant shoreland habitat; a pigeon watering area. Mitigation actions in this area will not decrease pigeon habitat values. (*Personal communication, Doug* Taylor, ODFW.)

Site – 5
Classification – Inventory
Discussion – Small Island is an approximately 24.6-acre forested island with several small fringing salt marshes. Creation of additional intertidal marsh at this site would be possible if parts of the island were regraded to lower elevations. This site could not provide in-kind mitigation for the habitats lost due to development in 4ED and 13ED, since the low salinities within this area would result in the creation of marsh types which are different from the ones at these development sites.

Site – 6
Classification – Inventory
Discussion – Site 6 contains a strip of land on either side of a small tidal channel. Creation of intertidal marsh adjacent to this tidal channel would be possible if the land adjacent to the channel were regraded to lower elevations. The acreage of marsh created would vary, depending upon the length and width of the regraded area. The area adjacent to the tidal channel is a forested freshwater wetland. This site could not provide in-kind mitigation for the habitats lost to development in 4ED and 13ED.

Site – 7
Classification – Priority
Discussion – An approximately 22-acre low elevation area that has the possibility of being converted to intertidal flat or intertidal marsh habitat through grading and removal of logs at the *northern end.*

Site – 8
Classification – Inventory
Discussion – This site corresponds to restoration site 3 which includes the remnants of a pile dike that once extended between Dean Point and Lazarus Island. The removal of this dike would restore water flows to the northern portion of Nehalem Bay that existed before the dike was constructed. Before this action could be considered for mitigation, the Department of State Lands must determine that the habitat value of the affected area is increased.

4.4b Tillamook Estuary

4.4b.1 Restoration Sites

Seventeen restoration sites have been identified within Tillamook Estuary (Map 5). Twelve of these sites (Site 1, 2, 4, 5, 7, 8, 9, 10, 12, 13, 14 and 15) are banklines along the tributary rivers and sloughs of Tillamook Estuary. Site 1, which runs along the interior of Bayocean Spit, is an area which experiences wind and wave erosion. The beneficial impacts which could result from the establishment of additional riparian vegetation include:

1. Shading of aquatic areas and reduction of increases in water temperatures which could be detrimental to aquatic life;
2. Reduction of streambank erosion (or wind and wave erosion along the Bayocean Spit); and
3. Reduction of sedimentation in adjacent aquatic areas.

Sites 3, 6 and 11 mark the location of river and slough channels within Tillamook Estuary where channel navigability has been reduced due to the presence of snags. Site 3, along the Kilchis River and Hathaway Slough, also contains old pilings. These snags and/or pilings pose a hazard to navigation and may alter the current patterns with the areas. Removal of these obstructions would increase the navigability of the channels, and may serve to increase the rate of water flow within these areas.

TILLAMOOK BAY
RESTORATION SITES
Map 5

Tillamook County is studying the potential for dredging the mouths of the Wilson and Trask Rivers for the purposes of flood control. Such dredging may be restoration if it is demonstrated that restoring the dimensions of channels to what has existed in the past will also reduce flooding to levels that existed at that time. An amendment to the Comprehensive Plan will be necessary if these sites are to be identified as restoration sites.

Dredging within both of these areas occurred in 1972, when the U.S. Army Corps of Engineers removed approximately 108,000 cubic yards of material from these river segments to provide a uniform channel bottom at about -6 feet M.S.L. The purpose of the dredging was to enhance the capacity of river channels. Based on flood control benefits, dredging was economically infeasible. Levesque (1980) has suggested that the low-cost benefit ratio could have resulted from an underestimation of the damages of flooding to agricultural lands[1].

Tillamook County has cosponsored a study by CH2M Hill of the impacts and effectiveness of dredging for flood control. This study concluded that dredging would have no effect on major flood events when high tides and storm surges hold up river flows but may reduce flooding when those other events are not simultaneously occurring. The County is pursuing a further study to determine the amount of benefit that can be achieved by dredging.

The remainder of the Tillamook Estuary channel and the channels of the tributary rivers and sloughs have not been evaluated for their potential as restoration sites at this time. Tillamook County, however, strongly supports the concept of the Tillamook Bay Restoration Study which was authorized by Congress in 1975. The purpose of the study was to "investigate the restoration of the estuary in consideration of, but not limited to, navigation, flood control, restoration of fisheries, water quality, beach erosion and recreation". The County feels that such a study would provide the factual base necessary to justify a restoration project. If a factual base supporting the concept of Bay Restoration and identifying the location of sites to be restored and the actions involved in bay restoration can be developed, Tillamook County will amend the Comprehensive Plan and identify additional restorations sites with Tillamook Estuary.

4.4b.2 The seven mitigation sites which have been identified within Tillamook Estuary are described below. Site 1 is discussed in more detail in the Dredged Material Disposal Plan element (XV1). Any future use of the sites listed below as mitigation sites must meet with the approval of the landowner and any affected incorporated cities.

Site – 1
Classification – Priority
Discussion – An approximately 17 acre area of diked intertidal marsh east of Miami Cove. (See Dredged Material Disposal Plan element, XV1).

[1] Levesque, Paul (1980). Proposal for Flood Control Project in the Tillamook Bay Drainage System.

Site – 2, 3, 4, and 6
Classification – Inventory
Discussion – Sites 2, 3, 4 and 6 are areas containing diked intertidal marsh. Dikes could be breached or tidegates removed within these areas to create additional intertidal marsh. The approximate land acreage included within these sites is: Site 2 - 20 acres; Site 3 - 95.6 acres; Site 4 - 82 acres; Site 6 - 15 acres.

Site – 5
Classification – Inventory
Discussion – This site contains a tidal slough (Tomlinson Slough) which has been cut off from tidal circulation by the placement of a tidegate. The area was historically used as a log storage pond in conjunction with a mill at the site. Removal of the tidegate and removal of the wood debris within the area should restore tidal circulation within the area and increase the habitat value of the site.

Site – 7
Classification – Priority
Discussion – Site 7 is an approximately 25 acre extension of Bayocean Spit located east of the dike which formed Bayocean Lake. Additional intertidal flat could be created by regrading the area to a lower elevation. This site is located immediately adjacent to the oyster lease areas which have been included within the Estuary Conservation Aquaculture (ECA) zone. This proposed mitigation action would have to be carefully evaluated and designed in order to avoid any potential adverse impacts (such as excessive sedimentation) to these valuable oyster growing areas. The Oregon Department of Fish and Wildlife considers this area to be an important habitat for waterfowl.

TILLAMOOK BAY
MITIGATION SITES
Map 6

NETARTS BAY
RESTORATION SITES
Map 7

4.4c Netarts Estuary

4.4c.1 Restoration Sites

Five restoration sites have been identified within Netarts Estuary (Map7). Four of these sites (Sites 1, 2, 4 and 5) are areas where the placement of roadfill has reduced tidal circulation within intertidal marshes to the east of Whiskey Creek Road. Increasing the bridge span by removing culverts and excess roadfill would increase tidal circulation and reduce sedimentation within these marshes. An additional tidal marsh restoration site at Whiskey Creek was eliminated after removal of excess roadfill and replacement of the culvert at the site was complete by Tillamook County in 1981.

Site 4 is Yager Lake, a seasonal lake which was created by diking an intertidal marsh. Removal of the dike in this location would restore tidal flushing within the intertidal marsh, and thereby increase estuarine surface area. This site could also serve as a mitigation site if future amendments to the Tillamook County Comprehensive Plan are proposed which allow development in Netarts Estuary which would require mitigation. The restoration action of dike removal would require the approval of the landowner.

NESTUCCA BAY
RESTORATION SITES
Map 8

SAND LAKE
RESTORATION SITES
Map 9

4.4c.2 Mitigation Sites

No mitigation sites have been identified within Netarts Estuary.

4.4d Sandlake Estuary

4.4d.1 Restoration Sites

The Whalen Island bridge (Site 1, Map 8) is the only identified restoration site within Sandlake Estuary. Removal of the rock fill beneath the bridge and enlargement of the bridge span would reduce the restriction of inflowing and outflowing tidal waters, and would also reduce turbulent flows beneath the bridge, thereby reducing erosion of the adjacent land and improving navigational access for small boats beneath the bridge.

Neither of the two dikes intertidal areas within Sandlake Estuary were considered suitable restoration sites. Removal of the dike surrounding the Beltz Farm wetland would eliminate the existing freshwater marsh, which is a significant waterfowl habitat (see the discussion on the Belts Farm wetland on XVII). The diked area on the northern end of Sandlake Estuary was also considered an unsuitable restoration site, primarily because the area behind the dike has already reverted to intertidal marsh. Dike removal in this location would also be in conflict with the landowners desire to maintain the property for future agricultural use.

4.4d.2 Mitigation Sites

No mitigation sites have been identified within Sandlake Estuary.

4.4e Nestucca Estuary

4.4e.1 Restoration Sites

Five restoration sites have been identified in Nestucca Estuary along the channels of the Big and Little Nestucca Rivers (Map 9). All of these restoration sites are banklines which could benefit from establishment of additional riparian vegetation. Beneficial impacts from establishment of additional riparian vegetation include:

1. Shading of aquatic areas and reduction of increases in water temperatures which could be detrimental to aquatic life;
2. Reduction of streambank erosion; and
3. Reduction of sedimentation in adjacent aquatic areas.

Diked intertidal marshes along the Little Nestucca River were also examined as potential restoration sites, since the historical loss of intertidal marsh due to diking has been greatest within this area. The diked intertidal marshes along the Little Nestucca River were determined to be unsuitable for restoration actions involving dike breaching or removal, due to the agricultural productivity of the area and the historical and future commitment of the areas to agricultural use. Except for a 12 acre parcel between the old and new Highway 101 bridge over the Little Nestucca River, all of diked tidelands within Tillamook County's F-1 (Farm) zone. An exception to the Agricultural Lands Goal (Goal 3) is being taken to justify the Commercial (C-

1) zone at this site.

4.4e.2 Mitigation Sites

No mitigation sites have been identified within Nestucca Estuary.

4.5 MITIGATION AND RESTORATION PLAN REVIEW

The Mitigation and Restoration Plan Element shall be reviewed during the periodic updates of the Tillamook County Comprehensive Plan. The Mitigation and Restoration Plan for an individual estuary or estuaries shall be reviewed prior to a periodic update of the Tillamook County Comprehensive Plan upon the request of the County Board of Commissioners, or if

1. Amendments to the Tillamook County Comprehensive Plan and zoning maps are requested in order to delete Priority Mitigation (MIT-1) sites; or if
2. The total area of inventory mitigation sites is reduced by 25%, due to the commitment of the sites to uses which preclude their ultimate use as mitigation sites.

A public hearing shall be held to review the Mitigation and Restoration Plan Element, or the Mitigation and Restoration Plan for an individual estuary or estuaries. Notification of this Public Hearing shall be made to all affected property owners, jurisdictions and state and federal agencies at least 30 days prior to the public hearing.

5. GENERAL POLICIES FOR ESTUARIES

5.1 Fisheries

1. Intertidal flats, tidal marshes, subtidal and intertidal seagrass and algae beds and other estuarine areas of major significance for rearing and other life stages of marine fish and invertebrates have been so identified in estuary inventory reports, and shall be protected from conflicting uses through designation as Estuary Natural (EN), Estuary Conservation 1 (EC1) and Estuary Conservation Aquaculture (ECA).

2. In order to maintain and improve fish runs and fisheries in Tillamook County, wise management of fishery resources, fish enhancement programs, and maintenance of reproductive stocks are strongly supported.

3. Within Conservation and Development estuaries, areas shall be designated as Estuary Development (ED) (in Development estuaries only) or Estuary Conservation 2 (EC2) to provide for adequate dock and moorage space for present and anticipated future commercial and sport fishing vessels and for fish processing, cold storage and other water-dependent support facilities.

4. Traditional sport and commercial fishing areas, shellfish harvesting areas and subtidal shellfish seed beds should be protected when dredging, filling, pile driving, constructing pile dikes or rock jetties or other disruptive in-water activities are permitted.

5. Tillamook County shall encourage the maintenance, improvement of enhancement of anadromous fish habitat by assigning appropriate estuary zones (see Policy 1, above), by encouraging the establishment of protective stream corridors, and by controlling excessive sedimentation from agricultural and forested shorelands.

6. Minimum tributary stream flows adopted by the State Water Resources Board or

recommended by the Oregon Department of Fish and Wildlife shall be maintained, except in those areas where over-appropriation of water has already occurred. Water Quality standards shall apply.

In those streams where private water rights preclude maintenance of minimum flows, and where low flows interfere with fish migrations, state water resource management programs are encouraged to include provisions for both the purchase of private water frights and construction of small impoundments on tributaries to maintain minimum flows. Impoundments to maintain minimum flows should be located as high in the headwaters of streams as possible, preferably in areas which are not utilized by anadromous fish and wildlife. Other impoundments of tributary streams are discouraged unless provision is made for protecting the fishery and wildlife resources before construction.

7. Tillamook County will support any efforts of commercial or sport fishing interests to minimize the destruction of salmon by their natural predators, provided that these efforts are non-destructive and are not in violation of the Marine Mammals Protection Act or any other applicable state or federal laws providing for the protection of marine birds or mammals.

5.2 Natural Habitat and Resource Areas

1. A portion of all types of ecosystems in Tillamook County's estuaries and shorelands shall be designated and managed accordingly to ensure habitat diversity.

2. Estuarine habitat shall be designated and managed as follows:

a. Except where goal exceptions have been taken in the Tillamook County Comprehensive Plan, Estuary Natural (EN) zones shall contain, at a minimum, all major tracts of salt marsh, tideflats, seagrass and algae beds.

The purpose is to:

(1) assure the protection of significant fish and wildlife habitats; and

(2) retain diversity of native ecosystems and continued biological productivity within each estuary.

The management objective is to preserve those natural resources in recognition of dynamic natural, geological and evolutionary processes. Permissible uses within these areas shall be consistent with this management objective and shall recognize the low tolerance level of intensive human use.

b. Estuary Conservation Aquaculture (ECA) zones shall contain:

(1) areas which are in existing aquaculture use and which are subject to a valid oyster growing lease from the Department of State Lands pursuant to ORS 509 and 510.

(2) other areas suitable for aquaculture which do not qualify as natural management units.

This management objective is to promote the continuing utilization of designated shellfish culture areas, while providing for low-intensity water-dependent recreation, commercial and recreational fishing and crabbing and protecting the significant biological productivity of major tracts of fish and wildlife habitat and area needed for scientific, research or educational purposes.

c. Except where goal exceptions have been taken in the Tillamook County Comprehensive Plan, Estuary Conservation 1 (EC1) zones shall contain, at a minimum:

(1) tracts of tidal marshes, tideflats, seagrass and algae beds which are smaller or of less biological importance than those designated as Estuary Natural (EN); and

(2) native and commercial clam, shrimp and [native] oyster beds; and

(3) productive recreational or commercial fishing areas; and

(4) areas that are partially altered and adjacent to existing development of moderate intensity which do not possess the resource characteristics of Natural or Development management units; and

(5) areas with potential for shellfish culture (excluding platted oyster beds in Tillamook Bay); and

(6) subtidal channel areas adjacent to rural or agricultural shorelands.

The management objective is to:

(1) provide for long-term maintenance and enhancement of biological productivity; and

(2) provide for activities allowing the long term utilization of renewable resources and not requiring major alterations of the estuary except for the purposes of active restoration; and

(3) provide for the long-term maintenance of the aesthetic values of estuarine areas, in order to promote/enhance low intensity recreational use of estuarine areas which are adjacent to rural or agricultural shorelands.

d. Except where goal exceptions have been taken in the Tillamook County Comprehensive Plan, Estuary Conservation 2 (EC2) zones shall contain:

(1) tracts of significant habitat not qualifying for EN or EC1 designation;

(2) areas containing existing water-dependent facilities which require periodic dredging to maintain water access;

(3) partially altered estuarine areas or estuarine areas adjacent to existing water-dependent development, and which do not otherwise qualify for EN, EC1 or ED designations; and

(4) subtidal navigable areas which are adjacent to urbanized areas, which do not qualify for EN, ECA or EC1 designation and which are not federally authorized and maintained navigation channels.

The management objective is to:

(1) provide for long-term use of renewable resources that do not require major alterations of the estuary except for purposes of restoration; and

(2) other than minor navigational improvements, aquaculture facilities and water dependent recreational facilities, provide for new water-dependent industrial and commercial uses only where dredging and filling are not necessary and where consistent with the resource capabilities of the area and purposes of the management unit.

e. Estuary Development (ED) zones shall contain:

(1) areas which contain public facilities which are utilized for shipping, handling or storage of water-borne commerce, or for moorage or fueling of marine craft;

(2) subtidal channel areas adjacent or in proximity to the shoreline which are currently used or needed for shallow-draft navigation (including authorized maintained channel and turning basins);

(3) areas of minimum biologic significance needed for uses requiring alteration of the estuary; not included in EN, ECA, EC1 and EC2 zones; and

(4) where an acknowledged Goal 16 exception has been taken, areas of biologic significance which are potentially suitable for commercial, recreational or industrial development, due to their proximity to subtidal channels, developed or developable shorelands or developed estuarine areas, and to the availability of services.

The management objective is to:

(1) provide for long-term maintenance, enhancement, expansion of creation of structures and facilities for navigational and other water-dependent commercial, industrial or recreation uses.

(2) provide for the expansion or creation of other commercial, industrial or recreational facilities, subject to the general use priorities outlined in Section 6.7.

3. Developments that require surface water appropriation and diversion shall be located where stream flows are not reduced below the minimum recommended levels. Water Quality policies shall apply.

4. Non-hazard snags adjacent to streams, sloughs and in forested areas should be left in order to increase habitat diversity.

5. Tillamook County encourages a reduced tax assessment for privately owned lands which have been identified as important estuarine or shoreland natural habitat and resource areas.

5.3 Public Access to the Estuary and its Shorelands

1. Tillamook County recognizes the value of maintaining and improving public access to its publicly owned estuaries, beaches, coastal lakes and shorelands for all people.

2. Further acquisition, sale or development of shorelands owned by federal, state and local governments shall be carried out in a manner to retain existing public access and maximize future public access to these publicly owned shorelands, consistent with resource capabilities and site sensitivity to human use. To this end:

   a. Existing public ownerships, rights of way and similar public easements in coastal shorelands which provide access to or along coastal waters shall be retained or replaced if sold, exchanged or transferred. Rights of way may be vacated to permit redevelopment of shoreland areas provided public access across the affected site is retained.

   b. Governments should avoid closing their lands to public use unless protection of fragile resources outweighs the benefit to be derived from public use.

   c. All units of government providing or supporting public access to public coastal areas should give particular attention to use capabilities in order to protect areas from over-use and to prevent potential damage to resources.

   d. Public access to shorelands owned by federal, state and local governments should be improved where feasible and consistent with authorized use.

   e. Tillamook County should consider the purchase of conservation or scenic easements whenever opportunities are available to increase public access.

   f. Tillamook County supports the voluntary use of the open space special tax assessment law when it will result in property owners maintaining natural areas or providing visual or physical access to public areas.

   g. Special consideration should be given to making some designed areas of the County's publicly owned shorelands available to the elderly, handicapped, and physically disabled.

3. The private use of privately owned intertidal areas, tidal wetlands and shorelands is legitimate and must be protected against encroachment. Public access through, and the use of, private property shall require the consent of the owner, and is trespass unless appropriate easements and accesses have been acquired in accordance with the law.

4. Where major shoreline developments are allowed they should not in combination with other developments in the area, exclude the public from shoreline access to areas traditionally used for fishing, hunting or other shoreline activities.

5. Special consideration of the need to retain open space and improve public access to publicly owned shorelands is necessary in urban and urbanizing areas. Industrial

and commercial facilities such as canneries, ports and marinas should, where feasible, provide physical or visual access to coastal waters and shorelands.

6. The creation of waterfront parks, and the restoration of historic waterfront areas (such as proposed by the City of Nehalem) is strongly encouraged as a means of providing public access and open space. Future proposals for waterfront restoration shall include a detailed description of the areas to be restored and the activities involved in restoration. Shoreland Development policies shall apply.

5.4 Recreation and Recreational Facilities

1. Maintenance and repair of existing docks, moorages, marinas and other recreational facilities shall be permitted within all estuary zones, and within Water-Dependent Development (WDD) zones and other shoreland areas.

2. Low-intensity water-dependent recreation shall be permitted within all estuary zones, and within Water-Dependent Development (WDD) zones and other shoreland areas.

3. To preserve significant fish and wildlife habitat and provide continued biological productivity, recreation in the Estuary Natural (EN) zone shall be limited to boat ramps for public use where no dredging or fill for navigational access is needed.

4. Boat ramps for public use where no dredging or fill for navigational access is needed are permitted in Estuary Conservation 1 and Estuary Conservation 2 zones. Other water dependent recreational facilities shall be permitted only if consistent with the resource capabilities of the area and the long-term use of renewable resources, and if they do not cause major alteration of the estuary.

5. The siting of recreational developments and areas where recreational activities are focused within the shoreland area shall comply with the following conditions:

   a. areas of concentrated public access and recreational development which experience heavy use should, where appropriate include auxiliary facilities such as parking and sanitation;

   b. parking areas should be located away from the waterfront, access to beach and waterfront areas provided by walkways other methods;

   c. the design and siting of high intensity recreational facilities should account for possible adverse impacts on adjacent or nearby private property.

5.5 Scientific Research, Planning and Public Education in Estuaries and Shorelands

1. To ensure local coordination and to provide useful information for local estuary management decisions, all agencies, consultants, university personnel and private individuals conducting research or developing plans in Tillamook County should:

   a. contact Tillamook County during the project planning stage, to outline the research objectives and schedules and the means of reporting project results; and

   b. convey research results to local government agencies.

2. Tillamook County shall continue to compile physical and biological inventory material

on the estuaries and shorelands of Tillamook County and shall make all available material accessible to citizens, particularly those proposing projects requiring state and federal permits.

5.6 Water Quality

1. The following state and federal authorities shall be utilized for maintaining water quality and minimizing man-induced sedimentation in estuaries:

   a. the Oregon Forest Practices Act and Administrative Rules for forest lands as defined in ORS 527.610-527.730, 572.990;

   b. the non-point source discharge water quality program administered by the Department of Environmental Quality under Section 208 of the Clean Water Act of 1977 (P.L. 92-500);

   c. the Fill and Removal Permit Program administered by the Department of State Lands under ORS 541.605-541.665; and

   d. the programs of the Soil and Water Conservation Commission and local districts and the Soil Conservation Service for agricultural lands;

   e. sections 404 and 402 of the Clean Water Act of 1977 (P.L. 92-500).

2. Tillamook County supports the efforts of the Department of Environmental Quality to identify the quantities of bacterial wastes derived from non-point pollution sources, and to develop a bacteria management plan for Tillamook Bay. Tillamook County shall review the Tillamook Bay Bacteria Management Plan and incorporate appropriate elements of the plan into county policies and standards.

3. Tillamook County encourages the preparation of an erosion and sedimentation study for the Nehalem Bay drainage comparable to the 1978 Tillamook Bay Drainage Basin Erosion and Sediment Study. Sources of erosion, quantities or eroded sediment transported into Nehalem Bay, and corresponding preventive measures should be identified.

4. Projects or uses requiring appropriation of water shall be allowed only if minimum stream flows established by the State Water Resource Board in the 1975 North Coast River Basins Study, or recommended by the Oregon Department of Fish and Wildlife, are maintained. In cases where existing water rights prevent the maintenance of minimum stream flows, existing rights shall be protected but additional appropriations shall not be allowed.

5. Gasoline and oil sales on the waterfront should be limited to the servicing of water-dependent facilities and marine craft.

6. Uncontrolled release of pollutants into ocean, river or estuarine waters is prohibited by state and federal law. Controlled release of treated industrial, domestic and agricultural wastes into ocean, river or estuarine waters shall be permitted only if no practicable alternatives exist. In this case, waste disposal into the ocean or rivers is preferred over estuarine waste disposal.

7. All projects involving dredging, fill, piling/dolphin installation, or navigational structures shall be constructed so that flushing capacity is maintained or improved

so that changes in circulation patterns will not result in water quality problems.

8. Tillamook County recognizes the statutory authority of the Oregon Department of Agriculture to regulate the application of pesticides and herbicides, the Oregon Department of Environmental Quality to regulate the impacts of chemical substances on estuarine water quality, and the Oregon Department of Environmental Quality to regulate water withdrawal and effluent discharge into estuarine waters. Preparation of impact assessments for these activities shall be the responsibility of these agencies.

6. POLICIES FOR ESTUARIES USES

6.1 Agriculture

1. Dikes, tidegates and drainage systems should be kept in good working order to protect agricultural values and prevent flood and erosion.

2. Maintenance and repair of existing dikes, tidegates, drainage systems, farm roads and bridges and other existing farm structures shall be permitted within all estuary zones and shoreland areas. Dike maintenance and repair shall be permitted for:

   a. existing serviceable dikes (including those that allow some seasonal inundation); and

   b. dikes that have been damaged by flooding, erosion or tidegate failure where the area behind the dike has not reverted to estuarine habitat; and

   c. dikes that have been damaged by flooding, erosion or tidegate failure where the area behind the dike has reverted to estuarine habitat only if this area is in the Farm, F-1, and it has been in agricultural uses for 3 of the last 5 years and reversion to estuarine habitat has not occurred more than 5 years prior.

   Tillamook County will rely on the U.S. Army Corps of Engineers and the Department of State Lands to determine whether an area has reverted to estuarine habitat.

   For the purpose of this policy, agricultural use means using the area for pasture several months of the year or harvesting them once a year.

3. Tillamook County supports the efforts of the Tillamook County Soil and Water Conservation District and the Department of Environmental Quality to identify the sources and quantities of bacterial wastes associated with agricultural practices and non-point pollution sources, and to develop a bacteria management plan for Tillamook Bay. Tillamook County shall review the Tillamook Bay Bacterial Management Plan and incorporate appropriate elements of the plan into county policies and standards.

4. Grazing and pasturing of livestock and fencing shall be permitted within all estuary zones to the extent that water quality is maintained in the estuary. Fencing shall not be placed across public owned lands or publicly owned intertidal areas, nor shall it restrict recreational boating over the water's surface.

5. Erosion-prone banks shall be protected by establishing concentrated and protected points of access when pasturing and watering cattle in riverfront areas. Where practicable, riparian vegetation shall be maintained or enhanced to inhibit erosion

and provide wildlife cover. The use of temporary fencing may become necessary to allow establishment of a vegetated steam corridor.

6. Diversion of waters for agricultural purposes shall be in accordance with water right procedures and with minimum stream flows maintained. Existing water rights shall be protected. Water Quality policies shall apply.

7. In the event that a tidal marsh area undergoes a natural succession or transition from tidal wetland to a non-aquatic habitat, the area shall be reclassified from an estuary zone to a non-estuary zone, either at the request of the owner or during periodic plan updates. Consultation with state agencies through the Department of State Lands shall occur prior to this reclassification.

8. The use of productive agricultural lands for dredged material disposal shall occur only when the sponsor of the dredging project can demonstrate that the productivity of these lands can be restored when the use is completed. In cases where this demonstration can not be made, an exception to the Agricultural Lands Goal must be taken and included as an amendment to the comprehensive plan prior to the use of the site for dredged material disposal.

9. An exception to the Agricultural Lands Goal shall be taken and included as an amendment to the Tillamook County Comprehensive plan before productive agricultural land is lost due to breaching or removal of functional dikes for purposes of mitigation or restoration. The Tillamook County Agricultural Criteria shall be used to evaluate the value or productivity of the agricultural land. Mitigation and Restoration standards shall apply.

10. Dredge or fill in estuarine waters, intertidal areas or tidal wetlands in conjunction with maintenance of existing farm structures or other agriculture activities shall be subject to estuary activities policies for dredging and fill (section 7.2 and 7.3 respectively), the requirements of the State Fill and Removal Law (ORS 541.605-541.665) and the Clean Water Act of 1977 (PL 95-217) (applies to fill only).

6.2 Aquaculture

1. Existing aquaculture facilities and areas designated as possessing significant aquaculture potential shall be identified and protected from conflicting uses or uses that would create water quality problems.

2. In Water-Dependent Development (WDD) zones and other shoreland areas, aquaculture facilities shall be sited, designed and operated to minimize adverse impacts on navigation channels, and public access points to publicly owned lands.

3. In the Estuary Natural zone (EN), aquaculture shall be allowed only where it is determined to be consistent with the resource capacities and purpose of the management unit. This determination shall be made by the Oregon Department of Agriculture and the Oregon Department of Fish and Wildlife in instances where Tillamook County finds that it does not have the resources or abilities to make such a determination.

4. In Tillamook Bay, areas which are legally platted by ORS 509 and 510 for oyster culture and which are in existing aquaculture shall be placed in the Estuary Conservation Aquaculture zone and shall be managed to provide for the continuation and expansion of the Tillamook Bay oyster industry. Aquaculture facilities of the

ECA zone shall be limited to benthic or pelagic structures (stakes, racks, trays, long lines or rafts) and accessory pilings or dolphins for anchoring purposes.

5. In Estuary Natural (EN) and Estuary Conservation Aquaculture (ECA) zone, aquaculture and water-dependent portions of, aquaculture facilities shall be limited to temporary or easily removable benthic or pelagic structures (stakes, racks, trays, long lines or rafts) that will not require dredging or fill other than incidental dredging for harvest of benthic species or removal of in-water structures.

6. The use of aquaculture projects (fish hatcheries and fish release/recapture operations) to replenish natural stocks is encouraging.

7. Tillamook County recognizes the statutory authority of the Oregon Department of Fish and Wildlife and the Oregon Department of Agriculture to regulate aquaculture and oyster culture. These departments shall forward their finding to Tillamook County for issuance or denial of aquaculture permits.

8. In Estuary Conservation (EC1 and EC2) zones, aquaculture facilities will require a resource capability determination with dredging, fill or other alterations of the estuary is needed, other than the incidental dredging for the harvest of benthic species or removal of in-water structures.

9. Aquaculture facilities in Estuary Development (ED) zones will preclude the provision or maintenance of navigation or other for commercial and industrial water-dependent use, and will not prevent the use of shorelands especially suited for water-dependent development.

6.3 Diking

1. Maintenance and repair of existing dikes, tidegates, drainage systems, farm roads and ridges and other existing farm structures shall be permitted within all estuary zones and shoreland areas. Dike maintenance and repair shall be permitted for:

   a. existing serviceable dikes (including those that allow some seasonal inundation); and

   b. dikes that have been damaged by flooding, erosion or tidegate failure where the area behind the dike has not reverted to estuarine habitat; and

   c. dikes that have been damaged by flooding, erosion or tidegate failure where the area behind the dike has reverted to estuarine habitat only if this area is in the Farm (F-1) zone and it has been in agricultural use for 3 of the last 5 years and reversion to estuarine habitat has not occurred more than 5 years prior.

   Tillamook County will rely on the U.S. Army Corps of Engineers and the Department of State Lands to determine whether an area has reverted to estuarine habitat.

   For the purpose of this policy, agricultural use means using the area for pasture several months of the year or harvesting this area once a year.

2. Construction of temporary (60 days or less) dikes for the purpose of flood protection in emergency situations or in the interest of safety or welfare of the public shall be permitted within all estuary zones, and within Water-Dependent Development (WDD)

zones and other shoreland areas.

3. Dredging within estuarine waters, intertidal areas or tidal wetlands to obtain fill for dike repair or maintenance shall not be permitted. However, dredged material obtained from an approved dredging project may be used for dike repair or maintenance. Dredged material stockpile sites shall be used as a source of fill material for dike repair and maintenance whenever practicable.

4. Breaching or removal of functional dikes on productive agricultural land shall not be allowed as part of a restoration or mitigation project unless an exception to the Agricultural Lands Goal is taken and included as an amendment to the Tillamook County Comprehensive Plan. The Tillamook County Agricultural Criteria shall be used to evaluate the value of productivity of agricultural land. Mitigation policies and standards shall apply.

5. New diking of intertidal areas and tidal marshes shall be limited to Estuary Development (ED) zones and shall be permitted only:

   a. for a water-dependent use that requires an estuarine location or is specifically allowed by the management unit or zone; and

   b. if adverse impacts are avoided or minimized to be consistent with the purposes of the area; and

   c. a need (i.e. a substantial public benefit) is demonstrated and the use or alteration does not unreasonably interfere with public trust rights.

6.4 Boat Ramps, Docks and Moorages

1. Maintenance and repair of existing boat ramps, docks and moorages shall be permitted within all estuary zones, and within Water-Dependent Development (WDD) shoreland zones and other shoreland areas.

2. Safe navigational access to boat ramps, docks and moorages should be provided and maintained.

3. New boat ramps, docks and moorages shall be allowed only where sufficient back-up land exists without the need to fill tidelands or marshlands.

   To ensure that consideration is given to the beneficial economic and social impacts of moorages on local communities, proposals for new or expanded moorages should include statements on the impacts to local communities derived from increases in employment or increases in commercial or recreational activity.

4. To encourage the most efficient use of waterfront and water surface area, alternatives to individual, single purpose docks and moorages (such as cooperative use facilities mooring buoys or dryland storage) are encouraged. New subdivisions and planned developments in areas adjacent to estuaries, rivers, streams and coastal lakes shall provide for cooperative use facilities whenever possible.

5. Conflicts with navigation and other water surface uses, such as commercial fishing or recreational boating, shall be avoided or minimized.

6. To preserve significant fish and wildlife habitats and provide for continued biological productivity, docks and moorages shall not be permitted within Estuary Natural (EN) zones. Boat ramps for public use where no dredging or fill for navigational access is needed shall be allowed, where consistent with the resource capabilities of the area and the purposes of the management zone.

7. Boat ramps, docks and moorages in Estuary Conservation 1 and Estuary Conservation 2 zones shall be permitted only if consistent with the resource capabilities of the area and the long-term use of renewable resources, and if they do not constitute a major alteration of the estuary. Boat ramps for public use where no dredging or fill for navigational access is needed shall not require a resource capability determination.

6.5 Energy Facilities and Utilities

1. Maintenance and repair of existing energy facilities and utilities shall be permitted in all estuary zones and in Water-Dependent (WDD) shoreland zones and other shoreland areas.

2. In selecting sites for development of new energy facilities and utilities, priorities are, from highest to lowest:

   a. non-shoreland sites;

   b. shoreland sites;

   c. Estuary Development (ED) zones:

   d. Estuary Conservation 2 (EC2) zones;

   e. Estuary Conservation 1 (EC1) zones;

   f. Estuary Natural (EN) zones.

   Tillamook County, however, realizes that this priority list is subject to modification by economic considerations, or by the need for services in a particular area. The site-selection process shall weigh economic considerations and social benefits against environmental losses within estuaries and shorelands.

3. New energy facilities and utilities shall be designed and sited to be consistent with the protection of the natural values of identified major marshes, significant wildlife habitat, and exceptional aesthetic resources [and significant historical and archaeological sites] within the shorelands planning boundary identified in the Tillamook County comprehensive Plan. New energy facilities and utilities on coastal headlands shall be limited to wind generation facilities.

4. New energy facilities and utilities (with the exception of waste water treatment plans) shall be permitted within estuarine waters, intertidal areas or tidal wetlands only if:

   a. a need (i.e. a substantial public benefit) is demonstrated and the use or alteration does not unreasonably interfere with public trust rights; and

   b. no feasible alternative upland locations exist; and

c. adverse impacts are avoided or minimized;

Waste water treatment plants shall not be allowed within estuarine waters, intertidal areas and tidal wetlands.

5. Underground or underwater installation of power and communication lines is encouraged over overhead installation.

6. In Estuary Natural zones, new energy facilities and utilities shall be permitted only if consistent with the resource capabilities of the area and the purpose of the management unit, and shall be limited to:

   a. electrical transmission lines and line support structures; and

   b. water, sewer and gas lines.

7. In Estuary Conservation 2 (EC2) and Estuary conservation 1 (EC1) zones, new energy facilities and utilities shall be limited to:

   a. electrical transmission lines and line support structures;

   b. water, sewer and gas lines, or

   c. storm water and sewer outfalls (where consistent with the resource capabilities of the area, the purpose of the management unit and Water Quality policies).

8. New energy facilities and utilities in Estuary Development (ED) zones shall be permitted where consistent with the maintenance of navigation and other needed public, commercial and industrial water-dependent uses.

9. Tillamook County should encourage alternative energy sources such as wind, wave and tidal power. Tillamook County should also encourage the development of energy from wood by-products. Significant economic gains may be realized by developing this energy source while providing a means of solid waste disposal for the Tillamook County lumber industry.

6.6 Forestry and the Forest Products Industry

1. Tillamook County supports continued enforcement of the State Forest Practices Act and other relevant state and federal regulations governing timber propagation and harvest on commercial forest lands. Tillamook County recommends uniform enforcement of existing regulations for state, federal or private forest lands which require that:

   a. preventative measures be taken during road building, site preparation and timber harvest to reduce excessive sedimentation in estuaries, rivers, streams and coastal lakes caused by mass soil wasting or surface erosion.

   b. preventative measures be taken during application of fertilizers and herbicides to minimize the runoff of pollutants which could contaminate water supplies in public and private watershed.

   c. preventative measures be taken during all phases of timber harvest to

minimize excessive sedimentation, extreme fluctuations in stream flow, solar heating of stream waters or other impacts which could adversely affect aquatic life. The requirements of the State Forest Practices Act shall not be exceeded.

2. Forestry operations within coastal shorelands shall be consistent with the protection of the natural values of major marshes, significant wildlife habitat and riparian vegetation. The State Forest Practices Act and Forest Practices Rules administered by the Department of Forestry shall be used to protect the natural values of these resources on commercial forest lands and other lands within coastal shoreland which are subject to their provisions.

3. Tillamook County encourages the Oregon State Legislature and the State Department of Forestry to review, revise and implement the Forest Practices Act and Administrative Rules to:

   a. address wildlife habitat protection; and

   b. recognize sensitive coastal shoreland habitats; and

   c. minimize man-induced sedimentation in estuaries; and

   d. address impacts of herbicide application.

4. Tillamook County supports minimization of the drift and snag material problem through land disposal of sinker logs and removal of snag material from the estuary.

5. New or expanded log handling, sorting and storage areas shall be limited to Estuary Development (ED) zones, and shall be allowed only if:

   a. the handling, sorting and storage area is an integral part of the process of water-dependent transportation of logs, (ie. is water-dependent); and

   b. a need (i.e. a substantial public benefit) is demonstrated and the use or alteration does not interfere with public trust rights; and

   c. no feasible alternative upland locations exist; and if

   d. adverse impacts are minimized.

   New or expanded log handling, sorting and storage areas shall be located in shellfish beds, shallow spawning areas, or in areas where grounding of logs will occur.

6. New log handling, sorting and storage areas in Water-Dependent Development (WDD) shorelands shall not preclude or conflict with existing or reasonable potential water-dependent uses on the site or in the vicinity, unless there is a public need for a storage or sorting yard as part of a water-dependent facility.

7. Tillamook County shall cooperate with the Department of Environmental Quality to develop standards for in-water log storage and handling facilities prior to their establishment in Tillamook County.

8. Tillamook County should encourage the development of energy from wood by-products. Significant economic gains may be realized by developing this energy

source while providing a means of solid waste disposal for the Tillamook County lumber industry.

6.7 Industrial and Commercial Uses in Estuarine Waters, Intertidal Areas and Tidal Wetlands

1. Maintenance and repair of existing industrial and commercial uses shall be permitted in all estuary zones. Expansion and new construction of industrial and commercial uses other than water-dependent recreation facilities shall be limited to Estuary Conservation 2 (EC2) and Estuary Development (ED) zones.

2. New commercial and industrial uses in the EC2 zone other than water-dependent recreation shall be limited to water-dependent commercial and industrial facilities which;

   a. do not require dredging or filling;

   b. are consistent with the resource capabilities of the area and the long-term use of renewable resources; and

   c. do not cause a major alteration of the estuary.

3. The following shall be considered in the designation of ED and EC2 zones

   for the purpose of new development or expansion of industrial or commercial uses:

   a. value of the area to local communities as an economic resource;

   b. proximity to land transportation facilities;

   c. availability to water and sewer service and power supplies;

   d. proximity to urban or urbanizable areas;

   e. availability of developable shorelands;

   f. degree of existing estuarine or shoreland alteration;

   g. type, extent, and scarcity of biologic resources in the area;

   h. proximity to navigation channels.

4. Development and improvement of existing commercial and industrial sites is encouraged prior to development of new commercial and industrial sites.

5. Water-dependent industrial facilities include, but are not limited to:

   a. piers, wharves and other terminal and transfer facilities for passengers or water-borne commerce such as fish, shellfish or timber products;

   b. water intake and discharge facilities of timber processing plants;

   c. portions of facilities for the extraction of minerals, aggregate, petroleum, natural gas, earth products or geothermal resources (as defined by subsection (4) of ORS 522.010) which require access to water during the

extraction procedure;

d. portions of facilities for the refining or processing of minerals, aggregate, earth products or geothermal resources (as defined by subsection (4) of ORS 522.010) which require access to a water body for intake or release of water during the refining or processing procedure;

e. portions of facilities for manufacturing, assembly, fabrication, maintenance or repair of marine craft or marine equipment which require access to water body as part of the manufacture, assembly or fabricating process, due to the size of the craft or equipment which is being constructed.

6. Water-dependent commercial facilities include, but are not limited to, commercial marinas and moorages (including seaplane moorages0 and ancillary facilities such as marine craft or equipment repair facilities or fueling stations.

7. Other uses not listed in 6 and 7 above may be determined to be water-dependent if the use can only be carried out on, in or adjacent to water, and the location or access is needed for:

a. water-borne transportation;

b. recreation; or

c. a source of water (such as energy production, cooling of industrial equipment or wastewater, or other industrial processes).

8. Industrial uses shall be identified as water-related industrial uses on a case-by-case basis, with consideration given to the public loss of quality in goods or services which would result if the use were not offered adjacent to water. Water-related industrial uses could include:

a. fish or shellfish processing plants;

b. warehousing and/or other storage areas for marine equipment or water-borne commerce.

9. Commercial uses shall be identified as water-related commercial uses on a case-by-case basis, with consideration given to the public loss of quality in goods or services which would result if the use were not offered adjacent to water. Water-related commercial uses could include:

a. fish or shellfish or wholesale outlets;

b. marine craft or marine equipment sales establishments;

c. sport fish cleaning, smoking or canning establishments;

d. charter fishing offices;

e. ice, bait, tackle, nautical charts, gasoline, or other products incidental to, or used in conjunction with, a water-dependent use;

f. restaurants which provide a water-front view.

10. Other uses not listed in 7 and 8 above may be determined to be water-related if the use:

    a. provides goods and/or services that are directly associated with water-dependent uses (supplying materials to, or using products of, water-dependent uses); and

    b. if not located near the water, would experience a public loss of quality in the goods and services offered. Evaluation of public loss of quality shall involve a [subjective] consideration of economic, social and environmental consequences of the use.

11. Multipurpose and cooperative use of piers, wharves, parking areas or handling and storage facilities shall be provided for, whenever practicable.

12. Water-related and non-dependent, non-related industrial and commercial uses in Estuary Development zones shall be limited to those uses which:

    a. do not require the use of fill; and

    b. do not preclude the provision or maintenance of navigation and other needed public, commercial and industrial water-dependent uses.

13. Development or expansion of industrial or commercial uses within Water-Dependent Development (WDD) or other shoreland zones shall be subject to Shoreland Development policy requirements.

6.8 Land Transportation Facility

1. Maintenance and repair of existing roads, railroads, airports, bridge crossing support structures and bridge approach ramps, and establishment of low water bridges shall be allowed in all estuary zones and in Water-Dependent Development (WDD) zones and other shoreland areas. Replacement of bridge crossing support structure and bridge approach ramps may be considered a form of maintenance if the resulting bridge support structure or ramp is the minimum size necessary to accommodate the same number of traffic lanes as exist on that portion of the highway.

2. In selecting sites for development of new land transportation facilities, priorities are, from highest to lowest;

    a. upland sites;

    b. shoreland sites;

    c. Estuary Development (ED) zones;

    d. Estuary Conservation 2 (EC2) zones;

    e. Estuary Conservation 1 (EC1) zones.

    Tillamook County, however, realizes that this priority list is subject to modification by economic considerations, or by the need for services in a particular area.

3. New land transportation facilities within estuarine waters, intertidal marshes or tidal wetlands shall be permitted only if:

   a. no feasible alternative upland route exists; and

   b. a need (i.e. a substantial public benefit) is demonstrated and the use or alteration does not unreasonably interfere with public trust rights; and

   c. *adverse impacts are avoided or minimized.*

4. In order to preserve significant fish and wildlife habitats and maintain biological productivity, new land transportation facilities in Estuary Natural (EN) zones shall be limited to low-water bridges, bridge crossings and bridge crossing support structures. Bridge crossing support structures are allowed only if consistent with the resource capabilities of the area and the purposes of the management unit.

5. In Estuary Conservation 1 (EC1) and Estuary Conservation 2 (EC2) zones, new land transportation facilities shall be limited to bridge crossing support structures and temporary low-water bridges.

6. New land transportation facilities in Estuary Development (ED) zones shall be permitted only if consistent with the purposes of the management area and the maintenance of navigation and other needed public commercial and industrial water-dependent uses.

7. New land transportation facilities in Water-Dependent Development (WDD) shoreland zones shall be permitted if the proposed facility does not preclude or conflict with existing or reasonable potential water-dependent use on the site or in the vicinity.

8. New land transportation facilities shall be sited and designed to be consistent with the protection of the natural values of identified major marshes, significant wildlife habitat, coastal headlands, and exceptional aesthetic resources within the shorelands planning boundary identified in the Tillamook County Comprehensive Plan.

9. When bridge crossing support structures are needed, the amount of estuarine surface area occupied shall be the minimum amount possible. Bridges, piers, and trestles shall be designed so as not to impair tidal flow in respect to volume, velocity or direction.

10. Proposals for new land transportation facilities shall be reviewed locally to determine land and water use compatibility and resource capabilities.

11. In the interest of air safety and wildlife conservation, airports and associated facilities shall be located away from migrating bird flyways and heavily used habitat for resident waterfowl or other birds.

12. Dredged material stockpile sites shall be used as a source for fill material for land transportation facilities whenever practical.

13. Roadway construction shall be scheduled to avoid critical periods of breeding, feeding and migration of coastal species.

14. New land transportation facilities should be designed and located to take advantage of natural topography so as to cause minimum disruption of the shoreline area.

15. Construction and maintenance of land transportation facilities should be timed and conducted so that mass soil wasting or excessive surface erosion does not occur. Tillamook County recommends increased coordination between the State and County Road Departments and state natural resource agencies in order to meet this objective.

6.9 Mining and Mineral Extraction

1. Location of valuable mineral, sand, aggregate, clay, natural gas and petroleum deposits within estuarine water, intertidal areas, tidal wetlands and shorelands shall be identified, and these sites protected from preemptive use until the resources are extracted.

2. Petroleum extraction and drilling operations shall not be allowed in estuarine waters, intertidal areas or tidal wetlands. Petroleum may, however, be extracted from beneath aquatic areas using equipment located on adjacent shorelands. Petroleum exploration not involving exploratory drilling shall be permitted within all estuary zones and within Water-Dependent Development (WDD) shoreland zones and other shoreland areas.

3. To ensure the preservation of significant fish and wildlife habitats and the maintenance of biological productivity within estuaries, mining and mineral extraction shall not be permitted within Estuary Natural (EN) zones. However, future decreases in the supply of mineral and aggregate resources may require the extraction of resources from areas which are currently designated as Estuary Natural (EN). In such cases, an exception to the Estuarine Resources Goal shall be taken and included as an amendment to the Tillamook County Comprehensive plan. Coordination with affected state and federal resources agencies shall occur during this amendment process.

4. Mining and mineral extraction in Estuary Conservation 2 (EC2) and Estuary Conservation 1 (EC1) zones shall be permitted only if consistent with the resource capabilities of the area and the long-term use of renewable resources, and if it does not cause a major alteration of the estuary.

5. Mining and mineral extraction in Estuary Development (ED) zones shall be permitted only if consistent with the maintenance of navigation and other needed public, commercial and industrial water-dependent uses.

6. Mining and mineral extraction projects shall be sited and operated to be consistent with the protection of the natural values of identified major marshes, significant wildlife habitat, coastal headlands, and exceptional aesthetic resources within the shorelands planning boundary identified in the Tillamook County Comprehensive Plan.

7. Mining and mineral extraction in Water-Dependent Development (WDD) Shoreland zones shall be permitted only if the mining and mineral extraction project will not preclude or conflict with existing or reasonable potential water-dependent uses on the site or in the vicinity.

8. Tillamook County encourages the Department of State Lands to lower the charge for

minerals sand aggregate to be in line with local market prices.

6.10 Mitigation

1. Dredging or fill within intertidal areas or tidal wetlands shall be mitigated by the creation, restoration or enhancement of similar estuarine areas.

2. Mitigation projects shall comply with the requirements of the State Fill and Removal Law (ORS 541.605-541.665).

3. An exception to the Agricultural Lands Goal shall be taken and included as an amendment to the Tillamook County Comprehensive Plan before productive agricultural land is lost due to breaching or removal of functional dikes for purposes of mitigation. The Tillamook County Agricultural Criteria shall be used to evaluate the value or productivity of agricultural land. Significant wildlife habitat should not be lost through breaching or removal of dikes.

4. Mitigation sites which generally correspond to the types and quantity of intertidal area proposed for dredging or filling shall be identified in the mitigation plan element of the Tillamook County Comprehensive Plan. Priority sites shall be preserved for future mitigation use.

6.11 Navigational Structures and Navigational Aids

1. Navigational aids (beacons, buoys, channel markers) and maintenance and repair of existing navigational structures (breakwaters, jetties, groins and pile dikes) shall be permitted within all estuary zones. Expansion or new construction of navigational structures is only permitted in Estuary Conservation 1 (EC1), Estuary Conservation 2 (EC2) and Estuary Development (ED) zoned areas.

2. Navigational structures shall be permitted only if:

   a. required for navigation or in conjunction with a water-dependent recreational, commercial or industrial use for which there is a need (i.e. substantial public benefit) demonstrated and the use or alteration does not unreasonably interfere with public trust rights; and

   b. the need cannot be met by non-structural solutions; and

   c. adverse impacts on water currents and erosion and accretion patterns are avoided or minimized to be consistent with the purposes of the area; and

   d. in Estuary Conservation 2 (EC2) and Estuary Conservation 1 (EC1) zones, navigational structures shall be limited to floating breakwaters, which shall be permitted only if consistent with the resource capabilities of the area and the long-term use of renewable resources, and if they do not cause a major alteration of the estuary.

6.12 Restoration and Enhancement

1. Habitat types, resources or amenities which are in shortest supply as compared with historical abundance shall be identified as part of the restoration plan element of the Tillamook County Comprehensive Plan, and shall be priority sites for restoration projects.

2. Restoration and enhancement activities may serve as part of a mitigation project, subject to the requirements of the State Fill and Removal Law (ORS 541.605-541.665) and other applicable state and federal laws.

3. Estuarine Restoration means to revitalize or reestablish functional characteristics and processes of the estuary diminished or lost by past alterations, activities or catastrophic events. A restored area must be a shallow subtidal or an intertidal or tidal marsh area after alteration work is performed and may not have been a functioning part of the estuarine system where alteration work begins. The following types of restoration work are recognized but not limited to:

   (1) Diked lands restoration- Priority shall be given to restoration of agriculturally marginal or unused, low-lying diked areas to adjacent estuarine wetland or tideland. This may be accomplished by either active means such as contouring to provide the potential for diverse habitats (mudflat and marsh) or removal of dikes, or by passive means such as breaching a dike to allow tidal flushing. An exception to the Agricultural Lands Goal shall be taken and included as an amendment to the Tillamook County Comprehensive Plan before productive agricultural land is lost due to breaching or removal of functional dikes for purposes of restoration. The Tillamook County Agricultural Criteria shall be used to evaluate the value or productivity of agricultural land. Significant wildlife habitat should not be lost through breaching or removal of dikes. Incentives should be provided to landowners to encourage the restoration of unused diked tidal marsh areas with minimal agricultural value to aquatic production.

4. Passive restoration is the use of natural processes, sequences and timing which occur after the removal or reduction of adverse stresses without other specific positive remedial action. Passive restoration shall be permitted in all estuary zones.

5. In Estuary Development (ED) zones, only those passive restoration projects shall be permitted [which are consistent with the resource capabilities of the area and] which do not:

   a. interfere with the provision or maintenance of navigation and other needed public, commercial and industrial water-dependent uses; or

   b. preempt the use of adjacent shorelands especially suited for water-dependent development.

6. Estuarine enhancement is an action which results in the long term improvement of an existing estuarine functional characteristics and processes that are not the result of a creation or restoration action. Estuarine enhancement includes but is not limited to:

   (1) Removal of old pilings and structures- Priority shall be given to the removal of old pilings, buildings or navigational structures which are a hazard to navigation, pose a danger to life and property, and are structurally unsound or serve no demonstrated public use.

   (2) Restoration of shoal areas- Priority shall be given to estuarine channel areas where excessive shoaling has resulted in loss or decrease in navigability.

(3) Restoration of eroded areas- Priority shall be given to areas where erosion constitutes a hazard.

(4) Restoration of river channels and mouths for purposes of flood control- Priority shall be given to river channels and mouths where shoaling or concentration of debris have occurred. Proposed restoration projects for the purposes of flood control must demonstrate that flooding conditions will be reduced to those which existed at the time of the physical dimensions (e.g. depth and width) to which the channel is being restored.

(5) Salmon habitat/spawning restoration projects- Priority shall be given to projects involving the regravelling of streams where excessive siltation has occurred, and/or removal of bypass constructions, such as old tidegates, dams or waterfalls.

7. Active restoration and estuarine enhancement as defined above shall be permitted in all estuary zones, subject to the following requirements.

(a) In Estuary Natural (EN), active restoration shall be limited to restoration of fish and wildlife habitat or water quality. Active restoration and estuarine enhancement shall be consistent with the resource capabilities of the area and the purposes of the management unit.

(b) In Estuary Conservation Zones, a resource capability determination shall be required for active restoration for purposes other than restoration of fish and wildlife habitat or water quality.

(c) In Estuary Development zones, active restoration shall not interfere with the provision or maintenance of navigation and other needed public, commercial and industrial water-dependent uses or the use of adjacent shorelands especially suited for water-dependent development.

(d) In Water-Dependent Development (WDD) Shoreland Zones, active restoration shall not preclude or conflict with existing or reasonable potential water-dependent uses on the site or in the vicinity.

(e) In major marshes, significant wildlife habitat, coastal headlands and exceptional aesthetic resources within coastal shorelands, active restoration shall be consistent with the protection of shoreland natural values.

6.13 Shallow Draft Port Facilities and Marinas

1. Maintenance and repair of existing port facilities and marinas shall be permitted within all estuary zones. Expansion and new construction of port facilities and marinas is only allowed in Estuary Development (ED) and Estuary Conservation 2 (EC2) zoned areas.

2. Development or expansion in EC2 zones shall be permitted only if:

a. consistent with the resource capabilities of the area and long term-use of renewable resources; and

b. no major alterations of the estuary would result.

3. In Shallow Draft Development estuaries (Tillamook and Nehalem Estuary), the depth of those portions of the main channel which are maintained by dredging shall not exceed 22 feet in depth.

4. The following shall be considered in the designation of areas for the purpose of port facility or marina development or expansion:

   a. proximity to navigation channels;

   b. degree of existing estuarine or shoreland alteration;

   c. resource capabilities;

   d. relative biological significance;

   e. proximity to land transportation facilities;

   f. availability of water and sewer service and power supplies;

   g. value of the area to the community as an economic resource;

   h. proximity to urban or urbanizable areas;

   i. need for, and availability of, developable shorelands;

   j. proximity to industrial areas or potential upland industrial sites;

   k. initial and long-term dredging and dredged material disposal requirements, and availability of dredged material disposal sites.

5. Safe navigation access to existing and future port facilities shall be maintained.

6. To encourage the most efficient use of waterfront and water surface area:

   a. public or private community marina facilities are encouraged over the proliferation of individual, single--purpose piers and mooring facilities;

   b. concentrated marinas are preferred over small, widely distributed marinas;

   c. dryland, rather than in-water storage of boats is preferred when feasible.

7. POLICIES FOR ESTUARY ACTIVITY

7.1 Dredged Material Disposal Policies

1. Dredged material disposal (DMD) plans shall be developed for Tillamook and Nehalem Bay, and shall be adopted as part of the Tillamook County Comprehensive Land Use Plan. Coordination with affected state and federal resource agencies shall occur during the development, implementation and future amendment of DMD plans.

2. Tillamook County shall develop dredged material disposal (DMD) plans for Nestucca and Netarts Estuary prior to approval of new and maintenance dredging projects if the total of the initial and 5-year dredged material disposal requirements exceeds 500 cubic yards.

3. Tillamook County dredged material disposal plans shall evaluate dredging needs over a five-year period, and shall establish priorities on areas for dredged material disposal based on the following economic, engineering and environmental considerations:

   a. engineering feasibility;

   b. probable method of dredging;

   c. distance from dredging project;

   d. elevation;

   e. cost of site acquisition, preparation, and containment of dredged materials;

   f. size of site;

   g. cost of, ability, or necessity to revegetate or develop on top of the dredged material;

   h. impacts on biological productivity, aquatic communities and habitats, water quality, wetlands and floodplain;

   i. ownership (public or private);

   j. conformity of the final use, after dredged material disposal, to the Tillamook County Comprehensive Plan;

   k. habitat, scenic, recreational, archaeological or historic values of the site.

4. Whenever practicable, ocean disposal in an approved ocean disposal site shall be the preferred method of disposal of dredged materials. The designation of additional ocean disposal sites shall occur only after a formal site review and impact analysis by all federal and state agencies with regulatory authority, and is subject to final approval by the U.S. Army Corps of Engineers and the Environmental Protection Agency. Copies of site review and impact analysis shall be made available to local governments.

5. When engineering or economic considerations preclude the use of approved ocean disposal sites for dredged material disposal, sites identified in the Tillamook and Nehalem Bay DMD plan elements of the Tillamook County Comprehensive Plan as "Presently Acceptable" shall be used for dredged material disposal.

6. Flow-lane disposal of dredged material shall be limited to ED zones and monitored to assure that estuarine sedimentation is consistent with the resource capabilities and purposes of the affected natural and conservation management units.

7. Sites identified in the future to be included in the Tillamook and Nehalem Bay DMD plan element of the Tillamook County Comprehensive Plan shall be used for disposal of dredged material only after an amendment to the Tillamook County Comprehensive Plan and zoning map. If rezoning of an area to provide for dredged material disposal involves an exception to the Statewide Land Use planning Goals, the exception shall be included as part of the amendment:

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a. why these other uses should be provided for;

b. what alternative locations within the area could be used for the proposed use;

c. what are the long-term environmental, economic, social and energy consequences to the locality, the region or the state from not applying the goal or permitting the alternative use;

d. a finding that the proposed uses will be compatible with other adjacent uses.

Coordination with affected state and federal resource agencies shall occur during this amendment process. State and federal permits must be obtained prior to disposal of dredged material.

8. As needs arise, additional disposal sites shall be approved for dredged material disposal. Designation of additional dredged material disposal sites shall be coordinated with state and federal resource agencies with regulatory authority over dredged material disposal. An amendment shall be taken to the Tillamook County Comprehensive Plan and zoning map if rezoning of an area is necessary in order to provide for dredged material disposal. If rezoning of an area to provide for dredged material disposal involves an exception to the Statewide Land Use Planning Goals, the exception shall be included as part of the amendment.

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9. Disposal of dredged material on ocean beaches for purposes of beach nourishment should be utilized, whenever practicable. Beach areas suitable for nourishment shall be identified in the DMD plan. The use of dredged material for beach nourishment shall be coordinated with the Oregon Parks and Recreation Department or the Department of State Lands, if the practice could impact their lands, and with the Oregon Department of Fish and Wildlife and the National Marine Fisheries Service if the practice could impact subtidal or intertidal clam beds, eelgrass beds or fish spawning substrates.

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10. Disposal of dredged material within state parks shall be coordinated with the Oregon Parks and Recreation Department to ensure consistency with the State Park Master Plan, and with the maintenance of significant wildlife habitat and other natural and aesthetic resources.

11. Tillamook County shall identify a sufficient number of dredged material disposal sites to accommodate dredged material disposal needs identified in the Tillamook and Nehalem Bay DMD plans. Sites identified as priority sites shall be preserved for future dredged material disposal use. Tillamook County shall cooperate with local ports and affected local jurisdictions to preserve these sites for future disposal use.

12. Tillamook County, in conjunction with local ports, affected local jurisdictions and state and federal resource agencies, shall review the dredged material disposal plans for Tillamook and Nehalem Bay at no more than five year intervals to reexamine dredging needs, site availability, new permit requirements and degree of plan implementation.

13. Use of dredged material from navigational or other dredging actions as fill for approved fill projects shall be encouraged. Prior determination shall be made to ensure that the structural characteristics of the material are suitable for this use.

14. Whenever practicable, stockpile sites of dredged material suitable for use as fill shall be established and the dredged material sold. Particular emphasis shall be given to establishing stockpile sites in areas where acceptable disposal sites are presently, or likely to be limited.

15. Dredged material disposal is subject to the requirements of the Clean Water Act of 1977 (P.L. 95-217, the State Fill or Removal Law and other state and federal laws which regulate the disposal of dredged materials).

7.2 Dredging in Estuarine Waters, Intertidal Areas and Tidal Wetlands.

1. Dredging in estuarine waters, intertidal areas and tidal wetlands shall be allowed only if required for:

   a. navigation, port facilities, marinas or other water-dependent uses that require an estuarine location; or

   b. an approved active restoration, estuarine enhancement or mitigation project deemed necessary to fulfill a public need and for the future environmental well-being of the estuary (subject to restoration and mitigation policies and standards); or

   c. on-site maintenance of existing drainage tiles, drainage ditches or tidegates; or

   d. mining and mineral extraction (subject to mining and mineral extraction policies and standards); or

   e. installation or maintenance of bridge crossing support structures, electrical transmission line support structures or water, sewer, gas, or communication lines; or

   f. incidental dredging for harvest of benthic species or removal of in-water structures such as stakes or racks; or

   g. temporary alterations.

2. Dredging in estuarine waters, intertidal areas or tidal wetlands shall be allowed only if:

   a. if required for navigation or other water-dependent uses that require an estuarine location or are specifically allowed by the management unit or zone; and

   b. a need (i.e. a substantial public benefit) is demonstrated and the use or alteration does not unreasonably interfere with public trust rights; and

   c. no feasible alternative upland locations exist; and

d. adverse impacts are avoided or minimized to be consistent with the purposes of the area. Dredging shall be the minimum amount possible to accomplish the proposed use.

3. Dredging in intertidal areas or tidal wetlands shall be subject to the requirements of the Mitigation policies and the State Fill and Removal Law (ORS 541.605-541.695).

4. Proposals for new dredging projects in Tillamook and Nehalem Estuary shall be reviewed against the long-range dredged material disposal (DMD) plan for these estuaries to ensure that sufficient DMD sites are available to meet initial and maintenance dredged material disposal needs.

5. Proposals for new dredging projects in the Nestucca or Netarts Estuary shall provide a sufficient number of DMD sites to meet initial and maintenance dredged material disposal needs. A dredged material disposal plan consistent with Dredged Material Disposal policies shall be developed prior to approval of new dredging projects if the total of the initial and 5-year maintenance dredged material disposal requirements exceeds 500 c.y.

6. Dredging in the Estuary Natural (EN) zones shall be permitted only for:

   a. an approved restoration or estuarine enhancement project (subject to Restoration and Estuarine Enhancement standards); or

   b. on-site maintenance of existing drainage tiles, drainage ditches, tidegates, bridge crossing support structures or electrical transmission line support structures;

   c. installation or maintenance of water intake facilities, sewer outfalls and, gas or communications lines;

   d. installation or maintenance of an electrical transmission line or line support structure;

   e. bridge crossing support structures;

   f. temporary alterations;

   g. public boat ramps (excluding dredging for navigational access);

   h. incidental dredging for harvest of benthic species or removal of in-water structures such as stakes or racks.

7. Dredging in the Estuary Conservation Aquaculture (ECA) zone shall be permitted only for an approved restoration, estuarine enhancement project (subject to restoration and estuarine enhancement policies and standards), and for incidental dredging for harvest of benthic species or removal of in-water structures such as stakes or racks.

8. Dredging in Estuary Conservation 1 (EC1) zones shall be permitted only for:

   a. item 7 a - h above;

   b. mining and mineral extraction;

c. minor navigational improvements;

d. boat ramps;

e. water-dependent portions of aquaculture facilities or operations.

9. Dredging in Estuary Conservation 2 (EC2) zones shall be permitted only for:

a. items 8 a - e above; or

b. high intensity water-dependent recreational facilities;

c. maintenance dredging of existing facilities.

10. Dredging in Estuary Conservation 2 (EC2), Estuary Conservation 1 (EC1), Estuary Conservation Aquaculture (ECA) or Estuary Natural (EN) zones shall be permitted only if consistent with the resource capabilities of the area and purposes of the management unit. This determination shall be made by the Department of State Lands and the U.S. Army Corps of Engineers during review of dredging permit applications.

11. Dredging within estuarine waters, intertidal areas or tidal wetlands is subject to the requirements of the State Fill and Removal Law (ORS 541.605-541.665), the Rivers and Harbors Act of 1899 and other applicable state and federal laws.

7.3 Fill in Estuarine Waters, Intertidal Areas and Tidal Wetlands

1. Fill for the purpose of on-site maintenance and repair of existing man-made structures or facilities or the construction of temporary low-water bridges shall be permitted within all estuary zones.

2. New fill within estuarine waters, intertidal areas or tidal wetlands shall be permitted only if:

a. required for navigation or water-dependent uses or other uses for which an estuarine location is required; and

b. a need (i.e. a substantial public benefit) is demonstrated and the use or alteration does not unreasonably interfere with public trust rights;

c. no feasible alternative upland locations exist for th portion of the use requiring fill; and

d. no practicable alternative design or construction methods exist which would eliminate the use of fill. (Construction of facilities or structures on piling is preferred over construction on fill); and

e. potential adverse impacts have been identified and avoided or minimized to be consistent with the purposes of the area.

3. The placement of fill shall be consistent with the protection of property, estuarine habitat and diversity, aesthetics, water quality and recreational resources. Loss of estuarine surface area and volume shall be avoided or minimized and/or mitigated.

4. Fill within intertidal areas or tidal wetlands shall be subject to the requirements outlined in the mitigation policies and the State Fill and Removal Law (ORS 651.605-541.665).

5. New fill in the EN zone shall be allowed only for:

   a. an approved active restoration or estuarine enhancement project (subject to Restoration and Enhancement standards); or

   b. on-site maintenance of dikes or bridge crossing support structures; or

   c. temporary alterations; or

   d. installation of public boat ramps or bridge crossing support structures.

6. New fill in the EC1 zone shall be permitted only for:

   a. items a - d above; or

   b. flood control structures or structural shoreline stabilization (subject to Shoreline Stabilization standards) if:

      (1) required to protect a water-dependent use or an existing use, facility or structure; and

      (2) land use management practices and non-structural solutions are inadequate to protect the use.

   c. water-dependent portions of aquaculture facilities;

   d. temporary alterations;

   e. boat ramps.

7. New fill in the EC2 zone shall be permitted only for:

   a. items 5 a-e above; or

   b. minor navigational improvements; or

   c. water-dependent recreational facilities.

8. In EC2 and EC1 zones, only fills which do not constitute a major alteration to the estuary, and which are consistent with the resource capabilities of the area and the long-term use of renewable resources, shall be permitted. This determination shall be made by the Department of State Lands and the U.S. Army Corps of Engineers during review of fill permit applications.

9. New fill in the ED zones shall be permitted for:

   a. items 7 a-c above;

   b. navigational structures and navigational improvements; or

c. water-dependent uses that require an estuarine location; or

d. dredged material disposal, in conjunction with an approved fill project (fill standards shall apply); or

e. communication facility support structures.

10. In certain ED zones for which an exception has been taken in the Tillamook County Comprehensive Plan to the overall Goal 16 requirements for dredge and fill, fill shall also be allowed for non-water-dependent use and for which:

a. no feasible alternative upland [practicable non-aquatic] locations exist for the portion of the use requiring fill; and

b. a need (i.e. a substantial public benefit) is demonstrated and the use or alteration does not unreasonably interfere with public trust rights; and

c. no practicable alternative design or construction methods exist which would eliminate the use of fill; and

d. potential adverse impacts have been identified and avoided or minimized and/or mitigated.

7.4 Piling/Dolphin Installation

1. Replacement of existing pilings and dolphins shall be permitted within all estuary zones.

2. In Estuary Natural (EN) and Estuary Conservation Aquaculture (ECA) zones, new pilings shall be limited to:

a. individual unconnected pilings in conjunction with an approved aquaculture facility or a navigation aid;

b. temporary alterations;

c. active restoration and estuarine enhancement.

Aquaculture facilities and navigation structures and aids policies and standards shall apply.

3. Piling and dolphin installation in Estuary Conservation 2 (EC2) and Estuary Conservation 1 (EC1) zones shall be allowed only for navigation or a water-dependent use for which no practicable alternative locations exist, and shall be permitted only if consistent with the resource capabilities of the area and the long-term use of renewable resources, and if it does not cause a major alteration of the estuary.

4. Piling and dolphin installation in Estuary Development (ED) zones shall be permitted if:

a. required in conjunction with navigation or a water-dependent use for which no feasible alternative upland locations exist; or

b. required in conjunction with a water-related use or a non-dependent, non-related use, only if consistent with the maintenance of navigation and other needed public and industrial water-dependent uses.

5. Replacement of existing pilings and dolphins and installation of new pilings and dolphins shall be subject to the requirements of the Rivers and Harbors Act of 1899, and other applicable state and federal laws.

7.5 Shoreline Stabilization

1. Maintenance and repair of existing shoreline stabilization measures shall be permitted within all estuary zones, and within Water-Dependent Development (WDD) shoreland zones and other shoreland areas.

2. Within estuarine waters, intertidal areas, tidal wetlands and along WDD shoreland zones and other shoreland areas, general priorities for shoreline stabilization for erosion control are, from highest to lowest:

   a. proper maintenance of existing riparian vegetation;

   b. planting of riparian vegetation;

   c. vegetated riprap;

   d. non-vegetated riprap;

   e. groins, bulkheads and other structural methods.

3. Proper maintenance of existing riparian vegetation and planting of additional vegetation for purposes of shoreline stabilization shall be permitted within all estuary zones, and along WDD shoreland zones and other shoreland areas. Tillamook County supports the efforts of the Tillamook Soil and Water Conservation District to maintain and improve streamside habitat along the County's rivers and streams.

4. Structural shoreline stabilization methods within estuary zones, WDD shoreland zones or other shorelands areas shall be permitted only if:

   a. flooding or erosion is threatening a structure or an established use or there is a demonstrated need (i.e. a substantial public benefit) and the use or alteration does not unreasonably interfere with public trust rights; and

   b. land use management practices or non-structural solutions are inappropriate because of high erosion rates or the use of the site; and

   c. adverse impacts on water currents, erosion and accretion patterns and aquatic life and habitat are avoided or minimized.

5. In Estuary Natural (EN) and Estuary Conservation Aquaculture (ECA) zones, structural shoreline stabilization shall be limited to riprap, which shall be allowed only to protect:

   a. existing structures or facilities, which are in conformance with the requirements of this ordinance, or non-conforming structures or facilities; and

b. unique natural resources or sites with unique historical or archaeological values; and

c. established uses on private property.

6. In Estuary Conservation 1 (EC1) and Estuary Conservation 2 (EC2) zones, structural shoreline stabilization (riprap, groins or bulkheads) shall be permitted only if:

a. consistent with the long-term use of renewable resources; and

b. does not cause a major alteration of the estuary.

7. In Estuary Development (ED) zones, structural shoreline stabilization (riprap, groins or bulkheads) shall be permitted only if consistent with the maintenance of navigational and other needed public, commercial and industrial water-dependent uses.

8. Structural shoreline stabilization in WDD shoreland zones shall not preclude or conflict with existing or reasonable potential water-dependent uses on the site or in the vicinity.

8. IMPLEMENTATION POLICIES

1. Estuaries of Tillamook County shall be managed through implementation of the Tillamook County Comprehensive Plan by means of the Tillamook County Land Use Ordinance, which shall contain estuary development standards, estuary zone descriptions and zoning maps.

2. Tillamook County shall review state and federal permit applications for uses and activities within the estuaries for consistency with the Tillamook County Comprehensive Plan and Land Use Ordinance. Where applicable, procedures for review shall be developed as part of the Tillamook County Land Use Ordinance. The review of actions which would potentially alter the integrity of the estuarine ecosystem shall include an impact assessment and a demonstration that the public's need and gain warrants the modification or loss unless this is already part of the comprehensive plan.

3. Tillamook County shall coordinate with local, state and federal agencies and citizen advisory groups implementation of the Estuarine Resources element of the Tillamook County Comprehensive Plan. Tillamook County may convene an implementation conference as a means of coordination during the following:

a. preparation of post-acknowledgment amendments to the Comprehensive Plan, or Land Use Ordinance;

b. periodic updates of the Tillamook County Comprehensive Plan;

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a. . state and federal permit applications for uses and activities within estuaries;¶
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b. . A-95 project pre-application notification, by means of referral from and comment to the Clatsop-Tillamook Intergovernmental Council.¶

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c. review of recommendations and/or findings of fact for state or federal permit applications as a form for discussion or resolution of disputes over regulatory functions;

d. establishment of mitigation banks.

4. Tillamook County shall involve the following state and federal agencies in the review of regulated activities: Oregon Department of Fish and Wildlife, Oregon Department of State Lands, Oregon Department of Land Conservation and Development, Oregon Economic and Community Development Department, U.S. Fish and Wildlife Service, National Marine Fisheries Service, Environmental Protection Agency, U.S. Army Corps of Engineers.

5. Dredge and or filling shall be allowed only if:

   a. required for navigation or other water-dependent uses that require an estuarine location or is specifically allowed by the management unit or zone; and

   b. a need (i.e. a substantial public benefit) is demonstrated and the use or alteration does not unreasonably interfere with public trust rights; and

   c. no feasible alternative upland locations exist; and

   d. adverse impacts to aquatic life and habitat, recreation and aesthetic uses, water quality and other physical characteristics of the estuary are minimized.

6. Significant degradations or reductions of estuarine natural values include dredging, fill, in-water structures, riprap, log storage, application of pesticides and herbicides, flow-lane disposal of dredged material, water-intake or withdrawal and effluent discharge and other activities which will cause significant offsite impacts as determined by an impact assessment.

7. Dredging, fill piling/dolphin installation, navigational structures, shoreline stabilization and dredged material disposal associated with an estuarine use or uses shall be reviewed as a whole subject to the respective policies for these activities and uses.

APPENDIX A: FINDINGS TO JUSTIFY TILLAMOOK BAY ESTUARY CONSERVATION AQUACULTURE ZONING

The Land Conservation and Development Commission required Tillamook County to "amend the Tillamook estuary management unit designations and zoning maps to re-designate as ECA only those estuarine areas in existing aquaculture use, or to other estuarine areas suitable for aquaculture and which do not qualify as natural management units". (LCDC 81-CONT-173 Goal 16 IOTC No. 8)

The attached map shows the dates of last use of each oyster plat. Of the 50 total plats, 36 or 72% of them are currently in use. These are shown by the diagonal line pattern. Of the remaining 14 plats, 11 or 22% of the total have been used within the past 5 to 10 years. Large populations of mud and ghost shrimps have made these areas unusable at present. These plats are, however, in the center of the platted area and are surrounded by plats in current use. Only 3 plats, 6% have been last used more than 10 years ago.

In sum, the great majority of plats are in present use or have been used in the recent past. These constitute 94% of the plats. The remaining three plats which have been in historical use but not in recent use are a very small part of the total area and are surrounded or otherwise well connected with the remainder of the platted area.