



United States  
Department of  
Agriculture

**Forest  
Service**

July 2008



# **Environmental Assessment**

## **French Bug Timber Sale**

**Detroit Ranger District  
Willamette National Forest  
Marion County, Oregon**

**Legal Location: T9S, R5E, Sections 20, 21, 23, 24, 25, 26, 27, 28, 29, 35, 36; T9S R6E Sections 16, 20, 21, 22, 28, 29, 30, 31, 33; T10S R5E Section 1; and T10S R6E Section 6 of the Willamette Meridian, Marion County, Oregon.**

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# 1. Purpose and Need for Action

## 1.1 Document Structure

The Forest Service has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Environmental Assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into five parts:

**Purpose and Need:** This section describes the project area, the purpose and need for the project, and the agency's proposal for achieving that purpose and need. This section also outlines applicable management direction, details how the Forest Service informed the public of the proposal, and the list of issues identified from the public.

**Comparison of Alternatives, including the Proposed Action:** This section provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes possible mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.

**Environmental Consequences:** This section describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by resource area. Within each section, the affected environment is described first, followed by the effects of the no action alternative that provides a baseline for evaluation and comparison of the other alternatives that follow.

**Agencies and Persons Consulted:** This section provides a list of preparers and agencies consulted during the development of the environmental assessment.

**Appendices:** The appendices provide more detailed information to support the analyses presented in the environmental assessment.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record at the Detroit Ranger District Office in Detroit, Oregon.

## 1.2 Location

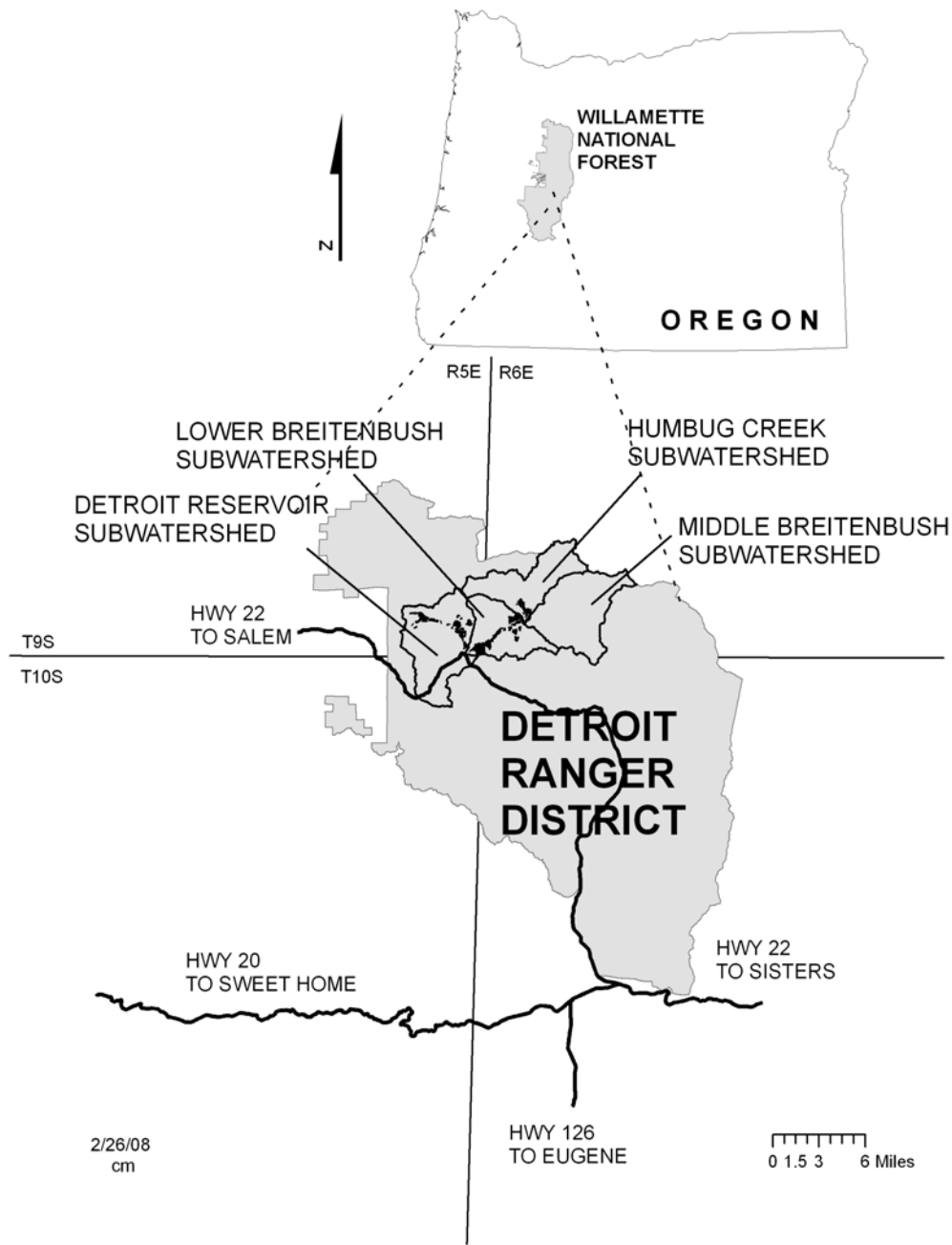
The project area consists of lands on both sides of French Creek road, lands south of the Breitenbush road and areas near the confluence of Humbug Creek and the Breitenbush River. The project area covers 17,350 acres and is defined by nearby ridge lines that surround the project. Elevations in the project area range from 1600 to 5000 feet. (Unit elevations range from 2000 feet to 3500 feet.)

The project area is in the Detroit Ranger District, Willamette National Forest near the town of Detroit, Oregon. The area lies within two fifth-field watersheds: the Detroit Reservoir and the



North Fork Breitenbush River (see figure 1-1). The proposed harvest units consist of lands on both sides of French Creek road, lands south of Breitenbush Road, and areas near the confluence of Humbug Creek and Breitenbush River (see figure 1-3). The proposed harvest units are located in T9S, R5E, Sections 20, 21, 23, 24, 25, 26, 27, 28, 29, 35, 36; T9S R6E Sections 16, 20, 21, 22, 28, 29, 30, 31, 33; T10S R5E Section 1; and T10S R6E Section 6 of the Willamette Meridian, Marion County, Oregon.

Figure 1-1 Vicinity Map



## 1.3 Purpose and Need for Action

The purpose of the proposed action is to 1) help contribute timber products to meet Willamette National Forest long-term sustainable harvest levels and 2) use silvicultural methods to reduce tree density in order to enhance tree growth and promote structural and species diversity in stem exclusion stands.

### **Contribute timber products to meet Willamette National Forest long term sustainable harvest levels.**

The 1990 Willamette National Forest Land and Resource Management Plan (Forest Plan) and the amendment by the 1994 Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl (Northwest Forest Plan), provide broad management direction for this area. Section 1.6 provides further information on these documents.

The project area is located mostly in general forest and scenic land management allocations of the Willamette National Forest Plan overlaid by matrix and riparian reserves of the Northwest Forest Plan. There is a need in the Forest Plan allocations to manage to provide multiple-use benefits which includes an expected output of timber products. Timber would be provided at the optimum level to meet the long term sustained-yield capacity based on the growth potential of the land which is compatible with multiple use objectives (LRMP IV-227; LRMP standard and guidelines FW-176, FW-177).

The Northwest Forest Plan recognizes that “the need for forest products from forest ecosystems is the need for a sustainable supply of timber and other forest products that will help maintain the stability of local and regional economies, and contribute valuable resources to the national economy, on a predictable and long-term basis” (Northwest Forest Plan, p. 26).

### **Use silvicultural methods to reduce tree density in order to enhance tree growth and promote structural and species diversity in stem exclusion stands.**

The 34-76 year old managed stands proposed for treatment (both in the riparian reserves and upland areas) are densely stocked and dominated by Douglas-fir trees of the same age class. Canopies in these stands are generally closed, annual growth is beginning to slow as competition increases, and crowns are receding. Most stands lack natural canopy gaps and associated understory diversity. Previous clearcutting, along with the exclusion of fire, has created young forests in this planning area that lack the structural diversity otherwise present in stands of a moderate severity fire regime. Thinning and creating small openings (gaps) would (1) increase the amount of light and nutrients reaching the remaining trees and increase their growth rates and (2) increase the amount of light and nutrient that reach the forest floor allowing understory development.

## 1.4 Proposed Action

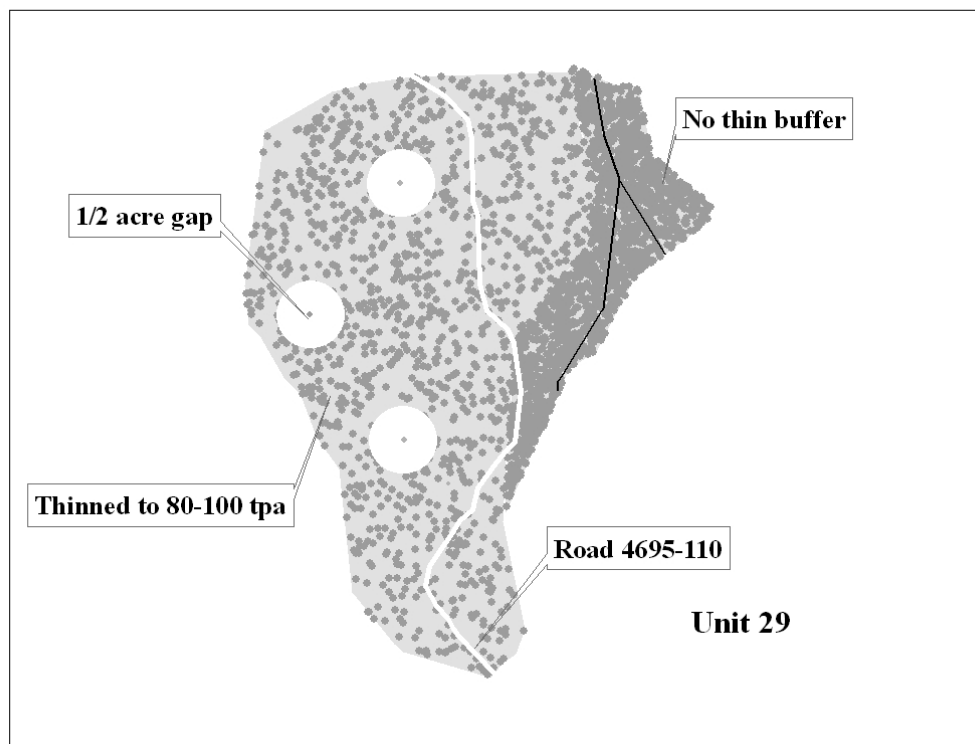
The proposed action (Alternative 2) was designed to meet the purpose and need of contributing timber products and reducing tree density to enhance tree growth and promote structural and species diversity in stem exclusion stands. The Detroit Ranger District proposes to commercially thin and/or create small openings (1/2 acre in size) on 1255 of 2200 acres of young second

growth managed forest stands. This proposed action would yield about 15 million board feet (15 MMBF) of wood products.

**Commercial Harvest** – Commercial thinning and/or ½ acre gaps are proposed within fifty-two managed stands using a combination of skyline, helicopter and ground-based logging systems. Emphasis is placed upon the creation of an uneven structure across the landscape using no-thin areas, canopy gaps, and different thinning intensities to diversify homogenous stands. No treatment will occur on approximately 945 acres of the original stand boundaries due to other resource considerations. This combination of treatment and no treatment will result in skips and gaps within stands and promote variable density at the stand scale (see figure 1-2). Favoring hardwoods and minor conifers in the thinnings will also promote variable density. A mixture of three different thinning intensities<sup>1</sup> and gaps is proposed across the planning area to provide diversity at the broader, landscape scale.

See section 2.2.2 for further details.

Figure 1-2. Unit 29 Depiction of thinning



The following activities are associated with this project and would most likely be implemented in fiscal years 2010-2013:

**Road Maintenance** – The proposed action would utilize, but not expand, 36 miles of the existing forest road system. Work required on the road system would be limited to reconstruction or maintenance. Maintenance and reconstruction would include cutting hardwood trees along roads, felling hazard trees, clearing and grubbing, surface blading, replacing drainage

<sup>1</sup> Three thinning intensities are proposed: 50-70 trees per acre; 80-100 trees per acre, or 110 trees per acre.

structures, reshaping ditches and placement of aggregate surfacing. Not all roads would need reconstruction or maintenance. Treatments would be applied as necessary to facilitate timber hauling.

**Temporary Roads** – This alternative would utilize about .48 miles of past logging spur road locations from the initial logging entry. In addition, about .38 miles of new temporary logging spurs would be created in this project for a total of .about .86 miles of temporary roads.

Temporary logging spurs are dirt roads which may need grading, clearing, rock placement or other activities in order to facilitate timber haul. These roads are not part of the official road system—use on these roads is authorized only by permit or contract to meet a specific one time use (e.g. access to a timber sale unit). These roads will be decommissioned, hydrologically stabilized, and returned to as near a natural state as possible after sale activities are complete.

**Fuel Treatment** – Fuel treatments that would occur as part of the proposed action for French Bug Timber Sale include 650 acres of the following: grapple piling and burning in the units, roadside grapple piling, burning landings and underburning. One acre of gaps would be underburned.

**Visual Resource Management** – Special visual resource considerations were incorporated into the proposed commercial thinning treatments in stands near or along the Breitenbush Road which is part of the West Cascades National Scenic Byway. More emphasis was given to maintaining and enhancing within stand variability and softening the transitioning between treated and no-treated areas by prescribing a variety of treatments including different thinning intensities within a unit, lighter thinnings, leaving more no-treated areas, and modifying gap shapes.

### **Riparian Management**

**Best Management Practices (BMPs):** BMPs were used in all aspects of this sale to reduce impacts to water quality. Activities which were evaluated and designed to align with best management practices include unit design, stream course protection, landing locations, erosion control, stream crossing design, prescribed fire activities, slope and soil moisture limitations for tractor operations. A full description of BMPs can be found in the General Water Quality Best Management Practices Handbook (1988).

**Riparian Reserves:** For this project, riparian reserves are set at 172' for non-fish bearing streams and 344' for fish bearing streams. This means that any activities within these reserves must benefit riparian-dependent species.

To help maintain appropriate water temperature, a no cut buffer would be placed on the primary shade zone (approximately 50'-60') for perennial streams. Within the secondary shade zone (approximately 172' from perennial streams), an average canopy cover of no less than 50% must be maintained across the stand being treated.

To protect fish, there is a 100 foot no-cut buffer for all streams (Class I-IV) adjacent to listed fish habitat (LFH). For streams greater than 100 feet but less than one mile from LFH, there is a 50 foot no cut buffer for perennial and intermittent streams. For streams greater than one mile from LFH, there is a 50' no cut buffer for perennial streams and a 30' foot buffer for intermittent streams.

**Noxious Weed Control:** This project includes a number of noxious weed mitigations including the eradication of high risk weed populations along roads and the containment of existing weed infestations inside harvest units.

**Other Activities** – For this timber sale, there are a number of similar and connected actions that will be completed as funding allows. This includes tree planting in canopy gaps, underburning gaps, precommercial thinning in young managed stands, and the restoration/conversion of a landing in Unit 31 near the Humbug Flats Campground into a small parking area.

## 1.5 Decision Framework

The Responsible Official for this proposal is the District Ranger of the Detroit Ranger District on the Willamette National Forest. Thirty days of public comment will be taken on this EA. Based on the response to this EA and the analysis disclosed in the EA, the Responsible Official will make a decision and document it in a Decision Notice. The Responsible Official can decide to select the proposed action, an action alternative that has been considered in detail, modify an action alternative, or select the no action alternative. The Responsible Official may also identify what mitigating measures apply.

## 1.6 Tiering and Incorporating by Reference

This Environmental Assessment incorporates by reference the Breitenbush (USDA, 1996) and Detroit Tributaries Watershed Analyses (USDA, 1997); the Willamette National Forest Road Analysis Report (USDA, 2004); the Willamette National Forest Land and Resource Management Plan and Record of Decision (USDA, 1990); and the Northwest Forest Plan (USDA and USDI, 1994a).

The Watershed Analyses provide the responsible official with comprehensive information to aid land management decisions. A watershed analysis provides historic and existing conditions of the important physical, biological, and social components of the watershed. The study analyzes activities and processes and recommends management activities based upon landscape and ecological objectives.

The Willamette National Forest Road Analysis Report provides recommendations for key roads to be maintained open for traffic and for non-key roads to be considered for closure. The analysis provides information needed to manage a road system that is safe and responsive to public desires, affordable and efficient, has minimal adverse effects on ecological functions and is balanced with available funding.

This EA is tiered to the Final Environmental Impact Statement (FEIS) for the Land and Resource Management Plan (Forest Plan), Willamette National Forest (USDA, 1990) and the FEIS on the Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl (Northwest Forest Plan) (USDA, USDI 1994) and the Environmental Assessments for subsequent Forest Plan amendments. The Willamette National Forest Plan as amended by the Record of Decision for the Northwest Forest Plan is incorporated by reference.

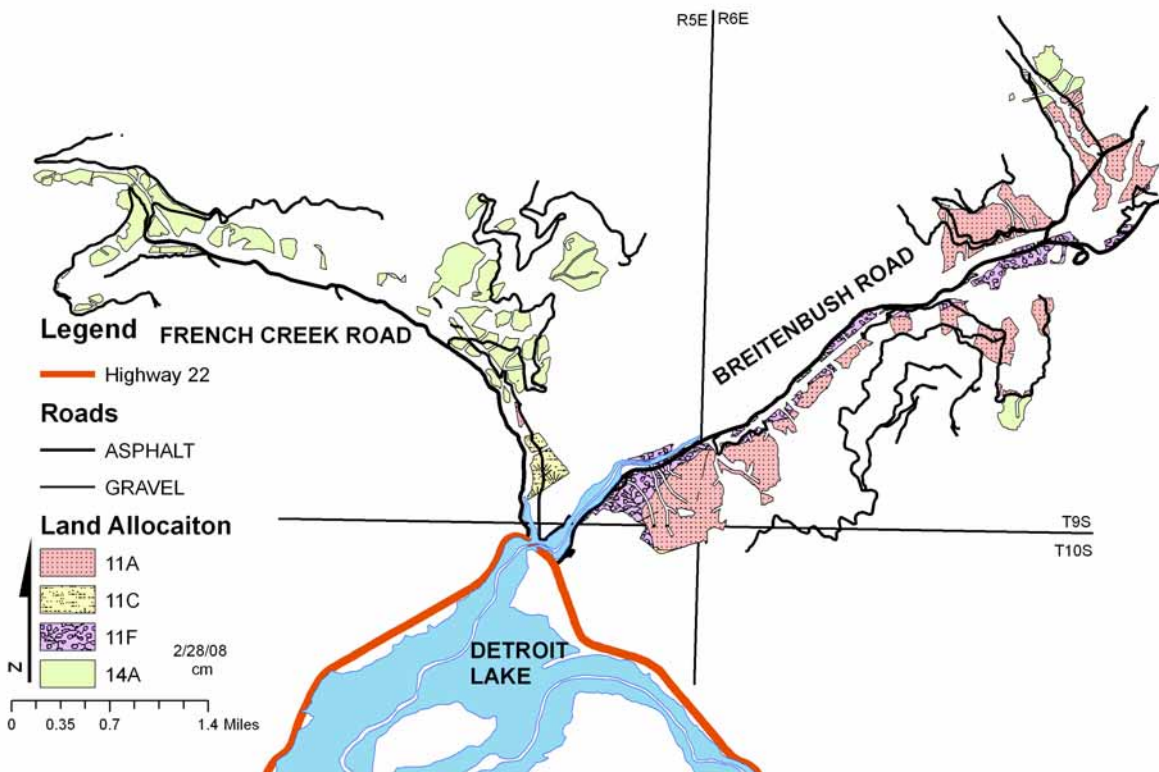
Table 1-1 shows all management allocations within the planning area. Only the General Forest (management allocation 14a) and the Scenic Allocations (management allocations 11a,c,d) fall inside the boundaries of proposed sale units and are discussed in this section. Figure 1-3 shows management allocations within unit boundaries.

Table 1-1 Management Allocations

<b>Willamette Forest Plan Management Allocations</b>	<b>Northwest Forest Plan Land Allocations</b>	<b>Acres</b>
14a – General Forest – Intensive Timber Management	Matrix Land	9,517
11 (a,b,c,d,f) – Scenic Allocations	Matrix Land	5,933
9 (b,c) – Wildlife Habitat – Pileated Woodpecker & Marten	Administratively Withdrawn	628
16 – Late Successional Reserve	Administratively Withdrawn	543
13a – Special Use Permit Areas	Administratively Withdrawn	482
8000 – Private Land		50
Major Water Bodies	Administratively Withdrawn	74
7 – Old Growth Groves	Administratively Withdrawn	65
12a – Developed Recreation Forest Service Site	Administratively Withdrawn	31
15 – Riparian Reserves	Overlay Existing Allocations	8991*
Total Acres		17,323

\*Riparian Reserves overlay other Forest Plan management allocations; the acres presented here are not included in the total acres.

Figure 1-3 Management Allocations of Alternative 2 Proposed Sale Units



### 1.6.1 General Forest – Intensive Timber Management (14a)<sup>2</sup>

Timber Harvest Units: 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 38, 39, 40, 41, 42, 43, 45, 47, 48, 51, 52, 53, 54, 55, 56, and 57

The primary goal of this management allocation is to produce an optimum and sustainable yield of timber based on the growth potential of the land that is compatible with multiple use objectives and meets environmental requirements for soil, water and wildlife habitat quality. In addition, this allocation can provide many opportunities for public use and enjoyment. Northwest Forest Plan Matrix objectives include production of timber and other commodities, functions as connectivity between late successional reserves and provides habitat for a variety of organisms associated with both late-successional and younger forest. Direction for silvicultural treatments is outlined in the Forest Wide Standards and Guidelines for Timber Management (Forest Plan Standards and Guidelines FW-176 through FW 183).

### 1.6.2 Scenic – Modification Middle Ground (11a)

Timber harvest units 15, 20, 22, 23, 25, 26, 27, 28, 29, 30, 34, 35, 36, 37, 38, 60, 62, 64

Scenic Modification Middle Ground areas to be harvested in the French Bug Timber Sale consist of a portion of the viewshed seen along both sides of the Breitenbush Road. Although management activities may visually dominate the natural surroundings, alterations will borrow from established form, line, color and texture elements of the original landscape. Unnatural

<sup>2</sup> Some units are in more than one management allocation.

features such as structures, roads, slash and other developments will remain visually subordinate to the proposed composition. Management Area Standards and Guidelines are provided on pages IV 201-202 of LRMP.

### **1.6.3 Scenic – Partial Retention Middleground (11c)**

Timber harvest units 16, 20

Scenic Partial Retention Middle Ground areas to be harvested in the French Bug Timber Sale project consist of portions of units near the mouth of the Breitenbush River and the mouth of French Creek. Forest management activities will be noticeable in the middle and background zones as viewed from major travel routes and recreation sites. Resource treatments will be conducted in such a way as they are visually subordinate to the characteristic landscape. Alterations will remain subordinate by repeating the form, line, color and texture elements which are characteristic of the landscape. Visual contrast will be minimized through shape, edge effect, scale and distribution of resource treatments. Management Area Standards and Guidelines are provided on pages IV 205-206 of LRMP.

### **1.6.4 Scenic –Retention Foreground (11f)**

Timber harvest units 19, 20, 21, 22, 23, 24, 25, 26, 31, 33, 60, 64

Scenic Retention Foreground areas to be harvested in the French Bug Timber Sale consist of portions of units along the Breitenbush River. Forest Management activities will be conducted in such a way that they are completely subordinate to the character of the natural landscape and are not evident to the casual observer. Unusual landscape features with distinctive variety in form, line color and texture will be retained and perpetuated. These elements include: large trees, distinctive bark, spring and fall color, shrubs and ground cover, and a variety of tree species having age class diversity. Management Area Standards and Guidelines are provided on pages IV 213-215 of LRMP.

### **1.6.5 Riparian Reserves (15)**

All harvest units include some areas of riparian reserves.

Riparian reserves are one of the components of the Aquatic Conservation Strategy (ACS) outlined in the Northwest Forest Plan ROD (USDA Forest Service, 1994). Riparian reserves, “provide an area along all streams, wetlands, ponds, lakes, and unstable and potentially unstable areas where riparian-dependent resources receive primary emphasis” (Northwest Forest Plan, p. A-5). They also serve to “improve travel and dispersal corridors for many terrestrial animals and plants, provide greater connectivity within the watershed,” and serve as connectivity corridors among Late-Successional Reserves (Northwest Forest Plan Record of Decision, A-5 and B-13).

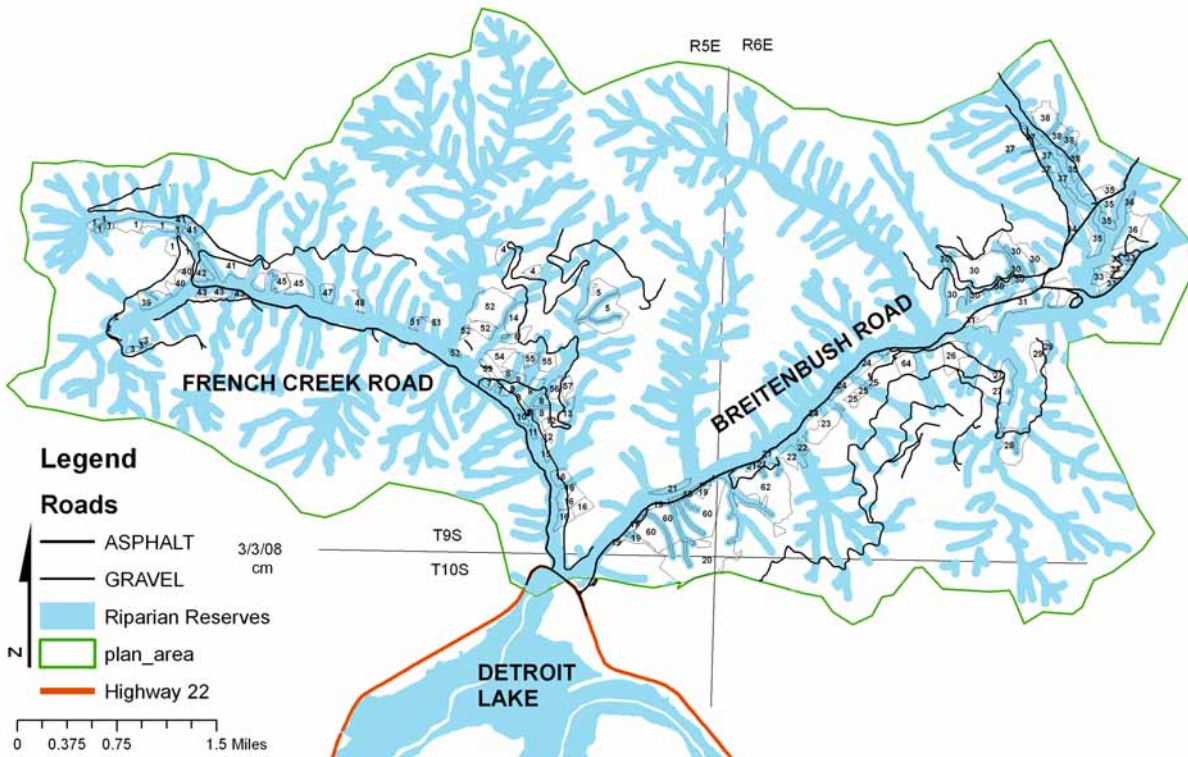
Riparian reserve widths are based on some multiple of a site-potential tree, or a prescribed slope distance, whichever is greater. In French Bug, riparian reserves are 344 feet wide adjacent to fish bearing streams and 172 feet wide on all other streams. The ACS objectives were developed to restore and maintain the ecological health of watersheds and aquatic ecosystems on public lands by maintaining and restoring ecosystem health at watershed and landscape scales.

Appendix D addresses ACS objectives consistency. Management activities may occur within riparian reserves in this project only if they maintain and restore the riparian dependent species and their requirements. Portions of all units would include harvest in the riparian reserves.



Maintenance and reconstruction of existing timber haul roads could occur in this management allocation. The existing transportation system travels through these areas and their reserves. Each alternative affects riparian reserves differently, yet all are permissible under the Standards and Guidelines in the Willamette Forest Plan and the Northwest Forest Plan.

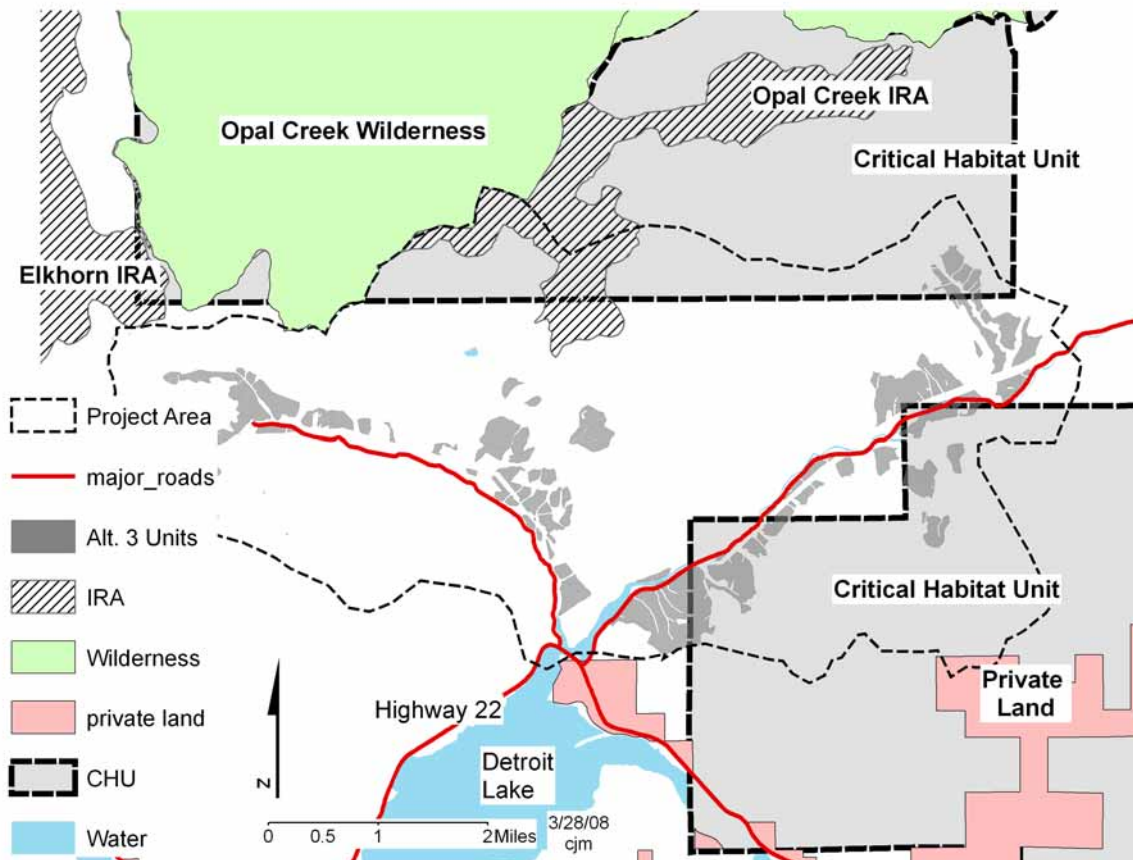
Figure 1-4 Riparian reserves in the French Bug project area



### 1.6.6 Forest Management Guidance

The project area contains Inventoried Roadless Area (IRA) and Spotted Owl Critical Habitat Units. Just north of the project area is the Opal Creek Wilderness. There are no activities proposed in either wilderness or IRA. These management areas will be discussed in Chapter 3 of this document. All activities meet forest plan standards and guidelines for each of these areas. Figure 1-5 shows these areas in relation to potential harvest units and the project area boundary.

Figure 1-5 Management Areas in French Bug Project Area



### 1.6.7 Other Ownership

There is approximately 50 acres of private land in the southeast portion of the planning area. There is also Corps of Engineers managed land near the confluence of the Breitenbush River and French Creek. The District is not aware of any future management activities on these lands.

## 1.7 Public Involvement

The scoping letter for the French Bug Timber Sale was mailed to tribal contacts including Klamath Tribe, Confederated Tribes of the Grand Ronde, Confederated Tribes of the Siletz Indians and, Confederated Tribes of the Warm Springs on September 14, 2007. In both 2007 and 2008, this project was included in the District's program of work package that is presented and discussed with the Tribes at the annual coordination meetings.

The scoping letter for French Bug was mailed to all other interested parties on September 18, 2007. Comments were received from the following organizations and public agencies: American Forest Resource Council, Rocky Mountain Elk Foundation, Oregon Wild, the City of Detroit, Oregon Department of Fish and Wildlife, Breitenbush Hot Springs and, Cascadia Wildlands Project. Two individuals also submitted comments. All correspondence and the full text of

letters received are available in the analysis file for French Bug Timber Sale at the Detroit Ranger District office.

The proposal has been listed in the Schedule of Proposed Actions (SOPA) or “Forest Focus” throughout the project planning process. The Willamette National Forest publishes the SOPA quarterly on the web and sends the document to over 100 individuals, groups and industry representatives.

Several informal meetings were held with those that expressed interest in the project including Portland General Electric, the Breitenbush Community and Dave Wiley of the Rocky Mountain Elk Foundation.

Using the comments from the public and other agencies, the interdisciplinary team developed a list of issues to be addressed in this assessment.

## **1.8 Issues**

The Forest Service separated the issues into two groups: significant and non-significant issues. Significant issues describe a dispute or present an unresolved conflict associated with potential environmental effects of the proposed action. Significant issues are used to formulate alternatives, prescribe mitigation measures and focus the analysis of environmental effects. Significant issues are tracked through issue identification (Chapter 1), alternative development and description (Chapter 2), and environmental consequences (Chapter 3). Non-significant issues were identified as those outside the scope of the proposed action; already decided by law, regulation, Forest Plan, or other higher level document; irrelevant to the decision to be made; or conjectural and not supported by scientific or factual evidence.

### **1.8.1 Significant Issue: Structural and Species Diversity (Variable Density Thinning)**

#### **Measure of Change: Number and type of gaps**

Several parties expressed concern that structural diversity and species diversity were lacking in these young second growth stands. Respondents also emphasized variable density thinning as a way to improve resiliency of stands. Variable density thinning would include light, moderate and heavy thinning treatments, planting underrepresented species and gap cuts of different sizes.

The variable density thinning concept is incorporated into the silvicultural prescriptions for both Alternative 2 and 3. The effects related to this harvest strategy are disclosed in Chapter 3.

### **1.8.2 Significant Issue: Big Game Forage**

#### **Measure of Change: Qualitative discussion of potential forage by alternative**

Respondents were interested in providing big game forage by creating larger gaps and seeding them with forage species. Responses pointed out the lack of early seral habitat in this area and suggested that these created openings could provide opportunities to encourage early seral species in this area.

To respond to this issue, Alternative 3 was designed to include 30 acres of large gaps (1-3 acres).

### **1.8.3 Significant Issue: Noise Disturbance**

#### **Measure of Change: Number of Days By Harvest Activity Type**

Some respondents were concerned that noise disturbance from helicopter logging would affect businesses in the area by disturbing peace and quiet sought by forest visitors. Helicopter logging was the main noise generating activity of concern.

This issue was handled in two ways. First, Alternative 3 was developed, in part, to include less helicopter logging (compared to Alternative 2). Also, the effects related to noise are disclosed in Chapter 3 of the EA.

### **1.8.4 Significant Issue: Road Density**

#### **Measure of Change: Miles of closed roads**

During the scoping period, some comments recommended that an alternative consider road decommissioning in conjunction with the timber sale. Although no specific issues were raised with road densities in the project area, these comments pointed to the various environmental impacts related to roads. These include impacts to wildlife and aquatic habitats.

To respond to this issue, Alternative 3 includes 6.3 miles of seasonal and year round road closures. The unit of measure for this issue is the number of miles of road closures.

### **1.8.5 Non-Significant Issue: Roadless and Unroaded Areas**

#### **Reason for non-significance: already decided by law or Forest Plan direction**

Comments received during scoping expressed concerns about timber harvesting within “roadless areas” defined by Oregon Wild, and “uninventoried unroaded areas” defined by the Willamette Roads Analysis. The specific concern was that logging in these areas has the potential to disturb soil and water, destroy scenic integrity, eliminate reference landscapes, limit primitive recreation, introduce non-native weeds, and disturb cultural resources.

There are no Inventoried Roadless Areas (IRAs) within the project area. The proposed action does include harvest units within so called “unroaded areas.” These areas are not mapped and do not have specific direction for their management. These areas have Forest Plan Management Area designations and it is the standards and guidelines that go along with these designations that determine the management of the areas.

This issue was not considered significant because even though timber harvest is proposed in these areas, all actions would meet Forest Plan Standards and Guidelines and would be consistent with agency policy of disclosing the effects of forest management in unroaded areas. Project analysis indicates that timber harvest and other actions would not result in adverse impacts to any roadless values that currently exist. The effect of the proposed action and other alternatives on unroaded areas is discussed in chapter 3, Roadless and Unroaded Areas.

## Chapter 2 – Alternatives, Including the Proposed Action

This chapter describes and compares the alternatives considered for the French Bug Timber Sale. It includes a description and map of each alternative considered. This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. Some of the information used to compare the alternatives is based upon the design of the alternative (i.e., helicopter logging versus the use of skid trails) and some of the information is based upon the environmental, social and economic effects of implementing each alternative (i.e., the amount of erosion or cost of helicopter logging versus skidding).

### 2.1 Alternatives Considered but Eliminated from Detailed Study

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14).

#### **No new temporary road construction**

This alternative was considered as it was brought up as a concern during the scoping process. Temporary road construction is a necessary piece of timber harvest implementation. These roads are often 50 to 100 feet long and generally allow better alignment of skyline towers, better access with ground based logging equipment and careful placement of helicopter landings. In this way, temporary road construction can help minimize effects to a number of resources. This project includes a minimum of temporary road construction. This alternative was not analyzed in detail as eliminating all temporary road construction would make thinning cost prohibitive in many units and would not meet the project's purpose and need.

### 2.2 Alternatives Considered in Detail

#### **2.2.1 Alternative 1. No Action**

In Alternative 1, current management plans would continue to guide activities in the project area. None of the proposed projects would be implemented. The “No Action” alternative serves as a baseline to compare and describe the differences among action alternatives.

#### **2.2.2 Alternative 2. Proposed Action**

Alternative 2, the proposed action, would respond to the purpose and need by harvesting 1255 of 2200 acres of stands. Approximately 945 acres would remain untreated. This alternative is consistent with management direction set forth in the Willamette National Forest Plan. Figure 2-1 and 2-2 show the units by treatment type. Table 2-1 shows the specific features and types of treatment for each unit in this alternative.

A number of the activities described below are similar and connected actions but are not considered mitigations. These activities will be completed as funding becomes available. These activities are indicated with an asterisk.

This alternative would:

- Harvest approximately 14.6 MMBF on 1255 acres
- Thinning would occur on 1243 acres
- ½-acre gaps would occur on 34 acres (22 acres within the thinning stands and 12 acres of gap only stands)
- Precommercial thin 111 acres in 7 young managed stands\*
- Fertilize unit #23 (25 acres)\*
- Replant ½ acre gaps with western red cedar
- Utilize .48 miles of past logging spur road locations from the initial logging entry as temporary roads for this project (spurs will be closed after use)
- Construct .38 miles of new temporary spur roads (spurs will be closed after use)
- Maintain 34 miles of existing system roads
- Reconstruct 2 miles of existing system roads
- 650 acres of fuels treatments including the following activities: grapple piling and burning in the units, roadside grapple piling, burning landings and underburning
- Underburn 1 acre of gaps
- In Unit 31, restore landing (remove slash and delineate parking area with rock)\*
- Eradicate high risk weed populations along roads
- Contain existing weed infestations inside harvest units
- Cleanup of harvest generated slash at landings and dispersed sites
- Subsoil units 8, 15, 16, 29, 31, 33, 34, 35, 37, and 43\*
- Post-harvest visual clean-up and rehabilitation including planting large stock trees, down logs and boulders on ripped skid roads. Prune limbs damaged during operations adjacent to Rd 46. Visual cleanup of slash including chunking, scattering or chipping, and logging debris at landings and dispersed sites to meet Visual Quality Objectives. End haul residual cull decks, cut stumps and rootwads. Flush cut stumps visible from road.

Figure 2-1 Alternative 2 French Creek Arm

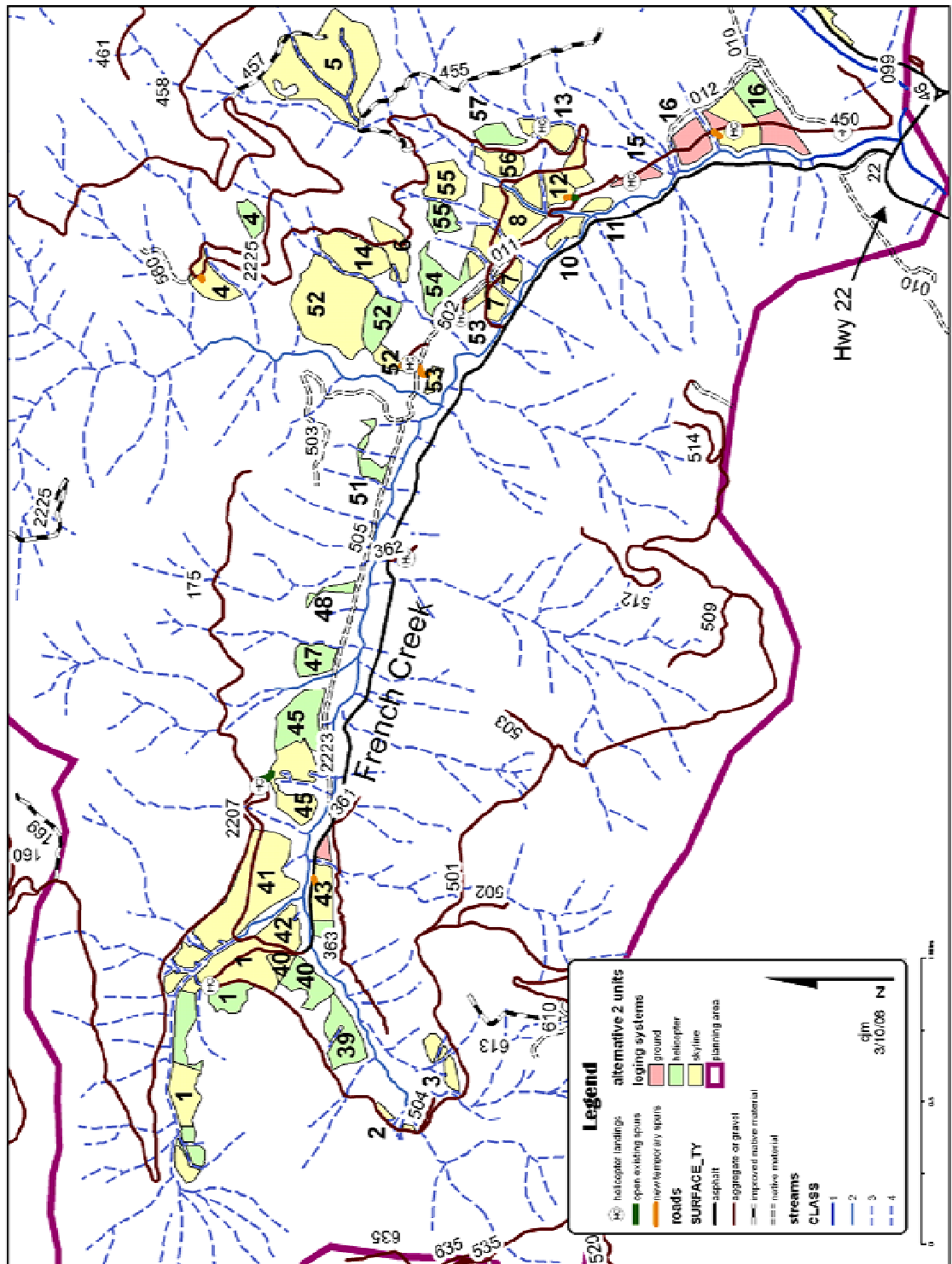
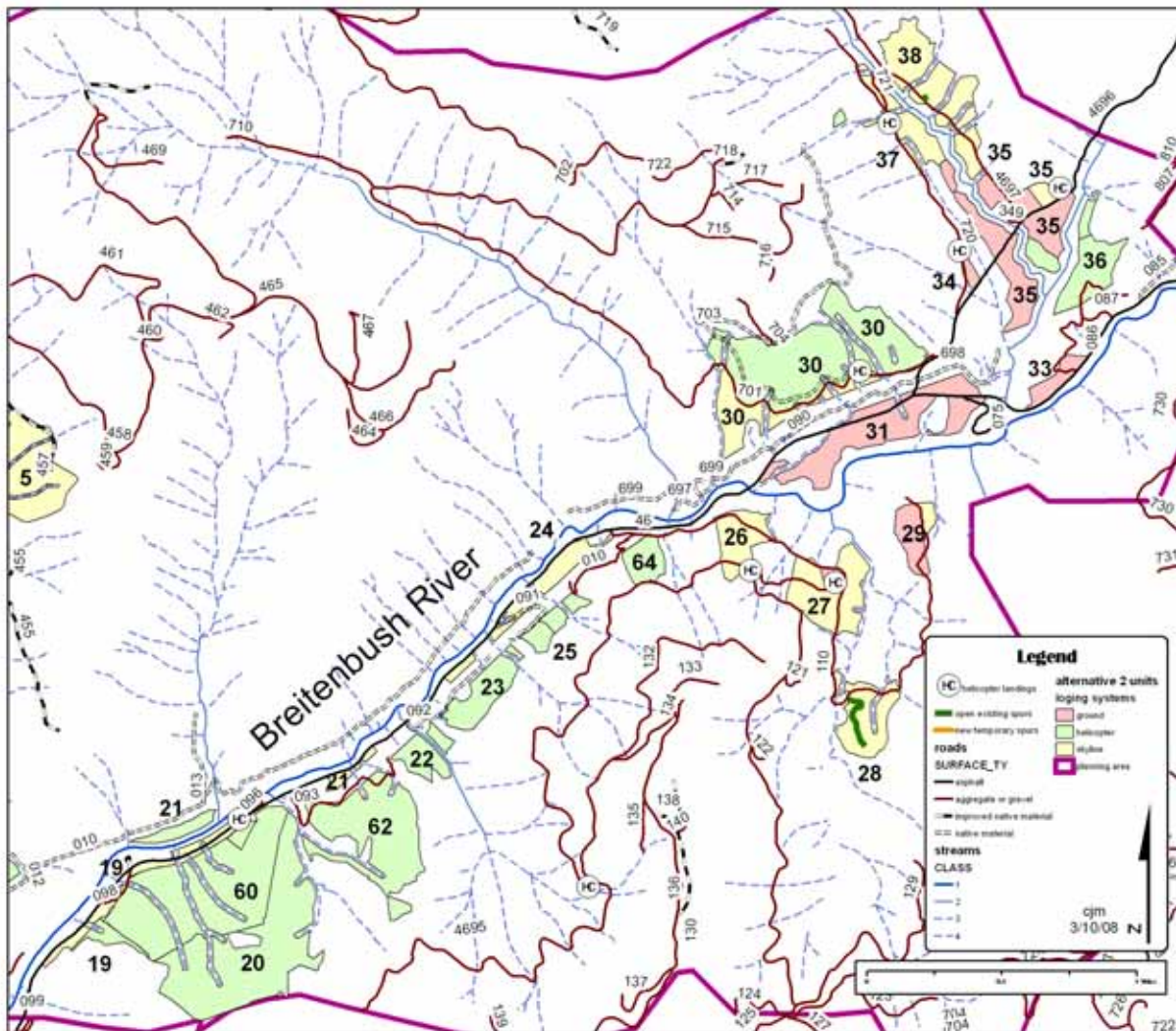


Figure 2-2 Alternative 2 (Breitenbush River Arm)



### Vegetation

Harvest treatments include 1255 acres of commercial thinning, of which, 34 acres would consist of ½ acre gaps. Thinning would occur at three different intensities: 792 acres would be thinned to 80-100 trees per acre; 391 acres would be thinned to 50-70 trees per acre and 60 acres would be thinned to 110 trees per acre.

Precommercial thinning is proposed in 111 acres in seven young managed stands to release overstocked conifers from competition to enhance tree growth. Nitrogen fertilization is proposed in unit #23 (25 acres). This treatment is proposed following commercial thinning in order to enhance tree growth because site conditions indicate a nitrogen deficiency is likely present in these stands.



Timber harvest vegetation treatments are determined by the silvicultural prescriptions which include detailed information for each unit and post-harvest treatment. These prescriptions are in the French Bug Analysis file at the Detroit Ranger District. A general summary of prescription features is described in this file.

### **Road Maintenance**

The proposed action would utilize, but not expand, 36 miles of the existing forest road system. Work required on the road system would be limited to reconstruction or maintenance. Maintenance and reconstruction would include cutting hardwood trees along roads, felling hazard trees, clearing and grubbing, surface blading, replacing drainage structures, reshaping ditches and placement of aggregate surfacing. Not all roads would need reconstruction or maintenance. Treatments would be applied as necessary to facilitate timber hauling.

### **Temporary Roads**

This alternative would use about .48 miles of past logging spur road locations from the initial logging entry as temporary roads for this project. In addition, about .38 miles of new temporary logging spurs would be created in this project for a total of .about .86 miles of temporary roads.

Temporary logging spurs are dirt roads which may need grading, clearing, rock placement or other activities in order to facilitate timber haul. These roads are not part of the official road system—use on these roads is authorized only by permit or contract to meet a specific one time use (e.g. access to a timber sale unit). These roads will be decommissioned, hydrologically stabilized, and returned to as near a natural state as possible after sale activities are complete.

### **Fuel Treatment**

Fuel treatments that would occur as part of the proposed action for French Bug Timber Sale include 650 acres of the following: grapple piling and burning in the units, roadside grapple piling, burning landings and underburning. One acre of gaps would be underburned.

Treating fuels by prescribed burning would take place when fuel moistures are greater or equal to 25% to ensure soil and duff retention levels are maintained at or below duff retention objectives.

### **Recreation/Visual Resource Management**

Special visual resource considerations were incorporated into the proposed commercial thinning treatments in stands near or along the Breitenbush Road which is part of the West Cascades National Scenic Byway. More emphasis was given to maintaining and enhancing within stand variability and softening the transitioning between treated and no-treated areas by prescribing a variety of treatments including different thinning intensities within a unit, lighter thinnings, leaving more no-treated areas, and modifying gap shapes.

In addition, one landing adjacent to Humbug Campground would be restored to create an overflow vehicle parking area that is needed to accommodate extra vehicles at this site. This restoration would consist of post-harvest clean-up and the use of rocks and barriers to delineate a parking area for the overflow parking.

### **Riparian Management**

**Best Management Practices (BMPs):** BMPs were used in all aspects of this sale to reduce impacts to water quality. Activities which were evaluated and designed to align with best

management practices include unit design, stream course protection, landing locations, erosion control, stream crossing design, prescribed fire activities, slope and soil moisture limitations for tractor operations. A full description of BMPs can be found in the General Water Quality Best Management Practices Handbook (1988).

**Riparian Reserves:** For this project, riparian reserves are set at 172' for non-fish bearing streams and 344' for fish bearing streams. This means that any activities within these reserves must benefit riparian-dependent species.

To help maintain appropriate water temperature, a no cut buffer would be placed on the primary shade zone (approximately 50'-60') for perennial streams. Within the secondary shade zone (approximately 172' from perennial streams), an average canopy cover of no less than 50% must be maintained across the stand being treated.

To protect fish, there is a 100 foot no-cut buffer for all streams (Class I-IV) adjacent to listed fish habitat (LFH). For streams greater than 100 feet but less than one mile from LFH, there is a 50 foot no cut buffer for perennial and intermittent streams. For streams greater than one mile from LFH, there is a 50' no cut buffer for perennial streams and a 30' foot buffer for intermittent streams.

### Noxious Weed Control

This project includes a number of noxious weed mitigations including the eradication of high risk weed populations along roads and the containment of existing weed infestations inside harvest units.

### Alternative 2 as it Responds to Significant Issues

During scoping the issues of structural and species diversity, big game forage, road density, and noise disturbance were raised. Structural and species diversity were incorporated into the silvicultural thinning prescriptions through the use of no-thin areas, ½-acre canopy gaps, planting western red cedar minor species retention, and different thinning intensities. Big game forage, road density and noise disturbance were not specifically addressed as part of this alternative.

Table 2-1 Alternative 2 Harvest Unit Summary

Unit	Thinning Acres	Thinning Intensity (trees per acre remaining)	Gap Rx (% of unit) (Gap Size)	Gap (in acres)	Temp road constructed (in feet)	Past temp road utilized (in feet)	Volume (mbf)	Logging System <sup>1</sup>
1	62	80-100	n/a	n/a	n/a	n/a	651	H, S
2	2	80-100	n/a	n/a	n/a	n/a	18	S
3	6	80-100	n/a	n/a	n/a	n/a	54	S
4	15	80-100	n/a	n/a	50	n/a	150	H, S
5	57	80-100	n/a	n/a	n/a	n/a	513	S
6	10	80-100	n/a	n/a	n/a	n/a	100	S

<sup>1</sup> G – Ground-based, H – Helicopter, and S - Skyline

Unit	Thinning Acres	Thinning Intensity (trees per acre remaining)	Gap Rx (% of unit) (Gap Size)	Gap (in acres)	Temp road constructed (in feet)	Past temp road utilized (in feet)	Volume (mbf)	Logging System <sup>1</sup>
7	9	50-70	n/a	n/a	n/a	n/a	102	S
8	34	50-70	5% (1/2 ac)	2	150	100	417	S
10	3.5	50-70	10% (1/2 ac)	0.5	n/a	n/a	61	S
11	2	50-70	n/a	n/a	n/a	n/a	32	S
12	7	50-70	n/a	n/a	n/a	n/a	63	S
13	8	50-70	n/a	n/a	n/a	n/a	127	S
14	15.5	50-70	5% (1/2 ac)	0.5	n/a	n/a	188	S
15	3	50-70	n/a	n/a	n/a	n/a	43	S
16	43	50-70	5% (1/2 ac)	2	100	200	750	G/H/S
19	27	110	n/a	n/a	n/a	n/a	289	S
20	110	80-100	n/a	n/a	n/a	n/a	1100	H
21	12	110	n/a	n/a	n/a	n/a	120	S
22	16	80-100	n/a	n/a	n/a	n/a	160	H
23	23	80-100	n/a	n/a	n/a	n/a	253	H
24	21	110	n/a	n/a	n/a	n/a	162	S
25	12	80-100	n/a	n/a	n/a	n/a	72	H
26	22	80-100	n/a	n/a	n/a	n/a	198	S
27	43	80-100	n/a	n/a	n/a	n/a	370	S
28	28	80-100	n/a	n/a	n/a	1000	263	S
29	16	80-100	10% (1/2 ac)	2	n/a	n/a	334	G/S
30	133	80-100	n/a	n/a	n/a	250	1330	H/S
31	59	80-110	5% (1/2 ac)	2	1000	n/a	984	G
33	10	80-110	n/a	n/a	250	250	120	G
34	3	50-70	n/a	n/a	n/a	n/a	38	G
35	68	80-100	n/a	n/a	n/a	n/a	938	G/H/S
36	27	80-100	n/a	n/a	100	n/a	284	H
37	23	80-100	5% (1/2 ac)	1	n/a	n/a	232	H/S

Unit	Thinning Acres	Thinning Intensity (trees per acre remaining)	Gap Rx (% of unit) (Gap Size)	Gap (in acres)	Temp road constructed (in feet)	Past temp road utilized (in feet)	Volume (mbf)	Logging System <sup>1</sup>
38	44	80-100	n/a	n/a	n/a	120	396	S
39	14	50-70	n/a	n/a	n/a	n/a	168	H
40	14	50-70	n/a	n/a	n/a	n/a	154	H/S
41	49	50-70	n/a	n/a	n/a	n/a	632	S
42	9	50-70	10% (1/2 ac)	1	n/a	n/a	120	S
43	14	50-70	n/a	n/a	100	n/a	196	G/H/S
45	32	50-70	10% (1/2 ac)	3	n/a	600	469	H/S
47	8	50-70	10% (1/2 ac)	1	n/a	n/a	130	H
48	3	50-70	n/a	n/a	n/a	n/a	39	H
51	5	50-70	n/a	n/a	n/a	n/a	56	H
52	53	50-70	10% (1/2 ac)	5	100	n/a	780	H/S
53	6	50-70	n/a	n/a	200	n/a	70	S
54	11	50-70	10% (1/2 ac)	1	n/a	n/a	161	H/S
55	16	50-70	n/a	n/a	n/a	n/a	192	H/S
56	7.5	50-70	5% (1/2 ac)	0.5	n/a	n/a	103	S
57	6	50-70	n/a	n/a	n/a	n/a	62	G
60	n/a	Gaps Only	5% (1/2 ac)	4	n/a	n/a	120	H
62	n/a	Gaps Only	10% (1/2 ac)	7	n/a	n/a	210	H
64	n/a	Gaps Only	10% (1/2 ac)	1	n/a	n/a	30	H
<b>All</b>	<b>1243</b>			<b>34</b>	<b>1050</b>	<b>2520</b>	<b>14601</b>	

RGP – Roadside Grapple Piling

GP – Grapple Pile

UB – Under Burn

L – Burning of Landings

50-70 – Second thinning to 50-70 trees per acre

80-110 – First thinning to 80-110 trees per acre

Gaps Only – no thinning is prescribed in the units

GAP – burn gaps

### 2.2.3 Alternative 3

Alternative 3 was developed to respond to the four significant issues raised during scoping: structural/species diversity, big game forage, noise disturbance and road density. This

alternative differs from Alternative 2 in that it includes more treatment acres in gaps, has less acres of helicopter logging and closes approximately 6.3 miles of roads.

Alternative 3 would respond to the purpose and need by harvesting 1276 of 2200 acres of stands. 924 acres would remain untreated. This alternative is consistent with management direction set forth in the Willamette National Forest Plan. Figures 2-3 and 2-4 show the units by treatment type. Table 2-2 shows the specific features and types of treatment for each unit in this alternative.

Similar to Alternative 2, Alternative 3 contains a number of the activities that are similar and connected actions but are not considered mitigations. These activities will be completed as funding becomes available. These activities are indicated with an asterisk.

This alternative would:

- Harvest roughly 15.1 MMBF on 1276 acres
- Thinning would occur on 1264 acres
- ½-acre gaps would occur on 21 acres (15 acres within the thinning stands and 6 acres within the gap only stands)
- Larger gaps (1-3 acres) would occur on 30 acres (22 acres within the thinning stands and 8 acres within the gap only stands). Placement of some of the gaps (totaling one acre) placed in thinning units adjacent to the Portland General Electric powerline corridor to reduce risk of electrical outages from falling trees.
- Pre-commercial thin 111 acres in 7 young managed stands\*
- Fertilize unit #23 (25 acres)\*
- Replant ½ acre gaps with western red cedar; replant large gaps with a mix of Douglas-fir, western red cedar, and western white pine
- Utilize .48 miles of past logging spur road locations from the initial logging entry as temporary roads for this project (spurs will be closed after use)
- Construct .78 miles of new temporary spur roads (roads will be closed after use)
- Maintain 36 miles of existing system roads
- Reconstruct 4.2 miles of existing system roads (including 1.75 miles of 703 road in unit 30, .5 miles of 086 road in unit 33, 1.5 miles on the 110 road and 0.46 miles on the 457 road)
- In conjunction with the reopening of the 703 Road, install five culverts
- Relocate 0.12 miles of existing system roads (086 road in unit 33)
- 650 acres of fuels treatments including the following activities grapple piling and burning in the units, roadside grapple piling, burning landings and underburning
- Underburn 25 acres of gaps
- In Unit 31, restore landing (remove slash and delineate parking area with rock)\*

- In Unit 31, obliterate temporary road on existing Humbug Flats Trail. Restore trail back to original alignment and condition. At the Breitenbush Road junction, temporary road will be converted to a small parking area.\*
- Eradicate high risk weed populations along roads
- Contain existing weeds inside harvest units
- Cleanup harvest generated slash at landings and dispersed sites
- Subsoil units 8, 15, 16, 29, 31, 33, 34, 35, 37, and 43\*
- Post-harvest visual clean-up and rehabilitation including planting large stock trees, down logs and boulders on ripped skid roads, and returning helicopter landings in unit 19 and 31 to natural condition by end hauling debris, removing rock and planting large stock trees. Prune limbs damaged during operations adjacent to Rd 46. Visual cleanup of slash including chunking, scattering or chipping, and logging debris at landings and dispersed sites to meet Visual Quality Objectives. End haul residual cull decks, cut stumps and rootwads. Flush cut stumps visible from road.
- Gate 4.3 miles of road to limit winter access only\*
- Gate 2.0 miles of road to limit year-round access\*

Figure 2-3 Alternative 3 (French Bug Arm)

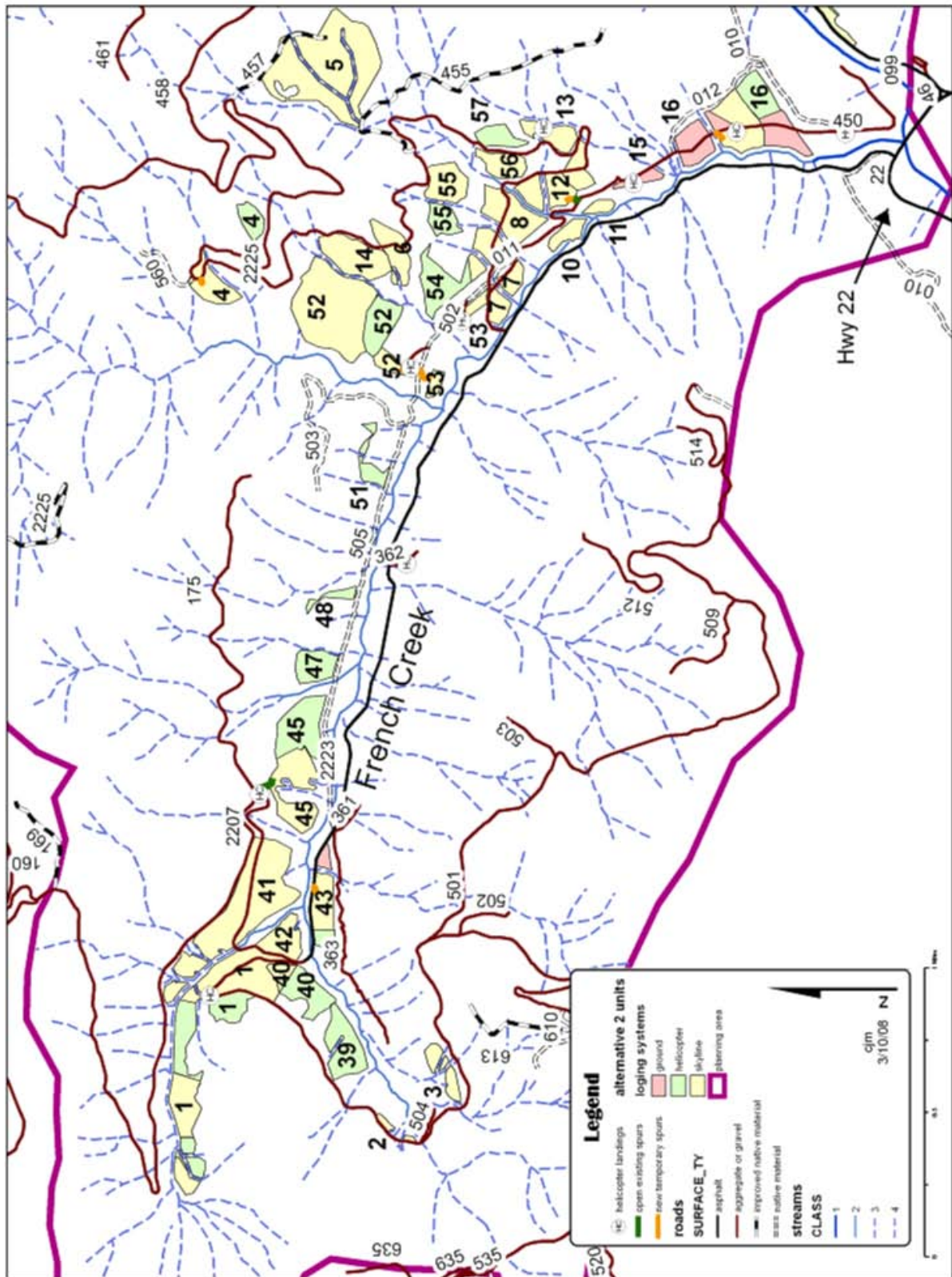
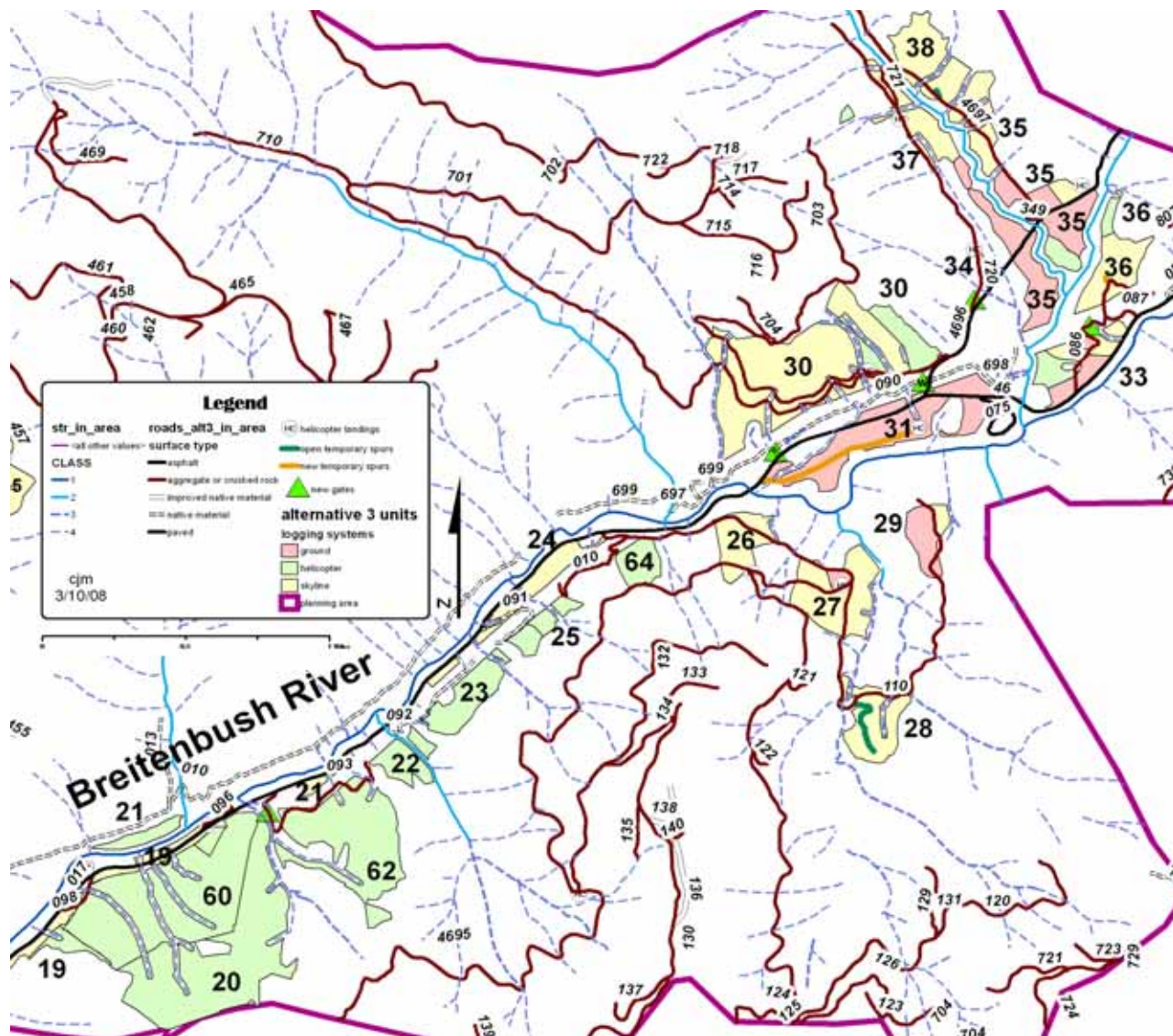


Figure 2-4 Alternative 3 (Breitenbush River Arm)



## Vegetation

Harvest treatments include 1264 acres of commercial thinning, of which 51 acres would consist of ½ acre and 1-3 acre gaps. Thinning would occur at three different intensities: 812 acres would be thinned to 80-100 trees per acre; 392 acres would be thinned to 50-70 trees per acre and 60 acres would be thinned to 110 trees per acre. Twelve acres are gap only harvest.

Precommercial thinning is proposed in 111 acres in 7 young managed stands to release overstocked conifers from competition to enhance tree growth. Nitrogen fertilization is proposed in unit #23 (25 acres). This treatment is proposed following commercial thinning in order to enhance tree growth because site conditions indicate a nitrogen deficiency is likely present in these stands.



Timber harvest vegetation treatments are determined by the silvicultural prescriptions which include detailed information for each unit and post-harvest treatment. These prescriptions are in the French Bug Analysis file at the Detroit Ranger District. A general summary of prescription features is described in this file.

### **Fuel Treatment**

Fuel treatments that would occur as part of the proposed action for French Bug Timber Sale include 650 acres of the following: grapple piling and burning in the units, roadside grapple piling, burning landings and underburning. Twenty-five acres of gaps would be underburned.

### **Wildlife**

To help protect big game and winter range, Alternative 3 includes 6.3 miles of year round and winter-only closures. Winter closures would be placed on portions of the following roads 2225-503, 2225-450, 2225-11, and 4600-90. This would result in 4.3 miles of winter closures. Year round closures would be placed on portions of the following roads 2225-455, 4600-093, 4696-699, 4696-720, and 4696-086. This would result in 2.0 miles of year-round closures.

Forage would be created by underburning and then planting 30 acres of larger (1-3 acre) gaps with a native forage mix.

### **Recreation/Visual Resource Management**

Special visual resource considerations were incorporated into the proposed commercial thinning treatments in stands near or along the Breitenbush Road which is part of the West Cascades National Scenic Byway. More emphasis was given to maintaining and enhancing within stand variability and softening the transitioning between treated and no-treated areas by prescribing a variety of treatments including different thinning intensities within a unit, lighter thinnings, leaving more no-treated areas, and modifying gap shapes.

Alternative 3 includes the Unit 31 landing restoration described in Alternative 2 and restoration of the Humbug Flats Trail. Alternative 3 proposes constructing a temporary road into Unit 31. The road would follow the Humbug Flats trail for a short distance then turn off to the east into Unit 31. This temporary road would be decommissioned where visible from the Breitenbush Road and Humbug Flats Trail. When thinning is complete, opportunity exists to convert the temporary road at the intersection with the Breitenbush Road into a trailhead. The segment of road on the trail would be rehabilitated back to a hiking trail width and any portion of the road visible from the trail would be restored to a natural appearing condition.

### **Riparian Reserves**

Riparian reserve management is the same in Alternative 3 as Alternative 2.

### **Road Maintenance**

The proposed action would utilize, but not expand, 37 miles of the existing forest road system. Work required on the road system would be limited to reconstruction or maintenance. Maintenance and reconstruction would include cutting hardwood trees along roads, felling hazard trees, clearing and grubbing, surface blading, replacing drainage structures, reshaping ditches and placement of aggregate surfacing. Not all roads would need reconstruction or maintenance. Treatments would be applied as necessary to facilitate timber hauling.

### **Temporary Roads**

This alternative would use about .48 miles of past logging spur road locations from the initial logging entry as temporary roads for this project. In addition, about .78 miles of new temporary logging spurs would be created in this project for a total of .about 1.26 miles of temporary roads.

Temporary logging spurs are dirt roads which may need grading, clearing, rock placement or other activities in order to facilitate timber haul. These roads are not part of the official road system—use on these roads is authorized only by permit or contract to meet a specific one time use (e.g. access to a timber sale unit). These roads will be decommissioned, hydrologically stabilized, and returned to as near a natural state as possible after sale activities are complete.

This alternative would differ from alternative 2 in that there would be about 3,000 feet of additional temporary road construction in unit 31, the 703 road would be re-opened for log haul and the 086 road would be realigned where it enters the Breitenbush Road. The reopening of the 703 Road will involve the installation of five culverts.

### Alternative 3 as it responds to the Significant Issues

During scoping the issues of structural and species diversity, big game forage, road density, and noise disturbance were raised. Structural and species diversity is further enhanced in this alternative by the increased variability in gap sizes. Big game forage will be created on 30 acres where larger gaps (1-3 acres) will be burned and subsequently seeded with a native forage mix. Open road density will be reduced by closing 4.3 miles of roads with gate devices and closing 2.0 miles of roads with winter only gates. Noise disturbance was addressed by reducing the amount of helicopter logging by 106 acres.

Table 2-2 Alternative 3 Harvest Unit Summary

Unit	Thin Ac.	Thinning Intensity	Gap Rx	Gap (acres)	Temp Road constructed (feet)	Past Temp Road Reopened (feet)	Volume (MBF)	Logging System
1	62	80-100					651	H/S
2	2	80-100					18	S
3	6	80-100					54	S
4	15	80-100			50		150	H/S
5	57	80-100					513	S
6	10	80-100					100	S
7	9	50-70					102	S
8	34	50-70	5% (1/2 ac)	2	150	100	417	S
10	3.5	50-70	10% (1/2 ac)	0.5			61	S
11	2	50-70					20	S
12	7	50-70					63	S
13	8	50-70					127	S

Unit	Thin Ac.	Thinning Intensity	Gap Rx	Gap (acres)	Temp Road constructed (feet)	Past Temp Road Reopened (feet)	Volume (MBF)	Logging System
14	15.5	50-70	5% (1/2 ac)	0.5			188	S
15	3	50-70					43	G
16	43	50-70	5% (1/2 ac)	2	100	200	750	G/S
19	27	110					289	H/S
20	108	80-100	5% (2 ac)	2			1100	H
21	12	110					120	S
22	16	80-100					160	H
23	23	80-100					253	H
24	21	110					162	S
25	12	80-100					72	HS
26	22	80-100					198	S
27	41	80-100	5% (2 ac)	2			406	G/S
28	26	80-100	10% (2 ac)	2		1000	291	S
29	16	80-100	10% (1/2 ac)	2			334	G/S
30	130	80-100	10% (1 ac)	3		250	1366	H/S
31	59	80-110	5% (2 ac)	2	3000		984	G
33	29	80-110	5% (1/2 ac)	1	250	250	388	G/H/S
34	3	50-70					38	G
35	66	80-100	5% (2 ac)	2			991	G/H/S
36	25	80-100	10% (1 ac)	2	100		318	H/S
37	23	80-100	5% (1/2 ac)	1			232	G/H/S
38	44	80-100				120	396	S
39	14	50-70					168	S
40	14	50-70					154	H/S

Unit	Thin Ac.	Thinning Intensity	Gap Rx	Gap (acres)	Temp Road constructed (feet)	Past Temp Road Reopened (feet)	Volume (MBF)	Logging System
41	49	50-70					632	S
42	9	50-70	10% (1/2 ac)	1			120	S
43	14	50-70			100		196	G/S
45	32	50-70	10% (1/2 ac)	3		600	469	H/S
47	7	50-70	20% (2 ac)	2			154	H
48	3	50-70					39	H
51	5	50-70					56	H
52	53	50-70	10% (1/2 ac and 3 ac)	5	100		780	H/S
53	6	50-70			200		70	S
54	11	50-70	10% (1/2 ac)	1			161	H/S
55	16	50-70					192	H/S
56	7.5	50-70	5% (1/2 ac)	0.5	800	2200	102	S
57	6	50-70					62	H
60		Gaps Only	5% (1/2 ac)	4			120	H
62		Gaps Only	10% (1/2 ac and 2 ac)	7			210	H
64		Gaps Only	10% (1/2 ac)	1			30	H
<b>All</b>	<b>1264</b>	Thinning Intensity		<b>51*</b>	<b>4050</b>	<b>2520</b>	<b>15088</b>	

\* 51 acres total is 21 acres of 1/2 acre gaps and 30 acres of 1-3 acre gaps.

RGP – Roadside Grapple Piling

GP – Grapple Pile

UB – Under Burn

L – Burning of Landings

50-70 – Second thinning to 50-70 trees per acre

80-110 – First thinning to 80-110 trees per acre

Gaps Only – no thinning is prescribed in the units

GAP – burn gaps

## 2.3 Connected Actions

### 2.3.1 Pre-haul maintenance and road reconstruction

Pre-haul maintenance and road reconstruction would occur at the levels specified in table 2-3 for all action alternatives. These roads are in generally good condition due to light traffic volumes and seasonal access. Needed road work involves brushing, blading, ditch reconditioning, spot surfacing placement, danger and downed tree removal, culvert inlet and outlet cleaning, and occasional culvert replacements. The 703 road in unit 30 would be reopened to provide access to unit 30 as part of alternative 3. This would require installing temporary culverts, grading the road and clearing the road prism of brush. The first portion of the 086 road in unit 33 would be realigned as part of alternative 3. This work would involve establishing a new road bed and decommissioning the old section. Realigning the road would improve access to the Breitenbush road and reduce erosion potential from log haul at that road junction.

Temporary road work would occur to facilitate harvest. In alternative 2, a total of .86 miles of temporary road would be either reopened or constructed, alternative 3 would need a total of 1.26 miles of temporary road work. Table 2-3 shows the miles of temporary road work for each alternative by mile of existing roads that would need reopening and miles of new construction. Temporary roads are mapped by alternative in section 2.2. Within this section, temporary roads for alternative 2 are displayed in figure 2-1 and 2-2 for alternative 2 and figure 2-3 and 2-4 for alternative 3.

Table 2-3 System and Temporary Road Work

Alternative	Forest Service System Roads			Temporary Roads	
	Pre-Haul Maintenance (mi.)	Reconstruction (mi.)	Realignment (mi)	Temporary Road Reopening (miles)	New Temporary Road Construction (miles)
1	none	none	none	none	none
2	34.0	2.0	0	.48	.38
3	36.0	4.2	0.12	.48	.78

### 2.3.2 Yarding Methods

Yarding methods for timber sales on the Detroit District may include helicopter, skyline and ground based systems. The French Bug Timber Sale would be mostly skyline and helicopter yarded. Depending on the alternative, these numbers may change slightly. Alternative 3 has less helicopter yarding and more skyline yarding. Ground based yarding acres are relatively similar between alternatives.

Table 2-4 Logging Systems by Alternative

Alternative	Ground Based Yarding (acres)	Skyline Yarding (acres)	Helicopter Yarding (acres)
1	0	0	0
2	173	617	465

Alternative	Ground Based Yarding (acres)	Skyline Yarding (acres)	Helicopter Yarding (acres)
3	179	738	359

## 2.4 Mitigation Measures

In response to public comments and internal input on the proposal, mitigation measures were developed to ease some of the potential impacts that commercial thinning may have on various resources in the project area. The mitigation measures may be applied to any of the action alternatives. Mitigation measures are defined by the Council of Environmental Quality (CEQ) Regulations as:

- avoiding the impact all together by not taking a certain action or certain parts of an action,
- minimizing impacts by limiting the degree of magnitude of the action and its implementation, rectifying the impacts by repairing, rehabilitating, or restoring the affected environment,
- reducing or eliminating the impact over time by preservation and maintenance operations during the life of an action or,
- compensating for the impact by replacing or providing substitute resources or environments.

Table 2-5. Mitigation Measures for the French Bug Timber Sale

Units	Mitigation Activity
<b>Wildlife and Fisheries</b>	
22, 23, 39, 47, 48, 55, 57	To protect Northern Spotted Owls, no Type 1 helicopter (CH-47 Chinook, UH-60 Blackhawk and other heavy lifting ships) yarding 3/1 - 9/30. <i>Note: K-max helicopters are considered type 2 for noise disturbance.</i>
39	To protect Northern Spotted Owls, no helicopter yarding 3/1 – 7/15.
2, 5, 6, 22, 23, 28, 39, 47, 48, 55	To protect Northern Spotted Owls, no burning 3/1 – 7/15
Stand #4004997 (adjacent to Unit #20)	To protect Northern Spotted Owls, no precommercial thinning 3/1 – 7/15
23	To protect Northern Spotted Owls, no aerial fertilization 3/1 – 7/15
34, 35, 37, 38	To protect fisheries resources, no haul 10/16 -5/14
4, 16, 51, 52, 54, 55, and 57	To protect big game winter range, no helicopter operations (from 1/1-4/15)
30, 31, 33, 35 (south of the 4696 road), 36 (from 12/1-4/15) and 15, 16, 21 portion of the unit north of the Santiam River on the 2225-010 road. (from 1/1-4/15)	To protect big game winter range, no operations <i>Note: dates vary</i>
All units	Protect all raptor and colonial nesting bird nest sites to comply with Forest Plan S&Gs. Nest site protection will be a no harvest area within one tree height of

Units	Mitigation Activity
	known nest sites. Directional felling away from known nest trees should be specified in the timber sale contract to avoid direct impacts to the nest site. Nest sites located during harvest operations are to be reported to the district wildlife biologist when encountered by U.S. Forest Service personnel, contractors or others.
19, 20, 21, 60, 62	To protect nesting ospreys, no harvest operations 3/1-7/31
16, 22, 23	To protect nesting ospreys, no helicopter yarding 3/1-7/31
22, 23	To protect nesting ospreys, no precommercial thinning 3/1-7/31
52	To protect nesting ospreys, no harvest operations 4/1-7/31
16, 19, 20, 21, 60, 62	To protect bald eagles, no harvest operations 1/1 - 8/30
19	To protect Peregrine falcons, no helicopter operations 1/15-7/31
20, 21, 22, 23, 24, 25, 60, 62, 64	To protect Peregrine falcons, no operations 1/15-7/31
23	To protect Peregrine falcons, no Aerial Fertilization 1/15-7/31
21, 24, 33, 35 (south of road 4696), 36	To protect Harlequin ducks, no operations 3/15-7/15
Multiple	Existing old growth trees should be retained in all harvest areas as they generally have defect and provide some benefit to snag dependant species. It is estimated less than 20 old growth trees are present in all proposed harvest units.
<b>TES and Noxious Weeds</b>	
All	Eradicate high risk weed populations along roads and disturbed project activity along powerlines to prevent establishment of these small populations, with chemical and manual, scotch broom, black berry and weed canary grass. Forest direction is to eradicate new invader infestations.
All	Contain the existing noxious weed populations and new populations within managed areas. This includes monitor disturbed like gaps and roads after timber sale for 5 years and first year initial eradication. Mitigation measure to reduce cumulative affects of the project.
8, 10, 16, 20, 30, 31, 33, 35, 36, 45, 47, 54, 60, 62, 64	30 foot no harvest buffer between all gaps which abut the powerline corridor and the remainder of the unit to prevent spread of noxious weeds.
16, 22, 23, 24, 28, 31, 35, 36	Avoid known <i>Peltigera Pacifica</i> sites by 200 foot buffers
<b>Recreation &amp; Visuals</b>	
31	Close Humbug Trail during tree falling operations.
31	Restore temporary road back to hiking trail width and obliterate sections visible from Road 46 and Humbug Trail.
19, 21, 24	For visuals, handpile slash and logging debris <b>2 ½ chains</b> where visible from the Breitenbush Road within one year of project completion. Visual cleanup of slash including grapple piling from road, hand piling, burning, chunking, scattering or chipping. Piles will be placed in manner to minimize charring/damage of residual trees. All logging debris at landings, pullouts and dispersed sites will be cleaned up. Slash treatment may require end haul of residual cull decks, cut stumps and rootwads to an approved location.
31, 33	For visuals, handpile slash and logging debris 1 chain after the 50' no cut buffer along the Breitenbush Road.
34, 35, 38	Visual cleanup <b>½ chain</b> where visible from road. Visual cleanup of slash including grapple piling/burning, chunking, scattering or chipping. All logging

Units	Mitigation Activity
	debris at landings and dispersed sites will be removed. Slash treatment may require end haul of residual cull decks, cut stumps and rootwads to an approved location. This end haul, however, is not the responsibility of the purchaser.
Roads # 46, 2233, 2225, 4695, 4696, 4697	Purchaser shall post “truck traffic ahead” signs to warn travelers coming from either direction.
Roads #46, 2233, 2225, 4695, 4696, 4697	Purchaser shall sign expected traffic delays, as appropriate
Recreation & Visuals (Harvest Restrictions)	
All	No hauling Memorial Day and Labor Day weekends Friday 5 PM through Monday midnight. No Hauling 4 <sup>th</sup> of July Weekend (the weekend that the City of Detroit has their fireworks) Friday 5PM through Monday midnight. If July 4 falls outside the holiday weekend, restrict haul on that day until midnight.
16, 19, 60, 20, 62, 22, 23, 25, 64, 30, 33, 35, 36	No helicopter operations Memorial Day and Labor Day weekends Friday through Sunday. No Hauling 4 <sup>th</sup> of July Weekend Friday through Sunday. If 4 <sup>th</sup> of July falls on a Monday, no hauling Friday through Monday.
19, 21, 31, 33, 60 (portions of these)	Between Memorial Day Weekend and Labor Day Weekend, no harvest operations or helicopter yarding within ¼ mile of Humbug Campground and Upper Arm Day Use Area on any Saturday or Sunday.
Heritage Resources	
1, 7, 40, 41, 42, 45, 53	Directional falling of trees away from the historic logging railroad grade segments (06180400979) and full suspension of trees over the grade segments is required to protect the grade’s integrity within required units. The goal is to prevent further damage to the historic railroad logging grade. The timber sale layout crew and the timber sale officer will work with the archaeologist to insure that each segment is flagged on the ground prior to timber harvest.
NA	A 150 to 164 foot buffer will adequately protect sites 06180400131, 06180400037, and 06180400154 (TSO and Layout Crew need to work with the Archaeologist to insure proper buffer width).
NA	The district archaeologist will conduct post-harvest monitoring to document the condition of each of the above listed cultural sites

## 2.5 Project Design Measures

Design measures are actions common to most projects that provide resource protection to ensure activities are consistent with the Willamette Forest Plan Standards and Guidelines. All design measures would be in place unless directed otherwise or waived by Forest Service personnel. Design measures provide resource protections that ensure implementation activities remain consistent with Willamette Forest Plan Standards and Guidelines. Common design measures are listed in table 2-6.

Table 2-6 Common Design Measures

Units	Design Measures	Dates
Fuels & Air Quality		
All	Conduct a post-harvest field evaluation to verify actual fuel loadings. Reduce fuel loading in harvest units that exceed the maximum levels specified in the Forest Plan. Fuel loadings should not exceed 7-11 tons per acre in the 0-3 inch size class and 8-12 tons per acre in the 3-9 inch diameter class.	NA



Units	Design Measures	Dates
All	Conduct fuel burning to meet air quality requirements specified by the state of Oregon Smoke Management Plan	During burning season
All – specific to landings	Slash Disposal and Storage: Landings that may be used for more than one unit must be planned so as to accommodate anticipated large volumes of slash. Machine piles may be created at any landing area and along any roads adjacent to units within the project area. Machine piles should be piled in haystack fashion, meaning that the heights of the piles are approximately equal to their widths. Care should be taken to make piles so as to minimize damage to standing trees during the burning phase. Machine and landing piles will be burned during the fall/winter.	NA
<b>Botany (Noxious Weeds and Special Habitats)</b>		
All	Survey to locate invasive weed populations and remove them where possible in harvest units and along adjacent roads	NA
All	Pressure wash construction and logging equipment prior to entering the sale area	NA
All	Obtain gravel for road construction and reconstruction from a weed-free rock source.	NA
All	Minimize areas of soil disturbance during all harvest activities including spur road construction and re-opening, road reconstruction, fuels treatment, etc. Seed all heavily disturbed areas with native species, including landings and subsoiled skid roads to reduce weed establishment.	NA
All	Special habitats, including seeps rock outcrops and gardens, caves, and meadows, would be protected in accordance with the Forest Plan and the Special Habitat Management Guide. Protection measures include: Directional falling away from special habitats Avoiding placement of equipment, landings, skyline corridors, and designated skid roads through special habitats Seeps and small wetlands will have a 100 foot buffer of no cut with an additional 100 foot buffer of no gaps	NA
<b>Soils</b>		
1,2,3,4,5,6,1214, 20,22,23,24,25,27, 30,38,39,40,4145, 47,48,51,5455,56, 57,61,62,63,64	Retain 60-80 percent of the existing duff	NA
19,26,33,36,59,60	Retain 50-70percent of the existing duff	
21,52	Retain 40-60 percent of the existing duff	
10,11,16,35, 43,53	Retain 30-50 percent of the existing duff	
7,8,13,15,29,31,34 ,37,42	Retain 20-40 percent of the existing duff	
All	On units where ground based yarding is prescribed, Tractor skid roads must be located in advance of felling activities.	NA
All	Ground-based equipment should operate in the dry season. This measure may be waived by Forest Service personnel if dry conditions exist outside this season. Unclassified or temporary roads used outside the standard operating season, may need to be rocked, snow covered, or frozen to reduce the potential for erosion.	Dry Season (May – October)

Units	Design Measures	Dates
All	Open roads should be storm proofed if they have to sit through extended periods of wet weather. <i>Note: Does not apply to the 703 road. See mitigations table.</i>	NA
All	Horses and ground -based equipment are usually limited to side slopes less than 30%, unless otherwise directed by Forest Service personnel, in order to reduce soil disturbance.	NA
All	Ground-based skidding equipment shall stay on designated skid trails. Ground-based skid trails would be pre-designated and pre-approved before use. Skid roads should not exceed 15 feet in width, and the objective is to maintain a 10 to 12 foot width throughout the length. Where practical the skidder, cat, or processor/forwarder should travel on slash to reduce off site soil erosion and lessen soil compaction.	NA
All	At the completion of harvest activities, limbs and woody debris should be placed on exposed soil to reduce off site erosion.	NA
All	Trees, not designated for harvest in riparian buffers that need to be cut to facilitate harvest operations, should be dropped into the stream if possible to aid in woody debris recruitment.	NA
All	Avoid disturbance to existing large down woody debris.	NA
All	At the completion of harvest activities, tractor skid roads should be water barred and scarified as needed. Waterbars should be block the in-board ditch.	NA
All	Skid roads and landings should be sub-soiled in order to reduce compaction and return the site to near original productivity. Subsoiling needs to be considered in light of the potential for root pruning, damage to existing regeneration, and the increased amount of soil disturbance.	NA
<b>Aquatics</b>		
All	No harvest buffers are set at 100 feet from listed fish habitat. Between 101 feet and 1 mile from LFH, the no harvest buffer is 50' for both perennial and intermittent streams. More than 1 mile from LFH, no harvest buffer is 50' for perennial and 30' for intermittent streams	NA
All	No harvest in the primary shade zone (approximately 50'-60' feet from perennial streams).	NA
All	Canopy cover must be maintained at 50% or greater in the secondary shade zone (approximately 172' from perennial streams).	NA
<b>Recreation &amp; Visuals</b>		
31	Coordinate location of facilities and underground water line with Recreation during layout to protect all facilities from damage. No falling trees, skidding or driving over lines.	During layout
31	Humbug Trail, a class I trail, has a 75' no harvest corridor. Fall trees away from the trail corridor.	During layout
8, 10, 11, 15, 16, 19, 21, 24, 31, 33, 34, 35, 36 and 37	Locate or minimize skid trails to reduce encroachment by vehicles and/or visual impacts.	N/A
All	Locate gaps 200' from Breitenbush Road, Humbug Campground and dispersed sites, 150' from Humbug Flats Trail and campground; and 100' from other roads and dispersed sites unless prescribed by visual resource specialist. Larger gaps should be placed outside of viewshed retention zones and Humbug Flats Trail. In the middleground (Highway 22, Detroit Lake), locate on natural terraces and borrow from adjacent natural land patterns. Create variable shape on larger gaps.	During layout

Units	Design Measures	Dates
Unit 33, 36, 62, 64	Place small gaps in coordination with visual specialist adjacent powerline corridor to reduce lineal edge effect.	During layout
19, 21, 24, 31, 33	Within the Breitenbush Road corridor, minimize any disturbance in the immediate (visible) foreground as a result of ground based impacts to the greatest extent practical. Rip any skid roads, block with logs and/or barrier rocks grouped in natural appearing arrangements with 1/3-1/2 buried, and plant sapling sized trees. End-haul all visible grubbed stumps or scatter to approved locations. Stumps shall not be used as traffic control barriers. Fall and skid trees in the immediate foreground in manner to protect and avoid damaging understory regeneration and residual trees to the greatest extent practical.	Within one of treatment.
19, 21, 24, 31, 33	Any new landings, skid roads and temporary roads shall be coordinated with and located in consultation with the recreation/visual resource specialist.	N/A
19, 20, 21, 22, 23, 24, 25, 26, 30, 31, 33, 36, 35, 60, 62, 64	Tree marking shall be visually sensitive within the Breitenbush Corridor. The objective is to reduce any visible marking paint from the Breitenbush Road to the greatest extent practical. Use tags in place of paint in visible areas except for corner boundaries.	NA
19, 20, 21, 24, 31, 33	Flush cut stumps visible from roads as close to the ground as possible with a slight angle facing away so stump tops are not viewed from travel ways (aprox. 2 chains). Cut stumps must be hauled off to an approved location or moved out of sight.	Within one year of treatment.
5, 30	Place corridors at angles to minimize visibility from critical views. Consult with visual resources on skyline corridors during operations to get desired end-result.	
Roads		
All	Purchaser is responsible for repairing road damage that occurs during logging operations.	NA
All	Maintain all haul routes in stable conditions.	NA
All	Excessive dust would trigger watering or other dust abatement activities.	NA
Heritage Resources		
All	All National Register of Historic Places (NRHP) eligible sites and potentially eligible sites would be avoided during all project activities.	NA
All	Changes to the current unit configurations and/or the addition of any new units, would require consultation with the District Archaeologist in order to protect known and unknown heritage resources.	NA
All	Project activities planned outside of the area defined in the heritage resource inventory schema must be coordinated with the district archaeologist prior to initiation. This includes the establishment of harvest and helicopter landings, guy-line equipment anchors, slash burning, removal of roadside danger trees, and silvicultural treatments.	NA
All	In order to extend protection to heritage resources which have not yet been discovered, but which may be uncovered during the course of project activities, contract clause BT6.24 must be included in all project prospecti and contracts. The contract clause outlines the procedures to follow in the event heritage resources are discovered.	NA

## 2.6 Comparison of Alternatives

Table 2-7 Comparison of Alternatives

Management Activity	Units	Alt 1	Alt 2	Alt 3
<b>Vegetation</b>				
Thinning to 50-70 trees per acre	Acres	0	391	392
Thinning to 80-110 trees per acre	Acres	0	792	812
Thinning to 110 trees per acre	Acres	0	60	60
Gaps only stands	Acres	0	12	12
Small (1/2 acre gaps) <sup>2</sup>	Acres	0	34	21
Large (1-3 acre gaps)	Acres	0	0	30
Total Harvest	Acres	0	1255	1276
Estimated Timber Volume	MMBF	0	14.6	15.1
<b>Logging Systems</b>				
Ground Based Harvest	Acres	0	173	179
Skyline Harvest	Acres	0	617	738
Helicopter Harvest	Acres	0	465	359
<b>Fire &amp; Fuels</b>				
Grapple pile and burn in units and landings	Acres	0	Approx. 650	Approx. 650
Underburning	Acres	0	1	25
<b>Wildlife</b>				
<b>French BGEA<sup>3</sup></b>				
Size and Spacing of Forage (HEs) (Min Forest Plan Value = .40)	Existing Habitat Effectiveness Value	.91	The small increase in forage would not measurably change the current habitat effectiveness values for forage in the BGEA's. The effects resulting from road management would be no change from those described for the existing condition.	Forage: same as Alternative 2; Roads: The effects resulting from road management would be a decrease in road density in winter range.
Cover (HEc) (Min Forest Plan Value = .40)		.60		
Forage (HEf) (Min Forest Plan Value = .40)		.17		
Road Density (HEr) (Min Forest Plan Value = .40)		.42		
Overall (HEI) (Min Forest Plan Value = .50)		.44		

<sup>2</sup> Gap acres are already included in the total harvest acres as part of thinning treatments.

<sup>3</sup> Existing habitat effectiveness values are shown. Treatment would not measurably change model values. Explanation of anticipated effects is provided by treatment type.

Management Activity	Units	Alt 1	Alt 2	Alt 3
Road Closures	Miles of closure	0	0	2 miles of year-round closure; 4.3 miles of winter closure
<b>Spotted Owl – Habitat Removed</b>				
Suitable Habitat (includes nesting and foraging)	Ac	7,496 acres in the project area	0 acres thinned or removed	0 acres thinned or removed
Thinning in Dispersal Habitat	Ac	9,127 acres in project area	969 acres thinned (outside CHU); 288 acres (within CHU). All acres remain dispersal habitat.	Same as Alternative 2
<b>Hydrology &amp; Fisheries</b>				
Changes in Risk of Altered Peak Flows (Aggregate Recovery Percentage) NOTE: Midpoint represents a minimum safe level of vegetative recovery to prevent substantial alteration of peak flow regimes as a result of management activities. Current values are 21.44% above midpoint	% Change in ARP above the midpoint value	0	<1%	<1%
<b>Recreation &amp; Visual Quality</b>				
Number of days of operation (Cutting, skidding, skyline yarding)	Days	0	386 days	466 days
Number of days of Helicopter Yarding	Days	0	46 days	42 days
Number of days of Truck Hauling	Days	0	522 days	539 days
<b>Engineering (Roads)</b>				
Road Pre-Haul Maintenance	Miles	0	34.0	36.0
Road Reconstruction	Miles	0	2.0	4.4
Road Realignment	Miles	0	0	0.12
Opening Existing Temp. Roads	Miles	0	.48	.48
New Temp. Road Construction	Miles	0	.38	.78
<b>Economic Analysis</b>				
Net Present Value	\$	0	\$90,471	\$444,688
Cost/Benefit Ratio (Gross value/Associated costs)	Ratio	0	1.10	1.50
Jobs created	Number of jobs	0	51 jobs in the logging sector; 58 jobs in forest products manufacturing	53 jobs in the logging sector; 60 jobs in forest products manufacturing

## Chapter 3 – Existing Conditions and Environmental Consequences

This section summarizes the physical, biological, social and economic environments of the affected project area and the potential changes to those environments due to implementation of the alternatives. It also presents the scientific and analytical basis for comparison of alternatives presented in the table in Chapter 2.

### 3.1 Past, Present and Reasonably Foreseeable Future Activities

The cumulative effects discussed in this section include an analysis and a concise description of the identifiable present effects of past actions. These effects are described to the extent that they are relevant and useful in analyzing whether the reasonably foreseeable effects of the agency proposal for action and its alternatives may have a continuing, additive, and significant relationship to those effects. The cumulative effects of the proposed action and the alternatives in this analysis are primarily based on the aggregate effects of the past, present, and reasonably foreseeable future actions. Individual effects of past actions are not listed or analyzed, and are not necessary to describe the cumulative effects of this proposal or the alternatives. (CEQ Memorandum, Guidance on the Consideration of Past Actions in Cumulative Effects Analysis, June 24, 2005.)

The French Bug Project falls into four sub-watersheds Detroit Reservoir, Humbug Creek, Lower Breitenbush River and the Middle Breitenbush River. Table 3-1 shows units by sub-watershed.

Table 3-1 Units by Subwatershed

Subwatershed	Unit Acres	% of Units
Lower Breitenbush	531	42
Detroit Reservoir	544	43
Humbug Creek	176	15
Middle Breitenbush River	25	<1

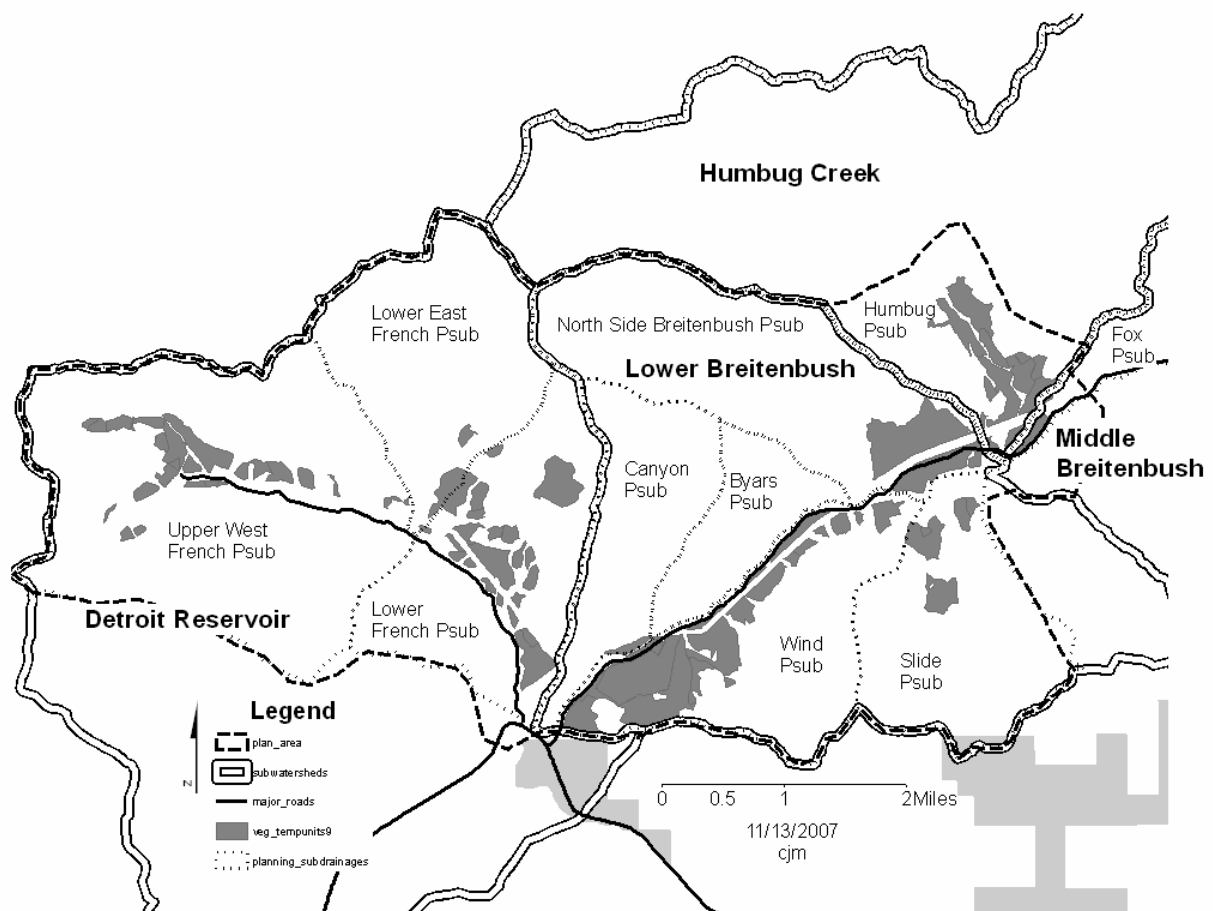
These four sub-watersheds together cover 49,000 acres. The project area covers 17,300 acres. There is a very small portion (approximately fifty acres) of private land in the project area.

#### 3.1.1 Analysis Scales

There are five major analysis scales of interest for this environmental assessment: 1) Detroit Tributaries and Breitenbush Watersheds comprise the largest analysis scale and are used in the two Watershed Analyses that guide management in the planning area; 2) four sub-watersheds (Detroit Reservoir/French Creek, Humbug, Lower Breitenbush and Middle Breitenbush) which cover 49,000 acres are used for analysis by several resource areas; 3) planning subdrainages (Upper West French, Lower East French, North Side Breitenbush,

Humbug, Fox, Lower French, Canyon, Byars, Wind and Slide) are used to analyze compliance with several Willamette Forest Plan requirements and 4) the project area, roughly 17,300 acres that contains the sale area and surrounding acres, is an analysis scale for some background information, direct and indirect effects as well as some portions of the cumulative effects analysis. The project area begins west of French Creek and extends east to include the lower reaches of Humbug Creek. The northern border is formed by the ridge that runs between Boulder Peak and Gold Butte Lookout. The southern edge of the project area is formed by Hoover Ridge. 5) The 1276 acres of actual sale units (harvest area) are the smallest scale of analysis discussed in the document. These analysis scales are depicted in Figure 3-1. Other scales and areas used for analysis included, Big Game Emphasis Areas, the Spotted Owl Area of Concern and Critical Habitat Units. Each resource considers effects (including cumulative effects) at a scale appropriate for that resource.

Figure 3-1 Analysis Scales Planning Sub Drainages (Psub) and Sub-watersheds (in bold)



### 3.1.2 Vegetation Management

Beginning in the early 1900s with railroad logging and until the 1980s, the most common type of timber harvesting was clearcutting. Since 1990, shelterwood and commercial thinning have been the most widely used method of timber harvest (see table 3-2 and figure 3-2). Harvesting peaked

from the 1960s through the 1980s. Today approximately 41% of the sub-watersheds' acres have had timber harvest activities. Within the French Bug planning area, approximately 55% of the acres have had timber harvest activities.

Future timber harvest activities planned within the Detroit Reservoir/French Creek sub-watershed includes the Margie timber sale. It would include approximately 1200 acres of commercial thinning. Planning for this sale would begin in 2009, with implementation expected between 2012 and 2015. It is unknown at this time if there will be road construction associated with this sale.

A utility powerline corridor runs through much of the project area. Some limited vegetation management occurs in conjunction with the operation and maintenance of the powerline. This vegetation management includes regular maintenance of vegetation growing under the powerline and "danger tree" removal. Vegetation management under the powerline is intended to keep trees and other vegetation from growing into the powerline. Danger tree removal is intended to prevent trees from toppling into the powerline corridor. Danger tree removal adjacent to the corridor is limited, typically averaging two or three trees a year. It is not anticipated that the continued operation and management of this powerline will contribute to cumulative effects in the project area.

Other relevant vegetation activities within the four sub-watersheds include precommercial thinning of managed stands. A total of 7,300 acres have been precommercially thinned within the sub-watersheds. Within the next five years about 500 acres of managed stands will be precommercially thinned.

Table 3-2 Past Timber Harvest in French Bug Sub-Watersheds

Decade	Acres of Clearcut (Regen harvest)	Acres of Partial Cut/Salvage	Acres of Commercial Thin
1900-1919	1314		
1920-1929	896		
1930-1939	1141		
1940-1949	164		
1950-1959	1740	13	
1960-1969	3606	37	
1970-1979	2336	406	298
1980-1989	4439	292	1349
1990-1999	573	723	1226
2000-2006	28	351	1141
Total:	16,237	1,822	4,014



Figure 3-2 Past Harvest Activities

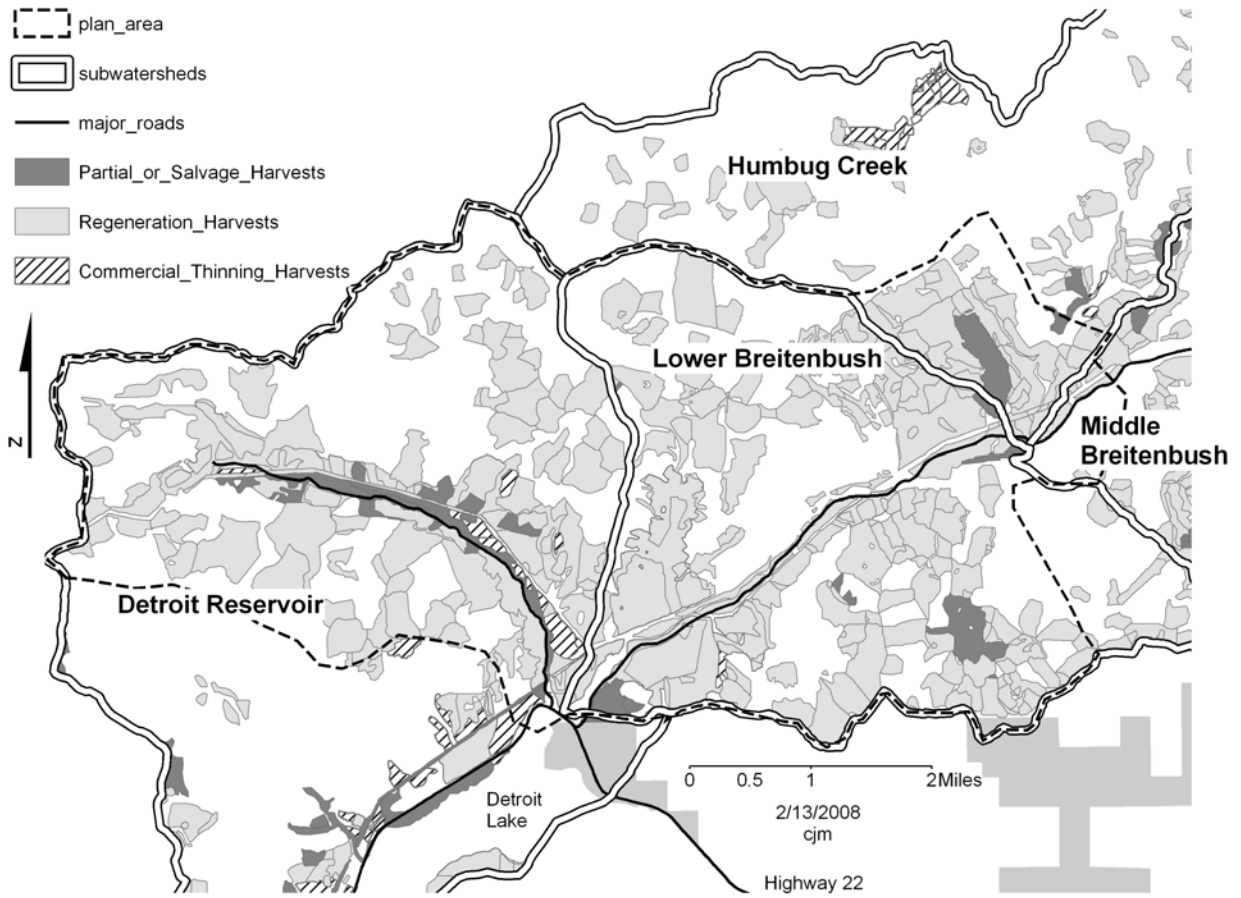
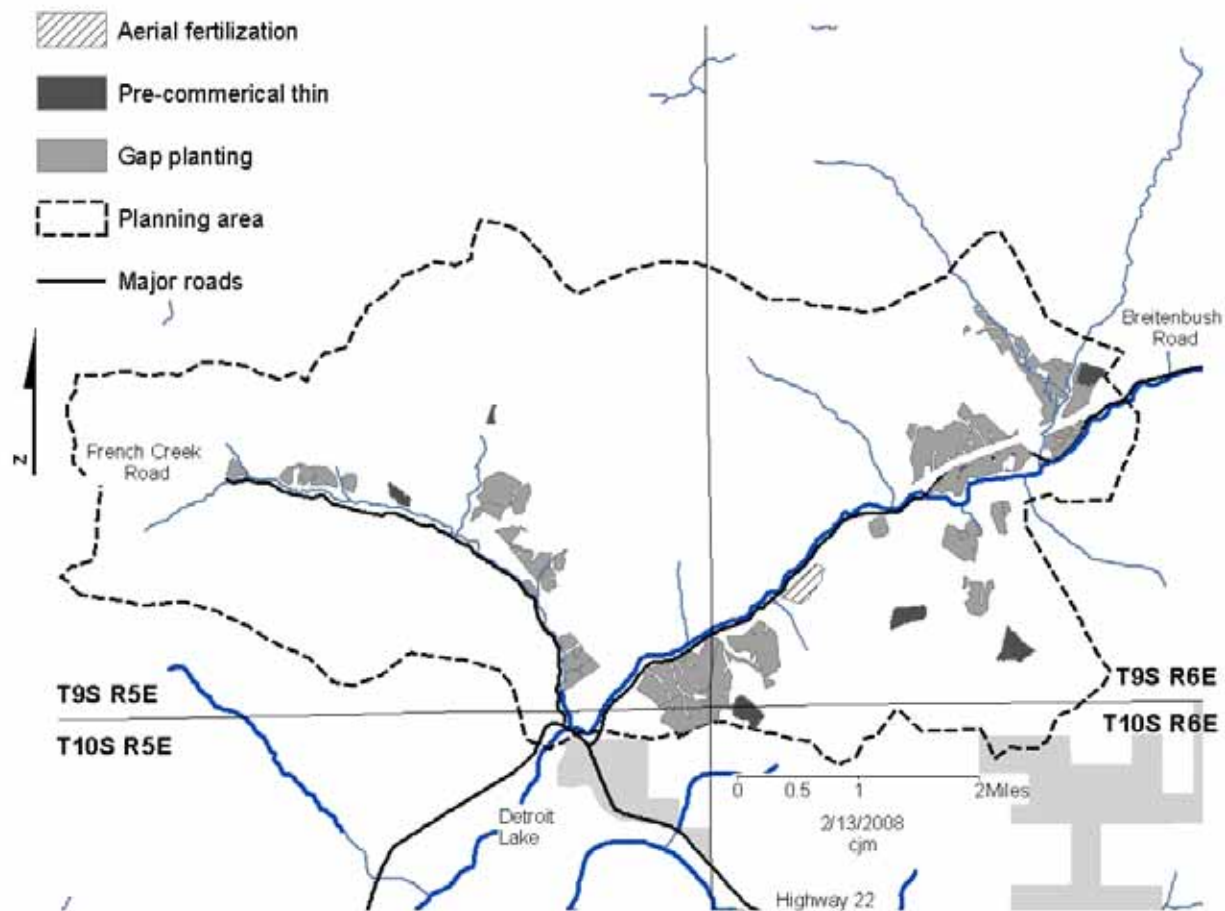


Figure 3-3 Future Timber Stand Improvements in French Bug



### 3.1.3 Transportation System Maintenance

There are currently about 182 miles of Forest System Roads in the planning area. About 21 miles these roads are “Level 1” or closed to public motorized use.

Future road maintenance includes major improvements to the Breitenbush road. This includes some sections of overlay paving and asphalt patches from Highway 22 up to the Mt Hood National Forest boundary, with a few sections beyond the boundary. All guard rails, including sections of guard rails on bridges, will be replaced and brought up to standards as part of this project. There will be some sections of deep patch fill stabilizations. Deep patch fill stabilization involves digging down several feet, installing geogrid reinforcements and rebuilding the road prism. A section of road about eight miles from highway 22 would be stabilized by removing water from the adjacent hillside with horizontal drains. Some removal of loose rock will occur in areas where material commonly falls into the road prism. These activities will be completed in summer of 2008. This project involves improvements to the Breitenbush road (46) only. No maintenance of other system roads is scheduled.

Annual maintenance would also occur in the future. Forest Service system roads receive annual maintenance in accordance with established road management objectives. Road maintenance

work includes activities to reduce brush, clean out drainages, and repair road surfaces on many of the key and secondary roads in the project area (Willamette Roads Analysis, 2003).

### 3.1.4 Stream Restoration

Past stream restoration activities include replacing the culverts on Humbug Creek to allow for fish passage, placing large wood structures in French Creek and obliterating and decommissioning the 703 road.

A program called Respect the River was implemented in 2007 and 2008 along the Breitenbush, French Creek and Little North Fork of the Santiam River. This program physically restores the damaged riparian areas by de-compacting soils with heavy equipment or by hand, re-vegetating with native vegetation, placing large rocks or other physical barriers to eliminate unwanted off road vehicle traffic, physically removing invasive weeds, and site hardening of trails and camping areas. The program also includes public education through public contact, interpretative signs, and information kiosks. There are approximately 15 sites on the Little North Fork Santiam River, 25 sites on the Breitenbush River from Detroit Lake to the 4685-302 road, 5 sites on French Creek near Detroit Lake, and 5 sites on Whitewater Creek.

Future stream restoration efforts include fish habitat improvements on 1.5 miles of French Creek. Improvements include adding large woody material in 80 structures. Large wood will be placed by line-pulling trees into the channel. Trees (with their roots left intact) would be removed from adjacent, densely-stocked conifer stands. Yarding systems are currently being explored. The same type of treatment would occur for 0.4 mi. of the north fork tributary of French Creek and 0.3 mi. of the south fork of French Creek. These streams also bear native trout.

### 3.1.5 Weed Eradication

Past projects of weed eradication include removal and continued control of noxious weeds at the Upper Arm Day Use area. Sites included with this project include the beach area and nearby weed waste pile located at the interpretive sign across the Breitenbush Road. In Spring of 2008, a recently documented population of False brome (*Brachypodium sylvaticum*) along the Breitenbush Road was sprayed. Control and monitoring will continue until this population is gone. Foreseeable future actions include continued control of the Upper Arm Day Use site. This will include removal of newly sprouted weeds. Additional control and monitoring will occur in locations along haul routes and near units in the French Bug planning area. Aggressive control will occur where roads cross powerlines.

### 3.1.6 Potential Post Sale Resource Enhancement Projects

Depending on the amount of available funding that may result from the sale of the French Bug timber sale, any number of the following resource enhancement projects could be implemented. All post sale resource enhancement projects are listed in Appendix E.

## 3.2 Vegetation

### Introduction

The purpose of the project is to reduce tree density in the stands in order to enhance tree growth, promote structural and species diversity, and provide wood products to the local community.

Currently these stands have a dense overstory and limited understory species abundance. The trees are beginning to compete for sunlight, water, and nutrients causing suppression mortality of the smaller diameter trees and a slowing down of tree growth. Most stands have uniform stocking, lack natural canopy gaps, and are dominated by a single tree species. Density management is proposed in these stands to 1) maintain or improve tree growth for vigorous growing, healthy stands and 2) provide for understory development to enhance species and structural diversity.

## **Regulatory Framework**

- Willamette National Forest Plan Standards and Guidelines (FW-181, 182, 188, 189, 190, 192, 193)
- Land Management Allocations 14a, 11a, 11c, 11f, 15
- Northwest Forest Plan Matrix Allocations and Riparian Reserves
- Detroit Tributaries Watershed Analysis (1997)
- Breitenbush Watershed Analysis (1996)

## **Analysis Methods**

### **Models, Methodologies Used**

Existing and future stand conditions were quantified and modeled using stand examination data collected in 2007 and the Forest Vegetation Simulator Model (Donnelly and Johnson, 1997). In addition, ArcGIS version 9.2 was used for mapping analysis.

### **Scale of Analysis and Measurement Criteria**

Two spatial scales are used in the following discussion: 1) the stand scale and 2) the landscape scale. The stand scale refers to an area between 2 and 150 acres in size and is the proposed units. The landscape scale focuses on larger scale conditions, such as forest vegetation patterns, and is a) the Detroit Tributaries and Breitenbush watersheds or b) the four sub-watersheds identified in Section 3.1.

At the stand level, overstory canopy closure and tree diameter growth were measured to evaluate the effects of the alternatives on the vegetation in terms of increased structural complexity and enhanced tree growth.

At the landscape scale, a late-successional structural index was used to evaluate the effects of the alternatives on the acceleration of the development of late-successional stand characteristics. This structural index includes thresholds for four major characteristics of late-successional stands 1) density of large conifers in the overstory, 2) density of shade-tolerant conifers in the understory, 3) density of large snags, and 4) density of large down wood. Structural index is discussed further in the Vegetation Direct and Indirect Effects section.

## **Existing Condition**

### **Existing Condition – Landscape Scale**

The Detroit Tributaries and Breitenbush watersheds are primarily within the western hemlock plant series. Plant series reflect differences in local environmental conditions and can provide

insight to potential natural vegetation pathways. The western hemlock series dominates the Westside Cascades of northwest Oregon and spans a wide range in precipitation and temperature. Older natural stands within this series are generally dominated by Douglas-fir, western hemlock, and western redcedar.

The dominant disturbance agents influencing landscape vegetation patterns within the watersheds have been fire and timber harvesting. Lightning has been the primary cause for most of the large historic fires in the area. Numerous large fires in the watersheds occurred in the late 1800s through the early 1900s (USDA, 1996; USDA, 1997). Timber harvesting began in the early 1900s with railroad logging beginning in what is now the Detroit Reservoir area.

These disturbance agents have resulted in a mix of structural stages across the watersheds. Forest age classes that develop after disturbances are often used to characterize stages of forest structural conditions or seral stages. The two watershed analyses used the following four stages to characterize vegetation structural stages:

- Stand Initiation – in this stage the stand is young, has an open canopy, and is generally 1 to 20 years old.
- Stem Exclusion – in this stage the stand transitions from an open growing stand into a dense, closed canopy forest. New trees are prevented from establishing and smaller existing live trees may die due to competition for sunlight, water, and nutrients. This structural stage includes stands that range in age from 20 to 150 years, depending on site conditions.
- Understory Reinitiation – in this stage the stand transitions from a dense, closed canopy into a stand where an understory begins to develop in response to small openings in the canopy (Oliver and Larson, 1990). This structural stage includes stands that range in age from 80 to 250 years, depending on site conditions.
- Old Growth – in this stage the stand is typically over 200 years old and includes the “transition stage” and the “shifting gap stage” as defined by the Northwest Forest Plan. Stand characteristics include large live trees, multiple canopy layers, coarse woody debris accumulation, and small gap-type disturbances. (USDA and USDI, 1994a)

For this analysis, the understory reinitiation and old growth stage will be combined into a “late-successional” stage. These two stages are often combined because natural stands of mixed ages make separation of these older stages difficult.

The two watershed analyses looked at current (1995) seral conditions versus historical (1895) seral conditions by plant series. The reference date of 1895 was used because it was assumed that there was not much human influence at that time and because a very active fire period followed. The Detroit Tributaries watershed analysis also established an historical range of variability from 1600 to 1850 based on a Sub-Regional Assessment done for the North Santiam Sub-basin. Both analyses showed, that for the western hemlock plant series, there have been some changes in the percentages of each structural stage between the reference and current conditions. Table 3-3 shows that there is far more stem exclusion acreage and far less late-successional acreage now than approximately 100 years ago and from the average of the historical range of variability. There has been an increase in the amount of non-forest area in the Detroit Tributaries Watersheds primarily due to the Detroit Reservoir. (USDA, 1996; USDA, 1997)

Table 3-3. Estimate of current and historical percent acres in each structural stage with the two watersheds' western hemlock plant series.

Year	Western Hemlock Series (Breitenbush Watershed Analysis)		Western Hemlock Series (Detroit Tributaries Watershed Analysis)		
	1895 (% acres)	1995 (% acres)	1600-1850 (% acres)	1895 (% acres)	1995 (% acres)
Stand Initiation	25%	30%	18%	21%	18%
Stem Exclusion	15%	35%	22%	8%	47%
Late-Successional (UR and OG)	55%	30%	60%	69%	17%
Non-Forest	5%	5%	n/a	2%	18%

The dominant small-scale disturbance agents across the landscape include fire, wind, snow, and root diseases. These disturbances have generally resulted in small openings within stands providing structural and species diversity. Although the watersheds have seen numerous large stand replacing fires in the last 100 years, periodic small fires have been a normal and recurring part of the watersheds.

Both wind and snow have also caused periodic small openings. In 1990, a windstorm in the watersheds caused blowdown and created small openings in areas along roads and power lines. Heavy snow in 1996 caused tree breakage in some stands in the watershed resulting in small scattered openings. There are two primary root diseases endemic to the area: *Phellinus weirii* and *Armillaria mellea*. Both of these root diseases have caused mortality at low levels in the conifers resulting in small scattered openings.

### Existing Condition – Stand Scale – commercial thinning and gap stands

The fifty-two stands proposed for treatment were originally clearcut harvested. The stands were planted or seeded with primarily Douglas-fir and are now 34 to 76 years old. A mixture of other conifer species has naturally seeded in over time and includes western hemlock, and western redcedar.

Twenty-five of the stands were commercially thinned in the late 1980s through mid 1990s. They were originally thinned lightly, removing 1/4 to 1/3 of the standing volume, and quickly closed back into a dense overstory allowing for little understory development. Twenty-four of the stands have not been commercially thinned and also have a dense overstory with even less understory development. Table 3-4 demonstrates that the commercially thinned stands are larger in diameter than the previously unthinned stands but show very little difference in other stand attributes. The three stands proposed for gaps only were recently commercially thinned from 2003 through 2005 and have not yet begun to develop an understory.

Today, all stands are largely single-storied and dominated by Douglas-fir with a minor amount of other trees species scattered throughout, but mostly in the understory. The stands have a uniform stocking and lack natural canopy gaps. The understory shrub vegetation includes vine maple, Pacific rhododendron, dwarf Oregon grape, and salal.

The stands are considered to be in the stem exclusion stage (Oliver and Larson, 1990). Stem exclusion stands have dense crowns that block out light to the forest floor and limit understory development. The trees are beginning to compete for sunlight, water, and nutrients causing

suppression mortality of the smaller diameter trees and a slowing down of tree growth. Average stand conditions can be found in Table 3-4. A unit by unit description of current stand conditions can be found in the Silvicultural Report in the French Bug Project file on the Detroit Ranger District.

Table 3-4 Average stand conditions

	Stands not previously commercially thinned	Stands previously commercially thinned	All stands
	Average	Average	Average
Age (total years)	58	61	59
Overstory diameter (inches)	14.3"	15.3"	14.9"
Overstory height (feet)	86'	87'	86'
Overstory trees per acre	186	173	172
Total canopy closure	79%	77%	78%

The stands range in average elevation from 1600 to 3100 feet with slopes ranging from 5 to 60%. The primary plant association identified in the stands is western hemlock/dwarf Oregon grape. This plant association is one of the most common associations in the Westside Cascades and occurs on warm, well-drained, moderately productive sites (McCain and Diaz, 2002). Older natural stands in this association tend to have a mix of Douglas-fir, western hemlock, and western redcedar in the overstory. Understory typically consists of western hemlock, western redcedar, dwarf Oregon grape, and vine maple. Table 3-6 provides a distribution of plant associations within the units.

### **Existing Conditions – Stand Scale (precommercial thinning and fertilization stands)**

The seven stands proposed for precommercial thinning in the planning area were clearcut harvested 13 to 24 years ago. The stands were planted with a mix of Douglas-fir, western redcedar, and western white pine. Today, the trees are densely stocked, averaging around 500 trees per acre, and are beginning to compete with each other for growing space.

There is one stand proposed for commercial thinning that is also proposed for nitrogen fertilization: Units 23. This stand is presently exhibiting yellowing (chlorotic) tree needles, slow growth, and contains a high amount of Pacific rhododendron, which often grows on nitrogen poor soils (McCain and Diaz, 2002). All indicators are that this unit is nitrogen deficient and limiting tree growth potential.

### **Environmental Consequences**

Direct and indirect effects of commercial thinning and gaps are demonstrated using Units 29 (a first commercial thin) and 52 (a second commercial thin). These units are used as sample stands because they represent the range of stand conditions in terms of age, tree density, and canopy closure. Direct and indirect effects are analyzed for the following areas: overstory canopy closure, tree growth and development of late successional stand characteristics.

### Direct and Indirect Effects – Overstory Canopy Closure (Thinning and gap stands)

An immediate direct effect of the action alternatives would be reduced overstory canopy closure from removing trees. Table 3-5 shows the canopy closure by alternatives for the two representative stands.

Table 3-5. Average canopy closure in units 29 and 52 by alternative<sup>1</sup>

Overstory Percent Canopy Closure			
Unit	Alt. 1	Alt. 2	Alt. 3
Unit 29	78%	55%	55%
Unit 52	61%	51%	51%

**Alternative 1** - The no thinning alternative maintains high overstory canopy closures. This high canopy closure allows minimal light to the forest floor resulting in continued heavy inter-tree competition and suppressed vegetation development in the understory.

**Alternatives 2 and 3** - An immediate direct effect of the action alternatives is reduced overstory canopy closure. As overstory canopy closure is reduced, more light reaches the understory and there is less competition for resources by the overstory. The degree of understory response is proportional to overstory reduction (Bailey et al, 1998). Thinning promotes the development of diverse, multi-layered stands by favoring an understory establishment, and by releasing saplings and intermediate trees in the stand (Bailey and Tappeiner, 1998). Thinning can also maintain or enhance plant species diversity. Studies have shown that total species richness was greater in thinned stands than unthinned stands (Bailey et al, 1998). Gaps can further promote understory development and provide within stand heterogeneity by providing openings that allow planted and/or natural regeneration to develop.

**Conclusion** - Both action alternatives reduce overstory canopy closure to increase the amount of light and nutrients to 1) the remaining trees to increase growth rates and 2) the forest floor to allow understory development. Alternative 3 treats twenty-one more acres of thinning and 17 more acres of gaps than Alternative 2 and thereby offers the greatest opportunity for reducing canopy closure to promote enhance species and structural diversity.

### Direct and Indirect Effects – Tree Growth (thinning and gap stands)

Table 3-6 provides an example of the average overstory diameter growth by alternative, over a 50-year period, for the two representative units.

Table 3-6 Average overstory quadratic mean diameter over time

	Unit 29		Unit 52	
	Alt. 1	Alt. 2 and 3	Alt. 1	Alt. 2 and 3
Overstory diameter in 2008	13.3"	16.8"	18.6"	21.4"
Overstory diameter in 2058	19.1"	24.2"	25.8"	30.1"

<sup>1</sup> Average canopy closure was determined across the whole stand and includes thin, no thin and gap acreage.



**Alternative 1** - The stands would continue to grow over the next 50 years, but at slower rates as trees compete for growing space. Diameter growth would decline as this competition increases and the trees would become less vigorous and more susceptible to insect and diseases. Those trees in the intermediate and sapling stage would begin to die from suppression.

**Alternative 2 and 3** - Table 3-6 shows that diameter growth rates of the overstory would increase as an indirect effect of thinning and both action alternatives provide increased tree growth. Thinning accelerates the development of large diameter trees and promotes vigorous growing, healthy stands (Tappeiner et al, 2007).

**Conclusion** - Both action alternatives enhance tree growth to promote vigorous growing, healthy stands. Alternative 3 treats twenty-one more acres than Alternative 2 and thereby offers the greatest opportunity for enhancing tree growth.

### **Direct and Indirect Effects – Tree Growth (precommercial thinning and fertilization stands)**

Precommercial thinning is proposed to enhance and maintain tree growth rates for a longer period of time before the stands starts self-thinning from suppression mortality. Density management diagrams show that stands with an average of 500 trees per acre can expect to reach an average diameter of around 8” before self thinning occurs. Stands thinned down to 300 trees per acre at a young age can expect to reach an average of around 10” before self thinning occurs (Tappeiner et al, 2007).

Nitrogen fertilization after thinning is proposed to enhance tree growth rates in stands that show signs of nitrogen deficiency where tree growth potential may be limited. As a stand grows, nitrogen tends to accumulate in the biomass and upper soil horizons where it is unavailable for plant growth (Tappeiner et al, 2007). In a study of 53-year-old Douglas-fir stands thinned and fertilized 30 years prior, it was found that fertilization increased the stand growth per unit of leaf area (Binkley and Reid, 1984).

**Alternative 1** – Diameter growth rates in the precommercial thin stands proposed for precommercial thinning would likely be maintained until the stands reaches around 8 inches in diameter. At the time, inter-tree competition would begin to cause suppression mortality. Diameter growth rates in the stand proposed for fertilization would either 1) begin to slow down if the commercial thinning was not done or 2) continue to grow but at slower rates because of limiting nitrogen.

**Alternative 2 and 3** – By precommercial thinning, diameter growth rates in the proposed stands would likely be maintained for a longer period of time until the stands reach around 10 inches in diameter. By fertilizing after the commercial thinning in the one proposed stand, stand growth per unit of leaf area increases providing larger trees faster than the no action alternative.

**Conclusion:** Both action alternatives enhance tree growth to promote vigorous growing, healthy stands. Direct and Indirect Effects – Development of Late-successional Structures –thinning and gaps

### **Direct and Indirect Effects – Development of Late-successional Structures (thinning and gap stands)**

Units 29 and 52 were modeled over 100 years to show differences between alternatives in the development of four key attributes of late-successional stands: large trees, multiple canopy

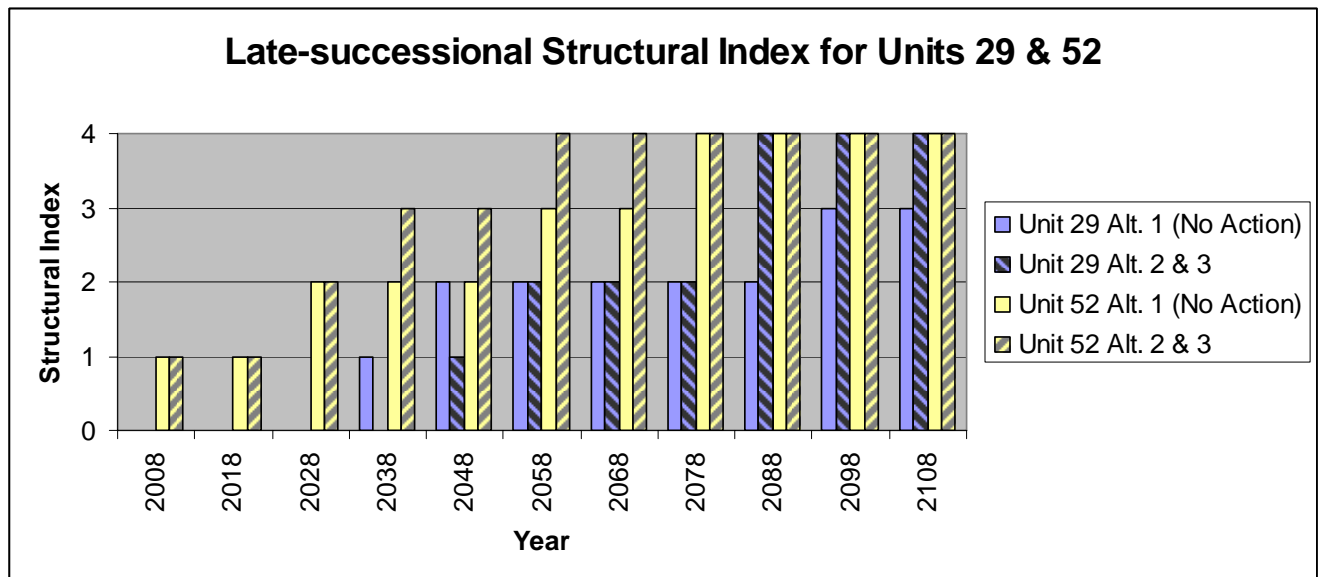
layers, large dead trees, and large woody material. These four attributes are used as a late-successional structural index. A definition and minimum thresholds for this index are found in Table 3-7.

Table 3-7 Definition of late-successional structural index used for stand modeling.

Key Attribute	Definition for Modeling	Reference
Large diameter living trees	At least 8 trees per acre $\geq 31''$ in diameter	Franklin J.F. et al, 1986. Research Note PNW-447
Multiple canopy layers	At least 12 trees per acre of shade tolerant trees $\geq 16''$ in diameter	Franklin J.F. et al, 1986. Research Note PNW-447
Large dead trees	At least 5 snags per acre greater than 10'' in diameter and at least 5 snags per acre greater than 20'' in diameter	Mellen, et al, 2005 DecaID
Large woody material on the forest floor	Greater than 20 tons/acre of large wood that is $>6''$ in diameter	Mellen, et al, 2005 DecaID; USDA, 1995)

Figure 3-4, using the late-successional structural index described above, shows how Units 29 and 52 progress towards achieving all four key attributes over the next 100 years.

Figure 3-4. Comparison of development of late-successional attributes over time. The bars reaching the top of the graph attain all of the key attributes described in Table 3-7.



**Alternative 1** – Figure 3-4 shows that with no treatment the stands may or may not achieve all four attributes of the late-successional structural index over the next 100 years. The graph shows that Unit 29, that has never been commercially thinned, only obtains three out of the four attributes. Unit 52, which had a light commercial thin in 1995, obtains all four attributes in about 70 years. In both example stands, it is the development of multiple canopy layers that is the critical element. Due to the high overstory canopy closure, the understory development is delayed or never achieved within the 100-year analysis period.

**Alternatives 2 and 3** – The treatments have the indirect effect of accelerating the development of late-successional structures. Figure 3-4 shows that reducing stand density accelerates the

development of achieving all four attributes in both example units. Modeling shows, by reducing stand density, that Unit 29 obtains all four late-successional attributes in about 80 years and Unit 52 obtains all four attributes in about 50 years.

**Conclusion** – Both action alternatives offer the opportunity to accelerate stands towards late-successional conditions by at least 20 years in order to promote 1) habitat for late-successional related species, including the Northern spotted owl and 2) restoration of plant communities' species and structural diversity within Riparian Reserves. Alternative 3 treats twenty-one more acres than Alternative 2 and thereby offers the greatest opportunity for accelerating stands towards late-successional conditions.

### **Cumulative Effects**

Section 3.1 contains a list of past, present, and reasonably foreseeable activities within the project area, subwatershed or other analysis scale. For vegetation, the relevant activities are past, present, and future vegetation management activities at the subwatershed scale.

Cumulative effects to forest vegetation are addressed in terms of how they have influenced both the individual units and the landscape seral stages.

### **Cumulative Effects – Stand Development (thinning and gap stands)**

Past management practices in the fifty-two units have cumulatively impacted current stand density and species diversity. The original stands were clearcut harvested from the 1920s through the 1960s. Reforestation included planting, artificial seeding, and some natural seeding and tended to result in uniform establishment within the stands and favored Douglas-fir. Most stands were never precommercially thinned at a young age to reduce density and inter-tree competition. The stands that were precommercially thinned (~22%) were thinned early on in the timber stand improvement program when practices tended to leave stocking levels higher than are currently regarded as optimum for acceptable growth (USDA Forest Service, 1997). These management activities resulted in stands with dense, uniform stocking dominated by Douglas-fir. The plant associations identified in the proposed units describe potential natural vegetation pathways that result in stands with more of a variety of conifer trees in the overstory than currently exist (McCain and Diaz, 2002).

**Alternative 1** – The units would continue to maintain the high tree densities with Douglas-fir almost exclusively dominating the overstory and a slow understory development. Intermediate trees and saplings will begin to die from suppression mortality.

**Alternatives 2 and 3** – Through thinning and gaps, the action alternatives were designed to 1) reduce the dense overstory to provide for understory development, 2) favor minor tree species as leave trees to enhance overstory species diversity, and 3) create openings for the development of structural and species diversity.

**Conclusion** – The stands' current density and species diversity have been impacted by past management activities. No reasonably foreseeable future activities are planned in the stands. Therefore, the cumulative effects of the alternatives on stand development would be the same as the direct and indirect effects. In the no action alternative, there would be continued high overstory canopy closure with limited understory development and reduced species diversity. In the action alternatives, there would be reduced overstory canopy closures allowing increased development of understory vegetation and species diversity.

### **Cumulative Effects – Seral Stages (thinning and gap stands)**

Section 3.1 contains a list of past, present, and reasonably foreseeable activities within the project area, sub-watershed or other analysis scales. The relevant activities for cumulative analysis of seral stages are at the sub-watershed scale and their relationship to the larger fifth-field watersheds.

Past, present and reasonably foreseeable management activities can alter vegetation patterns across the landscape by changing the distribution of seral stages. Past timber harvesting was analyzed within the four sixth-field sub-watersheds within the planning area and found 33% of the acreage has been regeneration harvested and most of this acreage is currently in the stem exclusion stage. This is consistent with the current amount of stem exclusion acreage in the western hemlock plant series within the larger fifth-field watersheds. The current acreage distribution of the seral stages within the western hemlock plant series indicate there is more stem exclusion acreage and less late-successional acreage now than approximately 100 years ago and from the average of the historical range of variability (see Table 3-3). The action alternatives propose to commercial thin 1255 to 1276 acres (3%) of the sub-watersheds. Reasonable foreseeable future actions affecting vegetation in the sub-watersheds are 1) approximately 500 acres (1%) of precommercial thinning in young managed plantations and 2) approximately 1200 acres (2%) of commercial thinning planned to the west of the proposed alternatives. Thinning changes the density of overstory trees, but does not alter a stand's current seral stage.

**Alternative 1** – The proposed stands are currently in the stem exclusion stage and would have no cumulative effect on the seral stage distribution.

**Alternatives 2 and 3** – The thinning proposed in the action alternatives change the stand density in the stands but does not alter a stand's current seral stage. Therefore the thinning would have no cumulative effect on the seral stage distribution. The proposed gaps, however, would change the seral stage from stem exclusion to stand initiation. Alternative 2 proposes 34 acres of gaps (0.07% of the sub-watersheds) while Alternative 3 proposes 51 acres of gaps (0.10% of the sub-watersheds).

**Conclusion** – The proposed thinning would have no cumulative effects on seral stage distribution. All of the stands would be classified as being in the stem exclusion stage before thinning and would be in the same seral stage after thinning. The proposed gaps would decrease stem exclusion and increase stand initiation acres in the sub-watersheds by approximately 0.10% but the overall percentage of seral conditions does not change substantially. However, the action alternatives, through thinning and gaps, can offer the opportunity to accelerate stands towards late-successional forests in order to provide a seral distribution that begins to better reflect what historically occurred in the watersheds.

### **Consistency with Direction and Regulations**

The treatments are consistent with standard and guidelines in the Willamette National Forest Plan for General Forest (MA-14a-13), Scenic Modification Middleground (MA-11a-05), Scenic Partial Retention Middleground (MA-11c-05), and Scenic Retention Foreground (MA-11f-08).

The treatments are consistent with standard and guidelines for Matrix and Riparian Reserves (TM-1). In accordance with the National Forest Management Act, all proposed units are 1) on

lands classified as suitable for timber management and 2) not within 95% of culmination mean annual increment so no regeneration harvest is proposed.

## 3.3 Fire and Fuels

### Introduction

The need for fuel reduction treatments is based on the fact that fine fuels are created during tree harvesting operations. Treatments will be done to reduce the majority of fine fuel loads to 7-11 tons per acre (the desired condition according to Willamette Plan Standards and Guidelines). Thinning of stands and the subsequent fuel reduction treatments will have the secondary benefit of lowering the risk of large wildfires in the project area.

The analysis was done to predict post-harvest fine fuel loads in the French Bug planning area and to analyze the potential effects of treating those fine fuels. Pre and post harvest fuel load predictions were obtained using digital photo, stand exam data and ocular methods. Direct, indirect and cumulative effects were analyzed using a combination of fire and fuels modeling/assessment tools. The analysis shows that reducing stand density and treating fine fuels will improve stand conditions and reduce the long-term risk potential of larger more intense wildfires. The analysis also shows that periodic fires have been a normal and reoccurring component of the French Bug planning area and the Willamette National Forest ecosystem as a whole. Because wildfires cannot be allowed to burn freely in this era, thinning and related fuel treatments may be viewed as a substitute for the results of natural fire.

### Regulatory Framework

- The Willamette National Forest Plan Standards and Guidelines (Section FW-252)
- Oregon Smoke Management Plan
- Northwest Oregon Fire Management Plan

### Analysis Methods

The following is a list of analysis methods and their uses:

- BeHave by Remsoft: software predicting a range of factors related to fire behavior.
- Fire Regime Condition Class (FRCC): framework for evaluation/quantification of stand health relative to historic conditions.
- Fire Behavior Prediction System Fuel Models (FBPS): standardized fuel models for predicting fire behavior characteristics.
- First order Fire Effects Model (FOFEM): software for predicting a range of fire effects, including mortality and smoke emissions.
- Fuels Management Analyst Suite (FMAPlus): for evaluation, quantification and prediction of the Effects of a range of fuel treatment activities.
- Geographic Information Systems (GIS): mapping/evaluation of spatial characteristics of fire and fuels information/data.

## **Desired Future Condition**

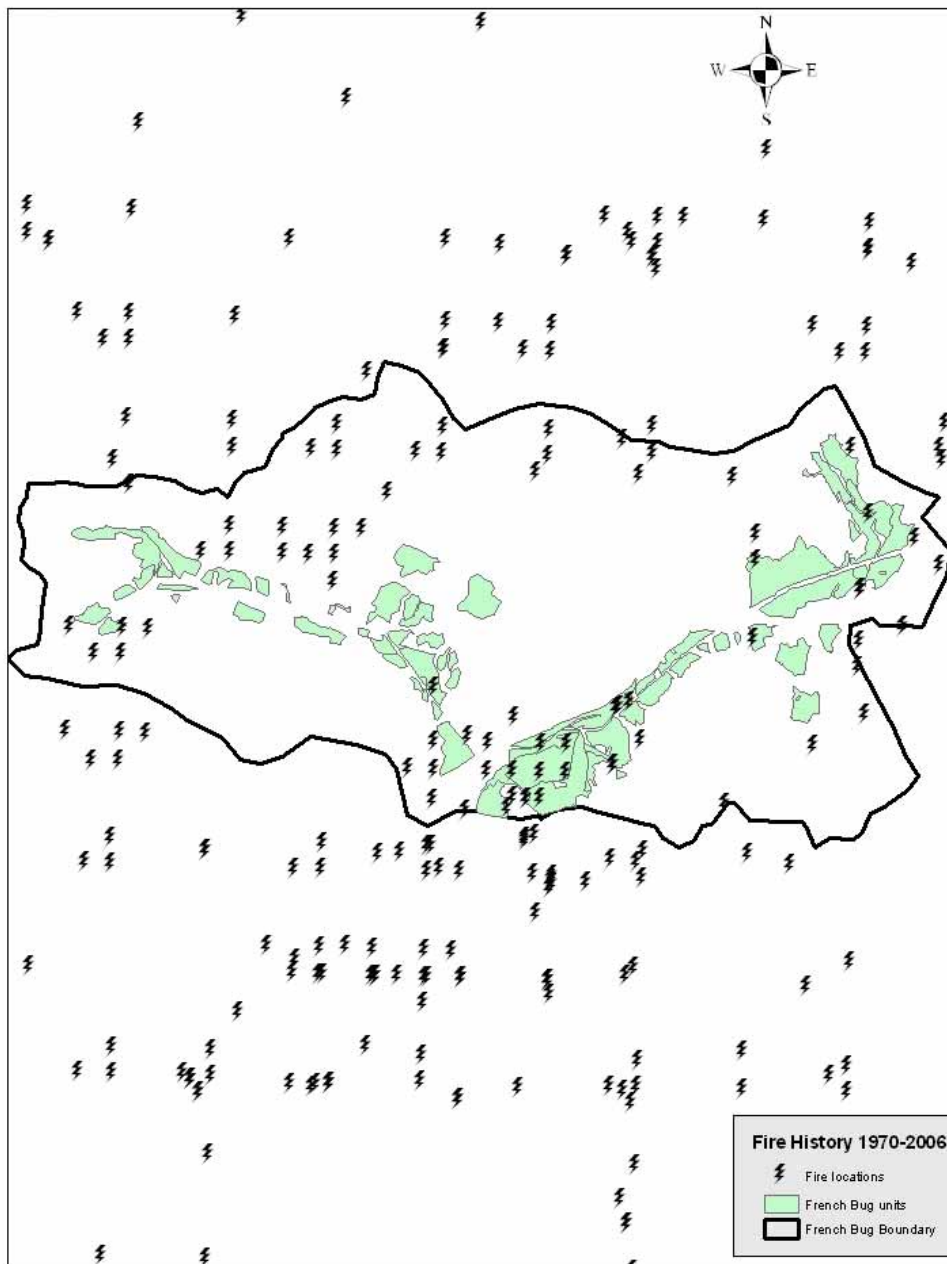
As earlier noted, the Willamette National Forest Plan Standards and Guidelines has established desired conditions for activity created fine fuel loads on forest lands. Two specific guidelines related to fire and fuels are Forest Wide (FW) 212 and 252 which state 7-11 tons/acre of 0-3" diameter fuels in stands post-harvest. These guidelines are to enable better control of wildfire, performed safely by firefighters, because the conditions limit flame length and thus fire behavior. In addition, Fire Regime Condition Class (FRCC) assessment provides a framework for understanding the overall health of forested stands relative to their historical condition. The desired future condition for treated stands in the planning area is Condition Class 1, which is defined by the following statement: within the range of natural/historical variability of vegetation characteristics, fuel composition, fire frequency, fire severity, and associated disturbances.

## **Existing Condition**

### **Fire History**

Fire records from 1970-2006 indicate that approximately 69 fires were reported and suppressed within the 17,300 acre planning area boundary. The causes were lightning, human caused and some were escaped debris burns. In 1998 the Dead Horse fire burned 25 acres, the cause was lightning. In May of 1983 an escaped debris burn burned 335 acres and was located less than 1 mile to the northeast of the planning area boundary. Approximately thirty fires 1 acre in size burned within the planning area. All other fire starts during the modern fire suppression era (1970-present) were contained to one-tenth of an acre or less. In summary, the French Bug area has typically experienced one to two fires per year since 1970 (Sources: Willamette NF fire records and GIS). The following map (Figure 3-5) represents fire history for the French Bug Planning Area.

Figure 3-5 French Bug Fire History (from Willamette National Forest GIS)



### Timber Harvest and Fire

During the modern era of fire suppression (1943-present), timber harvest has replaced fire as the dominant disturbance mechanism within the project area. The first recorded timber harvests were in the early 1900's mainly in the form of clearcut logging. During this period, broadcast burning was the most common treatment utilized to dispose of harvest slash. Since the 1980's salvage

logging, partial cuts and shelterwood harvests have been most widely used. The commercially thinned, second growth stands pose less of a threat in terms of fuels/fire danger potential. The forest understory is comprised primarily of salal, oregon grape, vine maple bear grass and rhododendron (Sources: Willamette NF GIS and field observations).

## Fire Regime

Fire has been a dominant disturbance process over much of northwest Oregon for centuries. Fires play an important role in shaping the composition, structure and processes of most native ecosystems. A natural fire regime is a general classification of the role that fire would play across a landscape in the absence of modern human intervention, but including Native American burning (Agee 1993, Brown 1995). Heinselman(1981), Morgan et.al. (1996), and Brown (1995). The five natural fire regimes (and sub-classes) are classified based on the number of years between fires (fire frequency) combined with the severity (amount of stand replacement) of the fire on the dominant overstory vegetation. (Schmidt et Al. 2002) (Hann et Al. 2004) Table 3-8 (below) provides a description of natural fire regimes.

Fire regime classes may be further categorized into subgroups that provide more detail than the standard five categories. For example, mapping done through the Integrated Natural Fuels Management Strategy (INFMS) has designated lands within the French Bug project as fire regimes 3C ( $\approx 50\%$ ), 3B ( $\approx 20\%$ ), VA ( $\approx 30\%$ ). Fire regime designations are simply a method to estimate how often we would expect to see natural fire on the landscape in the absence of human intervention. For example, in natural landscape categorized as fire regime 3B, we would expect to see a mixed-severity fire at least once every 50-100 year on any given piece of ground. In fire regime 3C, we would expect to see at least one fire every 100-200 years at a specific site, and so on. In the era of modern fire suppression, we will continue to see natural (lightning) ignitions according to the same natural regime schedules. What is different now is that natural wildfires are quickly suppressed by firefighters and are not able to spread and grow naturally. When a fire is immediately suppressed, a fire return interval is essentially skipped, causing natural, healthy forest conditions to degrade over time. Because fire regimes range from 50-200 years within the planning area, deteriorating forest health may not be readily apparent in all areas. Figure 3-6 is a representation of fire regimes in the French Bug planning area.

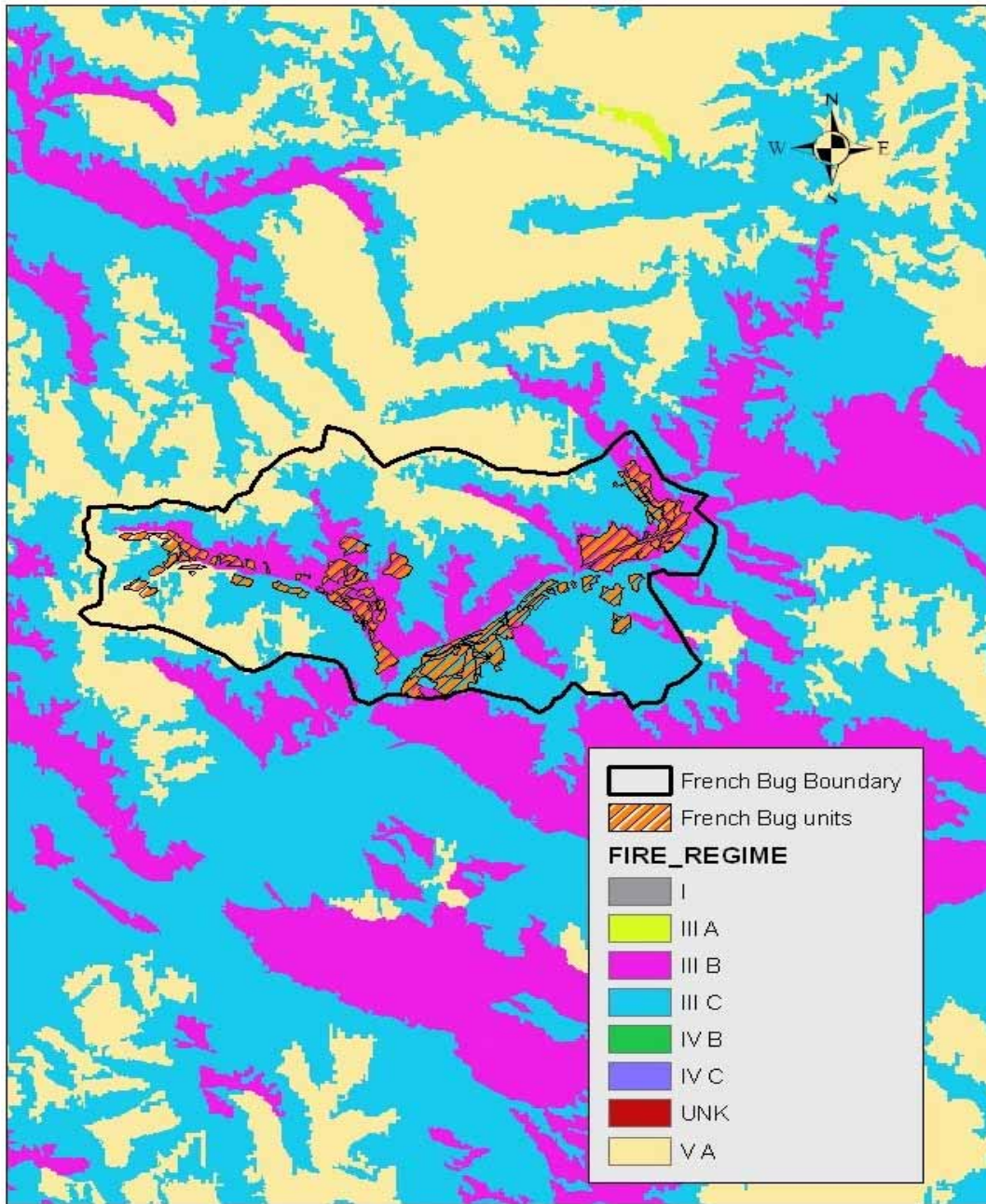
Table 3-8 Description of Fire Regimes

Fire Regime Group	Frequency (Fire Return Interval)	Severity
I	0-35 years	Low severity (underburn)
II	0-35 years	High severity (stand-replacing)*
IIIA	< 50 years	Mixed severity
IIIB	50-100 years	Mixed severity
IIIC	100-200 years	Mixed severity
IVA	35-100years	High severity (stand
IVB	100+ years	High severity (stand
IVC	100-200 years	High severity (stand
V A	200-400 years	High severity (stand



Fire Regime Group	Frequency (Fire Return Interval)	Severity
V B	400+ years	High severity (stand
V C	No Fire	High severity (stand
V D	Nonforest	

Figure 3-6 French Bug Fire Regime<sup>2</sup>



Pink = III B = mixed severity, 50-100 fire return interval (20%)

<sup>2</sup> Color versions of these figures are available upon request or can be viewed on the Willamette National Forest’s website at: [www.fs.fed.us/r6/willamette](http://www.fs.fed.us/r6/willamette).

Blue = III C = mixed severity, 100-200 year fire return interval (50%)  
 Tan = VA = high-severity, 200-400 year fire return interval (30%)

Field observations have shown that the mountain hemlock stands in this area are influenced by factors that affect mortality fires susceptibility. These stands are infected with mistletoe, have a high mortality rate with low canopy closure and lots of brush. These stands typically have a higher fire frequency of less severe fires than other similar mountain hemlock stands. Stands also have much more fuel than would be found under reference condition.

Today the vast majority of fires are suppressed before they can spread, consume fuels and thin out overgrown stands. When fire is immediately suppressed, a fire-return interval is interrupted or skipped, causing forest fuel conditions to gradually accumulate over time (FRCC Guidebook, INFMS and field observations).

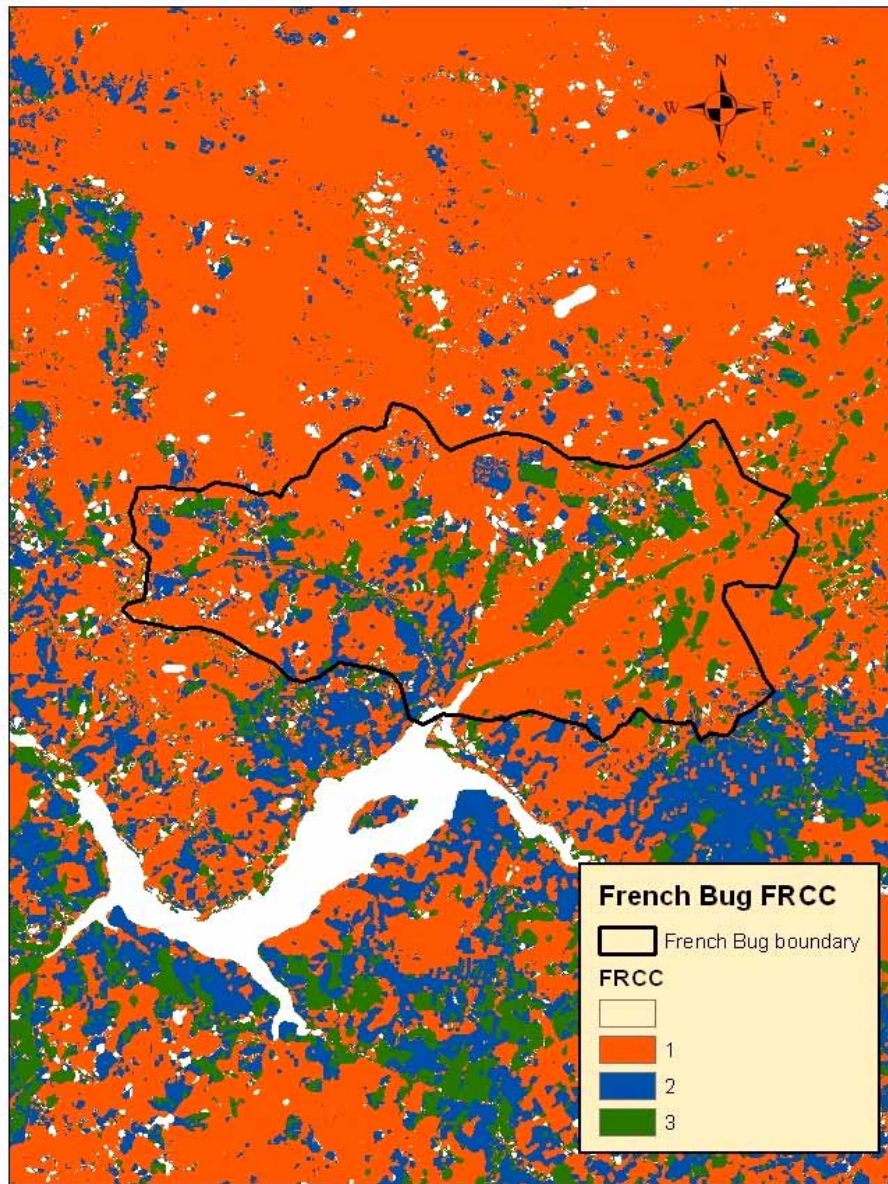
### Condition Class

Condition class is a classification of the amount of departure from the natural fire regime. Condition classes have been defined as within (1), moderate departure from (2) and high departure from (3) the natural/historical variability of vegetation characteristics, fuel composition, fire frequency, fire severity, and associated disturbances. Based on fuels inventories, 70% of the planned harvest acres are condition class 1, about 10% of the proposed harvest acres are condition class 2 and about 20% of the acres are condition class 3. Table 3-9 shows definitions for the three different condition classes. This indicates that 30% of the lands within the French Bug planning area have undergone moderate to high departure from the range of natural/historical variability of vegetation characteristics, fuel composition, fire frequency, fire severity, and associated disturbances.

Table 3-9 Fire Regime Condition Class Definitions

Condition Class	Departure of Fire Regime from Historic Range	Risk of Losing Key Ecosystem Components	Alteration of Vegetation Attributes from Historic Range
1	Departure is not more than one return interval	Low	Functioning within the historic range
2	Moderate change in size and intensity has resulted	Moderate	Moderately altered
3	Dramatic changes in fire size and severity have resulted	Severe	Substantially Altered

Figure 3-7 Fire Condition Class in the French Bug Project Area



### Fuel Models

Four Fire Behavior Prediction System fuel models are represented within the French Bug planning area; fuels models 1, 5, 8 and 10. Field observations have indicated that approximately 30% of the project area can be described as fuel model 8 (see Table 3-11 for descriptions).

Fuel model 8 is characterized by closed conifer stands where dead fuel loads in the understory are relatively light. Fuel model 8 spreads primarily through the litter and light fuels on the forest floor. Under normal conditions, fires in a fuel model 8 burn with low intensity and do not spread quickly. Approximately 50 % of the planning area can be described as a fuel model 5. This fuel model is characterized by conifer stands or openings where the primary carrier of fire is understory brush. Under dry and windy conditions, understory brush fires spread quickly with moderate intensity, and may lead to the development of crown fires in the overstory trees. Fuel

model 10 which makes up the remaining 10% is characterized by closed conifer stands with a large component of dead and down fuels. Fires in this fuel type spread primarily through the dead/down fuels on the forest floor, and generally burn with greater intensity than fires in a fuel model 8. Fuel model 10 fires have a higher probability of developing into crown fires. Crown fires often spread quickly and often cause severe, stand replacement fires when hot, dry and windy conditions persist. Approximately 10% of the planning area can be described by fuel model 1. FM 1 fires are surface fires that move rapidly through cured grass and associated materials. Very little shrub or timber is present, generally less than one third of the area. Figure 3-8 (below) provides a spatial representation of fuel models found within the French Bug planning area.

Table 3-10 Potential Fire Behavior in Late Summer Conditions (source: BEHAVE)<sup>3</sup>

Fuel Models*	Flame Lengths (ft)	Rate of Spread (ft/hr)	Size of Fire After 1 Hour (acres)
1	4.2	416	2.1
8	0.9	106	0.5
8/5	2.9	488	2.8
10	4.2	330	1.4

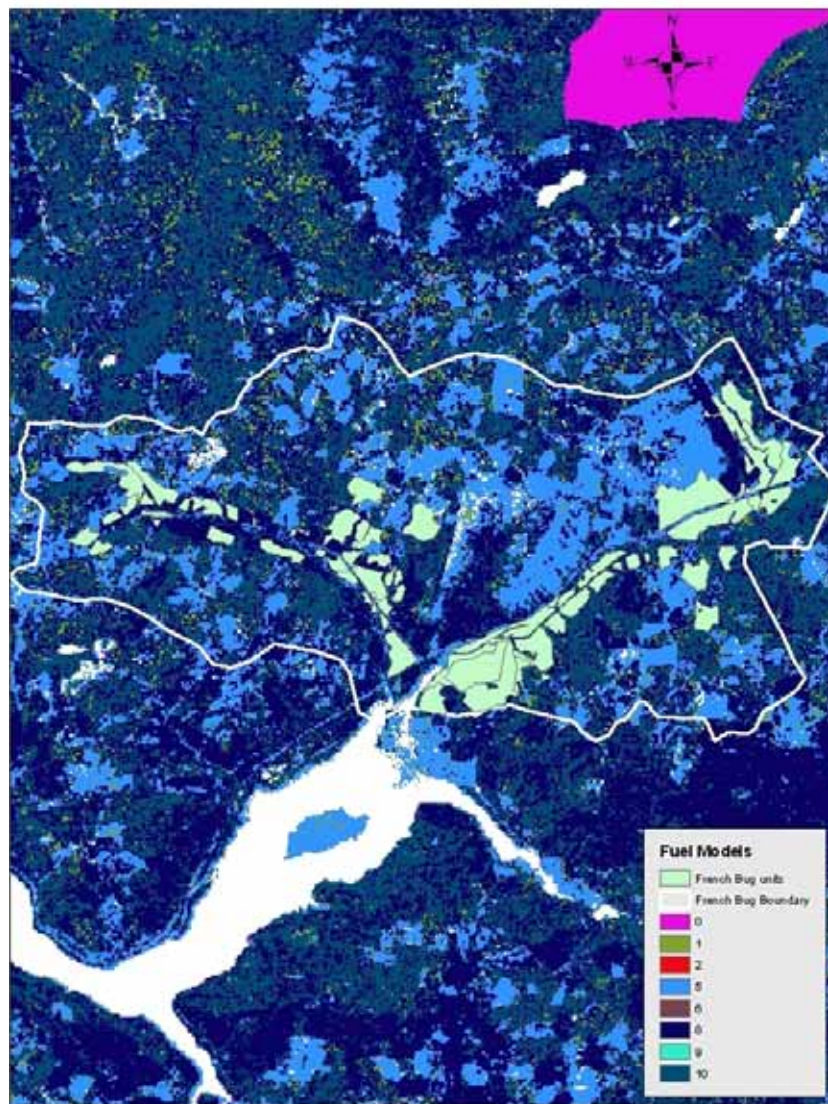
Table 3-11 Fuel Models in Project Area

Fuel Model #	Description	Fire Behavior	% Project Area
8	timber with light litter	Slow burning ground fire with low flame. Hazardous only under severe weather conditions involving high temperatures, low humidity's, and high winds	30%
10	timber with heavy dead and downed material	Closed conifer stands. Fire spreads primarily through litter and light fuels on the forest floor with a substantial component of dead fuel. Greater intensity than fuel model 8. May develop into crown fires, with substantial mortality when hot, dry and windy conditions persist.	10%
5	timber with understory brush	Carried in the surface fuels. Generally not very intense because surface fuel loads are light and foliage has little dead and volatile material	50%
1	Short grass		10%

GIS fuels mapping done for the Willamette National Forest can help illustrate how fuels exist in a mosaic across a landscape. Landscape fuel mapping is done at a coarse scale and is not as accurate as observations in the field. However, figure 3-8 does give an indication of how fuel models exist in a mosaic in the project area (Fuel modeling sources: GTR-INT-122, Willamette NF GIS and field observations).

<sup>3</sup> Fuel Model 1, Fuel Model 8, Fuel Model 10 & Fuel model 8/5 represent current fuel models. Under Alternatives 2 & 3, all treated units will become Fuel Model 8 or Fuel Model 8/5 after recommended treatments are completed.

Figure 3-8 Fuel Models in the Project Area



**Fuel Loading**

Surface fuel loads were determined by completing random transects in the project area using digital photo series applications (FMA Plus) and visual estimation. In some cases, surface fuel loads from surveyed stands have been used to model nearby stands with similar characteristics.

Table 3-12 French Bug Existing Surface Fuel Loading Estimates<sup>4</sup>

0-3" Fuel Load (tons/acre)*	>3" Fuel Load (tons/acre)	Total Fuel Load (tons/acre)
3-6	4-11	10

Coarse woody fuels have little influence on the spread and intensity of initiating surface fires (Brown et al, 2003). Fine fuels are required for fires to spread and gain the intensity needed to

<sup>4</sup> For the purpose of French Bug analysis, 0-3" fuels may also be referred to as fine fuels and >3" fuels may be referred to as coarse woody fuels.

ignite heavier fuels. Harvest activities primarily generate fine fuels and create relatively small amounts of coarse woody fuels.

## **Environmental Consequences**

### **Direct and Indirect Effects – Alternative 1**

Under the No Action Alternative, there would be no thinning or fuels reduction, and forested stands would continue on a path of natural succession. Modern fire suppression policies would continue to dictate fire exclusion from the project area, and this would contribute to overstocked stand conditions and increasing fuel loads. Overtime, the increasing surface fuel loads, ladder fuels and denser canopies would be associated with greater fire intensity and higher burn severity. Fire occurrence on the landscape would continue only under uncontrolled fire situations, making it more difficult and dangerous for firefighters to suppress future wildfires.

### **Direct and Indirect Effects – Alternatives 2 and 3**

The proposed commercial thinning in the French Bug project area would open the stands, creating a forest canopy less susceptible to sustaining a crown fire. Ladder fuels would be reduced as harvest operations remove the vertical fuel continuity. Because the thinned stands will have fewer residual trees and more crown spacing, these stands will be less susceptible to crown fires. The proposed treatments for both alternatives include grapple piling, roadside grapple piling clean-up, and pile burning. Underburning of the gaps is for forage enhancement and site preparation for planting.

The amount of harvest-related slash remaining in a unit depends primarily on the pre-existing surface fuel load and the number of trees to be harvested. In the French Bug project area, stands that have been previously pre-commercially thinned will require harvest of fewer trees than stands that have never been thinned (assuming similar prescriptions). As a consequence, harvest generated slash will generally be heavier in previously unthinned units. In addition, previously unthinned stands in the project area generally have heavier pre-existing surface fuel loadings. This is true because there are more crowns to shed needles/twigs/branches, and because unthinned stands tend to have more dead and dying trees.

Over the long run the 500 acres of proposed pre-commercially thinning in the French Bug planning area will greatly reduce the vulnerability of those stands to fires. By creating sufficient openings in the canopy layer and reducing ladder fuels. In the short term, usually a 5 year interval there is an increase in fire risk. Concentrations of slash following pre-commercial thinning of juvenile trees can present a fire hazard within the treated stands as well as the surrounding areas. Natural processes of compaction and breakdown will diminish this hazard over time.

### **Direct and Indirect Effects – Alternative 2**

In Alternative 2, comprehensive fuels treatments would be done in units that have been identified as having an increased hazardous fuels condition (Table 3-13). These treatments would include grapple piling, roadside grapple piling and burning, burning of landing piles and the underburning of two ½ acre gaps. The proposed action timber harvests will create varying amounts of residual slash (0-3”) in each unit. Activity fuels (slash) treatments would reduce the amount of fuels created from the harvests to the Standards and Guides fuel loading of 7-11 tons for 0-3” diameter fuels. Fuel treatments are proposed to be accomplished within 1-2 years after

the harvest. The treatments would effectively modify uncharacteristic fire risk created by the harvest-related logging slash.

Table 3-13 Alternative 2 Fuel Treatment Information

Unit Number	Recommended Fuels Treatment	Approximate % Area Treated	Approximate Acres Treated
1,3,4,6,7,8,10,12,13,15,16,26,27,30,31,33,34,35,38,41,42,43,45	RGP and GP <sup>5</sup>	61%	650
8,16	UB	1%	1
TOTAL	N/A	63%	651

Prescribed fire would take place during conditions that mimic spring-like conditions or when weather and fuels are in spring-like conditions. Spring conditions are: Fuels 3” and greater in diameter (1000 hour fuels) would have fuel moistures of 25% or greater, soil moistures and duff moistures would be damp, at levels where duff consumption would be limited to duff retention objectives or less across the unit, and mortality of overstory trees would be low.

### Direct and Indirect Effects – Alternative 3

Alternative 3 is similar to Alternative 2 with regard to the treatments of grapple piling, roadside grappling and burning and under burning gaps. Alternative 3 differs from Alternative 2 in that 25 acres of gaps will be underburned (Table 3-14).

Timber harvests increase fuel loadings in units which increase the wildfire potential. Following timber harvests a greater hazardous fuels condition exists for 0-5 years because of the red needle slash. This would be reduced with the fuels treatment 1-2 years post harvest. Increased surface fuel loads affect fire behavior by temporarily increasing fire intensity and rate of spread. The increase in fuel loading is temporary because moderate to heavy precipitation in the western Cascades Mountains accelerates decomposition processes, especially for fine fuels. As a result, fire danger in an untreated stand would be highest 1-5 years after thinning and will decrease significantly thereafter. Studies done by Fahnestock and Dieterich have shown that Douglas fir slash decomposes to approximately 79% of its original volume after 5 years (Fahnestock). Field observations on the Willamette National Forest have indicated that Douglas fir and Western Hemlock slash decomposes to approximately 50% of its original volume after 10 years; observations have found that less than 10% of residual slash remains after 20 years. This indicates that all harvest units in the French Bug project area would be within Willamette National Forest Standards and Guidelines for 0-3” fuels after 10 years. Because fire spread is primarily driven by 0-3” fuels, standards and guidelines for 0-3” fuels are used to determine when slash loadings are above acceptable levels.

In summary, approximately 65% of the harvest area will be treated to levels within the Willamette National standards and guidelines for 0-3” fuel loading. The additional 35% of the area will remain slightly above standards and guidelines for 6-10 years while residual slash decomposes. Many of the units within the project area were already at or below standards and guides due to previous harvest activities, broadcast burning and yarding of unmerchantable material and burning. The activity generated slash presented a small measure of risk to the fire program. Table 3-14 displays the recommended fuels treatment by unit.

<sup>5</sup> RGP & GP=roadside grapple pile & burn and grapple pile & burn; UB= under burn

Table 3-14 Alternative 3 Fuel Treatment Information

Unit Number	Recommended Fuel Treatment	Approximate Percentage of Harvest Area	Approximate Acres treated
1,3,4,6,7,8,10,12,13,15,16,26,27,30,31,33,34,35,38,41,42,43,45	GPandB	62%	650
8,12,16,20,27,28,29,30,31,35,36,47,52,60,62	UB	3%	25
<b>TOTAL</b>	N/A	65%	675

### Cumulative Effects

Section 3.1 contains a list of past, present, and reasonably foreseeable activities within the project area, subwatershed or other analysis scale. This report identifies direct, indirect effects within the proposed treatment areas (harvest units) of 1276 acres. The cumulative effects are analyzed at the planning level area of 17,300 acres. Specific field data within the project area was gathered with methods describe in the introduction under analysis methods.

### Alternative 1

Under the no action alternative, stands would continue on the path of natural succession. Because of previous timber management practices of clearcut, burn and yarding unmerchantable material in the planning area during the past, most stands in the project area are in relatively good condition. Approximately 69 fire starts have been recorded in or immediately adjacent to the 17,300 acre planning area during the era of modern fire suppression (1971-present). Approximately 90 % of these fires were contained at one acre or less. Two fires during the fire suppression era escaped initial attack and burned approximately 360 acres. During the pre-suppression era, natural fires in the project area would have burned at least 2600 acres during the same number of years. This estimate is based upon a natural fire return interval of 200 years, although the actual return interval is probably closer to 150 years (Source: INFMS Fire Regime Mapping).

The cumulative effects of fire exclusion during the modern fire suppression era are well documented and have been observed in fire prone ecosystems throughout the American West (RMRS-GTR-42 vol. 5, pg.185-203). Due to the cumulative effects of fire suppression, the buildup of fuels in previously unthinned stands will become a more significant problem over the next 50 years. Increasing stand density and the accumulation of fuels will inevitably lead to a wildfire that is more difficult to control than a fire in a thinned stand. Condition class will continue to worsen until future treatments are accomplished or a stand destroying wildfire occurs. A severe, large wildfire may not occur in the project area for 50 years or more, but natural combinations of weather and fuel conditions will ensure that it will happen eventually.

### Cumulative Effects – Alternative 2 and 3

Relevant past and present activities considered for cumulative effects include fire suppression practices and past timber management. A relevant reasonably foreseeable activity is the planned Margie Timber Sale. This project is in a preliminary planning phase. Cumulative effects related to this thinning project are not anticipated.

As already noted, fire suppression practices during the past 50 years have caused the greatest cumulative effects with regard to fuels in the project area. Past timber management in the French



Bug planning area has been a secondary factor influencing cumulative effects on the forest fuel loadings. This has resulted in surface fuel loads and crown densities that are generally low-moderate in about 80% of the planned harvest area; these areas are represented mostly by fuel models 5 and 8. Surface and crown fuel loads in approximately 20% of the planned harvest area are generally heavy, and are mostly represented by a fuel model 10. Since 1900, approximately 22,000 acres in the French Bug were clear cut creating a mosaic of stand ages. Seventy three percent of these stands were broadcast burned. The other 27% was YUM (yard unmerchantable material) yarded, piled and burned at the landings. Forty five percent of the planning area have been not been harvested. Surface and crown fuel densities in these stands are similar to unthinned stands within the French Bug project area. A wildfire in these stands has the potential to become larger and cause more tree mortality than a fire in a thinned stand. With recommended fuel treatments, areas that currently have low fuel loadings are expected to be within forest standards and guidelines after treatments are completed. From a fire danger perspective, this means that the post-treatment fire risk in these areas will be typical of other healthy stands found on the Willamette National Forest. Thinning will produce secondary benefit of long-term resistance to crown fire development and stand destroying fires in the project area. Main roads and spur roads within the project area where residual fuels have been thoroughly removed will serve as access points to firefighters and fuel breaks to reduce continuity of remaining slash. Condition class will improve and stabilize due to lower crown density and lighter fuel loads, especially as residual slash decomposes( Sources: GTR-INT-122, Willamette NF GIS timber sale data, and field observations.)

### Fuels Treatment Costs

Table 3-15 represents estimated costs for fuel treatments for the action alternatives.

Table 3-15 Estimated Treatment Cost Totals<sup>6</sup>

Alt.	Under Burn	Burn Grapple Piles	Burn Landing Piles
1	0	0	0
2	\$500	\$15,000	\$5,350
3	\$14,500	\$15,000	\$5,350

## 3.4 Air Quality

### Regulatory Framework – Air Quality

- 1990 Clean Air Act and the 1977 Clean Air Act and its amendments
- Smoke Management Plan

### Existing Condition

The Oregon Smoke Management Plan establishes designated areas that are principal population centers and Class I airsheds, including wildernesses and other sensitive airsheds. One purpose of the Smoke Management Plan is to protect air quality in these high priority areas. The closest

<sup>6</sup> Under Burn (\$500/acre), Grapple Pile Burning (100/acre), Burning Landing Piles (\$50/each)

Class I air shed is the Mt Jefferson Wilderness directly east of the project area (10 miles respectively). At the northern border of the project area approximately 1 mile is the Bull of the Woods Wilderness and to the northwest is the Opal Creek Wilderness which is within (3 miles respectively). These are not considered a Class I airsheds but are sensitive airsheds during the summer recreational months. Also of consideration are the towns of Detroit and Idanha. Any burning of slash must be conducted according to the guidelines established by the Oregon Smoke Management Plan.

## Environmental Consequences

### Direct and Indirect Effects – Alternative 1

The buildup of fuels represents a threat of the uncontrolled release of large amounts of emissions in the event of a wildfire. As noted earlier, fire exclusion has exacerbated the buildup of fuels in the project area and made a large wildfire more likely the longer forests go un-thinned. While there is no evidence to suggest that such a release of pollutants would be of any harm to general air quality, it is clear that such an event could have significant impact on air quality to sensitive areas. Table 3-16 gives an indication of the volume of common pollutants that would be released in the event of a wildfire.

### Direct and Indirect Effects – Alternative 2

Air quality in the designated areas could be affected by fuel treatments that include pile burning, broadcast and underburning. Fuel treatment associated with alternative 2 would produce 174 tons of particulate matter of 2.5 microns and 206 tons of particulate matter of 10 microns for a total of 347 tons. These figures are based on burning approximately 772 acres of machine piles (landing and grapple piles within units and along roads).

### Direct and Indirect Effects – Alternative 3

Air quality in the designated areas could be affected by fuel treatments that include pile burning, broadcast and underburning. Fuel treatment associated with alternative 3 would produce 179 tons of particulate matter of 2.5 microns and 212 tons of particulate matter of 10 microns for a total of 391 tons. These figures are based on burning approximately 650 acres of machine piles (landing and grapple piles within units and along roads).

Table 3-16 Project Area Burning Emissions Estimates (tons)

Emission Type	Alt. 2 <sup>7</sup>	Alt. 3 <sup>8</sup>	Wildfire <sup>9</sup>
PM 2.5	174	179	554
PM 10	206	212	654
PM Totals	380	391	1208

Prescribed pile burning would occur during fall and winter months according to limitations established by Oregon Smoke Management System forecaster. Any broadcast or underburning

<sup>7</sup> Based on burning approximately 750 acres of machine piles (landing and grapple piles within units and along roadsides) & approximately 1 acre of underburning

<sup>8</sup> Based on burning approximately 650 acres of machine piles (landing and grapple piles within units and along roadsides) & underburning 25 acres.

<sup>9</sup> Based on wildfire burning on approximately 1276 acres, late summer conditions.

would typically happen in the spring<sup>10</sup> during spring-like conditions or when weather and fuels are in spring-like conditions. By adhering to the smoke management daily forecast, smoke impacts on sensitive areas should be negligible (Source: Oregon Smoke Management Emissions Estimates).

### **Cumulative Effects – Alternative 1**

The buildup of fuels represents a threat of the uncontrolled release of large amounts of emissions in the event of a wildfire. As noted earlier, fire exclusion has exacerbated the buildup of fuels in the project area and made a large wildfire more likely the longer forests go un-thinned. While there is no evidence to suggest that such a release of pollutants would be of any harm to general air quality, it is clear that such an event could have significant impact on air quality to sensitive areas. Table 3-16 gives an indication of the volume of common pollutants that would be released in the event of a wildfire which could happen under alternative 1.

### **Cumulative Effects – Alternative 2 and 3**

No long term, cumulative effects on air quality are anticipated due to burning associated with this project. All burning would be completed within two years of harvest, and would create far fewer emissions than a wildfire occurring in an area of equivalent size. In order to protect air quality, the Oregon Smoke Management instructions will be strictly adhered to. The North Zone Fire/Fuels (Sweet Home and Detroit RD) management strategy for prescribed burning is to avoid large, uncontrolled releases of smoke that are produced during large wildfires. By burning slash fuels in one timber sale area at a time, residual fuels are treated gradually and in a controlled manner. For this reason, emissions from prescribed burning are not greater than emissions caused by natural wildfires. The Santiam River Zone Ranger District (Sweet Home and Detroit) currently burns approximately 700 acres of logging slash per year. Fire history records for the districts from 1970-2001 indicate that wildfires burned 3611 acres on district lands or an average of 120 acres per year. Natural fire return intervals on most of the 490,000 acre Santiam River Zone are 100-200 years (INFMS mapping). If we assume (as the established fire regimes suggest) that all lands on the district burn at least once every 200 years, we can determine that the historical (pre-suppression era) average annual acres burned was 2450 acres (490,000 divided by 200- see FRCC Guidebook). In other words, natural wildfires that occurred prior to modern fire suppression era created a significantly higher quantity of pollutants than are created by prescribed burning on the district today.

## **3.5 Wildlife**

The purpose of the wildlife specialist report is to identify the desired condition for wildlife and to evaluate the effects of the proposed alternatives on wildlife species, including terrestrial insects and mollusks, and to determine consistency with Forest Plan and other regulatory direction for wildlife management on National Forest lands. The focal evaluation areas are big game; snags; downed wood; migratory birds; raptors and colonial nesting birds; management indicator species; rare and uncommon species; and proposed, threatened, endangered and sensitive species.

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<sup>10</sup> Spring burning is dependent on wildlife-related restrictions. To protect spotted owls, units 2, 5, 6, 22, 23, 28, 39, 47, 48, and 55 have a restriction on spring burning.

## 3.5.1 Big Game

### Regulatory Framework

Management objectives for deer and elk habitat apply to specific mapped “Big Game Emphasis Areas” (BGEA) within the Willamette National Forest. Each emphasis area has been assigned a rating of high, moderate, or low with habitat effectiveness values defined for each rating. Habitat effectiveness objectives are defined for each habitat type which includes cover quality; forage quality; open roads; and size and spacing of cover and forage areas. A Model to Evaluate Elk Habitat in Western Oregon (Wisdom, 1986) was used to measure cumulative effects of habitat alteration west of the Cascade Mountains crest. This model will be referred to as the HEIWEST model throughout this section. Minimum desired habitat values are given in the Willamette Forest Plan at FW-147, FW-151, and FW-153 and are shown in Tables 3-17 and 3-18. Forest Plan Standard and Guideline FW-143 suggest, “seasonal restrictions should be considered for activities such as road construction and timber harvest when they occur in...key wintering areas” (Forest Plan, IV-68).

### Analysis Methods

The analysis area considered for effects to big game habitat for the French Bug project is composed of the Byars, French, Humbug, Short and Slide Big Game Emphasis Areas (BGEAs) (see figure 3.9).

Forest Plan Standards and Guidelines (S&G) (FW-137) directs the use of HEIWEST to model the effects of projects on habitat within BGEAs. A Model to Evaluate Elk Habitat in Western Oregon (Wisdom, 1986) is used to estimate habitat effectiveness (HE), which is defined as the proportion of achievement relative to an optimum condition. The management intent is to maintain effectiveness value in the range of 0.2-1.0 (depending on the emphasis area) with the optimum value being 1.0. HE incorporates and qualifies four key habitat attributes: size and spacing of forage (HEs), quality of forage (HEf), cover areas (HEc), and open road density (HEr) through big game habitat. Each habitat variable is calculated individually and allows for a comparison by variable or as a whole (known as the Habitat Effectiveness Index or HEI). The HEIWEST model considers past and ongoing activities. Recent studies suggest forage quality during summer and autumn periods may be more important than thermal cover in the winter for reproductive success and survival than previously assumed (Cook et. al., 1998, 2005). This research involved controlled studies where elk were given sufficient amounts of forage during the winter season but thermal cover was restricted. The resulting conclusions showed that forage may limit health and survival more than hiding or thermal cover during winter.

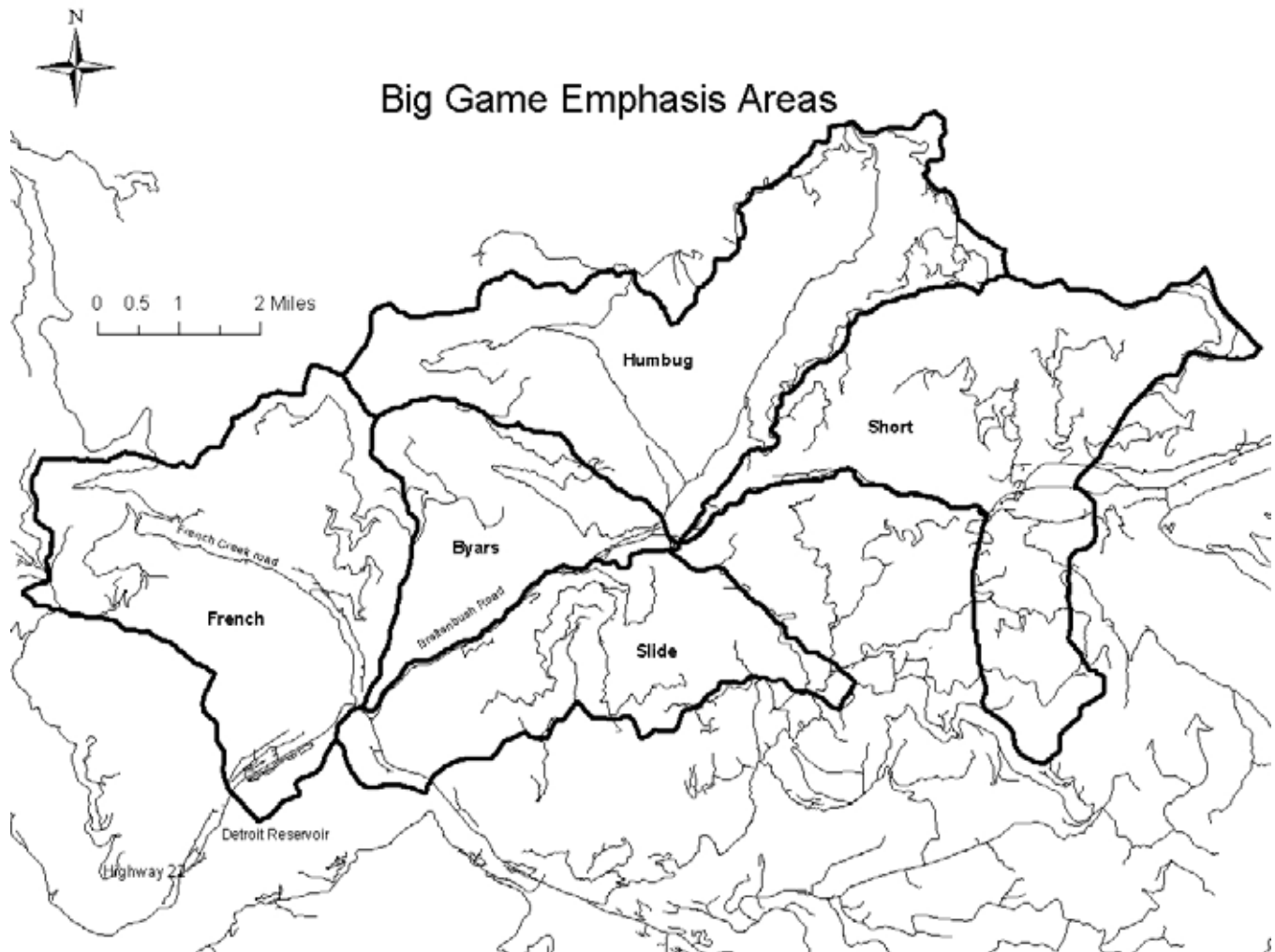
Changes in management practices altered how we achieve habitat effectiveness values. Clearcuts followed by slash burning are no longer the primary harvest method. Clearcut harvest creates much higher forage values than thinning and other types of harvest strategies. Foraging habitat in general forest will continue to experience reductions by being converted to hiding and then thermal habitat over time.

Byars BGEA is a low emphasis area and French, Humbug, Short and Slide are moderate emphasis areas. All emphasis areas contain winter range. On the Detroit Ranger District, winter range is managed for high emphasis habitat values which equates to a minimum desired rating of .5 for each variable with an overall value of .6. A moderate emphasis area should have an HEI

between 0.4 and 1.0 for each habitat value with 1.0 being optimum and less than 0.4 being marginal. The overall HEI for a moderate emphasis area should be greater than 0.5. Tables 3-17 and 3-18 describe the current index values for the BGEA's in the French Bug Planning Area.

As the project area includes only portions of the BGEA's it cannot bring habitat values of entire BGEA's to desired levels but can cause them to move closer to desired levels. As more projects are planned in these BGEA's additional work may be funded to improve habitat values.

Figure 3.9. Big Game Emphasis Areas in the French Bug Project Area



### Existing Condition

Habitat values for overall forage in four of five BGEA's are below desired values. Habitat values for winter range forage are below desired levels in all BGEA's.

The Slide BGEA is above the minimum desired overall road density. Four of five winter range road density values are above desired densities. Reduction in road densities is desired in winter range in four BGEA's.

Table 3-17 Current Big Game Emphasis Area Habitat Values

Big Game Emphasis Area	Spacing (HEs)	Cover (HEc)	Forage (HEf)	Roads (HEr)	Overall (HEI)
<b>Byars (Low emphasis)</b>					
Current values	.91	.49	.09	.49	.37
Minimum Desired Rating	.20	.20	.20	.20	.20
<b>French (moderate emphasis)</b>					
Current values	.91	.60	.17	.42	.44
<b>Humbug (moderate emphasis)</b>					
Current values	.96	.62	.27	.46	.52
<b>Short (moderate emphasis)</b>					
Current values	.87	.57	.26	.40	.48
<b>Slide (moderate emphasis)</b>					
Current values	.87	.60	.46	.37	.54
Minimum Desired Rating	.40	.40	.40	.40	.50

Table 3-18 Current Big Game Winter Range Habitat Values<sup>11</sup>

Big Game Emphasis Area	Spacing (HEs)	Cover (HEc)	Forage (HEf)	Roads (HEr)	Overall (HEI)
<b>Byars (High Emphasis Winter Range)</b>					
Current values	.81	.50	.09	.52	.37
<b>French (High Emphasis Winter Range)</b>					
Current values	.94	.55	.11	.37	.38
<b>Humbug (High Emphasis Winter Range)</b>					
Current values	.93	.63	.32	.46	.54
<b>Short (High Emphasis Winter Range)</b>					
Current values	.84	.55	.25	.34	.44
<b>Slide (High Emphasis Winter Range)</b>					
Current values	.82	.62	.26	.36	.46
Minimum Desired Rating (high)	.50	.50	.50	.50	.6

<sup>11</sup> Values in italics are not meeting desired ratings

In calculating road values some roads which are following the boundary of emphasis areas were not included in road miles as they are not affecting the interior area. Road miles not included in the analysis include highway 22 and Forest Service road 46 which are both 2 lanes wide and paved. Including these roads in the analysis would result in a higher road density than actually exists within the emphasis areas.

## **Environmental Consequences**

### **Alternative 1**

There would be no roads created or proposed for new closures with this alternative. HEIWEST model results for the direct and indirect effects of alternative 1 would be the same as the existing condition. Forage species exclusion will occur sooner in stands proposed for pre-commercial thinning. Current habitat effectiveness values would remain below minimum Forest Plan desired levels for all winter range areas and four of five overall emphasis areas.

### **Direct and Indirect Effects – Alternative 2**

#### **Forage**

Thinning will provide additional forage on 1255 acres for a few years until the canopy closes in thinning units and allow for seeding of about 10 acres of disturbed areas for additional forage production. Thinning would result in slightly better forage values as more sunlight would reach forage species on the forest floor.

Precommercial thinning of 111 acres will maintain forage values in young stands.

Precommercial thinning delays canopies in these stands from closing and excluding forage species. Forage will be maintained for approximately 10 years longer in these stands compared to unthinned areas.

Gaps of one half acre are proposed to be created for habitat diversity in some units which will also provide a small amount of additional forage until the crown closes in. Gaps are proposed in 16 units at ½ acre each for a total of 68 gaps totaling 34 acres.

The small increase in forage would not measurably change the current habitat effectiveness values for forage in the BGEA's. Forage values would remain below Forest Plan desired levels for all winter range areas and four of five areas year round.

#### **Roads**

The effects resulting from road management would be no change from those described for the existing condition. There would be no roads proposed for new closures under this alternative.

#### **Big Game Winter Range**

The project is occurring mostly in big game winter range. Haul routes pass through winter range to access the 46 road and state highway 22. The area of winter range accessed by the 2225 and 4696 haul routes are used by big game during the winter.

Project activities occurring during the December 1 – December 31 time period in units 15, 16 and that portion of unit 21 north of the Santiam River on the 2225-010 road may temporarily impact big game using winter range. Impacts are added stress during winter months with resulting loss of fat reserves which lowers survival rates in harsh winters. As roads may be plowed to access these areas the risk of poaching is increased during the life of this project.

## **Cumulative Effects – Alternative 2**

The cumulative effects analysis is also defined by the big game emphasis areas. Past, present, and foreseeable actions were considered in the analysis and model during the mapping of habitat conditions. Section 3.1 describes all past, present and reasonably foreseeable future actions. Past management practices increased forage in the area which was low in forage and resulted in increases in big game populations. Over time forage value has decreased as trees planted in the previously harvested areas have grown and are crowding out forage species.

The cumulative effects on the BGEAs in the project area are expected to be inconsequential. Thinning and ½ acre gaps may provide additional forage for a few years until the trees grow larger and return to closed canopy conditions. The ½ acre gaps are designed to provide habitat diversity in thinning units and not specifically to enhance big game forage. An addition of forage value associated with the ½ acre gaps will occur and is so slight will not be reflected in model results. No other projects in the planning area are known which would increase forage values. Existing past harvest units are expected to continue to decline in forage value in the near future as conifers continue to grow.

The planned Margie Timber Sale overlaps French Bug project area in the French BGEA. Cumulative effects related to this sale are not anticipated.

Road closures are not proposed under this alternative. Additional road closures are not occurring in the planning area as a result of other projects. Some power line roads have been closed in the past 2 years by power companies and these closures are reflected in the existing condition analysis.

Both the French Bug Timber Sale and the proposed Margie Timber Sale have units in the French BGEA. The Margie Timber Sale is not scheduled to have units identified until fall 2009. It is likely that this sale will include mostly thinning units so it is not likely that any cumulative effects will result from these two sales happening in the same BGEA.

These activities in conjunction with the proposed project would have a slight positive overall cumulative effect on big game habitat in the French Bug area. The overall road densities will remain unchanged. As a result of this project, forage values will be increased slightly for a few years.

## **Direct and Indirect Effects – Alternative 3**

### **Forage**

Thinning will provide additional forage on 1276 acres for a few years until the trees grow larger and the stands return to closed canopy conditions. Disturbance within thinning units would allow for seeding of about 10 acres with a big game forage mix for additional forage production. Thinning would result in slightly better forage values as more sunlight would reach forage species on the forest floor.

Precommercial thinning of 111 acres will maintain forage values in young stands. Precommercial thinning delays canopies in these stands from closing and excluding forage species. Forage will be maintained for approximately 10 years longer in these stands.

Creating larger gaps to provide additional forage in key areas will be of value to big game by increasing availability of the most limiting habitat in the planning area. Compared to Alternative 2, Alternative 3 contains larger gaps and 16 more gap acres. This will provide additional big



game forage as well as stand diversity. The difference between alternative 2 and 3 is an increase in acres of gaps from 34 to 51 acres a 16 acre increase. Gaps of one acre or larger will be burned and planted with big game forage species which will increase overall forage values.

Two acres of gaps will occur along the powerline near units 8 and 12 which are designed to reduce the risk of electrical outages from falling trees. These two acres will provide an additional benefit to big game by increasing forage production along the powerline corridor. Total gap acres remain the same as in alternative 2 for unit 8 with a one acre increase in size of unit 12.

The HEIWEST model is designed to measure large scale habitat effectiveness. The small increase in forage value from thinning would not measurably change the current habitat effectiveness values for forage in the BGEAs. Gaps created to enhance diversity and create higher forage values are located in the best quality sites and will have a higher value for big game than those reflected in the model. The addition of forage value from thinning is so slight it is not expected to be reflected in model results. Forage values would remain below Forest Plan desired levels for all winter range areas and four of five areas year round.

Overall forage availability will be increased as a result of this project. Project design elements include measures to increase forage availability in the project area.

### **Roads**

A total of 2.0 miles of permanent road closures and 4.3 miles of winter closures are proposed in the planning area. The effects resulting from road management would be a decrease in road density in winter range. Closure of these roads will result in a 6.3 mile reduction in open roads in winter range in the project area. Habitat value will be improved by the closure of these roads. Project design elements list the roads to be closed to increase habitat effectiveness by lowering road densities.

### **Big Game Winter Range**

Effects are similar to Alternative 2. The road closures in Alternative 3 would provide benefits to big game using winter range. Two key areas were identified to provide protection to big game in winter range. Restrictions for the two key areas are identified in the Big Game – Project Design Elements section. Project design elements are designed to protect big game using winter range in the project area.

### **Cumulative Effects – Alternative 3**

The cumulative effects analysis is also defined by the big game emphasis areas. Past, present, and foreseeable actions from Section 3.1 were considered in the analysis and model during the mapping of habitat conditions. Past management practices increased forage in the area which was low in forage and resulted in increases in big game populations. Over time forage value has decreased as trees planted in the previously harvested areas have grown and are crowding out forage species.

The cumulative effects on the BGEAs in the project area are expected to be inconsequential. Ongoing vegetation management in the powerline corridor may contribute some big game forage in the project area, but no other projects in the planning area are known which would increase forage values. Existing past harvest units are expected to continue to decline in forage value in the near future as conifers continue to grow.

Road closures are not occurring in the planning area as a result of other projects. Some power line roads have been closed in the past 2 years by power companies and these closures are reflected in the existing condition analysis. The overall road densities will be improved where sale generated funding is available to install gates. One road will be realigned which involves creating 0.12 miles of new road and closing 0.07 miles of existing road for a net gain of 0.05 miles of open road.

These activities in conjunction with the proposed project would have a slight positive overall cumulative effect on big game habitat in the BGEA's associated with the French Bug project.

## 3.5.2 Snags

### Introduction

The Willamette Forest Plan directs snag habitat to be managed at levels capable of providing for at least 40% or greater potential populations of cavity-nesting species. The WFP, as amended, requires retention of snags at levels sufficient to support cavity-nesting birds at 40 percent potential population levels. More detailed definitions can be reviewed in the Willamette Forest Plan (WNF Plan, pp.IV-65, 66). Snag habitat shall be provided and monitored at the subdrainage level (p.IV-65). Because timber harvest can affect the amount and distribution of snags, the effects of the alternatives on snag abundance was evaluated.

### Analysis Methods

There were two analysis methods used to inform decision makers as to how many trees should be left for snags in the project area and the effects of the alternatives on snag-dependent wildlife. A snag model tied to a forest geographic information system layer of vegetation types was used to calculate current conditions in planning subdrainages affected by the project and for determining compliance with Willamette Forest Plan and Northwest Forest Plan Standards and Guidelines.

DecAID is the second tool used to suggest treatment level snag densities relative to landscape levels. DecAID represents a new approach to addressing the habitat components of snags and downed woody debris. DecAID is the decayed wood advisor for managing snags, partially dead trees, and down wood for biodiversity in forests of Washington and Oregon (Mellen et al. 2006). DecAID is a web-based advisory tool to help land managers assess impacts of forest conditions and existing or proposed management activities on organisms that use snags and down wood. It is a summary, synthesis, and integration of published scientific literature, research data, wildlife databases, forest inventory databases, and expert judgment and experience.

One objective of the DecAID model is to mimic natural conditions across the landscape, generally defined as 20 square miles or greater. Not all areas of all units would have the same number of snags; they may be clumped or scattered, large or small. Another objective is to provide guidance for management of snags to meet wildlife needs. "DecAID presents wildlife data at three tolerance intervals (30%, 50% and 80%) for each species, which the user can interpret as increasing levels of assurance of providing for species" (Marcot et al., in prep). DecAID also presents snag information based on inventory data. The user can choose which set of data, wildlife or inventory, best applies to a given project.

## Existing Condition

Table 3-19 shows planning subdrainages (psubs) and existing snag levels. Percent snags in the table refers to the Willamette Forest plan requirement that all planning subdrainages supply snags at a level which provides for 40% of the potential population level of cavity nesting species. The project area is in the Byars, Canyon, Fox, Humbug, Lower East French, Lower French, North Side Breitenbush, Slide Upper West French and Wind planning subdrainages.

Table 3-19 Planning Subdrainages and Existing Snag Levels

Planning Subdrainages <sup>12</sup>	Potential population level for cavity nesting species <sup>13</sup>
Byars	23%
Canyon	13%
Fox	48%
Humbug	58%
Lower East French	58%
Lower French	32%
North Side Breitenbush	36%
Slide	45%
Upper West French	45%
Wind	29%

The Fox, Humbug, Lower East French, Slide and Upper West French psubs are providing snag habitat above levels needed to meet forest plan S&G's. The Byars, Canyon, Lower French, North Side Breitenbush and Wind psubs are providing snag habitat below levels needed to meet forest plan S&G's.

Snag levels are the result of past management practices with unique characteristics and locations. In the 1920-30's railroad logging occurred at lower elevations in low gradient areas on which railroads could be built. The Byars, Canyon and Lower French psub's were most impacted by railroad logging with other areas also impacted to a lesser degree. The Fox psub seems to have been impacted by a fire in approximately 1900. The North Side Breitenbush psub was railroad logged in the 1920's at lower elevations and then logged at higher elevations via roads in the late 1960's and early 1980's. Slide psub was heavily logged in the 1980's. Upper West French was railroad logged in the 1920's and later logged at higher elevations in the 1960's and 1980's. Wind creek was logged at low elevations in approximately 1920 and the higher elevations extensively logged in 1964, 1970-72 and 1984-86. Humbug and Lower East French were impacted by railroad logging and some later sales and have maintained high levels of un-logged areas.

Past practices have resulted in approximately 45% of the combined psub areas with less than 9" diameter trees. Railroad logging and fire have left approximately 16.5% of the area in stands

<sup>12</sup> The area covered by planning subdrainages is different from the area covered by sub-watersheds for the French Bug Project.

<sup>13</sup> Potential population level figures are based on a GIS run that looked at stand ages and average tree diameters.

between 9-21" dbh stands. Unharvested stands with stand dbh's above 21" account for approximately 37% of the area.

### DecAID

For the Westside Lowland Conifer-Hardwood Forest Type, data on wildlife use of snags is limited to cavity nesting birds, northern flying squirrel, bushy-tailed wood rat, Douglas squirrel and bats.

DecAID information can be interpreted based on tolerance levels. The planning subdrainages listed in Table 3-20 were combined for purposes of DecAID analysis. A minimum of 20 square miles is recommended as the analysis scale for DecAID with this area at 39.2 square miles or 25,086 acres of forested habitat. DecAID analyzes snags at two diameter ranges which are > 10" DBH and >19.7" DBH. Unharvested acres providing natural levels of snags represent 37.3 % of the area. Unharvested areas are providing snags greater than 21" dbh. Previously harvested areas which are providing snags in the greater than 10" dbh size and less than 21" dbh size represent 16.5% of the area. Previously harvested areas have trees which are between 1-9" dbh and are not providing snags greater than 9" dbh represent 44.7% of the area. A very small percentage of the area is providing snags based on previous harvest in which wildlife trees were left at a rate of approximately 1.5 per acre which represents 1.5% of the area.

The analysis area is providing snags at levels within the range of the 50% tolerance level for the Westside Lowland Conifer-Hardwood forest type. The level of snags described in this inventory analysis represents existing conditions averaged across the landscape in this forest type. Distribution of snag habitat across this landscape is highly varied based on past harvest practices. Low elevation areas were railroad logged resulting in existing conditions of providing snags in the 10"-19.6" dbh average diameter range. Road building and harvesting of higher elevation areas occurred in the early 1960's through the late 1980's. These areas are not providing snag habitat above the 10" size except in 1.5% of the area which has some wildlife trees retained. Other areas remain unharvested and are providing natural snags of larger diameter trees.

Table 3-20: Reference Conditions of Snag numbers By Tolerance Level<sup>14</sup>

% Landscape (Tolerance Level)	# Snags Needed >10" DBH (Trees/Acre)	# Snags Needed >19.7" DBH (Trees/Acre)
30%	10	3.5
50%	16	6.4
80%	30	12

### Landscape Distribution of Snags in Natural Conditions

The following data describes distribution of snags on unharvested plots (n=219) in the Westside lowland conifer-hardwood forest in the western Oregon Cascades.<sup>15</sup>

- 13% of the unharvested plots has >30 snags/ha (12/acre) that are >50.0 cm (19.7 in) dbh: the value of snags/ha is similar to the midpoint of the 80% tolerance level for wildlife.

<sup>14</sup> Information interpreted from tables WLCH\_OCA\_S.inv-2 and WLCH\_OCA\_S.inv-3 DecAID Advisor. This is based on cavity nesting birds, northern flying squirrels, bushy tailed woodrat, Douglas squirrel and bats.

<sup>15</sup> The plots used in DecAID are small relative to stand size so they are more variable.

- 22% of the unharvested plots has >20 snags/ha (8.1/acre) that are > 50.0 cm (19.7 in) dbh: the value of snags/ha is similar to the data point at the 50% tolerance level for wildlife.
- 48% of the unharvested area has >0 to 15 snags/ha (4/acre) that are > 50.0 cm (19.7) in dbh: the value of snags/ha is similar to the data point at the 30% tolerance level for wildlife.
- 19% of the unharvested area has no snags > 50.0 cm (19.7 in) dbh.

## **Environmental Consequences**

### **Direct and Indirect Effects—Alternative 1**

Existing levels of snags would be maintained. Existing unharvested natural stands would continue produce large diameter snags through natural processes. Stands which are 70-100 years old would continue to produce small diameter snags through competition induced mortality. Generally competition induced mortality occurs in the smallest trees which average approximately one half the average stand diameter. The production of larger diameter snags through natural mortality would be delayed in previously thinned stands as a result of reduced competition and would produce fewer snags than would be expected from unmanaged stands. Snag diameters and numbers would continue to increase over time due to tree growth. In the future there will continue to be losses of snags for safety reasons as a result of road maintenance activities. In stands proposed for precommercial thinning growth rates will be decreased by competition, resulting in delayed snag development.

### **Direct and Indirect Effects—Alternative 2**

As a result of past railroad logging and fires many stands are between 9-21" dbh including the areas proposed for thinning under this sale. As a result of the proposed thinning, trees of a larger diameter will become available for snags in a shorter period of time. In stands proposed for thinning, slowing of growth has occurred from overstocked stands. Generally competition induced mortality occurs in the smallest trees which average approximately one half the average stand diameter. With treatment, the average diameter of the stand will be increased by removing the smaller trees and the remaining trees will grow faster. Thinning harvest units are not expected to have average stand diameters large enough to provide snags of the size desired (18"+ dbh or the largest available) by forest plan S&G's. Abundance of smaller snags will be initially reduced by harvest activities and a subsequent reduction in competition mortality in thinned units. Some small diameter snag loss will be offset by larger trees damaged during harvest with the most damage occurring in helicopter yarded units and from exposure to wind and snow breakage due to thinning. Precommercial thinning will increase tree growth rates and provide snags sooner than unthinned stands. The units proposed in alternative 2 meet Forest Plan Standards and Guidelines for snags because there is no requirement to leave snags in commercial thinning.

### **Direct and Indirect Effects—Alternative 3**

Direct and indirect effects are basically the same as alternative 2. The difference between alternatives is an increase in harvested area of approximately 21 acres primarily in unit 33. Total acres in gaps increases from 34 to 52 acres with larger gaps in alternative 3. The difference between alternatives is inconsequential for snag level evaluation. The units proposed in

alternative 3 meet Forest Plan Standards and Guidelines for snags because there is no requirement to leave snags in commercial thinning.

### **Cumulative Effects**

The area analyzed for cumulative effects was the French Bug project area which is in the Byars, Canyon, Fox, Humbug, Lower East French, Lower French, North Side Breitenbush, Slide Upper West French and Wind planning subdrainages.

The scale of analysis for the Willamette Forest Plan snag model describes conditions at the planning subdrainage level. DecAID combines the all subdrainages into one analysis area. At the subdrainage level, snag analysis reflects conditions created by past management practices and natural events at a project scale. Subdrainage level analysis is more responsive to project level effects to snag habitat. DecAID analysis reflects a larger landscape scale view of snags and is more related to broad scale changes over time and ecosystem persistence. Both scales of analysis show similar trends in the planning area based on past management practices. Over time previously railroad logged areas have developed larger average stand diameters and are producing small diameter snags. Over time these stands will begin producing trees which will meet forest plan S&G's for snag size and it is estimated this will begin occurring in approximately 20-30 years. Snags produced in these stands are generally smaller diameter trees killed by competition mortality so although there are trees of sufficient diameter to meet minimum snag diameter sizes they generally are not snags.

In the future these stands are expected to be harvested and snags would be created from the larger diameter trees as part of the harvest. This will result in larger snags being produced sooner than in naturally occurring mortality in unmanaged stands. Over time the area is expected to produce more snags of larger diameter than are currently available. Riparian areas will produce larger snag diameters more slowly than thinned stands and will produce them for an indefinite period of time. Changes to snags as a result of this sale would not alter the existing level of larger snags and are expected to contribute to the areas trend toward larger trees. Smaller snags will be initially reduced by a very small percentage across the area. Small diameter snag loss will be offset by larger trees damaged during harvest with the most damage occurring in helicopter yarded units. Additional snag recruitment will occur from exposure to wind and snow breakage due to thinning.

Hazard tree felling along roads would continue to reduce snag levels in areas where these activities occur. Thinning in managed stands in the future would increase average tree diameter and produce larger snags sooner than in unmanaged stands.

Fifty eight acres of private land occur in the project area. These acres are expected to have a downward trend in providing snags. Past and current harvest practices on private land, which is generally clearcut and burn, generally lack wildlife trees or down wood after harvest. As the number of acres of private land in the analysis area is less than ¼ of one percent the effect of private land on overall snag levels is negligible.

Snags are currently being provided at the 50% tolerance level. Changes as a result of activities on 58 acres of private land, and the French Bug project would not alter the tolerance level of snags. The area would continue to provide downed woody debris at the low end of the 50% tolerance level.

### 3.5.3 Downed Wood

A renewable supply of large down logs is critical for maintaining populations of fungi, arthropods, bryophytes, amphibians and various other organisms that use this habitat structure. Provision of coarse woody debris is also a key standard and guideline for American marten, fisher, two amphibians, and two species of vascular plants. These animals need coarse woody debris well distributed across the landscape that provides for ecological functions.

#### Regulatory Framework

- Northwest Forest Plan
- DecAID Tool
- Willamette Forest Plan, as amended

Forest Plan standards and Guidelines for downed wood apply to regeneration harvest units. To meet S&G's for downed woody debris, at least 240 linear feet of logs per acre greater than or equal to 20 inches in diameter and greater than 20 feet in length must be supplied where available. It is down wood in decay classes I and II that are counted. The down wood species to be left should be a reflection of the species mix found in the original stand.

The DecAID tool can also be used to analyze downed woody debris levels in unmanaged stands. DecAID presents downed woody debris information based on inventory data.

#### Analysis Methods

There are two analysis methods used to inform decisions as to how many trees should be left for downed woody debris in the project area. To comply with Willamette Forest Plan and Northwest Forest Plan Standards and Guidelines for regeneration harvest units, 240 linear feet per acre of at least 20 inch diameter and 20 feet in length downed woody debris must be provided. Downed woody debris should be provided and monitored at the harvest unit level. More detailed definitions can be reviewed in the Northwest Forest Plan (p. C-40).

DecAID is the second tool, used to analyze natural reference conditions for downed woody debris at the landscape level. One objective of the DecAID model is to mimic natural conditions across the landscape, generally defined as 20 square miles. Another objective is to provide guidance for management of snags to meet wildlife needs. DecAID presents downed woody debris information based on inventory data.

#### Existing Condition

In previously harvested units trees were not felled to provide downed wood and as a result levels of downed woody debris in these units are very low. Some units proposed for thinning have patches of small snags and downed wood as a result of insect and snow break killed trees.

Size of trees available in proposed thinning units for down woody debris is currently too small to meet size requirements of the Northwest Forest Plan. In stands that grew after railroad logging trees are small because growth has been retarded by high density conditions. Table 3-21 shows the percentages of the ten planning subdrainages in the project area that are providing sufficient large downed woody debris and percentages of these areas where trees are too small to meet minimum size requirements.

Table 3-21 Planning Subdrainages and Existing Downed Woody Debris (DWD) Levels

Planning Subdrainage <sup>16</sup>	Area Provides Sufficient DWD (%)	Area Where Trees are too Small to Meet DWD Size Requirements (%)
Byars	58	42
Canyon	41	59
Fox	40	60
Humbug	56	44
Lower East French	55	45
Lower French	43	57
North Side Breitenbush	56	44
Slide	47	53
Upper West French	58	42
Wind	31	69

### Decaid

Downed woody debris levels are at the low end of the 50% tolerance level in this analysis area. For the Westside Lowland Conifer-Hardwood Forest Type, data on wildlife use of downed woody debris is available for 27 species from 9 studies, inventory data was collected on 422 plots including 213 unharvested plots. Data specific to the Oregon Western Cascades sub-region are available for spotted owl and 16 small mammals and 5 amphibians. Inventory data was used to analyze DWD target levels for this project. DecAID information can be interpreted based on tolerance levels. In unharvested stands to maintain an 50% tolerance level on the landscape the Westside Lowland Conifer-Hardwood Forest Type would have downed woody debris densities of at least 4.6% cover (>4.9" DBH). Table 3-22 shows this relationship.

Table 3-22 Reference Conditions of Downed Woody Debris Levels Occurring on a Percent of the Landscape

% Landscape (Tolerance Level) <sup>17</sup>	% Cover DWD >4.9" Needed
30	2.9
50	4.6
80	9

Down wood percent cover for DecAID has not been measured directly in the project area. Spotted owl habitat mapping is useful in identifying old growth and mature stands which would be assumed to produce downed wood equivalent to unharvested plots sampled for DecAID. Another source of information used was the vegetation inventory system from which age and stand diameters can be used to approximate DWD levels. Both sources of information can be used to estimate % cover, in this analysis BEGIS information was utilized.

<sup>16</sup> The area covered by planning subdrainages is different from the area covered by sub-watersheds for the French Bug Project.

<sup>17</sup> Data from WLCH\_OCA\_S.inv-10 DecAID Tool



## Landscape Distribution of Down Wood in Natural Conditions

The following data describes distribution of down wood cover on unharvested plots (n=213) in the Westside lowland conifer-hardwood forest in the western Oregon Cascades.

- 17% of the unharvested area has down wood cover above 8%; the value of percent cover is similar to the 80% tolerance level for inventory data.
- Between 27 and 44% of the unharvested area has down wood cover above 5%; the value of percent cover is similar to the 50% tolerance level for inventory data.
- Between 44 and 69% of the unharvested area has down wood cover above 3%; the value of percent cover is similar to the 30% tolerance level for inventory data.
- 7% of the unharvested area either has no down wood or no down wood >4.9" at the large end.

## Environmental Consequences

### Direct and Indirect Effects – Alternative 1

Existing levels of downed woody material would be maintained. Stands which are 70-100 years old would continue to produce small diameter DWD through competition induced mortality. Generally competition induced mortality occurs in the smallest trees which average approximately one half the average stand diameter. These trees are generally larger than 5" in diameter and would contribute toward increasing Decaid based % cover over time. Existing unharvested natural stands would continue to produce large diameter DWD through natural processes.

### Direct and Indirect Effects – Alternative 2

As a result of past railroad logging and fires many stands are between 9-21" dbh which are the areas proposed for thinning under this sale. In stands proposed for thinning, slowing of growth has occurred from overstocked stands. Generally competition induced mortality occurs in the smallest trees which average approximately one half the average stand diameter. These trees are generally larger than 5" in diameter and would contribute toward increasing Decaid based % cover over time. Pre-commercial thinning will increase tree growth rates and provide downed wood sooner than unthinned stands. Existing unharvested natural stands would continue to produce large diameter DWD through natural processes.

As a result of the proposed thinning, trees of a larger diameter will become available for snags and DWD in a shorter period of time. The average diameter of the stand will be increased by removing the smaller trees and the remaining trees will grow faster. Thinning harvest units are not expected to have average stand diameters large enough to provide DWD of the size required (20"+ dbh) to meet forest plan S&G's. Smaller DWD diameter levels will be initially reduced by harvest activities and competition mortality reduced. Some small diameter DWD loss will be offset by larger trees damaged during harvest with the most damage occurring in helicopter yarded units and from exposure to wind and snow breakage due to thinning. Because this action is not a final removal there is not a requirement to meet Forest Plan Standards and Guidelines for DWD.

In the future there will continue to be losses of snags for safety reasons as a result of road maintenance activities.

### Direct and Indirect Effects – Alternative 3

Effects are similar to those described under alternative 2 with 21 additional acres treated with thinning and 29 acres of broadcast burning in larger than 1/2 acre gaps. A small reduction in downed wood is expected to occur on the 29 acres of broadcast burned acres which is inconsequential.

### Cumulative Effects

The area analyzed for cumulative effects was the French Bug project area which is in the Byars, Canyon, Fox, Humbug, Lower East French, Lower French, North Side Breitenbush, Slide Upper West French and Wind planning subdrainages. Section 3.1 contains the past, present, and reasonably foreseeable activities considered in the analysis.

Salvage logging and routine hazard tree felling along roads would continue to reduce snag levels in areas where these activities occur. Firewood cutting along roadways open to the public reduces down wood levels adjacent to roads. Thinning in managed stands in the future would increase average tree diameter and produce DWD of larger diameter sooner than in unmanaged stands.

Clearcut harvest units from approximately 1940-1980 did not leave wildlife trees. In 50-70 years after harvest these stands would begin to produce trees large enough to provide snags of 18-20" dbh which later become DWD. Natural recruitment in unmanaged stands may take 20-30 years longer to produce the same size snags as thinning in managed stands. Stands harvested over the last 20 years have provided for wildlife tree habitat by leaving green trees in the units and topping them to create future snags and DWD as a measure to meet Forest Plan standards. Most harvest units in the analysis area were harvested prior to the time when snags and downed wood were left to provide for wildlife needs. Stands that have been previously managed are expected to mature and in the future provide more DWD resources in the project area than are currently available. The future increase in acres providing DWD, and managed stands providing larger downed wood earlier than unmanaged stands, would increase the availability and quality of DWD in the project area.

Suppression of wildfires which historically were stand replacing fires has resulted in increases of down wood accumulations across the landscape. Underburning in low intensity fire areas has not occurred as a result of fire suppression creating more fuel for fires than were historically present.

Fifty eight acres of private land occur in the project area. These acres are expected to have a downward trend in providing DWD. Past and current harvest practices on private land, which is generally clearcut and burn, generally lack wildlife trees or down wood after harvest. As the number of acres of private land in the analysis area is less than 1/4 of one percent the effect of private land on overall DWD levels is negligible.

Downed woody debris percent cover is currently being provided at about the 50% tolerance level. Changes as a result of activities on 58 acres of private land, and the French Bug project would not alter the tolerance level of downed woody debris. The area would continue to provide downed woody debris at the low end of the 50% tolerance level.

## 3.5.4 Migratory Birds

### Introduction

The original 1918 statute (Migratory Bird Treaty Act) implemented the 1916 Convention between the U.S. and Great Britain (for Canada) for the protection of migratory birds. Later amendments implemented treaties between the U.S. and Mexico, the U.S. and Japan, and the U.S. and the Soviet Union (now Russia).

Compliance of the French Bug project with laws relating to migratory birds is important to maintaining long-term viability of healthy populations. Preserving unique areas and habitat types which are used by migratory birds is important for maintaining diversity and viability of these species.

### Regulatory Framework

- 1918 Migratory Bird Treaty Act

### Existing Condition

Forested habitats may contain warblers, swallows, swifts and other migratory species. Most of the habitat in the French Bug watershed is coniferous forest with hardwoods in riparian areas.

Regeneration harvest units are preferred by birds specializing in open habitat environments. Areas previously regeneration harvested and converted to open habitat have grown into young conifer stands. The analysis area is dominated by non-riparian coniferous forested habitats. Some riparian habitats occur adjacent to large streams, the Breitenbush River and Detroit Reservoir. The larger landscape provides a mix and distribution of habitat types important to migratory land bird species. Stand changes provide a mix of structure and seral type conditions which provides habitat for a mix of migratory land bird species.

### Environmental Consequences

#### Direct and Indirect Effects—Alternative 1

Species using forested habitats and densities of migratory birds are not expected to change.

#### Direct and Indirect Effects—Alternative 2

The number of trees removed as part of thinning and precommercial thinning would not be sufficient to change the habitat type or species patterns of use. Many riparian areas are excluded from harvest for anadromous fish habitat protection. Riparian areas with hardwoods have a higher concentration of neo-tropical migratory birds than general forest. Hardwood areas are generally excluded from harvest units to preserve this habitat type in a dominantly coniferous forest type. Thinning units are expected to maintain the same type of habitat before and after harvest.

#### Direct and Indirect Effects—Alternative 3

Larger gaps, of more than one acre, proposed in alternative 3 may result in additional habitat being available for open area specialists in approximately 11 gaps. Overall species composition is not expected to change and effects to migratory birds will be inconsequential as a result of harvest activities.

## Cumulative Effects

The area analyzed for cumulative effects is the project area. Section 3.1 contains the past, present, and reasonably foreseeable activities considered in the analysis. Thinning and variable density thinning from other projects in the project area is not expected to change the species composition from those that prefer closed-canopy forested environments to those that prefer open-canopy forested environments. No shift in species abundance is expected to occur as clearcuts are not occurring in the project area.

## 3.5.5 Raptors and Colonial Nesting Birds

### Introduction

The Forest Plan directs projects on the forest to manage raptors and colonial nesting birds. Active roost and nest sites (including rookeries) shall be protected. Timber management and road building activities should be prohibited or curtailed during the nesting season. Timber harvest may be foregone in a primary zone extending up to 500 feet from the nest or roost site. Where activities of significant disturbance and duration are near active roost sites it may be necessary to establish a secondary Restricted Activity Zone outside the primary zone. This secondary zone could range up to 1,000 feet or more from the nest or roost site, depending on the individual situation. Timing or duration of operations may be restricted within the secondary zone. (LRMP, pp.IV-66,67).

### Existing Condition

Surveys were not conducted to identify raptor or colonial nesting birds in sale units. Surveys adjacent to Detroit Reservoir were conducted for Bald Eagles and osprey in past years. Osprey nests were located in or adjacent to units 16, 19-24, 60 and 62 in past years. Ospreys are expected to continue utilizing the area adjacent to Detroit Reservoir for nesting where residual old growth trees are present. Large trees which could be used by nesting raptors or colonial nesting birds are present in the planning area and it is likely some of these trees are used for nesting and roosting. An aggressive goshawk was reported in unit 52 and is assumed, by its behavior, to be nesting in or adjacent to southern edge of the unit.

### Environmental Consequences

#### Direct and Indirect Effects – Raptors and Colonial Nesting Birds – Alternative 1

Active roost and nest sites for raptors and colonial nesting birds would not be disturbed. Stands will continue in their current trajectory and would generally be smaller and provide less desirable nesting habitat (compared to Alternatives 2 and 3).

#### Direct and Indirect Effects – Raptors and Colonial Nesting Birds – Alternative 2

Active roost and nest sites for raptors and colonial nesting birds would not be disturbed. A seasonal restriction on harvest operations and helicopter yarding protects nesting osprey and raptors from disturbance during the nesting season.

The sale as proposed complies with Willamette Forest Plan Standards and Guidelines.

#### Direct and Indirect Effects – Raptors and Colonial Nesting Birds – Alternative 3

Effects to raptors and colonial nesting birds as a result of alternative 3 are the same as those described in alternative 2.

### **Cumulative Effects – Raptors and Colonial Nesting Birds**

There are no past, present or reasonably foreseeable cumulative effects related to raptors and colonial nesting birds in the project area. Other sales in the area have seasonal restrictions to protect these species from disturbance during the nesting period. Other activities in the area are not expected to reduce availability of trees used for nesting or result in habitat alteration.

## **3.5.6 Management Indicator Species**

Management indicator species represent either featured species or ecological indicators. Featured species are threatened and endangered plant and animal species on federal lists, species that are hunted, fished, or trapped, species of special concern or interest, and species with special habitat needs that may be at risk due to planned management activities. Ecological indicator species were selected because their population and habitat changes indicate potential effects of management activities on other species dependent on selected habitat types or water quality. Population and habitat recovery objectives for federally Listed Threatened and Endangered species are determined by the U.S. Fish and Wildlife Service and incorporated into Land and Resource Management Plans through development of interagency Management Plans designed to meet site specific needs for habitat protection and enhancement. Usually each nest site or territory has a site specific plan to ensure recovery objectives are met. (FEIS, LRMP, Willamette NF, p. III-68)

The implementing regulations for the National Forest Management Act of 1976 (NFMA) require the Forest Service to plan the management of wildlife habitats to “maintain viable populations of existing native and desired non-native vertebrate species in the planning area.” To facilitate management of all these species, NFMA further requires each Forest to identify management indicator species (MIS) through the planning process and to establish objectives to maintain and improve the habitats of these indicator species. Implementing regulations for NFMA further define viable population management. “In order to insure that viable populations will be maintained, habitat must be provided to support at least a minimum number of reproductive individuals and that habitat must be well distributed so that individuals can interact with others in the planning area” (36CFR 219.19).

Through Region-wide coordination, each Forest identified the minimum habitat distribution and habitat characteristics needed to satisfy the life history needs of MIS. Management recommendations to ensure their viability were incorporated into all WNF Plan Action Alternatives.

Management Indicator Species (MIS) were addressed in the Willamette Forest Plan (USDA Forest Service, 1990). Management indicator species include the Spotted Owl, Bald Eagle, Deer, Elk, Peregrine Falcon, Cavity Excavators, Pileated Woodpecker and Pine Marten. Resident fish are also a Management Indicator Species. (See fisheries section for information.) By managing for viable populations of indicator species and their associated habitat, viability risks for other species found in the same habitats are reduced (table 3-23).

The Willamette Forest Plan (1990) “provides dedicated areas of mature and old-growth tree habitat to ensure maintenance of viable populations of selected management indicator species, surrogates for a diversity of species dependent on old-growth habitat.” (p.IV-15). Old growth and mature conifer habitat provides the feeding, resting, and breeding areas that are required by the northern spotted owl, pileated woodpecker, and pine marten. These management indicator species represent wildlife associated with late seral stages of Forest development. As ecological indicators, these wildlife species represent all species which may be affected by limited amounts, distribution, and quality of mature and old-growth coniferous forests. (p.III-69). The Northwest Forest Plan (1994) amended the Willamette Forest Plan. “Administratively withdrawn areas that are specified in current plans and draft plan preferred alternatives to benefit American martens, pileated woodpeckers, and other late successional species are returned to the matrix unless local knowledge indicates that other allocations and these standards and guidelines will not meet management objectives for these species.” (p.C-3).

One pileated woodpecker and two pine marten management areas are located in the analysis area. Forested habitat of older trees will naturally provide habitat for pileated woodpeckers and pine martens outside management areas for this species. These older forested habitats are generally the same habitat as that identified as suitable habitat for spotted owls.

Spotted owl, peregrine falcon and bald eagles are discussed in the Threatened, Endangered, and Sensitive Species section. Habitat for elk and deer is discussed under the Big Game section. Cavity excavators are discussed in the Snags section. American marten and pileated Woodpeckers are discussed in this Management Indicator Species section.

Table 3-23 Willamette National Forest Management Indicator Species (Terrestrial only).

Indicator Species	Habitat Features	Selection Criteria
Northern Spotted Owl	Old-growth and mature conifers	-Ecological Indicator -Represents limited habitat -Federal Register of Threatened and Endangered Species
Bald Eagle	Old-growth conifers near large bodies of water	-Federal Register of Threatened and Endangered Species
Peregrine Falcon	Cliff nesting habitat near abundant prey	-Ecological Indicator -Represents limited habitat
Cavity Excavators	Dead and decaying trees	-Ecological Indicator -Represents limited habitat
Pileated Woodpecker	Old-growth and mature conifer	-Ecological Indicator -Represents limited habitat
American Marten	Old-growth and mature conifer	-Ecological Indicator -Represents limited habitat
Big Game (Deer and Elk)	Winter Range	-Commonly hunted

## **American Marten and Pileated Woodpecker**

### **Existing Condition**

The French Bug analysis area is composed of approximately 45% of the area with less than 9" diameter trees. Railroad logging and fire have left approximately 16.5% of the area in stands 9-21" dbh. Unharvested stands with stand DBHs above 21" account for approximately 37% of the area and are thought to be the preferred marten habitat in the project area. The 37% in old-growth and mature conifer stands is well connected to similar habitat to the south of the Breitenbush river and to the north connects to the Opal creek and Bull of the Woods wilderness areas. An area approximately 1.5 miles wide along the north edge of the Breitenbush river lacks this habitat type and does not provide good connections across the landscape. In the future as riparian habitats mature connections will be reestablished in this area. Stands previously railroad logged will transition into mature stand ages in 10-30 years. Two pine marten and one pileated woodpecker habitat areas were retained in this area to provide high quality habitat until forests in the area mature and provide connecting habitat. The number and distribution of snags and downed wood that exists in the analysis area is moderate and is probably limiting overall potential population levels while providing habitat in areas with older stands.

### **Environmental Consequences**

#### **Direct and Indirect Effects – Alternative 1**

American marten habitat would not be measurably changed in the short-term as a result of alternative 1. The area will continue to provide old-growth characteristics in a fragmented pattern and with an improvement in connecting habitat along the Breitenbush River in the next 10-30 years.

#### **Direct and Indirect Effects – Alternative 2**

Effects to American marten and Pileated woodpecker are expected to be very minimal as the harvest areas do not provide old-growth characteristics that are thought to be optimal habitat. No change in available snag densities is expected as a result of the French Bug project. Average stand diameters will increase as a result of thinning and precommercial thinning and will provide better marten habitat sooner as a result of thinning. Habitat areas designated for American martens and Pileated woodpeckers will be protected. One or two American marten or Pileated woodpecker individuals may be disturbed as a result of noise and harvest activity but the actions are not likely to affect the American marten or Pileated woodpecker populations as a whole.

#### **Direct and Indirect Effects – Alternative 3**

Effects to American Marten and Pileated woodpecker as a result of alternative 3 are the same as those in alternative 2.

#### **Cumulative Effects**

There are no effects associated with past, present and reasonably foreseeable activities in the project area that when added to the effects of the proposed actions are expected to result in cumulative effects. No projects are known in the project area which will reduce available old-growth conifer forests in the area. Over time protection of riparian areas will result in the development of more old-growth forest which will better connected existing areas of similar habitat.

## 3.5.7 Rare and Uncommon Species

### Introduction

Potential habitat for great gray owls does not occur in the analysis area, and therefore is not discussed below.

Rare and uncommon species applicable to this project area includes Red Tree Voles.

### Red Tree Vole

#### Introduction – Red Tree Vole

Based on the literature, old-growth habitat appears to provide optimum conditions for red tree vole populations. The tall, multi-layered canopies of old growth retain humidity and intercept fog, which functions as a climatic buffer and a source of free water. Large branches provide stable support for nests, protection from storms, and travel routes (Gillesberg and Carey 1991, as cited in the Survey Protocol for the Red Tree Vole, Version 3.0). Active nests have been found in remnant older trees in younger stands indicating the importance of legacy structural characteristics (Biswell pers. Comm. as cited in the Survey Protocol for the Red Tree Vole, Version 3.0). Little is known about the minimum number or size of conifer trees, or other stand characteristics, required to sustain a local population of red tree voles. Red tree voles have been documented in conifer stands from sea level to 5,500 feet in elevation (Manning and Maguire 1999 as cited in the Survey Protocol for the Red Tree Vole, Version 3.0).

In September 2007 Survey Protocol for the Red Tree Vole, Version 3.0 was issued. Range changes based on extensive survey results and exclusion areas from survey requirements were defined in this document. The Detroit Ranger District is in the Northern mesic forest distribution zone.

#### Existing Condition – Red Tree Vole

Potential red tree vole (RTV) habitat is present in the planning area but not in proposed treatment units. Stand ages range from 56-76 years of age in treatment units. Stands under 80 years of age which do not contain two or more predominant conifer trees per acre are typically poor habitat for RTVs. Since none of the proposed units are likely nesting habitat, pre-disturbance surveys were not conducted.

#### Direct and Indirect Effects – Alternative 1

At the current growth trajectory, younger stands will remain in an overstocked condition. The overstocked conditions will result in slow development of late successional conditions. Since red tree voles prefer late successional forests, habitat for this species will develop more slowly by not thinning.

#### Direct, Indirect Effects, and Cumulative Effects – Alternative 2 and 3

Both action alternatives comply with the management direction for this species. As habitat is not being removed and large areas of suitable habitat in the surrounding area will remain intact no impacts are expected to this species from the proposed alternatives. By thinning and precommercially thinning young stands, late successional conditions will develop faster and provide preferred habitat for this species sooner.



Other projects occurring in the analysis area comply with management requirements for the Red Tree Vole. No known active nest sites have been located in the analysis area or on the Detroit Ranger District. There are no effects associated with past, present and reasonably foreseeable activities in the project area that when added to the effects of the proposed actions are expected to result in cumulative effects.

### **3.5.8 Proposed, Endangered Threatened and Sensitive Species**

#### **Introduction**

Sensitive Species which have habitat in the project area include American Peregrine Falcons, Bald Eagles, Bufflehead, Harlequin duck, Baird's Shrew, California Wolverine, Pacific Fisher, Pacific Fringe-Tailed Bat, Pacific Shrew, Cascade Torrent Salamander, Oregon Slender Salamander, and Crater Lake Tightcoil Snail. Threatened and Endangered Species with habitat in the project area include Northern Spotted Owl.

#### **Analysis Methods**

Analysis of impacts was done based on the process established in Section 2670 of the Forest Service Handbook and the R-6 Interim Direction R-6 2670-92-1. In addition to these and the following documents, personal knowledge of the area, professional judgment, and other studies were used to assess the risk of the proposed project adversely affecting Threatened, Endangered, or Sensitive Species.

Guiding documents for Spotted Owl analysis include: Land and Resource Management Plan, Willamette National Forest, as amended, 1990; Record of Decision, for amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl, U.S. Department Of Agriculture, Forest Service; U.S. Department of the Interior, Bureau of Land Management, April 13, 1994; Batched Biological Assessment (BA) for Projects with the Potential to Modify the Habitats of Northern Spotted Owls or Modify Critical Habitat of the Northern Spotted Owl within the Willamette Province in Fiscal Years 2009-2010 and USFWS Letter of Concurrence dated April 4, 2008 (reference number 13420-2007-I-0038) (USDI, 2008).

Field reconnaissance: Spotted owl surveys were conducted in parts of the project area in the 1990's. No surveys were conducted as part of the French Bug analysis.

#### **Species dropped from further analysis**

The following species have no habitat in the project/analysis area and will not be discussed further in this document – Black Swift, Least Bittern, Yellow Rail, Foothill Yellow-Legged Frog, Northwestern Pond Turtle, Oregon Spotted Frog and Mardon Skipper.

Table 3-24. Species dropped from consideration based on lack of habitat

Species	Step #1 Pre-field Review	Step #2 Field Recon.	Step #3 Conflict Determination	Step #4 Analysis of Significance
<b>Birds</b>				
Black Swift	Habitat not present	Not Conducted	None	No impact
Least Bittern	Habitat not present	Not Conducted	None	No impact
Yellow rail	Habitat not present	Not Conducted	None	No impact
Black Swift	Habitat not present	Not Conducted	None	No impact
<b>Herpetiles</b>				
Foothill Yellow-legged Frog	Habitat not present	Not Conducted	None	No impact
Northwestern Pond Turtle	Habitat not present	Not Conducted	None	No impact
Oregon Spotted Frog	Habitat not present	Not Conducted	None	No impact
<b>Insects</b>				
Mardon Skipper	Habitat not present	Not Conducted	None	No impact

Table 3-25 lists the proposed, threatened, endangered and sensitive species on the Willamette National Forest. Additional detailed information about these species is in the French Bug Biological Evaluation for Wildlife.

Table 3-25. Threatened, Endangered and Sensitive Species with Habitat in the French Bug Project Area

Species	Habitat Present in Project Area?	Status		
		Federal	Region 6 (USFS)	State
American peregrine falcon	Yes	N/A	Sensitive	Endangered
Bufflehead	Yes	N/A	Sensitive	Undetermined
Harlequin duck	Yes	N/A	Sensitive	Undetermined
Northern bald eagle	Yes	N/A	Sensitive	Threatened
Northern spotted owl	Yes	Threatened	N/A	Threatened
Baird's shrew	Yes	N/A	Sensitive	N/A
California wolverine	Yes	N/A	Sensitive	Threatened
Pacific fringe-tailed bat	Yes	N/A	Sensitive	Vulnerable
Pacific Fisher	Yes	Candidate	Sensitive	Critical
Pacific shrew	Yes	N/A	Sensitive	N/A

Species	Habitat Present in Project Area?	Status		
		Federal	Region 6 (USFS)	State
Cascade torrent salamander	Yes	N/A	Sensitive	Vulnerable
Oregon slender salamander	Yes	N/A	Sensitive	Undetermined
Crater Lake tightcoil	Yes	N/A	Sensitive	N/A

Spotted owls will be discussed separately after the sensitive species section. Spotted Owls are the only species listed as federally threatened in the project area.

## Regionally Sensitive Species

### Introduction

Sensitive species are designated by the regional forester for species which have population viability concerns which are evidenced by: 1) Significant current or predicted downward trends in population numbers or density or 2) Significant current or predicted downward trends in habitat capability that would reduce a species existing distribution. All Actions are taken to ensure that management activities do not jeopardize the continued existence of sensitive species or result in an adverse modification of their essential habitat (FSM 2670.3, Region-6 ID 2670-92-1, 1/91).

Analysis of impacts was done based on the process established in Section 2670 of the Forest Service Handbook and the R-6 Interim Direction R-6 2670-92-1.

### Existing Condition

Habitat is present in the planning area which could be occupied by the following sensitive species, American Peregrine Falcon, Northern Bald Eagle, Bufflehead, Harlequin Duck, Baird's Shrew, California Wolverine, Pacific Fisher, Pacific Fringe-Tailed Bat, Pacific Shrew, Cascade Torrent Salamander, Oregon Slender Salamander, Crater Lake Tightcoil Snail.

Detailed information on abundance, distribution, and habitat use by these sensitive species can be found in the French Bug biological evaluation for wildlife.

## Environmental Consequences

### Direct and Indirect Effects–Alt. 1

The no thinning alternative would maintain high over-story canopy closures. This high canopy closure allows minimal light to the forest floor resulting in heavy inter-tree competition. As competition increases trees become less vigorous and more susceptible to insect and diseases. Smaller trees in the intermediate and sapling stage continue to die from suppression mortality. The stands would continue to grow with declines in diameter growth as trees compete for growing space. Due to the high over-story canopy closure, under-story development is delayed or never achieved within a 100-year analysis period. Multi-story canopy layers are a needed component for development of late-successional forests. A more detailed analysis of late-successional forest development is available in the Silvicultural section of this EA.

Without thinning, average stand diameters increase more slowly and do not provide large snags or downed material for a longer period of time. The delay in providing large snags and downed material affects species dependant on this habitat type, such as woodpeckers and salamanders. The delay in late-successional forest development negatively affects species which rely on this habitat type, such as spotted owls.

### **Direct and Indirect Effects–Alt. 2**

Habitat conditions for the species listed below are not expected to change in the future as a result of this project.

**American Peregrine Falcon** nesting habitat is not expected to be affected by proposed project activities as cliffs and the primary nest zones do not have proposed treatments. Foraging habitat will become more open in thinning and precommercial thinning units and better access to prey species will be provided by gaps in units.

**Buffleheads** or their habitat are not expected to be affected as a result of this proposed project. Proposed units or landings do not contain and are not adjacent to suitable nesting habitat so no impacts will occur based on habitat changes. Disturbance is expected to be insignificant as most foraging use of the area would occur during migrations and would be of very short duration primarily in the spring.

**Harlequin Duck** habitat and individuals are expected to be affected by proposed project activities. Proposed units are adjacent to suitable foraging habitat for harlequin ducks and proposed units contain habitat suitable for nesting. Habitat suitable for harlequin duck nesting will remain suitable for nesting after units are thinned. Harvest operations in units 31, 35 north of road 4696, 37 and 38 are expected to impact harlequin ducks using the area for foraging and nesting activities. While foraging activities can be moved to adjacent undisturbed areas, nesting activities are more susceptible to harvest-related disruptions. Units with seasonal restrictions will help ameliorate the harvest-related effects on nesting ducks. The proposed project may adversely impact individuals, but is not likely to result in a loss of viability in the planning area, or cause a trend to federally listing or a loss of species viability range wide.

**Northern Bald Eagle** or its habitat is not expected to be affected as a result of this proposed alternative. Portions of units 19, 20, 21 and 60 are within the Bald Eagle Management area for Detroit Reservoir. Trees suitable for nesting are located within proposed units and these trees are not proposed to be cut. Trees suitable for nest building are remnant old growth trees which are surrounded by younger forests which this project proposes to thin. With required seasonal restrictions potential disturbance impacts to Bald Eagles will be avoided.

**Baird's shrew** or its habitat may be impacted by the proposed project if they are present and using the forested riparian environment which may be present beyond the buffered stream areas. As part of unit design to comply with protection measures related to endangered fish habitat all streams have a no harvest buffer of 30' with a 50' buffer on streams within 1 mile of Chinook spawning streams and a 100' buffer on Chinook spawning areas in lower French creek, Breitenbush river and Humbug creek. Numerous perennially flowing streams are located in and adjacent to proposed units. As Baird's shrew habitat use is not well understood it is expected that individuals using forested habitat may be impacted by harvest activities. The disturbance to individuals is of limited duration and is not expected to exclude Baird's shrews from using the area. Habitat is not expected to be made unsuitable to Baird's shrew use. Impacts to Baird

shrew are likely to be very overall, due to the large amount of potential habitat in the project area that would not be affected by proposed activities.

**California Wolverine** or its habitat is not expected to be affected by proposed project activities. Potential foraging may occur through the area as wolverine home ranges usually are between 170 to 270 square miles. Wolverines tend to avoid areas of human disturbance. The planning area is heavily used by people for recreation and forest management activities which discourage wolverine use of the area. Opal Creek and the Bull of the Woods Wilderness areas, a few miles to the north of the project area are seldom used by humans due to lack of trails and steep terrain and provides suitable potential habitat for wolverines. High human use of the project area during the summer and fall is expected to continue and create conditions unfavorable to wolverine occupancy. The wilderness is expected to continue to provide potential habitat for wolverines adjacent to the planning area. Disturbance by equipment is of limited duration and not expected to impact wolverines if they forage through the area. Wolverine presence in the planning area is highly unlikely. The last verified wolverine sighting in Oregon was in 1992.

**Pacific Fisher** habitat or individuals are not expected to be impacted under these alternatives. Habitat will remain available for fisher use in the project area and adjacent wilderness. The potential for effects to fishers is reduced because the probability is low that there are any fishers in the area. Past carnivore surveys on the Detroit Ranger District and the Willamette National Forest did not detect fishers. The closest known population is southern Oregon where existing populations are descendant from individuals transplanted from other states.

**Pacific fringe-tailed bat:** Bats may be affected if trees which have potential to be used for nursery colonies are felled as hazards during harvest operations. Potential habitat for nursery colonies is located within the project boundaries in old growth trees. From aerial photo analysis approximately 17 remnant old growth trees can be seen in proposed units. These trees will be retained in harvest units unless they are determined to be safety hazards. Stands throughout the planning area and adjacent to proposed harvest units contain residual and large stands of old growth trees which are expected to continue providing roosting and nursery habitat.

**Pacific shrew** habitat exists in the planning area and is suitable for occupancy. A small amount of this habitat may be impacted in the short term by disturbance, but is expected to remain suitable habitat after harvest. The proposed project may impact the Pacific shrews by disturbance of individuals if they are present in the project area. Harvest impacts to Pacific Shrew are expected to be insignificant if they occur at all.

**Cascade Torrent Salamander** habitat occurs in perennially flowing streams throughout the planning area. Flowing cold streams and the wet areas immediately adjacent to them are protected by a no harvest buffer and were excluded from planned units or are in protected special habitat areas. Disturbance to individuals and habitat by harvest activities may occur in the stream buffer areas while harvesting of trees is prohibited. It is possible, but unlikely, habitat and individuals could be disturbed if harvest activities cause disturbance to wet areas.

**Oregon slender salamander** habitat occurs throughout the project area. There is potential for habitat removal and disturbance of individuals if they are present in the project area. Bark and other woody debris are expected to be present after harvest and provide habitat for Oregon Slender Salamanders. Some bark and woody debris is expected to be removed by the project through removal of sound logs and burning of harvest generated slash. After thinning trees are more susceptible to natural mortality from wind and snow events and many will fall and

contribute to downed woody debris. Impacts to individuals would be of short duration and insignificant in effect as the surrounding unaffected area as well as the project area will continue to provide habitat for this species. In addition, old growth is better habitat for the Oregon slender salamander so there is more marginal habitat.

**Crater Lake Tightcoil Snail** or their habitat is not expected to be affected as a result of this project. Riparian areas which may have habitat suitable for *pristiloma* are excluded from harvest units and will not be disturbed by project activities. Surveys were conducted to determine locations of suitable habitat. Most streams surveyed for habitat were determined to be unsuitable due to steep gradient steep banked streams with no vegetation which is perennially wet. The only potentially suitable habitat located in the project area is adjacent to unit 13 and was surveyed to protocol with no *pristiloma* detected. Late in the planning process two perennially wet areas, located by contract surveys for hydrology, were identified in unit 28. As snow had already fallen in the area and surveys were not possible to determine *pristiloma* presence they were assumed to be occupied and a 10 meter no disturbance buffer was put around them for protection. This species of mollusk has not been located on Detroit Ranger District.

### **Direct and Indirect Effects – Alternative 3**

Direct and indirect effects to Bufflehead, California Wolverine, Pacific Fisher, Pacific Fringe-Tailed Bat, Cascade Torrent Salamander and Crater Lake Tightcoil Snail are the same as those described in alternative 2.

**American Peregrine Falcon:** Similar to alternative two with minor differences. Unit 33 would add helicopter and skyline yarding and increase treatment in this unit by 20 acres and unit 30 would change by adding 88 acres of skyline logging which are helicopter yarded in alternative 2. Helicopter yarding will still occur on 19 acres of unit 30. Larger gaps are created in alternative 3 which will add habitat diversity and make prey more available to peregrine falcons by opening the canopy.

**Harlequin Duck** Proposed units are adjacent to suitable foraging habitat for harlequin ducks and proposed units contain habitat suitable for nesting. Alternative 3 would have similar effects on Harlequin ducks as alternative 2. The only difference is that unit 33 in Alternative 3 has added acres that occur adjacent to Humbug Creek. Effects are not expected as this area has a seasonal restriction to protect harlequin ducks from disturbance.

**Northern Bald Eagle:** Alternative 3 is identical to alternative 2 as it relates to impacts to bald eagles. Gaps in units 20, 60 and 62 will be burned in this alternative and these units are seasonally restricted for all harvest related activities to protect nesting bald eagles. Gap sizes are different in units 20 and 60 which do not change habitat or potential impacts to nesting bald eagles when compared to alternative 2.

**Baird's Shrew:** Alternative 3 has 21 more harvest acres in non-riparian habitat than alternative 2. Burning of gaps larger than one acre is not occurring in riparian habitat. As the additional harvest acres and gap burning are not in riparian habitat, impacts from alternative 2 are the same as alternative 3.

**Pacific Shrew:** Burning of gaps of 1 acre or more in alternative 3 will increase impacts to Pacific Shrews in the 30 acres of larger gaps. The 21 additional acres and other insignificant differences in alternative 3 do not change the determination of impacts to Pacific Shrews as described in alternative 2.

**Oregon Slender Salamander:** Burning of gaps of 1 acre or more in alternative 3 will increase impacts to Oregon Slender Salamanders in the 30 acres of larger gaps. The 21 additional acres in alternative 3, when compared to alternative 2, would increase the total acres impacted which could contain Oregon Slender Salamanders with the determination of impacts remaining the same as alternative 2.

### **Cumulative Effects–Sensitive Species**

For sensitive species, the cumulative effects analysis area is the project area. The past, present, and reasonably foreseeable activities in Section 3.1 were reviewed for this analysis. Cumulative effects resulting from these activities and the action alternatives in this project are not expected for sensitive species.

### **Federally listed threatened and endangered species**

The Endangered Species Act (ESA), administered by the U.S. Fish and Wildlife Service (USFWS), mandates protection of threatened and endangered species.

The Endangered Species Act provides broad protection for species of fish, wildlife and plants that are listed as threatened or endangered in the U.S. or elsewhere. Provisions are made for listing species, as well as for recovery plans and the designation of critical habitat for listed species. The Act outlines procedures for federal agencies to follow when taking actions that may jeopardize listed species, and contains exceptions and exemptions.

The purposes of the Act is to provide a means of conserving the ecosystems upon which endangered and threatened species depend; provide a program for conserving those species; and take the steps necessary to achieve the purposes of the international treaties and conventions. The policy of Congress is that federal agencies must seek to conserve endangered and threatened species and use their authorities in furtherance of the Act's purposes. § 1531.

Communications with the U.S. Fish and Wildlife Service: Interagency cooperation between the Forest Service (or other federal agency) and the U.S. Fish and Wildlife Service, regarding proposed, threatened or endangered species, is described in Section 7 of the Endangered Species Act. Definitions relating to “consultation” and “conferencing” are given in the FSM Supplement 2600-90-6.

Need for further consultation with the U.S. Fish and Wildlife Service is based on the project's effects on T&E species and critical habitat. Based on the finding of the BE that the French Bug timber sale is not likely to adversely affect northern spotted owls, concurrence is needed from the USFWS for this determination.

French Bug was submitted to USFWS on February 2008 as part of the “Willamette National Forest, Biological Assessment (BA) for Four Vegetation Management Projects” requesting a letter concurrence from the USFWS. Alternative 3 was submitted to USFWS as it has 21 more acres of thinning and larger gap sizes than Alternative 2. A letter of concurrence was signed April 4, 2008 (USDI, 2008).

### **Introduction – Spotted Owls**

The northern spotted owl is primarily an inhabitant of old growth and mature forests.

Suitable spotted owl habitat has been defined in various documents: The ISC Report, USFWS Critical Habitat Determination, Memorandum Decision and Injunction for Judge Dwyer's Decision, and the FSEIS on Management of the Northern Spotted Owl in the National Forests. General guidelines for suitable spotted owl habitat are:

- Forested stands of Douglas-fir, Western hemlock, Western red cedar, or Ponderosa pine older than 200 years and having a moderate to high canopy closure of 60-80%.
- Adequate amounts of snags and downed material with diameters greater than 32 inches dbh (ISC Report 1990)
- An under-story of multi-layered conifers and hardwoods open enough to still allow owls to fly within and beneath it

However, all of the above characteristics do not need to be present for spotted owls to make use of an area, and for habitat to be determined suitable.

Dispersal habitat<sup>18</sup> typically does not have large, old-growth nest trees, multi-layered canopy, or many large snags and logs. The minimum canopy closure for dispersal habitat is about 40% with minimum stand diameter of 11" dbh.

Another component of spotted owl habitat is foraging habitat. Foraging habitat is typically 80 years of age or older and 18" in diameter or larger. If older trees with structural conditions which support nesting are present in predominately foraging habitat birds sometimes nest in these areas. In analysis of suitable habitat for spotted owls both suitable nesting and foraging habitats are combined.

The proposed project units occur in habitat suitable for spotted owl dispersal and in non-habitat. Nesting and foraging habitat is not present in the proposed project units. Project units are proposed in critical habitat areas for spotted owls.

Challenges to spotted owl conservation exist range-wide, including potential threats from wildfires, barred owl competition, great horned owl predation, West Nile Virus and sudden oak death disease. Disturbances on the landscape from wildfires and wind storms have affected spotted owl habitat.

### **Existing Condition– Spotted Owls**

Currently, the project area contains 7,496 acres of suitable spotted owl habitat (nesting and foraging) and 9,127 of dispersal only habitat. Total dispersal habitat is a total of dispersal only and suitable habitat equaling 16,623 acres and covering 65.5% of the forested area. Total forested acres in the planning area are 25,375. Total non-forested acres are 1,842.

Lower elevation areas which could be accessed by railroads were logged and not replanted in the 1900's. Trees in lower elevation areas in which units are planned are between 56 and 76 years of age with average diameters of 14.2 in first thins and 15.2" dbh in second thins. Some of the stands were thinned in the last 10 years and have not developed a snag and down wood component. The second thinning of these units is occurring much sooner than would be expected based on tree growth and is more a function of stem density, as the first thin did not

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<sup>18</sup> Dispersal habitat are areas of forest large enough to sustain groups of spotted owls and close enough to one another to allow movement of the owls among the forested areas.



remove enough trees. These stands were prescribed to have 70% crown closure after the first thinning. Gaps are being created in units 60, 62 and 64 to add diversity to the stands with no additional thinning prescribed. Fourteen other units will have gaps created as part of variable density thinning. Red cedar will be planted in gaps.

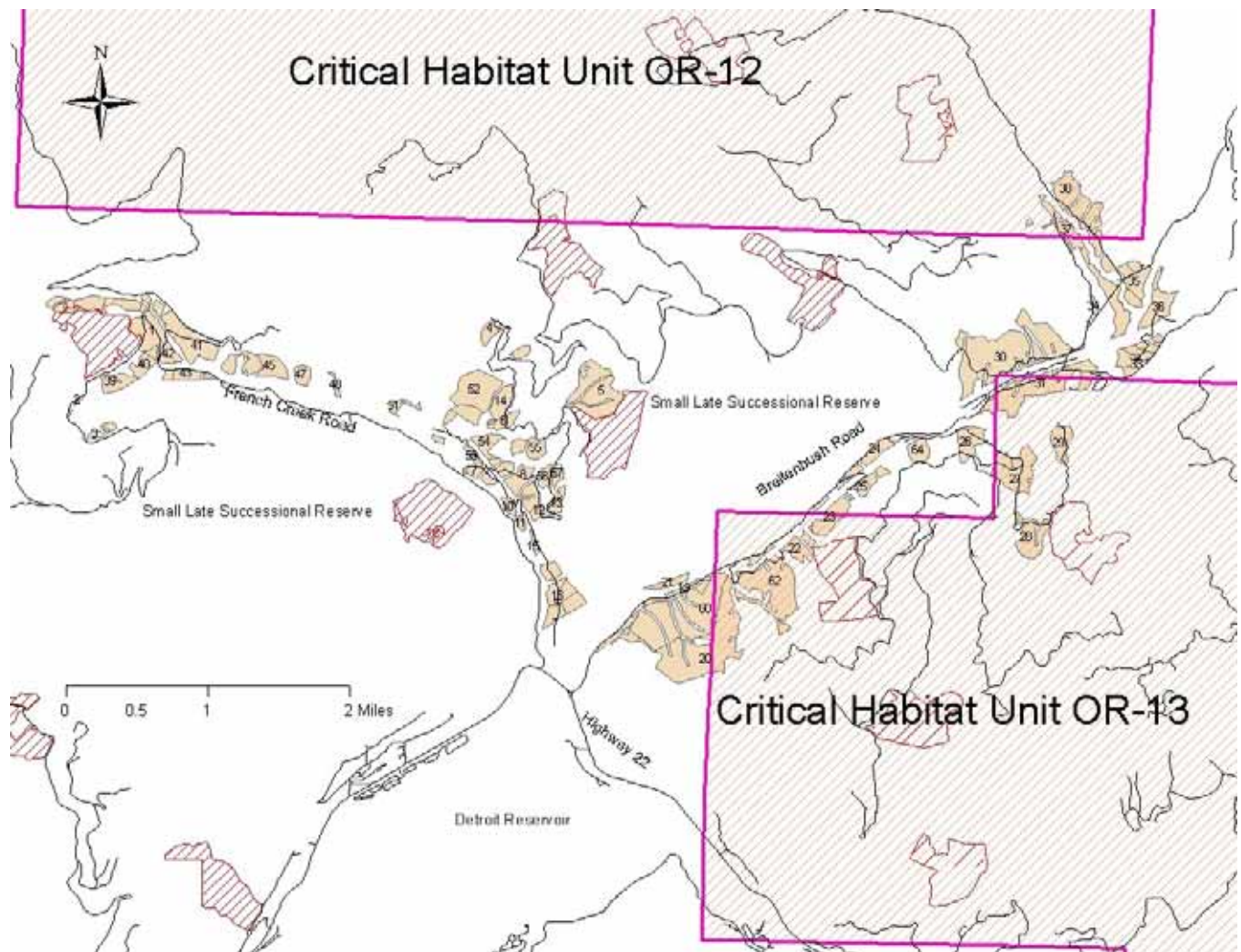
These stands lack primary constituent elements of suitable spotted owl habitat such as large downed wood, snags and trees with nesting structure. A few remnant older trees are present, which may have nesting structure, with unit 52 having the most at an estimated 7 older trees. Most units have no remnant trees with a few having one or two. To be suitable spotted owl habitat more late successional characteristics would need to be present in proposed units. Multiple canopy layers are not present in these stands and are not likely to develop without thinning. Thinning allows more light to reach the forest floor which promotes under-story development.

Previous clearcut harvesting fragmented spotted owl habitat in areas above the railroad logged areas. The largest intact old growth habitat block in the planning area is in the Cliffs Creek drainage in the southeast corner of the planning area. Suitable habitat in the planning area is well connected by dispersal habitat.

Seven known Spotted Owl activity centers are located in the analysis area.

Critical habitat is designated by the USFWS to identify lands that are considered essential for the conservation and recovery of listed species. Critical habitat units (CHU) OR-12 and OR-13 overlap the project area to the north and southeast (see figure 3-10).

Figure 3-10. Location of Critical Habitat Units and 100 acres LSRs in the French Bug Planning Area



## Environmental Consequences

### Direct and Indirect Effects—Spotted Owls – Alternative 1

Currently, these stands lack primary constituent elements of suitable spotted owl habitat such as large downed wood, snags and trees with nesting structure. To be suitable spotted owl habitat more late successional characteristics would need to be present in proposed units. The No Action Alternative would maintain the stands on their current trajectory and would likely delay attainment of larger diameter trees needed for late successional habitat.

### Direct and Indirect Effects— Spotted Owls – Alternative 2

#### Effects of Habitat Modification

On matrix land outside CHU, 969 acres of dispersal habitat will be thinned and remain dispersal habitat after thinning. On matrix land, outside CHU, 109 acres of dispersal habitat will have gaps created to enhance diversity and no thinning will occur with dispersal habitat remaining dispersal habitat after treatment. On matrix land inside CHU OR-12, 62 acres of dispersal habitat will be thinned and will remain dispersal habitat. On matrix land inside CHU OR-13,

216 acres of dispersal habitat will be thinned and will remain dispersal habitat. On matrix land, inside CHU OR-13, 85 acres of dispersal habitat will have gaps created to enhance diversity and no thinning will occur with dispersal habitat remaining dispersal habitat after treatment.

Suitable habitat within the home ranges of spotted owl activity centers will be affected. Only dispersal habitat is proposed for treatment by thinning and all dispersal habitat will remain dispersal habitat after treatment.

Average stand diameters of 18" dbh or above are needed for stands to begin providing foraging areas for spotted owls. Average stand diameters in first thins is 14.2" and in second thins 15.2" dbh. Thinning units in CHUs have an average stand diameter of 13.2" dbh. All thinning units in CHU are first entry thins. Two units in CHU are creating gaps only in units 60 and 62.

Thinning and precommercially thinning these units will increase tree growth and average diameters over time and is beneficial to spotted owls. Variable density thinning adds diversity to the stands which also benefits owls by providing more diverse habitats for prey species. With thinning stand diameters will increase more quickly than in unthinned stands.

The Biological Assessment for four Vegetation Management Projects, which included this project, did not include any actions which would result in a May Affect and Likely to Adversely Affect from disturbance determination.

### **Effects of Disturbance**

With design criteria protecting nesting spotted owls during the critical breeding season no adverse effects to spotted owls will occur from disturbance.

### **Cumulative Effects – Northern Spotted Owl - Alternative 2**

The analysis area for cumulative effects related to spotted owls is the project area. For this analysis, the activities included in Section 3.1 were reviewed. In addition, the Introduction and Existing Conditions sections reflect current habitat conditions for NSO considering all impacts to date. Habitat is expected to improve over time in spotted owl critical habitat units as areas which are currently dispersal habitat grow into suitable habitat. Riparian reserves will develop suitable habitat which is expected to remain intact for long periods of time. Non-riparian matrix land is expected to cycle through periods of no habitat and dispersal habitat as timber harvest occurs.

Ongoing road maintenance is expected to continue to fall hazard trees adjacent to roads which will continue to reduce the quality of suitable spotted owl habitat in the planning area. Personal use firewood cutting is expected to continue near roadways and is expected to maintain reduced amounts of downed wood and thus lower the quality of suitable habitat adjacent to road corridors.

A relevant foreseeable activity is the proposed Margie Timber Sale which may have a few units within the same subwatershed as the French Bug Timber Sale. This sale is in a preliminary planning stage, however, it is not anticipated that this thinning sale will result in cumulative effects to Northern Spotted Owl.

Due to suitable habitat not being proposed for treatment in other projects and dispersal habitat being well connected with suitable habitat in the planning area these foreseeable actions in conjunction with the effects of implementing Alternative 2 are not expected to compromise the functionality on any NSO home ranges or create barriers to dispersal across the project area.

### Direct and Indirect Effects— Spotted Owls – Alternative 3

Alternative 3 is similar to alternative 2 in terms of design criteria and effects. No suitable habitat is being treated. Spotted owl dispersal habitat will remain dispersal habitat after harvest with no adverse effects to dispersal habitat. Applying design criteria avoids adverse effects from disturbance to spotted owls.

Differences between alternatives are insignificant and are mostly a function of different gap sizes in variable density thinning units. Larger gaps create more habitat diversity and more options for different foraging opportunities for spotted owls. Larger gaps will be burned resulting in 29 acres of gaps burned. Burning in gaps and landings is seasonally restricted where gaps occur within the disruption distance of activity centers or unsurveyed suitable habitat to protect nesting owls. Unit 12 has one more acre of gap than in alternative 3. The largest difference occurs in unit 33 where in alternative 2 ground based yarding of 10 acres of thinning unit is increased in alternative 3 to 22 acres of ground based and 8 acres of helicopter yarded thinning of dispersal habitat in matrix outside CHU. In unit 30 under alternative 2 helicopter yarding of 106 acres is changed to 20 acres of helicopter with skyline yarding on the remaining 86 acres. Unit 36 in alternative 2 has 28 acres of helicopter yarding while in alternative 3 the same acres have 4 acres helicopter yarding and 24 acres of skyline yarding.

### Cumulative Effects – Northern Spotted Owl – Alternative 3

Same as Alternative 2 discussion.

Table 3-26 Consistency with Direction and Regulations

	Alternative 1	Alternative 2	Alternative 3
Big Game	Yes	Yes	Yes
Snags	Yes	Yes	Yes
Down Wood	Yes	Yes	Yes
Green Tree Retention	Yes	Yes	Yes
Migratory Bird Treaty Act	Yes	Yes	Yes
Raptors and Colonial Nesting Birds	Yes	Yes	Yes
Management Indicator Species	Yes	Yes	Yes
Threatened Endangered and Regionally Sensitive Species	Yes	Yes	Yes

## 3.6 Botanical Resources

### 3.6.1 Sensitive, Rare and Uncommon Botanical Species

#### Introduction

Sensitive, rare and uncommon botanical species, including vascular plants, lichens, fungi and bryophytes contribute to the overall diversity of the French Bug project area. Many of these species are considered old-growth related. Two project objectives relate explicitly to sensitive botanical species: encourage development of diverse species composition including hardwoods and other minor species, and encourage development of connectivity to aid in dispersal and genetic exchange that contributes to species viability. A number of sensitive, rare and uncommon species, particularly lichens, are disproportionately found on hardwoods and Pacific yew, and most are dispersal limited.

#### Regulatory Framework

Forest Service Manual (FSM) 2670 direction is to ensure the viability of sensitive botanical species and to preclude actions that will contribute to the federal listing of a species. To ensure compliance with this direction a biological evaluation is required for forest management activities that may alter habitat for proposed, endangered, threatened or sensitive species (FSM 2671.44) in order to determine the possible effects of the proposed activities on these species.

#### Desired Future Condition

The desired future condition for rare, uncommon and sensitive botanical species is to maintain existing occurrences and to promote stand structure diversity and complexity that will provide more suitable habitat for many of these species in the future.

#### Analysis Methods

The TES plants GIS data layer and Ranger District maps were assessed for known sites of sensitive, rare and uncommon species. Additional analysis of aerial photos determined high probability habitat. Field surveys using the intuitive-control method were conducted July, August, and September of 2007. The results of these surveys form the basis for analyzing effects. A biological evaluation was completed for French Bug Timber Sale. There are three steps in a plant biological evaluation which fulfill the requirements dictated by the USFS Manual (2672.4):

Step 1. Prefield Review: Each area to be affected by management actions is investigated for sensitive plant habitat.

Step 2. Field Reconnaissance: Units which have been identified as having high probability habitats in or surrounding the unit during the pre-field review are surveyed.

Step 3. Risk Assessment: If a sensitive species is found on or adjoining a site where an action is proposed, risk assessment (an analysis of the effects of a proposed action on species and their habitats) must be performed.

There are 17 species of fungi for which surveys were not conducted due to inconsistent fruiting and the impracticality of conducting surveys over multiple seasons (USDA, USDI 2001).

See the biological evaluation for sensitive botanical species in Appendix C for more details.

### **Basis for evaluating effects:**

Measurement criteria – Presence/absence

Scale of analysis, both direct/indirect effects and cumulative effects – Distribution within the watershed and range wide if there may be effects that push a species toward listing under the Endangered Species Act. Existing Condition — Sensitive, Rare and Uncommon Botanical Species

### **Existing Condition – Sensitive Plants, and Rare and Uncommon Botanical Species:**

Pre-field review has determined that one sensitive plant *Aster gormanii* was previously documented within the project area. All of the populations are outside of any units, appear to be stable, and would not be affected by activities within the French Bug Timber Sale project area.

Seventy-three Region 6 sensitive plant, lichen and fungal species were evaluated to determine if they or their habitat would be impacted by this project. Habitat exists for 53 of the 73 species. Of the 53 species, 17 are fungi for which no surveys were conducted. Surveys were done for the remaining 36 species. The species that were found and the number of populations located are listed in the Biological Evaluation, Table 1. Populations of one sensitive species (*Peltigera pacifica*) were located. This species is a foliose lichen found infrequently over soil, moss, and mossy logs in sheltered to shady coastal forests at lower elevations. It is also rare in humid inter-montane localities. Several locations within the French Bug Project area were documented. These included units 16, 22, 23, 24, 28, 31, 35 and 36. Further information about these populations is in the Biological Evaluation.

Two species that were previously considered rare and uncommon were put on a district watchlist. These are lichen species, *Leptogium rivale* and *Peltigera hydrothyria*, which reside entirely within the creek itself and would be well buffered from any direct disturbance of operations.

### **Environmental Consequences – Sensitive, Rare and Uncommon Botanical Species**

#### **Direct, Indirect and Cumulative Effects**

Precommercial thinning and fertilization are two types of management being proposed within the riparian reserve area to encourage development and growth of diverse vegetation. Effects to sensitive, rare or uncommon species are not anticipated from these activities.

However, persistence of lichen species may be threatened by host tree removal, windthrow, changes in microsite conditions, changes in epiphyte ecology and competition in more open stands, and by dispersal limitations in more widely spaced stands (USDA, USDI 2003). In some cases thinning may be beneficial to these epiphytes by enhancing tree species diversity, including Pacific yew and big leaf maple, two tree species known for their abundant lichen communities.

Documented sites were evaluated and those deemed at risk from the proposed action would be protected under all alternatives.

#### **Alternative 1 – No Action**

In Alternative 1, no acres would be subject to harvest. In the short term, Alternative 1 would provide the most benefit to rare and uncommon fungi and sensitive fungi because most of them form mycorrhizal relationships with conifers and thinning has been shown to have negative short term (5-7 years) impacts to fungi (Pilz et al 2003). However, the result of no action could be a reduction in species diversity as fungal diversity is correlated with stand diversity and structure.

The effects of not thinning to sensitive and rare and uncommon lichens and bryophytes are less clear. Lichens prefer slow growing substrates that overstocked stands would provide but they also prefer some species such as Pacific yew that would be better developed and more abundant in a thinned stand. In Alternative 1, no acres would be thinned and the stands would undergo a slow decline before presumably opening up enough to provide an understory. Windthrow, snowdown, and insect and disease pockets would create openings. Coarse woody debris would be abundant as trees would die due to overcrowding. Since *Peltigera pacifica* thrives in well shaded forests, no action would allow this species to continue to grow with no effects within occupied habitat.

There would be no effects to sensitive, rare and uncommon vascular plant species because there are none found within any of the units of the project area. Previously documented sensitive plants within the project area will not be affected because no management activities will occur within and near these populations

## **Alternative 2**

### *Introduction*

All stand prescriptions for this alternative would increase stand complexity over the long term (20-100 years) by opening the canopy to allow more light within the understory which would increase a higher diversity in understory vegetation. This would convert dense, stem exclusion stands into future late-successional habitat.

The proposed gap cuts would expose forest floor which would make it vulnerable for invasive species, however, all ½ acre gap cuts would be harvested using helicopter extraction which would minimize disturbance.

### *Fungus*

In Alternative 2, it is likely that individual sites of fungi may be negatively affected in the short term by host tree removal, physical disturbance, soil compaction, and the disruption of mycelial networks (Kranabetter and Wylie 1998, Amaranthus and Perry 1994) in timber harvest operations. Soil compaction resulting from harvesting equipment and the creation of temporary access roads can reduce host tree root growth and root tip availability for fungi (Amaranthus, et.al., 1996; Amaranthus and Perry, 1994). Reductions in the number of fruiting bodies of chanterelles, a common mycorrhizal species, were noted after initial thinning but appear to rebound after several years (Pilz et al 2003). Twelve of the seventeen sensitive fungi species are mycorrhizal and could experience direct effects from ground disturbing activities. However, affected populations will most likely rebound after several years.

However, fungi species would be most affected by the gap cuts due to the large opening of the area. Individual and short term impacts may occur, but it is not likely to result in a trend toward Federal listing or loss of viability for rare and uncommon and sensitive fungi species.

Pile burning has the potential to disrupt mycelial networks (Amaranthus and Perry, 1994) by creating localized intense disturbance and loss of organic matter that can decrease the ability of plants to form linkages with ectomycorrhizal fungi. Ectomycorrhizal diversity and abundance decrease with high intensity fire, especially where they are found in the litter and organic layers (Stendell et. al, 1999; Wiensczyk et. al, 2002).

Indirect effects of Alternative 2 reduces habitat for sensitive mycorrhizal fungi due to regeneration harvest and ½ acre gap cuts. Effects of timber harvest in fungal habitat include the short-term loss of moisture retention capabilities due to the drying effect of over-story shade removal, and the reduction of water storage with the disturbance or removal of forest floor organic material and large wood. Loss of large woody material and host trees also represents a reduction of available nutrients and possible inoculum source for future fungal regeneration and expansion (Amaranthus and Perry, 1994).

It is assumed that the greater number of acres of harvest, the greater effect there would be on fungi. These effects may be ameliorated by leaving greater numbers of trees. Korb et al (2001) found that restoration thinning in a northern Arizona ponderosa pine forest, mycorrhizal fungi rapidly increased following thinning. The key to recolonization was immigration of new propagules from nearby areas and spread of residual propagules. Thinning may enhance stand structure and understory development over the long term. The addition of understory trees and shrubs may benefit the sensitive mycorrhizal species. Duff retention and coarse woody debris creation can benefit both mycorrhizal and saprophytic species (Lindblad 1998).

In the longer term, prescribed burning could cause loss of litter and potentially reduce substrates for litter-dwelling fungi. Bruns (2002) studying short-term effects of ground fire in the Sierra Nevada found a short-term reduction in the biomass of ectomycorrhizal fungi correlated with incineration of the litter layer but that lower layers, where the greatest specie richness occurs, were preserved. Stendell et al. (1999) found a similar pattern in a Sierra Nevada ponderosa pine forest after prescribed fire where litter/organic species biomass decreased eightfold but no difference was detected in mineral layers.

Cable yarding causes soil compaction and localized disturbance along yarding corridors. This causes a loss of ectomycorrhizal root tips (Amaranthus et al, 1996) and can disturb litter-dwelling and saprophytic fungi within the corridors. Alternative 2 includes less acres harvested through skyline logging (compared to Alternative 3); therefore, the potential for ground disturbance is somewhat less (compared to Alternative 3).

### *Lichen*

Microclimatic changes would likely occur from thinning but would disappear over time as the canopies of residual trees expand and an understory develops. Microclimatic changes would likely occur more so in the ½ acre gap cuts. For lichen species, overstory is just close enough for spores to disperse over time in the proposed gap cuts. Benefits could include enhanced biodiversity for macrolichens as new habitat is opened up.

The proposed action may include gap cuts that fall within riparian reserves that are 72 feet from the riparian areas. The release of large conifers in riparian reserves would be beneficial for old-growth associated macrolichens. The benefits would include enhancement and increased biodiversity of associated species and possible new habitat for sensitive, rare and uncommon species to take hold.



Mitigation measures include buffer of all *Peltigera pacifica* populations for avoidance. This protective buffer changes the status to not likely to have direct effects.

Reopening of temporary road spurs, construction of new temporary roads, maintenance, and reconstruction of existing roads would not have direct and indirect effects to sensitive species within the area because buffers would be in place to prevent this. This alternative has less road issues than Alternative 3 and therefore it has less ground disturbance.

Mitigation measures include the buffering of all sensitive plant species for avoidance. This protective buffer results in a determination of not likely to have indirect effects.

Other mitigation includes slash clean-up and burning, the eradication of high risk weed populations, and the pruning of limbs damaged during operations along the Breitenbush Road. These measures will all reduce the effects related to Alternative 2.

### *Vascular*

There are no documented threatened, endangered or sensitive vascular plant species within the French Bug Project area.

### **Alternative 3**

In Alternative 3, the direct and indirect effects of fungi would be the same as in Alternative 2 but with more habitat affected.

In Alternative 3, larger areas would be affected and a slower rate of fungi regeneration (if at all) in the much larger 2-3 acre gap cuts. Other spore and seed producing species would have a greater challenge in recolonization and immigration of new propagules from nearby areas and spread of residual propagules within these larger gap cuts. Additionally two gap cuts along the powerline corridor were added to decrease hazardous trees in high failure areas. The large gap cuts would be seeded with forage plants to decrease noxious weed invasion and for big game forage. The larger 2-3 acre gap cuts would have the most ground disturbance and compaction and open up a much larger vector for weeds to invade. The planting of forage vegetation would help minimize weed infestation.

Mitigation measures are the same as Alternative 2.

### **Cumulative Effects – Sensitive, Rare and Uncommon Botanical Species**

Section 3.1 contains a list of past, present, and reasonably foreseeable activities within the project area, subwatershed or other analysis scale. These activities were reviewed for this analysis. Cumulative effects on fungi would be analyzed on a project area level. Spores, the method by which they propagate from fruiting bodies, may travel some distance, so an area larger than the harvest area is appropriate for analysis. An assumption is made that there has been some recovery of mycorrhizal diversity in stands over 20 years of age and that clearcut activity has the most severe effects on mycorrhizal diversity within the watershed by harvesting the host species they depend upon. These forests serve as refugia for many sensitive species that would be able to re-colonize the younger stands as they mature and become more complex in structure and diversity.

Within the sub-watersheds, approximately 16,000 acres were previously clearcut, while less than 5000 acres were partial cuts and commercial thinning. Alternative 2 would add 1243 acres of thinning and 34 acres of gaps. This alternative would reduce available fungus habitat within the

watershed but the effects should be short-term and of small magnitude (1243 acres – roughly 17,300 acres in project area). Alternative 3 would add 1229 acres of thinning, and 51 acres of gaps with more ground based and skyline yarding. This alternative would remove a higher percentage of fungus habitat from the watershed with a much longer rate of regeneration, if at all, in some areas.

Late-successional forest provides better habitat for sensitive lichens as well. Buffers around sensitive lichen species protect the sites from direct disturbance but may have indirect adverse effects as the trees grow and a dense canopy results. Almost all sensitive lichen species fall within the protected riparian stream protection buffer and therefore would have a greater distance of undisturbed protection. Thus there should be no cumulative effects on sensitive lichen species due to any action alternative.

### **Conclusions and Rationale Sensitive, Rare and Uncommon Botanical Species**

The proposed actions may affect individuals or habitat for fungi but are not likely to contribute to a trend towards federal listing or a loss of the species viability in this subwatershed. Riparian Reserves and known site protective buffers would help maintain suitable habitat on matrix lands over the long term. No effects are expected on lichens, bryophytes and vascular plants.

In the long-term (20-100 years), habitat for the majority of rare and uncommon and sensitive botanical species would be enhanced in the action alternatives. Dense stands that preclude understory growth and development of large trees, snags and down woody material provide poor habitat characteristics. Stand treatments proposed in this project should reverse that trend. The project area is surrounded by sufficient mature and old growth habitat, and species present in those stands should re-colonize the younger stands as they mature and become more complex in structure and diversity.

## **3.6.2 Invasive Plants**

### **Introduction – Invasive Plants**

An invasive plant is defined as “a non-native plant whose introduction does or is likely to cause economic or environmental harm or harm to human health” (Executive Order 13122). An estimated 420,000 acres of Forest Service lands in Region 6 are infested with invasive plants (USDA 2004). Invasive non-native plants, including noxious weeds, are a threat to native plant communities. These species thrive in a new environment because they arrive without the complement of predators, disease, and other ecosystem components found in their native region of the world. Most of these species take advantage of disturbance gaps such as logged units, roads, rock quarries, burned areas, and trails. Weed seeds and other propagules can be introduced into an area by a variety of agents, most notably wind, highway and off-road vehicles, and construction equipment. They can also disperse by way of water, animals, and humans. Once established, these populations serve as a seed source for further dispersal, generally along roads and trail corridors.

### **Regulatory Framework – Invasive Plants**

- The Final EIS for Pacific Northwest Region, Preventing and Managing Invasive Plants (USDA Forest Service PNW Region, May, 2005)

- Amendment 259 Willamette Land and Resource Plan (USDA 1990) prescribes that prevention be integrated into all management activities
- The Willamette National Forest Integrated Weed Management Plan (IWMP 1999)
- Guide to Noxious Weed Prevention Practices (2001)
- Executive Order 13112 (February 3, 1999)
- Noxious Weed Control and Eradication Act (2004)
- Willamette National Forest Noxious Weed Prevention Guidelines (2005)
- Preventing and Managing Invasive Plants EIS (2005)
- Willamette National Forest Integrated Weed Management EA (2007)

### Desired Future Condition

The desired future condition is prevention of new invader establishments and a cessation of established weed spread with a corresponding reduction in established weed presence. Allowing for the return of disturbed areas to a more natural condition helps retain sensitive species habitat and other special native habitats, and impedes noxious weeds from dominating these areas. This condition can be advanced through implementation of good management practices, minimizing disturbance where possible, and executing mitigation measures such as invasive weed removal and native species re-vegetation.

### Analysis Methods

Surveys for invasive species, including noxious weeds, were conducted in all stands. Surveys focused on priority treatment sites which are mapped in GIS tracked in a database.

### Existing Condition

Roads serve as invasive species corridors due to their disturbed soils, greater light levels, and vehicle traffic (Parendes 1997). There are currently 146 miles of road in the analysis area. Several invasive weed species have been documented in the watershed while the powerline corridors are primary vectors of invasive weed infestations.

The most serious weed infestations in and around the sale area are St. John's-wort (*Hypericum perforatum*), ox-eye daisy (*Chrysanthemum leucanthemum*), Scotch broom (*Cytisus scoparius*), Himalayan and evergreen blackberries (*Rubus armeniacus* and *Rubus laciniatus*), Climbing nightshade (*Solanum dulcamara*), tansy ragwort (*Senecio jacobea*), common tansy (*Tanacetum vulgare*), Foxglove (*Digitalis purpurea*), False brome (*Brachypodium sylvaticum*) and Reed canary grass (*Phalaris arundinacea*)

St. John's-wort and ox-eye daisy are well established weeds of roads and rocky openings. Both are the mostly widespread species in the project area, and most dense along many roads. Foxglove is sporadic through the project area.

Scotch broom is an established weed that favors roadsides, early serial plantations and in this project area, powerline corridors. It is shaded out in stem-exclusion staged stands. The seeds of Scotch broom can persist in the soil for decades and germinate when the soil is disturbed. There are some dense areas where roads go through powerline corridors and along some roads such as

the currently closed, upper road of unit 30. Scotch broom is spotty along all roads and in some cases has been found in other open areas within the project area.

Himalayan and evergreen blackberries prefer open areas and roadsides but also persist and spread under the forest canopy. Both species spread by animals that eat the berries and vegetatively by root tipping. These species are spotty along roads within the project area, and within the understory of some units. There are some large patches within the powerline corridors.

Tansy ragwort and common tansy have light wind-blown seed. Both species are found along roadsides and can spread through early seral stands. Tansy ragwort was also pulled as soon as it was located throughout the project area and along all roads but again, it is highly unlikely that all was eradicated from the project area and would need further monitoring throughout.

Climbing nightshade was located within unit 31 and was pulled right away. This plant population was large enough that it is highly unlikely all was collected and further monitoring of this site would be required. Bull Thistle was found sporadically throughout and is more difficult to map, so it was noted when possible.

## **Environmental Consequences – Invasive Plants**

### **Direct and Indirect Effects**

#### **Alternative 1 – No Action**

Alternative 1 has the least risk of spreading weeds. Few weed species can survive the deep dark conditions that would result from foregoing thinning in these stands. Although opportunities for KV-funded weed eradication would not be generated, there is less risk that weeds would spread into the closed canopy stands, not only due to light limitations but also because there would be no equipment in the stands that could potentially spread weed seeds.

#### **Alternative 2**

The proposed action has direct and indirect effects to invasive plant species due to ground disturbing activities from ground based and skyline yarding operations. Effects are due to a combination of soil disturbance and transport of seed. In the Alternative 2, areas that would be permanently opened up to light, such as roads and landings, would be the highest risk for introduction and further spread of invasive plant species. These areas are disproportionately subject to ground disturbance and exposure to vehicles and equipment that may bring in seed. Thinning may enhance habitat for all of these weed species by opening up the canopy and creating seed germination sites by disturbing the soil.

New weed species may be introduced on logging and slash treatment equipment. The direct effects of Alternative 2 are the movement of weed seed and establishment of new invasive plant populations in disturbed soils along with the creation of new invasive plant habitats. The ground disturbing activities of cable logging would also directly affect the habitat by altering it and creating ground that is so disturbed that any invasive species seed cash within the ground or nearby can get a foothold within these areas.

The proposed action may include gap cuts that fall within riparian reserves that are 72 feet from the riparian areas. Negative direct effects could include the promotion of weed establishment by opening up the canopy and taking out competing vegetation. Scotch broom prefers habitat that is

open with lots of direct sun. These gap cuts would create such habitat where species like scotch broom could become dominant in an area.

Mitigation measures include the control of invasive weeds by spraying and the use of manual pulling, and post-sale control and monitoring.

The indirect effects are the creation of new invasive plant habitats from opening the canopy in gap cuts and the disturbed ground activity, and the change in climate within these gap cut areas.

Microclimatic changes would likely occur from thinning but would disappear over time as the canopies of residual trees expand and an understory develops. Microclimatic changes would likely occur more so in the ½ acre gap cuts and would take much longer disappear as the canopy finally fills the gap in.

Roads are primary vectors for the spread of noxious weeds. Logging trucks and yarding equipment would spread weeds and the seed bank of the weeds from existing populations along the roads and in the forest to further along the roads and into the forest.

### **Alternative 3**

Just like Alternative 2, this proposed action has direct and indirect effects to invasive plant species due to high ground disturbing activities including ground and skyline based harvest activities. This action has differences in that it represents the highest risk of propagation of weeds with more landings developed and used, more miles of temporary road created and reopened, and the more acres harvested. This alternative has a more direct effect than Alternative 2 due to increased ground disturbing activities including within the larger gap cuts.

Since these gap cuts are much larger than in Alternative 2, the potential for invasive weed infestation would be higher as there is a larger opening of canopy letting in more light. The surface area of ground is much larger also which increases the habitat for existing local invasive weeds and the introduction of new invader weeds. However, these larger gap cuts would be burned and planted to avoid weed infestation and to promote forest biodiversity by allowing a more natural progression.

All other effects are the same as in Alternative 2 but with more acres added for ground disturbing activities including cable yarding.

Ground disturbance may also result in indirect effects. This could include long term re-establishment by vegetation succession in the larger open gap cuts. Microclimatic changes would likely occur from thinning but would disappear over time as the canopies of residual trees expand and an understory develops.

### **Mitigations**

Mitigation measures are included that would focus on new invader species along roads by control and controlling established infestations by preventing the large populations from spreading further along roads and other corridors. Another major mitigation measure is to avoid established invasive infestations, pre-dominantly scotch broom, by creating a “no ground disturbance” buffer zone from existing populations of 25 feet. In addition, timber sale contracts now require provisions that minimize the introduction and spread of invasive plants, including equipment cleaning and harvesting weedy sites last. Control and monitoring would also occur within the project area up to 5 years after the sale.

Alternative 3 shows the highest risk of invasive weed encroachment due to a larger level of ground disturbance and habitat modification represented by more acres harvested and more landings utilized.

### **Cumulative Effects – Invasive Plants**

Section 3.1 contains a list of past, present, and reasonably foreseeable activities within the project area, subwatershed or other analysis scale. These activities were reviewed for this analysis. The area analyzed for cumulative effects is the project area and the road system accessing the project area. Ground-disturbing activities such as ground-based yarding systems used during timber harvest, road construction and reconstruction, vehicular traffic and recreation use contribute to the incremental increase in invasive weeds. Assuming seed sources are nearby or transportable, the more disturbance and activity any given area is subject to, the more the risk of noxious weed introduction, establishment, and/or expansion. Past road construction and maintenance (146 miles in the analysis area), timber harvest (approximately 19,400 acres on Forest Service lands), and recreation use has contributed to the incremental increase in invasive weeds. Since the 1970's, the majority of the timber sale activity in this area has steadily decreased. Use of highway 22, the major source and vector for invasive weeds, has steadily increased with recreation use. Road maintenance, vehicular traffic, and harvest on private lands would continue in the foreseeable future and may spread or introduce weed seed, leading to new infestations.

The impact of non-native invasive weeds on native plant communities is cumulative. The more disturbance and activity any given area is subject to, the more the risk of noxious weed introduction, establishment, and/or expansion. The prevalence of ground-based harvest in the past likely resulted in numerous weed populations getting established within the stands.

With mitigation measures such as the reclosing of temporary roads and the rehabilitating of landings monitoring up to five years of the timber sale after the harvest, the cumulative effects related to all new invader species and established weed species should be minor.

### **Conclusions and Rationale for Conclusions:**

The spread of invasive weeds would be minimized through preventative measures taken prior to, during, and after thinning operations. Both action alternatives provide mitigation measures that would reduce the long-term likelihood of expanded weed populations. These include buffers around known weed sites of some species, logging equipment washing, post-treatment survey and control funding through KV, and pretreatment of existing weed sites. The canopy in the treated stands is expected to close in 10 to 20 years, and this would further reduce habitat for some weed species. False brome, a species that can flourish in the understory even in closed canopy stands, has the highest likelihood of expanding despite mitigation measures. Diligence would be required to keep this highly invasive species from overtaking the understory over the long-term. These efforts would be required whether the stands are thinned or not because the species is so tolerant of low light conditions.

### **Mitigation:**

Mitigation measures include the following:

- Survey to locate invasive weed populations and remove them where possible in harvest units and along adjacent roads.

- All road construction and logging equipment would be pressure washed prior to working in the area.
- Obtain gravel for road construction and reconstruction from a weed-free rock source.
- Minimize areas of soil disturbance during all harvest activities including spur road construction and re-opening, road reconstruction, road relocation, fuels treatment, etc. Seed all disturbed areas with weed-free native species, including landings and subsoiled skid roads to reduce weed establishment.
- Berm, gate, or rip, seed or maintain any new roads and re-opened roads to reduce disturbance and incoming seed due to vehicular traffic.

### **Monitoring**

The proposed harvest units and associated road system would be monitored for invasive weeds for five years after harvest is complete.

## **3.6.3 Special Habitats**

### **Introduction**

Special habitats are non-forested areas including, meadows, ponds, caves, rock gardens, talus and cliffs. These sites are important reservoirs of biodiversity and provide habitat for a wide variety of plants, fungi, and animals, many of which are not found in forested areas. In fact, while special habitats cover only about 5% of the area in the Cascades Range, 85% of native flowering plants are found in these areas (Hickman, 1993). In addition, special habitats provide habitat for many species currently on the Region 6 Sensitive Species List.

### **Regulatory Framework**

- Willamette National Forest Special Habitat Guide (Dimling and McCain 1996)
- Forest Plan Standards and Guidelines FW-201 through FW-214

### **Analysis Methods**

Special habitats, identified on aerial photos and from GIS database, were inventoried during project surveys conducted in 2007.

### **Desired Future Condition**

The desired condition for special habitats is to minimize direct and indirect influence from project disturbance, and to maintain microclimatic and site conditions within the historical range. A large part of maintaining the integrity of special habitats is to preclude the introduction and establishment of non-native invasive weeds.

### **Existing Condition**

The French Bug project area has been impacted and highly fragmented by previous harvest activities. This selective partial cutting has impacted normal stand structure and development by removing dominant trees. In some cases this process has resulted in high densities of understory

trees which leave species more susceptible to insect and disease. The area has been subject to some ground based harvest methods, leaving a few old skid roads that are easily accessed by the public and are a vector for weed infestation. Since there are so many rivers, creeks and streams throughout this project area continuity between riparian areas is well established.

Although few intact old growth stands remain in this project area, some of the mature stands have been subject to less management disturbance (e.g., some salvage and partial cutting) and exhibit old growth characteristics such as plenty of down wood, and multi-layered, uneven aged canopies.

The number of non-forested habitats (meadows, outcrops, cliffs, rock gardens) is relatively low in the French Bug project area. There are few surface water features (as defined in the Special Habitat Management Guide) as a result of sub-surface water flow but scattered areas of high diversity hydric/mesic plant communities exist where the water table is close to the surface or where springs exist.

Sedge meadows, seasonal ponds, skunk cabbage swamps, regular swamps and seeps, moist rock gardens, and dry rock gardens and talus slopes are the most common special habitats in the area. Many of the special habitats are within managed stands, or adjacent to managed stands and roads. These special habitats provide habitat for various plant communities and contribute to species diversity of the area, which is otherwise fairly uniform.

## **Environmental Consequences – Special Habitats**

### **Direct and Indirect Effects**

#### **Alternative 1 – No Action**

There would be minimal effects to special habitats under the no action alternative. Trees in or surrounding the special habitats would continue to grow but at a slower pace than under the action alternatives due to the lack of thinning. Weed populations in the surrounding areas are less likely to spread into special habitats. Effects could result from continued insect and disease spread in the absence of stand treatment, resulting in conversion of large areas to an early seral condition. Without thinning, many overstocked portions of these stands would be slow to develop desired structure and function. However, lack of thinning could also result in encroachment of special meadow and wetland habitats and drying out of wetlands by over abundance of encroaching trees. This encroachment process is usually naturally avoided through the natural cycles of fire but forest directives have included suppression of fire. Fuels reduction is now a standard management activity to create natural fire breaks and prevent high density vegetation to continue to increase the health of the forest. It could also prevent the development of species diversity by not mimicking the naturally occurring cycles that change the landscape and recruit new species.

#### **Alternatives 2**

Special habitats are protected from physical disturbance in all action alternatives. No special habitats occur in proximity to planned temporary spur roads or landings. Prescribed buffers would be sufficient to protect the microclimate and prevent invasive weed introduction. Not all special habitats are buffered. In cases where the prescription is to thin stands surrounding the relevant habitats, and the site is protected from physical disturbance, it is unlikely that the resultant canopy opening would substantially affect the plant community within the units.



Impacts from Alternatives 2 would be ameliorated by mitigation measures. These measures include a 100 foot no cut zone buffer around all wetland type special habitats and rock gardens. No gap cuts would be placed within 200 feet of these areas. Where there are dryer and already opened special habitats such as rock slopes and dry meadows, there are no buffers. There are mitigation measures that prevent any activities from entering into the habitat and causing ground disturbance, even if they are unbuffered.

Indirect effects include possible microclimate changes but are not likely to happen as long as mitigation measures are met. Since there would be 790 acres of ground disturbing activities including skyline throughout the project area and surrounding the buffered special habitats, possible introductions of new all-terrain vehicle activities may occur from newly accessible forested areas.

### **Alternative 3**

All direct effects would be the same as Alternative 2 except there would be more ground disturbing operations and slower recovery from the larger gap cuts. Indirect effects would also be the same as in alternative 2 but with greater possibility of invasive weed infestations within the larger gap cuts and greater spread of invasives from the roads into the skyline units.

### **Cumulative Effects**

Section 3.1 contains a list of past, present, and reasonably foreseeable activities within the project area, subwatershed or other analysis scale. These activities were reviewed for this analysis. Cumulative effects on special habitats would be analyzed on a harvest area level. Many of the special habitats in the French Bug Timber sale are adjacent to roads. Past management activities no doubt had an effect on special habitats, including changes to the microclimate and hydrology, soil compaction and introduction of invasive weeds. Past timber harvest, road construction and associated activities on public and private lands have adversely affected special habitats by introducing invasive weeds and altering the microclimate. Given the protective measures of this action, additional cumulative effects are not anticipated.

### **Conclusions and Rationale for Conclusions**

Special habitats in the analysis area have been compromised by past management activities and the introduction of invasive weeds. Given the mitigation measures for special habitats and those for invasive plants, no further degradation would occur as a result of the proposed action.

### **Mitigation**

Special habitats, including seeps rock outcrops and gardens, caves, and meadows, would be protected in accordance with the Forest Plan and the Special Habitat Management Guide meeting forest plan standards and guidelines in the direct/indirect effects sections. General protection measures include:

- Directional falling away from special habitats
- Avoiding placement of equipment, landings, skyline corridors, and designated skid roads through special habitats
- Seeps and small wetlands would have a 100 foot buffer of no cut with an additional 100 foot buffer of no gap cuts.

## 3.7 Soils

### Introduction

Short-term impacts to soil productivity from harvest activity, as discussed in the Willamette National Forest Final Environmental Impact Statement, include displacement, compaction, nutrient loss, and instability (FEIS 1990). In most situations, preventing soil impacts is the most effective and feasible way of ensuring long-term soil productivity. The total area of cumulative detrimental soil conditions should not exceed 20% of the total acreage within the activity area, including roads and landings.

### Regulatory Framework

- 36 C.F.R. 219.14(a) classifies lands that are not suited for timber production Non-forest;
- NFMA 6(g)(3)(E)(i) not suited for timber due to irreversible soil or watershed damage
- Forest Service Manual R-6 Supplement No. 2500.98-1 -- direction for activities where soil quality standards are exceeded from prior activities
- USDA FS Pacific Northwest Region handbook on General Water Quality Best Management Practices (November, 1988)
- Willamette Forest Plan Standards and Guidelines FW-079 to FW-114 BMP T-1, T-2 and T-3 apply to soils

### Analysis Methods

A major portion of the field investigation was directed at distinguishing the various identifiable landtype components within the study area and mapping them on the photo overlays. Much of the landtype analysis referenced in this report was originally conducted for previous timber sale planning activities. In general, the field investigation confirmed some of the original 1973 SRI designations and the previously mapped work. The major portion of the field work involved site specific evaluation of existing conditions within each of the units. Field investigation of landtypes and the determination of the impacts from prior management activities formed the basis for the site-specific recommendations and mitigations that follow in this report.

### Displacement

#### Existing Condition – Displacement

Displacement is defined as the removal of more than 50% of the topsoil or humus enriched soil horizons from an area of 100 square feet which is at least 5 feet in width. Displacement can occur with timber management during road or landing construction, yarding, or the mechanical treatment of slash, such as machine piling. Contract requirements which reduce or eliminate displacement are the primary way to minimize this concern.

Displacement occurs with three separate timber harvest activities: yarding, slash treatment, and road building and maintenance. Yarding activities on the existing plantations have for the most part occurred with the appropriate suspension requirements. Slash treatments usually maintained some amount of duff, though the current duff retention standards may not have been achieved. Some of the oldest managed stands may have been tractor piled. Tractor piling can result in both

excessive disturbance and excessive compaction. Whether these two activities resulted in moderate to major detrimental impacts to productivity in some units is difficult to determine. Tractor piling has not been considered acceptable as a management tool for over 20 years on the Willamette National Forest. Stand, shrub and brush growth, as well as duff accumulation over the decades has provided an effective ground cover. At the point in time, little physical evidence can be found in any unit to indicate whether these two timber management activities resulted in significant, long-term detrimental soil displacement, off-site soil movement, or substantive loss of productivity.

Road development in this project area is extensive, and most large blocks of forest have been accessed. Most major road systems were constructed in the 1950s and 1960s with older road construction standards. Many of the roads were built on steep side slopes with side cast construction standards, where most of the excavated material was pushed or blasted over the edge off onto the steep side slopes below. The remnants of this side cast, such as bare soil scarps and rocky talus zones, are still evident in some areas. Fortunately, most slopes have stabilized and revegetated. The amount of new road construction slowed considerably in 1980s, and with subsequent entries reconstruction began to dominant. Newer roads, when required, were constructed to different and better standards. Road grades were steepened and pitched to better fit roads to the terrain. Cuts and fills were minimized, and drainage controls were added to promote long term slope stability. Most road cuts and fills have naturally vegetated over the years. Because the side slopes have revegetated and overland flow is limited throughout much this project, erosion from roads is not generally considered a concern, except in a few localized areas.

### **Direct and Indirect Effects– Displacement –Alternative 1**

With the no action alternative, displacement or the loss of soil cover would not occur because of harvest activities. Displacement could occur as a result of wildfire-generated erosion. Over time, the increasing fuel loads that would be expected in the absence of thinning and fuels treatments could be associated with greater fire intensity, severity and rates of spread. Under this alternative, the stands and underlying brush would continue to grow, and in the shorter term, ground cover would increase. Slope instability is not a geologic process that is active in this project area in most units. Consequently, no effects to slope instability are anticipated.

### **Direct and Indirect Effects– Displacement –Alternative 2**

The logging suspension requirement for a proposed unit is mandated in the Land and Resource Management Plan to protect the soil from excessive disturbance or displacement (FW-107 and BMP T-12). The area near tail trees and landings is generally excluded from this suspension constraint. Unless otherwise stated or mitigated, all designated streams require full suspension or yarding away from the stream course during the yarding process (MA-15-27). To adequately protect the soil resource, the primary yarding objective for all units will be either ground based systems with predesignated skid roads and directional falling as appropriate, or skyline yarding with one end suspension, except at tail trees and landings. The primary factor differentiating these two yarding systems will be side slope.

Ground-based yarding systems may be employed on those acres in each unit where slopes are gentle enough (generally 30% or less) for ground-based systems. Ground based yarding systems, such as processor / forwarder, conventional line pulling or shovel, could be utilized in many units. All areas where ground based yarding might occur, are well away from active drainages, or

skid roads will cross ephemeral swales only during dry periods and at right angles. All ground based yarding will require the B6.422 contract clause be strictly adhered to, and/or line pulling and directional falling will be implemented, as appropriate. In all cases, existing skid or haul roads will be utilized before any additional new skid or forwarder roads are developed. Skyline yarding with one end suspension will be recommended for units or portions of units with side slopes greater than 30% to avoid excessive disturbance from heavy equipment.

In conclusion, disturbance from yarding will be well within the Regional and Forest standard and significant adverse impacts are not anticipated. With appropriate suspension during logging, soil disturbance is minimal and off site erosion is essentially non-existent. During harvest, the retention of stream adjacent trees and the requirement of full suspension yarding over or away from stream courses will minimize or eliminate off-site erosion.

NOTE: A more complete discussion of yarding suspension requirements and effects follows in the compaction section and can also be found in the unit summary tables (available in the project file).

Excessive displacement with slash treatment in thinning has not been a concern. Extensive monitoring and field reconnaissance in recent years has shown that the ground cover within thinned units is considerable because of the accumulation of slash and the release of brush and forbs with increased sunlight. For all action alternatives, within the managed plantations, slash will be scattered in the units, piled and burned, or perhaps broadcast or under burned. Piling may occur by hand or with a grapple machine. Grapple piling occurs with a grapple not with a dozer brush rake. Grapple piling requires only one pass of the machine across the landscape, and the machine works while sitting on slash. Extensive monitoring of grapple machine piling operations indicates that little or no additional compaction or displacement occurs.

Excessive displacement with road construction or reconstruction has not been a concern because of increased design standards. Some units may require temporary roads to access suitable landing sites for either ground based or skyline yarding systems. In all cases, these temporary roads are located on gentle stable side slopes in common material. Little or no full bench construction is required, and if needed, end haul of excess excavation will be required to a suitable waste area. For the most part, no active drainages are crossed. Some units are accessed by opening old logging roads constructed many decades ago. In most cases, use of these old roads will allow for drainage structure improvements and fill stabilization. Some units are accessed by using newer Forest Service roads that now require some additional work to maintain adequate road drainage and surface integrity. Standard and appropriate work practices and seasons of operation will be required to reduce excessive disturbance and minimize off site erosion.

NOTE: More discussion on potential impacts from slash treatment and from roads is found in the Nutrient Loss section.

### **Direct and Indirect Effects– Displacement –Alternative 3**

Displacement effects of alternative 2 would be similar to those described in alternative 2.

### **Cumulative Effects -- Displacement**

Cumulative effects are discussed collectively for displacement, compaction, nutrient loss and instability at the end of the soils section.

## Compaction

### Existing Condition – Compaction

The major source of compaction (and also much disturbance) is ground based skidding equipment. Unrestricted tractor yarding and tractor piling are not considered an option on those landtypes where sideslopes are gentle enough (generally less than 30%) to support tractor usage (BMP T-9 and VM-1, and FW-107). The silty nature of the fine-grained soils, and evidence that significant soil moisture is available most of the year indicate that any type of unrestricted tractor yarding and piling (even low ground pressure) would lead to excessive soil compaction and/or disturbance. Restricted tractor yarding from predesignated skid roads (B6.422 contract clause) is considered an option if the adversely affected area remains less than 20% of the activity area (BMP T-11). With tractor yarding, skid roads are predesignated, approved in advance of use by the Timber Sale Officer and generally 150 to 200 feet apart. With a processor/forwarder system the skid roads are usually only about 50 to 60 feet apart, but the number of trips for each individual road are substantially less than with skidding.

Extensive monitoring over many years has also shown that when designated skid roads are properly utilized in conjunction with line pulling and directional falling, compaction from ground-based tractor operations generally remains at about 9 to 13%. Residual compaction from the original harvest of these plantations needs to be considered.

Reducing the effective weight of the tractors and reducing the number of trips over a piece of ground are other means to reduce the risk of soil compaction and displacement. Yarding over frozen ground or over a deep, solid snow pack (24 inches of dense snow or equivalent) also substantively reduces soil disturbance and compaction (BMP VM-4). Over-the-snow yarding is encouraged for any of these units, as long as other resource objectives can be achieved, and sufficient snow accumulation is available. Monitoring of previous over-the-snow operations on various Districts has shown that essentially no displacement or compaction occurs, when it is properly implemented.

Evidence of compaction from previous entries is still present. Field reconnaissance through most of the ground based units shows some level of existing compaction. Oriented transects were walked through all the larger portions of possible tractor units. Transects were usually about 500 to 1000 feet in length, though both shorter and longer transects were walked. The results of the field investigation follow the next paragraph. In no case was the amount of soil compaction measured directly. In other words, absolute changes in soil bulk density or reductions of macropore space were not measured. Heavily disturbed skid roads, landings or other areas where equipment tracks were evident are considered adversely compacted. The total of their areas were used to determine the amount of compaction by transect.

Transects measure the amount of compacted ground along a line within a proposed unit. They were generally oriented to obtain information on management activities. They are not random, nor statistically representative of a particular unit. However, they do provide a strong indication of the degree of concern for the unit under investigation. In some cases multiple transects were walked in some units in different directions in order to provide more information, or to monitor and evaluate the initial results for accuracy. Ranges indicate some degree of uncertainty in the presence of compacted skid roads because of brush or other factors. As was stated earlier, only a few units in this project are proposed for ground based harvest. Transects were walked in those units, and the percent of existing compaction found in that field review follows:

Table 3-27 Existing Soil Compaction Levels

Unit	% Compacted
16	12-14
29	14-15
31	11
35	10-12

The field investigation indicated that none of the units as a whole exceeded the Willamette National Forest FW-081 Standard of 20% of an activity area impacted by compaction. Some units, like Unit 31 had high individual transect values that approach the standard. Usually, these were transects that crossed old landing sites. However, this unit on average is sufficiently below the threshold not to be considered a concern. One of the goals with entry into all these units is to provide the opportunity to subsoil the existing skid roads as much as is practical in order to reduce compaction to lower levels. With entry into any ground-based unit, evident skid or haul roads will be utilized before any new skid road is approved. It is possible with this proposed action that cumulative compaction in some portions of some units may exceed the threshold at the completion of harvest activities. Consequently, subsoiling is recommended enhancement to insure that cumulative levels remain below the 20% standard. Based on previous experience, this effort should be successful. For example in previous activities with other units with past subsoiling, the overall compaction was reduced by about 5 to 10% from initial levels (on a unit basis).

#### **Direct and Indirect Effects – Compaction – Alternative 1**

Short-term to intermediate term impacts from harvest, such as soil disturbance, dust or mud, slash accumulation and disposal, and longer term impacts such as compaction and nutrient loss would not occur.

#### **Direct and Indirect Effects – Compaction – Alternative 2**

With the use of designated skid roads, the reuse of the existing skid road system, and the subsoiling of primary landings and skid roads, compaction is not anticipated to exceed the 20% value in any unit and should be below the 15% level (or lower) in most units. Subsoiling may be curtailed in some areas in order to reduce the amount of root pruning of leave trees and to avoid excessive amounts of exposed soil.

Skyline operations in thinning units with small wood and intermediate supports usually impacts less than 1% of the unit area. Skyline yarding with one end suspension is proposed for most or all of Units 1, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 16, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 33, 35, 36, 37, 38, 39, 40, 41, 42, 43, 45, 47, 48, 51, 52, 54, 53, 55, 56, 57, 59, 60, 61, 62, 63, 64 and 65. Most of these units had little or no existing compaction levels as they were skyline yarded initially. In Units 8, 16, 29, 31, 33, 34, 35, 37, and 43, mentioned previously, some portions of these units may also contained ground based logging where side slopes are gentle enough to sustain ground based systems. Skyline landings are primarily planned at old existing landings, road turnouts, and road junctions. Little new spur road will generally be required. Consequently, effects from existing compaction and skyline yarding are not anticipated. In addition some of these skyline units may be helicopter yarded to reduce the expansion of the transportation system.

### **Direct and Indirect Effects – Compaction – Alternative 3**

Direct and indirect effects as a result of alternative 3 would be similar to those described in alternative 2.

### **Cumulative Effects – Compaction**

Cumulative effects are discussed collectively for displacement, compaction, nutrient loss and instability at the end of the soils section.

### **Nutrient Loss**

#### **Existing Condition – Nutrient Loss**

Most of the stands in this project area had little active fire history until management began in the 1930s. As a result, large expanses may have had considerable down woody debris throughout much of their history. Many of the managed stands also had the initial harvests when PUM standards were in effect. This required that larger waste material (usually 8 inches wide and 10 feet long or greater) be removed from the units to reduce fire intensity. On the other hand, some of the oldest stands were harvested when utilization standards were low or absent, and this resulted in concentrations of large woody debris in some locations. In addition, most managed stands were broadcast burned which removed additional amounts of above ground organic matter. Consequently across numerous older managed stands, management generated, down woody debris or slash is at lower levels, and this may not replicate the natural condition for this area. Conversely, some localized areas have substantive accumulations. Younger plantations, those from about 1990 onward, retained much more slash and large woody debris as was required by the current Forest plan direction. As a result, a wide range in the above ground tonnage of decomposing organic matter exists with amounts generally varying management history and fire intensity. The variety exists both between and within units.

#### **Desired Future Condition – Nutrient Loss**

Most of the stands in this project area had little active fire history until management began in the 1930s. As a result, large expanses may have had considerable down woody debris throughout much of their history. Many of the managed stands also had the initial harvests when PUM standards were in effect. This required that larger waste material (usually 8 inches wide and 10 feet long or greater) be removed from the units to reduce fire intensity. On the other hand, some of the oldest stands were harvested when utilization standards were low or absent, and this resulted in concentrations of large woody debris in some locations. In addition, most managed stands were broadcast burned which removed additional amounts of above ground organic matter. Consequently across numerous older managed stands, management generated, down woody debris or slash is at lower levels, and this may not replicate the natural condition for this area. Conversely, some localized areas have substantive accumulations. Younger plantations, those from about 1990 onward, retained much more slash and large woody debris as was required by the current Forest plan direction. As a result, a wide range in the above ground tonnage of decomposing organic matter exists with amounts generally varying management history and fire intensity. The variety exists both between and within units.

### **Direct and Indirect Effects – Nutrient Loss – Alternative 1**

Overstocked stands will rapidly see density increase, growth slow, and mortality rise. Fuel accumulations from blow down, snow down, and bug kill provide an ever increasing amount of fuel loading. Increased fire activity in these stands may increase nutrient loss.

### **Direct and Indirect Effects – Nutrient Loss – Alternative 2**

Duff Retention objectives were specifically developed many years ago by the Willamette National Forest to apply to clear cut harvest prescriptions with broadcast burns on various landtypes with differing surface soil erosion potentials. Retention objectives are based on several factors that include side slope percent, surface soil type, and existing premanagement thickness. Duff retention is the amount of duff thickness remaining after management activities are completed. For example, if average premanagement duff thickness was one inch, and approximately one half inch remained after broad cast burning, then duff retention would be 50%. When these standards were developed, duff retention on partial cut harvest prescriptions was not a significant issue, and none were formulated. Monitoring and field reconnaissance in recent years has shown that the duff retention percentages for under burns in partial cuts, thinnings, or fuels reduction within unmanaged stands, which maintain an intact live root mat and live canopy cover over most of the unit, could be less (to much less) and still achieve adequate soil protection. Having said that, actual duff retention measurements on under burns (both natural and management directed) on various Districts in the last few years indicate that the “broadcast burn” standards for duff retention are generally approached, even if they are not specifically required. Consequently, they serve as a good goal and are recommended as a desired objective for the units in this report.

In the unit summary section (available in the project file), objectives for duff retention will be specified for each unit. For all action alternatives, within the managed plantations, slash will be scattered in the units, piled and burned, or perhaps broadcast or under burned. Piling may occur by hand or with a grapple machine. Grapple piling occurs with a grapple not with a dozer brush rake. Grapple piling requires only one pass of the machine across the landscape, and the machine works while sitting on slash. Extensive monitoring of grapple machine piling operations indicates that little or no additional compaction or displacement occurs. On typical thinning, hand piles number about 40 per acre and occupy about 20 square feet per pile for a total of about 800 square feet per acre or about 1.8% per acre. Machine piles are substantively less in number, but correspondingly larger in size so that the 1.8 to 2% figure is maintained. In many cases only a few acres of any particular unit are hand piled or machine piled. Burning the piled slash may develop sufficient heat to affect the underlying soil. However, pile burning is usually done in the fall or winter months when duff and soil moistures are higher, and this helps reduce the downward heat effects to the soil. Consequently, pile burning is considered a minor effect and not cumulative because of the limited overall acreage involved.

Another aspect of long term nutrient availability and ectomycorrhizal formation is the amount of larger woody material retained on site. Management activities will be planned to maintain enough large woody debris (dead and down) to provide for a healthy forest ecosystem and ensure adequate nutrient cycling (FW-085). At this time, site specific needs will be considered commensurate with wildlife objectives as outlined in FW-212a and FW-213a (as amended), if they apply to the any action alternative.



In summary, duff retention objectives will be provided on a unit-by-unit basis in the unit summary table. Concentrations of larger down logs that were produced naturally with the initial harvest should be left undisturbed as much as possible. Consequently, with the retention of adequate duff and woody debris, potential adverse impacts to long-term soil productivity are not anticipated.

### **Direct and Indirect Effects – Nutrient Loss – Alternative 3**

Effects would be the same as described in alternative 2.

### **Cumulative Effects – Nutrient Loss**

Cumulative effects are discussed collectively for displacement, compaction, nutrient loss and instability at the end of the soils section.

## **Instability**

### **Existing Condition – Instability**

As was stated previously, this portion of the Upper North Santiam drainage is considered quite stable. Active slope instability from either debris chutes or slump/earth flow complexes does not occur. The recent intense rainstorms from 1996 to 2000 generated no instability in this project area.

### **Desired Future Condition – Instability**

Slope instability is also a natural ecological component of the Cascade Range ecosystem. Debris chute failure recurrence is generally associated with more episodic large fire and / or flood events. Slump / earth flow instability is more steady state and may extend for centuries. Slope failures of either type carry large wood and rock to stream systems. This material is needed to both create suitable structure for sediment storage and provide the gravels required for fish and other aquatic habitat. On the other hand, numerous failures, without the associated boulder or log structure, can overload a system with sediment and destroy functioning habitat. Activities which do not exacerbate existing unstable areas or promote long-term stability are favored.

### **Direct and Indirect Effects – Instability – Alternative 1**

In the absence of management, natural levels of instability are expected. In general, instability is low except for one to two acres in the southeast corner of Unit 27. The south boundary of Unit 28 borders and active slump / earth flow complex, but little or no thinning is planned on the unstable area.

### **Direct and Indirect Effects – Instability – Alternative 2**

Slope instability is not considered a concern for any unit in this project area, except about two acres in the southeast corner of Unit 27. A slump / earth flow of about two acres in size occurred in this unit prior to establishment of the regeneration. At this point, it is difficult to determine if the harvest of the unit caused the failure, increased the rate of failure, or already existed when the unit was cut. Most of this failure has now stabilized, but there is some evidence that some level of creep is still continuing. For the most part failure depths are below the rooting depth of the trees. For this project, thinning is recommended to reduce stem density and enhance growth and vigor of the remaining leave trees in order to maintain evapotranspiration rates and avoid longer term changes to the local ground water regime from suppression. The potential intermediate

impacts from thinning and a reduction in stem density will be quickly ameliorated by the increased growth on the leave trees. Monitoring of commercial thinning harvest implemented on potentially highly unstable or actively unstable terrain on other Districts has shown good release and not exacerbated slope instability. Thinning densities on the slide area are recommended to be the same as for the stand in general.

Unit 28 is for the most part located in stabilized slump / earthflow terrain. This “old slump ground” has been stable for hundreds of years, if not longer. However, the south boundary of Unit 28 borders an active slump / earthflow complex that involves several dozen acres. Little or no thinning is planned on the actively unstable area. Drainage is such that the thinning of Unit 28 will essentially have little or no effect on the active slump / earthflow terrain. Consequently, no specific mitigation is proposed for this unit as it affects the active slope failure, as none is needed.

### **Direct and Indirect Effects – Instability – Alternative 3**

Instability would not change with timber management as conditions are stable. Effects would be the same as described in alternative 2.

### **Cumulative Effects – Instability**

Cumulative effects are discussed collectively for displacement, compaction, nutrient loss and instability at the end of the soils section.

### **Cumulative Effects – Displacement, Compaction, Nutrient Loss, Instability**

For the cumulative effects analysis, the past, present and reasonably foreseeable activities in Section 3.1 were reviewed. For the soils resource the scale of analysis for both direct / indirect effects and cumulative effects is almost always the “unit”, i.e. the stand polygon proposed for silvicultural treatment. The unit of measure for evaluating those effects is generally considered the percent of the “unit” affected. The major short-term impacts to soil productivity from harvest activity include displacement, compaction, nutrient loss, and instability. Forest-wide Standards and Guidelines FW – 081, Detrimental Soil Conditions, state that the total area of cumulative detrimental soil conditions should not exceed 20% of the total acreage within the activity area, including roads and landings. No unit proposed in the French Bug environmental analysis is anticipated to exceed the 20% standard at the completion of management activities. In most situations, preventing soil impacts is the most effective and feasible way of reducing cumulative effects and ensuring long-term soil productivity.

The primary previous impact to the soil resource from management on an area basis is compaction, the effects of which can remain apparent for decades. Potential cumulative effects from displacement, nutrient loss, and instability with previous management were not observed to any degree in the field reconnaissance, and their cumulative area is not considered significant for any unit. Existing compaction levels have been documented and discussed for the various applicable units. The impacts are evaluated on a unit-by-unit basis, and are generally the same in any given unit for all action alternatives, unless otherwise noted. The soils design criteria are designed to limit the amount of additional compaction. It is possible that some portions of some ground based units may approach the 20% standard at the completion of yarding, grapple piling, and pile burning.

Skyline landings are primarily planned at old existing landings, road turnouts, and road junctions. Little new spur road will generally be required. Consequently, cumulative effects

from existing compaction and skyline yarding are not anticipated. In addition some of these skyline units may be helicopter yarded to reduce the expansion of the transportation system.

No unit is anticipated to exceed the 20% standard in total and subsoiling is intended to reduce compaction where levels would approach standards and guides. The final condition of these areas will meet Forest Plan Standards and Guidelines.

All prescriptions, design criteria, or soil protection measures discussed in this report are designed to meet or exceed the requirements outlined in the General Water Quality Best Management Practices Handbook (Pacific Northwest Region, November 1988). Prescriptions for soil protection and watershed considerations take into account past and predicted future land management activities.

At this time, no single unit measure of long-term soil productivity is widely used. Information on the survival and growth of planted seedlings may indicate short-term changes in site productivity. However, the relationship of short-term changes to long-term productivity is not fully understood at present. Experience indicates that the potential impacts on soils are best evaluated on a site specific, project-by-project basis. The major soils concerns - compaction, nutrient loss, displacement and instability - are most effectively reviewed, for both short and long-term effects, at the project level. With proper project implementation, unacceptable cumulative effects on the soils resource are not anticipated from any of the action alternatives (BMP W-5). Consequently, the utilization of soil protection measures and best management practices as defined in this report will generally preclude the need for additional cumulative effects analysis. Deviations from the standards and guidelines would be the primary trigger for a cumulative effects review, and no deviations are planned.

## 3.8 Aquatics

### Introduction

The French Bug Timber Sale is located in the North Santiam river basin on the western slope of the Cascade mountain range near Detroit Lake. The project boundary includes portions of the Detroit Reservoir/Blowout Divide Creek HUC 5 watershed and North Fork Breitenbush HUC 5 watershed. Humbug Creek, French Creek and the Breitenbush River are the prominent water ways in the project area; all streams flow into Detroit Lake, which was built in 1953 to control flooding and produce hydroelectric power. The North Santiam River continues into the Santiam, the Willamette and Columbia rivers before emptying into the Pacific Ocean.

The Breitenbush River flows in a westerly direction from the Cascade mountain range, near Mt. Jefferson and empties into Detroit Lake near the town of Detroit, Oregon. It is the northeastern-most watershed on the Detroit Ranger District of the Willamette National Forest and includes a small area of the Mt. Hood National Forest. The entire 69,400 acre watershed is located in Marion County, Oregon. The watershed is almost entirely managed by the USFS. Humbug Creek drains 10,362 acres of the northwest portion of Breitenbush watershed.

The Detroit Tributary watershed drains into either Detroit or Big Cliff reservoirs along Oregon State Highway 22. The watershed is on the west side of the Detroit Ranger District and extends outside the Forest boundary. This 49,335 acre watershed is divided between Marion and Linn Counties, Oregon. Approximately 64% of the watershed is managed by the USFS.

The French Bug Timber Sale is contained within four 6th field HUC's, sub-watersheds: Middle Breitenbush, Lower Breitenbush, Humbug Creek and French Creek/Detroit Reservoir. The French Creek/Detroit Reservoir subwatershed is within the Detroit Reservoir/Blowout Divide Creek 5th field HUC watershed and all others are in the North Fork Breitenbush 5th field HUC watershed. Both of these watersheds converge at Detroit Reservoir near the town of Detroit. The 17,357 acre analysis area for this project includes 2200 acres of managed stands. Actual treatment would occur on 543 acres of stands in the Detroit Reservoir/Blowout Divide Creek watershed and 928 acres of stands in the Breitenbush watershed.

Beside timber harvest, project elements include the maintenance and reconstruction of existing system roads, including construction of temporary operator spur roads to access the harvest units. After the project is completed, all temporary operator spur roads would be decommissioned. Hazardous fuel treatments would also be completed to reduce the short term fuel hazards created during the harvest activities and provide long term benefits for prevention of large scale disturbances such as wildfires. The project also considers watershed restoration and various wildlife habitat enhancements such as rehabilitation of past timber landings and dispersed recreation sites, wildlife tree snag creation, forage plantings, seeding and fertilization. Additionally, this project would enhance conditions in riparian areas to meet Aquatic Conservation Strategy Objectives by enhancing tree growth. Larger trees will better provide more shade for streams, moderate microclimate and improve overall structural diversity. Aquatics restoration projects considered include implementation of the Respect the River program and instream large wood placement.

## **Regulatory Framework: Relevant Aquatic Considerations, Management Criteria and Specific Management Guidelines**

### **Linnology**

Management of the Detroit Reservoir is the responsibility of the Army Corp of Engineers (COE). Land adjacent to the reservoir, COE land is administered by the Forest Service under the initial act which established the reservoir.

### **Water**

This section<sup>19</sup> will by no means be able to cover all of the Laws, Acts, Executive Orders, and Standards and Guidelines associated with water quality and riparian management, however, various documents provide direction on how management should occur. These include:

- Willamette National Forest Land and Resource Management Plan: The 1990 Land and Resource Management Plan (LRMP) for the Willamette National Forest identified water quality as a significant issue to guide its development, it described the desired future condition of water quality in 10 and 50 years; and it designed standards and guidelines creating operational requirements to meet water quality objectives.
- Memorandum of Understanding, Oregon Department Environmental Quality: The Pacific Northwest Region entered into an agreement with the State of Oregon adopting "General Water Quality Best Management Practices" in November 1988. Best Management Practices are practices or combinations of practices determined by the State

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<sup>19</sup> A more complete list and description of the regulatory framework is in the Aquatics specialist report, available in the project file.

after problem assessment, examination of alternative practices and appropriate public participation, to be the most effective, practicable means of preventing or reducing the amount of pollution generated by non-point sources to a level compatible with water quality goals. (Federal Register, Volume 40, No.230 dated 11/28/75)

- Clean Water Act PL92-500, as amended in 1977 and 1982
- Beneficial Uses: The Oregon Department of Environmental Quality is the agency responsible for implementation of the Clean Water Act within the State. The Forest Service is a Designated Management Agency. It is the responsibility of the Designated Management Agency to insure meeting the clean water act for their lands. Oregon Administrative Rules (Chapter 341, Division 41) identifies beneficial uses, which may include: aquatic life and fisheries, domestic water supplies, Wild and Scenic Rivers and other recreational values.
- Source Water Protection: Source Water is untreated water from streams, rivers, lakes, springs and aquifers that is used as a supply of drinking water. Source Water Areas are the sources of drinking water delineated and mapped by the state for each federally-regulated public water system.
- Oregon Department of Environmental Quality. 2006. Willamette Basin Total Maximum Daily Load, approved by the Environmental Protection Agency, Sept 29, 2006.
- USDA Forest Service. 2008. Willamette Basin Water Quality Restoration Plan, Willamette and Umpqua National Forests, Submitted April 30, 2008 and currently under review by Oregon Department of Environmental Quality, 142 pp.

### **Additional Directional Documents**

- Northwest Forest Plan (NWFP): In 1994 the NWFP included the aquatic conservation strategy, ACS, as an integral component. The NWFP amends land allocations and S&G's in the Forest LRMP, however, the most restrictive S&G's of the two would be maintained. It establishes Riparian Reserves and Key Watersheds across the landscape and sets forth detailed requirements land managers must meet within those reserves in accordance with the ACS. A key feature of the NWFP is that Watershed Analysis be performed as a systematic way to characterize aquatic, riparian and terrestrial features in a watershed. Watershed Analysis "consists of technically rigorous and defensible procedures designed to identify processes that are active within a watershed, how those processes are distributed in time, and space, the current upland and riparian conditions of the watershed, and how all of these factors influence riparian habitat and other beneficial uses." (NWFP S&G B-21) The Breitenbush Watershed Analysis was completed in 1995 and the Detroit Tributaries Watershed Analysis was completed in 1997.
- Tier II Watersheds: Under the NWFP the North Santiam River was designated as a tier II watershed. This places emphasis on the quality of water flowing off the landscape and the management direction to ensure obtainment of water quality objectives. One of the criteria established is that no net increase in road densities can occur within the watershed.

### **Fisheries**

All project alternatives were designed using the appropriate direction and guidelines found in the Willamette National Forest Land and Resource Management Plan (LRMP), the Northwest Forest Plan, the Aquatic Conservation Strategy, and Best Management Practices. These alternatives are also consistent with other guidance or direction such as the Endangered Species Act (ESA) of 1973, the Magnuson-Stevens Fishery Conservation and Management Act (MSA) of 1996, the Clean Water Act, Wild and Scenic Rivers Act, and Executive Orders 12962, 11988, and 11990. Specific guidance components applicable to this project are listed in the project file.

## **Analysis Methods**

### **Resource Data**

Analysis of the project area involved field review of the proposed harvest units and surrounding areas and streams. Field review includes walking through and around the perimeter of the proposed units. Streams and wet areas encountered were recorded on either a map base or aerial photo. This was done by a contract for the Forest Service in 2007 (August- October). These are transferred to integration maps for discussion and development of site-specific prescriptions. Stability, slope, soil types, vegetation type, aspect, and juxtaposition of the units are considered in developing a prescription that will protect and or enhance the hydrology, stream channels, water quality and riparian reserves found within the project. Darren Cross, District Fishery Biologist, and Dave Halemeier, Hydrologist, surveyed the project area during the project planning stage. Streams within the project area were sampled to confirm existing distribution records, confirming fish presence/absence, and species composition. Level II Stream habitat and biological surveys were completed on the Breitenbush River (2005), Humbug Creek (1995 and 2007), and French Creek (1997 and 2007).

Stream conditions, slope conditions, vegetation conditions were compared to information provided under the Breitenbush Watershed Analysis (WNF 1995) and Detroit Tributaries Watershed Analysis (WNF 1997) to determine if changes occurred since the drafting of the WA. Conditions appeared to be responding typically for Cascade environments.

An interdisciplinary (IDT) process was utilized to determine the desired condition of the stands and their response to treatment. IDT input from fisheries biologist, hydrologist, soil scientist, wildlife biologist, silviculturist, fuels planners, logging system planners, and engineers was reviewed and all actions were considered in relation to the prescription and risks were evaluated using models, past management track records, and professional judgment.

Existing data from the Willamette National Forest Geographic Information System (GIS) database was queried to provide stream density, road density, stand condition (age), riparian connectivity, habitat types, weed locations, special habitat locations, fisheries habitats types, and fish distribution. This allowed evaluation of the proposed actions at site (local) and 5th field scale.

Aggregate recovery protocol and standard observations of past activities within the watershed to determine response to disturbance were utilized to determine hydrology, stream channel, and water quality responses to proposed actions.

Critical habitat and ESA fish distribution maps from NMFS were reviewed. Consultation would be completed using the Programmatic Timber Sale BA (2007)

## Scale of Analysis

### Hydrology Stream Channels, Water Quality and Riparian Condition

Local site scale determines the juxtaposition of the various stands and their effect on hydrology, water quality, and channel condition. The sixth and fifth field HUC scales determine the project effect to connectivity, ecosystem processes, peak flow, and desired future conditions. This project would treat 1471 acres about 2% of the four subwatersheds. This dispersal across such a large area warrants looking at the larger 5th field HUC scale for determining cumulative effects.

### Fisheries

Site scale analysis will focus on the effects to the nearest stream channels and the accumulated effects to the nearest fish bearing stream reaches and Listed Fish Habitat for spring Chinook salmon.

Direct and indirect effects of the project will be assessed for the four sub-watersheds included within the project area based on site scale indicators. Integration of sub-watershed effects and discussion of cumulative effects to the fisheries resource will be assessed at the watershed scale.

## Existing Condition

### Watershed Scale Indicators

Watershed Scale indicators determine the baseline condition of the watershed based on past management activity and natural disturbance. Disturbance mechanisms are natural and human caused events that occur on the landscape. The indicators vary depending on the spatial, temporal, physical and biological nature of the four subwatersheds in the analysis area. For the French Bug project area there are six watershed scale indicators that shape the character of the project area:

- Timber Harvest, including vegetation management and instream large wood management;
- Riparian Disturbance;
- Roads, aquatic organism passage, drainage network and stream flow;
- Fire;
- Geology/Soils Landslides; and
- Social: Detroit and Big Cliff Reservoirs, recreation and riparian use.

These watershed scale indicators define aquatic habitat conditions.

### Aquatic Condition Indicators

The Aquatic condition indicators determine the baseline biologic condition of the fisheries resource. The Hydrology, Stream Channels, and Riparian Reserve indicators define the physical condition of the aquatic habitat and the Habitat Complexity and Biological Parameter indicators are the biologic components that react to changes in the physical conditions. Hydrology and Fisheries share the Water Quality indicator. The existing condition of aquatics habitat in the four subwatersheds that are included in the French Bug project area will be discussed using the effects of the watershed scale indicators. The Habitat Complexity, Biologic Parameters and

Water Quality are a reflection of the physical condition of Hydrology and Stream channels of the hydrologic analysis.

The Breitenbush Watershed Analysis (1996) and the Detroit Tributary Watershed Analysis (1997) discuss the physical domain of the project area; this report tiers to those documents and incorporates them by reference. It is important to note that the stream systems found within the planning area have been influenced by past management activities and management induced changes to hydrology. The project area was heavily logged in the mid 19th century by railroad and conventional cable logging operation into the 20th century. This vegetation removal contributed to increased peak flow and changed stream channel complexity has not yet recovered. Loss of large wood from treatment of logging slash and salvage of merchantable trees from the riparian areas and hill slopes opened to snow accumulation and rain on snow events, which have scoured channels down to bedrock and large boulders. These channels were armored due to extreme flows and became effective conduits for moving water off the landscape. Habitat complexity, diversity of species, and aquatic richness were reduced due to the high-energy nature of the systems. Within the last 20 years channel conditions have started to gain some of the complexity, diversity, and richness back as peak flows decrease because of stand regeneration and riparian reserve protection. Stand conditions are developing to create large wood and hydrologic recovery is occurring within the upland areas.

## **Hydrology**

The Breitenbush hydrology is similar to other documented watersheds within the Western Cascades. Peak flows occur during rain-on-snow events in the transient snow zone which is estimated to occur between 1,200 and 4,900 feet elevation (Christner and Harr, 1982).

Approximately 75 percent of the watershed is within this transient snow zone. For the remainder of the watershed, 9 percent is below 2400 foot elevation and 16 percent is higher than 4,800 feet elevation.

Deep upland soils, terraces, flood plains and numerous headwater lakes provide water storage in this watershed. Glacial soils, terraces, and flood plains act like sponges, retaining water and releasing it slowly during periods of low precipitation. Annual precipitation for the area averages 77 inches with intensities as much as 3.7 inches per 24 hours, which can be expected on the average once every two years (Slack et al., 1993). Intense precipitation is episodic in nature, and often generates peakflows which are a major disturbance mechanism for stream channels and associated riparian areas.

Average annual discharge for the watershed is 578 cubic feet per second. Between 1932 and 1987, discharge exceeded 5,000 cubic feet per second 27 times; 7,000 cubic feet per second 15 times; 10,000 cubic feet per second two times; and 16,900 cubic feet per second once. During the same period, flow in the Breitenbush River was below 100 cubic feet per second 14 times and below 90 cubic feet per second seven times. The lowest recorded flow was 87 cubic feet per second. This wide range of variability in stream discharge reflects the maritime climate and the corresponding flow regime that changes dramatically with the seasons.

The French Creek sub-watershed is very susceptible to rain on snow events and subsequent peak flows. The dominant parent material for this area is volcanic in origin, so soils are skeletal and shallow. Water storage in the soils is marginal with the only true storage areas being undulations in the geologic skin underlying these soils.



Hydrology is dominated by rain on snow events. Peak flow occur between October and May with low flow typically occurring in September. Groundwater storage is within colluvial deposits and earthflow features. Typical cascade responses to hydrology occur. Geothermal activity occurs to the east of this area. Aggregate recovery is at 84 percent (2004 run) for the French Creek/Detroit Reservoir subwatershed.

### **Stream Channels**

First to third order stream channels on steeper slopes and deeply incised parallel streams are found throughout the project area. This pattern transitions into a dendritic pattern as they drain the steeper areas and transition into the colluvial and glacially formed slopes that have been altered by erosion. The high gradient stream channels are associated with valley walls greater than 65 percent slope and contain channel bottom materials dominated by bedrock and boulders. The high-energy stream channels found within the planning area exhibit very little sinuosity. Rosgen type Aa+, A, and B channels are present within the proposed project area. Type B channels are present in higher order channels such as French Creek, Humbug Creek and portions of the Breitenbush River. These B type channels contain a high percentage of exposed bedrock and large boulders. In addition, debris torrent activity in headwaters streams feed these streams with structure. Most of the fine sediments are, transported out of the system and into Detroit Lake reservoir.

Headwater channels have low sediment storage capacity due to steep gradient and the lack of channel structure such as logs and boulders. Sediment storage capacity is low as streams transition from the valley wall regions. Streams transport sediment through these streams with the only storage being related to structure found within the channel. Historic benches of sediment are found throughout the planning area relating to the glacial deposits and the presumed concentration of large wood now missing. These terraces are disconnected with the channel and contain the most productive sites for growing trees.

As described in the Soils/ Geology Watershed analysis report, debris torrents have at times played an important role in the development of the first and second order stream channels in this planning area. Material from debris torrents builds terraces in third and fourth order stream channels that are shaped and reshaped by peak, flow events.

### **Water Quality**

Beneficial uses, dependent on aquatic resources, in this planning area are: domestic water use, resident and anadromous fisheries use, aquatic non-fish species use, riparian dependent species use, water-related recreation, hydroelectric power generation, and water-related fire suppression and road maintenance.

Domestic water for the town of Detroit is taken from the Breitenbush River at approximately river mile 1.5 during the summer months. Water off this project area flows into the Breitenbush River which ultimately flow into the North Santiam River which serves as a domestic water supply for several downstream municipalities, including Gates, Lyons, Mehama, Stayton, Sublimity and Salem. The North Santiam River generates hydroelectric power through hydroelectric operation of Detroit and Big Cliff Dams.

Water quality parameters critical to beneficial users are temperature, fine sediment input and biological contaminants.

**Temperature:** As is typical in the Western Cascades, water temperature controls the type and distribution of aquatic species in the watershed. The primary influence on water temperatures in the French Bug project area is solar radiation, which makes shade retention in the project area important.

**Sediment:** Sediment movement through the watershed is critical for various aquatic, domestic, recreation and hydroelectric resources. The timing, type and amount of sediment have varied effects on beneficial users, including the following: turbidity levels that exceed treatment methods for domestic water, loss of oxygen levels during egg incubation of aquatic species, and potentially affecting the ability of channels to pass peak flows.

**Biological contaminants:** The third potentially critical parameter for water quality is biological contaminants. Contaminants, such as water borne diseases, can impact both domestic and aquatic users. In the French Bug project area there is potential contamination from human waste because of the amount of recreation use in the area and from stocking non-native fish species such as hatchery rainbow trout. Community sanitation systems also pose a risk to water quality in the watershed, but the amount of contamination is unknown.

Water quality for domestic water use is generally high in the French Bug project area. Episodic storms temporarily reduce water quality, as sediment increases along with rising waters. This sediment is flushed out of the watershed and water quality returns to previous conditions, under normal flows. Domestic water users have established routines to draw water from the Breitenbush River during times of low turbidity, fine sediment transport.

During the 1996 water year a February storm event provided peak flows adequate to deliver increased sediment loads into the stream system and improve the floodplain connection lost from years of removing material from the channel areas. Stream systems within the project area are gaining the ability to store and meter sediment within the channel area as a result on improving structure within the channels. Additional sediment from future natural failures will aid in this recovery.

There are currently (2004/2006 DEQ database) no “303d” water quality limited water bodies within the French Bug project area; however, with the Willamette TMDL guidance all tributary streams to the Willamette will be required to meet certain criteria for water temperature. This criteria is being met though the implementation of the sufficiency analysis for stream temperature.

### **Summary of Physical Watershed Scale Indicators**

The timber harvest, riparian condition, roads, fire, and soils/geology indicators have all affected the hydrology, stream channel, and water quality indicators which in turn define aquatic habitat in the French Bug planning area.

Past harvest has increased runoff and peak streamflow, which has scoured and degraded channel conditions. Increased peak flows have disconnected the channel from the floodplain and flushed wood and spawning gravels out of the system. Salvage and riparian harvest has removed large key pieces of wood out of the system, which limits the channels ability to collect sediment and substrate needed to rebuild and reconnect to the floodplain. This reduces water storage and fish access to off-channel habitat.

Roads in the project area are located in the riparian reserves of French Creek, Humbug Creek, and the Breitenbush River which has reduced wood and substrate recruitment and disconnects

stream channels from their floodplains. Roads have increased the drainage network by intercepting and channeling water, which increases peak flow and routes fine sediment to streams. Culverts can block aquatic organism passage, prevent gravel and wood recruitment for fish habitat and create entry points for sediment routed through road ditches.

The social interactions with the landscape have changed aquatic habitat as well. Fire suppression has changed the stand dynamics and flow regimes and reduced wood recruitment to streams. Detroit and Big Cliff dams have blocked upstream migration of anadromous fish and extirpated bull trout from the basin. The most impactful social interaction with the landscape in the project area is recreation. Dispersed recreation causes soil compaction and loss of riparian vegetation. Human waste is also a water quality concern of the recreation in the watershed.

Overall, the physical landscape conditions evident in the project area are a result of existing geology and soils and their resistance to disturbance. Disturbance mechanisms, natural, (fire, flood, ice) or human induced (timber cutting, road construction), utilize the same processes of recovery once the disturbance occurs. These processes, driven by gravity, provide nutrient rich seed beds for revegetation, stabilization, and recovery to occur. Field review and Forest Plan models validate that this area is within its range of natural variability and recovery is occurring.

### **Fisheries**

The Breitenbush River provides habitat for Chinook salmon, rainbow trout, cutthroat trout, naturalized sockeye salmon (commonly referred to as kokanee salmon), long-nosed and speckled dace, and sculpin. French Creek is habitat for cutthroat trout, rainbow trout, sculpin, and giant pacific salamanders. Historically, bull trout and steelhead were found in both watersheds. The Breitenbush River and Humbug Creek provide spawning, rearing, and migration habitat for Chinook salmon; French Creek does not. Naturally reproducing populations of bull trout and steelhead no longer exist above Detroit and Big Cliff Dams. On the Willamette National Forest all fish species, resident and anadromous, are considered Management Indicator Species (MIS). MIS are in good condition in the project area and are found in all suitable reaches of rivers and streams.

Spring Chinook salmon historically utilized the Breitenbush and Detroit tributaries watersheds. Access to this habitat was eliminated in 1953 with the construction of Detroit dam, which does not provide upstream passage. Spring Chinook salmon, of hatchery origin, have been reintroduced above the dam, starting in the year 2000, with the capture, transport, and release of adult salmon. For the purposes of this analysis, it is assumed that the historically occupied habitat in the Breitenbush River and Humbug Creek is currently being utilized by both adult and juvenile spring Chinook salmon. French Creek may have provided habitat historically, but past management activities have changed the dynamics of the stream bed by removing cobble and gravel leaving bedrock chutes that are low flow passage barriers to Chinook migration

The National Marine Fisheries Service (NMFS) recently completed their final listing determinations for 16 Evolutionary Significant Units (ESUs) of West Coast Salmon (70 FR 37160; effective August 29, 2005). They listed the Upper Willamette River Chinook salmon ESU as threatened under the Endangered Species Act (ESA), confirming their earlier determination (64 FR 14308; effective May 24, 1999). The Upper Willamette River Chinook ESU includes all naturally spawned populations of spring-run Chinook salmon in the Clackamas River and in the Willamette River, and its tributaries, above Willamette Falls, Oregon.

Artificially propagated spring-run Chinook salmon from seven hatcheries in the basin are also considered to be part of the ESU. This includes the Marion Forks Hatchery (ODFW stock # 21) on the North Fork Santiam River, the source for out-planted spring Chinook salmon above Big Cliff and Detroit dams, and potentially utilizing their historical habitat in Blowout Creek. The NMFS determined that these artificially propagated stocks are no more divergent relative to the local natural population(s) than what would be expected between closely related natural populations within the ESU. The NMFS has designated critical habitat for 12 ESUs of West Coast Salmon and Steelhead in Washington, Oregon, and Idaho (70 FR 52630; effective January 2, 2006). Designated critical habitat for Chinook salmon does not extend above Big Cliff dam, and will not be affected by this project.

Similarly, the Magnuson-Stevens Fishery Conservation and Management Act lead to the designation of Essential Fish Habitat (EFH) for commercially harvested fish, which includes Chinook salmon on the Willamette National Forest. Their designation of EFH did not include any streams above Big Cliff dam, and therefore EFH will not be affected by this project.

The FEIS for the LRMP identifies “Anadromous Fish” and “Resident Fish” as Management Indicator Species (Chapter III-69).

Three primary indicators have been identified for assessment of affects to the fisheries resource on the Willamette National Forest; habitat complexity, water quality, and biological parameters.

These indicators incorporate the same diagnostics used in the matrix of pathways and indicators to make ESA determinations for federally listed fish (NMFS 1996 and USFWS 1998). A baseline functional rating of functioning appropriately, functioning at risk, or functioning at unacceptable risk is used to describe each indicator (Table 3-28). The existing condition, desired future condition, and direct and indirect effects of project elements are then discussed for each of indicator.

Table 3-28 Indicators for Assessment of Existing Fisheries Condition

Indicators	Functioning Appropriately	Functioning at Risk	Functioning at Unacceptable Risk
Habitat Complexity Large Wood, pools, off-channel habitat, Riparian Reserve, substrate embeddedness, and stream flow.	Habitat is functioning at or near historic levels and supports healthy fish populations	Habitat quality has been moderately reduced by past or current management activities	Severe reduction of habitat quality due to past or current management activities
Water Quality Temperature, sediment (roads), turbidity and chemical contaminants.	Indicators are functioning at better than state and federal standards	Indicators are functioning at minimum levels desired to be “functioning appropriately”	Indicators are out of compliance with state and federal standards
Biological Parameters Population size, growth and survival, life history, Hatchery influence and Non-native species.	All life history stages are represented, and growth and survival supports resilient fish populations.	Moderate reduction of population size and survival rates.	Small isolated population with low survival rates.

The French Bug project area has three important fish bearing streams; Humbug Creek, French Creek and the Breitenbush River; all of which provide some Chinook salmon habitat. The Breitenbush River and Humbug Creek have good spawning and rearing habitat that is utilized by salmon that area moved around the dams. French Creek has some available habitat that is of

marginal value with very little spawning gravel or wood. The transported salmon are released at the Upper Arm day use site and the Cleator Bend Bridge near the Breitenbush campground.

The other three streams in the project area, Canyon Creek, Wind Creek and Byars Creek, have limited habitat for MIS fish species including cutthroat and rainbow trout. These streams are characterized by steep narrow channels with mostly plunge pool habitat so most fish are found within 0.5 miles of the Breitenbush River where stream channel gradient is more suitable.

### **Habitat Complexity**

Fish habitat complexity is a measure of high quality pool, large wood, existing stream cover, off-channel habitat, Riparian Reserve condition, refuge habitat, stream flow, substrate and spawning habitat (embeddedness and surface fines). Good habitat complexity provides spawning gravels, rearing habitat, feeding opportunity and hiding cover. Fish habitat complexity was surveyed in Humbug Creek and French Creek in 2007 and the Breitenbush River was surveyed in 2005.

### **Humbug Creek**

Pool habitat in Humbug Creek is Functioning at Risk. The number of pools per mile is low in reach one and high in reach 3 with reach 2 somewhere in between. For streams the size of Humbug Creek 30-40 pools per mile would be considered good habitat and is about average for similar gradient reaches in the Breitenbush watershed. Large pool habitat, pools deeper than three feet, is abundant providing good cover and holding habitat. Large wood also provides cover.

The large wood habitat in Humbug Creek is Functioning at Unacceptable Risk. Large and 12medium size pieces of wood in the channel are very low. Past harvest activities have removed the large recruitment potential from project area streams and removal of instream large wood has left the channel with very few key pieces of large wood needed for quality fish habitat. The inner riparian zone, about 50 feet from waters edge, is dominated by alder then transitioning to second growth Douglas fir. The future recruitment of large wood to the Humbug Creek will recover as trees mature and are recruited in the next 100 years.

Off-channel and spawning habitat is limited in Humbug Creek. Stream Channels in Humbug Creek are confined reducing the amount of side channel habitat. The channels were armored due to increased peak flows and became effective conduits for moving water off the landscape. Habitat complexity, diversity of species, and aquatic richness were reduced due to the high-energy nature of the system. The channels contain a high percentage of exposed bedrock and large boulders that continually flush wood, gravel, and sediment.

In small to medium streams such as Humbug Creek, spawning occurs in the pool tailout as it transitions to riffle. This habitat averages only 24.4% of the habitat. This is most likely due the lack of large wood in the stream to create pool habitat and collect gravels. Off-channel and spawning habitat is Functioning at Risk.

Pebble counts in Humbug Creek show an average 4.82% fine sediment smaller than 6 mm; less than 12% is considered functioning appropriately. Pebble counts show very low fines and boulder and bedrock. Banks are stable throughout the surveyed stream reach. The high energy of the system flushes most of the gravels and fine sediments out of the system and into Detroit Lake reservoir. Fine sediment and unstable banks are Functioning Appropriately.

Pool habitat and deep pools (>3ft in depth) with boulders provide much of the hiding cover for fish in Humbug Creek. Off channel habitat is minimal, but is a natural function of the stream channel morphology of Humbug Creek. Large wood is severely limited in reach 1 of Humbug Creek with no key pieces and future recruitment centuries into the future without active restoration. Low quantities of instream wood reduces the stream channels ability to reconnect to the floodplain leading directly to reduced spawning gravel recruitment, pool forming features, and cover. The stream banks are stable and fine sediment is low in surveyed reaches. The inner riparian zone is comprised of alder and vine maple 18-24 feet from the channel and second growth, big leaf maple and western hemlock. The riparian vegetation provides good shade and large wood recruitment is expected to recover in the next 100 years. Overall, the condition of the fish habitat complexity indicator in Humbug Creek is Functioning at Risk.

### **French Creek**

French Creek contains habitat for resident rainbow and cutthroat trout MIS species. Listed Fish Habitat (LFH) for ESA listed spring Chinook salmon ends at Detroit Lake near the full pool elevation. Fish habitat complexity in French Creek is very similar to Humbug Creek because it is in the same landform block with a similar orientation and past management activity. Aquatic complexity is provided by pool depth, boulder substrate and side channel habitat in reach 1. Pool habitat in French Creek is Functioning at Risk with an average of 32 pools per mile, which is within the range of variability similar stream reaches in the Breitenbush watershed. Pool habitat in French Creek is created by boulder and bedrock scour. There are an adequate number of pools in reach 1, but in reaches 2 and 3 pool habitat is not sufficient. The lack of pool habitat is a result of the high stream gradient in French Creek and the reduced recruitment of large wood due to past management activities. This is also the reason for the lack of side channel habitat in French Creek. Pool habitat is Functioning at Risk due to the very low density of large wood, deep pool habitat provides most of the existing stream cover for fish.

The large wood density in French Creek is very low and Functioning at Unacceptable Risk. The channel morphology was created with a combination of high stream energy and dynamic erosion leading to steep gradient stream channels and bedrock-boulder channel bottoms. A long history of fires and timber management removed much of the larger vegetation from the landscape, leaving streams without an adequate supply of large woody material to provide structure and store sediments. As a result there is limited wood recruitment with few key pieces to start wood collection and a small number of large and medium pieces needed for functioning habitat complexity.

Off-channel and spawning habitat is limited in French Creek. Stream Channels are incised and disconnected from the floodplain, which reduces the amount of side channel habitat available. Stream channels in French Creek contain a high percentage of exposed bedrock and large boulders because most of the fine sediments and wood are transported out of the system and into Detroit Lake reservoir. Although Off-channel is limited in French Creek it is consistent with other stream channels in this landform block of the Breitenbush it is Functioning at Risk.

In small to medium streams such as French Creek, spawning occurs in the pool tailout as it transitions to riffle. This habitat averages only 18.5% of the habitat. This is most likely due the lack of large wood in the stream to create pool habitat and collect gravels. Fine sediment in French Creek is functioning appropriately with an average of 8.91% <6mm in size and there is no substrate embeddedness. Spawning habitat is Functioning at Risk.

The Riparian habitats in French Creek are homogenous throughout the surveyed portion of French Creek and consist of even-aged alder in the inner riparian zone, about 35 feet, and second growth Douglas fir and big leaf maple outer zone, beyond 35 feet. The riparian vegetation provides ample shade and leaf litter, but past management has reduced the large wood recruitment potential. The powerline right of way also affects the riparian habitat for much of French Creek. Overall, French Creek is Functioning at Risk. Increased peak flows from past management have disconnected the channel from the floodplain and riparian habitat.

### **Breitenbush River**

The Breitenbush River is a large sized river that drains 103 square miles, including Humbug Creek and French Creek. Valley bottom widths are generally narrow and confined with stable banks. There is good pool habitat in the Breitenbush River with 20%-42% pool area with an average depth of 12 feet, some as much as 26 feet deep. There are also deep runs and glides that function like pools increasing the amount of hiding cover available. The deep pools and riffles in the river provide most of the existing cover and refuge habitat. The Breitenbush River is Functioning Appropriately for quality pool habitat.

Wood densities, especially large wood counts, are very low and Functioning at Unacceptable Risk. The low density is a combination of past management activity and roads locations in the riparian reserve, and the confined channel that efficiently moves wood through the system.

Side channel habitat is limited in the Breitenbush River through the project area due to the narrow floodplain. Refuge habitat is limited to the river margins, tributaries and boulders. However, the channel is Functioning Appropriately because the confined channel is a natural condition.

The mainstem of the Breitenbush River in the project area is confined between steep valley walls with bedrock substrate resulting in a high energy, stream reach where wood and sediment is transported through and into Detroit Reservoir. Fine sediment (<6mm) is low and the substrate is not embedded. Spawning habitat is available in the margins and pool tailouts. Streambanks are stable throughout the project area. The spawning habitat and sediment indicator is Functioning Appropriately.

Riparian Reserve condition in the lower Breitenbush River has been affected by roads and past management activities.

### **Water Quality for Fish**

The Breitenbush River originates from snowmelt in the Mt. Jefferson Wilderness in the high cascades. Water quality in the Breitenbush River, Humbug Creek, and French Creek sub-watersheds is good and was probably higher historically. Temperature and turbidity data suggest that it is still Functioning Appropriately for these sub-watersheds. Water temperatures in the project area sub-watersheds are cool and good for beneficial uses and fish production. The city of Detroit utilizes water from the Breitenbush River as a source for drinking water. These watersheds are part of the North Santiam basin which provides municipal water for the Santiam Canyon communities and the cities of Albany and Salem where water quality is touted as the best in the Northwest.

Water temperature data was collected during water years 1999, 2000, and 2001 for French Creek, Humbug Creek and the Breitenbush River. The Breitenbush site contains a REAL-Time gage that the US Geological Service (USGS) maintains. Maximum Daily means for each day, the

period of record (10/1/1974 – present), show the highest values to occur in August (15.3 degrees C).

### Fish Biological Parameters

Biological parameters include life history stages, population size, population density, and food supply. There are six fish bearing streams in the project area. Resident cutthroat trout, rainbow trout, and sculpin, all considered MIS for the Willamette National Forest, are found in all of them. Biological parameters are Functioning Appropriately for the Breitenbush River and Humbug Creek and Functioning at Risk for French Creek, Canyon Creek, Byars Creek and Wind Creek. Canyon Creek, Byars Creek and Wind Creek have local populations of MIS species that have population sizes functioning appropriately proportional to stream size, but are functioning at risk because connectivity to the Breitenbush River has been blocked by culverts or low flow barriers.

Table 3-29. Fish Bearing Streams in the Project Area

Stream	Spring Chinook	Rainbow Trout	Cutthroat Trout	Sculpin
Breitenbush River	X	X	X	X
French Creek		X	X	X
Humbug Creek	X	X	X	X
Canyon Creek		X	X	
Byars Creek		X	X	
Wind Creek		X	X	

The subwatersheds are Functioning at Unacceptable Risk for spring Chinook salmon. Spring Chinook salmon use of the Breitenbush watershed is dependant on hatchery supplementation and passage around Big Cliff and Detroit Dams. Access to historic spawning habitat has been reduced by the Detroit Lake pool and reduced channel complexity due to past management activities. Biological parameters in the Breitenbush River and tributaries in the valley bottom are Functioning at Risk due to reduced large wood recruitment and loss of riparian habitat, and past removal and salvage of instream wood. Riparian areas outside of the influence of road 46 are intact and functioning appropriately for biological parameters.

### Desired Future Condition

The desired future condition for the North Breitenbush River and Detroit Tributary watersheds moves the watershed condition from its current state towards restoration and a properly functioning condition. Desired Future Condition for a properly functioning watershed at the HUC 5 scale restores natural historical processes and disturbance mechanisms that allow the watershed to maintain diversity and complexity. The desired future condition for aquatic resources in the four HUC 6 subwatersheds in the French Bug analysis area can best be described as a range of variability for the Hydrology, Stream Channels, Water Quality and Riparian indicators. This range of variability has been established through time to represent the natural changes the various elements experience during a wide variety of outside influences. Flood, drought, fire, wind, snow, ice, and land movement all play a natural role in determining the changes to these elements. Add social political drivers to these natural conditions and one can



see the complexity of stating a Desired Future Condition. The desired future condition for the Hydrology; Stream Channel, Water Quality and Riparian indicators include:

- A range of flow and discharge, which allows for a diversity of species to exist within riparian areas.
- Maintenance of wet areas and hyporheic zones, no net loss.
- Maintenance of flows within historic range, no artificial peaks that exceed range.
- Maintenance of channel conditions that represent natural range.
- Reduction of stream energies through channel complexity. (Adding structure into channel, riparian areas.).
- Broad range of diversity associated to the riverine systems.
- Accumulation of woody material to mimic historic levels within riparian site.
- Maintenance of a transportation system which allows public access while minimizing effects to aquatic resources.

### **Fisheries**

Desired future condition for preferred salmonid habitat in Canyon Creek, Byars Creek and Wind Creek, French Creek, Humbug Creek, and the Breitenbush River include:

#### **Habitat Complexity**

- Instream and riparian large woody material increasing stream habitat complexity.
- Reconnection of floodplains for off-channel habitat, decreased temperature, and increased summer flows.
- Reestablishment of large wood component within riparian areas for future recruitment.
- Collection of wood and sediment which allows for various habitat types and flow regimes to be experienced.

#### **Water Quality**

- Water quality that remains within the range that maintains the biological, physical and chemical integrity of the system, and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.
- Water flows sufficient to create and sustain riparian aquatic and wetland habitats and to retain patterns of sediment, nutrient, and wood routing.
- Cooler summer water temperatures

#### **Biological Parameters**

- Increased distribution and self-sustaining populations of spring Chinook salmon and winter steelhead.
- Continued representation of all life stages and spawning, rearing, and migration habitat types for all aquatic species.

- Year-round input of leaf, needle, wood and insect material from a variety of species provide a variety of food sources for salmonids and invertebrates.

## **Environmental Consequences**

### **Direct and Indirect Effects Alternative 1**

#### **Hydrology**

Implementation of the no action alternative, would create a consequence of stands that through time do not have a sufficient live crown ratio (percent of the tree with limbs) to grow at full potential. Because of competition, these stands would experience reduced growth rates. Transpiration rates would decrease due to loss of canopy, crown diameters, and a potential for increases in summer flows could exist due to decline in stands ability to utilize available water. The ability of crowns to intercept and hold snow would decrease and result in a greater risk for tree damage and breakage through the accumulation of snow loads. Infiltration rates would be affected by the loss of canopy and the drip that occurs from snow interception. Latent heat would remove the snow and not allow for the water to infiltrate in the same manner or at the same rate that would occur within a healthy canopy. Reduced canopies are more exposed to latent heat transfer and rapid snow loss, which reduces the contact time the water stored in the snow has with the soil (Harr 1981).

#### **Stream Channels**

Implementing the no action alternative would maintain stream channels in their current condition. Changes to stream channels occur with the changes in hydrology, vegetation and physical changes. These elements change naturally and artificially through disturbance.

The no action alternative would eliminate new artificial disturbance mechanisms, road crossings, pipe installations, and ground disturbance. Indirect effects could occur as riparian stands decline leading to an increase in large wood recruitment to streams. Size of material and location of entry of wood would determine the effect of the wood on the system. The increased large wood accumulations would increase channel complexity within the watersheds. These channels do utilize the available wood and create small wetlands associated to the channels. A very low risk to channel bank stability exists from the increase in wood.

#### **Water Quality**

Water quality is closely tied to the hydrology and channel bank stability of the streams found within this area. Under this alternative very minor change may occur as the result of no action in the hydrology and stream channel resource area. It is anticipated that little, if any, effect would occur to water quality.

#### **Riparian Reserve**

Through time, these reserves would naturally develop the desired characteristics of structure, openings, and down wood. The average tree diameter associated with these reserves would lag in diameter by 4-5 inches at 50 years out while acquiring the same height (Elliot, Silvicultural Report. Stands would experience reduced vigor from increased competition. Snow and insects may also result in damage. This is not anticipated to have an effect on the long-term (100 + years) objective for these areas due to the variability of climate and the resiliency of the stands to respond to change.

## **Fisheries**

In Alternative 1 there would be no change to the watershed disturbance indicator. Timber stands would remain in the current state, and precommercial thinning and fertilization would not occur. The road system would remain in the current state with limited maintenance. There would be no change to stream flow. Riparian reserves would continue to recover from previous timber harvest activities and continue growing towards maturity.

There would be limited road maintenance completed so the current level of sedimentation from roads in the project area would continue at current levels.

Watershed scale diversity would remain in the current state. There would be no gap cuts or broadcast burning and replanting with red cedar and other species

No funding would be generated for instream large wood restoration in Humbug Creek or Respect the River education and restoration for dispersed recreation in the watershed.

## **Habitat Complexity**

The hydrology and soils analyses of this project predict that this alternative would have minimal effects to runoff, water quality or soil erosion processes. Non-treatment of forested stands and the subsequent increase over time in the fuel loadings, could lead to more severe burning conditions if/when the area burns. Also, existing road systems would not be maintained at a high level, increasing the probability of failure and subsequent increased delivery of fine sediment to streams and fish habitat. No measurable downstream change to timing or volume of stream flows is expected with this alternative.

Because of changed management practices and protections for streamside riparian reserves, the currently degraded existing conditions would slowly recover over time. Passive restoration by protection of riparian reserves would result in long-term (100 years) recovery to desired future conditions. Large wood pieces are the building blocks of fish habitat needed for the capture of gravels, forming pools, and providing cover and reconnecting to the floodplain. In this alternative thinning will not occur and stands would stagnate. The growth and recruitment of large wood needed for habitat complexity would be slower than in previously managed stands that remain unthinned.

## **Water Quality for Fish**

The hydrology and soils analysis for this project show that this alternative would have minimal negative effects to water quality or soil erosion processes. Continued soil erosion from unmaintained roads could have a small indirect effect on sediment input to stream channels. However, current data shows that streams in the project are functioning appropriately for water quality and implementation of this alternative would maintain this indicator.

## **Biological Parameters**

Biological parameters are functioning appropriately for the non anadromous fish species in the project area and Functioning at Unacceptable Risk for Chinook salmon. There is a no probability that Alternative 1 would result in negative effects to the fishery resource. However, current conditions would remain and restoration of instream large wood needed to reconnect the floodplain and off-channel connectivity would passively occur, extending attainment of DFCs for centuries. There would be no change to fish population size or distribution; therefore the indicator would be maintained if Alternative 1 was implemented.

**Cumulative effects:**

The list of past present and foreseeable future actions is listed in Chapter 3, Section 3.1 of the French Bug EA.

Traditionally, projects involving timber harvest on the Willamette National Forest are analyzed for their cumulative impact on the quantity and timing of peak flows and water yields, using an accounting methodology known as Aggregate Recovery Percentage or ARP. The ARP model compares the amount of an analysis area within the transient snow zone that is recovered against a threshold value (Midpoint) that was calibrated for the area during development of the Forest Plan. The Midpoint values were developed based on the soil, geology, vegetation, climate, and stream channel condition, in each planning sub-drainage, and intend to represent a minimum safe level of vegetative recovery in the planning sub-drainage to prevent significant alteration of peak flow regimes as a result of management activities. Recovery generally occurs when stand diameters average 8" dbh and crown closures exceed 70%. The transient snow zone is generally considered to include those areas of the forest between the elevations of 1,200 and 4,900 feet respectively.

The current vegetative conditions of the subwatersheds are above ARP thresholds. This means that the subwatersheds are in a recovered condition and hydrologic cumulative effects to peak flows are not anticipated. Hydrologically, this action or any reasonably foreseeable future action, are not anticipated to create an adverse downstream effect. (See page 109 for actual ARP number.)

The watershed condition types for streams found within the project area, determines what management prescriptions should be followed (Page E-10 to E-17; LRMP) "This criterion is intended to address the potential for changes in peak flows during rain-on-snow events, and the associate potential change in the stability of the stream banks and streambed." (LRMP pg. E-6). The Watershed condition is type 5 (LRMP; pg. E-14), which should be at or above midpoint ARP levels. Upon reviewing these criteria and the streams involved in this project it is anticipated that cumulative effects could only occur as the result of not adhering to prescribed best management practices. This judgment is due to the condition of the channels and the topography and soil types found in the project area.

For the fisheries resource, the cumulative effects of Alternative 1 are a combination of habitat complexity, water quality and biological parameters. Cumulative effects of past timber harvest adjacent to channels have created the current condition of fish habitat. Alternative 1 would allow for long term recovery of fish habitat as trees grow and recruit to the stream channels. There would be no change to road densities, riparian reserves, or large wood recruitment. Large wood recruitment is the most important habitat forming feature missing from streams and rivers in the project area. Without thinning, the recruitment of large wood is expected to recover in 100 years. Water quality would remain high for the foreseeable future and biological parameters would remain steady for non- anadromous fish species. Since Chinook salmon are survival in the project area is dependent on physical movement around the dams, future population dynamics in the Breitenbush and Detroit Tributary watersheds is unknown. MIS fish populations would remain stable throughout their current range and habitat would remain in the current state if this alternative was implemented.

Transportation maintenance of the Breitenbush road and system roads is planned. Paving and replacement of guard rails on the Breitenbush road is to occur within the existing right of way

following best management practices for protection water quality. Culvert replacements would not occur on any fish bearing streams. Maintenance of system roads is necessary to maintain proper drainage and prevent failures. There are no cumulative effects to MIS or ESA listed species as a result of transportation maintenance.

Several stream enhancement projects are planned to occur in the foreseeable future within the Breitenbush and Detroit tributaries watersheds. Large woody material will be added to French Creek and Humbug Creek. Dispersed site restoration, including soil decompaction and boulder placement, are also slated for future completion in both watersheds. The “Respect the River” program will educate campers and restore impacted sites to improve riparian function and water quality. These projects will move stream condition towards the desired future condition for the both watersheds.

Future noxious weed treatments in the watershed would have no cumulative effect on MIS or ESA listed species.

The probability that non-treatment would result in negative effects to the fishery resource, with biological effects, reduced habitat complexity, or reduced water quality, is negligible. The No action alternative would maintain the current condition of the Breitenbush and Detroit Tributary watersheds.

### **Conclusion:**

In looking at the Hydrology, stream channels, water quality, riparian, and fisheries in the area it is anticipated that under alternative 1 no measurable effect would occur for approximately 20 years. At that time stand conditions would change that would have both positive and negative effects on hydrology, stream channels, water quality, and fisheries. Timber harvest, roads, fire, geology/soils, and social influences on these parameters will remain unchanged from the current condition and potential positive effects of bring recovery to certain parts of the ecosystem would be delayed (eg. large wood levels within stream).

The probability that non-treatment would result in negative effects to the fishery resource, with biological effects, reduced habitat complexity, or reduced water quality is insignificant. Increased fuel loadings would increase the severity of subsequent burning, but large fires are relatively uncommon in the project area. There would be no road construction or reconstruction, so instream fine sediment would be maintained. Large wood is the overall limiting habitat factor for fish populations in project area streams and rivers. Recruitment of large wood for channel forming features and cover would improve naturally over the next 100 years as key pieces mature and are recruited to stream channels. All fisheries indicators would be maintained with implementation of this alternative.

## **Direct and Indirect Effects Alternative 2**

### **Hydrology**

Alternative 2 treats 1255 acres and reconstructs 2.0 miles of existing system roads and maintains 34 miles of existing road system. Reconstruction of the system roads would reestablish drainage and improve the condition of the road system while reducing the vegetation and interception associated to these roads.

Stand treatment consists of 1243 acres of thinning to an average of 52 percent canopy and 34 acres of ½-acre gaps. Riparian treatment occurs on 542 acres in this alternative. Primary shade

zone will be buffered out of the treatment and secondary shade zone would be maintained at 50% shade canopy as required by the sufficiency analysis requirements. (USDA Forest Service, USDI Bureau of Land Management. 2005. Northwest Forest Plan Temperature TMDL Implementation Strategies, Evaluation of the Northwest Forest Plan Aquatic Conservation Strategy and associated tools to achieve and maintain stream temperature water quality standards. Conditionally accepted by Oregon Department of Environmental Quality, September 9, 2005. PNW Region USFS and Oregon BLM, Portland, Oregon. 52pp.)

Thinning the stands would change the hydrology by reducing competition for light, water, and nutrients in the thinned stands. There would be increased snow accumulation on the thinned acres, roads and landings. A short term (5-10 years) increase in discharge during the wet and the dry periods would occur from two mechanisms in the thinned stands. Increased snow accumulation (wet period) would create small increases in peak flows (Jones and Grant, 2001), and reduced canopy (dry periods) would reduce transpiration rates which would account for small increases in summer flows because canopy closure would remain greater than 50%. It is not likely that either of these changes would create detrimental effects. It may be that the changes are not even measurable (Pike and Scherer, 2003).

Harvest operations can change hydrology by compacting soil and capturing overland flow. The capture and routing of overland flow could occur from the use of ground-based yarding equipment, processor forwarder, tractor, or shovel. Units 2, 7, 8, 10, 11, 13, 15, 16, 27, 29, 31, 33, 34, 35, 37, 42, 43, and 53 all contain ground-based systems, totaling 173 acres. The thinning of riparian reserves places the equipment within closer proximity to drainage networks and a greater risk of routing water out of its historic flow routes. To minimize the risk a no equipment buffer will be established along all streams and utilization of designated skid roads and crossing will be required. This has effectively worked in past thinning sales reducing the risk to an acceptable level. Ground-based systems tend to have a higher risk of encountering ground water and bringing it to the surface. The design of the above mentioned units have this potential and as a result could have the effect of creating additional wet areas. These effects will be reduced through the utilization of Best Management Practices that designate skid trails and season of operations found within the timber sale contract.

### **Stream Channels**

Alternative 2 includes ground based logging on 173 acres. Ground based logging has a moderate risk of capturing water and creating additional channels exists. With the increase in channel length a reduction in infiltration and an increase in overland flow could occur. Each of the units utilizing ground-based systems would require yarding away from stream courses/channels to reduce the direct connection of skid roads to channels. Project design specifies that requirements to reduce and or eliminate any disturbance to the stream channel's bank. Historic review of tractor ground shows that approximately 10 percent of the skid roads capture some water and that these do not create a measurable effect to increases in discharge.

Under this alternative a loss of intermediate wood would occur due to the removal of timber from the riparian reserve areas. Loss would create an intermediate term, 10 to 30 year period, where large wood would not be recruited into the channel through the natural thinning of the stand. This effect, however, will be offset by no harvest buffers on streams that would allow some streamside wood recruitment. Channel response to this loss of wood varies depending upon the specific site; however, it is anticipated that additional energy will be available and

channel storage would be reduced. This wood is utilized in the regulation of flows and creation of sediment storage areas within the channel. Current areas of deposition could transition to transport reaches due to the decomposition of existing wood resulting in an increase in stream energy. Increases in energy will erode channel banks and create channel cross-sections capable of handling higher flows. Having stated the above it is important to note that due to the height of the trees being thinned (50 to 120 feet), a very low, less than 5 percent of the time, potential exists that trees being thinned would actually end up in the channel. No harvest buffers have been established along all streams allowing for recruitment of near stream wood. Treated areas within the riparian reserve are anticipated to have a positive long term, >30 years, effect on the wood recruitment by allowing for tall and large trees to be developed and recruited.

A low risk of downstream effects exists due to the mitigations prescribed for each of these units. Stream channels should remain within their natural range of variability and the proposed project is not anticipated to create any long-term detrimental effect resulting from the action. Short-term effects would be associated with the designated crossings and would be short lived, gone after the first storm event that provides sufficient flow to flush channel. The loss of wood structure for the intermediate term, 10-30 years, would be offset through the creation of larger wood for the long-term. Due to the dynamic nature of channel morphology this action is not anticipated to create a measurable difference in the channel conditions or have any measurable effect on downstream beneficial users.

### **Water Quality**

Effects to water quality could occur with increases in inputs of contaminants from petroleum products, sediment or solar radiation. All of these could have an adverse effect of the quality of water within the project area. To reduce and minimize the effects to water quality, design criteria were utilized which provided for the maintenance of protection no cut buffers to be placed along all streams regardless of class to protect water quality. 50 foot up to 100 foot, no cut buffers were placed along perennial streams while all intermittent and ephemeral channels were protected through the maintenance of trees attributing to channel bank stability by designating 30 foot no cut buffers. In addition equipment exclusion buffers were placed 50 feet from all streams. Localized effects will occur during the replacement of the culverts and the stream crossings after the first flow and for a limited length downstream. Mobilized materials are expected to fall out prior to reaching a confluence with a higher order stream due to the size of the material mobilized. It is therefore anticipated that minimal, if any, downstream effects will occur from the proposed activity due to channel complexity storing any sediment within 100 feet of activities. Benthic organisms found within the area would be displaced until such time recolonization would occur (would expect this to occur within 1 life cycle of organism).

### **Riparian Reserve**

Riparian treatment would occur on 542 acres in this alternative. The primary shade zone would be buffered out of the treatment and secondary shade zone would be maintained at 50% shade canopy as required by the sufficiency analysis. Management within reserves would accomplish a multitude of resource benefits. The reserves would naturally develop the desired characteristics (structure, openings, and down wood); however, development of these characteristics could be expedited with selective management. Direct and indirect effects to the riparian reserves are a compilation of the hydrology, stream channel, water quality, and fisheries components and are

discussed in this section. Terrestrial wildlife components are discussed within the wildlife report.

Identification of riparian areas where benefits from management at this time would improve the long-term objectives for the riparian reserves were incorporated into the action alternatives. Unit design criteria developed by the interdisciplinary team directed the management action and the protection needed to accomplish resource goals. Not all areas warranted management at this time due to the area developing the needed characteristics naturally.

Precommercial thinning and fertilization are two types of management being proposed within the riparian reserve area to encourage development and growth of diverse vegetation. Water quality is expected to remain unchanged as the result of these actions.

It is expected that management of the riparian reserves in this manner will protect and enhance the aquatic and wildlife dependent species present, and the ACS objectives at the 5th field, landscape level.

## **Fisheries**

### **Habitat Complexity**

Large wood, bedrock, large boulders, and coarse sediment are the channel forming features generally responsible for creating fish habitat complexity in the project area. Channel forming features in streams in the analysis area are functioning appropriately except for large wood, which is the habitat complexity component that is missing from the current channel condition. This alternative was designed to protect current wood recruitment using no harvest buffers and enhance long term (100 years) input of large wood by thinning trees in the riparian reserve and upland slopes and protecting wood adjacent to channels. The project is designed to protect and promote recruitment of all size classes of wood to the channel.

Alternative 2 allows thinning harvest within Riparian Reserves. Buffers are consistent with the Programmatic BA with no harvest buffers set at 30 feet from intermittent stream channels, 50 from perennial channels, and 100 feet from listed fish habitat in the Breitenbush River, Humbug Creek, and French Creek. Riparian reserve thinning would have a direct effect to the fisheries resource by removing some trees that could have potentially been recruited to adjacent stream channels as woody material. However, trees would be retained at high stocking levels within the protection buffers (30, 50 and 100 feet). These residual trees left in treated units near streams and untreated stands in the affected watersheds would leave a supply of potential wood available for short-term and long-term recruitment to the stream network. The long term indirect effect would be the eventual recruitment of larger trees to the stream channels that are crucial for long term recovery of wood for fish habitat. Riparian thinning harvest would allow the residual trees to grow to a larger size more rapidly, and more healthy than untreated stands.

Small gaps created in the uplands and Riparian reserves outside of the appropriate stream buffers would increase species diversity and future channel complexity. Instream wood is recruited from the riparian areas directly adjacent to stream channels and upland sources during debris torrents and landslides. By creating small ½ acre gaps and replanting them with underrepresented native species, such as western red cedar, the long-term diversity of wood recruited to stream channels would be improved as larger trees are recruited.

Thinning in riparian reserves would maintain the properly functioning fine sediment and embeddedness condition. Riparian buffers and BMPs are in place to reduce the likelihood of fine



sediment input to stream channels. Fine sediment is not expected to reach stream channels and fines that do would be flushed into Detroit Lake and not effect interstitial space in gravels in streams. Overall, the habitat complexity indicator would be maintained with the large wood recruitment moving towards restoration for the project area and the North Breitenbush and Detroit Tributary watersheds.

### **Water Quality for Fish**

Temperature and turbidity are the key indicators that effect water quality for fish. The harvest activities for this project follow the Programmatic BA's PDCs to minimize the negative effects to water quality. The location of harvest units were selected to reduce the risk of slope failure, and streams were buffered to limit the probability of affecting stream shade, or allowing the down slope migration of disturbed soils. The PDC variable width buffers allow for the protection of stream shade, temperature, and bank stability.

Road work associated with this alternative has the most potential to directly affect stream turbidity due to increased fine-grained sediment delivery to streams. This would most likely result in increased water turbidity levels during the first precipitation events following the road work. PDCs for scheduled maintenance and timber haul timing would limit road related turbidity events which are expected to be short in duration (2-4 hours) and would be further mitigated by best management practices and timber sale administration and monitoring. Increased turbidity is not expected in any named or fish bearing streams. No turbidity is expected to reach LFH or affect MIS species in the project area.

Unit 31 is a ground based harvest unit located on a bench near the Humbug Campground. In this alternative, timber in Unit 31 would be yarded to five landings on the 46 road. The unit is topographically flat with three intermittent channels that would be buffered. The direct effects to fisheries habitat would be negligible because buffers would protect the primary shade zone, wood recruitment, and minimize the effects of sediment to stream channels. However, there is the possibility of an indirect effect to the riparian reserve if the landings on the 46 road and the skid trails leading to them are not properly closed. Dispersed camping use in the project area is heavy and Unit 31 has desirable characteristics for camping (the site is flat and close to the river). The landings and skid trails would be disguised and replanted to prevent camping and vehicle access to the unit to prevent possible future impacts to the riparian reserve.

Use of a helicopter landing approximately 100 feet from the Breitenbush River has the potential to affect LFH. The landing is located adjacent to the Breitenbush River at mile marker 1.5 and has been used previously as a helicopter landing. There is limited opportunity for helicopter landings in the project area because of powerline and highway locations. The increased disturbance of creating a new landing would have greater impacts to water quality. Sediment input to the Breitenbush River is the concern about the location. Therefore, the landing would be surfaced with aggregate rock and erosion control measures would be in place to minimize the likelihood of sediment reaching the river. The landing location increases the potential for direct effects to water quality, but required mitigations would prohibit sediment input to the Breitenbush.

Wet season haul would occur as helicopter yarded timber is hauled from units 22, 23, 39 and 57. All main haul routes are paved and most aggregate surfaced roads are outside of the permitted distance from LFH. Winter haul on the aggregate surfaced roads would occur more than 239 feet from LFH at the at the closest point closest point on the 4695 road. There are no aggregate

surfaced crossings of LFH in the project area: all crossings are paved. Approximately 250 feet of the 4695 road drains in the direction of the Breitenbush River and LFH. The drainage flows in well-vegetated ditches to the 4600 road where the gradient flattens and sediments settle out. The flow then moves under the 4600 road in a culvert in a low gradient channel for 150 feet before reaching a steeper 50 foot run to the Breitenbush River. The low gradient sections of the ditch are very complex with vegetation and wood that captures all sediments before reaching LFH. The probability of sediment reaching LFH is of discountable.

Due to stream protection buffers and other best management practices as described in the watershed and soils analysis, the implementation of the Alternative 2 is expected to have negligible and discountable effects to water quality. There is no prescribed thinning harvest in the primary shade zone and 50% canopy closure in the secondary shade zone would be maintained at the stand scale. Because shade is a surrogate for stream temperature and shade would be protected, no increase in stream temperature is expected and temperature would be maintained.

### **Biological Parameters**

The implementation of Alternative 2 is not expected to result in a measurable change in the survival rate, distribution, or population size of any resident or anadromous fish species in either of the HUC 5 watersheds. Riparian areas and large wood recruitment would be protected by stream buffers and improved over the next 100 years as trees grow and are recruited to stream channels, thereby improving habitat complexity. Population distributions, densities, current spawning, rearing and migration habitat would be maintained with improved large wood recruitment occurring over the next 100 years.

### **Cumulative Effects**

The list of past present and foreseeable future actions is listed in Chapter 3 of this EA.

Effects of a cumulative nature are those effects which independently do not pose a risk to the hydrology, stream channels, water quality, and fisheries yet, but when added together may have some measurable effect on each.

Current vegetative conditions of Humbug Creek, Lower Breitenbush River and Middle Breitenbush River Subwatersheds exceed the ARP midpoint threshold by more than 5 points. This means that the planning subdrainages are recovered and cumulative effect are not anticipated for rain on snow events and hydrology. Less than a 1 percent change in the ARP level, (0.6%) is expected if this alternative is chosen. Hydrologically it is not anticipated that this action or any reasonably foreseeable future action will create an adverse downstream effect. Flow changes anticipated are well within the variation of normal flows and should not generate a condition that the channel has not responded to through time. Because of changes in transpiration rates and the routing of flows, short-term changes may be evident in the time of the peak flow and the duration of the flow. These changes are short lived until such time that the stand closes canopy and utilizes the available water for the site. With the areas recovery percentage being above the threshold, these effects will be immeasurable and therefore not anticipated to be adverse.

Table 3-30 ARP values for Planning Sub-drainage and Changes in ARP by alternative: (Data was reviewed on 1/31/2006).

Sub-watershed Name	Existing ARP Level	Forest Plan Midpoint	Alternative 2 unit acres in watershed	% change in ARP for Alternative 2	Alternative 3 unit acres in watershed	% change in ARP for Alternative 3
Humbug Creek	84%	75%	176	0.3%	197	0.4%
Lower Breitenbush River	82%	70%	513	1.0%	513	1.0%
Detroit Reservoir/French Creek	80%	75%	541	0.7%	541	0.7%
Middle Breitenbush River	84%	75%	25	0.03%	25	0.03%
Total	82%	70-75%	1255	<1%	1276	<1%

Looking at the watershed condition types for streams found within the project area, determines what management prescriptions should be followed. (Page E-10 to E-17; LRMP) “This criterion is intended to address the potential for changes in peak flows during rain-on-snow events, and the associate potential change in the stability of the stream banks and streambed.” (LRMP pg. E-6). The Watershed condition types for the channels found in the project area is type 5, (LRMP; pg. E-14). The proposed action does not exceed these recommendation for this channel type. Upon reviewing these criteria and the topography and soil types found in the project area it is anticipated that cumulative effects to stream channels could only occur as the result of not adhering to prescribed best management practices. In reviewing the reasonably foreseeable future projects found within the project record it is anticipated that the proposed action along with these foreseeable future actions would not generated an adverse cumulative effect in regards to stream channel conditions.

Water quality cumulative affects would be similar to the hydrology discussion. The effect of the proposed action under this proposal is tempered by the timing of the action in relation to the recovery of the stands, and the buffers required. With full leave primary shade zone buffers, channel bank stability is maintained through protection of rooting zone. Water quality impacts are anticipated to be minimal if any. Provided the Best Management Practices prescribed in this report are met, it is not anticipated that adverse cumulative effects to water quality will occur as a result of this action.

Watershed scale analysis of cumulative effects for aquatics is a comprehensive look at impacts of Alternative 2. Hydrology, stream channels and stream temperature, although not functioning at historical levels, would not be measurably affected by the project at this scale. Therefore the fisheries indicators dependent on these physical habitat conditions is expected to be maintained. Cumulative effects to the fisheries indicators of habitat complexity, water quality, and biological parameters can be narrowed down to project activities that affect fine sediment input and large wood recruitment at the watershed scale. Implementation of this alternative is not expected to have measurable cumulative effects on MIS species in the project area, and is not likely to adversely affect spring Chinook salmon.

The effects of road related impacts were discussed previously in the direct/indirect effects discussion. At the watershed scale the cumulative effects of this alternative to the fisheries resource are related to stream crossings and fine sediment routing to streams. The existing road density in the project area is 2.72 miles/mile<sup>2</sup> and there are 272 crossings in the analysis area. Alternative 2 would not eliminate or create new permanent roads or crossings, but would cause a short-term increase in the road density by building new or reopening decommissioned roads. Implementation of PDCs and BMPs are expected to mitigate the effects to sediment to levels that do not cumulatively affect the fisheries indicators.

Large wood recruitment at the watershed scale is very important for the protection and enhancement of fish habitat. Thinning in riparian reserves would move large wood recruitment for the Breitenbush and Detroit Tributaries watersheds towards restoration as larger trees mature and recruit into stream channels. Stream enhancement projects, including large woody material placement at multiple sites in French Creek and Humbug Creek, would be implemented in the foreseeable future within the Breitenbush and Detroit tributaries watersheds.

MIS fish species would remain stable throughout their current range and habitat would remain in the current state if this alternative was implemented. Long term recovery of large wood recruitment and riparian condition would benefit MIS populations.

Transportation maintenance of the Breitenbush road and system roads is planned. Paving and replacement of guard rails on the Breitenbush road is to occur within the existing right of way following best management practices for protection water quality. Culvert replacements would not occur on any fish bearing streams. Maintenance of system roads is necessary to maintain proper drainage and prevent failures. There are no cumulative effects to MIS or ESA listed species as a result of transportation maintenance.

Several stream enhancement projects are planned to occur in the foreseeable future within the Breitenbush and Detroit tributaries watersheds. Large woody material will be added to French Creek and Humbug Creek. Dispersed site restoration, including soil decompaction and boulder placement, are also slated for future completion in both watersheds. The “Respect the River” program will educate campers and restore impacted sites to improve riparian function and water quality. These projects will move stream condition towards the desired future condition for the both watersheds.

Future noxious weed treatments in the watershed would have no cumulative effect on MIS or ESA listed species.

The probability that non-treatment would result in negative effects to the fishery resource, with biological effects, reduced habitat complexity, or reduced water quality, is negligible. The No action alternative would maintain the current condition of the Breitenbush and Detroit Tributary watersheds.

## **Conclusion**

With the current vegetative conditions of the French Bug planning area, it is anticipated that the proposed action will succeed in meeting the goals and objectives of the project with minimal to low risk to hydrology, stream channels, water quality and fisheries. The planning subdrainages exceed their midpoint threshold by more than 5 points indicating that the planning subdrainages are well recovered and vegetation management is warranted at this time due to stand conditions. It is not anticipated that the hydrology, channel bank stability, water quality, riparian or fisheries

component will be adversely affected. With implementation of design criteria, adverse downstream effects are not anticipated.

Short-term effects will be associated with the designated crossings but will be short lived, gone after the first storm event that provides sufficient flow to flush the channel; effects would not reach LFH and MIS population size and distribution would not be affected. Loss of wood structure for the intermediate term will be off set through the creation of larger wood for the long term. Due to the dynamic nature of channel morphology, these actions are not anticipated to create measurable differences in channel conditions or have any measurable effect on downstream beneficial users. Increased use of dispersed sites will be the challenge along the 46 road. Numerous landing locations are slated along this road/riparian interface and will invite forest users to “set up camp” in these areas. The use of the surrounding area will add to the complexity of managing this streamside area.

Water quality should remain high and the proposed project is not anticipated to create any long term detrimental effect as a result of the action. Due to the design criteria, soil types, and topography, measurable differences in water quality are not anticipated nor are any measurable effect on downstream beneficial users including MIS fish species is expected.

Cumulative effects at the watershed scale are expected to maintain all indicators and improve large wood recruitment in the long term (100 years). Overall, Alternative 2 maintains fish habitat complexity, water quality, and biological parameter indicators.

### **Direct and Indirect Effects Alternative 3**

#### **Hydrology**

Alternative 3 consists of 1264 acres of thinning to an average of 52 percent canopy, and creates ½ acre to 3 acre gaps on 51 acres. Alternative 3 reopens 2200 feet of temporary road spurs, constructs 4000 feet of new temporary spur roads (roads will be closed after use), reconstructs 4.4 miles of existing system roads (including 1.5 miles of 703 road in unit 30, .5 miles of 086 road in unit 33 and 36), relocates 0.12 miles of existing system roads (086 road in unit 33), and maintains 36 miles of existing system roads. Landings associated with these roads will add an additional 26 acres (estimated 0.2 acres per landing) of openings. Ground based yarding activities account for 179 acres.

The main hydrologic effect will be associated with the opening of the 703 road in unit 30. Historically this road captured spring flow, off cutbanks of the 703 road, from Deadhorse Creek and channeled the flow via ditch into Byars Creek drainage. Slope instability resulted which created a debris torrent that damaged the 701 road down slope. Historic attempts to reduce the effects of this road were unsuccessful and so the road was decommissioned in 1990 and since that time, roadbed and drainage patterns have recovered. Depending upon the storm sequence encountered when opening the road and while the road is open, moderate to high hydrologic risk exists. Increased potential to affect the hydrology exists from the loss of the natural drainage pattern from road ditches moving water off site and the loss of vegetation that is currently occupying the site.

Similar effects and outcome exist for the other actions under this alternative as described in alternative two for hydrology provided the BMP are implemented. Provided best management practices, as outlined in the integrated prescription, are followed it is not anticipated that

detrimental hydrologic downstream effects will occur to the beneficial users as a result of implementing this alternative.

### **Stream channels**

Implementation of Alternative 3 contains similar effects as Alternative 2 for all actions except the road construction and reconstruction portion of the alternative. The main differences between alternative 2 and 3 are: the increase new road construction by 0.75 miles (4000 feet), increase in reconstruction by 1.9 miles, relocation of 0.12 miles of road and an addition of 1.5 miles of road maintenance. Stream channels will not show any effect resulting from stand management due to the design criteria placing buffers along stream channels and the permeability of soils and geology.

Channels will show an effect of placing an additional five crossings over streams during the reconstruction of the 703 road and the subsequent removal of material upon sale closure. Short term, after first flushing flow, impacts to the channel are anticipated by this action. Increased sediment will be transported through the system and incorporated in the existing bedload present. It is not anticipated that this effect will create a measurable difference in the channel conditions or have any measurable effect on downstream beneficial users provided it can be done in a manner that meets BMPs. The risk is in the duration the road remains in an open state and the potential for storm events to alter the existing drainage resulting from the road.

### **Water Quality**

Effects to water quality would be similar to Alternative 2 except when discussing roads and fire. With the reconstruction of the 703 road there is an increase risk of sediment entering the stream channel from the placement of five pipes along the road and then the removal of the pipes upon sale closure. This sediment will create a small pulse of turbidity, expected to be <50 NTU, for a short distance downstream of each pipe location. Mobilized materials are anticipated to fall out prior to reaching a confluence with a higher order stream due to the size of the material mobilized. It is therefore anticipated that minimal if any downstream effects will occur as a result of the proposed activity.

Broadcast burning is an effective method of reducing fuel loading but there is a risk to the adjacent boundary areas should fire burn outside of the proposed areas. Stream side buffers may be affected, yet past burning activities have shown that only 10 to 20 percent of the buffer becomes ineffective.

To reduce and minimize these effects design criteria were utilized which will aid the fuels specialist to maintain buffers to protect water quality.

### **Riparian Reserves:**

Riparian effects are similar to alternative 2.

### **Fisheries**

#### **Habitat Complexity**

Large woody debris is the limiting habitat complexity component for all streams in the project area. Thinning would increase development of large key pieces of large wood for future recruitment as stated in the Alternative 2 discussion.

Alternative 3 proposes an additional 18 acres of gap cut with effects similar to those described in Alternative 2. Larger gaps, 1-3 acres in size with no more than 4 acres in any one unit, would be created in the uplands outside of riparian areas on topographically flat units. The 1-3 acre gaps would be cut and helicopter logged in units 20, 27, 28, 31, 35, 47, 52, 60, and 62. Full primary shade buffers would be in place to protect large wood recruitment. Subsequent broadcast burning of these large gaps would remove slash and underbrush for replanting. The openings would be created to create wildlife habitat, and create diversity on the landscape by reintroducing fire and creating early seral habitat planted with red cedar. Openings would be located on stable flat slopes outside of landslide prone areas and outside of full riparian buffers, so there would be no effect to riparian reserves or large wood recruitment.

The thinning harvest would remove trees from the riparian reserve. However, trees would be retained at high stocking levels within the protection buffers (30, 50 and 100 feet) with residual trees left in treated units near streams. The large acreage of untreated stands in the affected subwatersheds would leave an abundant supply of potential wood available for short-term and long-term recruitment to the stream network. The long term indirect effect would be the eventual recruitment of larger trees to the stream channels that are crucial for long term recovery of wood for fish habitat. Riparian thinning harvest would allow the residual trees to grow to a larger size more rapidly, and these trees would be healthier than if the stands were left untreated.

There would be no direct effect to the habitat complexity indicator if this alternative was implemented. The indirect effect of large key pieces of wood recruited to the channel would be realized 100 years in the future. This indicator would be maintained and moved towards restoration with implementation of Alternative 3.

### **Water Quality**

Temperature and turbidity are the key indicators that effect water quality for fish. The effects to shade and water temperature are consistent with the analysis in the Alternative 2 discussion. The difference between Alternative 2 and Alternative 3 for the water quality indicator is temporary road construction, road reconstruction and road relocation, which have more potential to affect water quality for fish.

There is 3,000 feet more temporary road construction in Alternative 3. Much of that distance (Approximately 2,400 feet) is in Unit 31, a flat ground-based unit; the remaining 600 feet are short upland spurs. In Alternative 2, the timber is yarded to five landings on the 46 road. In Alternative 3, landings would be established on a temporary road in the unit. The direct impacts and the amount of ground disturbance would be similar in both alternatives, but shorter skid trails and only one access road from the 46 road reduce indirect impacts of future recreation access to the riparian reserve. The possible of indirect impacts as a result of dispersed camping and vehicle access to the Breitenbush River riparian reserve would not occur in this alternative because landings and skid trails would not access the 46 road.

In this alternative, the reconstruction of system roads has the potential to directly and indirectly affect the water quality indicator. The reconstruction of the 703 road in the unit 30 would reopen a road that was closed in 1990 due to chronic failure and high maintenance costs. The 703 road is currently revegetated and hydrologically stable. Although the road would be closed and returned to a stable state after use it would set back the recovery of the road by 20 years. Reopening this road would entail placement of five culverts placed over 1.5 miles. Sediment delivery to the Breitenbush is not expected to occur. Fine sediment input and turbidity in Byars Creek,

Deadhorse Creek and three small unnamed drainages that the 703 road crosses is expected to settle out before reaching the Breitenbush River due to channel complexity and flows going subsurface. Hydrologic analysis shows that turbidity would have a minimal effect on turbidity downstream of the 703 road crossings. Short-term episodes following rain events would likely muddy waters for up to two hours and fine sediment is expected to fall out of suspension before reaching the Breitenbush River, so there is no effect to LFH. A short term increase in turbidity could cause MIS species to seek refuge, but the no changes to population size or distribution is expected.

The relocation of 500 feet of the 086 road would occur in this alternative. A very sharp hairpin turn at in the first 500 feet of the road is not passable for loaded logging trucks. The road would be relocated to a more suitable junction on the 46 road with the very sharp corner removed. The old road would be obliterated so that there is no net gain of road mileage or road density. The road relocation is not located adjacent to any stream channels and there is no mechanism for fine sediment movement to stream channels. Relocation of the 086 road includes obliteration of the no longer needed portion of the road so there would be no change to the drainage network.

### **Biological Parameters**

The alternatives for this project were all designed to minimize the negative effect to water quality and riparian habitat, while still achieving the project objectives. Turbidity has the most potential to affect biological parameters. There is potential for a direct increase of turbidity as a result of the reconstruction of the 703 road and road maintenance activities. The effects of turbidity are expected to be short two hour events associated with rain. Effects are not expected to reach the Breitenbush River or LFH. MIS species in Byars creek could experience short-term (2-4 hours) turbidity, but no changes to population size are expected to result from the disturbance.

Indirect effects of turbidity from the implementation of Alternative 3 are road related and likely to occur in short duration events immediately following rain events. Good road maintenance, aggregate, and paved road surfaces would reduce the probability of fine sediment and turbidity reaching wetted channels.

Downstream affects of sediment routing from harvest and road maintenance activities would have a short term (2-4 hour) effect on biological parameters because of increased turbidity during the first storm following disturbance. The implementation of Alternative 3 associated with this project is not expected to result in a measurable change in the survival rate, distribution, or population size of any resident or anadromous fish species within the analysis area.

### **Cumulative Effects**

Differences between alternative 2 stem from the reconstruction of the road 703 and construction of  $\frac{3}{4}$  mile of road. Roads will create access points that will require management to prevent from allowing sediment to enter the channel from overuse of channel bank areas, and vegetation loss. Risk associated to water quality is moderate to high in this alternative due to these roads. Large gaps are also utilized under this alternative along with PCT and fertilization proposals. Gates will be utilized to control winter traffic on 2.5 miles of roads. This would reduce the potential for sediment to reach streams from the road surface. Route 46 is slated to be reconstructed prior to the offer of this sale and so its actions are foreseeable. The respect the River program on the district is also slated to work within the riparian reserve within the project area to restore riparian



conditions affected from dispersed camping. The cumulative nature of these effects, along with the direct and indirect effects proposed in alternative 3 was considered during the design of this proposal. With proper mitigation measures the anticipated effect to downstream beneficial user is low. A positive cumulative effect exists though these projects in that the riparian reserves are being restored and managed for the future.

### **Fisheries**

The cumulative effects for Alternative 3 are similar to those in explained in the Alternative 2 discussion. Additional effects from the reconstruction of the 703 road cause more turbidity and fine sediment input into Byars Creek, Deadhorse Creek and the three other crossings where culverts would be placed for log haul and removed when the road is returned to storage. The amount of sediment input from the 703 road reconstruction is not expected to reach the Breitenbush River, however short-term episodic turbidity events would occur. These effects would not reach the Breitenbush River or LFH because channels go subsurface or channel complexity would capture sediments. MIS fish species in Byars Creek and Deadhorse Creek may be affected for a short 2-4 hour period after the first rain event following reconstruction. There would be no long term effects and no change in MIS fish population size or distribution is expected

The gated road closures would limit vehicle travel on 4.3 miles of road during the wet season and remove two miles of road access year round. Elimination of wet season travel on these roads would improve the water quality indicator for the watershed. Other project activities that are unique to Alternative 3 are 1-3 acre gap cuts with broadcast burning and realignment of the 086 road. These activities occur on stable ground outside of riparian reserves where the probability of effect to the fisheries resource is very low because there is no mechanism for effect to any of the fisheries indicators.

### **Conclusion**

Hydrology, stream channels, water quality, riparian reserves, and fisheries objectives will be met under this alternative with some additional risks associated with the reconstruction of the 703 road and broadcast burning. Risk stem from the ability to reconstruct the road and then hydrologically store the road during a period of dry or dryer weather. Adequate precautions have been discussed to protect water quality under this alternative.

The effects Alternative 3 has on the fisheries resource are similar to Alternative 2 with the exception of road reconstruction. The temporary road construction and road reconstruction associated with Alternative 3 has more potential to negatively affect water quality for fish than Alternative 2 because of increased turbidity and sediment delivery from the 703 road. Effects of the 703 road reconstruction would impact water quality during reconstruction and after obliteration. Reconstruction of this road would also set back the recovery of this road by 20 years

### **Consistency with Management Direction and Regulations**

All project alternatives were designed using the appropriate direction and guidelines found in the Willamette National Forest Land and Resource Management Plan (LRMP 1990), the Northwest Forest Plan, the Aquatic Conservation Strategy, Best Management Practices and Fisheries Biological Assessment for Low-Risk Thinning Timber Sales on the Mt. Hood and Willamette National Forests, and portions of the Eugene and Salem Bureau of Land Management Districts (2007). These alternatives are also consistent with other guidance or direction such as the

Endangered Species Act of 1973, the Magnuson-Stevens Fishery Conservation and Management Act (MSA) of 1996, the Clean Water Act, Wild and Scenic Rivers Act, and Executive Orders 12962, 11988, and 11990. Specific guidance components applicable to this project are listed in the project file. A discussion of compliance with this direction is presented in section 3.18.

## Conclusions

The French Bug timber sale would thin previously managed stands in the North Breitenbush and Detroit Tributary watersheds. Comparison of the alternatives, and their effects on the current aquatic resource conditions, elucidates project elements that degrade, maintain or restore hydrology and fisheries indicators. Riparian thinning for long-term recruitment of larger trees to stream channels faster improves the stream channel, water quality, habitat complexity and biological parameter indicators. Road maintenance, road reconstruction and road relocation would all have short term negative effects on the water quality and biological parameter indicators. All other actions would maintain current conditions.

## 3.9 Road Engineering

### Introduction

The proposed development for the French Bug Planning Area will utilize but not expand the existing National Forest Road System. Work will be required on the existing system either as reconstruction, pre-haul maintenance, during-haul maintenance, or post-haul maintenance. Additionally, a small amount of construction and opening of existing temporary roads will be required. The objective for the existing system will be to maintain it to the level necessary to facilitate haul during the recommended season of use and comply with the current Road Management Objectives.

Documentation of the decision process and further notes are on file at the Detroit Ranger District.

### Regulatory Framework

- Forest-Wide Standards and Guidelines FW-094 to 102 and FW-308 to 319.
- 36 CFR Parts 212, 251, 261, and 295 Travel Management; Designated Routes and Areas for Motor Vehicle Use
- FSM sections 1561.9a, 7700, 7710, 7730, 7733, 7733.2, 7709.55, 7709.58 and 7709.59
- EO 11644 as amended by 11989
- EM-7100-15 Sign and Poster Guidelines for the Forest Service
- Manual on Uniform Traffic Control Devices (MUTCD)
- Willamette National Forest Roads Analysis (January 2003)
- Road Management Objectives<sup>20</sup>

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<sup>20</sup> Road Management Objectives will remain in its current state for the roads in the French Bug Planning area.

- Field Guide for Danger Tree Identification and Response, 2005, Richard Toupin, USDA Forest Service; Michael Barger, Bureau of Land Management
- Willamette NF Commercial Road Rules

## Analysis Methods

Initially, unit locations and harvest methods were primarily determined by the logging system specialist and Silviculturist/team leader. Placement of units into logical alternatives was then determined within the context of an interdisciplinary team process.

Haul routes, as well as landing and temporary road location needs (new construction and reopening of existing temporary roads) for the designated alternatives were then determined by collaboration between the logging system specialist and project engineer (through the interdisciplinary team process). Next, the identification and description of specific road construction, reconstruction, and pre-haul maintenance segments, were designated for the alternatives by the project engineer. This information was disseminated to the other resource specialists working on the project, including wildlife, botany, recreation, Silviculturist, and cultural resources for use in their respective analyses of potential project effects. Depending on the resource area, varying levels of work descriptions were required for their individual analysis.

Haul, construction season, as well as road use restrictions is also determined in collaboration with other resource specialists due to wildlife and recreational restrictions and to facilitate timely harvest of sale units. No hauling on native surfaced roads October 16-May 14 (wet season.) Aggregate surfacing must be durable rock (AASHTO T210.) No more than 15% fines (#200 Sieve.)

## Existing Condition

All of the roads within the French Bug planning Area are owned and maintained by the U.S. Forest Service. These roads are in generally good condition due to light traffic volumes and seasonal access. Needed road work normally involves only brushing, blading, ditch reconditioning, spot surfacing placement, danger and downed tree removal, culvert inlet and outlet cleaning, and occasional culvert replacements.

Primary access to the French Bug planning area is provided by roads 2223 and 4600. The 4600 road is paved past the planning area. The 2223 road begins paved, and continues until the 2223/2207 junction. The 2223 and the 2207 roads are then surfaced with aggregate. All other roads tributary to these major access roads are single lane gravel, pit-run, or native-surfaced roads with turnouts which have been built and maintained primarily for administrative, and timber harvest activities. Most of these roads are termed local roads.

## Environmental Consequences

### Direct and Indirect Effects – All Alternatives

Table 3-31 compares the No Action with the two action alternatives. Tables 3-32 and 3-33 show the breakdown (by alternative) of reconstruction and reconstruction costs and activities.

The following measurement criteria were used to assess transportation system effects:

1. Miles of road to reconstruct.

2. Cost of reconstruction.
3. Miles of Road to perform pre-haul maintenance.
4. Cost of pre-haul maintenance.
5. Miles of temporary road construction, new and existing.
6. Cost of temporary road construction.
7. Volume of timber to be harvested in MMBF.

Table 3-31. Direct and Indirect Alternative Comparison

	Volume MMBF	Miles of Reconstruction	Cost of Reconstruction	Miles of Pre-Haul Maintenance	Cost of Pre-Haul Maintenance	Miles of Temporary Road Construction		Cost of Temporary Road Construction
						New	Existing	
Alternative 1	0.00	0.00	\$0.00	0.00	\$0.00	0.00	0.00	\$0.00
Alternative 2	14.6	1.96	\$21,925.00	34.0	\$131,108.00	0.20	0.40	\$18,000.00
Alternative 3	15.1	4.20	\$173,150.00	36.0	\$135,598.00	0.75	0.40	\$35,000.00

Table 3-32 Alternative 2 Road Reconstruction Costs

Road Number	Reconstruction (Miles)	Estimated Cost	Anticipated Major Work Activity
4695110	1.50	\$8,540	Brushing, ditch reconditioning, barrier repair, slough removal, slump repair, culvert cleanout and replacement, surfacing, filling in of water dips, and danger tree removal.
2225457	0.46	\$13,385	Brushing, ditch reconditioning, slough removal, slump repair, culvert cleanout and replacement, surfacing, remove berms, filling in of water dips, and danger tree removal.
Total:	1.96	\$21,925	

Table 3-33 Alternative 3 Road Reconstruction Costs

Road Number	Reconstruction (Miles)	Estimated Cost	Anticipated Major Work Activity
4696703	1.74	\$123,858	Brushing, ditch reconditioning, fill repair, slough removal, slump repair, culvert installation, surfacing, filling in of water dips, and danger tree removal. Rip, and scarify, seed, culvert removal, water bar installation.
4695110	1.50	\$8,540	Brushing, ditch reconditioning, barrier repair, slough removal, slump repair, culvert cleanout and replacement, surfacing, filling in of water dips, and danger tree removal.
4600086	0.5	\$ 27,362	Existing: Rip and scarify, water bar, berm, and seeding. Relocate 0.12 miles: Clearing and Grubbing, excavation, pit

Road Number	Reconstruction (Miles)	Estimated Cost	Anticipated Major Work Activity
			run, and surface aggregate. Danger tree removal.
2225457	0.46	\$13,385	Brushing, ditch reconditioning, slough removal, slump repair, culvert cleanout and replacement, surfacing, remove berms, filling in of water dips, and danger tree removal.
Total:	4.2	\$173,146	

## Public Access

### Direct and Indirect Effects – Alternative 1

No action alternative. Key Forest Roads in the French Bug Planning Area will still receive routine maintenance according to Road Management Objectives. Roads will be maintained at the current maintenance levels identified in the Infra Database. No additional road maintenance, reconstruction, or relocation will occur with this alternative.

### Direct and Indirect Effects – For Alternatives 2, and 3,

There will be minimal short-term impacts on the transportation system in the French Bug Planning area. Public access on the 4600000(Breitenbush Road) will have temporary(20 minutes to 2 hours) delays, and increased truck traffic during the reconstruction/decommissioning of the 4696703road, reconstruction of the 4695110 road, as well as during the relocation of the 4600086 road. Public access on the 2225000 road and access to the 3349 Trailhead will also have temporary delays during the reconstruction of the 2225457 road.

The long-term impacts on the transportation system due to the reconstruction, relocation and routine road maintenance of the French Bug Planning area includes a more safe and efficient travel route for public, commercial, and administrative access. Key Forest Roads in the French Bug Planning Area will receive annual routine maintenance according to Road Management Objectives. Roads will be maintained at the current maintenance levels identified in the Infra Database.

## Cumulative Effects

Section 3.1 contains a list of past, present, and reasonably foreseeable activities within the project area, subwatershed or other analysis scale. For engineering, the relevant activities are past, present, and future transportation activities at the subwatershed scale.

Future road maintenance includes major improvements to the Breitenbush road. This includes some sections of overlay paving and asphalt patches from Highway 22 up to the Mt Hood forest boundary and would include a few sections on the Mt. Hood National Forest. All guard rails, including sections of guard rails on bridges, will be replaced and brought up to standards as part of this project. There will be some sections of deep patch fill stabilizations. Deep patch fill stabilization involves digging down several feet, installing geogrid reinforcements and rebuilding the road prism. A section of road about eight miles from highway 22 would be stabilized by removing water from the adjacent hillside with horizontal drains. Some removal of loose rock will occur in areas where material commonly falls into the road prism. These activities will take place in summer of 2008. This project involves improvements to the Breitenbush road (46) only. No maintenance of other system roads is scheduled.

Annual maintenance would also occur in the future. Forest Service system roads receive annual maintenance in accordance with established road management objectives. Road maintenance work includes activities to reduce brush, clean out drainages, and repair road surfaces on many of the key and secondary roads in the project area (Willamette Roads Analysis, 2003).

## 3.10 Economic and Social Analysis

### Introduction

This section deals with three aspects of economic and social impacts: economic viability, impacts to the local economy/employment, and environmental justice. Economic viability is dependent on costs and revenues associated with a particular timber sale. Impacts to the local economy are a reflection of District and Forest harvest levels and employment. Timber sales, fuel treatments, and associated resource work can generate employment and stimulate the local economy. Environmental justice can also be a concern if minorities are not granted equal opportunities to benefit from government programs and projects. It can also be a concern if a proposed project disproportionately impacts certain groups.

### 3.10.1 Economic Viability

#### Regulatory Framework

- Executive Order 12898 (February 11, 1994) on Environmental Justice

#### Analysis Methods

A comparison of the alternatives was completed for the French Bug Project area on the Detroit Ranger District. The Transaction Evidence Appraisal (TEA) method with the most recent product log values and TEA appraisal costs were used for evaluation.

It is important to note that the economic analysis presented here is a best estimate of costs. Actual appraised value may change over time and depend on how one or more sales are packaged out of this environmental assessment. It may be possible to produce one or more viable sales out of an EA that appears, as a whole to be non-viable.

The harvest volumes and species mix are estimates from the silvicultural prescriptions. Timber values were calculated using the current Product Quality Adjustment (PQA) for delivered logs, in western Oregon saw mills. Stump to truck logging costs were estimated by Ken Loree at \$500/mbf for helicopter logging, \$150/mbf for ground based logging and \$250/mbf for skyline logging. Brush disposal and haul costs, were pulled from the most current Transaction Evidence Appraisal Cost File (Version 811 TEA 02-08 R6 TEA data). Brush disposal costs were set at \$20.28/mbf and haul costs were set at \$58.69/mbf. Road maintenance and reconstruction costs were based on the logging systems analysis for the sale. Road maintenance costs were set at \$9.00/mbf, road reconstruction costs were set at \$15.00/mbf.

#### Existing Condition

Logging costs and road related costs are often the costs that have the most direct effect on economic viability. Market conditions may fluctuate throughout the year, and depending on the

time of year this sale is offered for auction, the current estimates may or may not be accurate, which could have an impact on the final sale values. Rising energy and fuel costs could create a substantial increase in sale operation and manufacturing costs.

## Environmental Consequences

### Direct and Indirect Effects – Economic Viability – Alternative 1

This alternative would not harvest any timber and therefore would not support direct, indirect and induced employment, or increased income to local economies. Current downward trends in timber harvesting from National Forests lands would continue into the future. Current employment in the wood products sector of the local economy would remain unchanged.

### Direct and Indirect Effects – Economic Viability – Alternative 2

Alternative 2 was found to be economically viable with a net present value of \$90,471. Alternative 2 has a lower value than alternative 3 because it has more helicopter logging as a percentage of the sale and less volume. The cost benefit ratio of this alternative is 1.10. The cost benefit ratio takes into account Forest Service costs including planning, prep and layout.

### Direct and Indirect Effects – Economic Viability – Alternative 3

Alternative 3 was found to be economically viable with a net present value of \$444,688. Alternative 3 has a higher value than alternative 2 because it includes less helicopter logging and more volume. The cost benefit ratio of this alternative is 1.50. The cost benefit ratio takes into account Forest Service costs including planning, prep and layout.

Table 3-34 Financial Summary by Alternative

Item	Alt 2	Alt 3
Discounted Costs	\$881,384	\$896,594
Discounted Revenues	\$971,855	\$1,341,282
Net Present Value	\$90,471	\$444,688
Cost/Benefit Ratio (gross value/ associated costs)	1.10	1.50
MMBF (Volume)	14.6	15.1
Acres of Helicopter Harvest	465	379

## 3.10.2 Local Economy and Employment

### Existing Condition

The economy of the local communities from the Salem urban-growth boundary to Detroit depends on a mixture of tourism, recreation, timber industry, and Forest Service jobs for stability. Local businesses that rely on tourism and recreation include the marinas on Detroit Reservoir, and the lodges, restaurants, stores, gas stations, along the North Santiam River and Highway 22 corridors. Timber industry jobs include a variety of woods and mill jobs, with sawmills in Mill City and Lyons. Forest Service jobs in the vicinity are located at Detroit, Sweet

Home, and Sisters Ranger Stations. Tourism and recreational activities connected with National Forest lands have been on the increase in recent years for the Detroit Reservoir and North Santiam River areas. Employment in tourism and recreation-related services has also increased accordingly.

Historically, government employment and expenditures have provided a degree of stability in rural communities such as Detroit, Mill City, Idanha, Gates, Lyons, and Mehama. With reduced Forest Service budgets and work force, and a switch to management emphasis that produces generally lower amounts and value of products, federal workforce and program expenditures has not buffered economic downturns as in the past (Oregon Department of Employment, 2001).

The current level of timber harvesting on the Willamette National Forest has dropped substantially from the levels of the late-1980s. This decrease has contributed to a drastic decline in the number of local jobs associated with wood products industry in the area.

The primary effect on timber harvest-related employment would occur from commercial harvesting associated with the alternatives over the next two years. In addition to primary harvesting jobs, there is employment associated with post-sale service contracts. Levels of harvest volume by alternative would affect employment and income in several ways:

Directly - effects attributable to employment associated with harvesting, logging, and mills and processing plants for saw timber, pulp, chips, veneer, and plywood;

Indirectly - effects attributable to industries that supply materials, equipment, and services to these businesses; and

Induced - effects attributable to personal spending by the business owners, employees, and related industries.

## **Environmental Consequences**

### **Direct and Indirect Effects – Local Economy and Employment – Alternative 1**

This alternative would not harvest any timber and therefore would not support direct, indirect, and induced employment, or increased income to local economies.

### **Direct and Indirect Effects – Local Economy and Employment – Alternative 2**

Jobs created in the logging sector in Oregon are estimated at 3.5 jobs per million board feet (MMBF) harvested (Gebert et. al., 2002). Jobs created in the timber products manufacturing sector in Oregon (using the estimate for sawmill jobs) are estimated at 4.0 jobs per million board feet, (Gebert et. al., 2002). Using these estimates, alternative 2 would provide about 51 jobs in the logging sector and about 58 jobs in forest products manufacturing.

### **Direct and Indirect Effects – Local Economy and Employment – Alternative 3**

Using the estimates from above, alternative 3 would provide about 53 jobs in the logging sector and about 60 jobs in forest products manufacturing.

### **Cumulative Effects – All Alternatives– Economic Viability**

Other employment would continue to occur as a result of other timber sales in progress, recreation activities, and other special use receipts across the Forest. Commercial collection of non-timber forest products, such as mushrooms, could continue to occur, although the quantity of



harvest is unknown. Overall, none of the alternatives would result in economic-related cumulative effects.

### **3.10.3 Environmental Justice**

#### **Existing Condition**

Data regarding minorities or people with disabilities employed in the region in the timber, mining, road construction, forestry services, and recreation sectors is unavailable. Some firms contracted by the Forest Service for reforestation work have traditionally hired Hispanic workers that comprise a migratory workforce in the area. Asian and Pacific Islanders uses of the area include commercial mushroom harvesting and developed camping associated with this activity. Some contracts are reserved for award to minority businesses under the USDA Office of Small and Disadvantaged Business Utilization and the Small Business Administration.

#### **Environmental Consequences**

##### **Direct and Indirect Effects – Alternative 1**

All current uses of the National Forest System lands would continue, including recreation, harvesting of non-timber forest products, special-use permits, subsistence uses, and spiritual/aesthetic uses. Effects to minority populations, disabled persons, and low-income groups would not be disproportionate with other users of the National Forest System lands.

##### **Direct and Indirect Effects – Alternative 2**

These alternatives provide a variety of opportunities for potential contracts. Alternative 2 would have no impact on the contracting process or the USDA Small Business Administration program for reserving contracts for minority groups for tree planting, precommercial thinning, and road restoration. Employment and income would be available to all groups of people, subject to existing laws and regulations for set-asides, contract size, competition factors, skills and equipment, etc.

Set-asides for Small Business Administration Contracting opportunities would not be affected. Employment by firms that have hired Hispanic workers or other minority groups or low-income workers associated with reforestation or other potential contracting needs would not differ from those employed in the sectors as a whole. In the short-term (3-5 years), reforestation needs would potentially benefit this group. This alternative would plant about 34 acres.

There is no existing information on how much use the area receives from minority and low-income populations. Opportunities for all groups of people to collect species from disturbed and non-disturbed sites would be maintained by all alternatives, and no disproportionate effect is anticipated to subsets of the general population. None of the alternatives would have disproportionately high and adverse environmental effects on minority populations, low-income populations, or Indian tribes.

##### **Direct and Indirect Effects – Environmental Justice – Alternative 3**

Effects on Environmental Justice as a result of this project would be similar to those described in alternative 2.

##### **Cumulative Effects – All Alternatives – Environmental Justice**

There are no environmental justice-related cumulative effects related to any of the alternatives.

## **3.11 Recreation and Scenic Resources**

### **3.11.1 Recreation**

#### **Introduction**

The French Bug planning area lies within a major recreation corridor along the Breitenbush River beginning near the confluence of French Creek at Detroit Lake. It extends almost five miles to the east up the Breitenbush drainage and to the northwest in the French Creek drainage. Detroit Lake and Breitenbush corridor serve as a significant backyard destination for many repeat visitors from the mid-Willamette Valley, Portland-Metro areas and North Santiam Canyon. The West Cascades National Scenic Byway, which follows Road 46, is a highly traveled scenic route and an alternative to I-5. The byway accesses numerous recreation destinations on both Willamette and Mt. Hood National Forests. Additionally, Road 2223-French Creek Road, also provides a scenic driving route to the Opal Creek Scenic Recreation Area and Wilderness, and accesses the French Creek Ridge Trail system. Quality recreation opportunities are important to the local tourist industry and economy.

#### **Regulatory Framework**

The 1990 Willamette National Forest Land and Resource Management Plan as amended by the 1994 Northwest Forest Plan sets the regulatory framework as it applies to Recreation. Area management practices shall result in a physical setting that meets or exceeds the “Recreation Opportunity Spectrum” (ROS) class of Roaded Natural for MA-11c and 11f or Roaded Modified for MA-11-a and 14a. The corridors along the Breitenbush Road and portions along the lower French Creek and Humbug Roads are managed for a “Roaded Natural” ROS, where the sights and sounds and evidence of other users is prevalent. The interaction between users is moderate to high on roads and recreation sites, and moderate to low on trails. Resource modification and utilization practices harmonize with the natural environment (1990 Forest Plan FEIS). The General Forest area outside of the scenic recreation corridors are managed for a “Roaded-Modified” experience. Sights and sounds of humans are readily evident, and the interaction between users is moderate to high. A substantially modified natural environment characterizes the area (USDA FEIS 1990). For each ROS class, degree of naturalness has been defined by the Visual Quality Objectives (VQO’s). Partial Retention and Retention VQO’s are consistent with Roaded Natural recreation settings where a higher degree of naturalness is desired; and Modification VQO’s are consistent with Roaded-Modified ROS settings.

#### **Analysis Methods**

The analysis methods used to evaluate the effects of the alternatives on recreation resources were based on a review of the Forest Plan and consistency with applicable standards and guidelines. Field visits to the project area, recreation use data, inventory of dispersed sites, knowledge of recreation use, past experiences and professional judgment were used to evaluate the alternatives on recreation. Estimates for operation periods including helicopter yarding and log hauling on

roads were obtained from logging systems and operations specialists to help analyze amount of potential disturbance to visitors.

## Existing Condition

The French Bug planning area lies within general forest and visual management areas, and are managed primarily for dispersed recreation. Season of use is April through the end of October, when free of snow. Recreation activities commonly found in the planning area include camping, fishing, swimming, picnicking, scenic driving, hunting, kayaking, hiking, huckleberry and mushroom picking, nature study and OHV use. The West Cascades National Scenic Byway (Road 46) is a highly traveled scenic route and “alternative to I-5” during late spring through fall, and is becoming popular with motorcycle enthusiasts. The byway accesses many nearby destinations such as the Breitenbush Hot Springs and Retreat Center, Elk Lake, Breitenbush River, Bull of the Woods and Mt. Jefferson Wilderness Areas; and Mt. Hood National Forest destinations such as Olallie Lake Scenic Area, Clackamas River and Bagby Hotsprings; and numerous associated campgrounds, dispersed campsites and trailheads. On peak weekend days in 2007, over 1000 vehicles were recorded on this road just east of the City of Detroit. During winter, the Breitenbush Community plows the road to their Retreat Center, which is open year round. French Creek Road #2223, also provides a scenic driving route to the Opal Creek Scenic Recreation and Wilderness Areas, and accesses the French Creek Ridge Trail system adjacent the planning area.

The City of Detroit is adjacent the planning area and the Detroit Lake State Park and Detroit Flats are about one mile away. Two developed recreation sites are located in the planning area along Road 46. Humbug Campground, a 22 unit campground receives about 3600 visitors annually and Upper Arm Day Use area along Detroit Lake hosts over 5000 visitors each year from April through September. Humbug Flats Trail offers a two-mile hike along the Breitenbush River. Although most of the trail use stems from visitors at Humbug Campground, use is limited because there is no well-established trailhead and parking area on the Breitenbush Road.

Intensive dispersed recreation use is concentrated along the Breitenbush River corridor. The planning area also incorporates portions of the French and Humbug Creek drainages, which receive moderate to high dispersed recreation use especially in the lower reaches near Breitenbush River and Detroit Lake. Within upper slopes of the planning area, dispersed use is light to moderate with more use occurring during the hunting season.

Dispersed camping is commonly found on existing landings, and along roads that access flat spots near water and scenic features. Sixty-three dispersed sites, including four popular large group areas, were located within or adjacent proposed harvest units. About  $\frac{3}{4}$  of these sites are frequently used on weekends, May through September. These sites are generally located along the Breitenbush River, French Creek and Humbug Creek. About 20 of these dispersed sites are proposed landings that would be used for sale activities. Another 60 sites are located  $\frac{1}{4}$  to 1 mile away from harvest units. Most of these sites are generally located in the upper slopes of the planning area. The majority of these sites receive occasional use, one or two times a month, and more typically during the hunting season. About a dozen of these sites have either a scenic view, are next to water or a trail and have use on most weekends.

## Environmental Consequences

### Direct and Indirect Effects—Alternative 1

The existing condition would be maintained and serves as the baseline for analysis. Since no harvest would occur, there would be no additional noise disturbance, truck traffic on roads or visitor displacement.

### Direct and Indirect Effects–Alternative 2

Alternative 2 proposes thinning and small gaps, ½ acre in size, across the landscape to mimic small-scale natural disturbances. The proposed action would harvest about 1254 acres near Breitenbush River, French Creek and Humbug Creek, which are popular areas for recreation use. The activities in total would take about 379 operation days of cutting, skidding and skyline yarding trees, 522 days of road hauling and 44 days of helicopter yarding. Operations would be done simultaneously on many units so it is impossible to predict but the potential days would be less. In addition, 111 acres would be pre-commercially thinned, and 25 acres aerially fertilized. This would add one day of helicopter operations and another seven days of cutting trees. It is anticipated that harvest operations would occur over a 3 to 4 year period through 2012.

Table 3-35 Comparing Activity Days by Alternative

Activity	Alternative 1	Alternative 2	Alternative 3
Operation (Cutting, skidding, skyline yarding)	0 days	386 days	466 days
Helicopter Yarding	0 days	45 days	41 days
Truck Hauling	0 days	522 days	539 days

Noise, dust and exhaust associated with logging operations would increase in the immediate sale area and along haul routes. Harvest operations would occur over time and space throughout the planning area so duration would be relatively short-term at any one locale. The duration of noise would last throughout the day, averaging a couple weeks to a month at a time for any given location. Noise disturbance from helicopters, yarders, cable carriages, chainsaws and log trucks, and increased traffic could disturb local residents and recreation users near these activities. Noise particularly during weekends and early morning hours could potentially impact and diminish visitor experiences. The highest disturbance would result from noise during helicopter operations since it can be heard at greater distances. Within one mile of helicopter units, noise could be heard from the City of Detroit, Detroit Lake State Park, Detroit Flats, Upper Arm Day Use Area, Humbug Campground, French Creek/Byars Peak and Humbug Flats trails, along five miles of the Breitenbush River, and about 160 dispersed sites throughout the area.

For units adjacent to dispersed sites (43 sites) and use areas, visitors may be disturbed or displaced to alternative areas during harvest operations because of noise or may need to relocate for safety reasons. This displacement would be short term and last approximately one to four weeks in any given localized area. Visitors would be directly affected when dispersed sites are used for landings and displaced elsewhere to camp or recreate. The existing 20 dispersed sites used for landings could displace campers for one to three seasons until debris is removed and the site is restored. Helicopter landings can be used multiple times over the course of the contract so cleanup may be delayed until the project is complete.

Limited operational and hauling restrictions to reduce impacts on recreation are imposed in order to feasibly implement the project. Log hauling can conflict with recreational traffic especially if occurring during peak use months, May – September. Recreational traffic is lighter on weekdays

than weekends, but is often heavier on summer weekdays than off-season weekends. Although not absolute, harvest operations and log hauling typically occurs during weekdays. Helicopters are often unavailable during the fire season, suspending harvest activities until the off-season. Helicopter yarding can often be delayed to the late summer or fall, and would likely occur on weekends due to cost of operating and as daylight hours shorten. It is likely that the purchaser would also harvest units along Breitenbush Road (eg. Units 19, 21, 24) or fly loads of logs over this road after Labor Day when traffic volume is lighter to minimize conflicts and work interruptions.

The Forest Service would work with the purchaser to reduce recreation and traffic conflicts to the greatest extent practical. At a minimum, no truck or helicopter hauling would occur on legal holiday weekends for Memorial Day, Fourth of July and Labor Day. No weekend harvest operations would occur within ¼ mile of Humbug Campground and Upper Arm Day Use Area between Memorial and Labor Day weekends. If operations occur during the use period, noise could potentially disturb visitors at these developed sites. Some wildlife restrictions particularly in the lower two miles of the Breitenbush drainage restrict operations between January 1st and August 30th. The purchaser would post traffic-warning signs to alert travelers of trucks on roads and possible traffic delays. Delays would be relatively short inconveniencing visitors for up to 20 minutes. Roads are not expected to be closed as a result of harvest operations.

Based on past comments, hunters have expressed concern about operations that create noise disturbance, which affects their hunting experience and success. Proposed activities would likely occur during the late summer through fall and may have an impact to hunters in the project area, especially in the upper slopes. Hunters could be displaced to other nearby areas adjacent the planning area.

No thinning would occur within developed recreation sites or within 75 feet of Humbug Flats Trail, so activities would not affect the existing character of these sites. The trail would be temporarily closed to public during tree falling operations for about a week in duration.

In Unit 31, a new landing would be built. After harvest, this landing would be restored with slash removed and a small parking area delineated with rock.

No new dispersed sites would be encouraged as a result of harvest activities. All temporary road spurs and skid trails, and any appearance of open areas as a result of thinning would be closed or restored to discourage off-road vehicle use and any new user-created dispersed sites. Gaps are located either 100 or 200 feet away from roads to discourage the encroachment of vehicles into the stands.

### **Direct and Indirect Effects—Alternative 3**

All actions in Alternative 3 and their effects are similar as described in Alternative 2 with the exception of the following:

The proposed action would thin 21 acres and 17 acres of gaps more than Alternative 2, but the effects are similar in terms of noise disturbance, truck traffic and visitor displacement described but with some increases. It would increase operation days of cutting, ground skidding and skyline yarding trees by 80 days, and road hauling by 17 days, while decreasing helicopter yarding by 4 days.

Alternative 3 includes closing 4.3 miles of roads to limit winter access and another two miles of road to limit year-round access. Roads with existing dispersed sites would only be closed during

the winter when use is virtually nonexistent. Other roads have very incidental use and no signs of dispersed camping. Most of these roads are in poor condition or are steep and unsafe. No adverse effect to recreation is expected because of winter or year-round closures. Road 086, in Unit 33 would be relocated and may affect two existing dispersed sites. These sites would be protected during operations, restored or relocated if necessary, so there would be no net loss of campsites.

Alternative 3 proposes creating a range of gaps sizes from ½ to 3 acres, which provides openings for big game forage habitat. This potentially improves opportunities for wildlife viewing or hunting.

Alternative 3 proposes constructing a temporary road into Unit 31. The road would follow the Humbug Flats trail for a short distance then turn off to the east into Unit 31. When thinning is complete, this road would be obliterated where visible from the Breitenbush Road and Humbug Flats Trail. The segment of road on the trail would be rehabilitated back to a hiking trail width and any portion of the road visible from the trail would be restored to a natural appearing condition.

An opportunity exists to convert the temporary road at the intersection with the Breitenbush Road into a small parking area.

There would be no thinning within 75 feet of the trail, so activities would not affect the existing character of the trail corridor. The trail would be temporarily closed to public during tree falling operations for about a week in duration.

### **Cumulative Effects – Common to All Alternatives**

Several timber harvest activities, precommercial thinning and aerial fertilization projects will overlap in timing within the area around Detroit Lake and Humbug Creek, adjacent to French Bug. This could affect recreation experiences of visitors in the French Bug planning area and nearby residents. Visitors often visit and travel through these other areas during their trip. They may encounter the sights and sounds of these activities or be displaced to alternative areas. The Sugar Pine timber sale is a helicopter operation located about one mile to the north of Humbug and Breitenbush Road. Some noise associated with this sale may be heard from areas along the lower Humbug Road. Shore Nuf thinning timber sale is located on the south side of Detroit Lake, which could affect visitors around the lake. In addition, the Margie planning area includes 1200 acres of proposed commercial thinning on the north side of Detroit Lake and along Highway 22. This could directly affect highway travelers with traffic delays as well.

Future road maintenance includes major improvements to the Breitenbush road from Highway 22 to the Mt Hood forest boundary and would include a few sections on the Mt. Hood National Forest. These activities will take place in summer of 2008, and visitors will experience traffic delays. The project will be complete prior to French Bug harvest activities.

The Respect the River program is a dispersed site restoration and front-country “Leave No Trace” education effort that will be implemented in 2008 along the Breitenbush, North Santiam, and Little North Fork of the Santiam Rivers, Detroit Lake and French Creek. The project aims at reducing resource impacts while sustaining continued recreation use. The number of available dispersed sites would not decrease but the size will be reduced to allow vegetation to reestablish. It would also limit foot and vehicle travel to delineated routes, and increase education at existing sites. Some repeat visitors might not like “restrictions” placed on their “traditional” access,

however, it is in keeping with Aquatic Conservation Strategy Objectives and meeting the Forest Plan.

Future stream restoration efforts include fish habitat improvements on 1.5 miles of French Creek. Restoration projects are often accessed from dispersed sites and have very limited and incidental impact to recreation use due to the short-term duration of project implementation. Better habitat could improve opportunities for fishing.

If KV funding becomes available for Alternatives 2 and 3, several recreation enhancement projects would be implemented. Several new disperse sites would be created or better delineated along Roads 2225-450 and 4696-720 to meet demand and focus use in suitable areas. More shade trees and shrubs would be planted at Upper Arm to improve the setting, and interpretation of the wetland would improve wildlife-viewing opportunities. A portion of the Humbug Trail would be relocated for riparian restoration and would provide better and safer access to the river.

## **Consistency with Direction and Regulations**

### **Wild and Scenic Rivers Act**

The Breitenbush River, and its entire 10-mile length, has been determined to be eligible for inclusion into the National Wild and Scenic River System through the 1990 Forest Land Management Planning process, also known as a Section 5(d) river in the Wild and Scenic Rivers Act. Until suitability has been determined, the river shall be managed within ¼ mile of each side to meet Standards and Guidelines prescribed for Wild and Scenic River Management Area 6c.

The recommended classification of this river is “Recreation” and begins at the confluence of the North and South Breitenbush Rivers and terminates where it flows into the Detroit Reservoir near Canyon Creek. The river’s Outstandingly Remarkable Value is tied to its variety and quality of recreational opportunities. The entire river length is intensively used. Recreational pursuits in the river corridor include camping, fishing, commercial resort activities, kayaking, hiking, and recreational driving and sightseeing. Additional distinctive features within the corridor are quality of the ecological setting including mature trees and wildlife variety. Timber harvest, including past regeneration harvest, and portions of two 1000 acre wildfires have occurred within the river corridor in the last 80 years but has since recovered with trees over 10-15 feet height in the younger stands. Generally, a no-harvest buffer was left between the river and past regeneration units.

In either action alternative, no thinning treatments or gaps will be located adjacent the river. However, about 386 acres in Alternative 2 or 405 acres in Alternative 3 would be treated within ¼ mile of the river within a five-mile section. Resulting harvest treatments would be subordinate to the character of the natural landscape and would not be evident to the casual Forest visitor as viewed from the river. During project implementation, action alternatives could affect recreation experience as a result of noise disturbance and temporary visitor displacement. However, the project would have no adverse affect on the recreational values or modify the free flowing character for which the river was deemed eligible, and does not preclude the river from potential inclusion into the National Wild and Scenic Rivers System.

## 3.11.2 Scenic Quality

### Introduction

The Breitenbush Viewshed surrounds the Breitenbush Road corridor from Highway 22 at Detroit east to the Forest Boundary, and is about 17 miles in length. The French Bug Planning Area lies within the western 5½ miles of the viewshed along the Breitenbush River and between French Creek and Humbug Creek. The travel corridor within the Breitenbush Viewshed has long been valued for its scenic qualities since the 1920's (USDA FS, 1996 Breitenbush Watershed Assessment). The quality of the Forest's scenic resource is important to the existing local tourist industry and economy. The West Cascades National Scenic Byway, which follows Road 46, is a highly traveled scenic route and alternative drive to I-5. Its "national" status and tourism marketing efforts attract people to travel the corridor to experience the West Cascades. The Breitenbush River is an eligible Wild and Scenic River. French Creek Road #2223, also provides a scenic driving route to the Opal Creek Scenic Recreation Area and Wilderness.





## Regulatory Framework

The 1990 Willamette National Forest Land and Resource Management Plan (Forest Plan) and Scenery Management Systems handbook sets the regulatory framework as it applies to Scenery. Generally, the entire planning area is to managed to provide very low to high scenic quality by managing for Maximum Modification, Modification, Partial Retention and Retention Visual Quality Objectives (VQO). The goal of visual management areas are to create and maintain desired visual characteristics of the forest landscape through time and space.

Table 3-36 Visual Quality Objectives and Scenery Management System Guidelines

Management Area <sup>21</sup>	Visual Quality Objective	Scenic Integrity	Landscape Condition	Deviations to landscape character (eg. form, line, texture, color, pattern)
Scenic Retention Foreground - 11f	Retention	High	Appears unaltered and intact	May be present but in such a way that is completely subordinate to the character of the landscape and are not evident.
Scenic Partial Retention Middleground – 11c	Partial Retention	Moderate	Slightly Altered	Remains visually subordinate to the landscape character being viewed.
Scenic Modification Middleground -11a	Modification	Low	Moderately Altered	Begins to dominate the valued landscape character being viewed but they borrow valued attributes.
General Forest - 14a	Maximum Modification	Very Low	Heavily Altered	May strongly dominate the valued landscape.

## Analysis Methods

The analysis methods used to evaluate the effects of the alternatives on scenery resources were based on a review of the Forest Plan for consistency with applicable standards and guidelines, and Scenery Management Systems handbook direction. Field reviews of proposed harvest units from critical viewpoints in conjunction with GIS geo-spatial mapping and a digital perspective analysis using Google Earth was used to determine design criteria, mitigations and evaluate project effects on visual quality. The existing visual condition was evaluated in the Breitenbush and Detroit Tributaries Watershed Assessments and GIS information on recent harvest units was analyzed. Silviculture prescriptions were developed to meet visual quality objectives. Existing stand condition, treatment alternatives, and stand and fuel modeling results were provided by the silviculturist and fuels planner and used to help evaluate potential effects on scenery.

<sup>21</sup> See French Bug Management Area map in Chapter 1.

## Existing Condition

The Breitenbush viewshed corridor follows the Breitenbush River to the North Fork of the Breitenbush River, and then continues upslope for the last two miles to a saddle at the Forest Boundary near Bald Butte. To most visitors, the duration of views is short and transitory while traveling along the Breitenbush Road corridor. For others camping and recreating along the Breitenbush River, views are longer where details are more discernable.

Beginning at Highway 22, scenes along the Breitenbush Arm of the Detroit Reservoir captures the viewer's attention for the first mile. Once past Upper Arm, the byway meanders through a closed corridor of trees that presents occasional views of the Breitenbush River and hillsides. Natural stands of mature trees along the river and pockets of old growth are interspersed along the road. Within the first five miles, however, 50-80 year old managed stands are predominant, especially on the uphill side and around Humbug flats. They are largely single-storied and homogenous, dominated by Douglas-fir. These stands have a dense overstory and limited understory vegetation and species abundance. Occasional hillside views of two past wildfires at Canyon Creek (1958) and Eagle Rock (1967) reveal interesting scree slopes and rock outcrops, and a vigorous young forest blanketing the landscape. These natural events and past management activities have recovered and are subordinate to the casual viewer. Forest landscapes transition from one stand to another and are relatively seamless to an untrained observer. Once above the Breitenbush Community, natural mature stands and old growth reside along much of the corridor and provide late successional habitat and diversity. Regeneration harvests over a decade old are visible near the Forest boundary and also provide expansive views of the Breitenbush drainage when viewed from the saddle.

A portion of the French Creek drainage of the French Bug planning area can also be seen from Detroit Lake and along Highway 22 at Detroit, which is also part of the North Santiam Viewshed.

Powerline corridors are a major deviation in the landscape and are inconsistent with visual objectives. Where seen, it ranges from slightly evident to very dominant and obvious in several locations. In the French Bug planning area, the powerline corridor visibly intersects the Breitenbush Road in two places and has a few short stretches with a narrow treed screen so the corridor or towers are slightly visible.

The Forest Plan visual standard and guidelines are outdated and primarily address a landscape managed for even-aged regeneration harvest. In visual management, regeneration harvests are considered "recovered" when trees reach a specified height. About 26 acres were regeneration harvested in the Breitenbush Viewshed in the last decade; and 310 acres in the North Santiam Viewshed. These viewsheds is recovering and within Forest Plan VQO standards and guidelines for maximum area disturbed condition. Within the French Bug planning area, about 17 acres of six "root rot pocket" units were harvested in the past decade to prevent the further spread of the disease. One of these stands, a 10-acre area is visible from Breitenbush Road and Highway 22. The other seven acres previously treated are one to two acres in size and are not visible from critical views along major travelways or recreation sites. Root rot pockets are natural events that eventually open the stand due to mortality, and create an irregular shaped opening when viewed obliquely.

A total of 1253 acres were commercially thinned within the French Bug Planning Area viewsheds, of which 1026 acres were thinned in the last decade. About 155 acres was thinned in

the Foreground zone along the first few miles of the Breitenbush road. These stands were lightly thinned within the past 10 years, and tree crowns have quickly closed into a dense overstory allowing for little understory development.

## **Environmental Consequences**

### **Direct and Indirect Effects –Alternative 1**

The forest would continue a path of natural succession and scenic stability could potentially be at risk, especially in previously managed stands. Scenic stability is the degree to which the valued scenic character and its scenic attributes can be sustained through time and ecological progression (USDA FS, 2007 SMS). A landscape with high risk to scenic stability is an ecosystem that departs from its natural range of variability and may not be sustained. The goal is to conserve valued scenery character for future generations.

The valued scenic landscape in the Breitenbush is typical of the Western Cascades characterized by dense vegetation of large scenic trees including western hemlock, Douglas-fir and true fir, with continuous cover of overstory and understory vegetation, and deciduous species and cedar intermixed along drainages. The desired landscape condition would have larger patches of late-successional stands than exist across the landscape today (Elliott, 2008). Structural diversity found in a late-successional forest is visually desirable, which includes a variety of tree sizes, conditions and species, and other important components such as large snags and down logs in a various states of decay, and well-developed forest floors. Research has shown that people are extremely fond of large trees (Kaplan et al. 1998) with full crowns (Bradley 1996), and old-growth forests are perceived as most scenic (Brunson and Shelby 1992, Shelby et. al 2003).

Presently, densely stocked second-growth Douglas-fir stands limit vegetation development and diversity (visual variety) in the understory. Stands would continue to compete for light, water and nutrients causing suppression mortality of the smaller diameter trees. Tree and diameter growth would decline as this competition increases and would become less vigorous and more susceptible to insect and diseases. Trees would appear wispy as they continue to lose their full crowns. With no treatment, the development of the diversity associated with late-successional forest would likely be delayed by at least 20 years (Elliott, 2008). Achieving the valued scenic character for these stands would take longer than if treated. With structural diversity, there is a high degree of spatial variability in both the vertical and horizontal dimensions (e.g. irregular tree spacing, clumpiness, multi-layered). The horizontal aspect is most obvious in the immediate foreground along the Breitenbush Road, where scenic attributes and degree of naturalness is more discernable. Managed stands would continue to exhibit uniformity, and lack structural and vegetation diversity.

Overstocked stand conditions and increasing fuel loads would be associated with greater fire intensity and higher burn severity (Curtis, 2008). Intense uncontrolled fires create large areas of blackened ground and scorched trees and snags. Scenic landscape values and attributes would be lost in the case of such an event.

The powerline corridor would continue to impact scenery along its route because of its strong visual contrasts in form, line, color, and texture to the natural appearing landscape.

### **Direct and Indirect Effects –Alternative 2**

Alternative 2 proposes 1255 acres of thinning with “skips” or no treatment areas, and 34 acres of small ½ acre in size “gaps” or openings, across the landscape to mimic small-scale natural disturbances and promote structural and species diversity. About 20 acres of gaps would be placed in a visual allocation. Preliminary research suggests that public reaction to such treatments is generally favorable (Brunson and Shelby 1992). The proposed treatments would place the existing landscape on a trajectory towards the desired future condition by accelerating the development of diverse ecological conditions and maintaining valued scenic quality that has long-term sustainability.

This alternative reduces overstory canopy closure, provides more opportunity for increased development of the understory vegetation and promotes stand complexity. The combination of thinning, gaps and skips within stands will promote horizontal and vertical variability (e.g. clumpiness, multi-layered) and diversity (e.g. structural, species) at the stand scale. This context is more relevant in the retention foreground zone along the Breitenbush Road, where forest scenes are in full view. The mixture of three different thinning intensities across the planning area also promotes variability at the broader, landscape scale. This alternative provides the opportunity to accelerate the transition of the stands into late-successional forest through increased growth and understory development (Elliott, 2008). Attaining structural diversity and spatial variability would enhance and sustain the valued scenic landscape character in the Breitenbush viewshed

Thinning accelerates the development of large diameter trees and promotes vigorous growing, healthy stands (Tappeiner et al, 2007). This alternative would enhance tree growth to promote healthy and aesthetic stands. Variable density thinning would accelerate stands towards late-successional conditions by at least 20 years (Elliott, 2008), hence achieving the valued scenic character for these stands much sooner than Alternative 1. An increase in the number of larger trees is often associated with an increase in scenic beauty ratings (Silvennoinen et al. 2001). A study found scenic ratings were significantly higher for untreated old-growth and nontraditional treatments including patch-cuts (gaps) and two-story retention than “traditional” even-spaced thinning but ratings improved over time and will likely to continue over the next decade (Shelby et al. 2003). Results of studies conducted in most forest zones of the US and Europe show that high scenic beauty is associated with presence of large mature trees, moderate tree densities, herb cover, color variation and species diversity. (Brunson 1996b). Thinning would encourage the development of fuller tree crowns and understory vegetation such as vine maple that would increase “fall colors,” which are desired visual characteristics.

The analysis shows that reducing stand density and treating fine fuels will improve stand conditions and reduce the long-term risk potential of larger more intense wildfires (Curtis, 2008). The proposed commercial thinning in the French Bug project area would have fewer residual trees and more crown spacing, creating a forest canopy less susceptible to sustaining a crown fire (Curtis, 2008). Reducing risk for larger more intense fires improves scenic stability.

In the retention foreground zone along the Breitenbush Road, the proposed action maintains a higher residual canopy closure (60-70%) by a lighter thin to 110 trees per acre. The proposed thinning would have irregular spacing as opposed to traditional thinning with uniform spacing where the appearance of management activity is more evident. Variability would be further introduced in these stands by leaving uncut skips, creating small gap openings, maintaining all minor species and hardwoods and ignoring them in spacing (adding clumpiness), and retaining large dominant and <9” intermediate trees for vertical diversity. Small ½ acre gaps would be

generally located 200 feet or more from the road and would appear like natural openings. These small gaps would have up to three residual dominant trees left and be planted with western redcedar. It is anticipated that these treatments would enhance stands by creating more variability, clumpy arrangements and natural appearing patterns to an already uniform appearing managed stand. It is likely another thinning entry could occur within the next 20 years or so; therefore it is a transitional approach to enhance and perpetuate desired scenic character over time.

A middleground landscape having steep topography is the often the most sensitive because they often can be viewed obliquely, and changes to the canopy cover are more obvious. Those units that can be seen from Detroit Lake or Breitenbush Road and are managed to meet partial retention. Landscape character would appear slightly altered but is visually subordinate in the context of the landscape being viewed. Proposed first time thinning treatments would maintain texture by leaving 80-100 trees per acre or 50-60% canopy cover. Other scenic modification and general forest units would retain 50-70 trees per acre or 40-50% canopy cover and are second entry thins. These units generally are not visible from any critical views. Retaining 40% canopy is consistent with modification VQO's according to an aesthetic perception study on harvest retention (Ribes 2005). Small irregular shaped gaps, 1/2 acre in size, would mimic small-scale natural disturbances and borrow from the landscape. Linear features such as skyline corridors could be visible in Units 5 and 30, but would be reduced through design measures to remain visually subordinate.

The powerline corridor crosses Breitenbush and Humbug Roads. To reduce the lineal edge effect of the stand against the corridor, a few small curvilinear 1/4-1/2 ac gaps would be placed on the edge to provide irregularity and improve the visual appearance.

Harvest operations would result in temporary direct effects to scenic quality, including visible slash, log decks, temporary roads and landings, skid trails, less dense stands (increasing depth of view) and tree stumps. These effects are unavoidable during implementation phase, and except for tree stumps would be short term (about one to five years). In the Retention zone visible from Breitenbush Road, stumps would be flush cut, concentrations of slash treated, cull decks removed, and skid roads and landings restored to a natural appearance including planting. Decomposition of residual slash and accelerated understory growth would further allow these areas to recover within three to five years. Tree in Units 21, 24 and 31 provide screening of the powerline corridor.

In this alternative, Unit 31 would have landings and designated skid trails to the Breitenbush Road, which would have short-term impacts, less than five years, until they are rehabilitated and replanted.

To minimize visibility, treatments would retain higher tree densities or areas of no cut to buffer the powerline. Thinning these stands may increase visibility slightly for several years until crowns and understory develop.

To give spatial context, Table 3-37 depicts percent of area change to the overall Breitenbush viewshed, a 17-mile corridor, versus the portion of the planning area in the viewshed, or western 5 1/2 miles of the viewshed. This alternative treats about 5% of the total viewshed acres or 12% of the planning area of the viewshed. The areas more readily seen in the foreground (11f) would treat about 8% and 23% respectively. In the context of these areas, the amount of change in the overall viewshed is small, however, it is concentrated to the western 5 1/2 miles with more

apparent change particularly in the foreground. The majority of the middleground (11a) would not be visible from the Breitenbush Road except for Unit 30.

Table 3-37. Amount of Change in the Breitenbush Viewshed and Planning Area

Mgmt Area	Harvest Acres Alternative 2	Breitenbush Viewshed (17 mile corridor)		French Bug Planning Area (western 5 ½ miles corridor)	
		Acres	% treated	Acres	% treated
11a	471	9,228	5%	4,256	11%
11c	2	2,533	0%	133	2%
11f	150	1,787	8%	654	23%
Total	623	13,548	5%	5,043	12%

An insignificant portion, or 48 acres, within the North Santiam Viewshed would be treated and effects were analyzed under the cumulative effects section.

Maximum opening (gap) size created in this alternative is a ½ acre and below Forest Plan standard for opening size for either viewshed management area (see Table 3-38). Maximum disturbed condition is well below Forest Plan standard. For example, disturbed condition rate for 11a is 24% and the total disturbed condition is 0.6%. This includes the 26 acres of past harvest that has not yet recovered plus 13 acres of proposed created openings under Alternative 2. Size and amount of created openings during this decade meets Forest Plan standards for each management area.

Table 3-38. Created Openings: Disturbed Condition by Viewshed and French Bug Planning Area

Mgmt Area	Viewshed	Forest Plan Max. Opening Size	Forest Plan Max. Disturbed Condition (DC) %	Alternative 2		Alternative 3	
				Created Opening (Ac)	MDC %View shed	Created Opening (Ac)	MDC %View shed
11a	Breitenbush	30 ac	24%	13	0.6%	25	.8%
11c	N.Santiam	15 ac	20%	2	2.5%	2	2.5%
11f	Breitenbush	5 ac, 2 ac roadside	10%	5	0.4%	5	.4%

### Direct and Indirect Effects –Alternative 3

All actions in Alternative 3 and their effects are similar as described in Alternative 2 with the exception of the following:

Alternative 3 proposes 1276 acres of thinning and a range of gaps sizes from ½ to 3 acres in size to not only mimic small-scale natural disturbances, but also provide larger openings for big game forage habitat. Fifty acres of gaps, 21 acres of ½ acre gaps and 30 acres of 1-3 acre gaps, would be created. About 32 acres of gaps would be placed in a visual allocation, which is 12 acres more than Alternative 2.

Gaps larger than 1/2 acre are proposed in units that offer optimal forage habitat conditions such as south aspects, flatter slopes, and big game travel corridors. Because these gaps are larger and

offer more sunlight, they will be planted with a mix of conifer species. Gaps would be placed greater than 200 feet from the Breitenbush Road and 100 feet from other roads. These larger gaps would also be situated mostly on terraces and areas out of oblique view. It may be slightly evident that an opening exists, but the shape will blend with existing natural forms and patterns in the landscape. The Forest Plan guideline for maximum opening size is 5 acres in the Retention Foreground (11f). For eligible Wild and Scenic Rivers (MA-6c-Recreation), 3 acres is the maximum opening size. Up to three-acre gaps meet guidelines for any management area in the French Bug Planning Area. In addition, the amount of created openings during this decade meets Forest Plan standards for each management area (See Table 3-38 under Alternative 2).

The thinning acreage is slightly higher than Alternative 2 because it allows access to 21 additional acres in Unit 33, which is located in MA-11f- retention foreground. This portion of the unit is on a steep slope where a viewer can see the ground and cut stumps more readily especially in the short term until more understory vegetation is developed. Alternative 3 also proposes to relocate and reconstruct Road 086 into U-33, which is visible from Road 46 and provides access to two dispersed sites. If a helicopter landing is constructed, it would also be visible from the road. These impacts would be mitigated by obliterating and rehabilitating disturbed areas and the abandoned road section to a natural appearing condition including planting larger trees. Dispersed sites would be visible from the road until the understory vegetation develops adequate screening. These affects would recover within 5 years.

Alternative 3 proposes constructing a temporary road into Unit 31 and would be obliterated where visible from the Breitenbush Road and Humbug Flats Trail. This alternative would eliminate the need to have landings and skid logs to the Breitenbush Road, which is more visually sensitive. The road would follow the Humbug Flats trail for a short distance then turn off to the east into Unit 31. The segment of road on the trail would be rehabilitated back to a hiking trail width and any portion of the road visible from the trail, restored to a natural appearing condition. There would be no thinning within 75 feet of the trail, so activities would not adversely affect the existing scenic character along the trail corridor.

Alternative 3 is similar to Alternative 2 in terms of overall amount of change in management areas 11a and 11c. The areas more readily seen in the foreground (11f) would treat about 10% of the total viewshed and 26% of the planning area. In the context of these areas, the amount of change in the overall viewshed is small, however, it is concentrated to the western 5 ½ miles with more apparent change particularly in the foreground. (see Table 3-39).

Table 3-39 Amount of Change in the Breitenbush Viewshed and Planning Area

Mgmt Area	Harvest Acres Alternative 3	Breitenbush Viewshed (17 mile corridor)		French Bug Planning Area (western 5 ½ miles)	
		Acres	% treated	Acres	% treated
11a	471	9,228	5%	4,256	11%
11c	2	2,533	0%	133	2%
11f	170	1,787	10%	654	26%
Total	643	13,548	5%	5,043	13%

### Cumulative Effects – Common to All Alternatives

Past management, developments, suppression of natural fire cycles, and natural disturbance has had the greatest influence on existing vegetation patterns within the Breitenbush and North Santiam viewsheds. The existing condition for both viewsheds meets Forest Plan Visual Quality Objectives. The Margie planning area includes 1200 acres of proposed commercial thinning on the north side of Detroit Lake and along Highway 22. This is within the North Santiam Watershed, of which a very small portion overlaps with French Bug. Visitors often travel through both of these corridors during their trip so visual continuity and quality are important to maintain over the forest landscape. For the North Santiam Viewshed around Detroit Lake there is a 15-acre root rot pocket that was harvested on the north side of Detroit Lake that has not yet recovered. It is not visible from Highway 22 but seen from the lake. The Shoreline project commercially thinned approximately 1400 acres and is located on the south side of Detroit Lake. It maintains a desired canopy texture when viewed obliquely from Highway 22 or the lake. Private lands are interspersed and large openings of regeneration harvests exist that do not borrow from natural landforms and contributes to the modified appearance. By Forest Service standards, they would not meet VQO's.

To give spatial context, Table 3-40 depicts percent of area change to the overall North Santiam viewshed. Both alternatives treat about 0.2% of the total viewshed acres. In the context of these areas, the amount of change in the overall viewshed is small. Unit 16 and a portion of Unit 15 lie within the viewshed and are not visible from the highway or Detroit Lake.

Table 3-40. Amount of Change in the Breitenbush Viewshed and Planning Area – Cumulative Effects

Mgmt Area	Harvest Acres Alternatives 2 and 3	North Santiam Viewshed	
		Acres	% treated
11a	4	11	0.03%
11c	44	8	5.41%
11f	0	5	0.00%
Total		24	0.19%

The Respect the River program is a dispersed site restoration and front-country “Leave No Trace” education effort that will be implemented in 2008 along the Breitenbush, North Santiam, and Little North Fork of the Santiam Rivers, Detroit Lake and French Creek. Dispersed site restoration would improve the aesthetics of site-specific valued riparian recreation settings by reestablishing vegetation and reducing visibly large areas of compacted soils. “Leave No Trace” education would help reduce the amount of unsightly trash and human waste left behind by users.

If KV funding becomes available for Alternatives 2 and 3, scenic enhancement projects such as planting to increase diversity would improve visual variety along the Breitenbush Road.



## 3.12 Heritage Resources

### Introduction

The purpose of this report is to analyze the effects of Timber Sale Harvest activities proposed under the French Bug Thin Project Environmental Analysis (EA) on cultural resources. Heritage resources are fragile and irreplaceable resources that chronicle the history of people utilizing the forested environment.

### Regulatory Framework

The legal framework that mandates the Forest Service to consider the effects of its actions on heritage resources is wide-ranging. In this case, Section 106 of the National Historic Preservation Act (NHPA) of 1966 (amended in 1976, 1980, and 1992) is the foremost legislation governing the treatment of cultural resources during project planning and implementation.

- 36 CFR800 (Protection of Historic Properties),
- 36 CFR 63 (Determination of Eligibility to the National Register of Historic Places), and
- 36 CFR 296 (Protection of Archaeological Resources),
- The 1994 Programmatic Agreement (PA) (amended in 2004) among the USDA Forest Service PNW, the Advisory Council on Historic Preservation, and the Oregon State Historic Preservation Officer Regarding Cultural Resource Management in the State of Oregon by the USDA Forest Service.

### Analysis Methods

The archaeological survey of the French Bug Thin Timber Sale was conducted in order to comply with the above stated laws and regulations (see regulatory framework). A systematic surface pedestrian search is the principal manner for implementing the mandated goals.

Ground surveys for the proposed French Bug Thin timber sale occurred between July 9 and August 30, 2007. Surveys were conducted under contract by Warm Springs Geo Visions Cultural Resources Department for the Willamette National Forest (Hylton et al. 2007). Pedestrian transects with 15 to 20 meter spaced intervals followed a specific orientation based on factors that included the shapes of units and landforms and the possible presence of historic Indian or Euro-American travel routes. One-by-one meter shovel scrapes made with entrenching tools exposed mineral soil every 20 to 30 meters in areas where dense vegetation limited ground visibility. Bearing orientations were followed to the best of abilities, but adjustments in orientation, spacing intervals, and shovel scrape spacing were made in order to avoid dangerous or unreasonable conditions (e.g., exceptionally steep slopes or impenetrable vegetation). The surveyor's utilized Garmin Etrex Summit™ Global Positioning System units to record transect routes for accuracy of coverage and compass and tape techniques were also utilized (Hylton et al. 2007). A total of 987 acres were survey consisting of 718 high probability and 269 low probability acres.

## Existing Condition—Heritage Resources

The prehistory and history of the North Santiam River Sub-basin have previously been summarized in Cultural Resource Overview for the Willamette National Forest, Western Oregon (Minor and Pecor 1977), the ten-year update of the above overview (Minor 1987), Prehistory and History of B. L. M. Lands in West-Central Oregon: A Cultural Resource Overview (Beckham, Minor, and Toepel 1981), Archaeology of Oregon (2nd Edition) (Aikens 1986), The Prehistory of the North Santiam Subbasin, on the Western Slopes of the Oregon Cascades (Kelly 2001), Cultural Resources Survey Report for the French Bug Project Planning Area (Hylton et al. 2007) and numerous other publications. These documents provide adequate detail of ethnographic and historic background for this report.

### Prehistoric Use

Ethnographic research indicates that highly mobile prehistoric and early historic aboriginal groups, probably the Molala, Kalapuya, and their ancestors used the western Cascade Mountains for the main purpose of seasonal hunting, fishing, and plant gathering. Ethnographic evidence also suggests that the Molala Indians were indigenous to the area and lived during the winter along low elevation streams, accessing the uplands during the summer and fall to hunt game and gather berries and other important plant resources. The Molala are linguistically related to Willamette Valley groups, but are thought to be a montane-based band that were living in the western Oregon Cascades during the historic period. The Molala generally are known to be split into two subgroups: the Northern Molala located in the vicinity of Mount Hood's drainage systems and the Southern Molala located west of the Klamath Lake area. Little is known of a third group, referred to as the Upper Santiam/Santiam band of Molala known to have occupied Linn and Lane counties in areas between the Northern and Southern groups. The Molala are also often culturally grouped with the Kalapuya who were based in the Willamette Valley but probably made seasonal forays to the Cascades for large game and berries. Many of the Molala and Kalapuya were removed to the Grand Ronde Reservation in western Oregon after the signing of the Dayton and Molalla Treaties of 1855). Other Molala shifted to the Siletz Reservation along the Oregon coast, the Klamath reservation to the south and east into Central Oregon where they were absorbed into the Confederated Tribes of Warm Springs Reservation of Oregon.

Prehistoric resources left behind by the Indians include chipped obsidian lithic scatters and obsidian lithic isolates, representing tool use, modification, or manufacture related to hunting and gathering. Ongoing stone tool analysis, both by agency archaeologists and contractors, supports that this portion of the Cascades was occupied primarily by highly mobile people indigenous to the Cascades. Those people were probably ancestral to the Molala people that were involved in early but unratified treaties of the 1850s.

Culturally significant vegetation observed within the timber sale units include huckleberry, blueberries, red flowering currant, wild strawberries, raspberries, thimbleberry, elderberry, ocean-spray, bear grass, rose, yew, and hemlock, Oregon grape, and many others. Culturally significant fauna utilized by the Indians include mule deer, black-tailed deer, elk, grizzly, cougar, and black bear, as well as small game including quail, beaver, raccoon, grouse, squirrel, rabbit, and many others. Raptors and water fowl are common, and anadromous salmon are found in Cascade forest streams (Hylton et al. 2007). Most of these food resources are still commonly used by present day Indian Tribes.

## Historic Use

In the early twentieth century, Confederated Tribes of the Warm Springs Reservation of Oregon (CTWSRO) members continued to use well known travel routes through the Oregon Cascades to access favored huckleberry and fishing locations within the mountains or to seek employment in western Oregon's berry and hop fields. Ms. Kalama, a CTWSRO Tribal Elder, noted that huckleberries in particular, but also many medicinal plants and other plant foods were and still are obtained from specific locations in the western Cascades (Hylton et al. 2007).

Documentation by a 1930s District Ranger describes the continued visits of the CTWSRO Tribal members to huckleberry fields in the WNF (Hylton et al. 2007).

Railroads built in the mid-nineteenth century were responsible for the early development of the timber industry in Oregon and in the North Santiam Drainage (Hylton et al. 2007:11). Railroad boom periods in the late nineteenth and early twentieth centuries were associated with the growth of several large commercial operations. Railroads permitted access to higher elevation timber during a period when lower elevation areas had already been logged. Southern Pacific Railroad's construction of a spur along the North Santiam would have opened up higher elevation timberlands near the Project Area to logging. The Hammond Lumber Company was particularly influential in the development of the timber industry in the Project area (Hylton et al. 2007:11). The company began in 1900 when owner Andrew Hammond (1848-1934) acquired the Curtiss Lumber Company of Mill City, Oregon and the John Vance Mill and Lumber Company from the Humboldt Bay area of California (Hammond Lumber Company Information Interviews on file at DRD, WNF in Hylton et al. 2007)). The Hammond Lumber Company, who operated a lumber mill in nearby Mill City (Erickson 1966 in Minor and Pecor 1977:25), conducted railroad logging operations in the 1920s and 1930s, which included timberlands along the Breitenbush River and French Creek (Wilbur Harlan Interview 1982, on file at DRD, WNF). In addition, the Curtiss Lumber Company had previously logged and burned timberlands in the French Creek area before the purchase by the Hammond Lumber Company (Wilbur Harlan Interview 1982, on file at DRD, WNF in Hylton et al. 2007). Hammond primarily used railroads for their logging operations, mills were usually located along major railroad lines and much of the company's timberland originated as railroad land grants (Hammond Lumber Company Information Interviews, on file at DRD, WNF in Hylton et al. 2007).

Small western Oregon communities, such as Mill City and Detroit, developed in close proximity to logging operations. World War II and the postwar years were responsible for a dramatic increase in the use of timber from the WNF and elsewhere. The war created a huge market for timber and associated technological developments allowed for greater timber production. By the end of the war, timber was the most important economic resource of the WNF (Rakestraw and Rakestraw 1990:74 in Hylton et al. 2007). In WNF, the era from postwar years to present times has been characterized by intensive use and planning involving timber sales, recreation campgrounds, dam construction, and wildlife management (Rakestraw and Rakestraw 1990:93-127 in Hylton et al. 2007).

A review of historical maps of the Project area indicates that prehistoric or historic trails and roads crossed through the Project vicinity. A trail is depicted on a 1931 Santiam National Forest (SNF) map (SNF [map] 1931, on file WNF Office in Hylton et al. 2007) originating at the Warm Springs Reservation near Schoolie Pasture Ranger Station (RS). The trail extends west and crosses Camas Prairie, "Camas R.S.", Lemiti Meadows, and Lemiti RS before dropping south through Wolf Spring and joining the Breitenbush River near the Breitenbush Hot Springs and

Breitenbush RS. The trail continues west along the Breitenbush River past Detroit and off the map but presumably down to the Willamette Valley. Viola Kalama, a Warm Springs elder and former member of the Warm Springs Cultural and Heritage Committee, is familiar with a well known trail following this route (Personal communication 2007 in Hylton et al. 2007). According to Ms. Kalama, the trail provided CTWSRO residents with access to high Cascade area huckleberry fields, favored fishing and hunting areas, and cash employment in the hop fields of western Oregon. The presence of this trail, or portions thereof, on a 1937 Santiam National Forest and 1947 WNF map (SNF [map] 1937, on file WNF Office; WNF [map] 1947, on file WNF Office in Hylton et al. 2007) suggests the trail continued to be used throughout the historic period.

The site types recorded within the French Bug project area include lithic scatters and historic railroad logging features. These sites are considered potentially eligible to the National Register of Historic Places (NRHP) and must be protected from project activities or evaluated to determine their eligibility to the NRHP. The proposed French Bug Timber Sale has the potential to affect four of the known cultural sites (06180400979, 06180400131, 06180400037, and 06180400154) within or near the project area.

## **Environmental Consequences – Heritage Resources**

### **Direct and Indirect Effects–Heritage Resources – Alternative 1**

Implementation of the no action alternative would not directly nor indirectly affect cultural resources since there would be no change to the integrity of heritage resource sites.

### **Direct and Indirect Effects– Heritage Resources – Alternative 2**

Implementation of Alternative 2 would result in ground disturbance on 2200 feet of temporary road, 1000 feet of new temporary spurs road, 2.0 miles of reconstructed roads, 34.0 miles of road maintenance and 1255 acres of timber harvest. Since appropriate and approved surveys and cultural site protection measures are already in place for this project (see Mitigation Measures Chapter 2), the potential direct effects would be in the form of inadvertent damage to the integrity of cultural resources which were not discovered during initial survey. Any sites uncovered during implementation of the project would require the application of Design Measures described in Chapter 2.

### **Direct and Indirect Effects– Heritage Resources – Alternative 3**

Implementation of Alternative 3 would result in ground disturbance of 1276 acres of timber harvest, over 2200 feet of temporary road, and 36 miles of road maintenance. Ground disturbance related to road construction would be greater under this alternative with 4000 feet of new temporary spur road construction, 4.4 miles of reconstructed roads, and 0.12 miles of relocated existing system roads producing greater amounts of potential disturbance. Since appropriate and approved surveys and cultural site protection measures are already in place for this project (see Mitigation Measures Chapter 2), the potential direct effects would be in the form of inadvertent damage to the integrity of cultural resources which were not discovered during initial survey. Any sites uncovered during implementation of the project would require the application of Design Measures described in Chapter 2.

### **Cumulative Effects – Heritage Resources**

It is not anticipated that there would be cumulative effects to the potentially eligible cultural resource sites in the French Bug Thin Timber Sale Project Area from any of the proposed actions as long as the Heritage mitigation measures are implemented prior to timber harvest and associated activities.

### **3.13 Roadless and Unroaded Areas**

#### **Existing Condition – Roadless and Unroaded Areas**

The French Bug project area does not contain Inventoried Roadless Areas (IRAs). The project area contains some unroaded areas 1,000 acres or more in size as analyzed in the Willamette Pilot Roads Analysis, 2003 (USDA Forest Service, 2003). These unroaded areas do not exist in large blocks due to extensive road building in this area over the past 100 years. They are intermingled with existing Forest roads and State and US Highways. Existing roads provide some access to all proposed harvest units. Ninety nine percent of all harvest units are within 1000 feet of existing roads. The other one percent consists of helicopter logged gaps that are still within ½ mile of existing roads. The unroaded areas are not likely to be considered candidates for future Wilderness because the existing roads are between the unroaded areas and IRAs. The nearest IRA is approximately 4/10 of a mile northeast of unit 4. The 2225, a single lane aggregate surfaced road, runs between unit 4 and the Opal Creek IRA. The nearest wilderness to the project area is Opal Creek, located over ½ miles to the north on the other side of French Creek Ridge.

#### **Environmental Consequences – Roadless and Unroaded Areas – Alternative 1**

Alternative 1 would not implement any management actions within the project area. Natural processes and forest successional pathways would continue. Alternative 1 does not manage forested stands within unroaded areas and therefore, would have no direct or indirect effects on any unroaded areas or any roadless values that currently exist within the project area.

#### **Direct and Indirect Effects – Roadless and Unroaded Areas – Alternative 2**

##### **Soil, Water and Air**

The effects of both action alternatives on water quality, soil and air are discussed in sections 3.8, 3.7, and 3.4. Stands within unroaded areas managed with partial cutting treatments would not adversely affect roadless characteristics derived from these resources. Applying thinning or gap cutting of not more than 3 acres in size within the unroaded area is not expected to affect the current ability of this area to function as a source of public drinking water to various downstream communities.

##### **Diversity of Plant and Animal Communities**

None of the action alternatives are expected to result in any decrease in such diversity of plant and animal species. Because of the heavily roaded condition of the project area, the proposed harvest units do not contain the diversity of plant and animal species that would be found in large, natural unmanaged stands where there would be no disturbance from road building and forest management activities. Part of the stated purpose and need of this project is to “reduce tree density in order to enhance tree growth and structural diversity in stem exclusion stands.” Treatment into these stands is expected to increase both structural and species diversity and

accelerate stands towards late-successional conditions by at least 20 years (section 3.2.6). Treatments are also planned to improve forage for big game by cutting larger gaps, underburning them and planting with a forage seed mix. This should improve the area's ability to support big game populations. Effects to sensitive species are discussed in sections 3.6.1 for sensitive plants and 3.5.8. for wildlife.

### **Habitat for TES Species and Biological Strongholds**

Effects to TES species is described in the wildlife and botanical section of this EA. The Biological Evaluations for both of these resources are included in the appendix.

Effects on the spotted owl are consistent with Standards and Guidelines from the Willamette Forest Plan. Through formal consultation, the U.S. Fish and Wildlife service concurs with the Biological Assessment, that the French Bug project would not jeopardize the continued existence of the spotted owl. All sites at risk from noise disturbance would be protected with seasonal restrictions.

Effects of the proposed action on habitat for threatened, endangered and sensitive species are discussed in sections 3.5 and 3.6.

Because of the existing roaded condition of the project area and the relatively small size and linear configuration of the areas considered unroaded, the areas are not considered interior habitat. The proposed action is not expected to affect areas that would function as biological strongholds or refuges for species that depend on large undisturbed areas, such as the Threatened northern spotted owl.

### **Primitive, Semi-Primitive Non-Motorized Classes of Recreation**

With clear evidence of past forest management, the landscape in the French Bug project is characterized as a patchwork of natural stands and second growth conifer plantations. The proposed treatments would all remain within Forest Plan Standards and Guidelines for Recreation Opportunity Spectrum (ROS) and Visual Quality Objectives (VQO), and would not adversely affect the existing scenic quality of the landscape.

### **Landscape Character and Scenic Integrity**

There are limited opportunities that depend on remote "wilderness-like" experiences in this area as discussed in section 3.11. Roads are either visible or vehicles can be heard from most locations in the project area. Except for short term noise and traffic occurring during project implementation the action alternatives would not diminish any sense of remoteness or solitude that currently exist within unroaded areas in the project area.

### **Traditional Cultural Properties and Sacred Sites**

There are no known cultural sites within any of the stands where timber harvest operations would occur, including managed stands within the unroaded areas. There would be no effect on traditional cultural properties or sites from any of the action alternatives.

### **Direct and Indirect Effects – Roadless and Unroaded Areas – Alternative 3**

Effects to the aforementioned resources will be the same under alternative 3 as in alternative 2. All harvest areas have been previously managed. This alternative will treat an additional 21 acres of previously managed stands.

## Cumulative Effects – Roadless and Unroaded Areas

There will be no additional cumulative effects due to past harvest activities, road building and the French Bug project.

The area of consideration for the unroaded area analysis is the 17,350-acre French Bug project area. Timber sales along with state and federal highway development have contributed to the development of a 98-mile road network in the project area. At an average width of 20 feet, these roads cover an estimated 240 acres or about 1 % of the project area.

About 28,000 acres or of stands have been modified in the French bug project area with silvicultural treatments. Timber sales have modified about 55% percent of the project area. French Bug units fall completely within previously harvested area and do not create any additional newly harvested ground in the project area. All harvest activities will occur in previously harvested stands. In total, about 56% of the project area has been harvested or cleared for road building. French Bug will not increase the percentage of the project area that is modified. No other management actions are planned for the project area that would result in additional affects to unroaded areas.

## 3.14 Monitoring Plan

### Vegetation

A monitoring plan was developed to evaluate the key elements of the prescription and provide contingencies.

Table 3-41. Monitoring plan

Key Prescription Element	Monitoring Threshold	Contingency Plan
Stocking Level	Residual trees per acre shall not deviate by plus or minus 10-12% of the target	The Silviculturist and TSO will monitor the timber marking with sample plots to ensure the prescribed trees per acre. Plot information will be reviewed and, if needed, trees will be marked out or additional trees added.
No-cut Buffers	No trees marked within the designated stream, special habitat and visual resource buffers	The TSO and project resource specialists will monitor the implementation of the timber sale contract provisions for no-cut buffers. If necessary, trees will be marked out if within buffers.
Species Diversity	All hardwoods, western hemlocks, and western red cedar in the overstory are maintained	The Silviculturist and TSO will monitor the timber marking and implementation of the timber sale contract. Any hardwood or minor species that must be removed for safety reasons require approval by the TSO.
Gaps	Gap size, location and other specifications are met	The Silviculturist, Wildlife Biologist and Recreation Planner will monitor timber marking for gap specifications.

## Fire and Fuels, Air Quality

Monitoring of fuels treatments activities will include ocular and photo series assessments of treated areas for the purpose of evaluating the success of implemented fuels reduction plans. Monitoring activities will continue until fine fuel loads have been returned to background levels (7-11 tons/acre).

## Botanical Species

Ten percent of the rare, uncommon and sensitive sites will be monitored one year after harvest to determine that the buffer width is adequate to protect the species.

Invasive plants will be monitoring and treatment will occur within the project area up to 5 years after completion of harvest activities.

## Soils

As the proposed project is carried out, it will be monitored to evaluate implementation efficiency, prescription adequacy, and to update sale area rehabilitation needs or protection. Primary implementation monitoring will be conducted at the contract administration phase of the project by the Timber Sale Officer. The logger will be required to maintain adequate suspension during the harvest process, to remain on designated skid roads and landings with equipment, and to limit the number and extent of skid road utilized. In addition, a host of other contract requirements dealing with such items as erosion control, hazardous material use, fire restrictions, etc. will be enforced. Duff retention will be monitored as part of any post sale activity that may affect the soil resource, such as spot or pile burning, grapple piling, or broadcast burning.

## Heritage Resources

The district archaeologist will conduct post-harvest monitoring to document the condition of each of the following cultural sites: historic logging railroad grade segments (06180400979) in French Bug units 1, 7, 40, 41, 42, 45, and 53.

## 3.15 Consistency with Direction and Regulation

All proposed action alternatives would comply with the following directions and regulations:

- Willamette National Forest Plan, including applicable Standards and Guidelines
- Northwest Forest Plan including applicable Standards and Guidelines
- The Record of Decision
- Clean Air Act
- Clean Water Act
- Endangered Species Act of 1973
- Wild and Scenic Rivers Act
- General Water Quality Best Management Practices Handbook (Pacific Northwest Region, November 1988).



Additional Direction and Regulations applicable to certain sections of this document include:

Resource Area	Direction and Regulation
Fire	State of Oregon Smoke Management Guidelines Northwest Oregon Fire Management Plan
Wildlife	Biological Assessments USFWS Biological Opinions Letters of concurrence
Hydrology and Fisheries	Aquatic Conservation Strategy Objectives Clean Water Act DEQ Sufficiency Analysis for Stream Temperature 303d Listing Executive Orders 11988 and 11990 Magnuson-Stevens Fishery Conservation and Management Act (MSA) 1996 Wild and Scenic Rivers Act Executive Orders 12962, 11988, and 11990
Heritage	National Historic Preservation Act

Other applicable Standards and Guidelines and/or Best Management Practices may exist which were not directly referenced in this document. Their exclusion does not indicate that they were overlooked or are inapplicable. As project development proceeds, appropriate constraints or mitigations may be added or changed in order to better meet the intent of adequate resource protection or enhancement as directed in the 1990 Willamette National Forest Land and Resource Management Plan and Final Environmental Impact Statement.

### 3.16 Irretrievable Irrevocable Commitment of Resources

None of the specialists consulted for this project anticipated any commitment of irretrievable or irrevocable resources.

## Chapter 4. Consultation and Coordination

### Preparers and Contributors

The Forest Service consulted the following individuals; Federal, State, and local agencies; tribes and non-Forest Service persons during the development of this environmental assessment:

#### Interdisciplinary Team (IDT) Members

Christy McDevitt, IDT Leader

Cara Kelly, Archaeologist

Chris Wagner, Botanist

Dani Pavoni, Recreation Planner

Darren Cross, Fisheries Biologist

Daryl Whitmore, Wildlife Biologist

Dave Halemeier, Hydrologist

Doug Shank, Geologist

Jared McCormick, Logging Systems Specialist

Leslie Elliott, Silviculturist

Louie Deshazer, Transportation Planner

Nanci Curtis, Fire and Fuels Specialist

Richard Hatfield, NEPA

### Federal, State, and Local Agencies

For this project, formal consultation with the U.S. Fish and Wildlife Service was completed and a Letter of Concurrence (reference number 13420-2007-I-0038) signed on April 4, 2008. For Northern Spotted Owls a “may affect and not likely to adversely affect” determination was made for effects related to the implementation of the project (USDI, 2008).

Consultation with the National Oceanic and Atmospheric Administration’s National Marine Fisheries Service (NOAA Fisheries) was completed using the *Endangered Species Act Section 7 Informal Consultation for the 2007-2009 Thinning Timber Sales Programmatic on the Mt. Hood and Willamette National Forests and portions of the Eugene and Salem Bureau of Land Management Districts* (NMFS Reference 2007/00170) referred to as Programmatic Timber Sale BA Programmatic Timber Sale BA (2007). A letter of concurrence dated June 10, 2008, was received from NOAA Fisheries.

Under the Programmatic Agreement among the USDA, Forest Service Pacific Northwest (Region 6), The Advisory Council on Historic Preservation, and the Oregon State Historic

Preservation Officer regarding Cultural Resource Management in the State of Oregon by the USDA Forest Service (2004) the North End Forest Heritage Specialist has project review authority, and certifies that the project complies with Section 106 of the National Historic Preservation Act. That certification of the project as “No Historic Properties Affected” was completed on December 5, 2007.

## **Tribes**

Government-to-government consultation regarding this project was conducted with the Confederated Tribes of Grand Ronde Community and the Confederated Tribes of Siletz Indians in 2007 and 2008 during the annual tribal coordination meetings. No comments were received regarding this project at any of these meetings.

In January 2008, a follow-up letter with the results of the cultural surveys was sent to the Grande Ronde, Siletz, and Warm Springs Tribes.

In addition, during the scoping of issues and concerns, as part of the public participation process, letters were mailed to tribal governments on September 14, 2007. No issues were raised regarding the proposed project as a result of that mailing.

## **Elected Officials**

Jeff Skeeters Mayor, City of Idanha

Pat Carty, Mayor, City of Detroit

Rian Windsteimer, Staff for Senator Gordon Smith

Debbie Dorris, Staff for US Rep Darlene Hooley

Scott Winkles, Staff for Senator Ron Wyden

## **Individuals and Organizations**

Scoping comments were received in response to the scoping letter from American Forest Resource Council, Rocky Mountain Elk Foundation, Oregon Wild, the City of Detroit, Oregon Department of Fish and Wildlife, Breitenbush Hot Springs and, Cascadia Wildlands Project. In addition, one scoping comment was received from a member of the public

**Appendix A – Works Cited**

**Appendix B – Wildlife Biological Evaluation**

**Appendix C – Botanical Biological Evaluation**

**Appendix D – Project Consistency with Aquatic Conservation Strategy Objectives**

**Appendix E – Post-Sale Activities**

## Appendix A – Works Cited

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*Caring for the Land and Serving People*

## Appendix B – Wildlife Biological Evaluation

Reply To: 2670 - Biological Evaluation

Date: April 14, 2008

Subject: Biological Evaluation for **French Bug**.

To: Paul Matter, District Ranger  
EA File

Summary of Effects Determinations:

### U.S. Forest Service, Region 6, Sensitive Species

1. Peregrine Falcon – The proposed project may impact the Peregrine Falcon by disturbance. The proposed project may adversely impact individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend to federally listing or a loss of species viability range wide.
2. Harlequin Duck - The proposed project may impact the Harlequin Duck or its habitat. The proposed project may adversely impact individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend to federally listing or a loss of species viability range wide.
3. Baird's shrew - The proposed project may impact the Baird's shrew or its habitat. The proposed project may adversely impact individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend to federally listing or a loss of species viability range wide.
4. Pacific shrew - The proposed project may impact the Pacific shrew or its habitat. The proposed project may adversely impact individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend to federally listing or a loss of species viability range wide.
5. Pacific Fringe Tailed Bat - The proposed project may impact the pacific fringe-tailed bat or its habitat. The proposed project may adversely impact individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend to federally listing or a loss of species viability range wide.
6. Cascade Torrent Salamander - The proposed project may impact the Cascade Torrent Slender salamander or it's habitat. The proposed project may adversely impact individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend to federally listing or a loss of species viability range wide.
7. Oregon Slender Salamander - The proposed project may impact the Oregon Slender salamander or it's habitat. The proposed project may adversely impact individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend to federally listing or a loss of species viability range wide.

The proposed project will have no impact on other U.S. Forest Service sensitive species.

### Federally Threatened, Endangered and Proposed for Listing Species

8. Northern Spotted Owl – The project meets the conditions in the BA and USFWS Letter of Concurrence for a may affect and not likely to adversely effect spotted owls determination. Variable density thinning treatments in dispersal habitat will maintain the habitat as functional dispersal habitat post treatment.

The proposed project will have no effect on other Federally listed or proposed species.

### Summary of mitigation requirements:

- Northern Spotted Owl - The following requirements comply with terms and conditions as stated in the Biological Assessment and USFWS Letter of Concurrence 13420-2007-I-0038 for activities that may affect but are not likely to adversely affect northern spotted owls, due to habitat modification and disturbance. Seasonally restrict helicopter yarding in units 22, 23, 39, 47, 48, 55 & 57 from March 1 – September 30 for type I helicopters. Type I helicopters include CH-47 (Chinook), UH-60 (Blackhawk) and other heavy lifting ships. Kmax helicopters are considered type II helicopters for disturbance based on noise studies on the Olympic National Forest in 2006. Kmax helicopter operations are restricted only in unit 39 from March 1 – July 15. Spring burning of slash piles on landings is seasonally restricted in units 2, 5, 6, 22, 23, 28, 39, 47, 48 & 55 from March 1 – July 15. With these restrictions, to protect spotted owls during the breeding season, adverse affects to spotted owls are avoided.
- Bald Eagle - To protect Bald Eagles, as directed by law, known foraging, sheltering and nesting sites must be located and protected. As bald eagle populations increase new territories will be established and shifts of current resident bald eagle use patterns may change. To determine foraging, sheltering and breeding sites yearly surveys are needed identify them in the project area. Monitor Bald Eagle use patterns yearly (particularly in May to identify new nesting sites) to provide information needed to protect Bald Eagles. Seasonally restrict all harvest related activities associated with units 16, 19-21, 60 & 62 during the critical breeding period of January 1 – August 30 or until survey are conducted to identify use patterns and nesting site locations.

Summary of Design Criteria:

1. Peregrine Falcon - All harvest related activities are restricted in units 20-25, 60, 62 & 64 from January 15 – July 31 to protect the known site from disturbance impacts. Helicopter operations are restricted in unit 19 from January 15- July 31 to protect the known site from disturbance impacts. .
2. Harlequin Duck - All harvest activities are seasonally restricted in units 21, 24, 33, 35 south of road 4696 and unit 36 from March 15 – July 15 to avoid disturbance to foraging and nesting harlequin ducks.

Prepared By: Daryl Whitmore \_\_\_\_\_

Date: April 14, 2008 \_\_\_\_\_

Daryl Whitmore  
Wildlife Biologist

## **Introduction**

This report provides the Biological Evaluation (BE) for wildlife, including terrestrial insects and mollusks, for Forest Service (FS) sensitive species and federally listed threatened, endangered, and proposed species for the French Bug project. Forest Service policy regarding BE's for sensitive species is stated in FSM 2672.4 as follows: "Review all FS planned, funded, executed, or permitted programs and activities for possible effects on sensitive species. The Biological Evaluation is the means of conducting the review and documenting the findings." Forest Service Manual 2670 also provides direction on the review, actions, and programs authorized, funded or implemented by the Forest Service relative to the requirements of the Endangered Species Act (ESA). This BE addresses the potential impacts on federally listed Threatened (FT), Endangered (FE), and Proposed species for the French Bug project. Fish and plant species are addressed in separate BE's prepared by the project fish biologist and botanist respectively.

## **Proposed Management Action**

The **French Bug** project is a proposed timber management project in township 9 south, range 5 east, sections 20-29, 35-36; township 9 south, range 6 east, sections 16, 20-22, 28-31, 33; township 10 south, range 5 east, section 1 and township 10 south, range 6 east, section 6 of the Willamette Meridian. The project is in French creek and lower Breitenbush river drainages. Project elevations range from 1600' to 3600'. The project is adjacent to the city of Detroit and extends approximately 5 miles to the northeast and northwest.

Three alternatives are proposed for the French Bug project. Alternative 1 is the no action proposal. Alternative 2 is thinning and variable density thinning in some units including 0.5 acre gaps. Alternative 2 proposes to treat roughly 1255 acres. Yarding by helicopter will occur on approximately 465 acres and ground based on 790 acres. Alternative 3 is thinning and variable density thinning in some units including 0.5 acre gaps and some larger gaps for big game forage. Alternative 3 proposes to treat roughly 1276 acres. Yarding by helicopter will occur on approximately 359 acres and ground based on 917 acres. Alternative 3 proposes burning 29 acres of gaps.

The purpose of the proposed action is to help contribute timber products to meet Willamette National Forest long-term sustainable harvest levels and to use silvicultural methods to reduce tree density in order to enhance tree growth and structural diversity in stem exclusion stands.

The purpose and need for the proposed action is directed by the Land and Resource Management Plan (LRMP) of the Willamette National Forest as amended by the Record of Decision for the Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl (NWFP). This document provides direction based on designated management areas (MA) and associated standards and guidelines (S&G). February 2008, Willamette National Forest, Biological Assessment for Four Vegetation Management Projects and USFWS Letter of Concurrence 13420-2007-I-0038 issued by the United States Fish and Wildlife Service (USFWS) provides direction for mitigation measures.

Design criteria to mitigate impacts or provide beneficial effects to (Threatened, Endangered, Proposed for listing and regionally Sensitive) TEPS species is required. The project as proposed does require mitigation measures to comply with LRMP standards and guidelines or the management standards as described in the BO.

This biological evaluation addresses the potential effects of the proposed project on Threatened, Endangered, Proposed for listing and Sensitive Species listed in the R-6 Sensitive Species List dated 07/21/2004. Analysis of effects of this proposed project on Federally listed Threatened, Endangered and Proposed species ensures compliance with the provisions of the Endangered Species Act of 1973, P.L.

93-205 (87 Stat. 884), as amended.

All Actions are taken to ensure that management activities do not jeopardize the continued existence of sensitive species or result in an adverse modification of their essential habitat (FSM 2670.3, Region-6 ID 2670-92-1, 1/91).



## Species Considered and Species Evaluated

Table 1 lists the species initially considered for analysis along with their habitat needs.

**Table 1. Summary of Ecological Requirements for Animal Species on the Regional Forester's Federally Listed and Sensitive Species Lists for species with documented or suspected occurrence on the Willamette National Forest (July 21, 2004).**

Species	Habitat
Northern Spotted Owl <i>Strix occidentalis</i>  <i>Status: Federally Threatened and Critical Habitat designated</i>	Occur primarily in the interior of older timber stands with structure required for food, cover, nest sites, and protection from weather and predation. Reproductive habitat = forest w/ canopy closure 60 – 80%; multi-layered, multi-species canopy dominated by large overstory trees (> 30" dbh); abundant large trees w/ deformities (e.g. large cavities, broken tops, dwarf-mistletoe infections, decadence); abundant large snags/down logs; and sufficient open flying space below the canopy. Foraging habitat = forest w/ > 2 canopy layers; overstory trees > 18" DBH; abundant snags/down wood; and a 50%+ canopy closure. Dispersal habitat = forest w/ > 11" DBH trees and > 40% canopy closure. Numerous sightings and occupied territories have been recorded on the Detroit R.D.
Northern Bald Eagle <i>Haliaeetus leucocephalus</i>	Use scattered old-growth conifer trees in proximity to open water near rivers, lakes, and reservoirs with plentiful prey. Feed primarily on fish, but will also eat waterfowl and carrion. On the Detroit R.D. they currently nest at Detroit Reservoir and Marion Lake. Foraging has been documented on most large lakes and streams on the R.D.
Least Bittern <i>Ixobrychus exilis</i>	Freshwater or brackish marshes with tall vegetation. Stalks through the weeds to find prey. Eats small fish, frogs, insects, small mammals, and sometimes bird eggs and chicks. Nests are small platform of sticks and live or dead vegetation, placed in cattails, bulrushes, or bushes 8-14" above water. No habitat or sightings have been recorded on the Detroit R.D.
Bufflehead <i>Bucephala albeola</i>	Nests near mountain lakes and rivers surrounded by open woodlands containing snags, winters on lakes and coastal waters. Nesting normally occurs near lakes in tree cavities 5-50 feet high. Dives underwater and eats small mollusks, fish, snail, and crustaceans. Also eats aquatic insects. Winter sightings common at Big Cliff and Detroit Reservoir and numerous sightings occur during spring migration on seasonal and permanent lakes.
Harlequin Duck <i>Histrionicus histrionicus</i>	During nesting (April-June) adults require fast-flowing water with midstream loafing sites nearby, dense shrub or timber/shrub mosaic vegetation on the bank, and an absence of human disturbance. Nest on ground under the shelter of vegetation, rocks, or large woody debris in close proximity to water. Broods prefer low gradient streams with adequate macroinvertebrate abundance. Breeding and foraging known to occur along the Little North Fork of the Santiam River, North Fork of the Santiam River, Breitenbush river, Marion Creek, Devils Creek and Blowout Creek on the Detroit R.D.
American Peregrine Falcon <i>Falcon peregrinus anatum</i>	Preferred nesting sites are sheer cliffs 75 ft. or more in height having horizontal ledges or small caves. Foraging is associated with a variety of open and forested habitats, however is most closely associated with riparian settings. Numerous potential nest sites occur on the Detroit R.D with five known nesting sites.
Yellow Rail <i>Coturnicops noveboracensis</i>	Feeds in shallow water, eating snails, insects, and some seeds and grasses. Summers on wet meadows, marshes; winters on grasslands, fields, and coastal marshes. No documented habitat or sightings of individuals have occurred on the Detroit R.D.
Black Swift <i>Cypseloides niger</i>	Found near wet cliffs in mountainous regions. Feeds on-the-wing eating flying insects. Nests in small colonies on ledges or mountain crevices associated with waterfalls. There are historical summer records in the Santiam Pass area, Linn County, which suggests breeding in that area. No sightings have been recorded on the Detroit R.D.

<p>Baird's Shrew <i>Sorex bairdii permiliensis</i></p>	<p>Poorly understood and habitat preferences are not known. In 1986 two specimens were trapped from an open Douglas-fir forested area with numerous rotting logs in Polk Co. (Land Mammals of Oregon). It has also been trapped on McKenzie River R.D. in the Mill Creek area and in the Blue River watershed. No documented known locations have been recorded on Detroit R.D.</p>
<p>Pacific Shrew <i>Sorex pacificus cascadenis</i></p>	<p>Poorly understood, but considered a riparian associate generally found in moist areas along class III-IV streams with abundant vegetation and down material. Occasionally found in adjacent conifer forest with moist abundant decaying logs and brush. Nests made of grasses, mosses, lichens, or leaves. Feed on slugs, snails, insects, and sometimes vegetation. No documented known locations have been recorded on Detroit R.D.</p>
<p>Pacific Fisher <i>Martes pennanti</i></p>	<p>Considered a riparian associate but found in a wide variety of densely forested habitats at low to mid-elevations. Diet consists of small and medium-sized forest mammals (porcupines, snowshoe hares, tree squirrels, mice, and voles most common). Also eat carrion, and will seasonally eat birds, bird eggs, amphibians, fish, and insects. Use ground burrows, tree cavities, witches brooms or other clumped growth, or occasionally bird or small mammal nests as resting sites. Tree cavities are used by most maternal females with young and ground burrows are used mostly in winter. Data suggests they do better in areas with minimized fragmentation of old growth, second-growth, and riparian area and in areas with abundant down and standing woody material important. No sightings of fishers have been recorded on the Detroit R.D.</p>
<p>California Wolverine <i>Gulo gulo</i></p>	<p>Found primarily in wilderness or remote country where human activity is limited. High elevation areas appear to be preferred in summer, which may effectively separate wolverines and intensive human disturbance in most areas. In winter wolverines may move to lower elevations that are snowbound and/or have very limited human activity. They are capable of foraging widely (30-40 km) on a daily basis, and do not significantly use young, dense stands of timber or clearcuts. The majority of activity occurs in large expanses of scattered mature timber, with some use of ecotonal areas such as small timber pockets, and rocky, broken areas of timbered benches. Heavy use of openings in areas with good winter populations of big game is a principal source of carrion which makes up much of the wolverine's diet. They also feed on marmots, snowshoe hares, various rodents, insects, insect larvae, eggs, and berries. Historical sightings on the Detroit R.D. have occurred over a wide range of habitat types and locations. Sightings have not been reported in approximately 15 years.</p>
<p>Pacific Fringe-tailed Bat <i>Myotis thysanodes vespertinus</i></p>	<p>Occurs in Oregon, however habitat use is poorly documented. Three captured in 1971 were associated with young coniferous forest. They are known to use caves, mines, rock crevices, and buildings as both day and night roosts. Little is known about habits in winter. Diet of moths, leafhoppers, lacewings, daddy-longlegs, crickets, flies, true bugs, and spiders. Occurrence has been documented on Detroit R.D. (Pat Ormsbee, Willamette N.F.)</p>
<p>Oregon Slender Salamander <i>Batrachoseps wrighti</i></p>	<p>Live in forested areas, especially old-growth Douglas-fir and younger stands with abundant downed large logs. They lay their eggs under thick bark, inside a crevice in a log, or in talus. Juveniles and adults live under thick bark, inside partially decayed logs, or in debris piles around the bases of large snags. They also occur in moist talus w/ abundant woody debris. Sightings have been documented on the Detroit R.D at numerous sites and habitat types.</p>
<p>Cascade Torrent Salamander <i>Rhyacotriton cascadae</i></p>	<p>Live in very cold, clear springs, seeps, headwater streams, and waterfall splash zones. Forage in moist forests adjacent to these areas. Eggs are laid in rock crevices in seeps. Larve and adults live in gravel or under small cobbles in silt-free, very shallow water that is flowing or seeping. Adults may be found under debris on streambanks or in streamside forests and talus during rainy periods. Sightings have been documented on the Detroit R.D.</p>

<p>Foothill Yellow-legged Frog <i>Rana boylei</i></p>	<p>Live in sections of low-gradient streams with exposed bedrock or rock and gravel substrates. Attach eggs to the bottom of quiet scour-pools or riffles in gentle-gradient streams, often where there is only slight flow from the main river. Hatchlings cling to egg masses initially and then to rocks. Nearest known sightings are on private lands adjacent to the Sweet Home R.D. to the south of Detroit R.D. Individuals have not been recorded on the Detroit R.D. and suitable habitat is not present.</p>
<p>Oregon Spotted Frog <i>Rana pretiosa</i></p>	<p>Favor lakes and slow moving streams associated w/a permanent water source w/a soft and muddy bottom. A marsh specialist w/strong preference/requirement for warmer waters; more aquatic than other ranids; often found in water or water's edge floating on the surface or resting on aquatic vegetation. Diet is invertebrates caught above and below the surface. Early breeders: egg masses are typically deposited on top of one another in a communal fashion, not attached to vegetation, and deposited in warmer shallow water, making them susceptible to mortality due to freezing or drying. Individuals have not been recorded on the Detroit R.D.</p>
<p>Northwestern Pond Turtle <i>Clemmys marmorata marmorata</i></p>	<p>Inhabit marshes, sloughs, moderately deep ponds, slow moving portions of creeks and rivers. Observed in altered habitats including reservoirs, abandoned gravel pits, stock ponds, and sewage treatment plants. Occur from sea level to about 1,830 meters. Require basking sites, such as partially submerged logs, vegetation mats, rocks and mud banks, and may even climb a short way onto tree branches that dip into the water. They use uplands for egg laying, overwintering, and dispersal. They may move up to 500 meters and possibly more for overwintering where they burrow into leaf litter or soil. Nest distances from the water course ranges from 3 meters to over 402 meters. Sparse vegetation, usually short grasses or forbs characterize most nesting areas. Individuals have not been recorded on the Detroit R.D and suitable habitat is not present</p>
<p>Mardon Skipper <i>Polites mardon</i></p>	<p>A small, tawny-orange butterfly currently known to exist at seven, small, geographically disjunct areas in Washington, Oregon, and California. In the southern Washington Cascades, the mardon skipper is found in open, fescue grasslands within Ponderosa pine savanna/woodland habitat at elevations ranging from 1900' to 5100'. South Cascade sites vary in size from small, ½ acre or less meadows, to large grassland complexes, and site conditions range from dry, open ridgetops, to areas associated with wetlands or riparian habitats. Within these environments a variety of nectar source plants are important. The short, open stature of native fescue bunchgrass stands allows mardon skippers to access nectar and oviposition plants. Surveys were conducted at high probability sites on the Willamette N.F. including Detroit R.D. in 2007 with no Mardon Skippers located. There are no documented reports of this species on the Willamette N.F.</p>
<p>Crater Lake Tightcoil <i>Pristiloma arcticum crateris</i></p>	<p>Species may be found sparsely distributed throughout Oregon Cascades above 2000' elevation associated with perennially wet environment in mature conifer forests and meadows among vegetation or under rocks and woody debris. Suitable locations within 10 meters of open water generally in areas under snow for extended periods during winter. One documented site on Middle Fork R.D. along with a few sites on Mt Hood, Deschutes, Umpqua, Winema, and Rogue River National Forests. No individual have been documented on the Detroit R.D.</p>

## Species dropped from further analysis

Marsh habitat suitable for the regionally sensitive *Yellow Rail* and *Least Bittern* are not present on the Detroit Ranger District. Wet cliff habitat suitable for *Black Swift* nesting is not found in or adjacent to proposed harvest units. Low gradient streams with exposed bedrock suitable for *Foothill Yellow-legged Frog* habitat is not found on the Detroit Ranger District. Slow moving water with other habitat components needed by *Northwestern Pond Turtles* are not located on the Detroit Ranger District. Slow moving streams or lakes warm enough to support *Oregon Spotted Frogs* are not located in or adjacent to proposed units. Habitat with fescue grass suitable for *Mardon Skipper* habitat was not located in or adjacent to the proposed units.

**The no action alternative which proposed no new activities will have no effects to Threatened, Endangered, Proposed or Sensitive (TEPS) animal species.** Only potential effects of the Action Alternatives will be discussed further in this document.

**Table 2. Species dropped from consideration based on lack of habitat**

<b>Species</b>	<b>Step #1 Pre-field Review</b>	<b>Step #2 Field Recon.</b>	<b>Step #3 Conflict Determination</b>	<b>Step #4 Analysis of Significance</b>
Black Swift	Habitat not present	Not Conducted	None	No impact
Least Bittern	Habitat not present	Not Conducted	None	No impact
Yellow rail	Habitat not present	Not Conducted	None	No impact
Foothill Yellow-legged Frog	Habitat not present	Not Conducted	None	No impact
Northwestern Pond Turtle	Habitat not present	Not Conducted	None	No impact
Oregon Spotted Frog	Habitat not present	Not Conducted	None	No impact
Mardon Skipper	Habitat not present	Not Conducted	None	No impact

**Evaluated Species Survey Information, Environmental Baseline for Species Evaluated, Effects of the Proposed Management Action on Species Evaluated, and Effects Determination**

Analysis of habitat and effects to Threatened, Endangered and Sensitive species are summarized in Table 3. Analysis of impacts was done based on the process established in Section 2670 of the Forest Service Handbook and the R-6 Interim Direction R-6 2670-92-1. In addition to these and the following documents, personal knowledge of the area, professional judgment, and other studies were used to assess the risk of the proposed project adversely affecting a Threatened, Endangered, or Sensitive Species.

**Table 3. Action Alternatives:**

<b>Regionally Sensitive Species</b>	<b>Step #1 Pre-field Review</b>	<b>Step #2 Field Recon.</b>	<b>Step #3 Conflict Determination</b>	<b>Step #4 Analysis of Significance</b>
American Peregrine Falcon	Habitat present	Not Conducted	Yes	May impact
Bufflehead	Habitat present	Not Conducted	None	No impact
Harlequin Duck	Habitat present	Not Conducted	Yes	May impact
Northern Bald Eagle	Habitat present	Conducted	Potential	No impact
Baird's Shrew	Habitat present	Not Conducted	Yes	May impact
California Wolverine	Habitat present	Not Conducted	None	No impact
Pacific Fisher	Habitat present	Not Conducted	None	No impact
Pacific Fringe-tailed Bat	Habitat present	Not Conducted	Yes	May impact
Pacific Shrew	Habitat present	Not Conducted	Yes	May impact
Cascade Torrent Salamander	Habitat present	Not Conducted	None	May impact
Oregon Slender Salamander	Habitat present	Not Conducted	Yes	May impact
Crater Lake Tight coil snail	Habitat present	Not Conducted	None	No impact

<b>Threatened Endangered and Proposed Species</b>	<b>Step #1 Pre-field Review</b>	<b>Step #2 Field Recon.</b>	<b>Step #3 Conflict Determination</b>	<b>Step #4 Analysis of Significance</b>	<b>Step #5 FWS Review</b>
<b>Birds</b>					
Northern Spotted Owl	Habitat present	Not Conducted	Potential	May effect and not likely to adversely effect	Yes

# Effects of Action Alternatives on Species Considered in More Detail

## Birds

### 1. American Peregrine Falcon (*Falco peregrinus anatum*)

Status: Federal: R6: Sensitive

State: None

#### Status Background:

Following a global population depression and the near total disappearance of the American peregrine falcon (*Falco peregrinus anatum*) from habitat throughout much of the United States, largely as a result of environmental contamination (Cade et al. 1988, USFWS 2003), the peregrine was listed as endangered in 1970 under the Endangered Species Conservation Act of 1969 (precursor to the ESA) and subsequently listed under the ESA in 1973. After meeting a variety of objectives listed in regional recovery plans, the peregrine was removed from the Federal ESA list of endangered species on August 25, 1999. Since that time monitoring results suggest that population growth has continued throughout the lower 48 states (USFWS 2003). At present a proposal is being considered that would also remove the peregrine from any listed status under the Oregon ESA.

#### Habitat and Pre-field Review:

In the Pacific states, preferred peregrine falcon nesting sites are sheer cliffs 150 ft. or more in height with horizontal ledges (USFWS 1982). On the Willamette National Forest, cliffs with potential for nesting by peregrine falcons include those that are at least 75 feet high, have horizontal ledges, ledges with overhangs or cave-like openings, have sheer faces inaccessible to ground predators and within 0.5 mile of riparian habitat (USDA 2000). Peregrine falcons feed almost exclusively on birds, many of which may be associated with riparian zones, large bodies of water or an abundance of snag habitat. Other small birds on which peregrine falcons feed are present in drier open areas, particularly where hardwood shrubs and trees are abundant. Some avian prey species of peregrine falcons select for closed coniferous forest. Peregrine falcons can forage widely for prey and will hunt over closed coniferous forest canopies as well as in open areas and over hardwood patches - wherever prey is abundant (Cade et al. 1988).

The project area contains habitat which is suitable for peregrine falcon nesting and one known nesting site. Known and potential nest sites within 3 miles of proposed project activities are analyzed for effects. All units are within 3 air miles of known or unsurveyed potential nesting habitat

The known peregrine falcon nesting site has management zones established which provide recommendations for management of the site. The known site is expected to be occupied yearly by nesting peregrine falcons. The primary management (nesting) zone has recommended seasonal restrictions for human entry with no habitat alteration (such as timber harvest) recommended. The secondary management zone has recommended seasonal restrictions for new human activity (such as timber harvest). Most recreational activities are permitted, within the secondary zone, if they are not expected to disturb nesting peregrine falcons. The recommended seasonal restriction period for this site is from January 15 – July 31. (USFWS, 2003). Units inside the secondary zone are units 20-25, 60, 62, 64 and the eastern ½ of unit 19. The tertiary management zone is a circle 3.0 miles in diameter, centered on the nest site, in which it is recommended that, helicopter use and blasting be seasonally restricted. (USFWS, 2003). Units with helicopter yarding within the tertiary management zone of the known site are 4, 16, 30, 37, 48, 51, 52, 54, 55, 57 and the western 1/2 of unit 19.

Four high potential, eleven medium potential and five low potential nest sites are located within three miles of proposed units. High potential sites are considered occupied by peregrine falcon pairs for determining effects of this project. Low and medium potential sites will not be further analyzed for effects as they are not considered occupied.

One high potential site and two medium potential sites are in close proximity to the known pair and are considered alternate nest sites within the known pair's territory.

Two high potential sites are geographically isolated by a ridgeline from proposed units. The high potential sites are 1.3 & 1.4 miles from the nearest unit with ground based yarding and 1.7 & 1.8 miles from the nearest unit with helicopter yarding. Although within the 3 mile radius, where harvest activities could impact nesting peregrine falcons, no impact is expected to occur based on the topographic buffer of the ridgeline.

One high potential site is within 3 miles of 8 helicopter yarded units (units 22, 23, 25, 30, 64, 35, 36 & 37) and within 2 miles of 11 ground yarded units (units 26, 27, 28, 29, 30, 31, 33, 35, 36, 37, 38). This high potential site is located 1.1 miles from the nearest unit which is unit 29. Unit 29 has ground based yarding and is in direct line of sight to a high potential sight.

#### Field Reconnaissance:

Surveys to determine occupancy by peregrine falcons were conducted in the project area in 2000, 2003, 2004 & 2005. Peregrine falcons were observed at the one known site in the project area with no additional sightings at potential nesting sites.

#### Design Criteria:

All harvest related activities are restricted in units 20-25, 60, 62 & 64 from January 15 – July 31 to protect the known site from disturbance impacts. Helicopter operations are restricted in unit 19 from January 15- July 31 to protect the known site from disturbance impacts.

#### Analysis of Effects

##### **Alternative 2:**

##### Direct and Indirect Effects:

##### **Known nesting site:**

No sale units or harvest activities are proposed within the primary nesting zone. Unit 19 is a mix of ground and helicopter yarded thinning in the secondary and tertiary zones. Unit 19 is not restricted for ground based operations during the nesting period. Units 4, 16, 30, 48, 51, 52, 54, 55 & 57, in the tertiary nesting zone, are not restricted for helicopter yarding during the nesting period. Units 4, 16, 52, 54, 55 & 57 are between 1.1-2.0 miles and units 30, 48 & 51 are between 2.0 – 3.0 miles from the known nest site. Impact potential will be greater for operations closest to the primary nesting zone. Operations in units closest to the known pair and in direct line of sight have the highest probability of impacting nesting peregrine falcons.

Thinning harvest within the secondary and tertiary zones will alter the habitat of prey species by making the stands more open. This habitat alteration is not expected to change the species mix or density in the area. Increases in access for hunting peregrines may occur by making flight into previously closed canopy stands possible. The effect is limited to the time before trees grow and return to closed canopy conditions in approximately 15 years.

##### **Potential nesting sites:**

One high potential site is within 3 miles of helicopter yarded units 30, 35-37 and within 2 miles of ground yarded units 26-31, 33, 35-38 which are not seasonally restricted. Unit 29 is located 1.1 miles away and has a direct line of sight to the potential sight so has the highest potential for nesting disturbance. Disturbance impacts will occur in those \_\_\_\_\_ years when helicopter yarding occurs in units

30, 35-37 and harvest activities occur in units 26-31, 33, 35-38.

Nesting habitat will not be impacted by harvest activities and will continue to provide high quality habitat for peregrine nesting. Proposed project activities will have no impact on peregrine falcon nesting habitat in the project area. Thinning effects on prey base habitat are the same as those described in known site effects.

Cumulative Effects: This alternative does not have potential to create additional cumulative effects to peregrine falcons in the planning area. One timber sale has unharvested units in the tertiary zone of the known nesting pair, these units are seasonally restricted to avoid disturbance impacts. Past, present and reasonable foreseeable forest management activities in the area will maintain cliff habitat suitable for nesting.

Determination: It is my determination that no impact will occur to peregrine falcon nesting habitat from project activities. This is because no nesting habitat will be affected by the proposed activities future occupancy of currently unoccupied sites and the known site will not be impaired by project activities.

This project may impact known peregrine falcons during the nesting period by disturbance and disruption of nesting activities. The known site is assumed to be occupied and nesting failure is expected to occur as a result of harvest related disturbance activities.

This project may impact peregrine falcons at one high probability site during the nesting season by disturbance and disruption of nesting activities. The high potential site is assumed to be occupied and nesting failure is expected to occur as a result of harvest related disturbance activities.

As disturbance is limited in duration to those years in which harvest activities occur this project is not likely to result in a loss of viability in the planning area, or cause a trend to federally listing or a loss of species viability range wide. The project is in compliance with forest standards and guidelines which require nest site protection for raptors.

### **Alternative 3:**

Direct and Indirect Effects: Similar to alternative two with minor changes. Unit 33 would add helicopter and skyline yarding and increase treatment in this unit by 20 acres and unit 30 would change by adding 88 acres of skyline logging which are helicopter yarded in alternative 2. Helicopter yarding will still occur on 19 acres of unit 30. Larger gaps are created in alternative 3 which will add habitat diversity and make prey more available to peregrine falcons by opening the canopy.

### **Known nesting site:**

No sale units or harvest activities are proposed within the primary nesting zone. Unit 19 is a mix of ground and helicopter yarded thinning in the secondary and tertiary zones. Unit 19 is not restricted for ground based operations during the nesting period. Units 4, 16, 30, 48, 51, 52, 54, 55 & 57, in the tertiary nesting zone, are not restricted for helicopter yarding during the nesting period. Units 4, 16, 52, 54, 55 & 57 are between 1.1-2.0 miles and units 30, 48 & 51 are between 2.0 – 3.0 miles from the known nest site. Impact potential will be greater for operations closest to the primary nesting zone. Operations in units closest to the known pair and in direct line of sight have the highest probability of impacting nesting peregrine falcons.

Thinning harvest within the secondary and tertiary zones will alter the habitat of prey species by making the stands more open. This habitat alteration is not expected to change the species mix or density in the area. Increases in access for hunting peregrines may occur by making flight into previously closed canopy stands possible. The effect is limited to the time before trees grow and return to closed canopy conditions in approximately 15 years. Larger gap sizes in this alternative will create openings in the



canopy for a longer period than in alternative 2.

**Potential nesting sites:**

One high potential site is within 3 miles of helicopter yarded units 30, 35-37 and within 2 miles of ground yarded units 26-31, 33, 35-38 which are not seasonally restricted. Unit 29 is located 1.1 miles away and has a direct line of sight to the potential sight so has the highest potential for nesting disturbance. Disturbance impacts will occur in those years when helicopter yarding occurs in units 30, 35-37 and harvest activities occur in units 26-31, 33, 35-38.

Nesting habitat will not be impacted by harvest activities and will continue to provide high quality habitat for peregrine nesting. Proposed project activities will have no impact on peregrine falcon nesting habitat in the project area. Thinning effects on prey base habitat are the same as those described in known site effects.

Cumulative Effects: This alternative does not have potential to create additional cumulative effects to peregrine falcons in the planning area. One timber sale has unharvested units in the tertiary zone of the known nesting pair, these units are seasonally restricted to avoid disturbance impacts. Past, present and reasonable foreseeable forest management activities in the area will maintain cliff habitat suitable for nesting.

Determination: It is my determination that no impact will occur to peregrine falcon nesting habitat from project activities. Because no nesting habitat will be affected by the proposed activities future occupancy of currently unoccupied sites and the known site will not be impaired by project activities.

This project will impact known peregrine falcons during the nesting period by disturbance and disruption of nesting activities. The known site is assumed to be occupied and nesting failure is expected to occur as a result of harvest related disturbance activities.

This project will impact peregrine falcons at one high probability site during the nesting season by disturbance and disruption of nesting activities. The high potential site is assumed to be occupied and nesting failure is expected to occur as a result of harvest related disturbance activities.

As disturbance is limited in duration to those years in which harvest activities occur this project is not likely to result in a loss of viability in the planning area, nor cause a trend to federally listing or a loss of species viability range wide. The project is in compliance with forest standards and guidelines which require nest site protection for raptors.

## 2. Bufflehead (*Bucephala albeola*)

Status: Federal: R6: Sensitive State: undetermined status, breeding population

Habitat and Pre-field Review: Buffleheads forage in lake and pond environments and nest in tree cavities along the shore. Winter sightings are common at Big Cliff and Detroit Reservoirs and numerous sightings occur during spring migration on seasonal lakes. Nesting is possible in high cascade lakes but is rare. The last recorded nesting occurrence on Detroit RD was at Red Butte Lake in 1946 (Birds of Oregon) which is approximately 20 miles southeast of the project area. There are no natural lakes in the project area which could be used for bufflehead nesting. Detroit Reservoir is adjacent to the project area but has not had recorded buffleheads present during the breeding season. Buffleheads nest in tree cavities and nest boxes. Trees with natural cavities are not abundant adjacent to Detroit Reservoir as the forests are not old enough to develop cavities which are associated with older trees. Nest boxes that are present adjacent to Detroit Reservoir have been used by hooded mergansers and wood ducks. Surveys have not been conducted for this species on the Detroit RD although they have been incidentally observed during the fall, winter and spring seasons. Summer surveys at high elevation lakes where buffleheads are suspected to nest have not been conducted on the district.

Field Reconnaissance: Surveys to determine summer occupancy by buffleheads have not been conducted on the Detroit Ranger District or within the project area. During nesting bald eagle surveys at Detroit Reservoir in May of 2007 (6 days) and weekend recreational boating on the reservoir during the summer of 2007 the district wildlife biologist, Daryl Whitmore, has not observed buffleheads during the breeding season.

### Analysis of Effects

#### **Alternative 2:**

##### Direct and Indirect Effects:

Proposed units or landings do not contain and are not adjacent to suitable nesting habitat so no impacts will occur based on habitat.

Units 16,19, 21 & 60 and helicopter landings HE8 & HE11 are in close enough proximity to habitat suitable for bufflehead foraging that disturbance could occur from harvest operations. During the months of November through March reservoir levels are below those needed to provide water in the area adjacent to these units and landings. During the months of April through October bufflehead foraging is possible in the reservoir adjacent to these units and landings. As the April through October time period coincides with maximum surface area on the reservoir many optional areas are available for bufflehead foraging. During the breeding period of late April and early May through early August breeding buffleheads are in high elevation mountain lakes and are not expected to occur in the reservoir area. During spring migration in late April and early May it is possible buffleheads may use the reservoir adjacent to these units and landings for foraging. During the fall when migration from high mountain lakes to lower elevation water bodies occurs it is possible buffleheads may forage adjacent to these units and landings. Disturbance is expected to be insignificant as most foraging use of the area would occur during migrations and would be of very short duration primarily in the spring.

Cumulative Effects: This alternative will not create additional cumulative impacts to buffleheads in the planning area. Peak recreational use of Detroit Reservoir occurs outside the time period buffleheads are expected to use the area. Past, present and reasonable foreseeable forest management and recreational activities in the area are expected to remain unchanged and not impact current bufflehead foraging use of the area.

Determination: It is my determination, based on the above discussion, that alternative 2 of the proposed French Bug Timber sale will have no impact to buffleheads.

**Alternative 3:**

Direct and Indirect Effects: The effects of Alternative 3 are identical to that discussed above for Alternative 2 because the same units and harvest prescriptions and yarding methods occur adjacent to bufflehead foraging and migratory habitat. Therefore, it is my determination, based on the above discussion, that Alternative 3 of the proposed French Bug Timber Sale will have no impact on buffleheads.

### 3. Harlequin Duck (*Histrionicus histrionicus*)

Status: Federal: R6: Sensitive  
State: Sensitive

Habitat and Pre-field Review: Harlequin ducks are classified as sea ducks, and are known to occur along the northern coasts of North America, Greenland, Iceland and northeast Asia where they spend a majority of their annual life cycle in rocky intertidal habitat foraging, loafing and roosting. However, the species is dependent on habitat associated with mountain streams for reproduction. Knowledge of specific habitat requirements of breeding harlequin ducks in the Pacific Northwest is based on a relatively small number of scientific studies of the species throughout the Region.

A recent study by Bruner (1997) of breeding harlequins in the central Cascade Range of Oregon has shown riparian habitat associated with 1st through 5th order streams having mixed conifer and hardwood vegetation in a variety of seral stages to have a strong influence on nest site selection and reproductive success. Use of riparian and aquatic habitat for breeding, loafing and foraging was found to be most associated with low gradient, 3rd order or greater streams with abundant in-stream rock and large woody material and overhanging streamside vegetation. Use of relatively clear rapidly flowing water with cobble to boulder substrates is universal to harlequin duck studies, and likely relates to the distribution of benthic macroinvertebrates (the duck's primary food source in breeding habitat) which are usually most abundant in such areas (Cassirer and Groves 1991). Concealing cover appears important at nest sites. Ninety-five percent of the 20 nest sites studied by Bruner had overhead cover within 1 meter of the nest, and all sites had horizontal cover surrounding nests that provided safety for incubating hens from ground-based threats. Bruner found nest locations varied from within floodplain sites to upslope locations that included cliff habitat. Overall, the horizontal distance to water averaged less than 11 meters, while vertical distance to water averaged about 9 meters.

Predator threats to this species include ravens, otters and other small mammals that could prey on eggs and young in the nest. Other potential threats to the breeding population of harlequin ducks in the Oregon Cascades include: 1) slope or road failure and subsequent debris torrents and sedimentation that could affect downstream aquatic macro-invertebrate levels, 2) activities that degrade cover habitat or potential nesting habitat within riparian areas, 3) other activities such as road and trail reconstruction and maintenance through nesting habitat, and various recreational activities such as camping, boating, fishing and hiking that could disturb breeding birds at nest sites.

A study in the central Oregon Cascades (Bruner 1997) noted the earliest female observed in potential breeding habitat paired with a male was on March 30, with the earliest nest initiation by a female on April 16. Typically, the breeding season for harlequin ducks in the central and northern Oregon Cascades extends from April 15 to August 1, with May 1 through July 15 the period when reproductive success is most vulnerable and the species is most sensitive to disturbance (Thompson et al. 1993). Evidence suggests a critical period occurs when females start incubation until young are three weeks of age - mid April to mid July depending on chronology. Cassirer and Groves (1991) studied the species' ecology in Idaho and determined male harlequin ducks apparently leave breeding areas shortly after incubation commences. This is believed to be true in the Cascades of Oregon as well (Marshall et al. 2003). As broods develop they tend to leave the immediate nest area with the hen and migrate downstream over the course of the summer.

Field Reconnaissance: Surveys to determine occupancy by breeding harlequin ducks were conducted on French Creek for two previous sales with no birds detected. French Creek is in a cold canyon which reduces productivity and the bottom of the stream is in many places bedrock with no substrate for species harlequin ducks feed on. Units adjacent to French Creek are 1, 7, 10, 11, 15, 16, 39, 40, 41, 43, 45 & 53. As French creek is not expected to have harlequin ducks present, harvest operations in these units are not expected to have potential for disturbance to foraging or nesting harlequin ducks.

Unit 19 is adjacent to Detroit Reservoir and is not expected to have flowing water suitable for harlequin duck foraging during the breeding season.

The Breitenbush River is a known breeding area for harlequin ducks and has not been recently surveyed. Surveys have not been conducted on the Humbug Creek portion of the proposed project. Humbug Creek is assumed to be suitable habitat for harlequin ducks. Proposed units 21, 24, 31, 35-38 are adjacent to suitable foraging habitat for harlequin ducks and contain habitat suitable for nesting.

## **Analysis of Effects**

### **Alternative 2:**

Design Criteria: All harvest activities are seasonally restricted in units 21, 24, 35 south of road 4696 and unit 36 from March 15 – July 15 to avoid disturbance to foraging and nesting harlequin ducks.

Direct and Indirect Effects: Habitat suitable for harlequin duck nesting will remain suitable for nesting after units are thinned so no long-term impacts are expected on nesting habitat. The main effect of the project will be potential disturbances to nesting and foraging birds.

Habitat suitable for nesting and adjacent to foraging areas for harlequin ducks occurs in units 31, 35 north of road 4696, 37 & 38. Harvest activities are not seasonally restricted in these units to protect nesting harlequin ducks during the breeding period. Disturbance and disruption of nesting is expected to occur in these units and adjacent foraging habitat as a result of project activities where harlequin ducks are present. Disturbance impacts will occur only in those years when harvest activities occur in these units.

Cumulative Effects: This alternative will create additional short-term disturbances to harlequin ducks in the planning area, but will not affect habitat. No other foreseeable activities are known that would further reduce habitat or increase baseline disturbance levels. Thinning that is presently occurring in the Planning area from another sale is seasonally restricted to avoid disturbance harlequins and will not affect nesting habitat. Past, present and reasonable foreseeable forest management activities will maintain forest habitats suitable for nesting.

Determination: It is my determination that this project may impact harlequin ducks by disturbance and disruption of nesting. As disturbance will occur only in those years that project activities occur during the breeding season in units 31, 35 north of road 4696, 37 & 38, this project is not likely to result in a loss of viability in the planning area, or cause a trend to federally listing or a loss of species viability range wide. No impact will occur as a result of habitat modification because no nesting habitat will be removed by the proposed activities.

### **Alternative 3:**

Design Criteria: All harvest activities are seasonally restricted in units 21, 24, 33, 35 south of road 4696 and unit 36 from March 15 – July 15 to avoid disturbance to foraging and nesting harlequin ducks.

Direct, Indirect and Cumulative Effects: Alternative 3 is identical to alternative 2 based on effects to harlequin ducks. The only difference is in alternative 3 unit 33 has added acres that occur adjacent to Humbug creek. Unit 33 has seasonal restrictions to protect foraging and nesting harlequin ducks from disturbance during the breeding season.

Determination: It is my determination that this project may impact harlequin ducks by disturbance and disruption of nesting. As disturbance will occur only in those years that project activities occur during the breeding season in units 31, 35 north of road 4696, 37 & 38, this project is not likely to result in a

loss of viability in the planning area, nor cause a trend to federally listing or a loss of species viability range wide. No impact will occur as a result of habitat modification because no nesting habitat will be removed by the proposed activities.

#### 4. Northern bald eagle (*Haliaeetus leucocephalus*)

Status: Federal: R6: Sensitive

State: Threatened

Indicator species for endangered species habitat

Habitat: Bald eagles require habitat consisting of scattered old-growth conifer trees near available fish sources. Bald eagles forage widely during non-nesting season, and scavenge on carcasses such as deer and elk.

Statewide bald eagle populations are increasing and new nesting sites are discovered yearly. As populations increase statewide it is reasonable to expect additional nest sites to become established on the Detroit Ranger District. Nesting habitat is available in areas of the district where foraging habitat is available such as the Breitenbush River, North Santiam River and Little North Fork of the Santiam River.

The Detroit Ranger District has two known nesting pairs of bald eagles. One nesting pair is located at Detroit Reservoir and a second at Marion Lake. Marion Lake is approximately 19 miles southeast of the French Bug project. Foraging habitat occurs in the project area at Detroit Reservoir and along the Breitenbush River. The areas most frequented by bald eagles at Detroit Reservoir are outside the planning area adjacent to the southern edge of the city of Detroit.

Two habitat reserve areas are located adjacent to Detroit Reservoir in the Detroit Reservoir Bald Eagle Management Area. Each habitat reserve is approximately 140-148 acres and contains the last remnant old growth stands adjacent to the reservoir. These reserves are in addition to the reserve area surrounding the known nesting site. The Willamette Forest LMP lists these areas as potential and existing bald eagle nesting sites and allocated one known and one potential site for Detroit Reservoir. Two potential sites were designated at Detroit Reservoir as part of the Detroit Reservoir Bald Eagle Management Plan. Once expanding populations of Bald Eagles establish a second territory near Detroit Reservoir retention of the unoccupied site will be reevaluated.

Pre-field review: Bald eagles have been observed foraging at Detroit Reservoir in the planning area. One known pair of nesting bald eagles is located approximately 5 miles southwest of the project area and occasionally forages in the project area. The known pair has been monitored using the same nesting area since 1988.

In 2007 bald eagles were removed from the USFWS threatened and endangered species list. At this time protection of the species was no longer primarily from the Endangered Species Act. Several other laws, plans and acts apply to management and protection of bald eagles.

References used to aid in analysis were the Pacific States Bald Eagle Recovery Plan, USFWS, 1984, The Detroit Lake Bald Eagle Site Plan, 1994, Land and Resource Management Plan, Willamette National Forest, as amended, 1990, Bald and Golden Eagle Protection Act, 1940/1978, Migratory Bird Treaty Act as amended in 1972 and the National Bald Eagle Management Guidelines, USFWS, 2007.

Protection under the Bald and Golden Eagle Protection Act prohibits disturbance which would agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1)injury to an eagle, 2)decrease in it's productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior. (USFWS, 2007).

Portions of units 19, 20, 21 & 60 are within the Bald Eagle Management area for Detroit Reservoir.

Trees suitable for nesting are located within proposed units and these trees are not proposed to be cut. Trees suitable for nest building are remnant old growth trees which are surrounded by younger forests which this project proposes to thin.

Field reconnaissance: Field reconnaissance of Detroit Reservoir Bald Eagle use was conducted on January 13, 2007 and for 6 days in May of 2007. The historical nesting site was occupied by one pair of bald eagles. During these surveys a new pair of non-nesting bald eagles was observed using the Detroit Flats area and North Santiam river arm of the reservoir for foraging. These eagles were first observed in the winter of 2006-2007 near Piety Island. The new pair did not establish a nest site in 2007. One sub-adult bald eagle was observed using Detroit Reservoir and Big Cliff Reservoir for foraging in 2007.

The new pair of bald eagles is expected to establish a nest site in 2008, or later, somewhere in the area adjacent to their 2007 foraging territory. The most likely area for nest establishment is adjacent to the North Santiam River arm of Detroit Reservoir which is outside the project area.

Design Criteria: To protect Bald Eagles, as directed by law, known foraging, sheltering and nesting sites must be located and protected. As bald eagle populations increase new territories will be established and shifts of current resident bald eagle use patterns may change. To determine foraging, sheltering and breeding sites yearly surveys are needed identify them in the project area. Monitor Bald Eagle use patterns yearly (particularly in May to identify new nesting sites) to provide information needed to protect Bald Eagles. Seasonally restrict all harvest related activities associated with units 16, 19-21, 60 & 62 during the critical breeding period of January 1 – August 30 or until survey are conducted to identify use patterns and nesting site locations.

### **Analysis of effects**

#### **Alternative 2:**

##### Direct and indirect effects:

Potential disturbance of nesting Bald Eagles could occur if a nest is established in or near these units and project related activities occur during the critical nesting period. Unsurveyed habitat in the Detroit Bald Eagle Management area is assumed to be occupied unless surveys determine the habitat is unoccupied. To avoid potential disturbance of newly established nest sites in or adjacent to proposed units in the Bald Eagle Management area and to comply with legal requirements for protection of Bald Eagles a seasonal restriction will be required for harvest activities in these units. With required seasonal restrictions potential disturbance impacts to Bald Eagles will be avoided.

Cumulative effects: There are no effects associated with past, present, and reasonably foreseeable activities in the project area that when added to the effects of the proposed action are expected to result in cumulative effects. Nesting habitat adjacent to foraging habitat in proposed units is not being removed by the French Bug project or other activities in the area. Sales in the area have and are currently thinning stands adjacent to the reservoir and in the Detroit Lake Bald Eagle Management Area while preserving remnant old growth trees in the units which could be used for nesting.

Determination: It is my determination that, because nesting habitat will not be removed and sale activities will not increase disturbances to Bald Eagle foraging areas at Detroit Reservoir, Alternative 2 will have no impact to Bald Eagles.

#### **Alternative 3:**

Alternative 3 is identical to alternative 2 as it relates to impacts to bald eagles. Gaps in units 20, 60 & 62 will be burned in this alternative and these units are seasonally restricted for all harvest related activities to protect nesting bald eagles. Gap sizes are different in units 20 & 60 which do not change habitat or potential impacts to nesting bald eagles when compared to alternative 2. Therefore, it is my determination that Alternative 3 of the proposed French Bug Timber Sale will have no impact to bald eagles.



5. Northern spotted owl (*Strix occidentalis caurina*)

Status: Federal: Threatened

State: Threatened

Indicator species for Old-growth and mature coniferous forests.

Habitat and Pre-field review: The northern spotted owl is primarily an inhabitant of old growth and mature forests. Suitable spotted owl habitat contains adequate quantities of dead and down woody material, decadent trees, a medium to high crown closure, multiple layers in the overstory, and trees at least 200 years old or greater than 32 inches dbh (ISC Report 1990). However, all of the above characteristics do not need to be present for spotted owls to be present or for spotted owls to make use of an area, and for habitat to be determined suitable.

Suitable spotted owl habitat has been defined in various documents: The ISC Report, USFWS Critical Habitat Determination, Memorandum Decision and Injunction for Judge Dwyer's Decision, and the FSEIS on Management of the Northern Spotted Owl in the National Forests. General guidelines for suitable spotted owl habitat are forested stands of Douglas-fir, Western hemlock, Western red cedar, or Ponderosa pine older than 200 years and having a moderate to high canopy closure of 60-80%. An under-story of multi-layered conifers and hardwoods open enough to still allow owls to fly within and beneath it, moderate to high snag densities, and large logs are also found in typical spotted owl habitat. However, all of the above characteristics do not need to be present for spotted owls to make use of an area, and for habitat to be determined suitable.

Dispersal habitat typically would not have the large, old-growth nest trees, multi-layered canopy, or many large snags and logs. The minimum canopy closure for dispersal habitat is 40% and minimum diameter 11" dbh.

Critical habitat is designated by the USFWS to identify lands that are considered essential for the conservation and recovery of listed species. Critical habitat units (CHU) OR-12 & OR-13 overlap the project area to the north and southeast.

Existing Condition: Prior to harvest in the analysis planning area there are 7,496 acres of suitable spotted owl habitat (nesting and foraging) and 9,127 of dispersal only habitat. Total dispersal habitat is a total of dispersal only and suitable habitat which is 16,623 acres covering 65.5% of the forested area. Total forested acres in the planning area are 25,375. Total non-forested acres are 1,842.

Lower elevation areas which could be accessed by railroads were logged in the 1900's. Trees in the lower elevation areas in which units are planned are between 56 & 76 years of age with average diameters of 14.2 in first thins and 15.2" dbh in second thins. Previous clearcut harvesting fragmented spotted owl habitat in areas above the railroad logged areas. The largest intact old growth habitat block, in the planning area is in the Cliffs Creek drainage in the southeast corner of the planning area. Suitable habitat in the planning area is well connected by dispersal habitat.

Seven known Spotted Owl activity centers, including six within 100 acres late successional reserves small (LSRS), and three predicted activity centers are located in the French Bug analysis area. Of the eight known activity centers seven are daytime pairs and one is based on nighttime responses from a resident single bird. Four of the known activity centers within LSRS's are also within critical habitat units. One predicted activity center is in critical habitat unit OR-13. Four known and two predicted activity centers are located on matrix land.

Challenges to spotted owl conservation exist range-wide, including potential threats from wildfires, barred owl competition, great horned owl predation, West Nile Virus and sudden oak death. Disturbances on the landscape from wildfires and wind storms have affected spotted owl habitat.

The U.S. Fish and Wildlife Service has determined that reduction of suitable spotted owl habitat below 40% of the median home range (1,182 acres) has notably higher likelihood of leading to disruption of essential breeding, feeding and sheltering behaviors (USDI Fish and Wildlife Service, 1992). A 1.2 mile radius around the activity centers defines the median home range. Suitable habitat acres in home ranges will not be altered by the project as nesting and foraging habitat is not present in the proposed

project units. The proposed project units occur only in habitat suitable for spotted owl dispersal and non-habitat.

**Table 4 Owl activity centers within 1.2 mile radius of proposed harvest units**

Spotted Owl Master Site Number	Basis for Activity Center	Existing Condition Spotted Owl Habitat Acres within 1.2 mile radius home range			Post Harvest Spotted Owl Habitat Acres within 1.2 mile radius home range No change from existing conditions		
		Nesting	Foraging	Total	Nesting	Foraging	Total
0731	Daytime Pair – observed	1006	207	1213	1006	207	1213
0754	Daytime Pair - observed	284	433	717	284	433	717
3298	Daytime Pair - observed	725	355	1080	725	355	1080
3304	Daytime Pair - observed	456	155	611	456	155	611
3333	Evening Resident Single - observed	171	818	989	171	818	989
3334	Daytime Pair - observed	164	487	651	164	487	651
3335	Daytime Pair - observed	159	236	395	159	236	395
194	Predicted Pair Location	188	831	1019	188	831	1019
284	Predicted Pair Location	191	950	1141	191	950	1141
374	Predicted Pair Location	1022	170	1192	1022	170	1192

Guiding documents for Spotted Owl analysis include: Land and Resource Management Plan, Willamette National Forest, as amended, 1990; Record of Decision, for amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl, U.S. Department Of Agriculture, Forest Service; U.S. Department of the Interior, Bureau of Land

## **Design criteria common to all action Alternatives**

The following requirements comply with terms and conditions as stated in the “Willamette National Forest, Biological Assessment for Four Vegetation Management Projects” and Letter of Concurrence from USFWS 13420-2007-I-0038 for activities that may affect but are not likely to adversely affect northern spotted owls, due to habitat modification and disturbance.

Seasonally restrict helicopter yarding in units 22, 23, 39, 47, 48, 55 & 57 from March 1 – September 30 for type I helicopters. Type I helicopters include CH-47 (Chinook), UH-60 (Blackhawk) and other heavy lifting ships. Kmax helicopters are considered type II helicopters for disturbance based on noise studies on the Olympic National Forest in 2006. Kmax helicopter operations are restricted only in unit 39 from March 1 – July 15. Spring burning of slash piles on landings is seasonally restricted in units 2, 5, 6, 22, 23, 28, 39, 47, 48 & 55 from March 1 – July 15. With these restrictions, to protect spotted owls during the breeding season, adverse affects owls are avoided.

The project as proposed, in all alternatives, avoids activities which would fall into the following seasonal restriction periods. These terms and conditions are referenced as an aid to project planners if they consider activities outside of the current proposals in their final alternative selection process. During harvest operations consult the district wildlife biologist prior to initiating any activities not described below or in the proposed action, such as whistles on yarding equipment and activities outside harvest units, which produce noise above ambient levels and may disrupt spotted owl nesting.

The hauling and removal of hazard trees for public safety are not seasonally restricted. Project related activities involving chainsaws are prohibited within 65 yards of known spotted owl activity and 284 yards of predicted centers from March 1 – July 15. Heavy equipment use is prohibited within 35 yards of known spotted owl activity centers and 254 yards of predicted activity centers from March 1 – July 15. Post-harvest burning is prohibited within 440 yards of known activity centers and 659 yards of predicted activity centers from March 1 – July 15. However, post-harvest prescribed burning may take place during the critical breeding period if the unit falls within 440 yards/.25 miles of unsurveyed suitable habitat when no activity center is present. These restrictions do not apply to activity centers or other suitable habitat that are surveyed to protocol and found to be unoccupied or have no nesting activity. Chainsaw and heavy equipment use is not restricted within any proposed harvest units. The location of known activity centers are isolated from road systems and harvest units and no proposed activities will occur within the disruption distance for activity centers.

Field reconnaissance: Surveys in parts of the area where units are proposed were conducted in 1990, 1991 & 1998. No surveys were conducted as part of the French Bug analysis.

## Analysis of effects

### **Alternative 2:**

#### Direct and indirect effects:

#### **Effects of Habitat Modification**

On matrix land outside CHU, 969 acres of dispersal habitat will be thinned and remain dispersal habitat after thinning. On matrix land, outside CHU, 109 acres of dispersal habitat will have gaps created to enhance diversity and no thinning will occur with dispersal habitat remaining dispersal habitat after treatment. On matrix land inside CHU OR-12, 62 acres of dispersal habitat will be thinned and will remain dispersal habitat. On matrix land inside CHU OR-13, 216 acres of dispersal habitat will be thinned and will remain dispersal habitat. On matrix land, inside CHU OR-13, 85 acres of dispersal habitat will have gaps created to enhance diversity and no thinning will occur with dispersal habitat remaining dispersal habitat after treatment. Only dispersal habitat is proposed for treatment by thinning and will remain dispersal habitat after treatment.

Seven known Spotted Owl activity centers including six within 100 acres late successional reserves small (LSRS) and three predicted activity centers are located in the analysis area. Of the seven known activity centers six are daytime pairs and one is based on nighttime responses from a resident single bird. Three of the known activity centers within LSRSs are also within CHUs. One predicted activity center is in critical habitat unit OR-13. Four known and two predicted activity centers are located on matrix land outside CHUs.

The stands in this sale area were railroad logged and not replanted. Natural regeneration occurred and created very dense stands which are approximately 56-76 years old. Some of the stands were thinned in the last 10 years and have not developed a snag and down wood component. The second thinning of these units is occurring much sooner than would be expected based on tree growth and is more a function of stem density, as the first thin did not remove enough trees. These stands were prescribed to have 70% crown closure after the first thinning. Gaps are being created in units 60, 62 & 64 to add diversity to the stands with no additional thinning prescribed. Fourteen other units will have gaps created as part of variable density thinning. Red cedar will be planted in all gaps.

These stands lack primary constituent elements such as downed wood and snags. A few remnant older trees are present with unit 52 having the most at an estimated 7 older trees, this does not make the stands suitable as foraging habitat. Most units have no remnant trees with a few having one or two. Average stand diameters in first thins is 14.2" and in second thins 15.2" dbh. Thinning units in CHUs have an average stand diameter of 13.2" dbh. All thinning units in CHU are first entry thins. Two units in CHU are creating gaps only in units 60 & 62.

As thinning these units will increase tree growth and average diameters over time it is beneficial to spotted owls. Variable density thinning adds diversity to the stands which also benefits owls by providing more diverse habitats for prey species.

**Table 5 Action descriptions used to clarify effect determination of the proposed action on spotted owl habitat from the “Willamette National Forest, Biological Assessment for Four Vegetation Management Projects” and Letter of Concurrence 13420-2007-I-0038.**

Action	Effect to Spotted Owl	Rationale for Effect Determination
Thinning that maintains dispersal habitat – 1255 acres	MA,NLAA	This activity is not likely to have a measurable effect on the ability of spotted owls to forage, or shelter while they are dispersing, since this action will maintain sufficient canopy and structure to function as dispersal habitat

<sup>1</sup> MA,NLAA = may affect, but is not likely to adversely affect

### Effects of Disturbance from Habitat Modification Project Activities

The BA for batched consultation, which included this project, did not include any actions which would result in a May Affect and Likely to Adversely Affect from disturbance determination. All MA-LAA disturbance activities are prohibited in the French Bug project. Only MA-NLAA or NE disturbance activities are planned to occur.

Disturbance from habitat modification projects is evaluated based on distance from suitable habitat and a subset of this is distance from a known activity center which results in nesting disruption potential.

Disturbance as defined in the B.A. “consists of the distance from the project boundary outward that would potentially cause a spotted owl, if one was present, to be distracted from its normal activity. This is generally .25 mile from a unit or activity associated with the project and .5 mile for helicopter operations. This type of activity is outside the disruption distance and within the .25 mile disturbance distance and results in a ‘may affect, but not likely to adversely affect’ spotted owl determination by the USFWS.

Disruption as defined in the B.A. “consists of the distance from the project boundary outward that would potentially cause a spotted owl, if one was present, to be distracted from its normal activity to such an extent to significantly impact its normal behavior (harass). The disruption distance is a subset of the disturbance distance.” Distances for various activities which result in disruption are listed in Table 6 below.

The proposed action includes all processes needed to plan, evaluate, survey, prepare and complete activities including, but not limited to, falling, bucking, hauling, road reconstruction; and the interdependent actions of rock source operations, post-harvest burning, and post-harvest firewood sales. Rock pit operations may require blasting, rock crushing, and operation of heavy equipment. B.A. p.4

Activities which were not addressed in B.A are activities within the disruption distance of a known or predicted spotted owl activity center during the critical breeding season of March 1 – July 15. Except for hauling and the removal of hazard trees to protect public safety, activities in this category are prohibited unless the activity center is known to be unoccupied or there is no nesting activity as determined by survey to protocol.

**Table 6 General effects determinations to spotted owls from disruption associated with habitat modification activities near an active or predicted owl site.**

ACTIVITY	DISTANCE FROM ACTIVE NEST SITES			TIME PERIOD
Use of a Type I helicopter	≤ 440 yards	440 - 880 yards	> 880 yards	
	<b>Prohibited</b>	MA-NLAA	NE	March 1 – July 15
	No activity proposed within this category	MA-NLAA	NE	July 16 – September 30
	NE	NE	NE	October 1 – February 28
Use of Type II-IV helicopters	≤ 120 yards	120 – 440 yards	> 440 yards	
	<b>Prohibited</b>	MA-NLAA	NE	March 1 – July 15
	MA-NLAA	MA-NLAA	NE	July 16 – September 30
	NE	NE	NE	October 1 – February 28
Use of chainsaws	≤ 65 yards	65 – 440 yards	> 440 yards	
	<b>Prohibited</b>	MA-NLAA	NE	March 1 – July 15
	MA-NLAA	MA-NLAA	NE	July 16 – September 30
	NE	NE	NE	October 1 – February 28
Use of heavy equipment	≤ 35 yards	36 – 440 yards	> 440 yards	
	<b>Prohibited</b>	MA-NLAA	NE	March 1 – July 15
	MA-NLAA	MA-NLAA	NE	July 16 – September 30
	NE	NE	NE	October 1 – February 28
Prescribed burning	≤ 440 yards		> 440 yards	
	<b>Prohibited</b>		NE	March 1 – July 15
	MA-NLAA		NE	July 16 – September 30
	NE		NE	October 1 – February 28
Hauling		≤ 440 yards	> 440 yards	
		MA-NLAA	NE	March 1 – September 30
		NE	NE	October 1 – February 29

Kmax helicopters are considered Type I helicopters for the ICS definition but will be considered Type II for the purposes of disturbance. Sound readings from Kmax helicopter logging on the Olympic NF registered 98 dB at 150 yards (Piper 2006).

**Cumulative effects:** The Habitat and pre-field review section and table 4 reflect current habitat conditions for NSO considering all impacts to date. Habitat is expected to improve over time in spotted owl critical habitat units as areas which are currently dispersal habitat will grow into suitable habitat. Matrix land will develop suitable habitat in riparian reserves which is expected to remain intact for long periods of time. Non-riparian matrix land is expected to cycle through periods of no habitat and dispersal habitat as timber harvest occurs.

Ongoing road maintenance is expected to continue to fall hazard trees adjacent to roads which will continue to reduce the quality of suitable spotted owl habitat in the planning area. Personal use firewood cutting is expected to continue near roadways and is expected to maintain reduced amounts of downed wood and thus lower the quality of suitable habitat adjacent to road corridors.

Due to suitable habitat not being proposed for treatment in other projects and dispersal habitat being well connected with suitable habitat in the planning area these foreseeable actions in conjunction with the effects of implementing Alternative 2 are not expected to compromise the functionality on any NSO home ranges or create barriers to dispersal across the project area.

**Determination:** Disturbance MA-NLAA or NE activities are planned to occur as part of the project. MA-NLAA disturbance will occur by helicopter yarding 651 acres of thinning units within the disturbance distance of 0.25 miles of unsurveyed suitable habitat during the March 1 – July 15 critical

nesting period.

Habitat MA-NLAA effects will occur by thinning 990 acres of matrix dispersal habitat, outside CHU, which will remain dispersal habitat after treatment. MA-NLAA habitat effects will occur by creating gap cut in diversity enhancement units in 110 acres of dispersal habitat, outside CHU, where no thinning will occur. MA-NLAA habitat effects will occur by thinning 287 acres of matrix dispersal habitat in CHU which will remain dispersal habitat after treatment. MA-NLAA habitat effects will occur by creating gap cut in diversity enhancement units in 85 acres of dispersal habitat, inside CHU, where no thinning will occur. MA-LAA disturbance activities are prohibited.

Communications with the U.S. Fish and Wildlife Service: Interagency cooperation between the Forest Service (or other federal agency) and the U.S. Fish and Wildlife Service, regarding proposed, threatened or endangered species, is described in Section 7 of the Endangered Species Act. Definitions relating to “consultation” and “conferencing” are given in the FSM Supplement 2600-90-6.

Need for further consultation with the U.S. Fish and Wildlife Service is based on the project’s effects on T&E species and critical habitat. Based on the finding of this BE that the French Bug timber sale is not likely to adversely affect northern spotted owls, concurrence is needed from the USFWS for this determination.

French Bug was submitted to USFWS in February 2008 as part of the “Willamette National Forest, Biological Assessment for Four Vegetation Management Projects” requesting a letter of Concurrence from the USFWS. Alternative 3 was submitted to USFWS as it has 21 more acres of thinning and larger gap sizes than Alternative 2.

### **Alternative 3**

Direct and indirect effects: Alternative 3 is almost identical to alternative 2 in terms of seasonal restrictions and effects. Differences between alternatives are insignificant and are mostly a function of different gap sizes in variable density thinning units. Larger gaps create more habitat diversity and more options for different foraging opportunities for spotted owls. Larger gaps will be burned resulting in 29 acres of gaps burned. Burning in gaps and landings is seasonally restricted where gaps occur within the disruption distance of activity centers or unsurveyed suitable habitat to protect nesting owls. Unit 12 has one more acre of gap than in alternative 3. The largest difference occurs in unit 33 where in alternative 2, ground based yarding of 10 acres of thinning unit is increased in alternative 3 to 22 acres of ground based and 8 acres of helicopter yarded thinning of dispersal habitat in matrix outside CHU. In unit 30 under alternative 2, helicopter yarding of 106 acres is changed to 20 acres of helicopter with skyline yarding on the remaining 86 acres. The acres in unit 30 remain the same just the yarding system changes. Unit 36 in alternative 2 has 28 acres of helicopter yarding while in alternative 3 the same acres have 4 acres helicopter yarding and 24 acres of skyline yarding.

In summary alternative 3 has 21 more acres than alternative 2 which are thinning acres in dispersal habitat on matrix land outside CHU. In units with different helicopter yarding acres none are within the disturbance or disruption distance of spotted owl activity centers so effects are the same in alternatives 2 & 3.

French Bug was submitted to USFWS in February 2008 as part of the “Willamette National Forest, Biological Assessment for Four Vegetation Management Projects” requesting a letter of Concurrence from the USFWS. Alternative 3 was submitted to USFWS as it has 21 more acres of thinning and larger gap sizes than Alternative 2.

## MAMMALS

### 6. Baird's Shrew (*Sorex bairdi permiliensis*)

Status: Federal: R-6: Sensitive

State: None

Habitat and Pre-field Review: Baird's shrew is known to inhabit forested riparian areas in the Cascade mountains. Riparian habitat does exist within the proposed project area. As part of unit design to comply with protection measures related to endangered fish habitat all streams have a no harvest buffer of 30' with a 50' buffer on streams within 1 mile of Chinook spawning streams and a 100' buffer on Chinook spawning areas in lower French creek, Breitenbush river and Humbug creek. Numerous perennially flowing streams are located in and adjacent to proposed units.

Field Reconnaissance: No surveys have been conducted to determine presence of Baird's shrews on the Detroit RD.

### Analysis of Effects

#### **Alternative 2:**

Direct and indirect effects: The proposed project may impact the Baird's shrew or its habitat if they are present and using the forested habitat and riparian habitat which may be present beyond the buffered stream areas. Most perennial flowing streams with riparian habitat have no harvest buffers which protect the habitat and little riparian habitat is expected to extend beyond the stream buffer. Harvest activities may occur in riparian buffer areas and cause disturbance while harvest of trees in these buffers is prohibited.

Cumulative effects: Riparian habitat is protected by riparian buffers in the planning area. Past activities in the planning area have had little impact on perennial streams. No other projects are planned which would have an impact on riparian associated habitat in the planning area. There are no effects associated with past, present, and reasonably foreseeable activities in the project area that when added to the effects of the proposed action are expected to result in cumulative effects.

Determination: Streams are buffered to exclude harvest so riparian habitat will not be adversely impacted by proposed activities. As Baird's shrew habitat use is not well understood it is expected that individuals using forested habitat may be impacted by harvest activities. The disturbance to individuals is of limited duration and is not expected to exclude Baird's shrews from using the area. Habitat is not expected to be made unsuitable to Baird's shrew use. Harvest impacts are very small in terms of overall habitat in the planning area. Based on all action alternatives effecting potential habitat for Baird's shrews, it is my determination that all action alternatives may impact the Baird's shrew or its habitat, but is not likely to result in a loss of viability in the planning area, nor cause a trend to federally listing or a loss of species viability range wide.

#### **Alternative 3:**

Direct and Indirect Effects: Alternative 3 has 21 more harvest acres in non-riparian habitat than alternative 2. Burning of gaps larger than one acre is not occurring in riparian habitat. As the additional harvest acres and gap burning are not in riparian habitat, impacts for Alternative 3 are the same as what was described for Alternative 2 above.



## 7. Wolverine (*Gulo gulo luteus*)

Status: Federal: R6: Sensitive  
State: Threatened

Habitat and Pre-field Review: Wilderness or remote country where human activity is limited appears essential to the maintenance of viable wolverine populations. High elevation wilderness areas appear to be preferred in summer, which tends to effectively separate wolverines and humans. In winter, wolverines move to lower elevation areas which are snowbound with very limited human activity. Wolverines make little use of young, thick, timber and clear-cuts (Hornocker and Hash, 1981).

Wolverines appear to be extremely wide-ranging, and unaffected by geographic barriers such as mountain ranges, rivers, reservoirs, highways, or valleys. For these reasons, Hornocker and Hash (1981) concluded that wolverine populations should be treated as regional rather than local.

Results of a recent study suggest that the historical distribution of wolverines in the Pacific Coast mountains was limited primarily to the northern Cascade Range in Washington from Mt. Rainier north to the Canadian border and the central and southern Sierra Nevada in California from Lake Tahoe south to its terminus near Mt. Whitney. The only evidence of wolverine occurrence historically in the intervening area are 2 documented records from the northern Cascade Range in Oregon. Given the isolation and extreme scarcity of records from Oregon, these reports may represent dispersals from populations in other regions. Whether or not the wolverine occurred in Oregon historically, its distribution in the Pacific states appears to have been disjunct. (Aubry 2006). The last verified wolverine sighting in Oregon was in 1992. (Aubrey et. Al. 2007)

Historical sightings on the Detroit RD have occurred over a wide range of habitat types and locations. Sightings have not been reported in approximately 15 years.

Field reconnaissance: Wolverine surveys have been conducted on the Detroit Ranger District. Cooperative aerial surveys with Oregon Department of Fish & Wildlife were conducted during the winters of 1997-98, 1998-99, 1999-2000 and 2000-2001. Camera bait sets were used to detect carnivores in the winters 2002, 2003 & 2004 with no wolverines detected. Wolverine dens or tracks were not located on the district.

An unusual snow event occurred in the fall of 2003 which allowed vehicle access to snow covered high elevation areas including the French Bug project area. An additional walk in snow tracking survey was conducted in the Marion lake area at this time. No wolverines were detected on the district during these surveys.

### Analysis of effects

#### **Alternative 2:**

Direct and indirect effects: Potential foraging may occur through the area as wolverine home ranges usually are between 170 to 270 square miles. Disturbance by equipment is of limited duration and not expected to impact wolverines which may forage through the area as it is highly unlikely that any wolverine would occur in the project area during the proposed sale.

Cumulative effects: Wolverines tend to avoid areas of human disturbance and the planning area is heavily used by people for recreation & forest management activities which would be expected to discourage wolverine use of the area. Opal Creek and Bull of the Woods Wilderness areas a few miles to the North of the project area are seldom used by humans due to lack of trails and steep terrain and provide suitable habitat for wolverines. High human use of the project area during the summer and fall is expected to continue and create conditions unfavorable to wolverine occupancy. The wilderness is expected to continue to provide suitable habitat for wolverines adjacent to the planning area if

wolverines were present in the state.

Determination: Because the project area has extensive human activities during the summer and fall time periods, which wolverines prefer to avoid, it is unlikely they will occur in this area. If wolverines forage or disperse through active project areas they can easily avoid proposed units by using adjacent undisturbed forested habitat. The adjacent wilderness has extensive undisturbed areas which are more likely to be occupied than non-wilderness areas such as the project area. Based on wolverine occupancy of the project area being highly unlikely and project activities being easily avoided by using adjacent forested habitat, it is my determination that all action alternatives will have no impact on wolverines.

**Alternative 3:**

Direct and Indirect Effects: Impacts from alternative 3 are the same as those listed in alternative 2. The 21 additional acres and other insignificant differences in alternative 3 do not change impacts to wolverines.

## 8. Pacific Fisher (*Martes pennanti*)

Status: Federal: Candidate for listing R-6: none  
State: Critical

Habitat and pre-field review: The Pacific fisher is found in a wide variety of forested habitats. Fishers are opportunist feeders and one would find more flying squirrels in their diet than snowshoe hares. Very little is known about fishers in Oregon. Fishers are not known to exist in the project area or on the Detroit ranger district.

Fishers in different regions may have different ecologies (Powell and Zielinski 1994) and, as is true with most field study data, caution should be exercised when extrapolating results from studies conducted in one region to another. However it is commonly suggested in published literature that fisher in the Western states are closely associated with late-successional conifer forests and riparian habitats possessing an interior forest component and abundant structural diversity – particularly for use as denning habitat (Banci 1989, Heinemeyer and Jones 1994, Powell and Zielinski 1994). A recent Oregon study (Yaeger 2005) found that structural characteristics may outweigh stand age with respect to selection for use as denning or resting habitat. A spatial and seral mixture of forest habitats may represent the most optimal environment for the species because of its reportedly diverse diet and large home range for an animal its size (range = 7.3mi<sup>2</sup> - 30.5mi<sup>2</sup> for adult male).

Overall habitat composition and connectivity, especially comprised of riparian coniferous and mesic forest types, plus security from disturbance for reproductive females may be two key factors to address in considering management of habitat with the welfare of fishers in mind.

Habitat conditions in this area during the reference era favored the likelihood of occupancy by fisher, as it is located well within the historic range for this species and would have been relatively free from human disturbance – especially during the breeding season. Then, as now, population densities would be expected to have been low given our current understanding of fisher ecology.

Maj and Garton (1994) mapped observation records for fisher from 1961 through 1982, which show a cluster of sighting locations in Willamette River watersheds. They also mapped records from 1983 through 1993, which show a sharp decline for sightings in the same location. Occurrence and breeding status data presented by O’Neil et al. (2001) show that fisher both occurs and breeds in Oregon. A review of local records for sightings reported between 1979 and 2005 revealed zero reports of fisher sightings in the Detroit Ranger District. There is no current confirmation that this species occupies habitat in the vicinity of the project, however there is confirmation of fisher presence within the past decade at a location approximately 80 air miles southeast of the planning area on the Umpqua National Forest. Presence was confirmed based on photographic evidence obtained at a remote camera station during a survey conducted by the Oregon Department of Fish and Wildlife.

It has been proposed, and generally accepted that any fishers that may occur in this area are members of one of two genetically isolated populations remaining in Oregon; and also that any individuals in the southern Cascade Range population are descendants from a reintroduction effort that occurred between 1977 and 1981 (Aubry and Lewis 2003).

Literature suggests fisher are more likely to associate with late seral and old-growth habitat, but may also be expected to occur within younger stands if they contain structural components more commonly associated with older stands. Mature stands and/or stands with 70% canopy closure are located throughout the planning area, and possess sufficient structural diversity such that they are assumed to serve as suitable fisher resting and denning habitat (Yaeger 2005). Potential forage and dispersal habitat are also present and includes much of the remaining forested habitat across the planning area.

Field Reconnaissance: Specific field surveys for fisher have not been conducted within the planning area. Nor has any evidence of the presence of this species been detected as a result of any field reconnaissance or surveys associated with this project throughout the planning process to date.

Carnivore surveys using automated cameras at bait sets were conducted on the Detroit Ranger District during the winters of 2002 & 2003. No fishers were detected at these stations. An unusual snow event occurred in the fall of 2003 which allowed vehicle access to snow covered high elevation areas. Surveys during this unusual event did not locate fisher tracks. A walk in snow tracking survey was conducted in the Marion lake area at this time. No fishers were detected during these surveys.

## **Analysis of Effects**

### **Alternative 2:**

Direct and indirect effects: Habitat will remain available for fisher use in the project area and adjacent wilderness. Fishers are not known to occur on the Detroit R.D. so any project disturbance effects are expected to be inconsequential if they occur at all.

Cumulative effects: Opal creek and Bull of the Woods Wilderness adjacent to the northern edge of the project area has not experienced large fires in the last decade which has occurred in the Mount Jefferson wilderness which reduced the amount of habitat available for fishers. These wilderness areas experienced major fire events in the 1800's and have since re-grown to closed canopy mature forests. Small patches of older remnant trees are scattered through this forest matrix. Wilderness areas adjacent to the project area are expected to continue providing suitable habitat for fishers. On land outside wilderness habitat suitable for fisher use is expected to increase as current land management practices leave more forest intact after harvest activities. Re-growing forests in previously clearcut areas will begin providing habitat as they mature. Past practices reduced suitable habitat for fishers, current and expected practices are expected to increase habitat over time. The proposed project when combined with other habitat related factors in the area is not expected to add to cumulative effects.

Determination: Based on large areas of undisturbed habitat occurring in the project area and adjacent wilderness areas habitat will remain available for fisher use. As populations are not known to exist on the district or in the planning area disturbance of individuals is very unlikely, it is my determination that all action alternatives will have no impact on Pacific Fishers.

### **Alternative 3:**

Direct and Indirect Effects: Impacts from alternative 3 are the same as those listed in alternative 2. The 21 additional acres and other insignificant differences in alternative 3 do not change impacts to fishers.

## 9. Pacific Fringe-tailed Bat (*Myotis thysanodes vespertinus*)

Status: Federal: R-6: Sensitive

State: Vulnerable

Habitat and Pre-field review: Prefers forested or riparian areas. Nursery colonies have been located in caves, mines and buildings. Project is within the range of the Pacific Fringe-tailed bat. The project is altering habitat which is expected to be used by Pacific fringe-tailed bats. Potential habitat for nursery colonies is located within the project boundaries in old growth trees. From aerial photo analysis approximately 17 remnant old growth trees can be seen in proposed units. These trees will be retained in harvest units unless they are determined to be safety hazards. Stands throughout the planning area and adjacent to proposed harvest units contain residual and large stands of old growth trees which are expected to continue providing roosting and nursery habitat.

Field Reconnaissance: Bat surveys have not been conducted in the planning area.

### **Analysis of Effects**

#### **Alternative 2:**

Direct and indirect effects: The proposed project may impact the Pacific fringe-tailed bat or its habitat. Potential effects may occur if old-growth tree habitat which has potential to be used for nursery colonies are felled as hazard trees during harvest operations. Individual old-growth trees are distributed throughout the project and analysis area and are providing habitat. Any loss of individual old-growth trees in harvest units will have an inconsequential effect on overall habitat availability as suitable individual and patches of old growth trees are located in unharvested adjacent stands.

Cumulative Effects: Previous harvest activities removed most old-growth trees which contained defect and cavities which could be used as roosting and nursery habitat by bats. Although this resulted in reduced habitat on the acres contained in harvest units adjacent stands retained old-growth and continued to provide habitat. Current and expected management is expected to retain these old-growth through multiple harvest cycles. In addition, over time green tree retention areas are expected to eventually begin providing trees with old-growth characteristics as they age. The proposed project units will retain most if not all trees with old-growth characteristics. Ongoing hazard tree removal adjacent to roads is expected to continue to reduce trees with defect that could provide habitat to bats. As adjacent areas have suitable habitat for bats the effect of hazard tree removal along roads is inconsequential. Sale units in the French Fly timber sale in the same planning area are thinning trees with similar retention standards as those in the proposed sale and is expected to have an inconsequential impact on bat habitat. The proposed project when combined with past, present and expected future activities will not add cumulative effects to Pacific Fringe-tailed bats or their habitat.

Determination: Suitable habitat for roosting and nurseries is present in and adjacent to project units. Over time this habitat is expected to increase as wildlife trees and trees in green tree retention areas age and develop old-growth characteristics. Old-growth located in proposed harvest units will be retained. Based on suitable roosting and nursery habitat being present in the project and adjacent analysis areas suitable habitat is not limited. It is my determination that action alternatives may impact the Pacific fringe-tailed bat by removing trees with defect in harvest units that may be safety hazards. Based on potential habitat occurring in some proposed units the action alternatives may impact individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend to federally listing or a loss of species viability range wide.

#### **Alternative 3:**

Direct and Indirect Effects: Impacts from alternative 3 are the same as those listed in alternative 2. The 21 additional acres and other insignificant differences in alternative 3 do not change impacts to Pacific

Fringe-tailed bats.

10. Pacific Shrew (*Sorex pacificus cascadenis*)

Status: Federal: R-6: Sensitive

State: None

Habitat and Pre-field review: The Pacific shrew is found in humid forests of western Oregon. Potential habitat does exist in the project area. “Pacific Shrew are often found in moist wooded areas with fallen decaying logs and brushy vegetation.” (Land Mammals of Oregon, p.54-55) The project area is in the expected elevation and geographic range of the Pacific Shrew. Most of the proposed units are adjacent to or contain riparian areas which are perennially wet and contain downed wood and brushy vegetation suitable for habitat.

Field Reconnaissance: No surveys have been conducted to determine the presence of Pacific Shrews on the Detroit RD.

### **Analysis of Effects**

#### **Alternative 2:**

Direct and indirect effects: Habitat in the planning area is suitable for occupancy by the Pacific Shrew. Habitat may be impacted in the short term by disturbance and is expected to remain suitable habitat after harvest. The proposed project may impact the Pacific shrews by disturbance of individuals if they are present in the project area. Harvest impacts are expected to be insignificant if they occur at all.

Cumulative effects: Past management practices involving clear cutting harvest followed by slash burning has reduces decaying wood in the planning area. Current and expected future harvest treatments will leave much more decaying wood. Forested habitat has not been converted into non-forest habitat so overall the amount of forested habitat is stable. When considered as part of the other activities in the area the proposed project action alternatives are not expected to cause additional negative cumulative effect to Pacific shrews.

Determination: The disturbance to individuals is of limited duration and is not expected to exclude Pacific shrews from using the area. Habitat is not expected to be made unsuitable for Pacific shrews. Based on forested habitat being present and the potential that the habitat can be occupied, it is my determination that all action alternatives may impact the Pacific shrew or its habitat, but is not likely to result in a loss of viability in the planning area, nor cause a trend to federally listing or a loss of species viability range wide.

#### **Alternative 3:**

Direct and Indirect Effects: Burning of gaps of 1 acre or more in alternative 3 will increase impacts to Pacific Shrews in the 29 acres of larger gaps. The 21 additional acres and other insignificant differences in alternative 3 do not change the determination of impacts to Pacific Shrews as shown in alternative 2.

## HERPETILES

### 11. Cascade Torrent Salamander (*Rhyacotriton cascadae*)

Status: Federal: R-6: Sensitive  
State: Vulnerable

Habitat and Pre-field review: Cascade Torrent Salamanders are expected to be found in streams with flowing cold water and wet areas immediately adjacent to streams. Habitat for Cascade torrent salamanders is located in proposed units and adjacent areas. As part of unit design to comply with protection measures related to endangered fish habitat all streams have a no harvest buffer of 30' with 50' on streams within 1 mile of Chinook spawning streams and a 100' buffer on Chinook spawning areas in lower French creek, Breitenbush river and Humbug creek. Numerous perennially flowing streams are located in the planning area.

Field Reconnaissance: Not conducted for Cascade Torrent Salamanders.

### Analysis of Effects

#### **Alternative 2:**

Direct and indirect effects: Habitat for this species occurs in perennially flowing streams throughout the planning area. Flowing cold streams and the wet areas immediately adjacent to them are protected by a no harvest buffer and were excluded from planned units or are in protected special habitat areas. Disturbance to individuals and habitat by harvest activities may occur in the stream buffer areas while harvesting of trees is prohibited. It is possible, but unlikely, habitat and individuals could be disturbed if harvest activities cause disturbance to wet areas.

Cumulative effects: Riparian areas with flowing cold water and wet areas immediately adjacent to streams have not been significantly impacted in the past by harvest activities in the planning area. These areas are expected to retain natural conditions and see an increase in tree sizes as riparian areas are managed to maintain natural conditions over time. Future conditions will improve over time as a result of riparian area protection. When considered together with other activities in the analysis area this project does not add to other past, present and reasonably foreseeable activities to produce any cumulative effects.

Determination: Based on the possibility that flowing cold water and wet areas may be disturbed by harvest activities, it is my determination that all action alternatives may impact the Cascade Torrent Salamanders or its habitat, but is not likely to result in a loss of viability in the planning area, nor cause a trend to federally listing or a loss of species viability range wide.

#### **Alternative 3:**

Direct and Indirect Effects: Impacts from alternative 3 are the same as those listed in alternative 2. The 21 additional acres and other insignificant differences in alternative 3 do not change impacts to Cascade Torrent Salamanders. Additional acres in alternative 3 do not occur in riparian areas.



12. Oregon Slender Salamander (*Batrachoseps wrighti*)

Status: Federal: candidate R-6: Sensitive

State: Undetermined status

Habitat and Pre-field review: Oregon Slender Salamanders are expected to be found under bark and moss in Douglas fir forests, they also use talus and rocky areas as habitat. This type of habitat is found throughout the analysis area and in project units. The proposed project will disturb forested environments which may contain Oregon slender salamanders.

Field Reconnaissance: Surveys were not conducted for the Oregon Slender Salamander in the project area.

### **Analysis of Effects**

#### **Alternative 2:**

Direct and indirect effects: The proposed project may impact the Oregon Slender Salamander or its habitat. There is potential for habitat removal and disturbance of individuals if they are present in the project area. Bark and other woody debris is expected to be present after harvest and provide habitat for Oregon Slender Salamanders. Some bark and woody debris is expected to be removed by the project through removal of sound logs and burning of harvest generated slash. After thinning trees are more susceptible to natural mortality from wind and snow events and many will fall and contribute to downed woody debris. Impacts to individuals is of short duration and is insignificant in effect as the surrounding unaffected area as well as the project area will continue to provide habitat for this species.

Cumulative effects: The type of habitat used by Oregon Slender Salamanders is readily available across the landscape and other projects and natural events have not significantly altered this habitat. Several thinning projects have occurred in the planning area and in the same units as French Bug in the past decade. Natural mortality from snow and wind have caused trees to fall in the thinned areas which contribute to downed wood, which is important for Oregon Slender Salamander habitat. When considered together with other activities in the analysis area this project does not add to other past, present and reasonably foreseeable activities to produce any cumulative effects.

Determination: The disturbance to individuals is of limited duration and is not expected to exclude Oregon Slender Salamanders from using the area. Habitat is not expected to be made unsuitable for Oregon Slender Salamanders. Based on downed wood, bark and moss being disturbed and the potential that the habitat can be occupied, it is my determination that all action alternatives may impact the Oregon Slender Salamander or its habitat, but is not likely to result in a loss of viability in the planning area, nor cause a trend to federally listing or a loss of species viability range wide.

#### **Alternative 3:**

Direct and Indirect Effects: Burning of gaps of 1 acre or more in alternative 3 will increase impacts to Oregon Slender Salamanders in the 29 acres of larger gaps. The 21 additional acres in alternative 3, when compared to alternative 2, will increase the total acres impacted which could contain Oregon Slender Salamanders with the determination of impacts remaining the same as alternative 2.

## MOLLUSKS

### 13. Crater Lake Tightcoil (*Pristiloma arcticum crateris*)

Status: Federal: R-6: Sensitive

State: None

Habitat and Pre-field review: The Crater Lake Tight coil is a snail that may be found in perennially wet situations in mature conifer forests, among rushes, mosses and other surface vegetation or under rocks and woody debris within 10 m. of open water in wetlands, springs, seeps and riparian areas, generally in areas which remain under snow for long periods in the winter. Riparian habitats in the Eastern Oregon Cascades may be limited to the extent of permanent surface moisture, which is often much less than 10 m. from open water. (Pilsbry, 1946). Habitat is present in the planning area and is not present in proposed harvest units. Potential habitat for this species is very limited across the landscape and generally falls inside protected habitat types.

Field Reconnaissance: Riparian areas which may have habitat suitable for *pristiloma* are excluded from harvest units and will not be disturbed by project activities. Surveys were conducted to determine locations of suitable habitat. Most streams surveyed for habitat were determined to be unsuitable due to steep gradient steep banked streams with no vegetation which is perennially wet. The only potentially suitable habitat located in the project area is adjacent to unit 13 and was surveyed to protocol with no *pristiloma* detected. Late in the planning process two perennially wet areas located by contract surveys for hydrology were identified in unit 28. As snow had already fallen in the area and surveys were not possible to determine *pristiloma* presence they were assumed to be occupied and a 10 meter no disturbance buffer was put around them for protection.

### Analysis of Effects:

#### **Alternative 2:**

Direct and indirect Effects: Habitat is present in proposed unit 28 and is protected by a no disturbance buffer of 10 meters out from the perennially wet areas. As potential habitat is protected in no disturbance areas, and suitable habitat adjacent to other proposed units were surveyed with no *pristiloma* located, there will be no direct or indirect effects to Crater Lake Tightcoil snails from project activities.

Cumulative Effects: No other activities are negatively affecting potential habitat for this species. As no past, present or reasonably foreseeable activities are known to affect habitat for this species no cumulative effects will occur as a result of this project.

Determination: Based on potential habitat being excluded from project activities, and suitable habitat adjacent to proposed units being surveyed to protocol with no detections, it is my determination that all alternatives will have no impact on Crater Lake tightcoil snails.

#### **Alternative 3:**

Direct and Indirect Effects: Impacts from alternative 3 are the same as those listed in alternative 2. The 21 additional acres and other insignificant differences in alternative 3 do not change impacts to Crater Lake Tightcoil snails.

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**Table 7.**

## REGIONAL FORESTER'S SENSITIVE ANIMAL LIST FOR THE WNF (REVISED 07/2004)

<u>SPECIES</u>	<u>OCCURRENCE ON WNF</u>	<u>OREGON STATE STATUS</u>	<u>FEDERAL STATUS</u>
<b>BIRDS</b>			
<u>Falco peregrinus anatum</u> American peregrine falcon	D	E	S
<u>Cypseloides niger</u> Black Swift	S	P/N	S
<u>Bucephala albeola</u> Bufflehead	D	U	S
<u>Histrionicus histrionicus</u> Harlequin Duck	D	U	S
<u>Haliaeetus leucocephalus</u> Northern Bald Eagle	D	T	S
<u>Strix occidentalis caurina</u> Northern Spotted Owl	D	T	T
<b>MAMMALS</b>			
<u>Sorex bairdi permiliensis</u> Baird's Shrew	D	-	S
<u>Gulo gulo luteus</u> California wolverine	D	T	S
<u>Lynx Canadensis</u> Canada Lynx	D	-	T
<u>Sorex pacificus cascadenis</u> Pacific Shrew	D	-	S
<u>Myotis thysanodes vespertinus</u> Pacific Fringe-tailed Bat	D	V	S
<u>Martes pennanti</u> Pacific Fisher	S	C	S

<u>SPECIES</u>	<u>OCCURRENCE ON WNF</u>	<u>OREGON STATE STATUS</u>	<u>FEDERAL STATUS</u>
<b>INSECTS</b>			
<u>Polites mardon</u> Mardon Skipper	S	-	S
<b>AMPHIBIANS AND REPTILES</b>			
<u>Batrachoseps wrightii</u> Oregon Slender Salamander	D	D	U S
<u>Rhyacotriton cascadae</u> Cascade Torrent Salamander	D	V	S
<u>Rana boylii</u> Foothill Yellow-legged Frog	D	V	S
<u>Rana pretiosa</u> Oregon Spotted Frog	D	C	S
<u>Clemmys marmorata marmorata</u> Northwestern pond turtle	D	C	S

**Occurrence on Willamette NF:**

**S = Suspected**

**D = Documented**

**State Sensitive Status:** (Oregon Department of Fish and Wildlife, Oregon Natural Heritage Data Base Etc.)

**C = Critical.** Listing as threatened or endangered is pending, or for which listing may be appropriate.

**V = Vulnerable.** Listing as threatened or endangered is not believed to be imminent or can be avoided through continues or expanded use of adequate protective measures and monitoring.

**P = Peripheral.** Those whose Oregon population are on the edge of their range.

**N = Naturally rare.** Those species which had low population numbers historically in Oregon because of naturally limiting factors.

**U = Undetermined Status.** Species for which status is unclear.

**Federal Status:**

**T = Threatened**

**E = Endangered**

**S = Sensitive**

**P = Proposed for Listing**

**C = Candidate** (Needs further information to confirm the appropriateness of proposing the taxon to the list of Endangered or Threatened species)

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## Appendix C – Botanical Biological Evaluation

File Code: 2510

Date: 2/18/2007

Route To:

Subject: Botanical Biological Evaluation for French Bug Timber Sale

To: Paul Matter, District Ranger/Project Files

Prepared by: /s/ Chris Wagner March, 2008  
*Chris Wagner, Botanist* *Date*

Reviewed by: /s/ Jennifer Lippert March, 2008  
*Jennifer Lippert, Forest Botanist* *Date*

Date: March 11, 2008  
File Code: 2510 Botany

Subject: French Bug project BE

## **I. Introduction**

### **Purpose:**

The purpose of this Biological Evaluation is to review the French Bug Timber Sale Project in sufficient detail as to determine whether the proposed action will result in a trend toward Federal listing of any sensitive plant species.

Forest management activities that may impact populations of or alter habitat for TESP (threatened, endangered, sensitive, or proposed) species require a Biological Evaluation (FSM 2671.44) to be completed. The Biological Evaluation process (FSM 2672.43) is used to assist in determining the possible effects the proposed management activities have on: Species listed or proposed to be listed as endangered (E) or threatened (T) by the U.S. Fish and Wildlife Service (FWS) and species listed as sensitive (S) by the USDA Forest Service, Region 6. There are 72 botanical listed on the Regional Forester's 2006 Sensitive Plant List that are documented or suspected to occur on the Willamette National Forest (Attachment 1).

### **Plant Species of Concern:**

Current management direction mandates conservation of several categories of rare botanical species on the Willamette National Forest. Protection of federally listed Threatened and Endangered species is mandated by the Endangered Species Act. No federally listed Threatened or Endangered, nor suitable habitat for these listed plants are known to occur in the project area. Sensitive species are protected by USDA Forest Service regulations and manual direction (FMS 2672.4).

A prefield review was conducted to determine if habitat exists for species on the list. This included review of old surveys, ISMS and sensitive plant databases and special habitat layers. Several previous projects in and around the French Bug Timber sale were surveyed and were found to have sensitive plants and suitable habitat present or potentially occur in or around the project area. Results show no known previous occurrences of sensitive plant species within the project units but several known occurrences outside of units and in surrounding areas. There is also potential habitat for 54 sensitive species (see Appendix A).

## **II. Description of the Proposed Project**

### **Location and Description:**

The French Bug Timber Sale is located in the Detroit Reservoir/ Blowout Divide Creek Watershed and in the Breitenbush River Watershed, north of the town of Detroit and along French creek Road and Breitenbush Road, on the Detroit Ranger District, Willamette National Forest, OR. The legal location for the project is: T.9S., R.6E., Sections 16, 21, 22, 28, 29, 30, 31, and 33; T.9S., R.5E., Sections 20-29, and 36; T.10S., R.5E. Section 1 and T10S., R.6E Section 6.

### ***Proposed Action and Alternatives***

The Detroit Ranger District of the Willamette National Forest proposes to commercially thin about 2100



acres of young second growth managed forests to enhance the growth and structural complexity of timber stands. This action would also provide a sustainable yield of timber for commercial products to local and regional economies. The following activities are associated with this project:

1. Commercial thinning of about 2100 acres of managed stands which would result in the removal of about 13 MMBF of merchantable timber. All stands in the planning area were previously harvested, about half of which occurred during the 1920's and 1930's when railroads were being built through this area. Some of the stands were previously commercially thinned in the 1980's and 1990's. This includes thinning in riparian reserves where it would meet the intent of the Aquatic Conservation Strategy Objectives.
2. Patch or gap cuts of less than one acre each would be established on about 200 acres of proposed project units to enhance structural, spatial, and seral stage diversity.
3. Harvest systems for this project would include roughly 40% helicopter logging, 50% skyline logging and 10% ground based yarding. These relative percentages would ultimately be determined by the final harvest units included in the project and amount of temporary roads constructed – more roads would result in fewer acres of helicopter logging. The relative amount of helicopter logging may affect the economic viability of the project and influence the alternative that is ultimately selected by the responsible decision maker.
4. Construction of about 0.4 miles temporary spur roads to access timber harvest units. The spur roads would be decommissioned by ripping, water-baring, and re-establishing drainage, and then seeded after harvest activities to minimize soil erosion and maintain water quality.
5. Road maintenance and reconstruction activities on about 36 miles of existing Forest System roads. Maintenance and reconstruction needs vary by road, but include such things as brushing, reconditioning of roadways and ditches, replacing culverts, and cut slope repair. Road work will help provide for user and public safety and meets the Forest Plan objectives.
6. Fuel reduction treatments designed to reduce fuel loadings would occur to bring stands to levels within Forest Plan standards and guidelines.

These activities would most likely be implemented in fiscal years 2010-2013.

***Proposed Actions and Alternatives:***

- I. No Treatment.
- II. Harvest roughly 14.6 MMBF on 1255 acres by thinning and gap cuts. Thinning would occur on 1221 acres, ½ acre gaps would occur on 34 acres. Pre-commercial thin 111 acres in seven young managed stands, fertilize about 325 acres, reopen 2200 feet of temporary road spurs. Construct 1000 feet of new temporary spur roads (roads will be closed after use. Maintain 34.5 miles of existing system roads. Reconstruct 2.5 miles of existing system roads. Grapple pile and burn where forest roads intersect units. Burn piles at landings. Rehabilitate and build one parking area in unit 31. Eradicate high risk weed populations along roads, contain existing weeds inside harvest units. Cleanup of harvest generated slash at landings and dispersed sites. Rip and close skid roads and prune limbs damaged during operations along Breitenbush road.
- III. Same as Alternative II except harvest roughly 15.1 MMBF on 1276 acres, thin 1226 acres, ½ acre gap cuts on 21 acres with added large gaps (1-3 acres) on 29 acres, 2 acres

of gap cuts along powerlines, gaps (one acre or less) would occur on 2 acres to reduce powerline electrical outages from falling trees, construct 4000 feet of new temporary spur roads (roads will be closed after use), maintain 36 miles of existing system roads, reconstruct 4.4 miles of existing system roads (including 1.5 miles of 703 road in unit 30, .5 miles of 086 road in unit 33 and 36), relocate 0.12 miles of existing system roads (086 road in unit 33), broadcast burn 29 acres, rehabilitate and build two small parking areas in unit 31 for recreation access, gate 4.3 miles of road to limit winter access only, and gate 2.0 miles of road to limit year-round access.

### **III Existing Environment**

#### **Biological Evaluation Process**

Under the suggested procedure for conducting a biological evaluation as described in a memo issued August 17, 1995 by the Regional Foresters of regions 1, 4, and 6, the Biological Evaluation is a 7 step process to evaluate possible effects to Threatened, Endangered, Sensitive, and Proposed (TESP) species. The seven steps are as follows:

1. Review of existing documented information.
2. Field reconnaissance of the project area.
3. Determination of effects of proposed actions on TESP species.
4. Determination of irreversible or irretrievable commitment of resources (required for listed and proposed species only).
5. Determination of conclusions on effects
6. Recommendations for removing, avoiding, or compensating adverse effects
7. Documentation of consultation with other agencies, references, and contributors

Evaluation of effects for each species may be complete at the end of step #1 or may extend through step #5, depending on project details. Steps 1, 2, 3, and 5 from above are included in this document. The other steps are included in the Environmental Assessment, and will not be discussed in detail in this document.

#### **Evaluation and Survey of the Planning Area (Steps 1 & 2)**

All plant species encountered during the field surveys were identified and recorded following the guidelines adopted by the Willamette National Forest and included mapping all sensitive species, rare and uncommon species, weeds and special habitats. Scientific nomenclature and common names used in this report follow Hitchcock and Cronquist (1978). The botanical surveys were floristic in nature, and were performed during the times of year when target species would be detectable. Most perennials were highly detectable and many plant species were observed in bloom. Vegetation can be dense in many places with many of the sensitive lichens well hidden. It is not possible to cover every square inch of a project therefore it is possible that some focal plant species went undetected. All sensitive habitats observed were documented and all focal habitats were surveyed.

Pre-field review was performed for the French Bug planning area. Surveys completed in 2007 and evaluation of previous project surveys were sufficient to determine the presence of known

sites or habitat for TESP species. Using the current list of potential TESP species (compiled from USFWS listings, and the Regional Forester's sensitive species list), maps of known sensitive plant populations were checked for previously reported sites and aerial photos and topographical maps were scrutinized for potential habitat during and after the 2007 surveys.

Pre-field review has determined that one sensitive plant was previously documented within the project area. This plant is *Aster gormanii*.

Surveys were not conducted for fungi because single pre-disturbance surveys for these species have been deemed impractical (USDA 1998; USDA 2000; USDA 2004). For all fungi except *Bridgeoporus nobilissimus*, which is a perennial conk. In general, the habitat requirements of fungal species found on the Willamette National Forest sensitive species list are poorly understood. The literature provides very general habitat characteristics for most of these species; therefore they are listed in Table 1 as having potential habitat in the project area.

Field surveys using the intuitive-control method were conducted July, August, and September of 2007. Approximately half of the surveys were conducted by contractors Rob Weiss, Ron Hamill, and David Kofranek. The other half was surveyed by Chris Wagner, District Botanist. Concentrated surveys were conducted in areas of suspected suitable habitat for sensitive plants. One sensitive lichen species from the 2006 Regional Forest's Sensitive Plant List for the Willamette National Forest were located during the survey. This species is *Peltigera pacifica*. As previously mentioned, *Aster gormanii* is documented within the project area but was not located within any of the project units.

### ***Peltigera pacifica***

*Peltigera pacifica* is a foliose lichen infrequent over soil, moss, and mossy logs in sheltered to shady coastal forests at lower elevations, also rare in humid inter-montane localities. *P. pacifica* is on the Region 6 sensitive list. Several locations within the French Bug Project area were documented. These included units 16,22,23,24,28,31,35 and 36.

### ***Aster gormanii***

*Aster gormanii* is a sensitive species considered very rare but endemic. It is a sub-alpine plant that is only found on cliffs and open rocky areas in the vicinity of the Oregon Cascade Mountains. It is a small aster, growing 4-12 inches tall, glandular, sessile leaves that are erect, crowded and overlapping up the stem. Ten to 12 ray flowers are white to pinkish surrounding the base of yellow disk flowers. *A. gormanii* was not documented in any of the units, however, it is documented within the project area as close as ¼ mile of a unit in the farthest east units, and also further east of the units. Several populations exists east from ¼ of a mile to unit 1, to up to 1 ½ miles east of units 1,2,3 and 39.

### **Species in which Surveys are Impractical**

There are 17 species of fungi for which surveys were not conducted. Fungi fruit inconsistently and would require multiple surveys each year for several years to determine their presence. Twelve of these fungi are mycorrhizal, four are saprophytic on duff or wood and one is a parasite on truffles. The effect of thinning on these species is largely unknown.

**Table 1a: Summary of Evaluation Process for TESP Botanical Species in French Bug Project Area for surveyable species**

<b>Species</b>	<b>Field Review</b>	<b>Species Presence</b>
<i>Agoseris elata</i>	habitat present	No
<i>Arabis hastatula</i>	habitat not present	No
<i>Arnica viscosa</i>	habitat not present	No
<i>Asplenium septentrionale</i>	habitat present	No
<i>Aster gormanii</i>	habitat present	No
<i>Botrychium minganense</i>	habitat present	No
<i>Botrychium montanum</i>	habitat present	No
<i>Botrychium pumicola</i>	habitat not present	No
<i>Bridgeoporus nobillissimus</i>	habitat not present	No
<i>Calamagrostis breweri</i>	habitat not present	No
<i>Carex scirpoidea</i> var. <i>stenochlaena</i>	habitat not present	No
<i>Carex livida</i>	habitat present	No
<i>Castilleja rupicola</i>	habitat not present	No
<i>Chaenotheca subroscida</i>	habitat present	No
<i>Cimicifuga elata</i>	habitat present	No
<i>Coptis trifolia</i>	habitat present	No
<i>Corydalis aqua-gelidae</i>	habitat present	No
<i>Dermatocarpon luridum</i>	habitat present	No
<i>Eucephalis</i> ( <i>Aster</i> ) <i>vialis</i>	habitat present	No
<i>Frasera umpquaensis</i>	habitat present	No
<i>Gentiana newberryi</i>	habitat not present	No
<i>Hypogymnia duplicata</i>	habitat present	No
<i>Iliamna latibracteata</i>	habitat present	No
<i>Leptogium burnetiae</i> var. <i>hirsutum</i>	habitat present	No
<i>Leptogium cyanescens</i>	habitat present	No
<i>Lewisia columbiana</i> var. <i>columbiana</i>	habitat present	No
<i>Lobaria linita</i>	habitat not present	No
<i>Lupinus sulphureus</i> var. <i>kincaidii</i>	habitat not present	No
<i>Lycopodiella inundata</i>	habitat not present	No
<i>Lycopodium complanatum</i>	habitat present	No
<i>Montia howellii</i>	habitat present	No
<i>Nephroma occultum</i>	habitat present	No
<i>Ophioglossum pusillum</i>	habitat present	No
<i>Pellaea andromedaefolia</i>	habitat present	No
<i>Pannaria rubiginosa</i>	habitat present	No
<i>Peltigera neckeri</i>	habitat present	No

<i>Peltigera pacifica</i>	habitat present	Yes
<i>Pilophorus nigricaulis</i>	habitat present	No
<i>Polystichum californicum</i>	habitat present	No
<i>Potentilla villosa</i>	habitat not present	No
<i>Pseudocyphellaria rainierensis</i>	habitat present	No
<i>Ramalina pollinaria</i>	habitat present	No
<i>Rhizomnium nudum</i>	habitat present	No
<i>Romanzoffia thompsonii</i>	habitat not present	No
<i>Scheuchzeria palustris</i> var. <i>americana</i>	habitat not present	No
<i>Schistostega pennata</i>	habitat present	No
<i>Scirpus subterminalis</i>	habitat present	No
<i>Scouleria marginata</i>	habitat present	No
<i>Sisyrrinchium sarmentosum</i>	habitat present	No
<i>Tetraphis geniculata</i>	habitat present	No
<i>Tholurna dissimilis</i>	habitat not present	No
<i>Usnea longissima</i>	habitat present	No
<i>Utricularia minor</i>	habitat not present	No
<i>Wolffia borealis</i>	habitat not present	No
<i>Wolffia columbiana</i>	habitat not present	No

**Table 1b: Summary of Evaluation Process for TESP Botanical Species in French Bug Project Area for species deemed unsurveyable**

<b>Group</b>	<b>Species</b>	<b>Field Review</b>
<b>Mycorrhizal Fungi</b>	<i>Boletus pulcherrimus</i>	Habitat Present
	<i>Cortinarius barlowensis</i>	Habitat Present
	<i>Gomphus kaufmanii</i>	Habitat Present
	<i>Leucogaster citrinus</i>	Habitat Present
	<i>Phaeocollybia attenuata</i>	Habitat present
	<i>Phaeocollybia dissiliens</i>	Habitat Present
	<i>Phaeocollybia pseudofestiva</i>	Habitat Present
	<i>Phaeocollybia sipei</i>	Habitat Present
	<i>Ramaria amyloidea</i>	Habitat Present
	<i>Ramaria aurantiisiccescens</i>	Habitat Present
	<i>Ramaria gelatiniaurantia</i>	Habitat Present
	<i>Ramaria largentii</i>	Habitat Present
	<b>Saprophytic on Litter Fungi</b>	<i>Cudonia monticola</i>
<i>Mycena monticola</i>		Habitat Present
<i>Sowerbyella rhenana</i>		Habitat Present
<b>Saprophytic on Wood</b>	<i>Gyromitra californica</i>	Habitat Present
<b>Parasitic Fungi</b>	<i>Cordyceps capitata</i>	Habitat Present

**Potential Effects on TESP Species**

Potential effects are listed in accordance with the formats put forth for listed species in the 1986 Endangered Species Act regulations (50 CFR Part 402), the March 1998 FWS/NMFS Endangered Species Consultation Handbook; and, for sensitive species, in the Forest Service Manual section 2670 and in the May 15 and June 11, 1992 Associate Chief/RF 2670 letters on this topic. The suggestion to use this format was also included in a memo issued August 17, 1995 by the Regional Foresters of Regions 1, 4, and 6. Attachment 3 gives details on these effects categories. Table 4 shows conclusions for effects of proposed actions on sensitive species with respect to each alternative in the Environmental Assessment. More detailed information on potential project effects on TESP species is found in the Environment Assessment for the project.

This guidance is intended to provide a range of possible conservation measures that may be selectively applied during site-specific planning to avoid, minimize, or mitigate negative long-term effects on TESP species and habitat. Involve appropriate resource specialists in the identification of relevant design criteria

**Table 2. Comparison of Alternatives.**

Alts	Thin acres	½ Acre Gaps acres	Larger Gaps acres	Volume MMBF	Logging Systems acres			Temporary Rd Opening miles		System Road Repair miles			Gate Closures Miles closed to vehicle access	
					G	S	H	New	Exist- ing	Main- tain	Recon- struct	Relo- cate	Winter	Year- round
<b>Alt. 1 No Action – 0 ac</b>	0	0	0	0	0	0	999	None		0	0	0	0	0
<b>At. 2 Proposed Action 1255 acres</b>	1221	34	0	14.6	173	617	465*	0.75	0.4	34.5	2.5	0	0	0
<b>Alt. 3 1276 acres</b>	1226	21	29	15.1	179	738	359*	0.2	0.4	36	4.4	0.12	4.3	2.0

## IV Impacts of Proposed Project

### Determination of Effects (Step 3)

There is debate as to whether commercially thinning overstocked conifer stands is advantageous in the long term for those species that have adapted to late-successional conditions. As might be expected, there are different responses to environmental change by different species groups, both within and between groups. Recent studies have compared the species compositions of old growth, thinned and un-thinned stands (Muir, et al, 2002). Thinning of most stands, depending

on age distribution and site productivity, resulted in the formation of late-successional characteristics such as multi-layered canopies and overall vegetation diversity within the stand age parameters of the studies. In general, while herbaceous vascular plants benefited from thinning in both abundance and species richness, certain forage lichens benefited in abundance and in species richness, and there was little change in these variables for bryophytes in thinned stands. But for all species groups, there seemed to be definite increases in abundance and species richness when structural diversity was promoted by variable density thinning, protecting hot spots of diversity, and retaining legacy components such as old down wood, snags, and large trees. What is not as clear is to what degree do overstocked stands self thin over time and achieve late-successional characteristics on their own, what is the role of fire in this process, and absent disturbance over time, do un-thinned stands lack the characteristics to support relict old-growth species? A partial answer contributed by these studies is that the relationship between a tree's diameter at age 200 years and its diameter and growth at age 50 show that trees that were large at age 200 years were generally large and fast growing when young, indicating a requirement of early release from competition in order for trees to attain large size.

For fungi species, the literature indicates increasing species abundance and diversity with increasing stand age, although younger stands tend to have more ectomycorrhizal sporocarps (mushrooms, e.g.) in the organic layer, and less lower soil profile fungi (truffles, e.g.) than old growth (*Bradbury et al.*, 1998; *Smith, et al.*, 2002). But like the other species groups, fungi benefit from retaining a certain amount of structure (host trees and large down wood for fungi) for long term source of nutrients, moisture, and inoculum, and fare much better when direct disturbance of habitat is minimized (*Amaranthus, et al.*, 1996; *Amaranthus and Perry*, 1994). However, two studies have shown that there is an optimal amount of organic debris and of moisture, and too much of either can be detrimental (*Harvey, et al.*, 1981; *O'Dell, et al.*, 1999). Numerous studies have shown there to be a definite gradient of decreasing fungi diversity and abundance from forest interior, to edge, into smaller openings, and finally very small fungi presence in the middle of large openings (*Durall, et al.*, 1999; *Kranabetter and Wylie*, 1998; *Perry, et al.*, 1989). For patches left within openings, larger interior habitat provides more abundance and diversity than smaller patches (*Berglund and Jonsson*, 2003). Regarding thinning, a study in Arizona concluded “preliminary results indicate that populations of arbuscular mycorrhizal fungi can rapidly increase following restoration thinning in Northern Arizona ponderosa pine forests.... Two main processes control population densities of mycorrhizal fungi following disturbance: immigration of new propagules from nearby areas and survival and spread of residual propagules.” (*Korb, et al.*, 2001). Closer to home, a study in a western hemlock-western red-cedar forest concluded that although harvesting, thinning, and fertilizing will directly affect ectomycorrhizal mushroom abundance and species composition, that “partial cutting systems could allow some timber removal without necessarily reducing ectomycorrhizal mushroom communities”, and “partial cutting that favors retention of a diverse mix of ectomycorrhizal tree species over western redcedar (a non-host species) may benefit ectomycorrhizal mushroom richness.” (*Kranabetter and Kroeger*, 2001).

The summary above (Table 1a and 1b) concludes that potential habitat exists for 51 sensitive species within the project area, 5 species occur within the 2 watersheds that the French Bug are on, 1 was located during project area survey while 3 of the species that exist in the watersheds, do not have habitat within the project area and are quite far. These species are generally

associated with higher elevations, above timberline. One is associated with rocky talus slopes and outcrops. The existing sensitive plant documented within the project area is usually associated with old growth Douglas-fir forests, or mature forests that contain remnant old growth Douglas-fir.

### **Alternative I, No Action**

*Direct Effects:* Under Alternative I, No-action, no acres would be subject to overstory removal, thinned or otherwise harvested, therefore there will be no direct effects to sensitive fungi, assuming they are present in the stands. Since *Peltigera pacifica* thrives in well shaded forests, no action would allow this species to continue to grow and no effects to occur within occupied habitat found during survey. Alternative I would provide the most benefit to sensitive fungi because most of them form mycorrhizal relationships with conifers and thinning has been shown to have negative short term (5-7 years) impacts to fungi (Pilz et al 2003).

*Indirect Effects:* Under Alternative I, No-action, no acres will be thinned or otherwise harvested and the stands will undergo a slow decline before presumably opening up enough to provide an understory. Windthrow, snowdown, and insect and disease pockets will create openings. Coarse woody debris will be abundant as trees die due to overcrowding. Indirect effects to sensitive fungi would likely be minimal.

### **Alternative II, Proposed Action**

*Direct Effects:* Under the action alternative II, it is likely that individual sites may be negatively affected in the short term by host tree removal, physical disturbance, soil compaction, and the disruption of mycelial networks (Kranabetter and Wylie 1998, Amaranthus and Perry 1994). Soil compaction resulting from harvesting equipment and the creation of temporary access roads can reduce host tree root growth and root tip availability for fungi (Amaranthus, et.al., 1996; Amaranthus and Perry, 1994). Reductions in the number of fruiting bodies of chanterelles, a common mycorrhizal species, were noted after initial thinning but appear to rebound after several years (Pilz et al 2003).

Microclimatic changes will likely occur from thinning but will disappear over time as the canopies of residual trees expand and an understory develops. Microclimatic changes will likely occur more so in the ½ acre gap cuts and will take much longer disappear as the canopy finally fills the gap in. For lichen species, overstory is just close enough for spores to regenerate over time in the proposed gap cuts. However, fungi species will most be effected by the gap cuts due to the large opening of the area. Individual and short term impacts may occur, it is not likely to result in a trend toward Federal listing or loss of viability for rare and uncommon and sensitive fungi species.

Pile burning has the potential to disrupt mycelial networks (Amaranthus and Perry, 1994) by creating localized intense disturbance and loss of organic matter that can decrease the ability of plants to form linkages with ectomycorrhizal fungi. Ectomycorrhizal diversity and abundance decrease with high intensity fire, especially where they are found in the litter and organic layers (Stendell et. al, 1999; Wiensczyk et. al, 2002).



Mitigation measures include buffer of all *Peltigera pacifica* populations for avoidance. This is protective buffer changes the status to not likely to have direct effects.

*Indirect Effects:* Alternative II reduces habitat for sensitive mycorrhizal fungi due to regeneration harvest and ½ acre gap cuts. Timber harvest to fungal habitat include the short-term loss of moisture retention capabilities due to the drying effect of over-story shade removal, and the reduction of water storage with the disturbance or removal of forest floor organic material and large wood. Loss of large woody material and host trees also represents a reduction of available nutrients and possible inoculum source for future fungal regeneration and expansion (Amaranthus and Perry, 1994).

It is assumed that the greater number of acres of harvest, the greater effect there will be on fungi. These effects may be ameliorated by leaving greater numbers of trees. Korb et al (2001) found that restoration thinning in a northern Arizona ponderosa pine forest, mycorrhizal fungi rapidly increased following thinning. The key to recolonization was immigration of new propagules from nearby areas and spread of residual propagules. Thinning may enhance stand structure and understory development over the long term. The addition of understory trees and shrubs may benefit the sensitive mycorrhizal species. Duff retention and coarse woody debris creation can benefit both mycorrhizal and saprophytic species (Lindblad 1998).

In the longer term, prescribed burning at landings will cause loss of litter, so it could reduce substrates for litter-dwelling fungi. Bruns (2002) studying short-term effects of ground fire in the Sierra Nevada found a short-term reduction in the biomass of ectomycorrhizal fungi correlated with incineration of the litter layer but that lower layers, where the greatest specie richness occurs, were preserved. Stendell et al. (1999) found a similar pattern in a Sierra Nevada ponderosa pine forest after prescribed fire where litter/organic species biomass decreased eightfold but no difference was detected in mineral layers.

All stand prescriptions for this alternative will increase stand complexity over the long term (20-100 years) by opening the canopy to allow more light within the understory which will increase a higher diversity in understory vegetation. This will convert dense, stem exclusion stands into future late-successional habitat. The proposed gap cuts will expose forest floor which will make it vulnerable for invasive species, however, all ½ acre gap cuts will be done using helicopter extraction which will minimize disturbance.

Cable yarding causes soil compaction and localized disturbance along yarding corridors. This causes a loss of ectomycorrhizal root tips (Amaranthus et al, 1996) and can disturb litter-dwelling and saprophytic fungi within the corridors. The area affected by this is much larger in Alternative II than in Alternative III (Table 2). Alternative II has less acres of proposed cable yarding then does Alternative III with more helicopter logging. This would minimize ground disturbance even more so then in Alternative III. Other ground based operations would have small differences in Ground disturbances since the 173 acres proposed is only 6 acres less then in Alternative III.

All ground based operations pose the highest ground disturbances when compared to helicopter logging. Helicopter logging is proposed for 465 acres. This will reduce the amount of ground

disturbing activity as compared to Alternative III

Reopening of temporary road spurs, construction of new temporary roads, maintenance, and reconstruction of existing roads (see Table 2) will have effects. However, mitigational actions written into the proposed action include burning piles at landings, grapple pile & burn where roads intersect units, rehabilitate and build one parking area in unit 31, eradicate high risk weed populations along roads and cleanup of harvest generated slash at landings and dispersed sites, rip and close skid roads and prune limbs damaged during operations along Breitenbush road all will reduce the total effects to the proposed action. This alternative has less road issues than Alternative III and therefore it has less ground disturbance.

Mitigation measures include buffer of all sensitive plant species for avoidance. This is protective buffer changes the status to not likely to have indirect effects.

### **Alternative III, Action Alternative**

*Direct Effects:* Under the action Alternative III, it is likely that individual sites may be negatively affected in the short term by host tree removal, physical disturbance, soil compaction, and the disruption of mycelial networks (Kranabetter and Wylie 1998, Amaranthus and Perry 1994). Soil compaction resulting from harvesting equipment and the creation of temporary access roads can reduce host tree root growth and root tip availability for fungi (Amaranthus, et.al., 1996; Amaranthus and Perry, 1994). Reductions in the number of fruiting bodies of chanterelles, a common mycorrhizal species, were noted after initial thinning but appear to rebound after several years (Pilz et al 2003).

All direct effects are the same as in Alternative II except there will be more cable yarding, less helicopter logging except in the the larger gap cuts and while there is proposed less ½ acre gap cuts, there are many more larger 2-3 acre gap cuts proposed. An additional 2 gap cuts along the powerline corridor were added to decrease hazardous trees to the powerlines in high failure areas. The large gap cuts will be seeded with forage plants to decrease noxious weed invasion and for big game foraging. The larger 2-3 acre gap cuts would have the most ground disturbance and compaction and open up a much larger vector for weeds to invade. Mitigation measure would be set in place to minimize weed infestation by planting forage vegetation.

Other changes in this proposed action Alternative III include the increase in temporary roads and a relocation of 0.12 miles of an existing road system. Rehabilitation and the building of two small parking areas in unit 31 for recreation access, gating of 4.3 miles of road to limit winter access only and gate 2.0 miles of road to limit year-round access.

Mitigation measures include buffer of all *Peltigera pacifica* populations for avoidance. This protective buffer changes the status to not likely to have direct effects.

*Indirect Effects:* These are the same as action Alternative II except with larger areas being affected and a slower rate of fungi regeneration (if at all) in the much larger 2-3 acre gap cuts. Other spore and seed producing species would have a greater challenge in recolonization and immigration of new propagules from nearby areas and spread of residual propagules within these

larger gap cuts.

Mitigations include burning piles at landings, grapple pile & burn where roads intersect units, rehabilitate and build one parking area in unit 31, eradicate high risk weed populations along roads and cleanup of harvest generated slash at landings and dispersed sites, rip and close skid roads and prune limbs damaged during operations along Breitenbush road. Mitigation measures also include buffer of all sensitive plant species for avoidance. This protective buffer changes the status to not likely to have indirect effects.

### **Cumulative Effects for All Alternatives:**

Four sub-watersheds (Detroit Reservoir, Humbug, Lower Breitenbush and Middle Breitenbush) which cover 49,000 acres are used for analysis by several resource areas 4) The project area, roughly 17,300 acres that contains the sale area and surrounding acres, is the analysis scale for for this botanical Biological evaluation which includes direct and indirect effects as well as some portions of the cumulative effects analysis. The project area begins west of French Creek and extends east to include the lower reaches of Humbug Creek. The northern border is formed by the ridge that runs between Boulder Peak and Gold Butte Lookout. The southern edge of the planning area is formed by Hoover Ridge. 5) The 1280 acres of actual sale units are the smallest scale of analysis discussed in the document. These analysis scales are depicted in Figure 3-1. Other scales and areas used for analysis included, Big Game Emphasis Areas, the Spotted Owl Area of Concern and Critical Habitat Units.

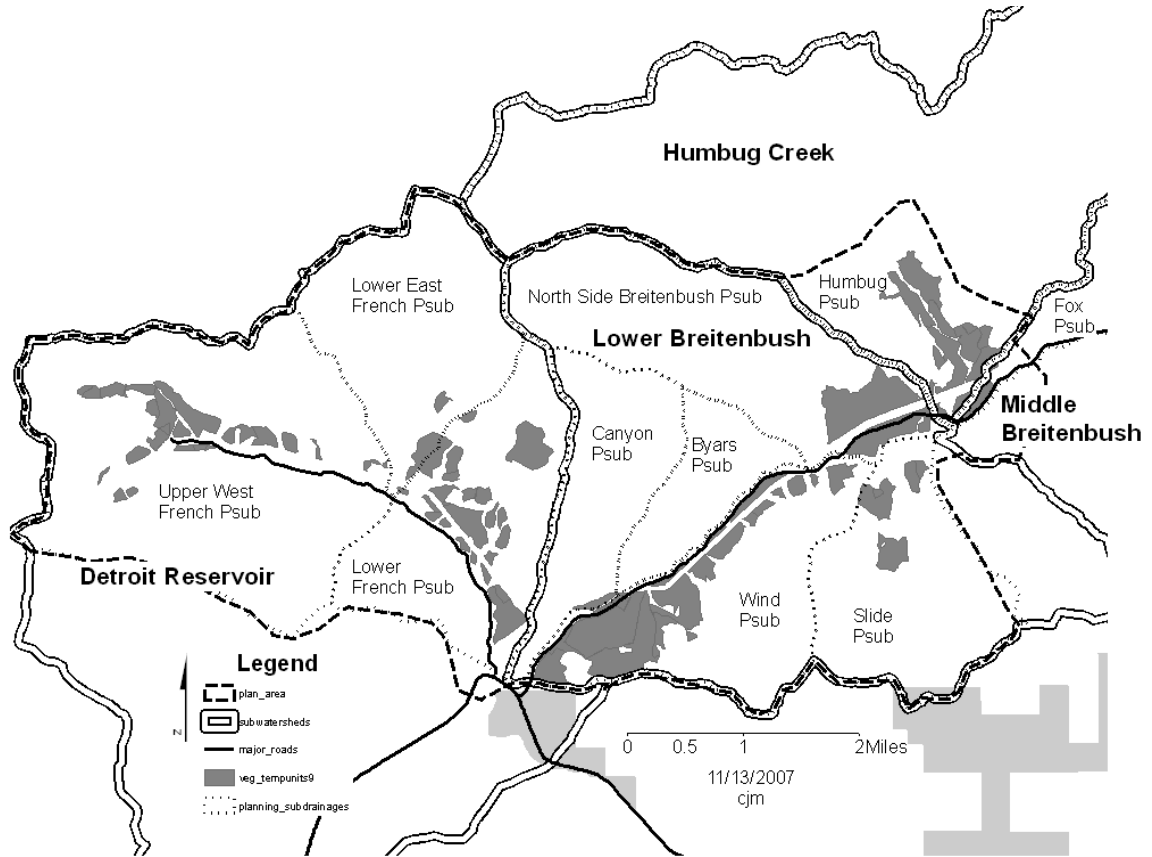


Figure 3-1 Analysis Scales Planning Sub Drainages (Psub) and Sub-watersheds (in bold)

Table 3 Past Timber Harvest in French Bug Sub-Watersheds

Decade	Acres of Clearcut	Acres of Partial Cut/Salvage	Acres of Commercial Thin
1900-1919	1314		
1920-1929	896		
1930-1939	1141		
1940-1949	164		
1950-1959	1740	13	
1960-1969	3606	37	
1970-1979	2336	406	298
1980-1989	4439	292	1349
1990-1999	573	723	1226
2000-2006	28	351	1141
Total:	16,237	1,822	4,014

Past timber harvest activities in the French Bug sub-watersheds have primarily been regeneration harvesting beginning in the early 1900's with railroad logging (see Table 3). Salvage logging, partial cuts and shelterwood cuts have also taken place. Until the 1980s, the most common type of timber harvesting was clearcutting. Since 1980, shelterwood and commercial thinning have been the most widely used method of timber harvest.

Harvesting peaked from the 1960s through the 1980s. Today approximately 41% of the sub-watersheds' acres have had timber harvest activities. Within the French Bug planning area,

approximately 55% of the acres have had timber harvest activities.

Cumulative effects on fungi will be analyzed on a project area level. Spores, the method by which they propagate from fruiting bodies, may travel some distance, so an area larger than the project area is appropriate for analysis. I am assuming that there has been some recovery of mycorrhizal diversity in stands over 20 years of age and that clearcut activity has the most severe effects on mycorrhizal diversity within the watershed by harvesting the host species they depend upon. These forests serve as refugia for many sensitive species that will be able to re-colonize the younger stands as they mature and become more complex in structure and diversity.

Within the sub-watersheds, approximately 16,000 acres were previously clearcut while less than 5000 acres were partial cuts and commercial thins (Table 3). Alternative II will add 1221 acres of thinning and 34 acres of clearcuts. This alternative will reduce available fungus habitat within the watershed but the effects should be short-term and of small magnitude (1221/ roughly 17,300 acres in project area). Alternative II will add 1229 acres of thinning, and 50 acres of clearcut with more ground based operations including skyline cabling. This alternative would remove a higher percentage of fungus habitat from the watershed with a much longer rate of regeneration, if at all, in some areas.

Harvested areas may have contained multiple populations of sensitive and rare and uncommon botanical species, most likely old growth dependent species such as *Pseudocyphellaria rainierensis* and *Nephroma occultum*.

Late-successional forest provides better habitat for sensitive lichens as well. Buffers around sensitive lichen species protect the sites from direct disturbance but may have indirect adverse effects as the trees grow and a dense canopy results. Almost all sensitive lichen species fall within the protected riparian stream protection buffer and therefore will have a greater distance of undisturbed protection. Thus there should be no cumulative effects on sensitive lichen species due to any action alternative.

## **Projects Common to all Action Alternatives:**

### **Road System Maintenance**

Future road maintenance includes major improvements to the Breitenbush road. This includes some sections of overlay paving and asphalt patches from Highway 22 up to the Mt Hood forest boundary and would include a few sections on the Mt. Hood National Forest. All guard rails, including sections of guard rails on bridges, will be replaced and brought up to standards as part of this project. There will be some sections of deep patch fill stabilizations. Deep patch fill stabilization involves digging down several feet, installing geogrid reinforcements and rebuilding the road prism. A section of road about eight miles from highway 22 would be stabilized by removing water from the adjacent hillside with horizontal drains. Some removal of loose rock will occur in areas where material commonly falls into the road prism. These activities will take place in summer of 2008. This project involves improvements to the Breitenbush road (46) only. No maintenance of other system roads is scheduled.

Annual maintenance would also occur in the future. Forest Service system roads receive annual

maintenance in accordance with established road management objectives. Road maintenance work includes activities to reduce brush, clean out drainages, and repair road surfaces on many of the key and secondary roads in the project area (Willamette Roads Analysis, 2003).

### Stream Restoration

Past stream restoration activities include replacing the culverts on Humbug creek to allow for fish passage, placing large wood structures in French Creek and obliterating and decommissioning the 703 road.

A program called Respect the River will be implemented in 2007 along the Breitenbush, French Creek and Little North Fork of the Santiam River. This program would physically restore the damaged riparian areas by: de-compacting soils with heavy equipment or by hand, re-vegetating with native vegetation, placing large rocks or other physical barriers to eliminate unwanted off road vehicle traffic, physically removing invasive weeds, and site hardening of trails and camping areas. A small pole thinning project may also be a part of this project to harvest poles for fence building material. The program also includes public education through public contact, interpretative signs, and information kiosks. Sites for this project are still being located. There are approximately 15 sites on the Little North Fork Santiam River, 25 sites on the Breitenbush River from Detroit Lake to the 4685-302 road, 5 sites on French Creek near Detroit Lake, and 5 sites on Whitewater Creek.

Future stream restoration efforts include fish habitat improvements on 1.5 miles of French Creek. Improvements include adding large woody material in 80 structures. Large wood will be placed by line-pulling trees into the channel. Trees would be removed from adjacent, densely-stocked conifer stands that meet the criteria for silvicultural thinning. Yarding systems are currently being explored. The same type of treatment would occur for 0.4 mi. of the north fork tributary of French Creek and 0.3 mi. of the south fork of French Creek. These streams also bear native trout.

**Table 4:** Summary of Conclusion of Effects

Species	Alt. 1	Alt. 2	Alt. 3
<i>Agoseris elata</i>	NI	NI	NI
<i>Asplenium septentrionale</i>	NI	NI	NI
<i>Aster gormanii</i>	NI	NI	NI
<i>Botrychium minganense</i>	NI	NI	NI
<i>Botrychium montanum</i>	NI	NI	NI
<i>Carex livida</i>	NI	NI	NI
<i>Chaenotheca subroscida</i>	NI	NI	NI
<i>Cimicifuga elata</i>	NI	NI	NI
<i>Coptis trifolia</i>	NI	NI	NI
<i>Corydalis aqua-gelidae</i>	NI	NI	NI
<i>Dermatocarpon luridum</i>	NI	NI	NI
<i>Aster vialis</i>	NI	NI	NI
<i>Frasera umpquaensis</i>	NI	NI	NI
<i>Hypogymnia duplicata</i>	NI	NI	NI

<i>Iliamna latibracteata</i>	NI	NI	NI
<i>Leptogium burnetiae</i> var. <i>hirsutum</i>	NI	NI	NI
<i>Leptogium cyanescens</i>	NI	NI	NI
<i>Lewisia columbiana</i> var. <i>columbiana</i>	NI	NI	NI
<i>Lycopodium complanatum</i>	NI	NI	NI
<i>Montia howellii</i>	NI	NI	NI
<i>Nephroma occultum</i>	NI	NI	NI
<i>Ophioglossum pusillum</i>	NI	NI	NI
<i>Pellaea andromedaefolia</i>	NI	NI	NI
<i>Pannaria rubiginosa</i>	NI	NI	NI
<i>Peltigera neckeri</i>	NI	NI	NI
<i>Peltigera pacifica</i>	NI	NI	NI
<i>Pilophorus nigricaulis</i>	NI	NI	NI
<i>Polystichum californicum</i>	NI	NI	NI
<i>Potentilla villosa</i>	NI	NI	NI
<i>Pseudocyphellaria rainierensis</i>	NI	NI	NI
<i>Ramalina pollinaria</i>	NI	NI	NI
<i>Rhizomnium nudum</i>	NI	NI	NI
<i>Schistostega pennata</i>	NI	NI	NI
<i>Scirpus subterminalis</i>	NI	NI	NI
<i>Scouleria marginata</i>	NI	NI	NI
<i>Sisyrrinchium sarmentosum</i>	NI	NI	NI
<i>Tetraphis geniculata</i>	NI	NI	NI
<i>Usnea longissima</i>	NI	NI	NI
<i>Boletus pulcherrimus</i>	NI	MIIIH	MIIIH
<i>Cortinarius barlowensis</i>	NI	MIIIH	MIIIH
<i>Gomphus kaufmanii</i>	NI	MIIIH	MIIIH
<i>Leucogaster citrinus</i>	NI	MIIIH	MIIIH
<i>Phaeocollybia attenuata</i>	NI	MIIIH	MIIIH
<i>Phaeocollybia dissiliens</i>	NI	MIIIH	MIIIH
<i>Phaeocollybia pseudofestiva</i>	NI	MIIIH	MIIIH
<i>Phaeocollybia sipei</i>	NI	MIIIH	MIIIH
<i>Ramaria amyloidea</i>	NI	MIIIH	MIIIH
<i>Ramaria aurantiisiccescens</i>	NI	MIIIH	MIIIH
<i>Ramaria gelatiniaurantia</i>	NI	MIIIH	MIIIH
<i>Ramaria largentii</i>	NI	MIIIH	MIIIH
<i>Cudonia monticola</i>	NI	MIIIH	MIIIH

<i>Mycena monticola</i>	NI	MIIH	MIIH
<i>Sowerbyella rhenana</i>	NI	MIIH	MIIH
<i>Gyromitra californica</i>	NI	MIIH	MIIH
<i>Cordyceps capitata</i>	NI	MIIH	MIIH
<i>Boletus pulcherrimus</i>	NI	MIIH	MIIH

**Key to Abbreviations in Table 2 (See attachment 3).**

NI = No Impact

MIIH = May Impact Individuals or Habitat, But Will Not Likely Contribute to a Trend Towards Federal Listing or Loss of Viability for the Population or Species

WOFV\* = Will Impact Individuals or Habitat with a Consequence That the Action May Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability for the Population or Species

BI = Beneficial Impact

\* Considered a trigger for a significant action in NEPA

**Conclusion of Effects (step 5)**

The proposed actions may affect individuals or habitat but are not likely to contribute to a trend towards federal listing or a loss of the species viability in this subwatershed. Riparian Reserves and known site protective buffers will help maintain suitable habitat on matrix lands over the long term. Road and trail maintenance activities over the next 10 years in this subwatershed will have no significant effects on sensitive botanical species.

**Compliance with Management Direction:**

This Biological Evaluation has documented the completion of the steps outlined in the Regional Office directive on the 2670 section of the Forest Service manual.

**IV. Determinations**

It is my determination that selection of any alternative will have no impact on sensitive plants and their associated habitat because all sensitive plants and sensitive habitats will be buffered appropriately before timber removal begins to avoid any effects to the plant species, surrounding habitat and sensitive habitats

In the event that a sensitive plant population is discovered after the timber sale is sold, Contract Clauses C9.52 and C6.25 will be enforced and project modifications may result.

Completed by: Chris Wagner Date: March, 2008  
District Botanist



**ATTACHMENT 1: Regional Forester's Sensitive Botanical Species List for the Willamette National Forest 2006**

<b>Species</b>	<b>Occurrence on WNF</b>	<b>ONHP Status</b>	<b>State Status</b>	<b>Federal Status</b>	<b>Habitat Types</b>
<i>Agoseris elata</i>	S	2			MM,DM
<i>Arabis hastatula</i>	D	1		SofC	RO
<i>Arnica viscosa</i>	S	2			RS
<i>Asplenium septentrionale</i>	S	2			RO
<i>Aster gormanii</i>	D	1			RS
<i>Boletus pulcherrimus</i>	D	1			CF
<i>Botrychium minganense</i>	D	2			RZ,CF
<i>Botrychium montanum</i>	D	2			RZ,CF
<i>Botrychium pumicola</i>	S	1	LT		HV
<i>Bridgeoporus nobilissimus</i>	D	1			CF
<i>Calamagrostis breweri</i>	D	2			MM,RZ
<i>Carex livida</i>	S	2			WM
<i>Carex scirpoidea</i>	D	2			RO
<i>var. stenochlaena</i>					
<i>Castilleja rupicola</i>	D	2			RO
<i>Chaenotheca subroscida</i>	D	3			CF
<i>Cimicifuga elata</i>	D	1	C		CF
<i>Coptis trifolia</i>	S	2			WM,CF
<i>Cordyceps capitata</i>	D	unlisted			CF
<i>Cortinarius barlowensis</i>	D	2			CF
<i>Corydalis aqua-gelidae</i>	D	1	C		RZ,CF
<i>Cudonia monticola</i>	D	not listed			CF
<i>Dermatocarpon luridum</i>	S	3			RZ on rock
<i>Eucephalis (Aster) vialis</i>	S	1	LT	SofC	CF
<i>Frasera umpquaensis</i>	D	1	C		MM
<i>Gentiana newberryi</i>	D	2			MM
<i>Gomphus kaufmanii</i>	D	3			CF
<i>Gyromitra californica</i>	D	2			CF
<i>Hypogymnia duplicata</i>	S	3			CF
<i>Iliamna latibracteata</i>	S	2			CF,RZ
<i>Leptogium burnetiae</i>					
<i>var. hirsutum</i>	S	3			CF
<i>Leptogium cyanescens</i>	D	3			CF
<i>Leucogaster citrinus</i>	D	3			CF
<i>Lewisia columbiana</i>	D	2			RS
<i>var. columbiana</i>					
<i>Lobaria linita</i>	D	2			RO
<i>Lupinus sulphureus</i>					
<i>var. kincaidii</i>	S	1	LT	LT	MM,DM
<i>Lycopodiella inundata</i>	D	2			WM
<i>Lycopodium complanatum</i>	D	2			CF
<i>Montia howellii</i>	D	4	C		RZ
<i>Mycenia monticola</i>	D	not listed			CF
<i>Nephroma occultum</i>	D	4			CF

<i>Ophioglossum pusillum</i>	D	2			WM
<i>Pannaria rubiginosa</i>	D	2			CF
<i>Pellaea andromedaefolia</i>	S	2			RO
<i>Peltigera neckeri</i>	D	not listed			CF
<i>Peltigera pacifica</i>	D	not listed			CF
<i>Phaeocollybia attenuata</i>	D	4			CF
<i>P. dissiliens</i>	D	3			CF
<i>P. pseudofestiva</i>	D	3			CF
<i>P. sipei</i>	D	3			CF
<i>Pilophorus nigricaulis</i>	D	2			RO
<i>Polystichum californicum</i>	D	2			RO
<i>Potentilla villosa</i>	D	2			RS, RO
<i>Pseudocyphellaria</i>					
<i>rainierensis</i>	D	4			CF,RZ
<i>Ramalina pollinaria</i>	D	2			CF, RZ
<i>Ramaria amyloidea</i>	D	2			CF
<i>R. aurantiisiccescens</i>	D	4			CF
<i>R. gelatiniaurantia</i>	D	3			CF
<i>R. largentii</i>	D	3			CF
<i>Rhizomnium nudum</i>	D	2			CF
<i>Romanzoffia thompsonii</i>	D	1			RS
<i>Scheuchzeria palustris</i>	D	2			WM
<i>var. americana</i>					
<i>Schistostega pennata</i>	D	2			CF
<i>Scirpus subterminalis</i>	D	2			SW
<i>Scouleria marginata</i>	S	3			RZ
<i>Sisyrrinchium sarmentosum</i>	S	1	C	SofC	MM,DM
<i>Sowerbyella rhenana</i>	D	3			CF
<i>Tetraphis geniculata</i>	S	2			CF
<i>Thorluna disimilis</i>	D	2			CF
<i>Usnea longissima</i>	D	3			CF,RZ
<i>Utricularia minor</i>	D	2			SW
<i>Wolffia borealis</i>	S	2			SW
<i>Wolffia columbiana</i>	S	2			SW

Occurrence on Willamette National Forest:

S = Suspected

D = Documented

Oregon Natural Heritage Program (ORNHP):

1 = Taxa threatened or endangered throughout range.

2 = Taxa threatened or endangered in Oregon but more common or stable elsewhere.

3 = Species for which more information is needed before status can be determined, but which may be threatened or endangered (Review).

4 = Species of concern not currently threatened or endangered (Watch).

Oregon State Status:

LT = Threatened

LE = Endangered

C = Candidate

Federal Status: These plant species were originally published as CANDIDATE THREATENED (CT) in the Smithsonian Report, **Federal Register**, July 1, 1975, or as PROPOSED ENDANGERED (PE) in a later report, **Federal Register**, June 16, 1976. The latest **Federal Register** consulted was dated September 30, 1993. Updated listings appear periodically in the Notice of Review (USFWS); the status of several species is categorized as follows:

LE = Listed as an Endangered Species

LT = Listed as a Threatened Species

PE = Proposed as an Endangered Species

PT = Proposed as a Threatened Species

C = Candidate for Listing as Threatened or Endangered

Sof C = Species of Concern; taxa for which additional information is needed to support proposal to list under the ESA.

Habitat Types:

MM = Mesic meadows

WM = Wet meadows

DM = Dry meadows

RZ = Riparian zones, floodplains

CF = Coniferous forest

RS = Rocky slopes, scree

RO = Rock outcrops, cliffs

DW = Dry open woods

HV = High volcanic areas

SW = Standing water

**ATTACHMENT 2: Field reconnaissance survey levels for determining presence potential for TES species.**

**Level A:** Aerial photo interpretation and review of existing site records. Determination of the potential for a listed species to occur within the proposed project area. No field surveys completed.

**Low potential:** Less than 40% potential for listed species inhabiting the project area.

**Moderate potential:** 40-60% potential for a listed species inhabiting the proposed project area.

**High potential:** Greater than 60% potential for listed species inhabiting the proposed project area.

**Level B:** Single entry survey of probable habitats. Areas are identified by photos and existing field knowledge. Field surveys are conducted during the season most favorable for species identification.

**Low intensity:** Selected habitat surveys (approximately 5-10% of area) are conducted with a single entry for listed species inhabiting the proposed project area.

**Moderate intensity:** Selected habitat surveys (approximately 10-40% of area) are conducted with a single entry for listed species inhabiting the proposed project area.

**High intensity:** Selected habitat surveys (approximately 40-60% of area) are conducted with a single entry for listed species inhabiting the proposed project area.

**Level C:** Multiple entry surveys are conducted for listed species likely to inhabit the proposed project area.

**Low intensity:** Selected habitat surveys (approximately 5-10% of area) are conducted with repeated entries for listed species inhabiting the proposed project area.

**Moderate intensity:** Selected habitat surveys (approximately 10-60% of area) are conducted with repeated entries for listed species inhabiting the proposed project area.

**High intensity:** Selected habitat surveys (approximately 60-80% of area) are conducted with repeated entries for listed species inhabiting the proposed project area.

ATTACHMENT 3:

**Conclusions Of Effects For Use In Biological Evaluations and Assessments**

**USDA Forest Service - Regions 1, 4, and 6**

**August, 1995**

**Listed Species:**

1. No Effect

Occurs when a project or activity will not have any “effect”, on a listed species, or critical habitat.

2. May Affect - Likely to Adversely Affect (LAA)

If the determination in the biological assessment is that the project May Affect - Likely to Adversely Affect a listed species or critical habitat, formal consultation must be initiated (50 CFR 402.12). Formal consultation must be requested in writing through the Forest Supervisor (FSM 2670.44) to the appropriate FWS Field Supervisor, or NOAA Fisheries office.

3. May Affect - Not Likely to Adversely Affect (NLAA)

If it is determined in the biological assessment that there are “effects” to a listed species or critical habitat, but that those effects are not likely to adversely affect listed species or critical habitat, then written concurrence by the FWS or NOAA Fisheries is required to conclude informal consultation (50 CFR 402.13).

4. Beneficial Effect

Written concurrence is also required from the FWS or NOAA Fisheries if a beneficial effect determination is made.

Requests for written concurrence must be initiated in writing from the Forest Supervisor to the State Field Supervisor (FWS or NOAA).

**Proposed Species:**

Whenever serious adverse effects are predicted for a proposed species or proposed critical habitat, conferencing is required with the FWS or NOAA Fisheries.

1. No Effect

When there are “no effects” to proposed species, conferencing is not required with FWS or NOAA.

2. Not Likely to Jeopardize the Continued Existence of the Species or Result in Destruction or Adverse Modification of Proposed Critical Habitat

This conclusion is used where there are effects or cumulative effects, but where such effects would not have the consequence of losing key populations or adversely affecting “proposed critical habitat”. No conferencing is required with FWS or NOAA if this conclusion is made. However, for any proposed activity that would receive a “Likely To Adversely Affect” conclusion if the species were to be listed, conferencing may be initiated.

3. Likely to Jeopardize the Continued Existence of the Species or Result in Destruction or Adverse Modification of Proposed Critical Habitat

This conclusion must be determined if there are significant effects that could jeopardize the continued existence of the species, result in adverse modification or destruction of proposed critical habitat, and/or result in irreversible or irretrievable commitments of resources that could foreclose options to avoid jeopardy, should the species be listed. If this is the conclusion, conferencing with FWS or NMFS is required.

**Sensitive Species:**

1. No Impact (NI)

A determination of “No Impact” for sensitive species occurs when a project or activity will have no environmental effects on habitat, individuals, a population or a species.

2. May Impact Individuals or Habitat, But Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species (MIIH)

Activities or actions that have effects that are immeasurable, minor or are consistent with Conservation Strategies would receive this conclusion. For populations that are small - or vulnerable - each individual may be important for short and long-term viability.

3. Will Impact Individuals or Habitat With a Consequence That the Action May Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species (WIFV)

Loss of individuals or habitat can be considered significant when the potential effect may be:

- Contributing to a trend toward Federal listing (C-1 or C-2 species);
- Results in a significantly increased risk of loss of viability for a species; or,
- Results in a significantly increased risk of loss of viability for a significant population (stock).

4. Beneficial Impact (BI)

Projects or activities that are designed to benefit, or that measurably benefit a sensitive species should receive this conclusion.

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# Appendix D – Project Consistency with Aquatic Conservation Strategy Objectives: French Bug Thin Timber Sale

05/07/08

The French Bug Thin Timber Sale does not retard or prevent attainment of Aquatic Conservation Strategy Objectives (ACSOs). The following discussion of ACSO consistency is framed around Alternatives 2 and 3- the action alternatives.

*ACSO 1. Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to insure protection of the aquatic systems to which species, populations and communities are uniquely adapted.*

In alternatives 2 and 3, this project will commercially thin approximately 540 acres of riparian reserve land allocation. The project will involve 6% of the riparian reserves found within the French Bug analysis area. This project's focus is to restore and maintain through time the diversity and complexity of the watershed and the aquatic systems to which species, populations, and communities have adapted. Detroit Tributary and Breitenbush Watershed Analysis recommends various management techniques or processes to accomplish long range (>50 yrs.) landscape level conditions (DTWA; V-32; BBWA; V-16). The proposed project was developed from these recommendations (eg. "Continue to improve structural diversity in both channels and terrestrial parts of Riparian Reserves..."). The project will maintain this objective at the watershed scale.

*ACSO 2. Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, Longitudinal, and drainage network connections including floodplains wetlands, up slope areas, headwater tributaries and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.*

Spatial and temporal connectivity within and between watersheds will be maintained through the implementation of Northwest Forest Plan riparian reserve widths. All streams were identified and interim widths for riparian reserves were placed on all streams (standard tree height width, 172 feet, buffer was placed on either side of the channel for non fish bearing and intermittent streams in Western Hemlock plant association, and 150 feet, either side for Pacific Silver fir plant association, and two standard tree heights for fish bearing streams, 344 feet either side of stream). These areas allow for connectivity between ridge tops and valley bottoms and provide over 50% of the landscape as connective corridors due to the stream density of the area.

Treated acres within these riparian reserves will retain a 50 percent canopy closure after harvest in the secondary shade zone, greater than 50 feet from perennial water or 100 feet from listed fish habitat, and 100 % of existing canopy within the primary shade zone, less than 50 feet from perennial water or 100 feet from listed fish habitat. Chemically and physically unobstructed routes critical to life history requirements will remain intact as a result of this prescription. Spatial connectivity may be restored for some plant and animal species that cannot survive under dense canopy. An increase in insects and arthropods is expected to result from a development of an under-story. This prey base increase is expected to benefit certain animal species found within the reserve.

The proposed thinning would reduce fuel loading and lessen the risk of fire while maintaining connectivity in the watershed. Slash accumulations would be treated by lopping, scattering, piling and burning or broadcast burned. Slash would be pulled away from ponds, seeps, or other standing or slow moving water to maintain water chemistry.

***ACSO 3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.***

Physical integrity of the aquatic system will be maintained through the utilization of Best Management Practices (BMPs) and Project Design Criteria (PDCs). Specific BMPs utilized for physical integrity are T-2 (Timber Harvest Unit Design); T-7 (Stream-side Management Unit Designation); T-8 (Stream course Protection); and T-12 (Suspended Log Yarding in Timber Harvesting). These practices maintain the physical integrity of the aquatic system through designation of parameters in the prescriptions (e.g. maintenance of root strength, shade canopy, and large woody material).

Harvest systems are designed to yard away from all streams in accordance with BMPs T-8 and T-12 (helicopter and other yarding). Decision to remove riparian leave trees may occur with interdisciplinary team consultation. Material may not meet the long term objectives or pose a health and safety risk to those on the site. Retention of primary shade zones and riparian reserve widths would maintain channel bank stability.

***ACSO 4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the systems and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.***

Water quality parameters of interest for this objective relate to this project's effects on temperature, water chemistry and suspended sediment. Alternatives 2 and 3 include riparian reserve management prescriptions (retention of primary shade and 50% post treatment canopy closure secondary shade zone), to provide adequate

shading and maintain stream temperatures within state standards (Compliance with Forest Plan MA-15-06).

The biological, physical, and chemical integrity of water quality will be maintained through utilization of BMP's and PDCs. Examples of recommendations utilized to protect biological, physical, and chemical integrity include the avoidance of cutting trees contributing to bank stability, pulling slash away from slow moving water and buffering of live streams during post treatment activities (eg. fertilization).

*ACSO 5. Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transportation.*

Fire and early management heavily influenced the effect of sediment regimes on aquatic ecosystems in the watersheds. Pockets of large down wood and large diameter standing trees in the project area (North facing slopes) are the result of those cooler damp isolated areas spared by fire or located in depositional areas of historic debris torrents. Sediment input into the stream would be episodic following the events. Vegetative slopes have reduced sediment input and reduced effects of peak flows on channel bank erosion, by reducing the snow accumulation typically found on hillsides following previous management and fire. The aquatic ecosystems have evolved under this scenario and maintained through the development of the riparian reserves and growth of vegetative material (larger wood) that could be incorporated into the channel.

Sediment pulses in the watersheds varied historically with fire frequency. Thinning in riparian reserves would reduce the likelihood of fire in the treated stands, but large fires are expected to occur on the landscape and will maintain the long term sediment regimes. Earthflow movement and debris torrent pulses are very dependent upon weather patterns and soil development and will be maintained after implementation of this project. Implementation of either alternative 2 or 3 will not retard, hinder or influence the pattern or development under which the sediment regime evolved.

*ACSO 6. Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.*

Instream flows are addressed in the Willamette National Forest Land and Resource Management Plan. The Willamette National Forest Plan discusses instream flow in FW-113; FW-111; FW-093; FW-089. Implementation of required forest-wide Standards and Guides would maintain sufficient flows to sustain and create riparian, aquatic and wetland habitats, and to retain patterns of sediment, nutrient, and wood routing.

*ACSO 7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.*

There are complex wetlands in or adjacent to stands proposed for treatment. Stream and wetland buffers in the project design maintain downstream variability of floodplains and wetlands in the analysis area. There are several small (less than 1/4 acre) wetlands within the proposed project area. Topography of the area that allows these are associated to colluvial deposits adjacent to stream channels. Short-term impacts may occur to the water table elevation of these wetlands. These impacts are anticipated to be negligible due to the increase in transpiration that follows increase stand growth. The timing, variability, and duration of floodplain inundation would be maintained at the watershed scale.

*ACSO 8. Maintain and restore species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability*

Selective thinning will improve tree species composition and create a more diverse plant community in the watersheds. Western red cedar and hardwoods will benefit from the removal of surrounding fir. Thinning the under story fir stands will also create better conditions for the establishment of shade tolerant trees, like western red cedar, western hemlock, and pacific yew.

Plant diversity and abundance will increase along thinned riparian areas. Thinning dense stands of fir is expected to result in suitable conditions for a number of under story species. The abundance of existing herbs and shrubs is expected to increase as light and nutrients are made available for the establishment of additional species. Species adapted to survival under a dense over story, however, may be displaced.

Thinning in the riparian reserves will increase structural diversity as individual riparian trees increase in size at a faster rate due to increased light and available nutrients. These larger trees will eventually (>50 yrs.), provide snags and down wood of larger diameter than would not otherwise have been available. Overall, this project will restore plant community diversity and maintain stream channels, sediment, and coarse woody debris at the project and watershed scale.

*ACSO 9. Maintain and restore habitat to support well distributed populations of native plant, invertebrate and vertebrate riparian dependent species.*

BMP's, PDCs and mitigation measures (e.g. seasonal restrictions, canopy closures requirements, and soil protection requirements) were designed to address instream

and riparian habitats. These measures will maintain riparian-dependent invertebrate and vertebrate species. Individual species may experience short-term impacts through canopy opening and yarding of material from riparian reserves within the treated stands. Effects are not anticipated to effect the distribution of populations of these riparian dependent species at the analysis area or watershed scale.

Thinning is expected to increase the abundance of native herbs and shrubs because more light and nutrients will be available for growth. The increase in plant biomass is expected to lead to increased prey base (insects and arthropods) for animals associated with riparian areas.

Epiphytic lichens and mosses will benefit from the retention of hardwoods and pacific yew, as well as the larger trees that will result from the thinning. Species requiring down wood, including fungi, lichens, mosses, and a variety of mollusks, bryophytes and animals, may suffer a short term (1-50 years) loss of habitat as trees are removed, however habitat will be maintained at the in the untreated portions of the surrounding stands and at the watershed scale.

## **Conclusion:**

Having reviewed the individual objectives and collectively looked at the 6<sup>th</sup> field watersheds, Detroit Reservoir / Blowout Divide Creek Watershed and North Fork Breitenbush River Watershed (HUC# 1709000503: and #1709000502 respectfully), it is anticipated that the proposed action will maintain or improve the riparian reserve system and its dependent resources for both watersheds.

David Halemeier  
Hydrologist

Darren Cross  
Fish Biologist

Daryl Whitmore  
Wildlife Biologist

Chris Wagner  
Botanist

## Appendix E – Post-Sale Activities

The following projects would be funded with KV money if available. The projects have been selected based on a preliminary sale area boundary. If the sale area boundary changes when the contract is prepared, then some of the projects may be eliminated as candidates for KV funding.

Priority	Essential Mitigation or Opportunity <sup>1</sup>	KV Activity	Amount	Unit Measure	Unit Cost	Total Cost	Units	Project Description
1	E	Planting Gaps	49	acres	\$700	\$34,300	8,10,14,16 20,27,28,2 9,30,31,33 34,35,363 7,42,45, 47,52,54,5 6,60,62,64	plant western red cedar in 1/2 acre gaps. Plant a mix of species in larger gaps (DF, WRC, WWP). Plant 200-300 trees per acre
2	M	Visual cleanup	50	acres	\$600	\$30,000	1, 2, 3, 4, 6, 7, 8, 10,11, 13, 14,15, 16,19, 21, 24, 26 27,30, 31, 33, 34, 35, 36, 37, 38, 41, 43, 45, 52, 55, 56	Visual cleanup of slash including chunking, scattering or chipping, and logging debris at landings and dispersed sites to meet VQO's. End haul residual cull decks, cut stumps and rootwads. Flush cut stumps visible from road.
3	M	Immediate high risk weed eradication	1280	acres	\$16	\$20,000	all units	Eradicate high risk weed populations along roads and disturbed project activity along powerlines to prevent establishment of these small populations, with chemical and manual, scotch broom, black berry and weed canary grass. Forest direction is to eradicate new invader infestations.*
4	M	Weed containment, manual control and monitor	1280	acres	\$27	\$35,000	all units	Contain the existing noxious weed populations and new populations within areas mngd, this includes monitor disturbed like gaps and roads after timber sale for 5 years and first year initial eradication. Mitigation measure to reduce cumulative affects of the project.*

<sup>1</sup>E= Essential Mitigation, M=Mitigation O=Opportunity

Priority	Essential Mitigation or Opportunity <sup>1</sup>	KV Activity	Amount	Unit Measure	Unit Cost	Total Cost	Units	Project Description
5	M	Visual Rehab	10	acres	\$2,500	\$25,000	19, 20, 21, 24, 31, 33	Rehab impacts of operations along Rd 46 to meet Retention VQO's. Ripped skid roads: plant large stock trees, down logs and boulders. Obliterate heli-landing U-31 to natural condition, end haul debris and remove rock, plant large stock trees. Restore heli-landing in U-19 and include delineated parking for dispersed camping. Prune limbs damaged during operations adjacent Rd 46.  In Unit 31, restore to a hiking trail the portion of the Humbug Flats Trail that overlaps a temporary road.
6	O	Subsoiling (high priority)	10	acres	\$350	\$3,500	8, 15, 16, 29, 31, 33, 34, 35, 37,43	reduce existing and created compaction
7	O	Respect the River	38	Site	\$1,500	\$57,000	7,10,11,15,16, 21-25,31-36,60,62,64	This project proposes to regulate dispersed recreation sites in riparian habitats in response resource impacts from unmanaged use.
8	O	Pre-commercial Thinning	111	acres	\$200	\$22,200	4,20,28,36,48	reduce stocking levels and enhance tree growth in young managed stands
9	O	Establish Dispersed Sites	10	sites	\$1,500	\$15,000	10,11,15,16,34, 35, 37, 33	Establish dispersed sites including delineated parking along Rds 450 and 720 to replace those that were closed including delineated parking. Replace obliterated sites in U-33
10	O	seed larger gaps w/big game forage	29	acres	\$750	\$21,750	20, 27, 28, 29, 30, 31, 35, 36, 47, 52, 60, 62	
11	O	Humbug Creek large wood placement	15	each	\$2,500	\$37,500	33-38	Placement of log structures at 15 locations in Humbug and East Humbug Creeks for Chinook salmon habitat restoration.
12	O	Gate Placement	9	each	\$2,100	\$18,900	7 (3 gates), 21, 30, 31, 33,	

Priority	Essential Mitigation or Opportunity <sup>1</sup>	KV Activity	Amount	Unit Measure	Unit Cost	Total Cost	Units	Project Description
							34, 55	
13	O	Relocate Trail	0.25	mile	\$28,000	\$7,000	31	Relocate a portion of the Humbug Trail for riparian restoration.
14	O	Upper Arm weed eradication and revegetation	2	acres	\$1,500	\$3,000	60	Weeds including scotch broom and weed canary grass in the Upper Arm Recreation Area was previously eradicated but some things are coming back. We want to control this by manual- possibly bulldozing and by spraying of small sites. Eradication and Control.*
15	O	Contain spread of existing Scotch Broom along roads and other high traffic areas	2.5	acres	\$600	\$1,500	30,31	Eradicate spread from powerline, up and down road in units 30,31 from pwrln corridor. May have partnership in this with PGE. Eradication and control.*
16	O	Berm	1	each	\$400	\$400	31	
17	O	Delineate parking	2	each	\$2,500	\$5,000	31	In conjunction with temp road obliteration and landing restoration, add rock and barriers to delineate overflow parking at Humbug CG and parking at Humbug TH
18	O	Visual Planting	10	acres	\$750	\$7,500	19, 20, 21, 24, 31, 33	Increase diversity and visual variety along Rd 46.
19	O	Upper Arm interpretation	1	each	\$10,000	\$10,000	19, 21, 60	Develop panel to interp wetland/species
20	O	Upper Arm vegetation	5	acres	\$750	\$3,750	19, 21, 60	Complete Upper Arm vegetation plan. Plant hardwoods and shade trees, riparian shoreline species, reseed lawn and remove noxious weeds that have invaded.
21	O	Canary Reed Grass eradication, reservoir	10	acres	\$1,500	\$15,000	21,60	Eradicate population from Upper Arm recreation area, down banks of reservoir. Eradication would include bulldozing population and then monitoring for next 4 years after. Opportunity to improve reservoir and



Priority	Essential Mitigation or Opportunity <sup>1</sup>	KV Activity	Amount	Unit Measure	Unit Cost	Total Cost	Units	Project Description
								recreation area for recreation and to stop this species from spreading throughout the lake.
21	O	Subsoiling	10	acres	\$350	\$3,500	8, 15, 16, 29, 31, 33, 34, 35, 37, 43	reduce existing and created compaction
22	O	Eradication of larger populations of CYCS4	97	acres	\$206	\$20,000	all units	This would partnerships with power-line companies and include spraying, manual pulling. Opportunity to eradicate all large Scotch broom populations.
23	O	scarify helicopter landings	15	each	\$200	\$3,000	13, 15, 16, 26, 27, 33, 34, 35, 37, 41, 45, 48, 52, 53	
24	O	Aerial Fertilization	25	acres	\$300	\$7,500	23	enhance tree growth on lower productivity commercial thin units