Environmental Assessment

for the

Polallie/Cooper Planning Area

LIST OF ACRONYMS AND ABBREVIATIONS

ac. . . . . acres(s)
ACS . . . . . Aquatic Conservation Strategy
ARP . . . . . Aggregate Recovery Percent
ATM . . . . . Access and Travel Management
BA . . . . . Biological Assessment
BE . . . . . Biological Evaluation
BMP's . . . . . Best Management Practices
CFR . . . . . Code of Federal Regulations
dbh . . . . . diameter at breast height
EA . . . . . Environmental Assessment
FEIS . . . . . Final Environmental Impact Statement
FS . . . . . Forest Service (USDA)
FSM . . . . . Forest Service Manual
LAD . . . . . Landscape Analysis and Design
LRMP. . . . . Land and Resource Management Plan
LSR . . . . . Late Successional Reserve
LS . . . . . Late Seral Structure
LWD. . . . . Large Woody Debris
MHLRMP. . . . . Mt. Hood National Forest Lands and Resource Management Plan
mi . . . . . miles
MIS . . . . . Management Indicator Species
MP . . . . . Mile Post
mph . . . . . miles per hour
MSE . . . . . Mature Stem Exclusion
NEPA . . . . . National Environmental Policy Act
NRHP . . . . . National Register of Historic Places
NMFS . . . . . National Marine Fisheries Service
NWFP . . . . . Northwest Forest Plan
ODFW . . . . . Oregon Department of Fish and Wildlife
ROD . . . . . Record of Decision
SHPO . . . . . State Historic Preservation Officer
SRI . . . . . Soil Resource Inventory
TE&S . . . . . Threatened, Endangered and Sensitive (Species)
USDA . . . . . US Department of Agriculture
USFWS . . . . . US Fish and Wildlife Service
VQO . . . . . Visual Quality Objective
WA . . . . . .Watershed Analysis

TABLE OF CONTENTS

CHAPTER 1.0 - PURPOSE AND NEED
FOR THE PROPOSED ACTION

CHAPTER 2.0 - ALTERNATIVES

CHAPTER 3.0 AFFECTED ENVIRONMENT

CHAPTER 4.0 IMPACTS

CHAPTER 1.0 - PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 Introduction and Project Area Location

The Polallie/Cooper planning area is comprised of approximately 4,496 acres of National Forest System Lands located seven miles south of the community of Mt. Hood (Map 1-1, and Map 1-2). The area is bordered on the north by Rouston Park, on the east by Surveyor's Ridge, on the south by Polallie and Cold Springs Creek and on the west by Tilly Jane Creek. Portions of State Highway 35 and the Cooper Spur Road traverse the area, as well as Doe, Buck, Tilly Jane, and Polallie creeks, which eventually flow into the East Fork of the Hood River, which ecologically divides the planning area into east and west. Several segments of private land (Cooper Spur Inn/Snowbird subdivision) are located immediately adjacent to the northwestern border of this planning area. This area is considered an "urban interface", where residential development is located adjacent to Forest Service land. The Cooper Spur Winter Sports Area and various hiking trails are also located within the planning area.

Due to ladder fuels, timber stands in the Polallie/Cooper Planning Area east of Highway 35 are susceptible to stand-replacing wildfires. Timber growth, yield, and health west of Highway 35 are currently declining in many of the Douglas-fir/grand fir stands. Fuel concentrations, on both National Forest and private lands within the "urban interface" are moderately high in many areas and could cause potential resource loss and damage to dwellings and other private property if a wildfire should occur. The Cooper Spur Ski Permit Area contains areas of accumulations of fuel as a result of the western spruce budworm infestation during the early 1990's. The dead understory layer of trees is falling down and becoming "jackstrawed" into heavy fuel concentrations. Additionally the Cooper Spur Road, which bisects the western part of the planning area, is a popular motor travel recreation route. Views of Mt. Hood from this road are not at locations which have a safe vehicle turnout.

Chapter 1.0 includes the location and description of a proposed action, the purpose and need for the proposed action, relevant plans, regulations and policies, and a discussion on issues/concerns brought up by the public.

1.2 Proposed Action

In order to address the declining timber stand growth and the moderate-high susceptibility of tree loss through stand replacing wildfires, timber harvest east and west of Highway 35 is proposed. Aerial fertilization of some of the harvested stands west of Highway 35 is proposed to accentuate growth in these declining stands. Underburning fuels in portions of the Cooper Spur Ski Permit Area is proposed to reduce fuels to manageable levels. A shaded fuelbreak along the "urban interface" of private residences with Forest Service land is proposed to reduce fuels to manageable levels and limit the potential for structural and resource loss from wildfire. The creation of a safe scenic viewpoint, through the topping or falling of trees, is proposed along an existing vehicle turnout on the Cooper Spur road (3510). To establish conifers for long term productivity in some of the planning areas' brushfields west of Highway 35, brush reduction through hand and mechanical cutting and conifer planting is proposed. Treatment of riparian reserves through commercial thinning and down log and snag creation is proposed to help create long term late seral structure. Down woody debris (logs) creation in harvested stands is proposed to benefit wildlife, botanical, and long term soil and timber productivity.

1.3 Purpose and Need for the Proposed Action

West of Highway 35

There are five actions proposed west of Highway 35 (see Map 1-3):

Commercial thinning
The **purpose** of this action is to improve timber growth and yield of stagnated stands so as to create and maintain the long term desired landscape character of providing a healthy, visually appealing forest scenery with a wide variety of natural appearing landscape features, as defined in the Mt. Hood Forest Plan and Highway 35 Viewshed Management Guide. There is a **need** for action because timber stand growth, yield and health is currently declining in many of the mature Douglas-fir/grand fir stands due to competition for water and light. As a result, trees grow more slowly and stagnate in dense stands. These stand conditions move the area away from the desired future condition. The **proposed action** would commercially thin 320 acres of timber stands, and create a mosaic of thinning and small openings (1-5 acres) on 123 acres (60 of these acres would be in small openings). The three hundred and twenty acres commercially thinned would be aerially fertilized. Down logs would be created on all harvested acres, with 383 acres (all thinned areas) having 240 linear feet created and 60 acres (openings) with 480 linear feet.

Brush reduction
The **purpose** of this action is to restore conifer vegetation in brushfields to fully support the timber growth capability and suitability of B-2 allocated lands as defined in the Mt. Hood National Forest Land and Resource Management Plan. In the late 1800's and early 1900's, portions of the project area were burned by several lightning and human caused wildfires. Action is **needed** as some of these areas failed to regenerate and establish a sufficient density of conifer trees to restock the stands. Instead, a vigorous brush component was established. The existing trees are currently suppressed by this brush, restricting tree growth and preventing the establishment of new trees. The **proposed action** would release existing conifers by reducing brush through hand and mechanical cutting, and plant conifer species in the newly created openings on 84 acres of brushfields.

Scenic viewpoint
The **purpose** of this action is to provide a viewpoint of Mt. Hood at a safe vehicle turnout. Action is **needed** because the Cooper Spur Road (3510) is a popular motor travel recreation route, accessing Cooper Spur Inn, Cooper Spur Ski Lodge and Cloud Cap, and views of Mt. Hood on this section of the road are obscured by trees or not at locations having a safe turnout. The **proposed action** would be to top or fall six to ten trees adjacent to an existing safe vehicle turnout.

Fuels reduction: underburning
The **purpose** of the proposed action is to reduce the fuel level within portions of the Cooper Spur Ski Permit Area, and to break the continuity of the fuel bed to slow down a fire, in order to protect public and private facilities and resources. The proposed action is **needed** as portions of the Cooper Spur Ski Permit Area contains areas of continuous accumulations of fuels as a result of the western spruce budworm infestation during the early 1990's. Both the ski permit area and the Tilly Jane/Cloud Cap facilities would be at risk of loss if a fire were to start in this vicinity. Currently the dead understory layer of trees is falling down and creating heavy fuel concentrations. These heavy fuels hinder fire suppression efforts and could cause unacceptable resource loss if a wildfire should occur. The **proposed action** would underburn 153 acres.

Fuels reduction: shaded fuel break

The **purpose** of this activity is to create a shaded fuelbreak along the "urban interface" (**Photo 1-1**) by reducing the existing fuel levels and breaking up the fuel bed, to slow the spread of fire in order to better protect public and private facilities and resources. Action is **needed** as fuel concentrations on both National Forest and private lands are high in many areas of this interface. Federal and private lands could potentially suffer resource loss, including structural loss if a wildfire should occur in this area. The **proposed action** would be to extensively thin trees and remove the majority of brush in 94 acres along the "urban interface". These acres would be aerially fertilized, and 240 linear feet of down logs per acre would be created.

/.../cell1.f6.r6.fs.fed.us/fs/fsfiles/unit/hr_terra/polallie/2flbrkpo.bmp: No such file or directory

Photo 1-1 : Aerial photo view of the urban interface, where FS lands are adjacent to residential development. Interface is the noticeable rectangle on the photo.

East of Highway 35

Commercial thinning
The **purpose** of the thinning (improvement cut) is to reduce stocking levels of fire intolerant tree species and improve vegetation health and sustainability so that timber stands are more resilient to insects, disease, and stand replacement fire. Action is **needed** as suppression of fire during this century has changed these stands from open, parklike stands, dominated by big trees (mainly ponderosa pine and Douglas-fir and other minor species), into stands with a dense under and midstory of smaller Douglas-fir and grand fir which have encroached upon the large ponderosa pine and Douglas-fir trees. These dense stands are more likely to suffer extensive mortality (including the large ponderosa pine and Douglas-fir), due to the high stocking levels of fire intolerant, smaller diameter trees. Low growing Douglas-fir and grand fir limbs act as "ladder" fuels. Ground fires can more easily jump to tree limbs and climb up into tree crowns, resulting in high levels of tree mortality. Dense stands also become stressed by inter-tree competition which can exacerbate insect infestation and/or disease. The **proposed action** would commercially thin, through and improvement cut, the under and midstory trees on 397 acres. Approximately 240 linear feet of down logs would be created on 55 acres, with 120 linear feet created on 342 acres.

East and West of Highway 35

Regeneration harvest
The **purpose** of these treatments is to re-establish diverse conifer stands on lands that currently lack viable existing stands. The healthy trees that exist in these stands are not adequately stocked to provide forest products on a regulated basis and/or meet the recommended Visual Quality Objectives, as stated in the Mt. Hood National Forest Land and Resource Management Plan or the Highway 35 Viewshed Management Guide. There is a **need** for the action because several stands in the planning area are in poor health. These stands include three specific conditions: 1) overstocked and decadent lodgepole pine; 2) understocked stands with laminated root rot and mistletoe; and 3) overstocked, stagnated grand fir. A **proposed action** would be to clear-cut harvest 27 acres (18 acres west of Highway 35, 9 acres east) and shelterwood harvest 17 acres (all east of Highway 35). Both treatment types would retain 15% of the original stand, and 480 linear feet of down logs would be created on 18 acres (west of Highway 35), 240 linear feet created on the remaining 26 acres.

Riparian Reserve treatment
The **purpose** of this action is to restore late successional components to riparian reserves to help enhance ACS objectives, by accelerating growth of the trees and helping to fund projects that create snags and coarse woody debris, to improve connectivity for late successional species in this important area (as discussed in the East Fork/Middle Fork Watershed Analysis and Landscape Analysis and Design). Stocking control treatments are **needed** within portions of riparian reserves that lack sufficient amounts of snags, coarse woody debris, and other late seral characteristics such as big diameter trees, which will help these riparian segments meet Aquatic Conservation Strategy (ACS) objectives. The **proposed action** would commercially thin 29 acres of riparian reserves, and maintain or create at least 10 large diameter snags per acre and 480 linear feet of large diameter down woody debris per acre.

1.4 Relevant Plans, Policies and Requirements

The main plans, policies and requirements applicable to the proposed action in the Polallie/Cooper Planning Area are the Mt. Hood National Forest's Land and Resource Management Plan (1990), as amended by the

Northwest Forest Plan (1994), the FEIS for Managing Competing and Unwanted Vegetation (1988), the State Highway 35 Viewshed Management Guide (1991), and the Mt. Hood National Forest Access and Travel Management Plan (1995).

Mt. Hood National Forest Management Plan as amended by the NW Forest Plan

Background

In 1993, President Clinton directed an interagency task force (the Forest Ecosystem Management Assessment Team, or FEMAT) to identify management alternatives to resolve on-going disputes about the management of federal lands in the range of the northern spotted owl that would comply with existing laws, take an ecosystem approach to managing for biological diversity, and produce the highest contribution to economic and social well being. The resultant President's Plan or Northwest Forest Plan applied to over 24 million acres of public land managed by the US Forest Service and the Bureau of Land Management within the range of the northern spotted owl.

The Secretaries of Agriculture and Interior signed a Record of Decision (April, 1994) for the Northwest Forest Plan which amended the Forest Service and Bureau of Land Management Planning Documents within the range of the Northern Spotted Owl, including the Mt. Hood National Forest's Land and Resource Management Plan (1990). Part of this Record of Decision includes Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl.

While the Mt. Hood Forest Plan contains many standards and guidelines that are not amended by the Northwest Forest Plan, some were. Where the Northwest Forest Plan standards and guidelines are more restrictive or provide greater benefits to late-successional forest related species than that of the existing Mt. Hood National Forest standards and guidelines, then those standards and guidelines would take precedence with four exceptions (reference page C-3 associated with Record of Decision for Northwest Forest Plan).

Land Allocations

Under the Mt. Hood National Forest Plan, 3245 acres of the Polallie/Cooper Planning Area is designated as B2 - Scenic Viewshed. Standards and guidelines for B-2 dictate management within these acres, except where Riparian Reserve and Late Successional Reserve land allocations overlap (where those allocations take precedence). The management goal of B-2 land is to provide attractive, visually appealing forest scenery with a wide variety of natural appearing landscape features. Vegetative management activities should be utilized to create and maintain long term desired landscape character.

The Cooper Spur Ski Permit Area is within the Polallie/Cooper Planning Area. The land allocation for this permit area (1201 acres) under the Mt. Hood Forest Plan, is designated A11-Winter Recreation Areas. Standards and guidelines for A-11 dictate management in these acres, except for those areas of A-11 overlapped by Riparian Reserve and Late Successional Reserve allocations (as the Riparian Reserve and LSR standards and guidelines are more beneficial to late-successional species). Management activities may be allowed in A11 allocated land which meet recreation objectives, protect resources or facilities, or insure the safety and enjoyment of Forest visitors.

Approximately 50 acres of the Polallie/Cooper Planning Area is designated as C1-Timber Emphasis in the Mt. Hood Forest Plan and identified as matrix under the NW Forest Plan. The primary management goal of both C1 and matrix land (where it overlays C1 land) is to provide lumber, wood fiber, and other forest products on a

fully regulated basis, based on the capability and suitability of the land. A secondary goal is to enhance other resource uses and values that are compatible with timber production.

As mentioned, the Polallie/Cooper Planning Area contains riparian reserves. Riparian reserves are one of four components (the others being key watersheds, watershed analysis and watershed restoration) of the Aquatic Conservation Strategy (ACS) identified in the Northwest Forest Plan. The ACS was developed to maintain and restore the ecological health of watersheds and aquatic ecosystems contained within them on public lands. The conservation strategy employs several tactics to approach the goal of maintaining the "natural" disturbance regime. Land use activities need to be limited or excluded in those parts of the watershed prone to instability. The distribution of land use activities, such as timber harvest or roads, must minimize increases in peak streamflows. Headwater riparian areas need to be protected, so that when debris slides and flows occur they contain coarse woody debris and boulders necessary for creating habitat further downstream. Riparian areas need protection to limit bank erosion, ensure an adequate and continuous supply of coarse woody debris to channels, and provide shade and microclimate protection. Riparian reserves are also intended to serve as dispersal and habitat corridors for terrestrial late successional associated species.

There are three 100 acre Late Successional Reserves located within the planning area. These reserves are located around known spotted owl activity centers, and are designed to maintain 100 acres of late successional habitat in these locations through perpetuity. Management actions within these reserves must be for the benefit of late successional species, or to maintain or restore late successional habitat characteristics in these stands. None of the proposed action elements enter/impact these reserves.

FEIS for Managing Competing and Unwanted Vegetation

The Final Environmental Impact Statement for Managing Competing and Unwanted Vegetation (1988) outlines the Forest Service, Pacific Northwest Region's program to treat competing and unwanted vegetation. Site analysis for vegetation management projects must be designed to minimize potential adverse impacts to the environment, project workers, and the public. The appropriate mitigation measures and environmental effects described in Section II of the FEIS would be implemented for all treatments under Federal responsibility and control.

State Highway 35 Viewshed Management Guide

In 1988, a study was initiated by the Hood River Ranger District in order to develop specific guidelines for management of the Highway 35 viewshed . The study resulted in the State Highway 35 Viewshed Management Guide. This Viewshed Guide was approved by the Mt. Hood National Forest Supervisor in 1991 with the intent of providing the Ranger District guidelines for landscape management on National Forest System lands within the viewshed of Oregon State Highway 35 as seen from Parkdale Ranger Station south to Bennett Pass. This Guide serves as a useful document for describing existing and desired future conditions as set forth in the Forest Plan for the Highway 35 viewshed.

Mt. Hood National Forest Access and Travel Management Guide

The Barlow and Hood River Ranger Districts prepared an Access and Travel Management Plan for the eastside of the Mt. Hood National Forest in 1995. This plan consisted of a map and a list of roads and trails that would be used as part of a forest-wide Access and Travel Management map for the Mt. Hood National Forest. As a

result of this effort, approximately 1700 miles of road have been identified on these two districts (and what was once the Bear Springs Ranger District). Of the 1700 miles, an estimated 610 miles are identified as primary and secondary roads, while an estimated 125 miles have been closed. Recommendations on the remaining 1000 miles or so of roads, some of which are in the Polallie/Cooper planning area remain. Some may be closed, some decommissioned and revegetated.

1.5 Issues to be Addressed in This EA

Scoping with other agencies and interested parties was conducted prior to and during preparation of this EA. Public notification of the Polallie/Cooper planning effort first occurred in the Spring 1996 edition of Sprouts, a quarterly newsletter published by the Mt. Hood National Forest and mailed to over 4000 addresses.

An October 3, 1997, scoping letter, which identified a proposed action was mailed to 182 individuals, agencies and organizations. Eighteen responses to this scoping letter were received. For specific responses to questions received in response to the October 3 letter, please refer to Appendix D of this EA.

Two field trips (11/5/97 and 11/15/97) and a public meeting (the evening of 11/5) were hosted by the Forest Service. A total of 20 individuals participated at the public meeting and/or the two field trips.

A public open house was held at the Hood River Ranger Station on February 4, 1998. A variety of projects and programs, including the Polallie/Cooper planning Area, were on display at this open house.

Through scoping, individuals and groups identified a number of concerns they had regarding the proposed action. In an effort to respond to public comments and concerns, a number of modifications to the proposed action sent out for scoping were made, and are now depicted as Alternative 2 within this EA. The proposed action sent out for scoping included an unspecified amount (the map showed 244 acres) of stands within riparian reserves to be commercially thinned; Alternative 2 has dropped the amount to be treated to 29 acres. Originally we proposed shelterwood and other regeneration harvest (clear-cut harvest with 15% green tree retention) on 225 acres. Alternative 2 now contains 44 acres of shelterwood and clear-cut harvest, with another 60 acres proposed as small regeneration units of 1-5 acres in size, for a total of 104 acres. The road system proposed for accessing the proposed timber sale has also been modified to not cross or go within any riparian reserves. In addition, under Alternative 2, no fertilization would occur within riparian reserves. Acreage of brush reduction has also dropped from an original 121 acres to 84 acres, as a reflection of public comments on this topic.

The following discussion summarizes public concerns and describes how these concerns were addressed:

1. New road construction would have adverse impacts to fish and water resources.

No roads would be constructed within riparian reserves. All roads to be constructed would be temporary, and would be closed after post harvest activities are completed. Three quarter miles of temporary road is proposed on a slope greater than 20%, with the nearest intermittent stream approximately 500 feet downslope and the nearest fish bearing stream over 1/2 mile away. In this location, Cooper Spur road intercepts the runoff. An assessment of effects of potential sedimentation is disclosed in Chapter 4, Aquatics, with a determination that potential sedimentation due to all newly constructed roads would be negligable. The geologist concluded that none of the proposed road system would be on slopes with a

relatively high susceptibility for landslides, while the hydrologist and soils scientist determined potential erosion and sedimentation from temporary roads would be minor to none. All new temporary roads would be constructed in accordance with the Mt. Hood NF Standards and Guidelines as amended by the Northwest Forest Plan. Numerous mitigation measures have been designed (Appendix E) as a means to reduce potential sediment. Based on these actions and mitigations, the effects of temporary roads upon fish, and water should be minimal.

2. Proposed road closure or obliteration of the newly created roads would limit future access to stands for timber management and fire suppression.

All new roads would be bermed, with at least the first 100 feet of road obliterated. Access into these areas for fire suppression could be achieved by using a bulldozer to push down the berm and smooth out the obliterated section of road. The time and cost to do this type of work for fire suppression would be minimal. Access into these areas for future regulated timber harvest is not anticipated within the next 15-20 years. This planning effort is intended to deal with stand treatment projecting out over the next 15-20 years, for those stands accessed by the new road system. After the 15-20 year window, when additional treatment in these areas may be needed, access will be assessed. Road closures do not preclude options for fire suppression and do not limit access for timber management.

3. Timber harvest would increase the peak flows, negatively impact water quality, cause landslides/mass wasting, and accentuate flooding within and downstream of the planning area.

An assessment of the proposed action by a geologist, soils scientist, and hydrologist indicate that the proposed action would not increase the likelihood of landslides/mass wasting, nor degrade the water quality through sedimentation. The geologist concluded that the proposed treatment would benefit slope stability by preserving large tree functions (improving root strength, improving slope (ground) water pumping, less likely to become diseased, and more likely to survive a severe wildfire), therefore reducing the potential for landslides/mass wasting. The potential for flooding and increased peak flows would be minimal, and well within the Standards and Guidelines within the Mt. Hood LRMP. Mitigation measures to decrease these potentials have been identified in Appendix E. Riparian reserve acres proposed for harvest have dropped to 29 from up to 244 acres identified in the scoping letter. Within the riparian reserves proposed for treatment, roughly one-half of the reserve width on each side of the stream, based on natural slope breaks, would not be entered for thinning. There should be minimal effects of timber harvest upon these resource concerns.

4. Timber harvest would retard the development of spotted owl habitat in the stands east of Highway 35.

The proposed action would meet the Standards and Guidelines within the Mt. Hood NF Plan, as amended by the Northwest Forest Plan. The Northwest Forest Plan was developed as a means for maintaining the viability of the northern spotted owl and other late successional associated species. The proposed action would be consistent with the Plan. In the long term, the proposed treatment may accelerate the development of owl habitat within these stands.

5. Timber harvest would result in adverse effects to snag and log associated species, mature forest associated species (within a wildlife corridor), threatened and endangered wildlife species, and reduce thermal cover for deer and elk.

There would be some adverse effects to spotted owls (and the mature forest wildlife species they represent) and snag and log associated species. Compliance with the Northwest Forest Plan would maintain the viability of spotted owls. Consultation with the U.S. Fish and Wildlife Service on the proposed action has provided specific protection measures which have been included in the proposed action. The USFWS concluded that the proposed action would not effect the continued viability of the spotted owl. The project is in compliance with the Recovery Plan for bald eagle and peregrine falcon, and would not impact viability.

Down logs and snag levels in the proposed action are at higher levels than those needed to meet the Mt. Hood and Northwest Forest Plan Standard and Guidelines, often twice as much, to benefit snag and log associated species within the connectivity corridor identified in the East Fork/Middle Fork Watershed Analysis and Landscape Analysis and Design. Mitigation measures to minimize disturbance related impacts to deer and elk and spotted owl have been incorporated into the proposed action. Thermal cover for deer and elk in the main migratory corridors will not be reduced below Standard and Guideline levels in the Mt. Hood Forest Plan. The effects to these species are discussed in Chapter 4, Wildlife Resources.

6. Timber harvest in the riparian reserves would harm, not help, aquatic and terrestrial species.

The fisheries biologist, hydrologist, soils scientist, and wildlife biologist worked with the silviculturist to design timber management within the riparian reserves with the objectives of growing larger trees faster, maintaining or developing snags and down logs, and minimizing the negative effects of logging in riparian reserves through the development of mitigation measures (see Appendix E). Acreage within the proposed action have dropped from a potential 244 to 29 acres, as a result of focusing on where treatment is needed to promote ACS objectives, and based on public comment. The fisheries biologist has concluded that stream temperatures would not be raised in these areas, and additional sedimentation is unlikely and minimal. The proposed action meets the Mt. Hood Forest Plan Standard and Guidelines, the Northwest Forest Plan Standard and Guidelines, and the 9 Aquatic Conservation Strategy Objectives.

7. Fertilization of timber stands would contaminate riparian reserves, and adversely impact aquatic and terrestrial species, and water quality.

These potential effects have been determined and disclosed in Chapter 4, Soils, Hydrology, and Aquatics reports. These specialists have concluded that fertilization would not result in adverse effects, and would likely not filter into any portion of the riparian reserve. The proposed action now proposes no fertilization within riparian reserves, different from the action presented in the October 3 scoping letter, based on public comment. The mitigation measures in Appendix E offer design features to eliminate the potential effects to riparian reserves.

8. Tractor logging would result in unacceptable soil compaction.

Soil compaction, as a result of the proposed action, would not exceed 15% as identified in the Mt. Hood NF Plan Standard and Guidelines. Mitigation measures (Appendix E) have been developed to greatly reduce the amount of soil compaction during and post logging. Effects of the proposed action upon soil compaction would be minimal.

9. Fertilization would impact the normal functioning of the soil, resulting in long term ecological impacts.

The effect of fertilization upon the soil resource, and hence the forest ecology, was assessed by the soils scientist and is presented in Chapter 4. He determined that there would be no adverse effects to soil, and that the proposed fertilization would meet the Standard and Guidelines surrounding soil health within the Mt. Hood NF Plan.

10. Timber harvest would result in changes to the scenic quality that violate the Forest Plan.

Mitigation measures on slash treatment and disposal and design features of the proposed action eliminate this concern. Proposed timber harvest and road placement, as well as the other resource projects (fuels reduction, scenic viewpoint creation, down log creation) were developed with a landscape architect with a goal of maintaining long term Visual Quality Objectives as defined in the Mt. Hood Forest Plan. The landscape architect noted no aspect of the project that would violate the Standards and Guidelines of the Forest Plan.

11. The character of the hiking experience along Trail 678 will be negatively impacted by timber harvest.

Mitigation measures have been identified in order to maintain the general scenic character of the trail to the standards identified in the Forest Plan and maintain the safe use of this trail. Appendix E identifies the measures to be implemented in order to maintain the quality of the trail.

12. New roads, including the current road system, will increase road density and human use and cause harassment of wildlife. The proposed shaded fuel break would function similar to a road.

Road density within the planning area is currently 1.69 miles/square mile. The proposed action would temporarily increase the density to 2.28 mi/sq mi, within the Standard and Guidelines for road density of 2.5 mi/sq mi. A seasonal restriction on construction and use of the temporary roads within the heaviest deer and elk migratory area is part of the proposed action. All new roads would be closed or obliterated after completion of project activities, through berming and obliteration of at least the first 100 feet of the road. These actions should effectively eliminate the availability of these roads to be used by vehicular traffic, and therefore would negate the concern regarding harassment to wildlife. All roads to be constructed would be in accordance with the Mt. Hood NF Standards and Guidelines as amended by the Northwest Forest Plan. The shaded fuel break will be effectively closed where it bisects open roads, through berming and piled materials (logs, boulders). Based on these actions and mitigations, the effects of the temporary roads and the shaded fuel break (as a potential vehicular travel corridor) upon wildlife should be minimal.

13. Brush conversion eliminates an element of diversity from the overall area. Brush may provide important habitat for wildlife.

Based on the input from several individuals and agencies, we modified the proposed action in order to retain some of the brushfields. Proposed brush reduction treatment is decreased from 121 acres in the October 3 scoping letter to 84 acres. The State Highway 35 Viewshed Management Guide focuses on the need to retain some of these types of patches on the landscape, both for landscape and visual texture as well as for wildlife and biodiversity.

14. Water quality for a domestic water source and several private wells would be negatively impacted by the timber harvest and aerial fertilization.

Tilly Jane creek, Doe Creek, and several private wells are utilized as sources for domestic water for residences within the vicinity of Cooper Spur, Mountain Shadows, and Snowbird residential areas. Only the Tilly Jane source is on National Forest land. The hydrologist determined that harvest and fertilization would not negatively impact this water source due to no harvest activities within the riparian zone and no fertilizer application within the riparian reserves. Additionally, the soils scientist determined that soil microorganisms would metabolize the fertilizer prior to fertilizer leaching into the groundwater. It was

determined that the private well sources are a sufficient distance from the National Forest boundary and would not be impacted. Additionally, mitigation measures (Appendix E) would help to insure that these areas receive adequate protection.

No significant issues or unresolved conflicts were identified regarding the above concerns and hence there is no need to develop additional alternatives relative to these concerns.

There were other comments/concerns which merit further discussion, as they offered alternative ways of implementing the proposed action:

1. Piling and burning slash negatively effects the soil by not allowing the nutrients in the slash to remain on site and decay into the soil. The Forest Service should lop and scatter (not pile) the slash.

2. New roads should not be constructed; helicopter logging is a viable option and a way to reduce or eliminate the negative effects of new roads.

These two concerns will be addressed within Chapter 2, Alternatives.

1.6 Decision to be Made

The Forest Supervisor for the Mt. Hood National Forest is the Responsible Official who will decide:

- Whether to conduct timber management and silvicultural activities now and, if so, what post sale treatment will be applied in the project area (down log creation, etc.)
- Whether to release brush and plant conifers in brushfields.
- Whether to underburn the fuels in the Cooper Spur Ski Permit Area.
- Whether to establish a shaded fuelbreak in the urban interface area.
- Whether to establish a scenic viewpoint on the 3510 road.
- What mitigation and/or monitoring measures to implement to meet or exceed the Standards and Guidelines in the Mt. Hood National Forest Land and Resource Plan as amended by the Northwest Forest Plan.

CHAPTER 2.0 - ALTERNATIVES

2.1 Introduction

A No Action Alternative (Alternative 1) and a Proposed Action Alternative (Alternative 2) are being evaluated for the Polallie/Cooper Planning Area. The No Action Alternative provides a baseline for estimating the effects against the Action Alternative. Under Alternative 1, none of the proposed actions would be implemented in this planning area as a result of this planning effort.

The Proposed Action Alternative is similar to the proposed action identified in an October 3, 1997, scoping letter which was mailed to individuals, agencies and organizations. The proposed action has been modified from that presented in the scoping letter, due to public comments and concerns.

2.2 Alternatives Considered in Detail

Alternative 1 (No Action)

Under this alternative, the proposed timber sale(s) and associated projects described in Alternative 2 would not occur at this time.

Alternative 2 (Proposed Action)

Alternative 2, the proposed action, consists of a commercial timber sale(s), two hazard fuel reduction treatments, the creation of a scenic viewpoint, brush reduction and conifer planting (Map 2-1). Specifically, the proposed action is as follows:

COMMERCIAL TIMBER SALE(s)

The commercial timber sale(s) would involve treatment of an estimated 1,007 acres by the following silvicultural harvest methods:

- Commercially thin (improvement cut) an estimated 397 acres of land east of Highway 35 using various harvest systems such as tractor and helicopter yarding. This action would involve the thinning of the under and midstory trees around larger diameter ponderosa pine, Douglas fir, and western larch, creating a varied canopy closure from 40-70%.

- Commercially thin an estimated 414 acres of land west of Highway 35, using tractor, skyline, and helicopter logging systems. This action would involve reducing the stand density by removing trees from the lower/mid crown classes to favor those trees in the upper crown classes.

- Regenerate harvest an estimated 44 acres of land, approximately 17 acres of which would be shelterwood cut (all east of Highway 35) and an estimated 27 acres clear-cut (with 18 acres west of Highway 35, 9 east). These treatments would maintain 15% of the stand, as the largest, oldest trees for green tree retention. All 44 acres would be planted with tree seedlings post harvest.

• Mosaic variable thin harvest (variable spaced thinning with small pockets of openings) 123 acres on the westside of Highway 35. Approximately 60 acres of this harvest would result in small openings (1-5 acres in size) which would be replanted after harvest. Thinned stands would vary in spacing and canopy closure. Openings greater than 2 acres would retain 15% of the stand as small patches and remnants.

• Commercially thin a total of 29 acres of riparian reserves through a commercial timber sale. No cut areas within the riparian reserve would be established where no harvest nor machine entry would occur. **Figure 2-1** below shows where harvest would occur within these acres. East of Highway 35, within the 10 acres proposed for riparian entry, canopy closure and spacing would vary depending upon slope aspect. North-facing slopes would retain a feathering of up to 70% canopy closure, with most of the treated part of the reserve near or at 70% canopy closure. South facing slopes would also feather, from 40-70%, but with more variety in that canopy closure. The difference in these canopy closures proposed for the two aspects is based on ecological differences noted in stocking and canopy closure based on aspect (north facing is cooler, more moist, and retains more trees and higher canopy closure). On the westside of Highway 35 (19 acres), canopy closure and spacing would be more even in texture, but still range from 40-70%.

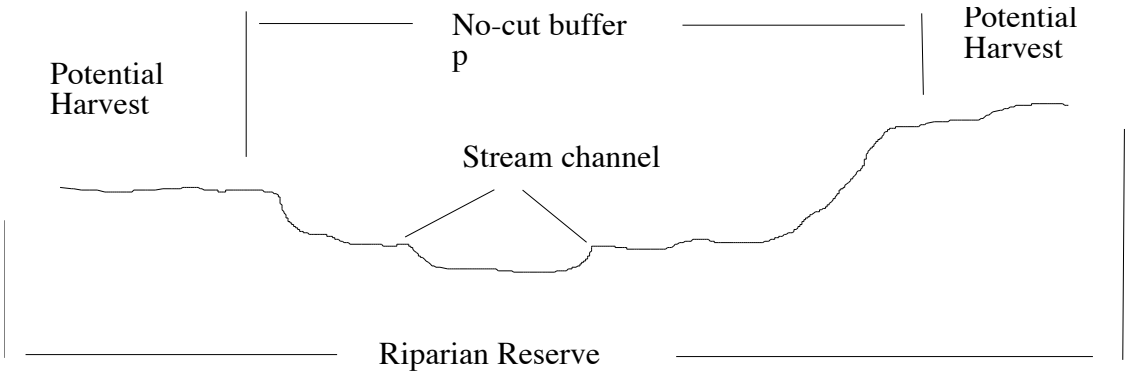

Figure 2-1. Schematic drawing illustrating the no-cut buffer as related to natural slope breaks and the riparian reserve width as proposed within the Polallie/Cooper planning area. Each perennial and intermittent stream proposed for timber harvest has a no-cut buffer although widths vary depending on slope breaks, most usually over one half of the total reserve width.

The proposed action would remove an estimated 24,066 CCF (or 12.75 MMBF) of timber, of which approximately 100 acres would require a skyline logging system, 421 acres would require helicopter logging, and 486 acres tractor logging. Approximately 4.1 miles of temporary roads would be constructed. These roads would be closed or obliterated after post harvest activity (slash treatment, reforestation, etc.) is completed by berming the roads at their junction with established roads, and obliterating at least the first 100 feet of roadbed.

BRUSHFIELD REDUCTION

Eighty four acres of brushfields, with scattered small conifer trees, would be treated for conifer release and interplanting. Brush would be cut either by machine or hand, and piled. Seven of the 84 acres are within a riparian reserve, and would be removed through chainsaw or other hand equipment. Treatment would not occur below the slope break (see **Figure 2-1** above for explanation of slope break and non-treated widths). Outside of riparian reserves, machine mastication or cutting would occur.

SCENIC VIEWPOINT CREATION

The viewpoint opportunity would consist of the falling and/or topping of six to ten trees adjacent to an existing vehicle turnout on the Cooper Spur Road. The cut or topped portions of the trees would remain on site. This project is located within a riparian reserve.

FUELS REDUCTION

The hazard fuels treatment involves 247 acres. Two projects are proposed:

• Underburn an estimated 153 acres in the Cooper Spur Ski Permit Area. Fuels within these stands would be reduced to 25 tons per acre across all fuels sizes. Burning would be done under prescription when fuel moistures are high. Burning would take place at a time of year to produce a low intensity fire that would reduce fine fuels with minimal duff disturbance. Approximately 18 acres of riparian reserve overlap this area. The proposed action would avoid burning within one half of the reserve width, and where burned within riparian reserves, only the 0-3 inch size class would be reduced.

• Create an estimated 94 acre shaded fuelbreak along the urban interface which would be approximately 300 feet wide with "scalloped" edges. Trees, hardwoods and shrubs would be reduced by approximately 60 percent within the fuel break. Islands of trees and shrubs, with a minimum of 100 feet separating them from the edge and other islands, would make up a mosaic pattern throughout the fuelbreak (**Figure 2-2**). (All but 6 acres of this proposal is also counted for previously under *COMMERCIAL TIMBER SALE,* as areas to be thinned or small openings. Six acres overlap the brushfield conversion, and acreage estimates under that heading take these six acres into account). Fuels/slash from this activity would be reduced below 12 tons per acre for the zero to three inch category and to 50 tons per acre for the greater than three inch size class. Fuels would be piled and burned. Four acres of riparian reserves are overlapped in this area. Half of the riparian reserve width would be excluded from the proposed action. Within the other 2 acres, some hand manipulation of fuel may occur within heavy (>50 tons/ac) concentrations. This fuel would be handpiled, or lopped and scattered outside areas of high fuel concentrations.

Figure 2-2: Diagram of proposed fuel break.

LEGEND:
* Trees/shrubs-
* Logs--------
* Structure---

/.../cell1.f6.r6.fs.fed.us/fs/fsfiles/unit/hr_terra/polallie/flbrk.bmp: No such file or directory

AERIAL FERTILIZATION

The 414 acres commercially thinned on the westside of Highway 35 (outside of riparian reserves) would be aerially fertilized at the rate of 200 lbs/ac of urea with a helicopter.

DOWN LOG CREATION

All stands proposed for commercial timber harvest (1,007 acres) would have large down logs created post harvest, through the falling or girdling of trees. The amount of creation proposed is based on the landscape context of the acreage, with more material left per acre, on average, within those stands within the wildlife connectivity area. Within the shaded fuelbreak (94 acres), the commercially thinned stands west of Highway 35 (320 acres), the thinned portions of the mosaic variable thin (63 acres), the regeneration acres east of Highway 35 (26 acres), and 55 acres of the improvement harvest east of Highway 35, 240 linear feet of down logs per acre would be created/retained. Within the remaining portion of the improvement cut (342 acres), 120 linear feet per acre would be created/retained. The 29 acres of riparian reserve thinning, the 18 acres of clear-cut harvest west of 35, and the 60 acres of openings in the mosaic variable thin would all have 480 linear feet per acre created/retained. One tree in this area is equal to about 100-120 linear feet.

DESIGN CRITERIA COMMON TO ALL PROJECTS

These are conditions by which the above listed projects would be implemented:

- Out of concerns for debris-flows originating from Polallie creek, workers and equipment would not occupy the Polallie Creek helicopter log decking area between November 1 and May 1 of any given year.

- Operations (timber harvest, aerial fertilization, post-harvest treatment, burning, etc.) would be seasonally restricted to provide protection to northern spotted owl pairs, located within 0.25 miles (and up to 0.5 miles away for helicopter use) from the known activity centers. Period of operation would be from July 1 to February 28. (Restriction from March 1-June 30). This restriction could be lifted for the year if non-nesting of spotted owls is verified. This measure is considered a "Mandatory Term and Condition" as a result of consultation from the U.S. Fish and Wildlife Service. This effects the Polallie Creek helicopter log decking site mentioned above, as well as the underburning project.

- Operations (road construction, timber harvest, helicopter flights, post-harvest treatment, etc.) within sections 32 and 5, west of Highway 35, would be seasonally restricted to protect spring migrating deer and elk. Period of restriction is from May 1 to June 30. Newly constructed roads would be closed to public access during this time.

- All new roads would be constructed using appropriate erosion control measures, and would be taken out of service within 5 years of the timber sale closure using timber sale collections. Closures would be by berming and obliterating at least the first 100 feet in an effort to prohibit vehicular use of these roads post project completion.

- Snags (large, greater than 21" dbh dead and dying trees) would be protected to the fullest extent possible, within the limitations of safe operations. Within the shaded fuelbreak (94 acres), the commercially thinned stands west of Highway 35 (320 acres), the thinned portions of the mosaic variable thin (63 acres), the regeneration acres east of Highway 35 (26 acres), and 55 acres of the improvement harvest east of Highway 35, at least 4-5 snags per acre would be retained. Within the remaining portion of the improvement cut (342 acres) at least 2-3 snags per acre would be retained. The 29 acres of riparian reserve thinning, the 18 acres of clear-cut harvest west of 35, and the 60 acres of openings in the mosaic variable thin would all have at least 8-10 snags per acre retained.

2.3 Alternatives Eliminated From Detailed Study

Scoping produced two concerns from the public which yielded alternative ways of completing the proposed action. For reasons discussed below, these alternatives were eliminated from a detailed study/analysis.

Helicopter Logging Alternative

Comments were received that oppose the construction of any roads, even temporary roads, as identified in the proposed action, suggesting that only helicopter logging be permitted. Some see these roads, even if closed after timber harvest activities, as a source of sediment, while others question the effectiveness of road closures. Also questioned was the need to build new roads when it appears that the Forest Service can't afford to maintain current roads.

The Forest Service eliminated the no road construction alternative from detailed study because the cost to helicopter log the stands is prohibitive when compared to the cost associated with the construction of these temporary roads. A preliminary assessment by the fisheries biologist, hydrologist, and soils scientist indicated that these roads, built on relatively flat terrain, would not be a source of excessive amounts of stream siltation. It was also determined that these temporary roads could be effectively closed. Forest Service road maintenance allocations have been steadily declining the last few years, however the roads proposed under Alternative 2 are temporary roads and are not part of the Forest Service system roads budgeted for maintenance. All of these factors (particularly the minimal resource damage anticipated) were reasons that this action was eliminated from detailed study. Road construction and operation effects will be disclosed in the Proposed Action Alternative and can be compared to the No Action Alternative for a baseline determination of effects. Mitigation measures listed in Appendix E would reduce roads' impacts upon the various resources.

Lop and Scatter Slash Alternative

Comments were received that full scale piling and burning of slash eliminated the potential nutrient and organic material source for the creation of new soil. Fine twigs, stems, and branches were thought to be vital to the continued health of the forest stand, as the fine material decays into the soil. An alternative was offered to lop and scatter all the material slash from timber harvest, to spread the twigs, stems and branches throughout the treated units. Some piling of material for wildlife was suggested as being acceptable.

The proposed action leaves the decision on how to dispose/reduce slash until after timber harvest is completed, based on what the level of slash is within the various units. Three main options are available for implementation post harvest: piling (either hand or machine piling) and burning, machine mastication (chewing up the material into smaller pieces), or lop and scatter (which essentially just spreads the slash more evenly across the landscape).

Slash levels of all size classes post harvest are estimated to be at approximately 80 tons/ac across the entire treated planning area post timber harvest (120 tons/ac in regeneration and openings; 45 tons per acre within thinned stands). This level of slash would create unacceptable fuel levels, and would increase the potential/risk for catastrophic fire within the planning area. Based on these estimates of slash/fuel levels anticipated post timber harvest, it is likely that the majority of slash treatment would be to pile and burn. Within a generic piling treatment, approximately 60% of the fuels/slash are reduced through pile burning. With the machine mastication, no material is reduced. Both of these slash treatment strategies would likely be employed in this planning area. The Forest Service has eliminated from detailed study blanket lop and scatter treatment, based on these slash/fuel levels anticipated post treatment. Lop and scatter would not effectively help meet the purpose and need for action within the planning area, of reducing the potential for catastrophic wildfire. Some level of lop and scatter or no slash treatment may occur within the planning area, if conditions indicate fuel levels create a low risk. Mitigation measures have been developed (Appendix E) to help retain as much slash as

possible for soil, botanical, and wildlife purposes, while insuring that unacceptable fuel loadings are not retained within harvested areas.

CHAPTER 3.0 AFFECTED ENVIRONMENT

3.1 Introduction

This chapter describes the existing conditions of the environment that could be affected by the alternatives being considered. The information in this chapter provides a basis for evaluating the potential effects of the alternatives under consideration.

Planning Area Setting

The Polallie/Cooper planning area is comprised of approximately 4496 acres, 3200 acres (71%) of which are in the Polallie Creek, Tilly Jane Creek, and portions of the East Fork subwatersheds on the west side of Highway 35. Approximately 1296 acres (29%) are located in several small unnamed "facing drainages" within the East Fork subwatershed, east of Highway 35. The planning area spans an elevation range of 2,800 to 5,600 feet. Average annual precipitation is in the range of 45 to 80 inches per year, occurring mostly during the winter months.

Most of the landscape on the west side of the East Fork Hood River is sloping radially away from the Mt. Hood peak, resulting in cool northwest to easterly aspects. Major climax plant communities include western hemlock, pacific silver fir, and mountain hemlock zones with western hemlock on the warmer sites and mountain hemlock on the coldest. Other seral tree species present include lodgepole pine, Douglas fir, ponderosa pine, western white pine, grand fir, noble fir, western larch, and western red cedar.

The landscape on the east side of the East Fork Hood River faces west for the most part, except in the draws where there is a slight north or south aspect. Major climax vegetation zones on these hot south and west slopes include ponderosa pine, Douglas fir, and grand fir, with ponderosa pine located in the warmest and grand fir in the coolest. Other seral tree species present include lodgepole pine, western white pine, western larch, Engelmann spruce, and western red cedar.

European influence in this area began with settlement, some small scale logging, and recreation activities in the first half of the 1900s .

3.2 Geology, Soils, and Water Resources

Planning Area Characterization

<u>Geology</u>

This area is bisected by the large north to south trending Hood River Fault. This fault has downthrown the land west of Highway 35 and upthrown the land east of Highway 35. Additional east to west trending smaller faults are responsible for the locations of most of the tributaries to the East Fork Hood River. This crisscrossing fault system is largely responsible for the distribution and concentration of groundwater throughout the planning area. West of Highway 35, pyroclastic- and debris-flow deposits from Mt. Hood eruptions have mantled the

surface with a thick layer of unconsolidated boulders, cobbles, gravels, and coarse sand mixed with ash. East of Highway 35, only ashfall events have mantled the steep sloped surface. For these reasons, contributing factors to landslide susceptibility greatly differ from west to east of Highway 35.

Soils

Soils across the planning area have been derived from numerous ashfall deposits, primarily from Mt. Hood eruptions. Prevailing winds have a south or west component to them and as the mountain would erupt, ash clouds would be carried downwind and deposited across the entire planning area. Wind, precipitation events, and landslides continue to alter the original depositional pattern by removing ash completely in some places exposing bedrock, and depositing it in others resulting in very thick ash deposits. Soil characteristics are generally similar under the forested terrain across the planning area. There are some major differences in soil development characteristics from west to east that can be used to help understand vegetation and fire patterns across the planning area. These differences are summarized in **Table 3-1** and explained in detail below.

Table 3-1. A table displaying trends from west to east in the Polallie/Cooper planning area.

	West					*East*
SRI map unit	380	169	168	212	213	211-7
Soil characteristics	Widespread Spodic	Spotty	Transition	Low Mollic	High Mollic Development	
Upland Veg.	Mt. Hemlock	Silver fir	W.Hemlock	Doug fir/Grand fir	Pond. Pine	Grassland
Climate	Cooler, wetter					Warmer, dryer
Organic matter	Average ≥25 tons and six logs per acre				Average 10 tons and one log per acre	
Fire frequency/type	Less frequent/stand replacing				More frequent/underburn	
Landslides	Larger volume, More frequent (except Tilly Jane System)				Smaller volume, Less frequent	

Less than 1% of the area proposed for vegetation treatment is currently in a detrimental soil condition. There also appears to be sufficient levels of effective groundcover across the planning area since no unusual erosion was observed.

Hydrology

The Polallie/Cooper planning area lies entirely within the East Fork Hood River watershed (HUC No: 1707010525) and includes portions of the Tilly Jane Creek, Polallie Creek and East Fork subwatersheds. The planning area lies entirely within the "transient snow zone" where precipitation can occur as either rain or snow, and where rapid melting of snowpacks due to rain-on-snow events is not an uncommon occurrence. The major tributaries to the East Fork occurring within the planning area (Tilly Jane Creek, Doe Creek (tributary to Tilly Jane Creek) and Polallie Creek) are perennial streams. Other streams in the planning area are intermittent, interrupted, or ephemeral. Most tributary streams to the East Fork Hood River are fed by springs, which are a result of groundwater routing through the extensive geologic faulting. No quantitative stream discharge data is available for tributary streams within the planning area.

Water Uses

Tilly Jane Creek, Doe Creek, and other minor tributaries and springs are utilized as sources for domestic water for residences within the vicinity of Cooper Spur, Mountain Shadows, and Snowbird residential areas. A substantial portion of the total flow of the East Fork Hood River is diverted for agricultural irrigation on private lands downstream from the planning area, occurring primarily during the months of April through August.

West of Highway 35

Landslide Susceptibility

The downthrown side of the Hood River Fault lies to the west of Highway 35, resulting in a landform characteristic consisting of gently rolling ridges with slopes generally less than 50% (the majority less than 30%). There are a few localized areas of rock outcrop where slopes can be very steep, occurring adjacent to Tilly Jane and Polallie Creeks.

Catastrophic debris-flows have occurred in the past and will likely occur in the future due to a combination of environmental factors including steep drainages, unstable geologic units, the presence of springs and seeps in the unconsolidated pyroclastic- and debris-flow deposits, the presence of colluvial hollows in the headwaters, and landslide triggering precipitation events (detailed landslide susceptibility contributing factor definitions are located in the Geology and Hydrology sections of the Middle and East Fork Hood River Watershed Analysis, 1996). Polallie Creek has produced two large debris-flows in the last 17 years, most recently in the winter of 1997. Evidence suggests that smaller volume debris-flows occur relatively frequently in the upper portion of the drainage, but are not large enough to sustain the momentum necessary to reach Highway 35. Polallie Creek is the most active debris-flow producing channel within the planning area and lacks riparian vegetation along its entire length. Within Tilly Jane Creek, channel gradients are stair-stepped and highly variable. Densely forested riparian areas adjacent to the channel indicate that there has not been a catastrophic debris-flow in recent times. However, a debris-flow fan deposit at the confluence of the East Fork Hood River and Tilly Jane Creek indicates the drainage has initiated large volume debris-flows in the past. Debris-flows are believed to initiate in the two steeper reaches of the drainage, above and below the Cooper Spur Road (Road 3510). For these reasons, Tilly Jane and Polallie Creeks are identified as having a high susceptibility to debris-flows resulting from debris-slides initiating in the upper watersheds. These debris-flows can be large in volume and are usually associated with rain-on-snow events. **Figure 3-1** identifies the areas with high landslide susceptibility.

Soils

Soil types occurring where activities are proposed include 380, 169, and 168 in the Mt. Hood National Forest (NF) Soil Resource Inventory (SRI) (Howes, 1979). These are deep, loamy, well-drained, productive soils (although 380 is colder and less productive), and are less rocky than described in the SRI. Rock contents from soils examined in the field were rarely more than 5%. The deep, loamy nature of the soils allows them to store adequate moisture for the growing season. Factors limiting growth here include cold temperatures and nutrient availability. These soils are beginning to develop what is called a spodic horizon. They develop over time where organic matter persists on the soil surface long enough to form organic acids that leach out of the duff and bleach out the surface mineral soil. Spodic development is fairly widespread in the west (map unit 380), but becomes very spotty toward the east, occurring only where large amounts of older, well rotted organic matter is present. Nutrients on these sites are stored in the duff layer, woody debris, and a very thin light brown topsoil that is found just above the thin (an inch or less), developing spodic horizon. The light gray soil below the topsoil (commonly referred to as subsoil) is relatively nutrient poor.

Taking into account field conditions that differ from the SRI, the surface and subsurface erosion potential are estimated as moderate and moderate-high, respectively. Erosion ratings are based upon *bare* soil (no vegetative or duff cover). The compaction hazard is estimated as moderate, and the susceptibility to soil displacement is high.

Water Quality

While no quantitative water quality data is available for the major tributary streams occurring in the planning area, anecdotal evidence suggests that water quality is relatively good. With the exception of Polallie Creek, the riparian areas of streams within the planning area are densely vegetated and shaded, suggesting that water temperatures are cool for extended periods of the year. Infrequent visual observations during various times throughout the year suggests that water clarity is generally very good, with the exception of Polallie Creek which runs turbid during periods of high runoff, owing to the absence of protective vegetation and intact riparian areas. Observations of the mainstem East Fork Hood River suggest that water clarity is generally good except for periods of heavy rainfall and/or snowmelt. Much of the fine sediments which become mobilized during winter rainfall and spring snowmelt are attributable to inputs from highway sanding and contributions from tributary streams, such as Newton Creek and Polallie Creek, both of which have experienced recent, naturally occurring debris-flows. Summertime turbidity in the mainstem is also common during periods of rapid glacial melt in the headwaters of tributaries such as Newton Creek.

Large Wood Input

Most of the tributary streams within the planning area have the potential for recruiting large wood on-site and redistributing it downstream. While many of the riparian areas do not currently have large trees, they have the potential to grow and contribute large wood to the stream system. A watershed analysis completed for the East and Middle Forks of the Hood River (1996) concluded that streams with active debris-flow potential probably contribute less wood over time . The potential for large wood input into westside streams like Tilly Jane Creek is relatively high, due to the relatively infrequent occurrence of debris-flows. Conversely, Polallie Creek is a good example of a naturally low wood component system due to the relatively frequent occurrence of catastrophic debris-flows. Naturally occurring debris-flows have historically been a major source of large woody debris for the East Fork Hood River.

East of Highway 35

Landslide Susceptibility

Slopes ranging from 40-60% are common with areas of rockfall and rockslides adjacent to the East Fork Hood River. Most of the drainages on the long, steep slope east of Highway 35 are susceptible to landslides. These drainages are identified as having a high susceptibility to shallow landslides, which usually are small in size and commonly develop in or adjacent to the unnamed drainages. See **Figure 3-1** for relative landslide susceptibility ratings. It is likely that they have occurred in the past and would continue to occur in the future due to the following environmental factors: severe wildfire susceptibility, steep drainage side-slopes, the presence of mostly intermittent flowing drainages, the presence of adverse oriented geologic contacts (shallow soils on lava flows -contact is oriented in the downslope direction), and landslide triggering precipitation events.

Historically, landslides on the east side were probably instigated by severe wildfire and heavy precipitation events. A severe wildfire would kill the large trees, their root strength and their ability to pump slope (ground) water would be lost. Less cohesive soil strength and more water on the slope decreases the overall slope stability and increases the susceptibility of landslides east of Highway 35. Heavy precipitation events have periodically flushed intermittent streams via debris-flows. These intermittent streams collect debris from channel side-slopes (fallen trees, boulders, and soil) until a heavy precipitation event mobilizes the debris and flushes the stream system with a debris-flow. East of Highway 35, the proposed actions are primarily located on relatively moderate and high landslide susceptibility landforms.

Soils

Soil types occurring where activities are proposed include 168, 212, 213, and 211-7 as defined in the Soil Resource Inventory (SRI). These soils differ from those on the west side in the following ways: they are generally not as deep due to eons of erosion on steep terrain; there are more frequent, larger patches of exposed rock (especially map unit 211-7) and thin soils that become droughty during the summer months because of aspect, rock content, shallow depth and lack of precipitation; they have evolved under a more frequent fire regime, which has resulted in stands of large diameter fire resistant tree species and supports more of a grass/forb understory where the canopy is not closed; and they store more nutrients in the mineral soil itself, rather than just a thin topsoil, duff, and old logs. These soils have a dark, well structured surface horizon evident of high organic matter content referred to as a mollic horizon. They develop where perennial grasses and forbs dominate (or used to dominate) the understory. The decay of fine roots from grasses and forbs leads to an accumulation of organic matter in the topsoil. Soil types 168, 169, 212, and 213 are transitional, and exhibit both spodic and mollic characteristics within the same map unit (but not at the same time). This area is a mosaic, where organic matter would come and go with fire, yet remain shady enough in pockets to deter the growth of an understory. Fire exclusion has brought about a domino effect of broad scale changes to vegetation species composition and structure, which has allowed fire sensitive species to encroach resulting in denser stands of trees, thus affecting soil properties. As more open stands close in, understories of grasses, forbs, and shrubs are shaded out, changing the soil development pathway from mollic to spodic. Sites then begin to store their nutrients more in duff, coarse woody debris, and additional trees, rather than in the topsoil. This is not a desirable situation because if fire should occur under these conditions the results could be severe. One older shelterwood stand (Thorhead sale, logged in 1991) supports a very dense understory of native grasses and forbs not present in adjacent shady stands, indicating the potential for sites to reverse this trend by replacing unvegetated duff layers with a more stable network of fine roots. This is a more desirable situation because the fine roots hold soil in place and plants usually resprout the following year should a wildfire occur. In the most productive areas on the east side, soils were found to be sufficiently deep and loamy to support either dense stands of trees or more spaced out larger trees (sometimes both in the same stand). Factors limiting growth on the east side include hot summer temperatures and availability of water and nutrients.

The surface and subsurface erosion potentials are moderate and high, respectively. As explained above, erosion ratings are based upon *bare* soil (no vegetative or duff cover). The compaction hazard is estimated as moderate, and the susceptibility to soil displacement is high.

Water Quality

While no quantitative water quality (neither temperature nor turbidity) data is available for the intermittent tributaries occurring in the east side of the planning area, anecdotal evidence suggests that water quality is relatively good. Most channels are dry during the time of the year when temperatures would otherwise be expected to be elevated due to the predominant west aspect and open canopy in stream adjacent stands.

Large Wood Input

Most of the eastside tributary streams within the planning area have the potential for recruiting large wood on-site and redistributing it downstream. Large remnant trees are present in the riparian areas. The primary mechanism for large wood recruitment is through windthrow of trees within or adjacent to the channels and through relatively infrequent naturally occurring debris-flows that transport large wood downslope into the East Fork Hood River channel.

3.3 Aquatic Resources

TE&S Aquatic Species and Associated Habitat

Steelhead trout

Of the two threatened salmonid species found in the Mt. Hood National Forest, only Lower Columbia River steelhead trout *Oncorhynchus mykiss* has been documented within the Polallie/Cooper planning area. Steelhead have been documented in the East Fork Hood River as far upstream as Cold Springs Creek (OSGC 1963), but there were no known migration barriers upstream from that point. Although in recent years radio tracking studies found no steelhead ascending as high as Polallie Creek in the East Fork (Olsen et al. 1995) only a few steelhead were tagged and it is possible other untagged steelhead migrated farther upstream. The portion of the East Fork Hood River that bisects the planning area is considered suitable habitat for steelhead trout.

Steelhead use in tributaries to the East Fork within the planning area, such as Polallie Creek, has never been documented. Tributaries that flow into the East Fork from the east side of the planning area (Surveyors Ridge) are too steep, with gradients approaching 40%, to support any fish species. Mt. Hood National Forest (USFS) fisheries personnel conducted fish presence/absence surveys in 1997 by electrofishing in the major perennial streams within the planning area (**Table 3-2**). Rainbow trout *O. mykiss* were found in Polallie Creek but not in any of the other streams surveyed. Juvenile steelhead are indistinguishable from resident rainbow trout until they begin to migrate to the ocean. It is possible the fish found in Polallie Creek were steelhead trout juveniles. For the purposes of this analysis steelhead are considered to inhabit Polallie Creek.

Table 3-2. Streams surveyed for fish presence/absence and species captured by electrofishing during 1997 in the Polallie/Cooper planning area.

Stream	Date(s) Surveyed	Species Found	Upper Limits (river mile)	Upstream Migration Barrier
Polallie Creek	17 July 1997 1, 5 August 1997	Rainbow trout Sculpin (at mouth)	2.7	Falls
Tilly Jane Creek	28, 29, 30 July 1997	Cutthroat trout Brook trout	1.7	Falls
Doe Creek	30, 31 July 1997 1 August 1997	Brook trout	0.8	Subterranean Flow
Doe Cr. Tributary	30 July 1997	Brook trout	0.6	Meadow 1500' above 3510 F
Buck Creek	28 July 1997	None	NA	Gradient, Hwy. 35 culvert

Bull trout

Columbia River bull trout *Salvelinus confluentus* are a threatened species under the Endangered Species Act. Extensive electrofishing surveys conducted throughout the East Fork Hood River watershed by ODFW and USFS personnel have not found any bull trout . Likewise, no bull trout were found during day and night snorkeling surveys within Cold Springs, Crystal Springs and Tilly Jane Creeks conducted by USFS personnel. These three streams were considered potential bull trout habitat due to favorable water temperature regimes and also because Cold Springs and Tilly Jane Creeks contain brook trout. The only bull trout seen within the entire East Fork Hood River watershed, upstream of the confluence with Middle Fork Hood River, have been in Wisehart and Evans Creeks. One bull trout was seen at the mouth of Wisehart Creek by Middle Fork Irrigation District personnel. The mouth of Wisehart Creek is located approximately 9 miles downstream from the USFS boundary and the Polallie/Cooper planning area. A few bull trout have been observed in Evans Creek but these

fish are likely attracted to irrigation water from Eliot Branch, a tributary to the Middle Fork Hood River, that empties into Evans Creek. The Evans Creek mouth is located approximately 6.5 miles downstream from the USFS boundary and the Polallie/Cooper planning area.

Based on the above information neither the USFS nor ODFW consider a reproducing population of bull trout to inhabit the East Fork Hood River watershed and, hence, the Polallie/Cooper planning area.

Chinook, Chum and Coho salmon

Lower Columbia River chinook salmon *O. tshawytcha* and Columbia River chum salmon *O. keta*, currently proposed as threatened, and coho salmon *O. kisutch*, a Region 6 sensitive species, are not believed to inhabit the planning area although suitable habitat is present, at least in the East Fork Hood River. Radio tagged spring chinook mostly ascended the West Fork Hood River with a few individuals ascending East Fork (Olsen et al, 1995). Those that ascended the East Fork did not travel as far upstream as Dog River, located approximately 1.5 miles downstream from the USFS boundary and the Polallie/Cooper planning area. There have been no documented reports of spring chinook upstream from this area. Chum salmon have never been documented in the Hood River Basin and neither ODFW nor USFS believe they currently inhabit the watershed. Coho salmon in the Hood River system are considered to be hatchery strays from other river systems although some natural reproduction is occurring. Most of these fish ascend the East Fork with some moving into the Middle Fork. Radio tagged coho in the East Fork only migrated as far upstream as Dog River.

Since chum salmon do not reside in the Hood River and few, if any, coho or chinook salmon ascend the East Fork past Dog River none of these species will be covered further in this analysis.

Cutthroat trout

Lower Columbia River cutthroat trout are a Region 6 sensitive species and these fish do reside in Tilly Jane Creek. These fish are found from the mouth upstream to an impassable falls at river mile 1.7, about 1000 to 1500 feet downstream from the 3510 road crossing. Suitable habitat is present in Polallie and Doe Creeks, but cutthroat were not found in these streams during 1997 surveys.

Redband/Inland rainbow trout

The only known population of redband trout *O. mykiss gairdneri* within the Hood River watershed is in Greenpoint Creek. Redband trout are not considered to inhabit the East Fork Hood River and will not be covered further in this analysis.

Existing habitat conditions for threatened and R6 sensitive fish species

Since most salmonids have similar habitat requirements the following is a summary of the existing habitat conditions in streams within the planning area. The most suitable streams for salmonids are East Fork Hood River and Tilly Jane Creek, followed by Doe Creek.

The East Fork is a glacial stream that runs turbid during warm periods in the summer and fall due to glacial melt. Glacial flour is so fine that impacts to spawning and rearing habitat, as well as impacts to fish themselves in terms of feeding efficiency and gill erosion, is much less than fine sediment originating from streambanks or overland erosion. The amount of fine sediment <1mm in spawning habitat in the East Fork is unknown, but based on a cursory evaluation the amount of fine sediment is likely within the 10-30% range and therefore may not meet Mt. Hood National Forest Land and Resource Management Plan (LRMP) fine sediment standards (FW-097 and FW-098). Within the planning area the East Fork does not meet LRMP standards for numbers of

pools, FW-091, and amounts of large woody debris (LWD), FW-094 and 095. These substandard conditions are at least partly due to debris flows in Polallie Creek that repeatedly have deposited large amounts of sediment and washed away woody debris. However, the pools that are present tend to be large and deep and provide good fish resting habitat. Water temperatures at the Forest boundary are suitable for most salmonids and meet Oregon DEQ standards for steelhead but not for bull trout.

The short section of East Fork within the planning area above Polallie Creek has relatively high quality salmonid rearing habitat because of the presence of large pools. Below Polallie Creek the East Fork has been subject to debris flows originating from the headwaters of Polallie Creek. The channel is steeper and straighter with relatively little pool habitat. One would expect less fish to reside in this reach of stream as opposed to the upstream reach. Riparian vegetation is also less developed in this reach, again due to past, large scale debris flows.

Tilly Jane Creek contains habitat suitable for salmonids from its mouth upstream into the headwaters. However, a natural barrier (falls) precludes fish use above river mile 1.7 and there are other falls upstream from this point. Spawning habitat fine sediment levels <2mm (1997 stream surveys lump all fine sediment <2 mm into one category) in Tilly Jane Creek exceeded 20% in all surveyed stream reaches which does not meet LRMP standards (FW-097) . High amounts of fine sediment are likely from natural erosion of the volcanic ash soils in the area coupled with low stream power to flush sediment downstream. Tilly Jane Creek is well shaded with adequate amounts of LWD to provide channel stability, pool formation, and high flow refuge for fish. The amount of pool habitat does not meet LRMP standards but based on professional judgement the number of pools is likely within the range of natural conditions for this size stream. Based on stream temperatures taken during the fall of 1997 by stream surveyors, and comparing those with temperatures recorded in the East Fork during the same time by an electronic temperature recorder, Tilly Jane likely has water temperatures suitable for trout.

Doe Creek, the major tributary to Tilly Jane Creek, is fish bearing but the fish residing there are non-native and were likely stocked by humans. A large falls/cascade at the mouth precludes fish naturally entering Doe Creek. Doe Creek is smaller than Tilly Jane and generally has less pool habitat and slightly less LWD. Except for some sections flowing through the private ground in the Cooper Spur area the channel is well shaded and water temperatures appear suitable for trout based on stream survey records. Fine sediment levels in Doe Creek exceeded LRMP standards, probably due to the same conditions as described for Tilly Jane Creek.

Polallie Creek contained few trout based on 1997 presence/absence surveys. A debris flow occurred in October 1997 that essentially scoured the streambed and may have swept away or killed the fish that were in the stream. Surveyors described the stream as relatively steep with little to no pool habitat, at least in the lower two miles. Riparian vegetation was mostly alder and vine maple. The amount of fine sediment was not known but appeared to be in the 10-30% range in spawning habitat based on cursory examinations and thus may not meet LRMP standards. Note that suitable spawning habitat overall is not abundant due to the debris flow in 1997. Habitat conditions presently are worse, in terms of available pool habitat, LWD, etc.. than those encountered during the July 1997 survey.

Other streams within the planning area are too steep to support fish use. They are important in terms of supplying clean water, sediment, and LWD to larger streams (primarily the East Fork) within the planning area. The culvert under highway 35 may be a fish passage barrier in Buck Creek but steeper gradients upstream would preclude fish use beyond river mile 0.2 or so.

R6 Sensitive caddisflies

Four species of caddisflies on the R6 sensitive species list have been found in the Mt. Hood National Forest in streams on the slopes of Mt. Hood above 4,000 feet in elevation: Cascades Apatanian caddisfly *Apatania tavala*, Mt. Hood primitive caddisfly *Eobrachycentrus gelidae*, Mt. Hood farulan caddisfly *Farula jewetti*, and one-spot rhyacophilan caddisfly *Rhyacophila unipunctata*. Habitat requirements are similar for the four species: small permanent streams, cold water, generally sand or silt free stream beds, and sometimes found in or near moss. Surveys were not conducted for these species but suitable habitat may be present in the headwaters of Tilly Jane and Polallie Creeks above 4000'.

3.4 Timber Resources

The planning area lies within two plant associations of the grand fir forest zone. On areas west of Highway 35, the grand fir/twinflower (ABGR/LIBO2) plant association is prevalent (**Photo 3-1**). These sites receive moderate precipitation and snow accumulations that help prolong the period of available soil moisture for plant growth. On the eastside of Highway 35, the grand fir/vine maple/vanillaleaf (ABGR/ACCI/ACTR) plant association exists (**Photo 3-2**). Sites having these associations are warm, but receive more rain and snow than much of the grand fir zone.

/.../cell1.f6.r6.fs.fed.us/fs/fsfiles/unit/hr_terra/polallie/2siv-1.bmp: No such file or directory
Photo 3-1 Typical overstocked timber stand found on the westside of Hwy 35, in the Grand fir/twinflower plant association, along the Cooper Spur Road.

/.../cell1.f6.r6.fs.fed.us/fs/fsfiles/unit/hr_terra/polallie/2siv-2.bmp: No such file or directory
Photo 3-2 Eastside timber stand with mature ponderosa pine overstory and a dense understory of Douglas-fir and grand fir, as a result of fire exclusion policy (Within the grand fir/vine maple/vanillaleaf plant association).

A variety of timber sites and elevation bands are found throughout the planning area. To better estimate the site potential, the planning area was divided into two different zones, based on sites west of Highway 35 and sites east of Highway 35. The westside of Highway 35 comprises approximately 71% of the planning area and the eastside 29%. For timber stands west of Hwy 35, Site Index Curves for Douglas-fir in the Pacific Northwest, 1966, by James E. King, were used. For timber stands east of Hwy 35, Site Index and Height Curves for Managed, Evenaged Stands of Douglas-fir East of the Cascades in Oregon and Washington, 1979, by P.H. Cochran, were used. Index ages for both curves are based on an age of 50 years (**Table 3-3**).

Table 3-3 - SITE INDEX SUMMARY

Association	(1)	(2)	(3)	Reference	Site Class (4)
Westside Hwy 35 DF	113	49	77	King, base 50	4
Eastside Hwy 35 DF	97	48	69	Cochran, base 50	5

1/ - Highest site tree sampled (feet)
2/ - Lowest site tree sampled (feet)
3/ - Average of all site trees (feet)
4/ - 4 = 85 - 119 cu.ft. growth/ac./yr.
5 = 50 - 84 cu.ft. growth/ac./yr.

Of the 4,496 acres of National Forest System Lands in the planning area, 437 acres are estimated to be unsuitable for timber production. These areas include rock outcrops, talus slopes, extremely rocky, shallow soils on south exposures, and natural openings, etc. Although other rocky, non-plantable or marginally plantable areas exist in the vicinity of this planning area, artificial and natural regeneration of past clear-cuts and shelterwoods have proven very successful within and adjacent to the planning area.

West of Highway 35 and North of Polallie Creek

Four general stand conditions exist on the west side of Highway 35 within the planning area:

Brushfields w/conifers (approximately 121 acres)
These areas are dominated by vine maple, willow, oceanspray, and ceanothus. Occasional conifer overstory trees can be found scattered throughout these stands. These stands are mostly comprised of scattered ponderosa pine, Douglas-fir, and grand fir, that range from approximately five to sixty feet in height. The existing conifers that have successfully been established within portions of these brushfields, including portions of the riparian areas, usually are in areas that are least droughty. Many of the smaller conifers are being impeded by the brush, slow growing, and are experiencing top damage from the physical abrasion of the hardwood branches. Most of these stands appear to be the result of past wildfires, with the exception of near Polallie Creek, which appear to have resulted from land clearing activities many years ago.

Overstocked second growth timber stands (approximately 2000 acres)
These stands consist of evenaged, relatively uniform, 70-90 year old, approximately 12 to 20 inch diameter, Douglas-fir, western white pine, western larch, ponderosa pine, lodgepole pine, and grand fir trees. The stand origin was around the turn of the century as a result of a stand replacement fires. They tend to have little to no regeneration, in the understory, and have significantly slowed their growth because of overstocking. Portions of the riparian reserves within these stands are also overstocked with trees.

Understocked two to three layered second growth timber stands (approximately 1000 acres)
These stands are comprised of low to moderately stocked, two to three canopy layers, second growth grand fir and Douglas-fir. Occasional ponderosa pine and western larch are found in the overstory. These stands have some large overstory trees with an understory of small sawtimber, sapling/poles, and a significant amount of brush, primarily vine maple. They appear to have been the result of an incomplete stand replacement fire around the turn of the century and are not producing timber growth to the site's potential because of poor

stocking and laminated root rot pockets. Approximately 150 to 200 acres of these stands are located within the Cooper Spur Ski Area and contain areas of continuous concentrations/accumulations of fuel as a direct result of the western spruce budworm infestation during the 1990's. Currently, within this area, the dead understory layer of trees is falling down and becoming jackstrawed into heavy fuel concentrations.

Mature lodgepole pine (approximately 71 acres)
These stands consist of mature, evenaged, lodgepole pine that has recently started to fall apart as mortality continues in the mature lodgepole. These stands tend to be approximately 5 to 12 inch diameter with grand fir beginning to occupy the understory. Large, mature ponderosa pine, western larch, and Douglas-fir can be found within these stands. Again, these timber stands are the result of a hot stand replacement fire around the turn of the century. The trees have significantly slowed their growth and are at their biological rotation age. They are not producing timber growth to the site's capability because of slow growth, overstocking, and increased mortality. Mortality is expected to significantly increase because of the relatively short lived nature of lodgepole.

East of Highway 35

Three general timber stand conditions exist on the eastside of Highway 35, within the planning area. Many of these stands have experienced a dramatic change in their species composition and structure during the past 80 years. Frequent underburns, historically created stands dominated by widely spaced ponderosa pine, Douglas-fir, and other minor species. Since the 1930-40's, humans have controlled natural wildfire occurrence and spread. These control efforts have not permitted natural succession events to proceed, which has permitted a significant change in the current species composition of these stands from a ponderosa pine dominated stand to Douglas-fir and grand fir dominated. As wildfire control efforts continue, these stands will eventually convert to relatively pure, climax grand fir or Douglas-fir stands. Such stands will tend to be more structurally uniform and dense than the more open and structurally diverse ponderosa pine stands. As a result, approximately 1100 acres of the eastside timber stands, within the project area, are presently, highly susceptible to stand replacement wildfire. Wildfire occurrence in dense grand fir or Douglas-fir stands frequently result in a complete stand replacement fire. More consistent underburning allows timber stands to become more tolerant of fire, as the fuel loads are never too great so as to create a stand replacing event. Wildfires in ponderosa stands tend to be ground fires rather than crown fires because of the uneven texture (structure) and more open nature of the crowns. Numerous snags, mostly grand fir, exist within the eastside of the planning area and large coarse woody debris is prevalent throughout the area due to the increased tree mortality.

Overstocked NW aspect, second growth timber stands (approximately 300 acres)
These stands occur on the slightly moister WNW to NW aspects. They are dominated by even-aged, uniform 12 to 20 inch diameter, 70 to 90 year old Douglas-fir, grand fir, and other minor species that have originated after stand replacement fires at the turn of the century. Timber growth has slowed significantly, within both riparian and upland areas, due to the density and occasional laminated root rot disease pockets that exist in the stands.

Understocked mature Douglas fir/grand fir timber stands (approximately 200 acres)
These stands occur on the eastern ridge top and have been previously entered with a commercial timber harvest. Most of the overmature timber has been removed. Grand fir, Douglas-fir, and other minor species dominate these stands. Average age is approximately 80-90 years old with an average diameter of approximately 16 inches and an average height of approximately 85 feet. Subsequent mortality (drought, laminated root rot, and

insects) have left portions of these stands in an understocked condition. Some pockets of natural regeneration have been established within the openings/gaps. These stands are less than optimally stocked with trees and are not growing to the site's capability.

Large ponderosa pine and Douglas-fir timber stands on West aspects (approximately 804 acres)
These stands consist of large, mature, overmature, ponderosa pine, Douglas-fir, and other minor tree species with a dense understory of sapling/small sawtimber size Douglas-fir, grand fir, and various brush species. The relative amount of large ponderosa pine, Douglas-fir, and other trees varies from almost pure ponderosa pine to mixed ponderosa pine, Douglas-fir, and other species. The lack of recent naturally occurring fire in these stands has changed these stands from open, parklike stands, dominated by big trees (ponderosa pine, Douglas fir, and other minor species) to species consisting mainly of smaller, densely growing Douglas-fir and grand fir. These denser stands, both within the riparian and upland areas, are functioning differently than during presettlement times by becoming stressed with inter-tree competition, which could exacerbate insect infestations and/or disease, and are highly susceptible to stand replacing fire.

Root disease occurs in most of these eastside timber stands. The severity varies from site to site. Normally, the greater the amount of ponderosa pine, the less evidence of root disease. Root diseases observed, include laminated root rot (Phellinus weirii), annosus root rot (Heterobasidion annosum), and armillaria root rot (Armillaria ostoyae). The severity of these diseases increases as these stands succeed to Douglas-fir/grand fir domination due to the lack of resistance of these species to the root diseases.

Table 3-4 - CURRENT VEGETATION

Category	Suitable For Timber Mgt. (Acre)	Unsuitable For Timber Mgt. (Acre)	Percent of Planning Area
Rock, Grass, Mdw, etc.	0	334	7%
Stand Initiation	15	0	1%
Stem Exclusion	793	0	18%
Mature Stem Exclusion	2,275	103	51%
Late Seral	1,078	0	24%
TOTAL	4,059	437	100%

Historically, only a small portion of the planning area has had timber harvest. **Table 3-4** illustrates that only 15 acres, less than 1 percent of the area, has had a regeneration cut. There is a large amount of timber stands (69%) that are of stem exclusion/mature stem exclusion age. Portions of planning area's riparian areas are lacking in snags, coarse woody debris, and have overstocked stand conditions which are displaying signs of decreased growth and vigor.

3.5 Fuels

The planning area is roughly divided into two fuel management types. West of Highway 35 is a moist transitional area, where the percent of rain fall tapers off from west to east due to the shadow effect of the mountain and the stands tend to be mixed conifer with closed canopies. East of Highway 35, dry ponderosa

pine/Douglas fir stands lie within the rain shadow of the mountain and combined with south to southwest aspects, are much dryer and historically were open park-like stands (see the East and Middle Fork Watershed Analysis and Landscape Analysis and Design. Both of these areas consist of a full range of fuel loadings from light to heavy. These loadings are dependent on such factors as stand types, stand condition, fire history, forest pathogen issues, and past management practices.

There are a number of stand types under consideration for management within the project area. These stands were categorized by plant associations, fire behavior, and successional patterns within the fire ecology groups Hot, Dry Pine-Oak and Douglas-Fir; Dry Grand Fir; and Moist Grand Fir using the Fire Ecology of the Mid-Columbia (Evers, 1994).

Stand loadings in the project area were verified using photo guides (Maxwell and Ward 1980, PNW-105) to identify fuel loadings that were 12 tons per acre or more in the zero to three inch size class, as well as fuel loadings of 50 tons per acre or more in the greater than three inch size material. These residue loadings have been developed where analysis has indicated them to be the most effective and feasible alternative. These residue loadings have been used to plan fuel treatment and prescribed fire strategies, meet site preparation and fire hazard reduction objectives, and to minimize any adverse effects on the site and adjacent resources in the area.

Overall loadings in the zero to three inch size class averaged below 12 tons at about seven to eight tons per acre. Still some concerns within the project area are ignition sources due to neighboring housing development, recreation sites, historical lightning patterns, and dead or dying standing fuels in locations that are already recognized as high in fuel concentrations.

West of Highway 35

This area, within the Moist Grand Fir fire group, is dominated by a mixture of Douglas-fir and grand fir, and tends to have a moderate to high concentration of fuels on the ground due to fire suppression and health of the stands (i.e. bug kill, wind throw, stand density). Ladder fuels are minimal in most of these stands except in areas of natural openings (locations where stands have naturally thinned due to bug kill or wind throw). Fuel loadings tend to build rapidly in these stands once the overstory begins to die from insect and disease attack and the canopy opens up. Under these conditions fuels can become drier due to the gaps in the canopy and can offer a suitable fuelbed for fire starts.

Duff layers of about two inches are typical in these stands. Wildfire hazard is usually low to moderate, depending on weather conditions in a given year or whether extensive canopy gaps have begun to develop. Once duff layer dries it will carry fire.

A drought in this area (three consecutive years of low rain fall) would dry the forest floor enough to allow fires to start and spread. Fire frequencies for the Moist Grand Fir stand types range from 70 to 200 years. Average fire return intervals in the moist riparian area could exceed 200 years.

Historically (presettlement), these stands would have burned due to lightning strikes starting fires on the upper slopes and backing down into the valleys and drainages. Due to early settlement in the Upper Hood River Valley, these stands have burned within the last 100 years from escaped agricultural fires. Historical records state that fires were started in this area to clear trail for climbing access. These fires have left basically uniform, dense stands of trees. Lightning strikes do occur in this area but are often accompanied by rain that puts any

fire starts out. Fire suppression efforts have been used to put out small fires that have held over after lightning storms.

There is a dense shrub and timbered area bordering on National Forest lands and privately owned land (urban interface). These bordering stands are a mix of both shrubs, trees, and standing and down dead fuels. In this area, shrub patches and a graduation of tree sizes from seedlings to canopy height have produced the potential for fires to reach all levels of these stands if an ignition occurs. This area holds the potential of an ignition to occur on both sides of this border: either through lightning strikes or human induced.
Further up slope in the Cooper Spur Ski Permit Area is a heavily damaged stand of western spruce budworm killed grand fir intermixed with remnant, large Douglas-fir trees. Although this stand does not have a lot of fine fuels there is a sufficient amount to carry fire.

East of Highway 35

Stands east of Highway 35 are dominated by two fire groups: Dry Grand Fir and Hot, Dry Pine-Oak and Douglas Fir. Patches of ponderosa pine and Douglas-fir dominate the southern facing slopes in this area while the dry grand fir dominate the drainages and northern facing aspects that tend to remain moist and cooler. During pre-settlement times, these stands, with their large ponderosa pine and Douglas-fir, would have had an open, parklike characteristic due to frequent natural underburning. Lack of fire has allowed ladder fuels to develop in the form of smaller, densely growing Douglas-fir and grand fir, with a heavy fine fuel bedload (i.e.. zero to three inch fuels). With the occurrence of an ignition source among these stands, a fire could move quickly into the canopies and kill otherwise fire hardy trees. This makes the role of fire in these stands much different than the moist west side stands with their predominant northern aspect. Historically, understory fire would have returned to these ponderosa pine/Douglas-fir stands every five to 25 years and every 25 to 100 years in the moister grand fir.

Duff layers contribute little to the fuels in these stands, with a half to one inch as an average. Downed, dead, woody fuel loadings are often light. Needle cast from ponderosa pine mixed with fine twigs cast from trees build up the greatest percent of the fine fuel loading. Dried grasses and forbs, mixed with an understory of conifers are common in openings and areas of sparse canopies and produce the potential of crown fires under the right burning conditions. The fuel beds in these areas dry rapidly after snowmelt and rain and can support a relatively fast moving surface fire.

3.6 Wildlife Resources

The East Fork and Middle Fork of the Hood River Watershed Analysis and Landscape Analysis and Design describes in detail habitat information including acreage, and species presence within the two watersheds. The WA/LAD describes in detail the vegetative historical context of the watershed, as well as the type of disturbance patterns that have shaped this planning area. In summary, at the turn of the century, a large majority of the planning area was in pole and sapling size trees, owing to large scale fires. Many of those fires were stand replacing events. In some cases, large diameter (remnant) trees survived; in other cases they became snags and or down logs that can still be seen today.

As described in the WA/LAD, the planning area is located in a crucial position on the landscape for the connectivity of late successional associated species around the north side of Mt. Hood. Based on land

ownership and management throughout the Hood River and Upper Hood River Valley, the Polallie/Cooper planning area contains a vital link of mature forest around the mountain: to the north of the planning area is agricultural land, and/or forests managed on an 80 year rotation. This "corridor" of mature forest provides links for small home range, mature forest associated species. The "connectivity corridor", as it is called in the WA/LAD, helps maintain the genetic linkage for these species, in a transitional ecological zone, moving from the Cascade crest to the eastside crest forests. This is the only link for small home range, mature forest wildlife species around the north side of Mt. Hood.

TE&S Wildlife Species and Associated Habitat

The following proposed, threatened, endangered, or sensitive wildlife species are thought to occur within the project area, or have suitable habitat present within the scope of the project area: California wolverine (sensitive), northern spotted owl (threatened), peregrine falcon (endangered), bald eagle (threatened), harlequin duck (sensitive), Canada lynx (proposed) and Cope's giant salamander (sensitive).

Habitat is not present for the following threatened, endangered, or sensitive wildlife species: black rosy finch, sandhill crane, Townsend's big-eared bat, spotted frog, red-legged frog, and Larch Mountain salamander. Both the Proposed Action and No Action alternatives would have "no impact" to these species. Because habitat and/or the species are not present within the scope of the project area, further discussion of these six species is not warranted.

California wolverine

The wolverine needs large tracts of undeveloped/uninhabited areas for its' life requisites, and is considered highly sensitive to human presence. Habitat for wolverine may consist of all forest and non-forest types. It appears that the limiting factor in wolverine presence and numbers are the presence of an abundant, large mammalian prey base, and the exclusion of human presence (USDA, 1994).

This species most likely utilizes the planning area at some point during its' life history. Numerous unconfirmed sightings of wolverine have been made in proximity to the planning area over the past 20 years. Most of these sightings are to the north and west of the planning area. Suitable denning habitat (as defined by Forest level analysis) appears to be present along the southwestern border of the planning area, along the upper portions of Polallie Creek. This potential denning habitat is within an unroaded portion of the planning area, bordering and within the Mt. Hood Wilderness. This potential habitat is over 1.5 miles from any stands proposed for treatment under the action alternative.

Northern spotted owl

Habitat for the northern spotted owl is widely distributed within the planning area. Of the approximately 4,496 acres within the planning area, approximately 1,700 acres is suitable (nesting, roosting, foraging or NRF) habitat. Of the remaining acreage in the planning area, approximately 1,700 acres are considered to provide for only roosting and foraging use (and hence, provide dispersal habitat). Stands that are not of a higher quality of suitability generally lack larger diameter trees or snags/broken tops/nesting structures, remnant trees from stand replacing fires. Much of the planning area contains spotted owl habitat that historically would not have been ecologically supported: fire suppression has created multi-layered stands with high canopy closure (good spotted owl habitat) particularly on the eastside of Highway 35.

Surveys have been conducted in portions of the planning area in 1989, 1990, 1995, and 1997 with three pairs of spotted owls located. All three have 100 acres of suitable habitat identified and protected as a 100 acre core around the nest/activity centers. A portion of a fourth 100 acre LSR is also within the planning area. All four pairs appear to have adequate levels of suitable habitat within a 1.2 mile radius of their activity centers for continued reproductive capability.

Dispersal conditions for spotted owls within the planning area are good; however, to the north of the planning area, dispersal for spotted owls is poor, transitioning to non-existent. Large LSRs are about one mile to the east of the planning area and 10 miles to the west. The Mt. Hood Wilderness abuts the southwestern portion of the planning area, and provides relatively low levels of spotted owl habitat.

A portion of Critical Habitat Unit (CHU) OR- 1 is within the southern 1/6th of the planning area. Neither the Proposed Action nor No Action Alternative enter this CHU, and hence, there are no effects to this CHU.

Peregrine falcon

Potential nesting habitat for the peregrine falcon is within the planning area. Cliff sites across from the junction of the Cooper Spur road with Highway 35 just below the 675 trail were rated as having a "medium" potential for providing quality nesting substrate, as defined by the Forest Service Regional peregrine falcon specialist. His assessment of the site was based on aerial flight observations, and examined the rock substrate, the slope/predator access to the cliffs, and the quality of the surrounding foraging habitat. Since identification of these cliffs as "medium" potential, two years of surveys have been conducted according to Regional protocol. No peregrine falcons have been observed, and the site has been determined to be currently unoccupied. Additional annual surveys will continue to be conducted at potential cliff sites on the Hood River Ranger District that classify as "medium" potential or greater (there are 8 sites).

Bald eagle

Observations of bald eagles foraging and migrating through the planning area have been made. Most of the observations have come either in late winter or early fall, when bald eagles may be migrating. There are no known nests within the planning area, and the nearest known nest is over 16 air miles away. There are very few late spring through early fall observations of bald eagles in the planning area. These low number of observations indicate that eagles forage within the East Fork of the Hood River, or perhaps some of its' tributaries (Polallie Creek). Based on fish abundance and distribution, the areas of higher forage value are within the upper portions of the planning area. However, this quality/value is actually quite low, based on the quantity of fish estimated by the District's fisheries biologist. Other forage opportunities, within the planning area, exist for non-fish prey (such as carrion, waterfowl), and these opportunities are more general in location (ie., there are no specific areas in the planning area with necessarily higher opportunities than other areas).

Harlequin duck

Harlequins nest adjacent to streams, within the floodplain, and up to a couple hundred feet away. They tend to focus on areas which provide concealment from above, and they can often be found in cavities like low stumps/snags or down logs. Harlequin ducks have been observed within the planning area, during the breeding season on the East Fork of the Hood River. Within the planning area, all of the East Fork Hood River and Polallie Creek are considered suitable habitat for harlequin ducks. Habitat quality is moderate: while the East Fork provides excellent habitat for harlequins (as documented by relatively high harlequin

density along East Fork in general), the portion of East Fork within the planning area is of poorer quality, owing to the close proximity of Highway 35 to the stream channel. Nesting may occur along the East Fork within the planning area, but the likelihood is low. The highest quality habitat would be along the eastern edge of East Fork. Polallie Creek provides for medium quality nesting habitat but is more isolated than East Fork and nesting may occur, particularly within the lower reaches of the creek. A probable scenario is that a pair of ducks may nest along Polallie Creek, and forage in both Polallie and East Fork.

Canada lynx

This species are no confirmed sightings on the Mt. Hood National Forest. The Dalles Office of the Oregon Department of Fish and Wildlife believes lynx to be absent from the northern Oregon Cascades. Decades of trapping information collected indicate that no lynx have been taken from at least the northern Cascades this century (Torland, 1997). A recent assessment of the range of lynx (Csuti, 1997) does not show the Mt. Hood National Forest as being in the range of lynx. Verts (1998), also underscores this point, preferring to view the isolated instances of lynx in Oregon (12 specimens only, ever) as potential dispersers from the northern portions of their range (presumably Washington) who immigrate and persist here for a short duration.

Even though it is likely that lynx is not within the northern Oregon Cascades nor the planning area, suitable foraging and denning habitat for this species does exist within the planning area, in the upper elevations. None of the proposed actions would enter into this habitat, nor would any of the actions degrade the quality of habitat or the likelihood of use. Based on these factors, the proposed action would not effect Canada lynx or its' habitat. Further discussion of this species within this EA is not needed.

Cope's Giant salamander

This species is almost strictly aquatic. Cope's are found associated with rocky, smaller, cold streams and seeps. Cope's Giant salamander has been found approximately five miles downstream from the northern edge of the planning area, within the East Fork Hood River. Due to that observation, it is likely that East Fork and Polallie Creek provide habitat for this species.

Other Wildlife Species and Associated Habitat

Approximately 265 vertebrate, non-fish species have the potential to occur within the East Fork watershed. This planning area contains habitat for almost all of those 265 species. This section will focus on those species considered of importance: either due to special management considerations, or as indicators for other groups or guilds of species.

Special management species

These include species which receive special management considerations under the Mt. Hood National Forest Land and Resource Management Plan, as amended by the Northwest Forest Plan. This section does not include any TES species, which were discussed in the previous section.

There are two "protection buffer" species located within the planning area: white-headed woodpecker and black-backed woodpecker. Both species have had documented sightings within the planning area. Suitable habitat is abundant throughout the planning area for both species. These "protection buffer" species require special consideration in timber sale planning: where habitat exists, additional snags (dead or dying trees) must be retained to insure for adequate nesting and foraging levels for these species post harvest (at the

100% biological potential level). Both alternatives mentioned in this document will meet that need. No other "protection buffer" or other species mentioned in Table C-3 of the Northwest Forest Plan (those requiring surveys for projects implemented prior to FY99) are within the planning area.

Management Indicator Species

These are species mentioned within the Mt. Hood Forest Plan as being indicators of ecosystem health. Each MIS species represents a certain type of habitat/condition. Managing for the continued existence of these species is presumed to manage for the continued existence of all the species these indicator species represent.

Pine marten

Pine marten represent the status of those species associated with medium to large diameter down logs, within mature to old growth forests. Habitat for this species is prevalent throughout the southern 1/2 of the planning area, in particular west of Highway 35. The habitat quality within this area is considered medium. Pine marten have not been documented within the planning area, but based on habitat suitability, are expected to occur within Polallie/Cooper.

Pileated woodpecker

Pileated woodpeckers are an indicator species for those animals associated with larger diameter snags within mature forest/closed canopy stands. Habitat for pileated woodpeckers is abundant throughout the planning area, with approximately 1,700 acres of nesting and an additional 1,700 acres of foraging habitat. Pileated woodpeckers have been observed between Tilly Jane and Polallie Creek. In addition, numerous other woodpeckers have been observed (white-headed woodpecker, black-backed woodpecker, Williamson's sapsucker, red naped sapsucker) throughout the planning area.

Deer/Elk

Deer and elk are indicative of edge associated species: those requiring forested habitat adjacent to openings. Within the Polallie/Cooper planning area, approximately 15 acres are vegetated openings. Over 4,100 acres are forested cover of varying degree of benefit to deer and elk. In addition, 334 acres are considered permanent non-forested areas (rock outcrops, etc). This level of open forage habitat is considered low. Adjacent to the planning area on non-Federal land, however large blocks of openings/early seral stands provide some forage.

Deer and elk use of the planning area is evident, although transitory. The planning area provides habitat for the spring and fall migratory flow for these species, mainly within Sections 32 and 5, just west of Highway 35. This area currently provides excellent cover, adjacent to the larger private land openings.

3.7 Heritage Resources

The project area contains ten identified cultural resource sites. The majority of the sites (eight) date to the early twentieth century. These early twentieth century sites include six homesteads, an irrigation ditch (Glacier Ditch), and a ``Sheepherder's Grave". The homesteads were established around 1907 as a result of the 1906 Homestead Act. These were officially surveyed (platted) in 1917. Most had been abandoned by the mid 1930's. One of these homesteads was developed into the ``Homestead Inn" located near the Cooper Spur ski area. The Homestead Inn was a small resort operating lower on the mountain than Cloud Cap Inn. It provided the focal point for the skiing that developed into the Cooper Spur ski area. By 1934 it was no longer in use and

was torn down. A historic grave has been reported on Surveyors Ridge, at the time it was reported it was thought to be that of a sheepherder who died around the turn of the century. During the depression the CCC's constructed a ski warming shelter in the Cooper Spur area. This shelter is in excellent condition and has had a National Register of Historic Places nomination prepared. The final site is a peeled cedar located near the East Fork of Hood River. Cedars were peeled by Native Americans generally to make baskets. All of these sites appear to be potentially eligible to the National Register of Historic Places and will be treated as if they were listed.

The Cooper Spur Warming Hut has been determined eligible to the National Register of Historic Places in accordance with 36CFR800.4(c). The remaining sites appear to be eligible to the National Register, however, at this time the evaluation has not been completed. In accordance with the Mt. Hood Forest Plan (FW-600) and FSM2361, until the sites have been evaluated through consultation with SHPO they will be treated as if they were eligible.

3.8 Scenery Resource

The Polallie/Cooper project area is located in the Polallie/Cooper Interim Design Area (IDA) of the East Fk Hood River Watershed. The planning area is viewed from Hwy 35, Forest Service Road (FS RD) 44, the Cooper Spur area and the Dog River Trail (#675). The critical views are from Hwy 35 and Rd 44. The area forms a portion of the forested base of Mt Hood for views from the north side of the mountain, and is the only area along the Hwy 35/26 Loop that ponderosa pine forests can be seen.

The existing scenic condition (now referred to as Scenic Integrity under the new Scenery Management System) ranges from Moderately High to High Scenic Integrity (Slightly Altered to Natural Appearing) except for some impacts visible on adjacent private lands.

The Forest Plan Standard and Guideline is foreground Retention and middleground Partial Retention as seen from Hwy 35; middleground Partial Retention as seen from Rd 44; and Modification for the remaining lands. In the Hood River District's 'Highway 35 Viewshed Management Guide' refers to the eastern portion of the planning area on page 54: "Retain diversity of cover types depending on aspect. Emphasize large ponderosa pine in areas where this is a feasible seral stage, particularly on south facing slopes. Perpetuate large yellow barked pine in foreground as long as possible. Increase larch where feasible to enhance fall color. Promote ground cover, shrubs and within stand diversity .... Maintain views to and across the river from the highway." Referring to the western portion on page 56: "Maintain areas of hardwoods and brush which provide textural diversity and fall color adjacent to trails and roads."

3.9 Recreation, Social and Infrastructure

Recreation facilities and opportunities include the Cooper Spur Ski Area and a variety of hiking, mountain biking, equestrian, and ski trails. The Tilly Jane Sno-Park and Trailhead, the Polallie Trailhead, the Zig Zag Trailhead, East Fork Trailhead, and Surveyors Ridge North Trailhead are all within the planning area. The Tamanawas(# 650A), and East Fork Trails (# 650) are accessed via the East Fork Trailhead and receive heavy use. The Dog River Trail (#675), is a very popular mountain biking trail, in conjunction with the portion of the Surveyors Ridge Trail (#678) in the planning area. Elk Meadows(#645), Zig Zag(#678), Polallie Ridge(#

643A), and Tilly Jane Trails(#643) receive lighter use. The Zig Zag Trail was recently relocated to cross the East Fork Hood River on the highway bridge. This was due to the migration of the river away from the trail bridge in the flooding of 1996. Tilly Jane Sno-park serves dispersed nordic skiing, and trails to the cabins in the Tilly Jane and Cloud Cap area. The Sno-park receives moderate to heavy use. Polallie Campground was abandoned after the Polallie Creek flood in the 1980's, but still receives some picnic and fishing use.

Cooper Spur is a small family ski area, with about 50 acres of cleared runs. It has been in operation since the 1950's. The potential development area identified as A-11, Developed Winter Recreation in the Forest Plan and included in the permit area totals approximately 1,400 acres and covers the western portion of the planning area. Several proposals for expansion in the permit area have been received, but none have proceeded past the initial planning phase. It is possible that expansion up to the 1,400 acres will occur.

Highway 35, the Cooper Spur Road, and Cloud Cap Roads are all popular scenic driving routes.

An historic shelter, the Cooper Spur Warming Hut, is located west of the 3512 road near the National Forest boundary. This shelter is located next to an area used as a ski slope before Cooper Spur Ski Area was established. The shelter, and a trail from private land, past the shelter, and up to the Cloud Cap Road has been maintained in recent years by an unknown group. This trail is not on the Forest Service system.

In 1996, the *Social and Economic Assessment for the East and Middle Forks of the Hood River Watershed Analysis* (Burke, 1996) gave an overview of Hood River County. The following information is largely from that report.

Hood River Valley was defined as a forest-dependent community by the Forest Ecosystem Management Assessment Team. It is immediately adjacent to forests, and has a high degree of dependence on tourism-related jobs and services. Forest based industries are a part of the local economy. The report also noted the trend from rural, commodity extraction based life-styles and values, to more urban. Immigration, and a growing urban population in Portland will exert increasing demands for all forest amenities in the planning area. Tourism has become an increasingly more important part of the economy. Travelers spent and estimated $26,091,000 in Hood River County in 1992, which directly created 487 jobs. In general the visitors are recreationists, enjoying multi-sport, multi-day stays, including hiking, mountain biking, climbing and windsurfing.

CHAPTER 4.0 IMPACTS

4.1 Introduction

This chapter address the potential environmental impacts that could result with the No Action alternative and the Proposed Action alternative. Direct, indirect, short, long, and cumulative effects are described. The latter are effects which occur because of a combination of past, current, and reasonably foreseeable future actions. Activities occurring over time on lands adjacent to National Forest System lands are considered if appropriate. Appendix E, near the end of this document, lists mitigation measures which could be implemented in order to reduce of eliminate the effects described in this chapter.

Standards and Guidelines are listed as ways of determining the potential effects of planned activities. As a definition, "should", as listed in the Mt. Hood Forest Plan, means that action is required. However, case by case exceptions are allowed if identified and documented during interdisciplinary project planning. "Shall" means that the action is mandatory.

4.2 Geology, Soils, and Water Resources

Do the proposed harvest activities, temporary road building, and/or fuel treatments increase the rate of landslides on the highly susceptible landforms?
Standard and Guideline(s): Slope stability shall be maintained by forest management activities (FW-001). In landslide susceptible areas: natural drainage features should be maintained or improved (FW-010).

Effects of Alternative 1 - No Action
No adverse slope stability effects would be expected in the planning area, unless a severe wildfire (moderate to moderately high probability of wildfire) occurred on the slopes east of Highway 35. Shallow, small volume landslides would be expected to increase due to elevated stream peak flows and the lack of groundcover vegetation following the wildfire. Loss of riparian vegetation could be significant. In the short term, under the severe wildfire scenario, landslide rates would likely increase in the intermittent stream channels due to the increased amount of surface soil erosion and downed woody debris that would be deposited in the dry stream channels awaiting a flushing, heavy precipitation event. Debris-flows would be released more frequently under this wildfire scenario and in the short term water quality parameters (sediment, clarity, and temperature) would be expected to deteriorate.

In the long term, under this severe wildfire scenario, large tree roots would no longer have any benefit to cohesive soil strength (>5 years post-fire) and the large trees would not be pumping slope (ground) water from the slope. The likely results from a reduction in large tree root strength and an increase in slope (ground) water would be shallow, larger volume landslides initiating on all parts of the highly susceptible landforms, not just near or in the drainages. Landslide rates in the intermittent channels and on the slopes would be expected to approach natural landslide rates 20 years post-fire. Overall, the No Action alternative would maintain current drainage features and the slope stability regime on the highly susceptible landforms throughout the planning area. Under the wildfire scenario, (FW-001) and (FW-010) would not be met.

Landslides, as a result of wildfires could cause an irreversible and irretrievable commitment of resources in terms of the sites' ability to grow vegetation (productivity), and the potential to damage riparian areas.

Effects of Alternative 2 - Proposed Action
The proposed actions are not expected to increase the rates of landslides on the highly susceptible landforms in the planning area. On the west side of Hwy 35, the temporary roads, harvest areas, and fuel treatment areas are mostly on low to moderate landslide susceptibility landforms. In the area that is rated relatively high, the proposed action(s) of commercial thinning with fertilizer should not adversely effect the slopes stability. On the east side of Hwy 35, the proposed actions of thinning and ultimately retaining larger diameter trees is not expected to increase the rates of landslides on the highly susceptible landforms. Natural drainage features and slope stability should not be effected by the proposed action in the short term. In the long term, on the east side of Hwy 35, the overall slope stability and natural drainage features should be maintained and slightly improved by the reduction of large tree mortality that is associated with severe wildfire, disease, and insect infestations. Removal of ladder fuels on the east side would promote big trees by improving their chances of surviving a severe wildfire. Maintaining and improving large tree root functions (as they pertain to cohesive soil strength and as slope (ground) water pumps) are essential to maintaining or improving slope stability. On the west side of Hwy 35, the proposed actions would maintain or slightly improve the slope stability and natural drainage features. Overall slope stability and natural drainage features would be slightly improved or maintained under the Proposed Action.

Would soil compaction be increased to unacceptable levels caused by ground based machinery used in timber harvest and fuels treatment as outlined in the proposed action?
Standard and Guidelines: Activity areas should not exceed 15% detrimental soil condition (FW-022).

Effects of Alternative 1 - No Action
Percent detrimental soil condition would remain unchanged .

Effects of Alternative 2 - Proposed Action
Soil damage within proposed units would remain below 15%. There are no long term effects because the area is estimated to remain productive over the long term.

Would there be potential increases in erosion rates, caused by physical ground disturbance or loss of groundcover?
Standard and Guidelines: In the first year following surface disturbing activities, the percent effective groundcover should achieve at least 60% where soils are rated in low to moderate erosion hazard, 75% in high hazard, and 85% in severe hazard (FW-025).

Effects of Alternative 1 - No Action
There would be no net change in short term surface erosion rates unless a fire of sufficient size, location, or severity were to occur on the steep slopes east of Highway 35. Soils west of Highway 35 would continue to develop through natural processes. East of Highway 35, stands would continue to close in and shade out the understory plants that hold soil in place with their fine root systems. Once these roots are gone and replaced with duff and litter, there is a potential for increased rates of surface soil erosion over the long term (>5 years) following a fire because there would be nothing to protect or hold soil particles in place until surface groundcover and trees become established. Ultimately, once the organic matter and topsoil have either burned or eroded away on some sites, there would be a long term loss in productivity that could last

centuries because once site damage has occurred it may take several hundred years for a site to return to full productivity (Harvey et al. 1987). Eventually, eroded soil material would likely find its way into riparian reserves and streams, causing increased sediment loading. It is not known or predictable whether Standard and Guideline FW-025 would be met following a wildfire under the current conditions.

Loss of soil productivity would be an irreversible and irretrievable commitment of resources should a fire occur under the current conditions.

Effects of Alternative 2 - Proposed Action
There may be a slight increase in surface erosion rates. However, the duration and extent should be minimal, and no erosion would be expected to impact riparian areas. There are no long term effects because the area is estimated to remain productive over the long term. No net changes in surface erosion rates are expected.

Would there be potential changes in soil physical, chemical, or biological characteristics caused by fertilizer application?
Standard and Guidelines: Favorable habitat conditions for soil microorganisms should be maintained for short and long term productivity (FW-032).

Effects of Alternative 1 - No Action
There would be no change in soil physical, chemical, or biological function.

Effects of Alternative 2 - Proposed Action
It is not expected that the fertilizer application would cause adverse short term effects to soil physical, chemical, or biological functions. No serious long term adverse changes are expected in soil physical, chemical, or biological functions due to the fertilization. Currently, there is insufficient information on which to predict positive or negative impacts to soil organisms, although it is likely there would be effects. The addition of a synthetic form of nitrogen in a form more powerful than that found in nature may cause an impact both in nutrient cycling and to the soil microflora and microfauna, but the impacts are unclear. Unfortunately, the scientific literature does not provide many answers on this issue, especially since most of the studies were conducted in Europe in totally different ecosystems. Fertilizer nitrogen has been found to cause changes in abundance and species composition of both saprophytic and mycorrhizal fungi (Nason and Myrold, 1992; Arnebrant *et al*. 1996), but the extent and impacts are unclear. Another study from a fertilized pine-oak forest in Poland found some understory species were favored over others, and some species completely lost their mycorrhizae (Turnau *et al*. 1992). Harvey and others (1994) found that native soil-borne pathogens such as *Armillaria* and *Phellinus* are sensitive to soil physical and chemical characteristics and concluded that the direct addition of nutrients may influence root diseases. A study in Idaho documented delayed stress reactions and damage from root rot following forest fertilization (Moore and others, 1993). There exists the possibility, then, that forest fertilization may impact the extent of *Phellinus* pockets in the planning area. Although fertilizer may be considered ecologically artificial, in the longer term the stage is being set to grow and manage larger pieces of woody debris and produce organic matter, thus maximizing the opportunities for site productivity without the use of synthetic fertilizers in the future.

The nitrogen level of the soil prior to fertilization is a key determinant of the biological response of the tree to fertilization. Because nitrogen is considered the growth limiting factor in interior forest types (Mika and

others, 1992), forest fertilizer nitrogen has the potential to increase growth substantially, and the less natural soil nitrogen the greater the growth potential. However, if the tree growth rate is increased substantially, there would likely be a trade-off in susceptibility to pathogen and drought stress, discussed in the previous paragraph, and a decrease in wood strength. Miller and Pienaar (1973, as reported in Chappell, Omule, and Gessel, 1992) found that high fertilizer application rates in 35 year-old Douglas-fir stands produced a greater increase in growth over a longer period but with added risk of snow or wind breakage.

The typical fertilizer used in forest applications in Douglas-fir forests is a synthetic urea fertilizer that has a NPK value of 46-0-0. Boyer and Legard report in 1973 that urea can be used by plants directly to some extent, but is more commonly used after converting to ammonia and nitrogen. After converting, it becomes readily soluble and subject to leaching, but ammonification considerably reduces the leaching losses. Ammonia is more likely to volatilize, rather than leach, due to the ionic attractions of organic matter and clay fractions within the soil. The best time of application is likely to be in the late spring, after the snow has melted, while the soil is still wet, but not saturated (Nason and Myrold, 1992). If the fertilizer is applied to saturated soil, a substantial percentage of the fertilizer may leach through instead of being utilized by the trees. Soil texture can be an important determinant of the level of nitrate that reaches the groundwater. The coarser the soil texture, the faster the movement of the dissolved nitrate, and thus the lower rate of uptake of that nutrient by the vegetation. The primary soil type in the planning area is a silty to very fine sandy loam with a coarse fragment volume of <5% and one to two inch duff layer. Consequently, nitrate leaching to the groundwater is not likely.

Would there be changes in the water quality caused by fertilizer application?
Standard and Guideline(s): The use of fertilizer shall not lower water quality in the fertilized area or downstream (FW-371).

Effects of Alternative 1 - No Action
There would be no change in water quality due to fertilization since this practice would not be implemented in this alternative.

Effects of Alternative 2 - Proposed Action
The risk of short term adverse effects to water quality related to aerial fertilization is very low (FW-371). Proposed aerial fertilizer application is not likely to adversely affect water quality. Aerial application of urea fertilizer is a common silvicultural practice in Pacific Northwest forests to improve growth rates of commercial conifer species. In most instances urea is readily absorbed into soil organic matter, metabolized by soil microorganisms, and utilized by forest vegetation. Aerial fertilizer application has the potential to enter the aquatic environment and may result in increased nitrogen levels in streams. The most likely routes by which urea potentially enters water is through direct application and drift, rather than via infiltration and translocation by soil (ground) water. The risk of direct application to water is avoided as no riparian reserve would be entered. Drift is similar to direct application but the fertilizer is carried by wind, the peak concentrations are usually lower, and the probability of stream organisms being affected is reduced. Drift is avoided by limiting aerial application to days with little or no wind.

Based on past monitoring of forest fertilization activities on the Mt. Hood National Forest and a review of applicable scientific literature, the risk of approaching or possibly exceeding standards and thresholds is extremely remote and would likely be limited to the unlikely occurrence of an accidental spill during transport. No long term adverse effects associated with fertilizer application are anticipated (FW-371).

Would there be changes in the water quality caused by road construction, use, and closure?
Standard and Guideline(s): Roads shall be maintained to minimize soil erosion and water quality degradation (FW-422). Rock, soil, or organic material should not be sidecast in the construction or maintenance of roads or landings within riparian zones (FW-423); with exception of designed stream crossings (FW-424). Roads should be designed and constructed so that they minimize landform disturbance (FW-426).

Effects of Alternative 1 - No Action
Water quality as influenced by the existing road system would remain unchanged.

Effects of Alternative 2 - Proposed Action
Short term effects of road construction include a low risk of increased erosion and potential water quality degradation during and immediately following ground disturbing activities. Potential erosion would be limited to the immediate area of soil disturbance. This may be more likely to occur if rain falls prior to completion of road construction and if required drainage and erosion control measures are not fully implemented. None of the roads are located on the relatively high landslide susceptibility landforms. Most road segments are located away from riparian areas. No adverse effects to water quality are anticipated since roads proposed for construction and/or closure are located away from streams. Risks can be greatly reduced though implementation of standard best management practices and following Forest Plan standards and guidelines (FW-422, FW-423, and FW-426) as discussed under Mitigations and Recommended Design Features.

No long term effects of the roads are anticipated, since no stream would be crossed (FW-422), and new temporary roads would be closed following use. Road closure techniques would include barricades and other means to prevent access and construction of self-maintaining drainage dips and/or placement of waterbars to control surface runoff. Extensive experience and monitoring of similar road closing practices has demonstrated that water quality is maintained and that long term risks, due to drainage failures, are greatly reduced. This is particularly true for closure of roads located on the relatively gentle terrain that is dominant in the planning area.

Would there be changes in the hydrologic recovery due to timber harvest and associated resource projects?
Standard and Guideline(s): Not more than 35 percent of an area available for vegetative manipulation should be in a hydrologically disturbed condition at any one time (FW-061, FW-062).

A cumulative effects analysis to assess management-related activities on forested lands can provide a means of estimating management effects over several years which may not individually impact the watershed, but which taken together may increase the risk for future impacts if they have not yet occurred. One way to determine hydrologic recovery following management activity is by determining the Aggregate Recovery Percentage (ARP). The ARP methodology was devised to estimate the ability of a subwatershed to absorb "rain-on-snow" events without significantly increasing the magnitude of peak flows in the subwatershed. The magnitude of peak flows is critical to a watershed's function, as relatively frequent peak flows (2-year to 25-year events) are the channel maintenance flows and relatively infrequent peak flows (50-year and 100-year events) are floods which can dramatically change the channel and riparian vegetation as a result of scour and sediment transport.

In forested stands the canopy intercepts snow which reduces snow accumulation on the ground. During rain-on-snow events there is less runoff from forested areas than in openings due to less snowpack accumulation. The ARP model assumes that different canopy closures represent different levels of hydrologic recovery and uses data about vegetation to calculate an overall ARP value. For purposes of assessing hydrologic recovery for conditions prevalent in the East Fork Hood River watershed, a methodology was utilized as described in "Forest Plan Management Direction, Interpretation #8", dated February 23, 1998 (Eastside Watershed Hydrologic Recovery).

The Mt. Hood National Forest Land and Resource Management Plan established a minimum standard of 65 percent referred to as a Threshold of Concern (TOC) for subwatersheds within the East Fork Hood River watershed. Table 4-1 displays ARP values for the various subwatersheds

Table 4-1 - ARP Values for Various Subwatersheds, by Alternative.

Watershed	Current (1998)	Alternative 1 (1999)	Alternative 1 (2020)	Alternative 2 (1999)	Alternative 2 (2020)
East Fork (FG2)	99.2%	99.2%	99.2%	88.2%	98.1%
East Fork (FG 4)	96.7%	96.7%	96.7%	92.9%	95.4%
Polallie Creek	99.0%	99.0%	99.0%	99.0%	99.0%
Tilly Jane Creek	95.1%	95.2%	95.7%	92.5%	95.0%

The current (1998) ARP values for the various subwatersheds indicate that Federal land ownership of all watersheds are almost fully recovered, reflecting little or no past management. Immediately following implementation of the various alternatives (assumed to occur in 1999), estimated ARP values would drop for each watershed in which timber harvest or road construction is planned. As the harvested areas and decommissioned roads recover, the hydrologic recovery would accelerate as reflected in ARP values. By the year 2020, ARP would be almost fully recovered. In all cases, ARP values remain well above the established TOC. In summary, no adverse effect on peak flows and hydrologic stability is expected as a result of the timber harvest and road construction activities proposed for Alternative 2.

Other effects

Under the No Action Alternative, maintaining excessive stem density and fuel loading would increase the likelihood of a catastrophic wildfire. The increased risk of wildfire carries with it an increased likelihood of adverse effects on watershed values, including increased rates of landslides on highly susceptible landforms, surface soil erosion, water quality deterioration (sediment, clarity, and temperature), and loss of riparian habitat.

4.3 Aquatic Resources

Would proposed harvest activities result in increased amounts of fine sediment <2mm in spawning habitat in the planning area?
Standard and Guideline: Spawning habitat (e.g. pool tailouts and glides) shall maintain less than 20% fine sediments (<1mm diameter) on an area weighted average, FW-097. NOTE: stream survey information lumps all fine sediment <2mm into one category.

Effects of Alternative 1 - No Action
There would be no direct or indirect short term effects to aquatic organisms and habitat resulting from the No Action alternative. There would be no soil disturbed as a result of logging operations or prescribed fire within riparian reserves and no potential fine sediment input to stream channels from log hauling on existing roads. No riparian vegetation would be disturbed. Aquatic habitat conditions and aquatic organism distribution would likely remain as is until the next high flow event or debris flow.

Long term effects to aquatic resources by not implementing the proposed action would be of an indirect nature and would greatly depend on possible natural disturbances in the area. Probably the largest negative effect of the No Action alternative on aquatic resources would result if a large fire were to occur. A large fire in either the eastern or western portions of the planning area could expose bare soil, increase overland erosion and cause increased sedimentation in streams. The degree of these impacts would depend upon the severity and size of a fire. It stands to reason that if the No Action is implemented then fires in these areas would burn more intensely and over a larger area. LRMP standards and guidelines for fine sediment would not be met in westside streams given the above potential impacts.

As explained in the Geology section, the rate of landslides could increase on the east side of the planning area in the event of a severe wildfire. A large volume landslide could cause excessive amounts of fine sediment to be delivered to the East Fork Hood River, as well as boulders and LWD. Although LWD from a landslide would be a positive addition to the East Fork (but perhaps not enough to meet standards and guidelines), the overall effect would be a degradation of fish habitat downstream from the slide due to the input of fine sediment.

The No Action alternative would have No Effect/Impact on any threatened, proposed threatened, or R6 sensitive aquatic species within the planning area.

Effects of Alternative 2 - Proposed Action
Increased fine sediment input to streams resulting from proposed activities is possible but the amount would be immeasurable against existing levels. Proposed activities are designed to reduce impacts to stream channels by using no-cut buffers and no new roads within riparian reserves. The primary way sediment would directly enter streams is via log hauling on native surface logging roads that cross, or run adjacent to, streams. Fine sediment from roads can enter streams as dust, sloughed off soil from the side of the road, or soil washed into streams during rain or snowmelt after disturbance. The 3510-640 and 3510-620 spur roads are the most likely sediment sources from log hauling as they cross Doe Creek and one of its intermittent tributaries and Buck Creek, respectively. Stream crossings are the primary areas of concern on these roads because soil mobilized from other road sections would be filtered by no-cut buffers. Log hauling mitigation measures outlined below should greatly reduce, if not eliminate, the chance of fine sediment entering these streams.

Increased sedimentation into the headwaters of Doe Creek, especially into an intermittent tributary to Doe Creek, is a possible indirect effect of underburning in stands 067, 069, 070, 076, and 083. If the prescribed fire is too hot and results in large amounts of exposed soil then there is a greater chance erosion could occur. Whether eroded soil would make its way into the stream channel depends in part on how much of the riparian area burns and the extent and intensity of the burn. If a vegetation buffer strip remains after the fire potential sedimentation into the creek would be greatly reduced. This area is over one mile upstream from a fish bearing stream so the effects on spawning habitat would be negligible.

One potential sediment source into the East Fork Hood River is a proposed helicopter landing and log storage site located within the riparian reserve to the south and west of Polallie Creek and East Fork Hood River, respectively. The landing would occupy an area already disturbed, most recently by the October 1997 Polallie Creek debris flow, with relatively little vegetation. Some trees, all lodgepole pine <20 feet in height, and shrubs would need to be removed and the site would be contoured with a drainage swale located

at the eastern edge to trap sediment. Dust from the helicopter rotor wash would be the most likely way fine sediment could enter either the East Fork or Polallie Creek. However, dust abatement is critical when using helicopters and would be accomplished with regular watering of the area. This should reduce the amount of sediment entering the waterway to immeasurable levels.

In the short term, the amount of fine sediment would remain the same throughout the planning area and standards and guidelines would not be met.

Amounts of fine sediment in spawning habitat should not measurably increase over the long term as a result of proposed activities, but standards and guidelines for fine sediment would still not be met. As harvested areas and closed roads stabilize and revegetate the chance of erosion from these sources would diminish. Thinning over stocked and dying stands of timber or conducting prescribed burns would result in greater fire resiliency. The area would not experience as hot of a burn in the case of a large natural or man-caused fire, more vegetation would be left, and vegetation recovery would be quicker. By reducing the fire intensity less of the duff layer would burn, less soil would be exposed, and there would be less erosion potential in the long term.

Any fine sediment introduced to streams as a result of proposed activities would be in addition to natural and man-caused sediment already in the planning area and downstream. However, the small amounts of introduced sediment expected would have negligible effects in the planning area and on the 5th field watershed scale. Given already high fine sediment levels in planning area streams, small amounts of additional sediment would be immeasurable. Since the anticipated effects upon LWD are small, there would be no cumulative effects associated with these issues.

Would proposed activities reduce amounts of present and potential in-channel LWD?
Standard and Guidelines: At least 90% of potential and naturally occurring in-channel LWD shall be maintained, FW-092. Retention of multi-piece accumulations of LWD and fallen trees with attached root wads should be emphasized, FW-093. An average of at least 20 pieces of suitable LWD per 1000 lineal feet of stream should be maintained, FW-094. Suitable LWD should meet the following dimensions: 35 feet minimum length, minimum mean diameter greater than or equal to 12 inches (80% of total) and greater than or equal to 20 inches (20% of total), FW-095.

Effects of Alternative 1 - No Action
Amounts of LWD and fine sediment would not meet standards and guidelines throughout the planning area. A large fire in either the eastern or western portions of the planning area could decrease the amount of existing and potential LWD. LRMP standards and guidelines for LWD would not be met in westside streams given the above potential impacts.

Many riparian areas are currently characterized by having many small diameter conifer trees that are closely spaced. These trees are crowding each other out reducing the growth potential and increasing susceptibility to disease. By not thinning these stands it would take longer for large diameter, big trees to grow and eventually fall into stream channels. If stands become diseased and many trees die then potential LWD recruitment could become reduced with a subsequent long term reduction of in-channel LWD.

Effects of Alternative 2 - Proposed Action

Proposed harvest activities within the planning area would not reduce existing amounts of LWD within streams or flood prone areas because of the no-cut buffers. Amounts of LWD would still not meet the Forest Plan standard (FW-094).

Future LWD recruitment potential from riparian areas proposed for thinning and underburning may be slightly reduced in the long term because less trees would remain on site, but the remaining trees would be larger and would last longer once they fell to the ground. The reductions in LWD recruitment are negligible because the majority of these trees are small (<10" diameter breast height) and are far enough from stream channels that many would not fall into any channels. More than 90% of the potential LWD (standard FW-092) would remain and larger trees in the riparian areas would help to insure that the LWD size standard (FW-095) would be met. No-cut buffers contain most of the trees that would directly contribute to LWD levels in planning area streams, hence there would be no negative impact on the amount of LWD in streams (FW-094).

Other effects

There would be no irreversible or irretrievable commitment of aquatic resources as a result of the proposed action. Potential changes in habitat conditions described above would recover over time. Fish and aquatic insect populations fluctuate naturally but any fluctuations caused by proposed actions would not result in local extinctions.

There would be no measurable effect on shade over the entire planning area. Some localized shade reduction is possible due to harvest and burning activities, but the estimated reduction would be <5% over the entire planning area. The estimate is based on 38 acres of proposed riparian reserve treatment out of 1500 total riparian reserve acres. Not all vegetation would be removed in the 38 acres, therefore the potential shade reduction would be less than 5%.

The Proposed Action would have No Effect on chum or chinook salmon or bull trout.
The Proposed Action may affect, but is not likely to adversely affect steelhead trout.
The Proposed Action would have No Impact on coho salmon.
The Proposed Action may impact Lower Columbia River cutthroat trout individuals or habitat but would not likely contribute to a trend towards Federal listing or loss of viability to the population or species.

Compliance with the Aquatic Conservation Strategy

At the 5th field watershed scale (i.e. East Fork Hood River) the proposed action would meet the Aquatic Conservation Strategy (ACS) because NW Forest Plan standards and guidelines would be met and the nine ACS objectives would be maintained or improved. Small amounts of sediment may, but are not likely to, degrade conditions at the site specific level but not at the 5th field watershed scale. Riparian area vegetation species composition and structural diversity would be maintained, and likely improved over the long term, in those areas proposed for vegetation treatment (including fire). The physical integrity of the aquatic system would be maintained due to no-cut buffers and no new road crossings or road segments in riparian reserves.

4.4 Timber Resources

What effects do timber harvest and the proposed resource projects have upon forest health, growth/yield, and conifer species diversity?
Homogeneity of timber stand conditions and over stocking of trees help create/sustain forest health problems. Regeneration harvest, when determined to be the optimum method for meeting the objectives and requirements of the relevant land management plans, is essential for improving and maintaining the health of the forest over the long term. Commercial thinning results in maintaining and/or increasing the rate of growth of residual trees and forestalling mortality within timber stands. Competing brush limits tree growth and can cause abrasion and damage to conifer branches and tops during the early stages of stand development. Large, down woody debris result in healthy soil organisms, which in turn influences soil nutrient and soil moisture availability to the vegetative resource.
Standard and Guidelines: Silvicultural treatments should consider and emphasize methods for a diversity of tree species, FW-152. Commercial thinning should maintain the desired stocking level to achieve a vigorously growing stand throughout the rotation, FW-372. Favorable habitat conditions for soil microorganisms should be maintained for short and long term soil productivity, FW-032. All vegetation management actions shall be directed toward creating or maintaining the desired landscape character through time and space, B2-035.

Effects of Alternative 1 - No Action

This alternative would result in not silviculturally treating any acres of National Forest System Land within the planning area. The homogeneity of timber stand conditions, overstocking of tree species, and the continuing un-natural succession events on the eastside of the planning area would continue to sustain the current and promote future forest health problems. Restricted tree crown growth, existing crown closures, and root rot disease pockets would continue to prevent the trees from growing at their full potential. Little to no increase in individual tree growth rates, promotion of stand health and stability, and/or salvage/utilization of considerable mortality would occur. The brush, within the brushfields, would continue to retard the growth of conifers and damage the advanced regeneration with inter branch abrasion. Conifers that experience terminal bud damage, as a direct result of the hardwood abrasion, would continue to be suppressed and unable to grow free or break through the hardwood canopy. Fuel concentrations, within the Cooper Spur Ski Permit Area and the urban interface, would continue to expose the vegetative resource to potential resource loss if a wildfire should occur. The short term effects of the No Action alternative would have no adverse impacts to the timber resource.

Currently, forest health concerns exist within the Polallie Cooper planning area, in particular laminated root rot, the increased component of grand fir, and overstocking. The amount and distribution of the root rot within the area varies and its ability to intensify is determined by the initial amount of inoculum, existence and distribution of the host trees, and time since first infection. In most of the unmanaged late seral stands within the planning area, the inoculum is probably kept at a relatively low density because these stands have fewer trees that are well spaced. In contrast to the situation in late seral stands, second growth stands are more dense and thus more susceptible to come within contact of residual inoculum. Approximately 123+ acres are currently showing signs that the inoculum has been present for sometime. This is evident because the areas are developing openings, are for the most part understocked, and contain an aggressive brush component. Numerous other pockets of root rot also exist. Long term effects would include fewer conifers (grand fir, Douglas-fir) on the landscape, increased windthrown trees, and a greater component of hardwoods within the root rot pockets. This alternative prevents any opportunities to help reduce and manage this disease.

The planning area currently contains approximately 3000 acres of overstocked stands (stem exclusion), in the B2 and A11 land allocation, that are of commercial thinning age. In dense, unmanaged timber stands, losses are commonly caused by damaging agents such as insects, fungi, fire, wind as well as by the loss of merchantable trees through inter-tree competition for light, nutrients, and water. Long term effects of not thinning include earlier culmination of mean annual increment (loss of vigor), increased/unutilized future tree mortality, and long-term site productivity, decreased carbon storage associated with larger growing stock. Stand replacing fires, especially on the eastside, increases the risk of landslides which could result in a lost of "available and suitable" commercial land for timber production/harvest and reduced site productivity.
Past management practices and hot stand replacing fires, on portions of the planning area, have created a deficiency in the amount of large, down woody debris to the timber resource. Long term site productivity (forest health) is maintained and/or enhanced by the availability of this material to the timber resource. Existing pockets of laminated root rot and overstocked timber stands would continue to contribute down woody debris to the ecosystem in an abundant manner. Long term effects on the other portions of the planning area that are deficit of this material would be a reduction of nutrients, especially nitrogen, which would effect long term site productivity and the health/vigor of the trees, especially after canopy closure and in mature trees (Heilman et al., 1981).

There are no additional, relevant cumulative effects expected within the next 10 years. As a result of no action, the timber stands would continue to slowly decline in growth/vigor and over time individual and groups of trees would die out, creating more forest openings, sparser tree canopies, and increased down woody debris. Through time, these timber stands would increase in susceptibility to disturbances (fire, insects, and disease).

Effects of Alternative 2 - Proposed Action
Regeneration (**Photo 4-1**), shelterwood (**Photo 4-2**), and mosaic variable thinning (**Photo 4-3**) treatments would be implemented on a total of 167 acres. Of these acres, approximately 104 acres would require reforestation after treatment. All of these treatments are designed to establish a diverse mix of trees species that are of lower susceptibility in the infected areas of laminated root rot and artificial reforestation of these sites would assure quick site occupancy and fast growth. A diverse, conifer species component can be regenerated on these sites to reduce inoculum or to hold the effects of the disease within acceptable limits. The short term effects of this treatment provides maximum control of the future crop tree species mix to favor faster growing serals (higher yield at Culmination of Mean Annual Increment [CMAI]) and genetical superior species for insect and disease resistance.

/.../cell1.f6.r6.fs.fed.us/fs/fsfiles/unit/hr_terra/polallie/2siv-3.bmp: No such file or directory
Photo 4-1 A regeneration harvest cut, where 15% of the trees are left and the entire area is reforested with conifers.
/.../cell1.f6.r6.fs.fed.us/fs/fsfiles/unit/hr_terra/polallie/2siv-4.bmp: No such file or directory
Photo 4-2 A shelterwood harvest cut, where individual trees are left to act as a shelter (temperature and moisture). The entire area is reforested with conifers.
/.../cell1.f6.r6.fs.fed.us/fs/fsfiles/unit/hr_terra/polallie/2siv-5.bmp: No such file or directory
Photo 4-3 A mosaic variable thin harvest, where in the healthy portion of the stand, trees are thinned 18 to 25 feet apart. In unhealthy portions, usually root rot pockets, the remaining healthy trees are thinned to a wider spacing. All others are removed. Only the unhealthy portion of the mosaic variable thinning unit is reforested.

Stocking control of dense stands (commercial thinning and improvement harvest) would be implemented on approximately 840 acres of forest where overstocking has/will exacerbate forest health problems (**Photo 4-**

4). Reducing stand density by thinning consistently shows increases in Diameter Breast Height (DBH) growth/vigor (Reukema et al. 1977) and reduces moisture stress on the residual stand. Many sites, such as many of the current second growth stands within the planning area, are not able to support dense stands without experiencing health problems. Short term effects of thinning these sites would result in utilizing/harvesting future tree mortality, increasing individual tree and overall stand vigor (up to 15 years or crown closure), and would result in a reduction of the overall existing and future forest health problems.

/.../cell1.f6.r6.fs.fed.us/fs/fsfiles/unit/hr_terra/polallie/2siv-6.bmp: No such file or directory

Photo 4-4 A commercial thin harvest, where the trees are spaced 18 to 25 feet apart. Trees within the upper crown classes are favored (retained) over the lower/mid crown classes.

The cutting of brush around existing trees and planting conifer species in the understocked areas of 84 acres would increase tree growth and bring these acres up to their timber growth capability, as defined in the Mt. Hood NF Forest Plan.

The cutting and/or falling of six to ten trees, adjacent to the Cooper Spur road, to create a viewpoint of Mt. Hood, would not understock or effect the integrity of the stand, providing that mitigation measures are implemented to insure that the amount of "green", prime habitat for Douglas-fir bark beetles is reduced. If an adequate number of freshly, "green" cut trees continue to lie in the woods, new Douglas fir beetle populations could colonize this more preferable host material first, rather than infest living trees. This situation would continue to build population numbers of the beetle and eventually lead to even greater beetle numbers available to attack living trees. The critical threshold of felled, green trees left in the forest, that would result in rapid bark beetle population increase and subsequent attacks on living trees is not known with any certainty. However, based upon experience in westside forests, when the number of green windthrown trees reaches or exceeds three trees per acre, Douglas-fir bark beetle populations would begin to increase to levels that could lead to the attack and mortality of green Douglas-fir in the following season. The felling/topping of six to ten trees per acre within a concentrated area, makes it necessary to remove a minimum of 75% of the cut wood with a diameter of 10 inches and greater.

Enhancing site productivity by creating large, down woody debris would be accomplished on 1,007 treatment acres. These acres would benefit from the positive effects that this material has on the long term soil productivity and wildlife. Creating large, down woody debris on 29 of these acres would enhance and add to the late seral characteristics within the riparian corridors. This action would help meet the aquatic conservation strategies within the NWFP.

Past timber harvest activities, within the planning area, have been minimal. Future federal timber harvest plans, within the planning area, are not scheduled for another 10 to 15 years, providing that no major disturbances (fire, insects, disease, or blowdown) occur. Some future, Federal timber harvest activities could occur adjacent to the planning area within the next 10 years. Portions of the Cloud Cap/Tilly Jane Historic District and the area west of Tilly Jane Creek may be scheduled for salvage logging, but would require a management plan and additional documentation in compliance with NEPA regulations. Other private parcels of forested land surrounding the planning area may implement future timber harvest activities, but their addition to the cumulative effects on the vegetation, within the planning area would be minimal. No relevant cumulative effects are expected to occur as a result of the proposed action.

What are the effects of nitrogen fertilizer on the growth and yield of timber resources?

The majority of Douglas-fir timber soils within the Pacific Northwest are deficient in nitrogen and respond in growth after nitrogen fertilizer treatments.
Standard and Guideline: Fertilization may occur in timber stands ten years prior to the next commercial entry, FW-368.

Effects of Alternative 1 - No Action

Research has shown that application of nitrogen fertilizer strongly influences growth rates of conifers (Gessel et al., 1992). Long term effects of not fertilizing would result in a reduction in the amount of extra foliage which would accumulate on the residual tree crowns as a result of the increased influx of nutrients. This reduction in extra foliage would result in the trees losing the opportunity to operate at high levels of photosynthesis and support extra growth. A delay in obtaining canopy closure would also occur in stands where canopies are not competing for space. The long term effects of the No Action alternative would have adverse impacts (forest health and growth/volume loss) on the timber resource.

Effects of Alternative 2 - Proposed Action

Short term conifer growth response to nitrogen fertilizer is immediate. Research has shown a definite response in diameter growth within the first year after fertilization. Two growing seasons after treatment, a statistically significant response in volume growth is evident (Miller and Pienaar, 1973, as reported in Chappell, Omule, and Gessel, 1992). The authors concluded that this first year response was due more to an improved photosynthetic activity per unit of foliage rather than to increased mass of foliage that occurs in the long term. The short term effects of the Proposed Action alternative would have no significant impacts to the timber resource.

Aerial application of nitrogen fertilizer would be applied on 414 acres of treated lands. Fertilization strongly influences growth rates which increases the risk of snow, ice, and wind breakage in exposed areas. The combined effects of accelerated operability, lower harvesting costs, and the extra wood produced are all positive, long term future effects. Research has shown that volume growth after fertilization is increased about 16 to 18% in unthinned stands and about 20 to 22% in thinned, predominately Douglas-fir stands for 8 to 10 years (Chappell, et al., 1992). Growth increases continue to be statistically significant for 8 to 16 years after initial treatment.

To quantify the fertilization response to this particular planning area, the Forest Vegetation Simulator (FVS) was used with stand data from a nearby forest inventory plot (Squeegee Creek). The data, within this particular inventory plot, adequately represents the stand conditions found within the Polallie/Cooper Planning Area. The Forest Vegetation Simulator shows a 5.019 CCF/acre (2.635 MBF/acre) fertilizer growth response within 20 years of application. Thus, the proposed 414 acres of fertilization would result in a gain of approximately 2103 CCF (1104 MBF) of timber within 20 years. Assuming a stumpage value of $85.72/CCF (tractor and cable), the net economic gain (without discounting) would be $180,269.

The long term effects of the Proposed Action alternative would have positive benefits (improved forest health and growth/volume gain) on the timber resource.

Cumulative effects

Under Alternative 1 (No Action), there are no additional, relevant cumulative effects expected within the next 10 years, with the exception of the effects of a catastrophic fire. As a result of no action, the timber stands will continue to slowly decline in growth/vigor and over time individual and groups of trees will die

out, creating more forest openings, sparser tree canopies, and increased down woody debris. Through time, these timber stands will increase in susceptibility to disturbances (fire, insects, and disease).

Under Alternative 2 (Proposed Action), past timber harvest activities within the planning area have been minimal. Future Federal timber harvest plans, within the planning area, are not scheduled for another 10-15 years, providing that no major disturbances (fire, insects, disease, or blowdown) occur. Some future Federal timber harvest activities could occur adjacent to the planning area within the next 10 years. Portions of the Cloud Cap/Tilly Jane Historic District and the area west of Tilly Jane Creek may be scheduled for salvage logging, but will require a management plan and relevant NEPA documentation. Other private parcels of forested land surrounding the planning area may implement future timber harvest activities, but their addition to the cumulative effects on the vegetation within the planning area would be minimal. No relevant cumulative effects are expected to occur as a result of the proposed action.

4.5 Fuels

What are the effects of the proposed action on fuel loadings increases within the harvest area for the first one to two years post timber harvest?
Standard and Guideline(s): Fuel profiles shall be identified, developed and maintained that contribute to the most cost effective fire protection program consistent with Management Area management direction (FW-263). Dead, down woody material loading levels shall be managed to provide for multiple resource objectives (FW-265). Prescribed fire Burning Plans (FSM 5140) shall be prepared prior to ignition (FW-267). Stand loadings greater than 12 tons/acre or more in the harvested units in the zero to three inch material and loading of 50 tons/acre or more in the greater than three inch material are the accepted fuel load thresholds for the Mt. Hood National Forest.

Effects of Alternative 1 - No Action
Under the No Action Alternative, the proposed projects and harvesting activities would not occur. The continuing moderate possibility of a catastrophic event, such as a wildfire would remain the same.

In the long term, natural fuel loadings would continue to increase and thus the possibility of a catastrophic wildfire would also increase to a higher probability.

Effects of Alternative 2 - Proposed Action
In the short-term, all harvest areas would have an increased potential for ground based fires due to the increase of branches and other fine fuels left on the sites after logging. These ground based fires could produce crown fires in surrounding stands due to intense heat. A post harvest review of the treated areas would be done and any areas with fuels loadings over 12 tons per acre in the zero to three inch size class and 50 tons per acres in the greater than three inch category would be treated within the first two years after harvest.

Reduction of ladder fuels among the ponderosa pine and Douglas-fir stands would reduce the possibility of catastrophic fires for up to 20 years.

In the long-term, fuels created during harvest activities would not be an issue due to treatment in the first two year after logging.

4.5 Wildlife Resources

The analysis methodology used in assessing the impacts to the wildlife related issues involves an assessment of current vegetative information via the District's Geographic Information System (GIS), which yields quantitative and spatial data. This current condition data is then applied to the two alternatives to determine a quantitative and qualitative determination as to the possible impacts.

How would species dependent upon the mature forest "connectivity corridor" (pine marten, pileated woodpecker), including threatened species (spotted owl), be impacted through timber harvest (loss of canopy closure, loss of stems, loss of snags), road construction (loss of forested acreage, traffic), logging activity (noise, human presence), and fuels reduction projects (loss of down logs, loss of snags, smoke, loss of shrub/small tree habitat)?
Standard and Guideline: FW-175, Habitat for TES animals shall be protected and/or improved. FW-215, wildlife trees should be maintained to support, over time, 60% of the maximum biological potential of cavity nesters.

Effects of Alternative 1 - No action
In general, the short term effects to spotted owls and other mature forest indicator/associated species (pileated woodpecker, pine marten) would be positive. Current snag and down log levels would be retained. Closed canopy forest would predominate on the landscape, with approximately 3,400 acres of the 4,496 acre planning area in a mature habitat condition. Black-backed and white-headed woodpeckers would benefit due to snag levels and snag sizes retained. The "connectivity corridor" described in Chapter 3 would continue to function at its' current state, as providing linkage for mature forest associated species. This would include the lack of larger diameter snags and logs on 29 acres of riparian reserve, but in general, the connectivity in the area would remain at fair/good. Fire potential within the planning area would continue to remain at medium levels and the risk to wildlife habitat loss (of mature forest) would remain constant.

Long term effects to these species would be similar to those described in short term above. The potential for stand replacing fires within the planning area would increase under this alternative, and move from medium to high potential. This increase would raise the likelihood of losing key mature forest habitat within the greater "connectivity corridor". Exact locations of potential stand replacing fires are unable to be made, however given current and expected future fuel loadings, a large scale catastrophic fire is probable. This kind of impact would severely limit east-west connectivity around Mt. Hood for those species associated with mature forest, down logs and snags, particularly those species with small to medium home ranges. The impact could be so severe so as to stop the genetic interchange of small home range mature/late successional associated species around the north side of Mt. Hood.

There may be an irreversible commitment of resources associated with this alternative. In the planning area, the probability of stand replacing fire would increase in the long term. It is likely that mature forest habitat would be lost through stand replacing fire, although the extent of this loss is unknown. The irreversible effect, depending upon extent and location of the fire, could be the severing of genetic interchange for late-successional associated species with small home ranges around the north side of Mt. Hood .

Effects of Alternative 2 - Proposed action

The short term impact to these species would be a reduction in habitat capability on approximately 1007 acres of mature forest habitat. Of this, approximately 198 acres (94 acres of shaded fuelbreak, 60 acres of openings in the mosaic variable thin, and 44 acres of regeneration harvest) would no longer function in any capacity as mature forest: Down logs and snags would be retained, but canopy closure would be expected to be at 25% or less. Within the remaining approximately 809 acres, habitat elements associated with mature forest would be retained (down logs, snags) and canopy closure would be a bit greater. On the westside of Highway 35, approximately 402 acres would be thinned (63 acres of mosaic variable thin, 414 acres commerical thin minus the 94 acres fuelbreak, 19 acres of riparian thinning) and would likely be at approximately 40% canopy closure. These stands may function, to some degree, as foraging or migratory habitat for some mature forest associated species. On the eastside of Highway 35, approximately 407 acres would be more variable in the leave tree spacing, and canopy closure is likely to vary between 40-70% . It is likely that these stands east of Highway 35 would provide for some nesting/denning/reproductive potential for mature forest wildlife species.

The Proposed Action would have negative short term effects upon the "Connectivity corridor" for mature forest associated species. A loss in canopy closure is expected over 1/4 of the planning area through the Proposed Action. Of the 1007 acres treated, 809 acres would continue to provide some habitat for mature forest associates within the connectivity corridor: migration, dispersal, some foraging, roosting/resting would likely occur, particularly in the 407 acres treated east of Highway 35. West of Highway 35, in the 402 acres thinned, reproductive habitat would be most effected. Species with small home ranges and/or closed canopy associates would be most impacted through the reduction in canopy closure and complexity within these 402 acres. This reduction would further limit the effectiveness of this "connectivity corridor" in the short term, and create an even wider gap/problem for small home range, mature and late-seral associated species. The proposed action would not eliminate this corridor's suitability for these species, but would severely restrict the capability in the short term. FW-175 would be met at the site specific/project scale, as the proposed action would maintain habitat for spotted owls and the guild of species they represent in compliance with the conservation strategies in place for spotted owl and mature forest associated species. At the larger scale, this project would maintain the continued viability of spotted owls and other late successional associated wildlife species.

Under the Proposed Action Alternative, species associated with down logs and snags would have greater than the minimum levels of snags and logs retained post-harvest than required under the Northwest Forest Plan. In an effort to maintain this "connectivity corridor" for snag and log associated species, 8-10 snags per acre would be left in the regeneration harvest units west of Highway 35 (approximately 18 acres plus 60 acres of small patch openings in the mosaic variable thin units) with four to five snags/ac within the shaded fuel break, and up to four trees for down logs retained (480 linear feet). (The Forest Plan recommends leaving 3-5 snags per acre, and 2 trees for down logs). Within 457 acres of the partial harvest units (402 acres west of Highway 35 and 55 acres east of Highway 35) 4-5 snags per acre and 2 trees for down logs would be retained. Within the 29 acres of riparian reserve where commercial thinning would occur, 8-10 snags and 4 trees for down logs would be left per acre. These levels of down logs and snags would help preserve the integrity of the "connectivity corridor" and would provide for good legacy habitat as the stands develop post-harvest. These levels and sizes of material maintained should help retain species such as black-backed woodpecker, white-headed woodpecker, and pileated woodpecker as components within this ecosystem. However, through harvest, many current snags would be felled as hazard trees to the logging operation. Standard and Guideline FW-215 would be met.

The Proposed Action "may effect, and is likely to adversely effect" spotted owls and their habitat, due to the loss of approximately 198 acres of suitable habitat, the degradation of 402 acres of dispersal habitat, and the degradation of 407 acres of suitable habitat into lower quality NRF habitat. In addition, this Proposed Action would likely result in the "incidental take" of one spotted owl pair, based upon the future habitat amounts surrounding this pair post harvest.

The 153 acres of underburning should be a positive effect to mature forest associated species. This would reduce fuels and help in the regeneration of the understory. These acres have a massive amount of smaller diameter material throughout the area; burning this would reduce the fire potential in the area and initiate new growth. This new growth, and development of multi canopy layers should be beneficial for mature forest associated species. A spotted owl pair is located in close proximity to these acres and could be adversely effected if burning is initiated while nesting is occurring. A mandatory Term and Condition from the US Fish and Wildlife Service requires a seasonal restriction surrounding this pair, until non-nesting is determined, or until June 30.

This proposed action alternative would result in the irreversible loss of 198 acres of mature forest habitat, as this habitat would not be developed again in the course of a human lifetime.

The long term effect to these species is expected to be much different than the short term effect. Whereas the short term effect to spotted owl and mature forest associated species is negative, the long term effect is mainly positive. One key to this benefit is the long term reduction in the fuel loadings and the overall reduction in the potential for stand replacing fires. This benefit means there is a greater chance of being able to maintain, through time, some of the key mature forest stands and/or key components of mature forests, such as snags and logs. FW 215 and 175 would be met.

Much of the acreage to be treated (approximately 809 acres) is some form of thinning, with integral structural components of mature forest maintained (snags, logs). On the west side of Hwy 35, the thinning would open up the stand and reduce canopy closure in the short term, but in the long term, canopy closure is expected to close up again. This closure, associated with greater tree growth, and hence larger diameter trees, would mean that in the long term, those acres thinned would likely become good quality spotted owl habitat. On the east side, it is likely that in the long term those acres thinned would start increasing the canopy closure, but the number of trees/acre is expected to be at lower, post harvest levels (similar to short term).

In general, the acreage treated through commercial thinning, mosaic variable thinning, improvement cutting, and the underburning project, should all develop into good quality habitat for mature forest associated species. The Proposed Action would likely result in an overall benefit to the "connectivity corridor" and those species dependent upon it for genetic interchange, in the long term.

How would species which require a reduced human presence in the landscape (deer/elk, peregrine falcon, wolverine) be impacted through noise (logging activity, road construction) and habitat alteration (timber harvest, fuels reduction projects)?
Standard and Guideline: FW-175, Habitat for TES animals shall be protected and/or improved. FW-197, a consistent quantity of forage should be created through regeneration harvest at the area analysis level.

Effects of Alternative 1 - No action
In the short term, impacts to these species through implementation of the No Action Alternative would also be positive. No roads would be developed. Helicopter use associated with logging would not occur. Disturbance from human presence/activities within the planning area would remain at the current levels, due to no logging and associated projects occurring.

Stand structural development that would occur within the planning area would be neutral for deer/elk, wolverine, and peregrine falcon. No forage habitat would be created for deer/elk. Riparian areas would continue to function at a reduced level of biological potential for bird species (prey items for peregrine falcon) on approximately 29 acres.

Long term effects to these species would be similar to those described above for short term, with the exception of the increased risk of fire within the planning area. Stand structural development in the long term is neutral for these species. However, the increased structural development would also increase the risk of stand replacing fire from medium to high. This increase in probability is likely in most portions of the planning area, and a substantial stand replacing fire is a possibility. The impacts to these species through potential large scale stand replacing fires is likely negative, but depends upon the extent and the distribution of those fires.

Peregrine falcon would likely benefit from smaller scale stand replacing events within the landscape, as bird populations and diversity would likely increase due to the increased complexity of the landscape. However, this benefit is related specifically to how much of the landscape undergoes a stand replacing event and where that fire occurs: if, as likely, a large portion of the landscape burns, this would likely have a negative impact on the potential for falcon to nest within the planning area.

Impacts to wolverine through extensive stand replacing fires within the planning area are likely negative. This species has not been linked to any specific habitat structure (mature forest, younger stands, etc.) and extensive habitat alteration in this area may or may not have negative effects to wolverine. However, a large scale stand replacing fire would likely reduce prey availability for wolverine, and increase the exposure of this species to more human presence, through lack of cover vegetation. One key factor in assessing the impacts to wolverine are by assessing the impacts to their prey. In this area, the prey may be deer/elk carrion, from losing sick, diseased, weak, young, or older animals during spring/fall migration.

An extensive stand replacement fire would have a negative impact to deer/elk (through reduction/elimination of cover). For all of these species, it is likely that some degree of stand replacing fires (depending upon where in the context of the landscape) would be a beneficial effect.

Effects of Alternative 2 - Proposed action
The Proposed Action would likely have negative short term effects to those species considered sensitive to human presence. Logging activity in this area, from road construction, helicopter logging, slash treatment, fuels treatment, aerial fertilization, and post timber sale work may be ongoing in the project area for 8 or more years. This level of human intrusion above and beyond ambient noise background levels would likely locally displace or adjust these wildlife species' use of the planning area. It is likely that wolverine would only utilize the area during the months when project activity would not occur (late fall through mid spring). The level of human activity within the planning area would result in a "may impact individuals, but not

likely to lead to loss of viability or Federal listing". Impacts through disturbance would be discreet in time (8 years) , but larger in scale (the northern 1/2 of the planning area). Deer and elk would be impacted mostly during the spring: a seasonal restriction on operations within sections 32 and 5 in the spring time would effectively mitigate the impacts of spring time presence of human activities in the planning area. This mitigation has been accepted and is part of the proposed action. Since this area is the main area of use for deer/elk migration, this restriction should render spring impacts moot. In addition, the construction of the temporary roads would still render the area below the Forest Plan Standard and Guidelines for road density in deer and elk summer range (it would be below this 2.5 miles per square mile density requirement). Habitat potential for peregrine falcon would be reduced under this proposed action. Logging activity near the medium nesting potential cliff site would eliminate nesting potential at this site until harvest operations are completed. Surveys would still be conducted on an annual basis during the duration of this project, and should a peregrine falcon be observed, the logging operation would be suspended until an analysis of impacts is determined, a site management plan developed, and consultation with the U.S. Fish and Wildlife Service completed.

These species would also be impacted through the changes in the vegetative structure associated with the proposed action. Forage habitat for deer and elk would be developed on approximately 198 acres within the planning area. Some of this acreage (40-50 acres) would be within the migratory corridor for these species and in proximity to the private land acreage considered forage habitat. These 40-50 acres of openings would occur in the "mosaic variable thinning" units described in the proposed action. The variability planned in the mosaic variable thin units within the migratory corridor should be positive for deer and elk, by creating a variable mosaic of forage habitat intermixed with some hiding cover. Thermal cover over this area though would be reduced on all acres proposed for timber harvest. Approximately 4,200 acres of thermal cover currently exists within the planning area. Timber harvest would eliminate this quality of habitat on 198 acres would no longer function as thermal or hiding cover; 809 acres would likely function as only hiding cover (40-70% canopy closure) after implementation of the proposed action. Post timber harvest, approximately 3,100 acres of thermal cover would still exist within the planning area, or 69% of the total planning area. In addition, 18% would function as hiding cover, and the remaining 12% would function is varying degrees as forage. This is still a very high amount of thermal and hiding cover for these species, and as a whole, the proposed action should have minimal negative effects on deer and elk.

If deer/elk impacts are neutral, wolverine impacts may also be neutral. Perhaps the creation of some forage habitat within the planning area would make deer/elk stay in the planning area longer. If so, wolverine may reap the benefit of this longer stay, as the likelihood for more carrion increases. As a whole, the vegetative treatment of the stands in this planning area should have a neutral impact to wolverine.

Habitat alterations through the proposed action should also have neutral impacts to peregrine. Some of the riparian thinning may actually help to bolster prey species abundance. Given the small amount of acreage (29 acres) proposed for treatment, it is likely that any beneficial impacts would be negligible and difficult to measure. Reduction of mature forest over the extent of the planning area may impact prey species also. The Proposed Action would result in a "no effect" to peregrine falcons, through habitat alteration and disturbance.

The long term impacts to these species appears to be neutral. For deer/elk, within the next 40 years, the forage habitat created by the proposed action would no longer be in a forage condition: it would likely be a combination of hiding and thermal cover, returning the area to a situation similar to the current condition

(albeit, one with less potential for stand replacing fires, and one with a lot less small diameter down material). For wolverine, similar impacts would be expected: a return to a similar habitat condition for this species. Peregrine falcon may experience some benefits from the proposed action in the long term. Due to the increasing complexity of the stands as a result of the proposed action, more abundant and diverse prey species may exist. This may make the overall habitat within the planning area more suitable/higher potential for nesting for this species. Disturbance to these species, in the long term, is expected to be at similar levels to the current condition, as all temporary roads would be closed/obliterated post project implementation.

How would riparian associated wildlife species (harlequin duck, bald eagle, Cope's giant salamander) be impacted through the 29 acres of riparian harvest and the logging activity (helicopters, log truck traffic) along Highway 35?
Standard and Guideline: FW-175, Habitat for TES animals shall be protected and/or improved. ACS objective #9: Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

Effects of Alternative 1 - No action
There would be no net benefit or loss to these species associated with the selection of the No Action Alternative. At present, 29 acres have a reduced capability for supporting riparian and mature forest associated species, due to higher stocking levels, the lack of larger diameter trees, and the paucity of down logs and snags. Selection of the "no action" alternative would keep these riparian areas functioning at a reduced capability. Under this alternative, disturbance associated with human presence due to logging would not occur. There would be no impacts to potential Harlequin duck nesting, Bald eagle foraging, or Cope's Giant Salamander.

Long term effects to these species would be similar to those described above for short term effects. The increased probability of extensive stand replacement fires within the planning area is likely negative for these species. If there are extensive stand replacement fires within riparian areas, negative impacts to all three species would occur. A general lack of ground and forested cover would negatively impact Harlequin duck. Cope's Giant salamander could have negative effects due to erosion from severely burned stands adjacent to streams or upslope. Bald eagle foraging use of the area may decline, if larger diameter trees and snags are either lost through fire or the fire fighting effort. All these species would be negatively impacted by the increases potential risk of landslides, post fire.

Effects of Alternative 2 - Proposed action
These species and the guilds they represent would be impacted by two aspects of the proposed action: riparian thinning (29 acres), helicopter landing construction and use.

Riparian thinning of 29 acres within the planning area should result in a short term neutral effect to riparian associated species. Within the acres proposed for harvest, stands are overstocked, with slow growth. Based on the number and size of trees to be removed, canopy closure would remain relatively high (40-70%). In addition, within the riparian reserves where harvest is proposed, a "no treatment zone" or "riparian zone" would be established where harvest would not occur. This zone goes to the slope break: in most instances it is over one half of the riparian reserve width. This removes the likelihood of any negative impacts to stream associated species (Cope's giant salamander (see discussion in Aquatics and Hydrology regarding

sedimentation potential)), and also assists in providing protection for streamside associated species (harlequin duck). In the short term, the treatment of vegetation in the riparian reserves should have no effect on bald eagle forage use of East Fork or Polallie creek.

Disturbance to riparian associated species may occur as a result of implementation of the proposed action. In particular, harlequin duck activity along Polallie creek and East Fork would be impaired if activities occur during the breeding period. The brush conversion along Polallie creek, and the helicopter logging (including flights all along East Fork) would result in a "may impact individuals, but not likely to lead towards a loss of viability or a trends towards Federal listing" due to the disturbance associated with this activity. In addition, bald eagle forage use of these same streams would be impaired if logging activity should occur during the spring or later fall months. Based on the poorer quality forage available within this section of East Fork, and the low and transitory use of this planning area by bald eagles, this project is considered to "may effect, not likely to adversely effect" bald eagles.

A helicopter landing pad and log deck would be constructed within the riparian reserve across from the intersection of Highway 35 and the Cooper Spur road. Creation of this deck/pad would require the removal of less than 1/4 acre of small (1-3" DBH) lodgepole pine which have pioneered this rocky, disturbed area. This intersection has experienced major flooding, due to upstream debris slides from rain on snow events (upstream, no logging has occurred within the drainage). This consistent disturbance has not allowed for vegetation to re-establish, except for sporadic lodgepole pine. Current functionality within this section of the reserve for mature forest and/or riparian associated wildlife species is non-existent. The proposed activity would have a very small negative effect upon this functionality: proposing the landing/pad within this area appears to maintain the current poor functionality of the area. This site would not negatively impact any riparian associated wildlife species, except for the disturbance associated with the logging and flights.

In the long term, effects to these riparian associated species would be neutral or beneficial. The riparian thinning of 29 acres should be a positive, small scale impact. All in-stream and stream-side species would benefit from the increased complexity and growth expected within these 29 acres. Bald eagles would benefit from this riparian treatment, as well as upslope treatments designed to increase tree size and complexity. Of greatest possibility for long term benefit are the shelterwood and regeneration harvests, which may actually, in the long run, help to establish/grow larger trees above the surrounding canopy layer, owing to the 15% of the stand retained post-harvest. Bald eagles often nest in trees such as this, when the undergrowth trees are of mature size/age.

Cumulative Effects

Cumulative effects will be discussed in two different ways: 1) The Endangered Species Acts (ESA) requires an assessment of effects of non-Federal activities, reasonably certain to occur within the action area (Joint Regulations, 402.02), upon threatened or endangered species; 2) NEPA requires a disclosure assessing the cumulative effects of past, present, and foreseeable future activities on all land ownerships (Federal, non-Federal) (from Forest Service Handbook, 1909.15-65.1, 1508.7). This discussion will first include an assessment of those activities that may occur within the future on non-Federal lands, and then will bring in an assessment of potential future Forest Service actions.

Endangered Species Act

In the foreseeable future, the Forest Service is not aware of any non-Federal projects within the general scope of the project area.

NEPA

The Forest Service has a few planned activities in the foreseeable future: 1) Evans Timber sale. This 24 acre sale is just to the northwest of the planning area. The sale would be clear-cut harvested in accordance with the Oregon Forest Practices Act, due to the fact that this is actually Hood River County land (from a land exchange). 2) The Clear Planning Area, scheduled for planning in 1999 and 2000, is also to the northwest of Polallie/Cooper. The eastern portion of the planning area overlap the "connectivity corridor" described in Chapter 3. In addition, 1 other project may occur within the "connectivity corridor" adjacent to Polallie/Cooper, 3) Tilly Jane fuels.

Short term impacts to mature forest down log and snag associated species are anticipated through these activities, as are impacts to spotted owls, deer and elk, and wolverine. Mature forest would be thinned or removed under all four proposed activities. In Tilly Jane fuels, a reduction in snag levels and down logs may occur to reduce the fire potential in these areas. In Clear and Tilly Jane fuels, 100% biological potential within the "connectivity corridor" for species tied to down logs and snags is proposed for retention. This proposal would reverse a previous cumulative trend which has provided less than 40% of the biological potential for early seral associated cavity nesting species throughout the general scope of the project area. Thinning of mature forest, with a high retention of snags and logs is expected to produce long term benefits to mature forest associated species. Short term, habitat quality would decrease, or in some cases, be removed (Evans, which would remove 24 acres of habitat).

When taken together, including the past removal of mature forest habitat, and snag and down log components, there are adverse effects to all of the wildlife species discussed in Chapter 4. However, it is important to weigh these adverse cumulative effects against the larger scale, to determine potential impacts to viability.

All of the Federal actions discussed in this section (except the Evans Timber sale) conform to the "Record of Decision for Amendments to the Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl", a strategy designed to maintain the viability of riparian de?pendent and late-successional associated species. This strategy is based on maintaining large blocks of late successional habitat (Late-Successional Reserves: LSRs), connected through a network of Riparian Reserves (buffering along stream lengths), and Wilderness Areas. Therefore, spotted owls, and those species associated with down logs and snags in mature forests have their viability insured by managing in compliance with the ROD. Much of the impacts to both wolverine and deer/elk through Forest Service actions are disturbance oriented, and short term in duration. Some of these effects can be mitigated through seasonal operating restrictions and road closures. The projects should not cumulatively affect the continued viability of these species. In addition, since early seral cavity nesting species would be managed on this portion of Federal land at the 100% biological potential, continued loss or deficiency of this habitat should be reversed though these projects, and more habitat would be provided for these species, to insure their continued presence in the general project area into the future.

4.7 Heritage Resources

The National Historic Preservation Act and the National Environmental Protection Act both require consideration be given to the potential effect of federal undertakings on historic resources (including historic and prehistoric resources). The guidelines for assessing effects and consultation are provided in 36CFR800 and Forest Service Manual 2361. To implement these Region 6 of the USFS entered into an agreement with the Oregon State Historic Preservation Office and the Advisory Council on Historic Preservation. In accordance with this agreement a cultural resource evaluation was conducted for the project.

What are the effects of the proposed action on historic resources located within the planning area?
The effects of projects are evaluated only on those sites that are listed on or are determined eligible to the National Register of Historic Places. However, until a determination is made (by consultation with the State Historic Preservation Office), all sites are treated as if they were eligible (Forest Plan FW-600 and FSM 2361). When applying the effects criteria, direct, indirect, and cumulative effects are considered. All effects are considered long term, for example the operation of equipment near the Warming Hut would produce an audible intrusion but since this would not be continuing over time it would not alter the characteristics of the site. In addition the potential effects from the proposed action are both irreversible and irretrievable.
Standard and Guideline: The Mt. Hood Forest Plan (FW-615) and Forest Service Manual 2361 suggest that the threshold of significant effect to cultural resources is an ``adverse effect'' determination.

Effects of Alternative 1 - No Action

The Cooper Spur Warming Hut (**Photo 4-5)** is the only site that would be affected by the No Action alternative. The existing stand of timber poses a fire hazard threatening the National Register eligible structure. The shelter originally had an open setting. The encroachment of small trees over the last 40-50 years has resulted in a cumulative change in the shelters setting and has also created a slight change in the environment of the shelter. This environmental change is an increase in the shade and moisture retention. Over time (cumulative) this has and would continue to accelerate rot. The small trees adjacent to the shelter are suspectable to wind throw and have the potential to fall onto the shelter causing damage to the structure.

Indirectly and cumulatively the lack of timber harvest would continue to accelerate moisture damage to the shelter. In the short and long term, not removing the encroaching trees may result in direct damage to the shelter from trees falling onto it, resulting in an adverse effect (36CFR800.9(b)(4). Additionally there is an increased potential for fire which could result in a total loss of the site.

/.../cell1.f6.r6.fs.fed.us/fs/fsfiles/unit/hr_terra/polallie/wmsh-2.bmp: No such file or directory

Photo 4-5 Cooper Spur Warming Hut showing tree encroachment.

Effects of Alternative 2 - Proposed Action

Six sites are located in proposed activity areas. These are the Cooper Spur Warming Hut, Don's Cabin the Homestead Inn, Homestead #150, Homestead #152, and the Glacier Ditch . The proposed activities would result in damage to the physical remains of these sites resulting in an ``Adverse effect'' as defined in (35CFR800.9(b)(1). Additionally, the timber harvest near the Cooper Spur Warming Hut would change its' setting and therefore would result in an effect. However, since this change would result in a restoration of the original setting and would reduce the ongoing and potential adverse impacts to the structure this effect would be beneficial and not adverse.

By following the mitigation measures and guidelines listed in Appendix E for the ditch, homesteads and cabin remains, these sites would meet the criteria of "no effect".

4.8 Scenery Resource

This section addresses the effects of the proposed project on the scenic qualities of the project site. Policies for protection and enhancement of the scenery resource are contained in the Mt. Hood Forest Plan in the section titled "Visual Resource Management".

What are the effects of management activities on the natural appearing characteristic landscape as seen from critical viewpoints?
The primary criteria for determining the project's effect are the Visual Quality Objectives (VQOs) that would result from the proposed action. The method used to determine achievement of a specified VQO is to evaluate the proposed alterations in relation to the existing natural appearing landscape in terms of scale, size, extent; and amount of contrast in form, line, color and texture, as observed from one or more critical viewpoints. This method relies primarily on professional judgment because there are no quantifiable interval measurements that can be used as thresholds. Failure to achieve the VQO specified is an "adverse' effect; achievement of the VQO is a "neutral" effect; and achievement of a higher VQO is a "beneficial" effect. VQOs and their definitions are as follows:
Retention: management activities/human alterations should not be visually evident to the casual visitor.
Partial Retention: management activities/human alterations should remain visually subordinate to the natural appearing landscape.
Modification: management activities/human alterations may visually subordinate the natural appearing landscape, but they must borrow form line, color and texture from that characteristic landscape.
Standard and Guideline: FW-552 though 557; 560-571; 576; 581-583; 584-589

Effects of Alternative 1 - No Action
No negative visual impacts would occur as no activities would be initiated. However, if overstocked stands on the east side of Highway 35 remain untreated, the large ponderosa pine would become less visually noticeable, as the understory of Douglas and grand fir begin to dominate, and the stands become susceptible to insect/disease and/or fire thus reducing the scenic integrity of this area.

Effects of Alternative 2 - Proposed Action
Regeneration Treatments*:* this prescription would create three openings ranging from 4 to 14 acres in size which are located in areas that are vegetatively and/or topographically screened from viewpoints along Hwy 35 or Rd 44. These units would meet the Modification Visual Quality Objective (VQO).

Shelterwood (w/reserves) Treatments*:* this prescription would create textural changes in the landscape that would not be evident in middleground views; foreground views would be mitigated as discussed in Appendix E. VQO's ranging from Retention to Modification would be met.

Commercial Thin Treatments*:* this prescription would create subtle textural changes in the landscape that would not be evident. VQO's ranging from Retention to Modification would be met.

Improvement Treatments*:* this prescription would remove the smaller diameter conifers (mostly grand fir) that have accumulated over time as fire has been excluded from these landscapes. The large (>20 inch diameter) ponderosa pine, Douglas-fir, larch, etc. would be retained (also retained would be the larger grand

fir >30 inch diameter). This would create a stand similar to what would occur here if frequent, low intensity fires were allowed in this area.

This would visually create a landscape slightly more open than presently exists (irregular spaced, small scale open areas occur now). The texture would change to one that is more course. These changes should meet the far foreground VQO of Retention which requires activities to "not be evident to the casual forest visitor".

Mosaic Variable Thin Treatments*:* this prescription would create textural changes in the landscape that would not be evident in middleground views; foreground views would be mitigated as discussed below. VQO's ranging from Retention to Modification would be met.

Fuels Reduction Treatments*:* this prescription would create subtle textural changes in the landscape that would not be evident. VQO's ranging from Retention to Modification would be met.

Brushfield Conversion Treatments*:* This prescription would create subtle textural changes in the landscape that would not be evident. VQO's ranging from Retention to Modification would be met.

Shaded Fuel Break Treatments*:* this prescription would create subtle textural changes in the landscape when viewed from middleground distances; from foreground views small openings and textural changes would be more visually evident. Irregular shaped islands of vegetation within the fuel break and textural feathering of edges would aid in meeting scenery needs. VQO's ranging from Partial Retention to Modification should be met.

Viewpoint Enhancement*:* this activity would have no negative visual impacts. Stumps created by removing trees would be flushcut (if not screened by vegetation, they would be covered by slash/debris).

Tree Planting Treatments: this activity would have no negative visual impacts. Where ecologically suitable, the planting of western larch would enhance the scenery resource due to its spring and fall color contrasts.

Aerial Fertilization Treatments: this activity would have no negative visual impacts.

All activities should be compatible with the desired future conditions proposed in the "Highway 35 Viewshed Management Guide".

Cumulative Effects

Proposed activities would not create visually disturbed areas (created openings) that are visible from the critical viewpoints as seen from Hwy 35 and Rd 44. Therefore, the Visually Disturbed Analysis (FW 562-566) is not required.

4.9 Recreation/Social/Infrastructure

Would fuels reduction adversely degrade the development potential of Cooper Spur Permit area?

Standard and Guideline: Guideline A11-045 states that prescribed fire may occur to achieve desired vegetative conditions. In the absence of an approved master plan, desired condition is a healthy forest stand.

Effects of Alternative 1 - No Action
The No Action Alternative has a higher risk of wildfire. The development potential of the Cooper Spur Permit area could be degraded if an intense fire were to burn through the area. The visual quality of the stand would decline, and the sheltering and snow retaining effects of a mature stand of trees would be lost. In the long term fire potential would continue to increase, placing the permit area at higher risk.

Effects of Alternative 2 - Proposed Action
There would be a beneficial effect on the development potential of the Cooper Spur Permit Area by reducing the fire potential, both in the immediate area by reducing fuels, but more importantly in the general planning area. The greatest risk to the permit area is from catastrophic fire, which is most likely to start outside of the permit area and burn into it. The development potential of the Cooper Spur Ski Area would be enhanced through reduction in fire potential. Fuels treatment would not effect any future ski run or facility development.

Would trails or recreation facilities closed or damaged during timber harvest operations.
Standard and Guideline: FW-458 and FW-463 state that forest management activities with the potential to adversely impact trails and other recreation sites shall includes measures to minimize impacts and provide for protection or restoration, or relocation.

Effects of Alternative 1 - No Action
This alternative would have no effect on closure or damage to trails and other recreation facilities from harvest activities. Intense fire would result in damage to the trail tread on trails within the planning area, increased maintenance costs, and reconstruction costs. The Cooper Spur Warming Hut and associated trail would be more at risk for damage from fire. In the long term fire potential would continue to increase, placing the trails at higher risk.

Effects of Alternative 2 - Proposed Action
This alternative would result in the closure of the Dog River, Surveyors Ridge and Zig Zag Trails during harvest. These are the only three trails in the area anticipated to be closed. The Dog River and Surveyors Ridge Trails are very popular, and users would be diverted to other trails on the district. The East Fork Trail was recently reconstructed and can handle most of the displaced users, but users seeking a steeper trail, such as Dog River, would have to go elsewhere. Two other new trails are scheduled for completion this year on the District, that can accommodate displaced users. Hood River County lands also have trails. Some damage may occur to the trail tread surface from falling and yarding operations. The trail damage would be repaired by the timber purchaser. Polallie Trailhead and picnic area may be closed during harvest operations. Tamanawas Trailhead is available as an alternate access to trails. The Cooper Spur Warming Hut and associated non-system trail receives mostly winter use and there would be little effect to the improvements and recreation experience if protected during harvest.

Long Term effects to all trails within the planning area would be a reduction in the risk of intense fire which would damage the trails. The recreation experience at the Cooper Spur Warming Hut would be enhanced by reduced risk of fire and more open conditions in the surrounding forest.

Would harvest, or deferral of harvest, have consequences for the social and economic structure of the Hood River Valley?

Effects of Alternative 1 - No Action
The short term effects on social and economic issues would be a lack of raw materials supplied to local mills and a foregone opportunity to provide employment in harvest operations. Social factions representing conservation views would possibly favor delay of harvest. Social factions favoring commodity extraction would have negative views about delaying harvest. Scenic vistas from Highway 35, Forest Road 44, and trails in the area would not be altered or cause a degradation of the quality of life for local residents, or the amount of tourism which contributes to the local economy.

With a timber program of this size, it is difficult to determine a long term effect of no harvest on society or the economics of an area. The effect on society would be negligible, or no effect. Trends leading to a significantly smaller sale program would reduce wood products, thus increased costs, and reduce the potential job opportunities in wood product manufacturing if the sale reduction were regional in scale. The long term forest heath decline could cause a degradation of the scenic view for drivers and hikers, with a resulting minor decrease in the quality of life for local residents, and attraction of the area for tourists. Social factions representing conservation views could be concerned about the decline in forest health. Social factions representing commodity extraction would be concerned about not harvesting trees that were dead or dying, and the loss of potential growth.

Effects of Alternative 2 - Proposed Action
The wood products manufacturing sector of the local economy would be favorably influenced by the harvest, which would amount to one and one half years of the programmed timber harvest quantity for the Hood River Ranger District. Anticipated revenues, after expenditures, from the timber sale receipts are estimated to be $1,394, 302. Driving for pleasure and tourism would have slight negative effects from the harvest activity. Social factors favoring commodity extraction would favor harvest. Social factors favoring conservation may have concerns over harvest, but may favor forest health goals. Some people who participated in scoping expressed a desire to have natural processes occur in the area, including large scale fire and insect and disease, and did not favor any harvest.

A single timber sale would not influence either the economic condition of an area, nor would it effect the local community. Because the scale of the proposed action is very small in the total economics of the region, there is no negligable effect. Social factors favoring conservation and commodity extraction might be pleased with the improved forest health and increased productivity of the area. Tourism and wood products industries would be favorably effected by healthy forest stands for scenery and future harvest potential.

4.10 Other Disclosures

Compliance with Executive Order 12898 Regarding Environmental Justice

On February 11, 1994, President Clinton issued the Executive Order on Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (Executive Order 12898). In accordance with this order, the proposed action has been reviewed to determine if it would result

in...disproportionately high and adverse human and environmental effects on minorities and low income populations.

A public information effort to inform and involve the potentially affected and interested individuals, agencies or organizations occurred (reference section 1.5). No specific concerns regarding minorities or low income families were identified during the public information process.

Compliance With the Farmland Protection Policy Act

The Farmland Protection Policy Act does not apply to National Forest System Land.

Compliance With the Clean Air Act

The fuels treatment method proposed in this planning area may temporarily affect local air quality. Prescribed burning of any magnitude has the potential to degrade air quality over areas for short periods of time. The principal impact on air quality from prescribed burning is the temporary visibility impairment caused by smoke to the recreational Forest users. Past experience has shown that significant air quality declines are limited in scope to the general burn area and are of short duration. Most significant impacts occur under strong, persistent inversions or stable air masses. Both these conditions do not comply with smoke management direction to minimize adverse effects. Effects on air quality would be minimal due to the burning being scheduled during periods of inclement weather, or primary burning seasons which is March through early June, and October through early December.

Compliance With the Clean Water Act

Water quality best management practices (BMPs) are the primary mechanism to enable achievement of water quality standards associated with the Clean Water Act. BMPs would be selected and tailored for site specific conditions to arrive at the project level BMPs for the protection of water quality (reference Mitigation Measures, Appendix E).

Section 319 of the Clean Water Act Amendments of 1987 requires that the States determine those waters that will not meet the goals of the Act, to determine those nonpoint source activities that are contributing pollution, and to develop a process of determining BMPs to reduce such pollution to the "maximum extent practicable". The Environmental Protection Agency has certified the Oregon Forest Practices Act and regulations as BMPs. The State of Oregon has compared Forest Service practices with State practices and concluded that Forest Service practices meet or exceed State requirements.

Unavoidable Adverse Effects

There would be unavoidable adverse effects to the northern spotted owl through implementation of the proposed action. Approximately 198 acres of spotted owl habitat would be removed, and 407 acres degraded as a result of this activity.

Threatened, Endangered, and Sensitive plant species

Region 6 Sensitive Plant Species Suksdorfia violacea, Suksdorf's rock-break, was found on rock cliffs in the planning area. This species and its habitat are outside of proposed project areas, therefore they would not be impacted. Field surveys for R6 Sensitive Plant species were conducted in June, July and August 1997, and May 1998. Surveys focused on identifying potential habitat for R6 Sensitive Plant species that are documented or suspected to occur on the Hood River Ranger District (including land added from the Bear Springs Ranger District). Surveys were conducted during the appropriate months necessary for definitive identification of species suspected to occur in the project area. There are no impacts to any TES plant species under either Alternative.

Northwest Forest Plan Survey & Manage Plant Species and Habitat

There are 354 plant species (lichens, mosses, liverworts, fungi, and vascular plants) listed in Table C3 (and supplements) of the 1994 Record of Decision (ROD) for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl (e.g. "Northwest Forest Plan"). Species listed in Table C3 require one of four levels of "Survey and Manage" protection.

The Forest Service has not previously been required to survey for fungi, lichens, mosses, and liverworts, therefore existing survey data for non-vascular plants is limited. Most vascular plants listed in the Northwest Forest Plan are also listed as Sensitive Plants by the Regional Forester. Surveys for Sensitive Plants have been conducted regularly as required under FSM 2670. Surveys for Survey and Manage species are not required for projects implemented before 1999.

Large scale surveys of the Polallie Cooper Planning Area were conducted in September 1997. No Survey and Manage plant species were located.

Riparian Reserves

Interim riparian reserve widths, outlined in the Northwest Forest Plan, were designated as final riparian reserve widths in the Polallie/Cooper planning area except where fish presence/absence surveys conducted in 1997 revealed interim widths were incorrect. The interdisciplinary team concluded most interim widths adequately encompassed the true riparian zone and zone of influence along stream channels in the planning area. Fish bearing stream riparian reserve widths along Tilly Jane and Doe Creeks were updated based on 1997 electrofishing surveys.

Based on a hydrologic, geologic, aquatic, wildlife, and soils input, the proposed action would meet or enhance the Aquatic Conservation Strategy objectives identified in the Northwest Forest Plan.

Present Net Value

The present net value of $1,394,302 is the difference between the present value of all present and future costs ($491,030) and the income ($1,885,332) at a 4% interest rate. A positive net value of $1,394,302 indicates that the proposed action furnishes a higher return than the selected interest rate of 4%.

Transportation/Roads

Road inventories and field reconnaissance of the area has been on-going over the last several years. Access and Travel Management Planning was completed for the Polallie Cooper area in 1995.

The road system is well established in this area. The Polallie Cooper Planning Area encompasses 11.8 miles of open road. The open road density for the area is 1.69 miles per square mile. This meets the 2.5 miles per square mile limit set by the Forest Land and Resource Management Plan (FW-208). There are 2.30 miles of closed roads. There are no seasonal closures inside the planning area. The road system in the planning area provides access for private residences. Highway 35 and the Cooper Spur road are a popular motor travel recreation route. Highway 35 is also used heavily as a commercial route through the area.

Under the Proposed Action approximately 4.1 miles of new road construction would be required to access stands for treatment. This would temporarily increase the open road density for the area to 2.28 miles per square mile. Obliteration would be specified for those new roads in which no future needs are identified. Road closures would occur on those new roads in which future use is anticipated. To help ensure that road closures are effective, berm/boulder placement and subsoiling of the first 100 feet of road would be used on all closures.

CHAPTER 5.0 CONSULTATION AND COORDINATION

US Fish and Wildlife Service

Consultation with the U.S. Fish and Wildlife Service on this project regarding potential effects to northern spotted owls was initiated on August 15, 1997. The assessment of effects to spotted owls was conceptual, based on a preliminary idea of the extent of the proposed action. At the time, a "may effect, likely to adversely effect" determination was made for the northern spotted owl, based on the presumption of the removal of 50 acres of owl habitat, degradation of 70 acres of owl habitat, the removal of 90 acres of dispersal habitat, and the degradation of 700 acres of dispersal habitat. Incidental take associated with the removal and degradation of all this habitat was requested. There were no effects identified to any other threatened or endangered species.

Consultation for the adverse effects to the northern spotted owl was completed on September 30, 1997. The U.S. Fish and Wildlife Service concluded that the proposed activities, in conjunction with all the projects in the Willamette Province which remove spotted owl habitat, would result in a "may effect, likely to adversely effect" to spotted owls and their habitat. They also concluded that "the FY 98 Habitat Modification Projects in the Willamette Province are not likely to jeopardize the continued existence of the spotted owl or result in adverse modification of spotted owl critical habitat." "Incidental take" of all spotted owl pairs associated with the project was granted, based on Forest Service compliance with the following Mandatory Terms and Conditions: For activities within a 0.25 mile radius (or further if deemed necessary by an agency wildlife biologist) of any known spotted owl activity center, a seasonal restriction would be in place between 1 March and 30 June (or later if deemed necessary by an agency wildlife biologist) for all activities associated with habitat modification that disturb nesting spotted owls and/or their habitat. This term and condition may be waived in a particular year if nesting or reproductive success surveys conducted according to the Service-endorsed survey guidelines reveal that spotted owls are non-nesting or that no young are present that year. Waivers are valid only until March 1 of the following year.

Even though estimates of northern spotted owl habitat to be degraded or removed were below actual figures determined during the planning process, these adverse effects, and the total amount of habitat removed/degraded is still covered under the programmatic document described above (total acres removed/degraded for the entire Province and Forest are below those consulted on for FY98. As such, the additional acres degraded/removed in the Polallie/Cooper planning area has been taken into account through the consultation process. The Mt. Hood National Forest has sent a letter to the USFWS verifying this).

Informal consultation regarding the "not likely to adversely effect" determination made to bald eagles was initiated on July 28, 1998. Results of consultation regarding these impacts will be completed prior to the signing of the Decision Notice, and will be included in that document.

Consultation on bull trout is not required with U.S. Fish and Wildlife Service due to the No Effect determination.

National Marine Fisheries Service

Consultation with the National Marine Fisheries Service has been initiated for Mid-Columbia River steelhead trout . The consultation period began on July 1, 1998 but the agency has not responded to date.

State Historic Preservation Officer

Consultation as required by the National Historic Preservation Act was accomplished in accordance with 36CFR800 following the guidelines established by the 1995 Programmatic Agreement between Region 6 of the Forest Service, Oregon State Historic Preservation Office, and the Advisory Council on Historic Preservation. This is documented in cultural resource report # 98/06/03.

CHAPTER 6.0 LIST OF PREPARERS

The following individuals took part in preparing and/or reviewing this EA:

Name	Title
Arthur Guertin	Co-Team Leader
Bruce Holmson	Silviculturist/Co-Team Leader
Gary Asbridge	Fisheries Biologist
Rob Huff	Wildlife Biologist/Writer/Editor
Susan Nugent	Botanist
Jim Neighorn	Transportation Planner
John Dodd	Soil Scientist
Larry Bryant	Hydrologist
Grady Caulk	Zone Archaeologist
Heidi Hubbs	Fire/Fuels Specialist
Gary Loeffler	Landscape Architect
Kevin Slagle	Recreation Planner
Rick Ragan	Hydrologist
Doug Anderson	Geologist
Kim Titus	District Ranger, Hood River Ranger District
Mike Redmond	NEPA Coordinator, Mt. Hood National Forest

APPENDICES

APPENDIX A: Biological Evaluation for TE&S Botany Species

R6 SENSITIVE PLANT SPECIES BIOLOGICAL EVALUATION
SUMMARY OF EFFECTS DETERMINATION

Project: POLALLIE COOPER

SPECIES	HABITAT NOT PRESENT	No Action Alt. 1	Alt. 2
1. *Agoseris elata*	x	NI	NI
2. *Arabis sparsiflora* var. *atrorubens*	x	NI	NI
3. *Botrychium lanceolatum*	x	NI	NI
4. *Botrychium minganense*	x	NI	NI
5. *Botrychium montanum*	x	NI	NI
6. *BotrVchium pinnatum*	x	NI	NI
7. *calamagrostis breweri*	x	NI	NI
8. *Calochortus longebarbatus* var. *longebarbatus*	x	NI	NI
9. *Carex livida*	x	NI	NI
10. *Coptis trifolia*	x	NI	NI
11. *Corydalis acruae-gelidae*	x	NI	NI
12. *Diphasiastrum com-olanatum*	x	NI	NI
13. *Huiperzia occidentalis*	x	NI	NI
14. *Lewisia Columbiana* var. *Columbiana*	x	NI	NI
15. *Lomatium watsonii*	x	NI	NI
16. *Lycopodiella inundatum*	x	NI	NI
17. *Ophioglossum ousillum*	x	NI	NI
18. *Phlox hendersonii*	x	NI	NI
19. *Potentilla* var. *iparviflora*	x	NI	NI
2O. *Ranunculus reconditus*	x	NI	NI
21. *Romanzoffia thomosonii*	x	NI	NI
22. *Scheuchzeria palustris* var. *americans*	x	NI	NI
23. *Scribnaria bolanderi*	x	NI	NI
24. *Streptopus streiptopoides*	x	NI	NI
25. *Suksdorfia violacea*	*	NI	NI
26. *Sisrvnchium sarmentosum*	x	NI	NI
27. *Utricularia minor*	x	NI	NI

NI = No Impact To Individuals or Habitat

RATIONALE FOR EFFECTS DETERMINATION:

Field surveys for R6 Sensitive Plant species were conducted in June, July, and August 1997, and May 1998. Surveys focused on identifying potential habitat for R6 Sensitive Plant species listed above that are documented or suspected to occur on the Hood River Ranger District (including the lands added from the Bear Springs Ranger District). Surveys were conducted at the appropriate time of year to identify the species suspected of occurring in the project area.

***Suksdorfia violacea** was found on rock cliffs that are outside of proposed project areas. This species and its habitat would not be impacted by activities proposed in the Polallie Cooper Planning Area.

- Contract clause C6.25# (11/80) would be included in the logging contract. This clause provides for the protection of any sensitive species that might be found after the sale has been sold.

APPENDIX B: Biological Evaluation for TE&S Wildlife Species

R6 WILDLIFE TES SPECIES BIOLOGICAL EVALUATION
SUMMARY OF EFFECTS DETERMINATION

Project: POLALLIE COOPER

SPECIES	HABITAT NOT PRESENT	No Action Alt. 1	Alt. 2
1. *Spotted frog*	x	NI	NI
2. *Larch Mountain* salamander	x	NI	NI
3. *greater sandhill crane*	x	NI	NI
4. *Townsend's big-eared bat*	x	NI	NI
5. *black rosy finch*	x	NI	NI
6. *California wolverine*		NI	MII
7. *northern spotted owl*		NI	MELA
8. *Peregrine falcon*		NI	NI
9. *Bald eagle*		NI	MENLA
10. *Harlequin duck*		NI	MII
11. *Canada lynx*		NI	NI
12. *red-legged frog*	x		
13. *Cope's giant salamander*		NI	NI

NI = No Impact/Effect To Individuals or Habitat
MII = May impact individuals, but not likely to lead towards loss of viability or trend towards Federal listing
MENLA = May effect, not likely to adversely effect
MELA = May effect, likely to adversely effect

APPENDIX C: Biological Evaluation for TE&S Fisheries Species

R6 TES AQUATIC SPECIES BIOLOGICAL EVALUATION
SUMMARY OF EFFECTS DETERMINATION

Project: POLALLIE COOPER

SPECIES NAME	Legal Status	Species Present	Habitat Present	ALT 2 Prop. Actio
Columbia River Bull trout *Salvelinus confluentus*	T	No	Potentia	NE
Lower Columbia River steelhead *Oncorhynchus mykiss*	T	Yes	Yes	NLAA
Lower Columbia River chinook *Oncorhynchus tshawytsha*	PT	No	Potentia	NE
Lower Columbia River chum *Oncorhynchus keta*	PT	No	Potentia	NE
Lower Columbia River coho *Oncorhynchus kisutch*	S	No	Potentia	NI
Redband/ inland rainbow trout *Oncorhynchus mykiss gairdneri*	S	No	Potentia	NI
Lower Columbia River cutthroat trout *Oncorhynchus clarki*	S	Yes	Yes	MIIH
Cascades Apatanian caddisfly *Apatania tavala*	S	?	Potentia	NI
Mt. Hood Farulan caddisfly *Farula jewetti*	S	?	Potentia	NI
One-spot rhyacophilan caddisfly *Rhyacophila unipunctata*	S	?	Potentia	NI
Mt. Hood primitive brachycentrid caddisfly *Eobrachycentrus gelidae*	S	?	Potentia	NI

KEY:
T = Threatened species
PT = Proposed threatened species
S = Sensitive species
NI = No Impact
MIIH = May Impact Individuals or Habitat, but will not likely contribute toward Federal Listing or loss of viability to the population or species.
BI = Beneficial Impact
NE = No Effect
NLAA = May Affect, Not Likely to Adversely Affect
LAA = May Affect, Likely to Adversely Affect.

APPENDIX D: Response to questions received to October 3, 1998, scoping letter

ROADLESS AREA ENTRY

*Both Chief of the FS Domback and Governor Kitzhaber agree stating clearly that logging in roadless areas and areas of controversy should be avoided. It seems that the Polallie/Cooper area fits into this criteria. Why are you not following this policy? (5)

Chief Dombeck has stated that this was not a "top-down policy dictum from Washington". The Governor was referring to roadless areas, riparian reserves, and old growth areas. The Polallie/Cooper proposed action avoids entry into designated roadless areas and the cutting of old growth. It does propose to treat 29 acres of riparian reserves for the purpose of maintaining and restoring these areas to meet the Aquatic Conservation Strategies as outlined in the NW Forest Plan.

*It appears that some entry is planned for an inventoried roadless area. Is this true? (5)

No entry/activity into a inventoried roadless area, as identified in the Mt. Hood Forest Plan (Appendix C), is proposed.

ROADS

*If the FS can't afford to maintain current roads, why build new ones, especially in roadless unprotected wilderness? (5)

No roads will be located in a designated roadless or wilderness area.

*How effective have past road closures been in the Mt. Hood National Forest? What studies and updates have been done to prove that these roads, in effect, have actually been closed? (10)

While no official studies have been done, successful road closures, in the past, have been mixed, depending on how the roads were closed. The most successful road closure have been with obliteration, and/or berming the entrance with a mound of dirt. The proposed action specifies berming the entrance and obliterating the first 100 feet of all temporary road surfaces .

*What will be the effects/impacts of new roads building? (11)

Refer to Chapter 4 (Geology, Soils, and Water Resources, Aquatic Resources, and Wildlife Resources) of the EA.

*Are there any alternatives to building more new roads? (11)

Helicopter logging is another alternative, but is more costly as is the post-sale treatments (fuels reduction, reforestation, etc.) that are required without access roads. Refer to Chapter 2.3 (Alternatives

Eliminated From Detailed Study) of the EA on why the proposed no road construction alternative was eliminated from detailed study.

SILVICS

*How many trees per acre will be left after thinning? (5)

In the proposed commercial thinning areas approximately 70-135 trees per acre will be retained after harvest.

*What is meant by "improvement cut harvest"? On this 439 acres of timber stand, how many trees will be cut and how many are estimated to be left per acre after thinning? (5)

A improvement cut is a harvest made in a timber stand, that is past the sapling stage (trees greater than 5 inches diameter DBH), primarily to improve the composition and quality of the area by removing the less desirable trees of any species. The following tentative guidelines will be used on the 407 acres of improvement cut:

- No harvest of any Douglas-fir, ponderosa pine, western white pine, western larch, Englemann spruce, western red cedar, western hemlock or lodgepole pine greater than or equal to 20 inches diameter (DBH). No harvest of any grand fir greater than or equal to 30 inches in diameter (DBH).

- Harvest all conifers (<20 inches diameter (DBH) within 25 feet of the base of a big tree. A big tree is defined as any Douglas-fir, ponderosa pine, western white pine, western larch, Englemann spruce, western red cedar, western hemlock or lodgepole pine greater than or equal to 20 inches diameter (DBH) or any grand fir greater than or equal to 30 inches in diameter (DBH).

- In areas void of big trees or between scattered big trees, thin the trees to an approximate spacing of 18 feet by 18 feet.

*Will any old growth stands be cut? (11)

No old growth stands, as defined by "Region 6 Interim Old Growth Definition", June 1993, will be cut.

*Will this action create an opening of greater than 60 acres, which would exceed the standards set forth by the Regional Guide? (11)

No.

*How can logging improve the health of the remaining trees when it has been shown to be more harmful than just leaving the trees intended for thinning? (11)

Refer to Chapter 4.4 (Timber Resources) of the EA.

*This brush (fields) provides important food and cover that thinned conifer forest will not. Isn't a mosaic of vegetation better for biodiversity than large areas of thinned conifers which seems to be a management goal? (17)

Yes, a mosaic of vegetation is usually better for biodiversity. Four of the eight brushfields within the planning area will be retained in the proposed action. In the brushfields proposed for treatment, a diverse conifer species mix will be planted in the understocked areas. In the short term, the brush will be a significant component within these stands until conifer canopy closure.

AQUATIC RESOURCES

*Have surveys been conducted to include interim streams? (10)

Intermittent streams are not usually surveyed or part of the Mt. Hood N.F. stream survey program. However, intermittent streams were assessed in the planning area during the planning process and mitigation measures have been developed to include no cut buffers on both perennial and intermittent streams. Refer to Chapter 4.3 (Aquatic Resources) of the EA.

*What will the impact be on the Riparian Reserves? (11) What will be the impact on the riparian zones within the projects? (11)

Refer to Chapter 4 of the EA.

*What will be the affect of these actions on an already stressed viewshed and watershed? (11)

Our landscape architect describes the viewshed (Chapter 3.8 Scenery Resource) of the EA as moderate to high scenic Integrity (slightly altered to natural appearing). The hydrologist states that the Aggregate Recovery Percentage (ARP) for the subwatersheds are greater than 95% (Chapter 4.2 Geology, Soils, and Water Resources). A Threshold of concern would be below 65%. Both of these reports indicate that the viewshed and watershed are not stressed. Refer to Chapter 4 of the EA for the effects of the alternatives.

*What impact will aerial fertilization have on existing streams? Have you analyzed other methods to determine which alternative would be least intrusive and polluting? (11)

Refer to Chapter 4.2 (Geology, Soils, and Water Resources) of the EA. No riparian reserves would be fertilized.

*What was the effect of the 1996 floods? (11)

Flooding did not have a large impact on streams within the planning area. Four damaged sites, within the Polallie/Cooper Planning Area, were recorded. Two were documented on small portions of the existing trail system and two were associated with Hwy 35.

*What would the impacts be on the East Fork of the Hood River, which runs right along Highway 35? (11)

Refer to Chapter 4 of the EA.

*What will be the impact to salmonid species including, salmon, steelhead, and bull trout? (11)

Refer to Chapter 3.3 (Aquatic Resources) and 4.3 (Aquatic Resources) of the EA.

*Would it not be easier to prevent salmon listing under ESA by taking care of them now instead of later? (11)

Proposed activities presented in Alternative 2 have been assessed for their potential to lead towards the loss of species viability. Consultation with both the USFWS and NMFS has occurred, and verbal documentation of the effects of the proposed actions upon TES fish species has concluded that the proposed action is consistent with strategies designed to maintain viability of these species.

*Has the Forest Service looked at the potential harm done to any fish species due to increased sedimentation and turbidity in surrounding lakes and streams? (11)

Yes, refer to Chapter 4.2 (Geology, Soils, and Water Resources) and 4.3 (Aquatic Resources) of the EA.

SOIL RESOURCES

*Is the land east of Highway 35 potentially unstable? (10)

Refer to Chapter 3.2 (Geology, Soils, and Water Resources) of the EA.

*Tractor logging will further contribute to soil compaction. Many timber sales now have to mitigate this soil compaction problem. Why contribute to it again now? (11)

Refer to Chapter 4.2 (Geology, Soils, and Water Resources) of the EA. The Mt. Hood NF Forest Plan standards and guidelines specifies that activity areas should not exceed 15 percent detrimental soil condition. Soil damage within the proposed units are predicted to remain below 15 percent.

*Does introducing nitrogen in this artificial way impact the normal functioning of soils, including the soil microorganisms like bacteria? Are trees truly healthier when we artificially induce faster growth than is natural? Perhaps when the tree puts its energy into faster growth with nitrogen input, other factors are changed in the tree, like resistance to diseases and insects. Do we have the answers? (17)

Refer to Chapter 4.2 (Geology, Soils, and Water Resources) and 4.4 (Timber Resources) of the EA.

WILDLIFE RESOURCES

*Are there any Northern Spotted Owl activity or roosting centers in or around the proposed action areas? (11)

Yes, refer to Chapter 3.6 and 4.6 (Wildlife Resources) of the EA.

*Can the mitigations for wildlife, such as adding woody debris, bird boxes, and blasting snags adequately replace the original forest habitat? (11)

Refer to Chapter 4.6 (Wildlife Resources) for a discussion on impacts to snag associated, mature forest species. No bird boxes are proposed as a mitigation. Adequate snag levels to provide for Forest Plan required levels will be retained through the proposed action.

*ONRC, NEDC and NEC would like to know what type of bird species are going to be impacted by the destruction of the forest? (11)

Refer to Chapter 4.6 (Wildlife Resources) of the EA, and the East Fork/Middle Fork Watershed Analysis and Landscape Analysis and Design.

*Will there be any impacts to Goshawks or Peregrine Falcon? (11)

Refer to Chapter 4.6 (Wildlife Resources) of the EA. The Goshawk is considered a mature forest associated species-as such, the discussion about spotted owl and the connectivity corridor is pertinent.

*What chance will wildlife, especially big game like deer and elk, have for survival without the protection and thermoregulation of the trees? (11)

Refer to Chapter 4.6 (Wildlife Resources). Deer and elk use of the area is mainly transitory (migration) and focused much on the west side of Highway 35. Different qualities of thermal cover should exist within this portion of the planning area to still insure adequate protection for migrating and dispersed summer deer and elk populations.

*Has there been an adequate assessment and count of indicator species? What are the numbers? Where are they located, and will the proposed action harm their habitat? Are there any endangered or sensitive species in this area? Will this adversely affect the possible reintroduction of Lynx? (11)

Refer to Chapter 4.6 (Wildlife Resources). A count of the indicator species has not been done. The proposed action would result in a short term adverse effect to the spotted owl and negative effects to pine marten and pileated woodpecker. At this time, the Hood River Ranger District knows of no plans to reintroduce lynx into the Mt. Hood National Forest.

VISUAL RESOURCES

*What will be the affect of these actions on an already stressed viewshed and watershed? (11)

Refer to Chapter 4.8 (Scenic Resources) of the EA. Same response as addressed in the aquatics question.

*What would the visual impacts of logging be? (11)

Refer to Chapter 4.8 (Scenic Resources) of the EA.

*Is the proposed area currently in violation of the Visual Quality Objectives set for in the Forest Plan? Would the proposed action cause you to be in violation of the VQO'S? (11)

No, refer to Chapter 4.8 (Scenic Resources) of the EA.

FIRE/FUELS

*What will the impact of the fuel abatement and fuelbreak be? (11)

Refer to Chapter 4 of the EA.

SOCIAL/ECONOMIC

*Why not create some very small sales to achieve your silvicultural objectives? I believe this approach would also strengthen the local economy, as well as the relationship between the Forest Service and the community. (15)

Good suggestion. The ranger district does have a demand for small sales and opportunities exist, within the proposed action, to help meet this demand.

*What is the probability that once it is logged a little (east of Hwy. 35), it will be fair game to be logged some more? Why is logging being considered here? If relatively low value logs are being removed by high cost heli-logging, who will gain? (15)

Once this area is treated, tree canopies will begin to close and within 20 years, it is anticipated that stand densities will again be high and another commercial thinning will be needed. Refer to Chapter 3.4 and 4.4 on why this area is proposed for logging. Because of the high stand density, within the lower/mid tree canopies, large acreage, sufficient harvest volume, and marketable conifer species, it is anticipated that this portion of the planning area is economic for helicopter logging.

*What percent of the Hood River Ranger District required "cut" will this planning unit represent? (17)

The proposed action harvest an estimated 12.8 MMBF of timber. The district probable sale quantity is approximately 8.0 MMBF of timber per year.

*In the EA, will you explore the option of dividing up the sales so there are many small ones? Could this be one of the alternatives? (17)

Tentatively, a minimum of three different timber sales are possible.

APPENDIX E: Mitigation Measures and/or Recommended Design Features

Mitigation measures are identified to avoid, reduce, or alleviate any potential adverse effects. Mitigation measures provide a means to minimize the full extent of the impacts associated with implementation of a proposed action. When the effects of mitigation are combined, the results are expected to limit the degree or magnitude of the proposed action, rectify impacts through repairing, rehabilitation, or restoring the affected environment, and reducing or eliminating impacts over time.

These measures or features were recommended by the resource specialists who worked on this planning project and represent recommendations to help reduce or eliminate impacts to the various resource issues discussed in this document.

The Decision maker for this project will determine whether or not to include these measures in the project design. That determination will be made/disclosed within the Decision document for this project.

* Log haul during very wet or dry periods should be evaluated on native surface roads, especially at or near stream crossings, to assess whether sedimentation into streams is, or may, occur. If sediment is being routed to streams, then hauling should be postponed until suitable conditions exist or consider low tire pressure during wet periods and dust abatement during dry periods. Only water should be used as a dust abatement medium.

* If spring application of fertilizer, when soil moisture is at field capacity, is proposed, then application should occur after the snow has melted and before the soil has begun to dry significantly.

*If fall application of fertilizer is proposed, then the following conditions should be met:

-apply following the first significant fall rain (e.g.>1/2 " measured at Hood River).
-before the first snow in the planning area.
-no earlier than September 15 and no later than November 1.
-ground conditions are field verified to determine soil conditions.
-soils should be moist and sufficiently warm (70 degrees F air temperature) to ensure that roots are still active before winter dormancy.

* Although not many exist, maximize use of the old skid trails for harvest operations whenever possible to reduce soil compaction.

* Subsoil all skid trails, temporary roads (no longer needed in the future), and landings (including all helicopter landings in the proposed action) in the regeneration and shelterwood units so they can be included with the reforestation planting or seed in on their own.

* In commercial and mosaic variable thinning units where multiple entries are expected, skid trails should be mapped so they can be used again; and following harvest, they should be scarified, waterbarred and closed.

* Do not operate ground based equipment when soils are at or exceed field moisture capacity.

* West of Highway 35, leave as much organic matter on site without causing unacceptable fuel levels or hinder reforestation efforts (>25 tons per acre is desired).

* In the fuels reduction and shaded fuelbreak, when possible, retain large, woody material on the slope contour to reduce erosion should a wildfire occur in the future.

* East of Highway 35, maintain approximately 15 tons of organic matter per acre.

* All new road construction and/or road closures should be completed prior to the onset of the winter rainy season. Any roads planned for over-wintering should have functioning drainage and erosion control mitigations inplace.

* Minimize closure of trails and trailheads. Possible methods include leaving trails open on weekends, opening segments of trails (Dog River Trail from the 44-620 road to either trailhead). Purchaser to sign the trail closures at trailheads, indicating section closed, and expected duration. Place a sign at the Cooper Spur Warming Hut to advise users of the harvest operations, objectives, and mitigations.

* Protect Dog River, Surveyor Ridge, and Zig Zag trails, the Cooper Spur Warming Hut, and the nonsystem trail associated with the hut. Require the purchaser to clear and reconstruct system trails to standard after harvest. The nonsystem trail associated with the Cooper Spur Warming Hut should be reconstructed to the existing standard before harvest.

* Logging operations should be prohibited on weekends and holidays on Forest road 3510 and 3512.

* Traffic control and safety signing, meeting the standards within the Manual On Uniform Traffic Control Devices and meeting state highway requirements will be placed along all routes used during logging operations.

* The flight paths for all helicopter log landings will not be over personnel, equipment, structures, or roads open to the public.

* Directional fall trees away from no-cut riparian buffer areas to reduce vegetation and soil disturbance within the no-cut buffer. If a tree falls within the marked no-cut buffer area, only that section of the tree outside the buffer may be removed to eliminate the chance of disturbed soil and reduce erosion potential.

* No mechanized equipment (tractors, skidders, etc.) should be allowed within riparian reserves, with the exception of the proposed helicopter landing at the Polallie Creek/East Fork confluence, to reduce the amount of disturbed soil, potential erosion, and vegetation disturbance. ID Team review (or at least a watershed or fisheries specialist) should occur prior to equipment entry into riparian reserves to help design access to minimize impacts.

* The proposed helicopter landing within the riparian reserve to the south and west of Polallie Creek and East Fork Hood River, respectively, shall be rehabilitated upon completion of the logging operation. Rehabilitation should include shaping and subsoiling in compacted areas and planting of native vegetation.

* All helicopter log landing and service areas shall require use of water for dust abatement. Water from Polallie Creek, as opposed to East Fork Hood River, should be used for dust abatement at the helicopter landing because there appear to be fewer fish in Polallie Creek due to debris flows. Pumps will be screened to prevent fish access.

* Skid trails shall not cross perennial or intermittent stream channels to reduce erosion and maintain channel stability. If a skid trail crossing is required over an ephemeral draw, then a watershed of fisheries specialist shall be consulted prior to construction to help design the least impactive crossing.

* Perennial, intermittent or ephemeral channels shall not be used as skid trails to reduce erosion and maintain channel stability.

* If skyline logging is used across stream channels, then one end suspension, at a minimum, should be required to reduce impacts to stream channels.

* Reforestation will be by handplanting in order to have maximum control over species composition. Emphasize, western larch, western white pine, lodgepole pine, western red cedar, ponderosa pine (eastside), and Douglas-fir. Do not plant any Douglas-fir within 66 feet of the last visible evidence of Phellinus root rot pockets.

* Leave trees (thinning/improvement cuts and legacy trees) preference for retention should also emphasize tree species that have lower susceptibility to the root rot. Order of priority for retention is : western red cedar, western white pine, western larch, ponderosa pine, noble fir, lodgepole pine, western hemlock, pacific silver fir, mountain hemlock, Douglas-fir, and grand fir.

* All skyline cable units will require a slack pulling carriage for lateral yarding and residual stand protection.

* To prevent the buildup of the Douglas-fir bark beetle at the Mt. Hood viewpoint, remove 75% of the felled/topped green trees which have diameters of 10 inches or greater,

* Seasonally restrict operations associated with helicopter logging along East Fork to protect potential harlequin duck use of the area. Operations include all proposed project activity and construction. Restriction would be from April 15 to August 1, and would cover those activities on the east side of Highway 35, up to 0.5 miles from the river. Implementation of this restriction would effectively negate the negative effects described in Chapter 4.

* No brush cutting within 75 feet of Polallie and it's tributary to protect potential for harlequin duck habitat in this area. Conduct surveys to determine presence and absence. If species is absent, lift seasonal restriction could be lifted.

* Retain one slash pile per acre for wildlife needs within regeneration harvest units. Do not ignite or disperse.

* Mechanical and hand piles will be placed in such a way to insure minimal damage and impact to surrounding trees and vegetation.

* Approximately 40 percent of the activity fuels will be treated. In particular, along roadsides, trails, and within large areas of continuous concentrations of slash. Machine pile/burn and/or mechanical mastication on tractor ground. Handpiling/burn on cable and helicopter ground.

* To avoid an adverse effect determination to cultural resource sites 666EA0083, 666EA0085, 666EA0087, and 666EA0179, establishment of a 100 foot no activity buffer around the ruins and features associated with these sites.

While not formally adopted by the Mt. Hood National Forest, the guidelines established by the Programmatic Memorandum of Agreement for Historic Water Transportation Ditches for the Wallowa-Whitman National Forest (1984) provide a basis for the protection of the Glacier Ditch (666EA0050). These are:

* Falling and yarding trees immediately adjacent to the ditch will be directional away from the ditch. This guideline applies to commercial thinning as well as the harvest of mature timber.

* Hand bucking and piling of slash will be the only method used within the ditch corridor (50 feet from centerline). Slash may be hand piled immediately adjacent to, but not within the ditch.

* Skidding across the ditch should be restricted to designated skid trails located at previously disrupted segments and crossings. If skidding needs to take place across the ditch in a previously undisturbed segment, the ditch must be repaired to its pre-harvest configuration of banks and contour.

* All new road construction and landings should be routed away from the ditch corridor (50 feet from centerline).

* Tree planting may occur up to within five feet of the sides of the ditch, but no closer, or within the ditch itself.

* In order to protect the Cooper Spur Warming Hut from direct adverse effect from timber harvest all trees within one and a half tree height from the shelter will be directionally felled away from the shelter. Skidding within 100 foot of the shelter will be away from the shelter. Additionally to minimize future encroachment there will be no tree planting within 50 feet of the shelter. This will result in a determination of ``no adverse effect.

* These requirements will be incorporated in the sale design and marking guidelines. An archaeologist or cultural resource technician will assist in the marking of these features in the sale areas. Monitoring during the sale and after the sale will provide documentation that the procedures were followed and were successful.

* Along foregrounds of Hwy 35, Rd 3510, and Rd 3512, stumps will need to be flushcut up to 300 feet from Hwy 35; 150 feet from Rds 3510, 3512; leave tree density will also be increased in these areas (where vegetative or topographic screening is present, these distances can be reduced).

* Slash concentrations, beyond natural litter/down woody/soil needs, should be piled and burned beyond 150 feet or 300 feet or topo break from the roads discussed above (Highway 35, Rd 3510, Rd 3512).

* Along the foreground of the Dog River Trail (#675), stumps will need to be flushcut up to 150 feet from the trail (vegetative or topographic screening may reduce this distance); visually dominant stumps cutfaces should be covered with slash or dirt.

* Slash concentrations, beyond natural litter/down woody/soil needs, should be piled and burned beyond the 150 feet from the trail (#675) area discussed above.

* Along the foregrounds of Rd 3510 and Rd 3512, and possibly some foreground views from private residences, layout assistance for the shaded fuel break from a Landscape Architect would be beneficial.

APPENDIX F: References

Amaranthus, Michael P., and others. 1996. Soil Compaction and Organic Matter Affect Conifer Seedling Nonmycorrhizal and Ectomycorrhizal Root Tip Abundance and Diversity. USDA Forest Service Pacific Northwest Research Station. Research Paper PNW-RP-494. Portland, Oregon.

Arnebrant, Kristina, and others. 1996. Soil Microbial Activity in Eleven Swedish Coniferous Forests in Relation to Site Fertility and Nitrogen Fertilization. *In:* Scandinavian Journal of Forest Research 11:1-6.

Boyer, D., and H. Legard. 1973.

Burke, Monica. 1996. Social and Economic Assessment. pp. B-1 to B-12, East fork Hood River and Middle Fork Hood River Watershed Analysis. USDA Forest Service, Hood River Ranger District, Parkdale, Oregon.

Chappell, H.N., S.A.Y. Omule, and S.P. Gessel. 1992. Fertilization in Coastal Northwest Forests: Using Response Information in Developing Stand-Level Tactics. *In:* Chappell, H.N., and others, eds. 1992. Forest Fertilization: Sustaining and Improving Nutrition and Growth of Western Forests. University of Washington, Institute of Forest Resources Contribution #73. Seattle.

Csuti, Blair and others. 1997. Atlas of Oregon Wildlife. Oregon State University Press, Corvallis OR.

Evers, Louisa. 1996. Fire Ecology of the Mid-Columbia. Mt. Hood National Forest. Gresham, OR.

Hadfield, James S. 1985. Laminated Root Rot - A Guide for Reducing and Preventing Losses in Oregon and Washington Forests. USDA, Forest Service, Pacific NW Region.

Harvey, Alan E., and others. 1987. Decaying Organic Materials and Soil Quality in the Inland Northwest: A Management Opportunity. USDA Forest Service Intermountain Research Station Station, General Technical Report INT-225. Ogden, Utah.

Harvey, Alan E., and others, eds. 1994. Biotic and Abiotic Processes in Eastside Ecosystems: The Effects of Management on Soil Properties, Processes, and Productivity. USDA Forest Service, General Technical Report PNW-GTR-323. Portland, OR.

Heilman, Paul E.; Anderson, Harry W.; Baumgartner, David M. 1981. Forest Soils of the Douglas-fir Region. Washington State University Extension Service.

Howes, Steve. 1979. Soil Resource Inventory, Mt. Hood National Forest. Mt. Hood National Forest. Gresham, OR.

Miller, R.E. and L.V. Pienaar. 1973. Seven-year response of 35 year-old Douglas-fir to nitrogen fertilizer. USDA Forest Service Research Paper PNW-165. As reported in Chappell, Omule, and Gessel, 1992.

Minore, Don. 1979. Comparative Autecological Characteristics of Northwest Tree Species, A Literature Review. Pacific Northwest Forest and Range Experiment Station, Forest Service, USDA, GTR PNW-87.

Moore, J.A., and others. 1993. Nutrition and forest health. *In:* Baumgartner, D.M., ed. Interior cedar-hemlock-white pine forests: ecology and management: Symposium proceedings; March 2-4, 1993. Washington State University. Pullman, WA. As Referenced in Harvey and others, 1994.

Mt. Hood National Forest Land and Resource Management Plan. 1990. USDA, Forest Service.
and Management Planning Documents Within the Range of the Northern Spotted Owl. 1994. USDA/USDI, Forest Service/BLM.

Nason, G.E., and D.D. Myrold. 1992. Nitrogen Fertilizers: Fates and Environmental Effects in Forests. *In:* Chappell, H.N., and others, eds. 1992. Forest Fertilization: Sustaining and Improving Nutrition and Growth of Western Forests. University of Washington, Institute of Forest Resources Contribution #73. Seattle.

Olsen, E.A., R.A. French, and A.D. Ritchey. 1995. Hood River and Pelton Ladder evaluation studies. Annual Progress Report of the Confederated Tribes of the Warm Springs Reservation and Oregon Department of Fish and Wildlife to Bonneville Power Administration. Portland, OR.

Oliver, Chadwick D.; Larson, Bruce C. 1990. Forest Stand Dynamics. McGraw-Hill, Inc.

Oregon State Game Commision. 1963. The Fish and Wildlife resources of the Hood River Basin, Oregon and their water use requirements. PRogress report of the Oregon State Game Commisiion (Federal Aid to Fish Restoration, Fisheries Stream Flow requirements, Project F-69-R-1, Job Number 1) to State Water Resources Board, Salem, OR.

Public Law 94-588, October 22, 1976, National Forest Management Act of 1976.

Regional Guide for the Pacific Northwest Region. USDA, Forest Service, Pacific Northwest Region - Oregon and Washington; June 14, 1984.

Reukema, Donald L.; Bruce, David. 1977. Effects of Thinning on Yield of Douglas-fir: Concepts and some Estimates Obtained by Simulation. USDA, Forest Service, General Technical Report, PNW-58.

Reulema, Donald L.; Pienaar, Leon V. 1973. Yields With and Without Repeated Commercial Thinnings in a High-site Quality Douglas-fir Stand. USDA, Forest Service, PNW-155.

Sherrod, D.R., and Scott, W.E., 1995. Preliminary Geologic Map of the Mt. Hood 30- by 60-Minute Quadrangle, Northern Cascade Range, Oregon. USGS. Open File Report 95-219. pp 35 plus attached geologic map.

Thies, Walter G. and Sturrock, Rona N. 1995. Laminated Root Rot in Western North America. USDA, Forest Service, PNW-GTR-349.

Torland, Jim. 1997. District Wildlife Biologist. Oregon Department of Fish and Wildlife, The Dalles OR. Personal Communication. Telephone conversation with R.Huff, October 1997.

Turnau, K., and others. 1992. Mycorrhizal status of herb-layer plants in a fertilized oak-pine forest. *In*: Plant and Soil 143: 148-152.

USDA Forest Service. 1994. The Sceintific Basis for Conserving Forest Carnivores: American Marten, Fisher, Lynx, and Wolverine in the Western United States. General Technical Report RM-254. U.S. Government Printing Office.

Verts, B.J. and Leslie Carraway. 1998. Land Mammals of Oregon. University of California Press, London England.