ENVIRONMENTAL ASSESSMENT

TRAPPER PROJECT

Lane and Linn Counties, Oregon

Prepared by:

U.S.D.A. Forest Service
Willamette National Forest
McKenzie River Ranger District

March 2003

TABLE OF CONTENTS

Table of Figures

Chapter 1.

PURPOSE AND NEED FOR ACTION

This Environmental Assessment is written to fulfill the purposes and requirements of the National Environmental Policy Act (NEPA), as well as to meet policy and procedural requirements of the USDA Forest Service. The intent of NEPA, its implementing regulations, and Forest Service policy is to evaluate and disclose the effects of proposed actions on the quality of the human environment. The intent of these procedures is to improve the quality of decision-making, as well as make the decision-making process more accessible and transparent to the affected public.

INTRODUCTION

Central Cascades Adaptive Management Area

The alternatives analyzed in this Environmental Assessment are located entirely within the Central Cascades Adaptive Management Area, as described in the Northwest Forest Plan Record of Decision (NWFP, USDA USDI 1994, 2001) (Figures 1 and 2).

The purpose of this Adaptive Management Area (AMA) is to "encourage the development and testing of technical and social approaches to achieving desired ecological, economic, and other social objectives." While the management of areas outside of AMAs, such as matrix and reserve lands, is grounded in a set of prescriptive, region-wide standards and guidelines, AMAs are recognized as areas where innovation, testing, and experimentation are both expected and appropriate. They are places where learning leads to validating or changing how resources are managed.

The following specific objectives for the Central Cascades Adaptive Management Area are listed in the NWFP (pages D12-13):

1. *"Intensive research on ecosystem and landscape processes and its application to forest management in experiments and demonstrations at the stand and watershed level,*
2. *approaches for integrating forest and stream management objectives and implications of natural disturbance regimes, and*
3. *management of young and mature stands to accelerate development of late-successional conditions."*

Blue River Landscape Strategy

The Blue River Landscape Strategy (*BRLS*, USDA 1997, 2002) was developed to respond to direction contained within the NWFP for the Central Cascades Adaptive Management Area. The Strategy consists of a recommended landscape management and watershed restoration

INSERT FIGURE 1

INSERT FIGURE 2

plan; an administrative study designed to measure effects on the ground; and a series of analyses of landscape effects over time. The *BRLS* outlined the idea that, over time, a landscape could be developed with a pattern and structure based to some degree on historical disturbance regimes -- particularly fire. To achieve that idea, the strategy recommended a system of no-harvest "reserves" coupled with three distinct landscape areas where timber harvest and fire could be used to alter forested conditions (Figures 3 and 4). The recommended timber harvest would approximate the important aspects of the frequency, severity, and spatial extent of historic fires. The retention of abundant down and standing live and dead woody material would approximate important habitat structures left after a fire. An initial evaluation of this approach indicates several potential benefits (Cissel et. al 1999).

The *BRLS* proposed to "restore" the pattern of the landscape over a period of many decades while meeting the objectives of the NWFP, including providing timber products; sustaining native habitats, species, and ecological processes; and meeting Aquatic Conservation Objectives. Where the landscape pattern is currently highly fragmented from a past "staggered-setting clearcutting" approach, it would evolve into a landscape with large blocks of old forest with high levels of connectivity (Figure 3). Where it is currently lacking in structure from standing dead and down wood in openings, those elements would be restored.

1. **Existing conditions are far different from historical conditions.** Forest roads, a patchwork of openings from past timber harvest, and a reservoir all influence the current landscape.
2. **Using timber harvest and prescribed fire as disturbance "tools" will produce results different than historical disturbances like fire, landslides, floods, etc.** During harvest, biomass is removed from the forest system in the form of live and dead trees for timber products. At the stand-level during historical natural fires, material that wasn't volatilized by the fire stayed on site and contributed structure to a future forest. At the landscape-level, natural historical fires occasionally occurred at large scales, burning thousands of acres. That level of modification can not be done through timber harvest or prescribed fire because the results would be unacceptable to today's society. Various laws require that native species be maintained, timber produced, and fire suppressed.

The *BRLS* can be found in its entirety at the Cascade Center for Ecosystem Management Web Site at http://fsl.orst.edu/ccem/brls/brls.html.

The Willamette National Forest previously implemented recommendations from the *BRLS* with the Blue River Timber Sale Environmental Assessment (USDA 1997).

The *BRLS* was formally approved as an **Administrative Study** (Forest Service memo on file with the McKenzie River Ranger District, 4/28/98). Revisions to the *BRLS* are expected as new information becomes available and experience is gained while implementing this management approach. This is the foundation of an "adaptive management" approach. Numerous monitoring activities are underway as part of the study. Updates and results of the study can be found on the internet at http://fsl.orst.edu/ccem/brls/brls.html. The *BRLS* was

INSERT FIGURE 3

INSERT FIGURE 4

presented to the Regional Interagency Executive Committee in 2001, which resulted in a memo signed by all of the NWFP agency executives. The memo supported continued implementation of recommendations from the *BRLS* (Appendix J.

PROPOSED ACTION

The District Ranger from the McKenzie River Ranger District proposes to implement a portion of the recommendations found in the Blue River Landscape Strategy, as described above. Actions include using timber harvesting techniques, prescribed fire, and snag creation methods to approximate stand structures resulting from historic high severity, stand-replacement fires and partial-stand replacement fires on 155 acres. The treatments would retain some overstory green trees and abundant standing and down dead woody material. Prescribed burning is proposed on 92 acres to approximate the effects of historic low severity fires. An extensive landscape and stand-level monitoring strategy is in place to evaluate the effects of these actions. Monitoring results would be incorporated in an adaptive management process.

Approximately 11.4 miles of existing permanent roads would receive maintenance to facilitate access for logging that includes resurfacing, culvert replacement, hazard tree removal, and roadside brushing and ditching. These roads are all currently open and expected to have continued use in the future for a variety of uses. The 1500, 1516, and 1517 roads were identified in the Forest Road Analysis (USDA 2003) as Key Forest Roads.

Approximately 1 mile of road would be decommissioned or stored to improve watershed conditions. These roads and road segments were not identified as Key Forest Roads in the Forest Road Analysis (USDA 2003).

Legal Description of Project Area: The proposed project area (Figure 1) is located in the Blue River watershed north of Highway 126, near the town of Blue River, Oregon. The legal location is T14S, R5E Sections 34 - 36 and T15S, R5E section 4, W.M., Lane and Linn Counties, Oregon.

PURPOSE AND NEED

The primary purpose and need for this project is to manage mature timber stands within the project area in a manner that is consistent with the Willamette National Forest Land and Resource Management Plan, as amended by the Northwest Forest Plan in 1994, to provide timber products; to provide sustainable native habitats and ecological processes which support wildlife, fish, and plant species; to meet Aquatic Conservation Objectives; and to respond to issues about the resources within the project area obtained through scoping.

Actions to meet the primary purpose and need would apply the adaptive management-learning process for Adaptive Management Areas by implementing and monitoring the alternative landscape management approach recommended in the Blue River Landscape Strategy *(BRLS)*.

The *BRLS* tests whether historical disturbance regimes can be used as a general model for forest management.

The purpose of the Adaptive Management Area (AMA) is to "encourage the development and testing of technical and social approaches to achieving desired ecological, economic, and other social objectives." While the management of areas outside of AMAs, such as matrix and reserve lands, is grounded in a set of prescriptive, region-wide standards and guidelines, AMAs are recognized as areas where innovation, testing, and experimentation are both expected and appropriate. They are places where learning leads to validating or changing how resources are managed.

DECISION FRAMEWORK

The McKenzie River District Ranger will decide which of the alternatives, if any, meets the purpose and need of achieving objectives of the NWFP while testing an alternative model for landscape management. The decision maker, in a Decision Notice and Finding of No Significant Impact (DN/FONSI), will document any concurrence with the findings in this Environmental Assessment. The selected alternative needs to be consistent with the amended Willamette Forest Plan.

THE FOREST PLAN

This Trapper Project Environmental Assessment is tiered to the 1990 Willamette National Forest Land and Resource Plan. The 1990 Forest Plan resulted from the extensive analysis and considerations addressed in the accompanying Final Environmental Impact Statement (FEIS) and Record of Decision (ROD). The Willamette Forest Plan was substantially amended in 1994 and 2001. In April 1994, the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Spotted Owl, April 1994 (USDA, USDI Northwest Forest Plan ROD, 1994) modified the Willamette Forest Plan with overlaying management areas and their accompanying standards and guidelines.

Watershed Analysis

The Aquatic Conservation Strategy in the NWFP includes two designations for Key Watersheds: Tier 1 and Tier 2. This project is located within the Blue River Watershed, which was not designated as a Key Watershed.

The Blue River Watershed Analysis (USDA 1996) developed and documented a scientifically based understanding of the processes and interactions occurring within the watershed. Blue River contributes indirectly to conservation of at-risk anadromous salmonids, bull trout, and resident fish species. The NWFP requires that actions be designed to maintain or restore aquatic habitat and riparian ecosystems in accordance with the Aquatic Conservation Strategy objectives. The *BRLS* updated the Blue River Watershed Analysis, documenting an

alternative approach to managing the watershed's landscape. This process was peer-reviewed by the scientific community and approved by the Regional Ecosystem Office. A memo from the land management and regulatory agencies associated with the Northwest Forest Plan (USDI USDA USEPA USDC 2002) recognized the *BRLS* as resting on sound science and encouraged its implementation (Appendix J).

Adaptive Management Areas

The standards and guidelines for AMA's were reviewed by the Regional Interagency Executive Committee and an Intergovernmental Advisory Committed chartered by the Regional Ecosystem Office. The results were documented in a May 2000 Memorandum (USDA USDI May 2000, Memo).

The Memo specified that the "intent" of NWFP Standards and Guidelines for the following must be met:

- The intent of matrix coarse woody debris, snags, and green tree retention.
- That 15% of federal forest land in a 5th field watershed should be in late-successional forest.
- That riparian protection be comparable to that prescribed for other federal land areas.

The Memo also specified that changes are allowed as indicated in the following:

- Interim riparian reserve boundaries can be changed based on Watershed Analysis, site analysis, and appropriate NEPA decision-making processes.
- S&G in existing land management plans, where they were not amended by the NWFP, can be modified in AMA plans based on site-specific analysis.

The Memo specified that the following must be met, though temporary deviations may be allowed if part of an approved research, monitoring, or administrative study specifically designed to test a standard and guideline:

- Meet "minimize soil and litter disturbance" S&G's.
- Meet "Survey and Manage" S&G's.
- Meet "Manage recreation areas to minimize disturbance to species" S&G's.
- Meet "Protect sites from grazing" S&G's.
- Meet "Protection of roost sites for bats" S&G's.

The Memo also specified that the following must be met. Any deviations require site-specific plan amendments:

- "Congressionally reserved areas" S&G's apply where they occur in AMA's.
- Aquatic Conservation Strategy Objectives must be met.
- Key Watershed S&G's overly all land allocations.
- Late Successional Reserve S&G's apply in AMA's.

SCOPING AND PUBLIC INVOLVEMENT

Scoping is the process for determining issues relating to a proposed action and includes review of written comments, distribution of information about the project, public meetings, interdisciplinary team (IDT) meetings, tours of the project area, and local news releases.

The Trapper Project was initiated in 1998 as part of the Wolfmann DEIS. Field trips and mailings occurred over a 2-year period to gain feedback on that Draft. The Trapper EA, a modified-subset of Wolfmann proposed actions, was listed in the spring 2002 issue of the Willamette Forest Focus--the quarterly schedule of proposed actions (SOPA) for the Willamette National Forest. The project has since appeared in the Forest Focus through the current issue (Winter 2002).

In August 2002, letters were sent seeking comment from the Tribal Council and Cultural Resource Coordinators of the Confederated Tribes of Warm Springs, Confederated Tribes of the Siletz Indians and the Confederated Tribes of the Grand Ronde Community. Letters were also sent to interested parties on the McKenzie River Ranger District mailing list.

One letter was received in response to scoping. Oregon Natural Resources Council Action and Oregon Natural Resources Council Fund supplemented original scoping letters to Wolfmann. Issues raised included roads and road building, roadless/wilderness areas, old growth, fish and wildlife, lynx, and water quality. "Fish and wildlife and lynx" are discussed in the Biological Evaluations in Appendices B and D. "Water Quality" is discussed as a Significant Issue in Chapters 2, 3 and 4. "Old Growth" is discussed in the issue *Vegetation Pattern and Composition* in Chapters 2, 3, and 4. "Roads and road building" are discussed in the Water Quality, Elk, and Inventoried Roadless Areas, Unroaded Areas, and Wilderness Areas Issues. There are no Inventoried Roadless Areas, Unroaded Areas, or Wilderness areas in the Trapper Project area.

SIGNIFICANT ISSUES

Forest Service regulations (1950, chapter 11(3)) require that issues that are not significant to the project or that have been covered by prior environmental review be identified and eliminated from detailed study. Discussion of these issues should be limited to a brief statement of why they will not have a significant effect on the human environment or a reference to their coverage elsewhere. The issues will be listed as Significant Issues and Other Issues.

The public and ID team identified nine issues. The ID team and responsible official considered these pertinent issues and have determined which are significant to the project. Three Significant Issues drove the development of the alternatives. Their description is followed by criteria for measuring each alternative. The Significant Issues are tracked through issue identification (in this chapter), alternative description in Chapter II, and environmental consequences in Chapter IV.

1. Learning and the Adaptive Management Area

Because this project lies in an Adaptive Management Area, its location requires that any actions include the components for learning. Two key components facilitate successful learning:

1) Monitoring efforts must be in place. This should include the identification up-front of key questions that, when answered, can benefit future management decisions.
2) A mechanism should be in place that feeds new information back into an adaptive management framework.

Measurement Criteria:
Existence of a monitoring plan in place
Existence of a mechanism to feed the information back into an adaptive management framework

2. Water Quality/Aquatic Resources

Landslide and debris torrents are natural disturbances on this landscape. However, timber harvest on unstable earthflow terrain and slopes could increase the risk of landslides and debris torrents following harvest. If a failure did occur, it could deposit sediment into streams, causing increased turbidity and/or imbeddedness that could adversely affect water quality, fish and other aquatic habitat of Blue River and its tributaries. Deposition of coarse sediment may also have positive affects when combined with inputs of large wood. Streams use these materials to create complex habitat for fish and other aquatic species. Opportunities for road restoration that could eliminate existing sediment sources were identified in the Road Restoration component of the *BRLS*.

Removal of forest canopy cover in the rain-on-snow zone may adversely affect peak stream flows that could affect stream channel conditions.

The *BRLS* did not recommend "no-harvest reserves" on non-fish bearing perennial and intermittent streams in the project area. However, it does include numerous prescriptive guidelines to maintain watershed processes. Timber harvest in riparian areas could potentially increase stream temperatures or bank instability and potentially affect water quality. Timber harvest within these areas may also enhance stand structure that would result in increases in shade, large wood production, and an improvement of habitat for aquatic and riparian species.

Measurement Criteria:
Acres of new soil disturbance
Road-related mass wasting and sediment transport
Potential impacts to stream temperature
Potential impacts on peak flows (ARP)
Large wood availability/delivery

3. Logging Economics

Logging systems vary in their operational expense. In general, helicopter logging is more expensive to accomplish per thousand board foot of timber than ground-based or skyline harvesting. Logging using ground-based or skyline operations may require the building of roads to support the operation.

Measurement Criteria:
Logging system costs

OTHER ISSUES

Forest Service regulations (1950, Chapter 11(3)) require that issues that are not significant to the project or that have been covered by prior environmental review be identified and eliminated from detailed study. Discussion of these issues is limited to a brief statement of why they will not have a significant effect on the human environment or a reference to their coverage elsewhere. These "Other issues" were considered during project development, but they did not "drive" alternative development. They are ameliorated through mitigation measures or application of Standards and Guidelines.

4. Vegetative Pattern and Composition

Forest ecosystems are dynamic: they change when humans disturb them, and they change when humans eliminate disturbance (Agee 2002). Introduction of disturbance through prescribed fire or timber harvest may alter the pattern of early and older forests at the landscape-level, and it may alter forest components such as species' composition, stand layers, snag levels, and large down wood at the stand-level. These impacts may vary in the short and long-term.

Timber harvest and prescribed fire proposed in the Trapper Project follow recommendations from the Blue River Landscape Strategy. Plant species of concern will be protected in all action alternatives, and woody material will be retained at levels that meet the intent of the NWFP. *At least 15% of the watershed will be retained in late successional condition. Currently, 52% of the Blue River 5th field watershed is in a late successional condition (USDA USDI, Late Successional 15% Analysis, 1999)*

5. Threatened Northern Spotted Owl

Activities that alter or remove older-forest habitats may affect the northern spotted owl. The degree of the affect varies by the proximity of the action to known nest sites and the amount of habitat that will remain within a home range. Long-term landscape management strategies can impact the effectiveness of the arrangement of spotted owl habitat on the landscape.

Surveys of the proposed project area have documented the presence of spotted owls and their habitat. Consultation with the USFWS has resulted in a "may affect, but not likely to adversely affect" determination. All applicable protection measures from the consultation will be included in the decision.

6. Heritage Resources

Harvest and other ground-disturbing activities could potentially affect heritage resources.

Surveys of the proposed project area have been completed. Archaeological evidence was found. Consultation with SHPO via the Forest Specialist has resulted in a finding of "No Effect" to significant heritage resources. Boundaries were adjusted so that significant heritage resources are safely outside of any proposed ground disturbance areas. Any newly-discovered cultural resource materials found during the course of project implementation would be evaluated for significance by the Zone Archaeologist.

7. Prescribed Burning and Fuels

Prescribed burning may produce levels of smoke that may negatively impact the health of people or diminish visual qualities of the airshed. Timber harvest may result in increased fuel loads that may change the risks associated with natural fires.

The use of fire would follow regional standards for thresholds in Class I airsheds. All proposed actions that generate fuels would be followed by the application of prescribed fire to reduce fuel loads. Targeted levels will be those outlined in the Willamette Forest Plan.

8. Threatened, Endangered, and Sensitive Wildlife; Migratory Landbirds; Management Indicator Species; Survey and Manage; and Botanical Species of Concern

Activities that remove or degrade forest habitats or create noise above ambient levels may impact a variety of wildlife and plant species.

All proposed actions that remove or degrade forested habitat will follow conservation and protection guidelines provided by the Willamette National Forest Plan, as amended (USDA USDI 1994 and 2001). Activities that generate noise above ambient levels near nest sites of threatened species would be seasonally restricted following USFWS terms and conditions.

9. Inventoried Roadless Areas, Unroaded Areas, and Wilderness Areas

Activities that alter forest habitats may impact the character of roadless or wilderness areas.

All proposed actions occur outside of Congressionally designated wilderness areas or Inventoried Roadless Areas as described in the WNF LMP. Unroaded Areas were mapped for the WNF in the January 2003 Road Analysis Report (USDA 2003, Map #4). The Trapper IDT reviewed this map. No Unroaded Areas occur in the Trapper planning area.

CHAPTER 2.
ALTERNATIVES

This chapter displays detailed information about the alternatives and their proposed actions for comparison. The ID Team developed two action alternatives that are designed to meet the purpose and need for the project, and respond to the three significant issues identified in Chapter 1.

A no action alternative was also developed, and is required by Federal law (National Environmental Policy Act, 1969). The no action alternative provides the baseline from which effects of other alternatives can be compared and measured.

LEGAL REQUIREMENTS

The alternatives for this project were designed to be in compliance with numerous federal and state laws and regulations.

Federal Laws:

The Antiquities Act, June 1906, and National Historic Preservation Act, October 1966 -- Field surveys for the area where ground-disturbing activities would occur have been completed. The Forest Specialist has been delegated authority for "no effect" findings by the State Historic Preservation Office (SHPO). The District Archaeologist found this project to be "no effect" upon review of the cultural resource inventory report for the Wolfmann Project (analysis for Trapper is a subset of that information). Concurrence was received on that finding from the Forest Specialist (Willamette National Forest Archaeologist).

The National Environmental Policy Act (NEPA), 1969 -- NEPA establishes the format and content requirements of environmental analysis and documentation. Preparation of the Trapper Project EA is in full compliance with these requirements.

The Endangered Species Act (ESA), December 1973 – The ESA establishes a policy that all federal agencies will seek to conserve endangered and threatened species of fish, wildlife and plants. Biological Evaluations for plants and wildlife have been prepared, which describes possible effects of the proposed action on sensitive species that may be in the Trapper Project EA project area. A Biological Assessment was prepared for threatened fish in the area. Consultation with the USFWS and NMFS has occurred as needed.

The National Forest Management Act (NFMA), 1976 – The alternatives were developed to be in full compliance with NFMA through compliance with the Amended Willamette National Forest Land and Resource Management Plan (USDA Forest Service 1990, 1994, 2001).

Clean Air Act Amendments, 1977 – The alternatives are designed to meet the National Ambient Air quality standards through avoidance of practices that degrade air quality below health and visibility standards.

The Clean Water Act, 1987 -- The alternatives meet and conform to the Clean Water Act, amended 1987. This act establishes a non-degradation policy for all federally proposed projects. The selected alternative is not likely to degrade water quality below standards set by the State of Oregon. This would be accomplished through planning, application and monitoring of Best Management Practices (BMPs).

State Laws:

Oregon State Best Management Practices (BMPs) -- State BMPs would be employed to maintain water quality.

The Oregon Smoke Management Plan -- The Oregon State Implementation Plan and the Oregon State Smoke Management Plan would be followed to maintain air quality.

Consultation with the Oregon State Historic Preservation Office (SHPO) – This has occurred (see above).

Oregon State Forest Worker Safety Codes-- The Oregon Occupational Safety and Health Code for Forest Activities would be met with implementation of the action alternative.

ALTERNATIVES CONSIDERED IN DETAIL

The three alternatives listed below were analyzed in detail for this project.

Alternative A

1. This Alternative uses timber harvesting, prescribed fire, and snag creation techniques to approximate the stand structures that resulted from historic stand-replacement fires and partial-stand replacement fires on 155 acres (Figure 5). Graphics that approximate the expected outcome are displayed in Appendix I.

INSERT FIGURE 5

All harvest is located within Landscape Area 3 (one of three landscape areas identified by the *BRLS*, see Figure 4). The general objective of Area 3 is to approximate key elements of infrequent, high severity (more than 80 % mortality) or mixed severity (more than 40% mortality) fires. The prescriptions for 6 of these areas will result in 15% canopy closure following all treatments. One area would result in 50% canopy closure (Table 2-1).

There are four stages to this action:

1. Harvest of majority of live green trees for timber products.
2. Understory burn to create some mortality in the retained green trees.
3. Girdle, top, or introduce fungus in retained green trees to create abundant standing dead trees.
4. Fell some of the retained live green trees for down woody material on the forest floor.

In every harvested area, there are two key prescriptive measures to create diversity. One includes retaining or creating an abundance of standing and down dead wood (i.e. snags and logs) following harvest. This would approximate the dead-wood structures historically left after fires on this landscape. The other is the creation of patchiness within each harvested areas. Some areas will be retained intact, while others will be turned into small openings or "gaps" (Appendix G and I).

Table 2-1: Areas proposed for using timber harvest, prescribed fire, and snag creation techniques to approximate the structures that resulted from historic stand-replacing and partial stand-replacing fires in Alternative A.

Unit	Acres	Volume MMBF	Remaining Live Canopy[1]	Snags Created/ Retained /acre[2]	Under-burn? [3]	Logging System[4]	Temporary Roads Constructed (feet)
20-1, 20-2, and 20-3	36	1.695	15% -13 ac. 50% -23 ac.	20-1 = 16.9/8.3 20-2 = 2.8 20-3= 16.0	Yes	C--11 ac. H--25 ac.	200'
21-1	27	1.994	15 %	15.4	Yes	H	
21-2	46	2.744	15 %	15.4	Yes	H	
21-3	1	0.0236	15 %	15.4	Yes	G	
40-1	39	1.886	15 %	23.7	Yes	C--21 ac H--18	
Total	**149**	**8.343**					**200'**

Volume MMBF = Millions of Board Feet

[1] Average across entire stand, including non-harvested retention areas, following timber harvest, prescribed burning, and snag creation.

[2] Approximately 240 lineal feet of down woody material will also be retained.
[3] Underburning occurs following timber harvest.
[4] Logging Systems – H = Helicopter; C = Cable; G = Ground Based

2. Prescribed burning would be used on 92 intact- forested acres to approximate the effects of historic low-severity fires.

Prescribed under-burning would occur in 2 forested stands within Landscape Area 3 (Figure 5 and Table 2-2) that have not been previously harvested. The fires would be manually lit in the spring under damp conditions. This should result in a creeping ground-fire that occasionally lifts into the canopy. Approximately 10-20% of the tree cover may be killed from the heat and flames. All of the trees that are killed will be left in place to provide important future snag habitat.

Table 2-2: Areas proposed for using prescribed fire to approximate historic low-intensity fires in Alternative A.

Unit	Acres	Prescribed Fire Acres	Prescription
26	119	67	Low-severity fire. 10-20 % mortality in overstory trees
71	84	25	Low-severity fire. 10-20 % mortality in overstory trees

3. Approximately 200 feet of temporary spur road, located on a ridge top, and without stream crossings, would be constructed. Approximately 11.42 miles of existing roads would be maintained (Table 2-3 and Figure 6).

Temporary road construction is minimal because helicopter logging systems are used for the majority of logging. Decisions for all temporary road construction must be informed by a Forest Roads Analysis, which was completed in 2003 (USDA 2003). The Analysis acknowledges the need for temporary road construction to support timber harvest activities (USDA 2003 pg. 40). Approximately 11.42 miles of road would be maintained, which includes roadside brushing, hazard tree removal, re-establishment of the roadway template and ditch functionality, culvert cleaning and replacement, site repairs to restore 12-foot minimum road width, and surface rock placement. The 1500, 1516, and 1517 roads were identified in the Forest Roads Analysis (USDA 2003) as Key Forest Roads.

INSERT FIGURE 6

Table 2-3: Road Maintenance associated with Alternative A.

Road	Miles Maintained	Maintained Roads Access These Activities	Key Forest Road
1500-612	1.40	Units 20-1, 20-2, 20-3 to 1500	No
1500-613	0.20	Units 20-1 to 1500-612	No
1500	3.2	Units 20-1, 20-2, 20-3 1500-612 to jct. W/ 1516	Yes
1517-655	1.05	Unit 21-2 to 1517	No
1516	2.84	Units 21-1, 21-2, 21-3 and 40-1	Yes
1517-560	0.24	Unit 40-1 to 1517	No
1517-565	0.19	Unit 40-1 to 1517-560	No
1517	1.5	Units 21-2, 21-2, 21-3, 40-1	Yes

4. An extensive landscape-level and stand-level monitoring strategy would evaluate the effects of these actions.

The *BRLS* has been approved as an administrative study. This includes a long-term, multi-scale monitoring plan to evaluate its effectiveness. Monitoring of previous projects (Blue River Face Timber Sale and N. Fork Quartz Timber Sale) that followed *BRLS* recommendations is occurring. Pre-treatment data has already been gathered for amphibians, trees, vascular plants, lichens, stream channel morphology, and stream temperature in this area. Numerous other on-going monitoring projects are occurring in the adjacent H.J. Andrews Experimental Forest. The varying scales of monitoring for the *BRLS* are shown in Table 2-4. Appendix E displays the types of monitoring questions being addressed.

Table 2-4: Scales of Monitoring of the Blue River Landscape Strategy.

Spatial Scales of Monitoring	
Watershed Scale	**Small-stream scale**
Landscape Pattern	Stream-Breeding Amphibians
Northern Spotted Owl Demography	Stream Temperature
Economics	Riparian Vegetation
Subwatershed Scale	Channel Morphology
Stand and Landscape Structure	**Site Scale**
Stream Discharge	Stand Development
Social Acceptability	Non-vascular Plants
	Forest Regeneration
	Erosion
	Forest Regeneration

Alternative B

This alternative is the proposed action. All four of the actions described above for Alternative A would occur with this alternative (Table 2-5) with these modifications:

1. Road 1508-435 (0.37 miles) would be *decommissioned* (for definition see USDA 2003 pg. 63). This would include activities to make it hydrologically stable on the landscape (Figure 7 and Table 2-6).
2. Road 1508-426 (0.5 miles) would be stored, which includes waterbarring, drain dips, and a berm to close it from vehicle traffic (Figure 7 and Table 2-6).
3. Unit 21-2 would be logged using a combination of cable, ground, and helicopter systems (Alternative A used only helicopter systems for this unit). This type of logging would be facilitated by building 300 feet of temporary road that would be obliterated following logging.
4. Unit 40-1 would be logged using a combination of cable, ground, and helicopter systems. Compared to Alternative A, this Alternative would use less helicopter and more cable and ground systems. This would be facilitated by building 900 feet of temporary road that would be obliterated following logging.
5. Approximately 0.1 mile of Road 1500-613 would be stored following timber sale use. The storage would include water barring, re-vegetation, removal of stream crossing fills below Unit 20-2, and placement of a berm to close it to vehicle traffic (Figure 7 and Table 2-6).

Table 2-5: Areas proposed for using timber harvest, prescribed fire, and snag creation techniques to approximate the structures that resulted from historic stand-replacing and partial stand-replacing fires in Alternative B.

Unit	**Acres**	Volume MMBF	**Remaining Live Canopy**[1]	**Snags Created/ Retained /acre**[2]	**Under-burn?** [3]	**Logging System**[4]	**Temporary Roads Constructed (feet)**
20-1, 20-2, 20-3	36	1.695	15% -13 ac. 50% -23 ac.	20-1 = 16.9/8.3 20-2 = 2.8 20-3= 16.0	Yes	C--11 ac. H--25 ac.	200’
21-1	27	1.994	15 %	15.4	Yes	H	
21-2	46	2.744	15 %	15.4	Yes	C--20.2ac. H--12ac. G--13.8ac.	300’
21-3	1	0.0236	15 %	15.4	Yes	G	
40-1	39	1.886	15 %	23.7	Yes	C--33 ac. H--2 ac.	900’
Total	**149**	**8.343**					**1400’**

Volume MMBF = Millions of Board Feet

[1] Average across entire stand, including non-harvested retention areas, following timber harvest, prescribed burning, and snag creation.
[2] Approximately 240 lineal feet of down woody material will also be retained.
[3] Underburning occurs following timber harvest.
[4] Logging Systems – H = Helicopter; C = Cable; G = Ground Based

Table 2-6: Road Maintenance and decommissioning associated with Alternative B.

Road Maintenance	**Miles Maintained**	**Maintained Roads Access These Activities**	**Key Forest Road**
1500-612	1.40	Units 20-1, 20-2, 20-3 to 1500	No
1500-613	0.20	Units 20-1 to 1500-612	No
1500	3.2	Units 20-1, 20-2, 20-3 1500-612 to jct. W/ 1516	Yes
1517-655	1.05	Unit 21-2 to 1517	No
1516	2.84	Units 21-1, 21-2, 21-3 and 40-1	Yes
1517-560	0.24	Unit 40-1 to 1517	No
1517-565	0.19	Unit 40-1 to 1517-560	No
Road Decommissioning	**Miles Treated**	**Treatment**	**Key Forest Road**
1508-435	0.37	Decommissioned to make it hydrologically stable	No
1508-426	0.5	Water barring, drainage dips, and berming	No
1500-613	0.1	Water barring, re-vegetation, removal of stream crossing fills, berming	No

Mitigation Measures

A number of mitigation measures accompany Alternatives A and B. Mitigation measures help define the alternatives by describing more specifically how the actions would be accomplished and how the resources would be protected. Table 2-7 shows the mitigation measures planned to protect soil and water, vegetation, Survey and Manage species, non-forest habitats, heritage resources, and wildlife. It also includes operating restrictions, safety measures, and mitigation measures for fire. Though they are not all mentioned here, all applicable Standards and Guidelines from the Willamette Forest Plan (as amended) would also be part of Alternatives A and B.

INSERT FIGURE 7

Table 2-7: Mitigation Measures Included in Alternatives A and B.

Mitigation Measure	Objective	Location	How
Soil and Water			
Retain trees on localized areas prone to streamside slides	Minimize risk of failure	21-1,2,3	Layout
Full suspension across class III and IV streams in skyline units	Protect water quality, stream bank integrity and channel bed	20-3, 21-2, 40-1	Contract
Construct one water bar for every 200 feet of cable corridors that have bare soils and with slopes less than 40 % along the corridor and two water bars along cable corridors that have bare soils for greater than 100 feet and with slopes greater than 40 % along the corridor.	To reduce the potential of erosion and fine sediment transport	All skyline units	Contract
Road construction and haul on native surface roads will be restricted to dry conditions, generally between July 15 through October 31. Hauling will be restricted when water pools on road surface.	To assure road stability, and limit sedimentation	20-3, 21-2, 40-1	Contract
All ground-based yarding will be restricted to dry conditions. Activities will not occur when water is pooling in skid trails and landings.	To protect site productivity, maintain soil hydrologic characteristic, minimize the potential of soil erosion and transport of fine sediments	All ground-based units	Contract
Use of ground-based equipment should be avoided within 100 feet of all stream channels.	To avoid sedimentation to streams	All ground-based units	Contract
Clean fill (soil or rock free of slash and debris) will be used for new temporary road construction and maintenance.	To assure stable road construction	21-2,40-1	Contract
All native surface roads shall have water bars constructed and shall be stored before seasonal shutdown.	To provide functional drainage and minimize potential road failures		Contract
Skid trails and landings within areas of regeneration harvest with ground-based equipment will be subsoiled. These trails and landings will have water bars constructed where necessary to provide effective drainage and shall be planted with conifers	To re-establish the natural hydrologic pattern and grow trees until the next entry in about 35 years	21-3	Contract

Mitigation Measure	Objective	Location	How
Locate designated skid trails to facilitate drainage following harvest.	To minimize disrupting drainage	21-3	Contract
Place weed-free straw bale sediment traps at class IV and larger streams during winter time haul.	To minimize the potential of soil erosion and transport of fine sediments into streams	Along all haul routes	Contract
Vegetation			
Ramaria stuntzii-fungus will have a 172-foot radius no harvest or ground disturbance buffer. No prescribed fire within buffered site.	To protect site from disturbance and maintain microclimate	21-2	Layout
Nephroma occultum-lichen will have a 172-foot radius no harvest buffer. No prescribed fire within buffered site.	Maintain substrate and microclimate	40-1	Layout
Mechanically remove noxious weeds in landings and along spur roads adjacent to units prior to project implementation.	Reduce the spread of noxious weeds in harvest units and along travel ways	20, 21, 71	Contract or District personnel
Minimize fireline construction; where it is necessary, use hand-construction rather than machine-constructed line.	Reduce the spread of noxious weeds	Entire project area	Fire Plan
All road construction and logging equipment will be pressure washed prior to working on the area.	Reduce the spread of noxious weeds	Entire project area	Contract
A weed free source of rock will be used for all road construction and maintenance.	Reduce the introduction of noxious weeds	Entire project area	Contract
Non-forested sites will be protected with a 50-200’ no-disturbance buffer.	Maintain integrity of site	Entire project area	Layout
Heritage Resources			
All known significant heritage sites will be protected from harvest activities. Locate unit boundaries away from heritage resources. If any sites are found during future fieldwork or during activities, contract provisions will be used to protect these new findings until they can be evaluated.	Maintain the integrity of heritage sites	Entire planning area	Layout and contract
Wildlife			
If previously undocumented species of concern are found, project modifications will be made as needed.	Minimize effects to species of concern	Entire planning area	Contract

Mitigation Measure	Objective	Location	How
240 lineal feet (or ≥3 sound trees) per acre of class I-II down woody material will be left in each unit. All existing down logs regardless of decay class will be left.	To provide down wood habitat and emulate effects of residual material following fires	All units with harvest activity	Contract
Snag creation will occur August 1-January 15 (inoculation and girdling) and September 30 - January 15 (blasting). It will not occur during elk rifle season or the first week of deer season (See Appendix G for specifications for retained trees).	To provide snag habitat and emulate effects of residual material following fires	20-1 & 20-3 = 16.9 snags/acre 20-1 w/ 30% canopy retention = 8.3 snags/ acre 20-2 = 2.8 snags/acre 21-1,2,4 = 15.4 snags/acre 40-1 = 23.7 snags/acre	Contract
Operating Restrictions			
Restriction on falling trees, ground-based yarding, and helicopter yarding between January 15 to July 31.	Minimize noise disturbance during nesting season of TES raptors	20-1,2,3 and 40-1	Contract
Restriction on falling hazard trees along haul routes April 1 to August 1.	Protect nesting primary and secondary cavity nesters	Haul Routes	Contract
Safety			
A flight safety plan, traffic management plan, and spill prevention and containment plan will be completed as part of contract preparation for the timber harvest and road work.	To maintain safe operations	Entire Project Area	Contract
Require fire equipment during logging operations.	Reduce risk of human caused fire	All units	Contract
Complete a risk assessment and contingency plan before ignition of prescribed fires.	To reduce the risk of fire escapement	All units	Burn Plan
Develop a prescribed fire safety plan.	Reduce risk to humans	All burn units	Contract Burn Plan

Mitigation Measure	Objective	Location	How
Fire Management			
Follow the Oregon Smoke Management Plan.	To control air pollution	All units	Burn Plan
Consult ODEQ to ensure burning will occur within the daily limit on tonnage of logging slash.	To control air pollution	All units	Burn Plan
Verify burn day upper wind direction and airshed condition at the burn site prior to burning.	To control air pollution	All units	Burn Plan
Follow Oregon Smoke Management Plan which encourages burning in spring when fuel moistures are higher.	To control air pollution	All units	Burn Plan

Riparian Management

The riparian management strategy within the *BRLS* includes a network of large, headwater aquatic refugia coupled with fish-bearing stream aquatic reserves (Figure 4). Intermittent and non-fish bearing perennial streams are not included in the reserve system. Interim riparian reserve boundaries in AMA's and non-AMA watersheds can be changed based on watershed analysis and site-specific analysis. The *BRLS* is an update to the Blue River Watershed Analysis that was complete in 1996. The IDT used the recommendations from the *BRLS* as a starting point, but fine-tuned the method of management for streams in the Trapper planning area based on site-specific analysis. Specific prescriptions for individual streams were based on their location in relation to reserves and their potential to provide high quality fish habitat (Table 2-8).

The *BRLS* reserve system was designed to meet the objectives of the Aquatic Conservation Strategy over time on a landscape basis. Reserves, coupled with recommendations for long periods between harvest, would limit the extent of disturbance in any one decade. The location of retained trees in harvested areas would emphasize a connection between riparian and upland habitats. The *BRLS* meets the intent of the NWFP standards and guidelines for riparian reserves (as required by USDA USDI May 2000) by providing protection of watershed and riparian processes (Appendix A). Additional detail on the riparian management strategy and its underlying assumptions can be found in Appendix A and in the *BRLS* on the web at http://fsl.orst.edu/ccem/brls/brls.html.

Table 2-8: Stream and Riparian Management within Alternatives A and B.

Harvest Units	Average Canopy Closure Following Harvest, Prescribed Fire, and Snag Creation	Streams in Unit	Prescription near Streams
20-1	15% canopy closure	None	Not applicable
20-2	50% canopy closure	Stream 20A = Class III Stream 20B = Class III	Retain 50% canopy closure the same as the rest of the unit, and retain all bank trees[1]
20-3	15% canopy closure	Stream 20A = Class III Stream 20B = Class III Stream 20C = Class III	20A: Retain all bank trees and retain 30% canopy closure within ½ potential tree height (86') of the active channel. 20B: Retain all bank trees and leave 15% canopy closure. 20C: No harvest within ½ potential tree height (86') of active channel.
21-1	15% canopy closure	Seep	Retain trees within 25' of seep.
21-2	15% canopy closure	Stream 21F = Class IV	Retain all bank trees and leave the same canopy closure as rest of unit (15%); limit disturbance; avoid ground-based logging within 100' of channel
21-3	15% canopy closure	None	None
40-1	15% canopy closure	Stream 40A = Class IV Stream 40B = Class III	Retain all bank trees and leave the same canopy closure as rest of unit (15%).
Prescribed Fire Units:			
26	Understory Burn	Stream 26A = Class IV Stream 26B = Class III Stream 26C = Class IV	Understory burn through creeks. Avoid installing control lines w/ground-based equipment w/in 100' of all streams.
71	Understory Burn	Stream 71A, B, C, D = Class IV	Understory Burn through creeks. Avoid installing control lines w/ground-based equipment w/in 100' of all streams.

1 Bank Trees = Trees that have the potential to provide stability to the stream bank through their root structure, usually all trees within 25'.

Alternative C – No Action

Alternative C, the no action alternative, would not implement recommendations from the *BRLS*. No timber harvest or project-related road maintenance would occur; no road construction, prescribed burning, or monitoring would occur, and on-going studies would be interrupted. This alternative serves as a baseline from which to understand the changes associated with the action alternative. The information presented in Chapter 3 (Affected Environment) describes the current condition of the watershed.

ALTERNATIVES CONSIDERED, BUT ELIMINATED FROM DETAILED STUDY

Several alternatives were discussed by the IDT, but eliminated from additional analysis:

1. ***Application of Willamette National Forest Standards and Guidelines for snag retention***. This would have resulted in approximately 4 snags per acre in each harvested unit, representing 40% potential population levels of primary and secondary cavity nesters. This alternative does not reflect an interest in emulating conditions following stand- and partial-stand replacing fire events which can result in a greater abundance of standing dead material.

2. ***Application of no-harvest riparian areas along all streams.*** The IDT determined this was not necessary to meet the Aquatic Conservation Objectives in this area based on Watershed Analysis updates documented in the *BRLS*; an Aquatic Conservation Objectives Analysis completed on the *BRLS* ; and site-specific analysis. Within the *BRLS*, all fish-bearing streams are protected by aquatic reserves (*BRLS* pg. 13); however, the units proposed for harvest in the Trapper project do extend into any fish-bearing aquatic reserves. Site-specific analysis indicated that Class III and IV streams present could be managed and still meet the intent of the ACS (USDA USDI 2000)(see *BRLS* ACSO Analysis) through retention of bank trees and at least 15% canopy closure; protecting cold water source areas through shade retention; protecting inputs of large wood by maintaining no-harvest streamside buffers on earth flow terrain; and by increasing canopy retention to 50% on landslide prone areas. The assumption that these measures are adequate will be monitored through the Administrative Study designed to support the *BRLS*. This alternative did not meet the purpose and need of this project.

3. ***Thinning in Mature Forests in the Blue River Watershed***. The District Ranger decided to focus this NEPA decision on implementation of the non-thinning research associated with the Blue River Landscape Study. The thinning described in the Wolfmann EIS may be presented to the public in a future NEPA document.

ALTERNATIVE COMPARISON

Table 2-9 displays information for each Alternative in terms of the Measurement Criteria used for each significant issue.

Table 2-9: Comparison of Significant Issues by Alternative in the Trapper Project.

Issue / Measurement Criteria	Alternative A	Alternative B	Alternative C (No Action)
Learning/Adaptive Management			
***Monitoring plan in place**	Blue River Landscape Strategy Administrative Study approved and in place. Monitoring questions identified in appendix.	Blue River Landscape Strategy Administrative Study approved and in place. Monitoring questions identified in appendix.	No activities proposed to monitor or learn from.
***Mechanism to feed the information back into an adaptive management framework**			
Water Quality/Aquatic Resources		`	
***Acres of soil disturbance**	11.1 acres	16.1 acres	0.0 acres
***Road-related mass wasting and sediment transport**	Road maintenance results in reduced cumulative risk of road-related failures.	Road maintenance results in reduced cumulative risk of road-related failures.	No project-related road maintenance. No change to road- related failure risk.
	No road decom-missioning. Sediment delivery from 0.97 miles of road stays the same.	Road decommissioning on 0.97 miles reduces potential delivery of sediment	No road decom-missioning. Sediment delivery from 0.97 miles of road stays the same.
***Potential impacts to stream temperatures**	Assumptions within *BRLS* support no change to stream temperatures	Assumptions within *BRLS* support no change to stream temperatures	Existing stream temperatures do not change
***Potential impacts on peak flows**	ARP above mid-point following project	ARP above mid-point following project	No change to ARP
***Large wood availability / delivery**	Assumptions within *BRLS* support no measurable change to availability /delivery of large wood	Assumptions within *BRLS* support no measurable change to availability /delivery of large wood	No change to landscape's current ability to provide / deliver large wood

Issue / Measurement Criteria	Alternative A	Alternative B	Alternative C (No Action)
Logging Economics			
***Logging system costs**	$3,683,831.5	$2,710,938.5	$0.0

CHAPTER 3.
AFFECTED ENVIRONMENT

Chapter III describes aspects of the environment that could be affected by the alternatives. This provides the baseline for the effects analysis in Chapter IV. The components of the affected environment follow. Additional details on the affected environment can be found in the Project File, Appendices, and the Blue River Watershed Analysis.

WATER QUALITY/AQUATIC RESOURCES

Blue River Watershed is a 59,000-acre tributary watershed that represents 7 % of the McKenzie River subbasin. Beneficial uses of the McKenzie River include habitat for fish and other aquatic species, recreational use, aesthetic values, power generation, and drinking water for over 200,000 people. Consequently, land management activities within the subbasin that may result in impacts to water quality and water quantities are a matter of public interest.

This project occurs in the Upper Blue River Subwatershed, which includes the Cook, Quentin, Mann, and Wolf Creek drainages as well as Blue River (Figure 8).

Stream Temperature

The streams in this area flow through a mix of managed and unmanaged forests of various ages. The stream system includes a substantial network of small perennial and intermittent tributaries that are highly interactive with ground water (i.e. they tend to go sub-surface). Recorded stream temperatures, based on limited sampling (Blue River WA 1996 and stream surveys in District files) are currently cooler than the 64 degree F standard set by the Department of Environmental Quality (DEQ). Removal of forest cover through past timber management activities has likely elevated stream temperatures because of reduced shade and increased exposure of water surfaces to solar radiation. Analysis in the Blue River Watershed Analysis (USDA 1996) from the adjacent (but similar) Lookout Creek drainage showed that temperatures there have exceeded 64 degrees F, but that appears to be more closely related to climatic variation than to forest management activities. This does not mean that management activities do not affect stream temperatures, but rather their effects are small compared to the stream temperature variations that result from natural climatic variability.

Blue River downstream from Blue River Dam and Reservoir (outside of the planning area) is listed as “water quality limited” by the DEQ due to elevated stream temperatures. However, the discussion with the Listing clearly ties this problem to operational aspects of the reservoir (Oregon DEQ Final 1998 Water Quality Limited Streams - 303(d) List). Blue River above Blue River Reservoir was added to the list of water quality limited streams, also for elevated stream temperatures in 2002 (Oregon DEQ Draft 2002 Water Quality Limited Streams – 303(d) List). [NOTE: The Oregon DEQ is required by the federal Clean Water Act to

INSERT FIGURE 8

maintain a list of steam segments that do not meet water quality standards. This list is called the 303(d) List, and is updated periodically as new information becomes available, usually every 2 years].

Geology and Sediment Production

The delivery of sediment and woody material to streams is an important ecological process on any landscape. This material "feeds" streams, and provides substrate to build high quality habitat for fish and other aquatic species. The mechanisms that transport that material include earthflows, shallow slope failures, and toe slope erosion. In this landscape, these mechanisms occur both naturally and under the influence of management activities (i.e. road failures). Typically when these events occur naturally, a mix of materials including both sediment and large wood are delivered to streams. Management-induced failures often generate more sediment than wood.

All five of the drainages within the project area contain areas of potentially unstable earthflow terrain. Some of these areas were used in the identification of "Source Areas" for sediment and large woody material (Figure 9) in the *BRLS.* These are important aspects of the landscape that provide building blocks of high quality aquatic habitat. Highly unstable earthflow areas are not appropriate for timber harvest, but those with a lesser degree of instability can support timber harvest if a portion of the stand is retained to provide root strength and stability.

The Cook and Quentin drainages are dominated by steep terrain heavily dissected by streams within deep, narrow-bottomed valleys. The Carpenter Ridge area of the Blue River and Wolf Creek drainages is also steep with highly dissected mountain side slopes. The lower third of the slope above Blue River is a mixture of glacial, riverine and colluvial deposits. Several relatively stable deep-seated earthflows occur on mid-slope positions. Snow and rockfall avalanche chutes originating from rock outcrops along Carpenter Ridge occur across the slope. The Mann Creek subdrainage is not as steep as the planning area, except for Wolf Rock. It is composed of mountain sideslopes and glacial terrain with relatively broad valleys. Figure 10 displays the topography of the project area and includes the soil stability hazard ratings based on soil depth (from the Forest Soil Resource Inventory 1973), slope, and the presence of identified earthflows.

Glacial processes and ancient earthflows (42,000 years old) have reworked much of the geologic deposits in this area. Four active earthflows ranging in size from 10 to 15 acres occur in the Trapper planning area. One occurs on the face drainage on the mid-third of the slope below Carpenter Ridge; two others were found north of Wolf Rock in Unit 20; and one in Unit 21. As a result of this geology, many of the streams carry relatively high natural loads of sediment, as earthflows move down-slope into the valley bottoms and streams undercut and erode their toe slopes.

In addition to high natural levels of sediment transport from earthflows and landslides, numerous roads in these drainages also contribute sediment through cut and fill slope failures, side-cast ravel, and road surface erosion. Prior to the storm events of 1996/1997, the Mann

INSERT FIGURE 9

INSERT FIGURE 10

subdrainage had the second highest incidence of failures within the Blue River watershed. Thirty-eight percent of the failures were in unmanaged forested areas; 46 % were in harvested forests; and 18 % were associated with roads. The Cook and Quentin subdrainages have the greatest stability in the watershed.

During the large storm events in 1996/1997, ninety-six known slope failures occurred in the watershed. Of these, approximately 60 % were road-related; 25 % were within harvested forests; and 15 % were within unmanaged forested areas. Approximately 22 of these failures occurred in the Mann and Quentin Creek subdrainages. The majority of the road-related failures were failures of the side-cast material. Road-related failures were often associated with a cascade of events that generally began with a cutbank, fill or side-cast failure. These failures generally translated into torrents that traveled between 500 to 1,500 feet, often sluicing streams and sideslopes to bedrock and impacting water quality.

Slope failures in Quentin drainage, regardless of source, are more likely to translate into torrents due to the high relief and greater drainage density. The slope failure that occurred during the 1996 storm flowed in a torrent down a fully forested channel and left a great deal of large wood and a stone and gravel substrate, which added to the channel complexity. In Mann drainage, the more gentle topography and relatively low stream densities prevents many of the slope failures from developing torrent velocities and momentum. The four failures on the toe slopes of a rotational earthflow occurred on the active earthflow in landscape block 20. These failures traveled 1,000 feet into a class III tributary to Mann Creek, creating channel complexity in the form of stone and cobble substrate and large wood.

In general, failures that occurred in harvested riparian forests resulted in long torrent paths (between 1,500 and 6,500 feet), which often scoured the channel to bedrock. Torrents that originated in forested areas and accessed forested channels left considerable amounts of large woody debris, channel complexity, and stone and cobble substrate. Often failures in fully forested slopes resulted in the displacement of a few trees with down-slope movement in tens of feet rather than thousands.

Water Quantity and Peak Flows

Fire suppression, road construction, and timber harvest have modified stream flows in these drainages. In particular, peak flows have probably increased from changes in snowpack accumulation/melt associated with timber harvest (Jones and Grant 1996) and because road construction essentially extends the drainage network (Wemple et al. 1996). Mann Creek experienced a unique peak flow event that occurred approximately 10 years ago when an impoundment on private land in the top end of the drainage breached. The resulting surge of water scoured channels and undercut banks and has left the upper reaches of Mann Creek in a deteriorated condition.

The factors that affect how past, present, and future management activities contribute to increased peak flows are analyzed using a process incorporated in the Willamette Forest Plan known as aggregate recovery percentage (ARP). This process evaluates the percentage of an area that is “hydrologically recovered,” and evaluates it against a threshold value that has been tailored for the area. ARP values greater than the threshold values, which are called

midpoint values, indicate that increases in peak flows are not likely to be significant. The areas for which aggregate recovery percentage is calculated are referred to as planning subdrainages.

Currently, all the planning subdrainages in the planning area are substantially above the midpoint values recommended in the Willamette Forest Plan (Table 3-1).

Table 3-1: Aggregate Recovery Percentage for the Trapper Planning Area.

Planning Subdrainages	WFNP Midpoint Value	Current Level
Upper Lookout Creek	75 %	80 %
Mann Creek	65 %	72 %
Quentin Creek	70 %	86 %
Cook Creek	70 %	90 %

Fish Species

Blue River and Cook, Quentin, Mann, and Wolf Creeks are the main fish-bearing streams in the watershed. The greatest fish diversity occurs in Blue River Reservoir and the 3- 4 miles of Blue River above the reservoir. The Blue River Watershed Analysis (USDA 1996) documented cutthroat and rainbow trout, chinook salmon, sculpin, long nose and speckled dace, redside shiner, and large scale sucker inhabiting these waters. Cutthroat and rainbow trout and sculpin are found in Cook and Quentin Creeks. The rainbow trout are both wild and of hatchery origin. Chinook salmon juveniles have also been found in Cook Creek. They are of hatchery origin and presumably migrate upstream from the reservoir where they are stocked.

The chinook salmon that occur in the watershed above the dam are juveniles from the McKenzie River hatchery and were artificially placed there by the Oregon Department of Fish and Wildlife (ODFW). This practice is no longer being implemented. The last year juvenile hatchery chinook were placed above the dam was 1994 (personal communication, Kurt Kremers, ODFW McKenzie Hatchery). It is not expected that any of these chinook are still surviving in the reservoir, and these hatchery fish are not considered in the official listing of Willamette spring chinook salmon (Federal Register 1999).

Blue River was never utilized by bull trout (a threatened species) for spawning and early rearing because colder water is required for these aspects of their life history (Buchanan et al. 1997). Historically, adult and sub-adult bull trout may have used the lower few miles of the river for foraging, especially in the winter when temperatures were cooler. Their ability to access the watershed is now blocked by Blue River Dam.

The Blue River Dam also blocks spring chinook migration. Historically, chinook salmon were known to migrate as far upstream as a waterfall at approximately river mile 4.5. This waterfall is currently inundated by Blue River Reservoir. Historical stream surveys conducted by the Fish Commission of Oregon (Willis, et al. 1960) documented chinook redds in Blue River, but it is not clear whether those redds were located above or below the falls.

simplify channel structure, and reduce sediment storage in streams. Mass failures that once deposited a complex mixture of various sized sediments and large wood, now contribute only sediment and often result in debris torrent events that eliminate existing channel structure. This situation is exacerbated by management-related slope failures attributed to poorly located, designed, or maintained roads.

Vegetation Composition and Pattern

Plant Communities

The forests in the planning area include the western hemlock and Pacific silver fir plant series. These forest-types are dominated by conifer species such as Douglas-fir, western hemlock, western redcedar, Pacific silver fir, and noble fir. A few healthy western white pine exist, and Pacific yew is fairly common. Hardwood tree species include big leaf maple, chinquapin, red alder and occasionally bitter cherry and madrone. The most common understory species include vine maple, rhododendron, salal, Oregon grape, swordfern, huckleberry, beargrass, and numerous grass and forb species. The age of the forests in this watershed range from 10 to more than 400 years old. Younger forests are primarily the product of timber harvest and lack many important structural components such as snags and down woody material. A significant portion of the area is mature forest approximately 150 years old from fires in the early to mid 1800's.

Non-forested areas distributed throughout the project area include rock outcrops, grass and forb meadows, talus and talus/shrub communities, and small wetlands. Within the Upper Blue River subwatershed there are approximately 536 acres of non-forested sites, of which 276 acres are rock outcrop and talus.

Plant Species of Concern

Conservation measures for Survey and Manage Species were established in the Northwest Forest Plan (USDA USDI 1994, 2001). These species are either genuinely rare, or, because of a lack of information about them, the agencies did not know whether they would adequately be protected by other elements of the NWFP.

The list of species that have potential habitat within the planning area, and results of site-specific, pre-disturbance surveys of proposed activity areas can be found in Appendix F. Species located in the planning area included the lichens *Pseudocyphellaria rainierensis, Nephroma occultum,* and the fungus *Ramaria stuntzii.*

Other rare plants -- often not associated with older forests -- are compiled on a Regional Forester's Sensitive Species list. These species and their habitats are often rare and limited in distribution. The list of species that have potential habitat within the planning area, and results of site-specific, pre-disturbance surveys of proposed activity areas can be found in the Appendix C. No sensitive species were located in the planning area.

The occurrence of noxious weeds in the planning area is sparse and not of great concern. Three species were observed: bull thistle (*Cirsium vulgare),* Canada thistle *(Cirsium*

arvense), and St. Johnswort *(Hypericum perfoliatum)*. They are primarily confined to roadsides and landings.

Snag and Down Wood Habitat

Current snag levels are estimated to range between 29 and 60 % of the average naturally occurring condition for the western Cascades. The Quentin and Cook subdrainages exceed the Willamette Forest Plan standard of 40 %. The Mann subdrainage is estimated to contain only 29 % snag habitat levels. This snag habitat level is low due to previous timber harvest practices on both private and national forest lands before it was common practice to retain or create these structures.

Down woody material levels are more difficult to estimate on a landscape-level, and they probably vary widely within the planning area. Down wood levels appear to be the lowest in the Mann subwatershed where past logging occurred prior to the mid-1980s, and very little, if any, down wood was left in harvest units.

Pattern

Forested communities are often grouped by their age into broad seral stages: early (0-20 years), mid (20-80 years), and late (80+). Figure 11 displays the pattern of forests within this planning area. Obviously past timber harvest using the "staggered setting" approach has resulted in a fragmented and patchy landscape. The Blue River watershed is about 38 % forest 0-30 years old, a result of timber harvest in the 1960s and 1970s. These openings lie in a matrix of older forest that averages about 140 years old, often with individual remnant old trees greater than 200 years old scattered throughout.

The Cook and Quentin drainages contain the most contiguous stands of late-successional habitat in the watershed. In general, the area has about 19 % early seral stage forested habitat that resulted from timber harvest in the 1970s and 1980s (USDA 1996).

Fire History

Prior to timber harvest, the dominant disturbance process in this area was fire. Weisberg (1998) found this area historically had infrequent, severe fires that often resulted in a homogenous pattern on the landscape. Fires, on average, returned to different zones of this landscape on the order of every 80, 145, or 240 years. Study results indicated that the entire Blue River Watershed had burned over within the last 500 years, with large fire incidents documented in 1849, 1893, 1902, 1918, 1930, and 1935.

Weisberg also found some areas in the watershed where fires returned with a more variable frequency, and the resulting pattern was more fine-scale and patchy. These historical fires were often driven by small-scale features in the area, like small drainages and ridges.

Historically, small fire starts probably smoldered in patches on the landscape over most of the fire season. These small fires grew to be large events only if a combination of fuel and weather reached an optimum condition for fire intensity and spread. During conditions of

INSERT FIGURE 11

extreme drought and/or strong winds, stand-replacing fires can occur in forests of any age. Under less severe conditions, understory burning is more typical, and it results in less overstory mortality.

In comparison, fire records from 1970 to 1994 show an average of four fires per year suppressed in the Blue River watershed. Older records often did not include fires that were remote from roads or residences and may underestimate the number of fire starts. Effective fire suppression coupled with the pattern of timber harvest has significantly altered the size and distribution of early seral forest on this landscape. In general, forest openings are now much smaller and more widely and evenly dispersed across the landscape than historically occurred.

Connectivity

When habitats on a landscape have some degree of "connectivity," plants and animals can more successfully move from one place to another. For example, movement is important for juvenile animals dispersing from their nests, or lichens blowing from tree to tree. Usually, connectedness of older forest is desirable because species associated with that habitat tend to be less flexible in the kinds of corridors they can successfully navigate. The following elements are needed for good connectivity of older forest:

- Areas must be wide enough to provide interior habitat that is not influenced by edge-effect.
- Forested canopy cover is most effective when greater than 60%.
- Shrubs and herbaceous understory vegetation should be intact.
- Snags and logs of various sizes and decay classes should be within the range of natural variability for the plant association.
- Multiple canopy layers should be present to provide niche-rich habitat for species such as fungi, lichens, and bryophytes.

The occurrence of connectivity is a matter of scale. Connectivity could occur where a riparian corridor links two disjunct forested stands. It could also occur on a much larger scale, such as with the Late Successional Reserve System designed for the Northwest Forest Plan (USDA USDI 1994). The Blue River Watershed, particularly the Cook and Quentin drainages, provides the best north-south, older forest habitat connectivity between the South Santiam and Horse Creek Late Successional Reserves (USDA 1998)(Figure 12). The Mid-Willamette Late Successional Reserve Assessment (USDA 1998) recommended improving late-successional connectivity between these reserves by establishing long-term strategies for retaining older forest or enhancing riparian areas. The *BRLS* provides greater connectivity between these LSRs than a matrix/riparian reserve strategy (Cissel et al. 1999).

HERITAGE RESOURCES

The Trapper Project area contains several documented prehistoric archeological sites, none of which have been formally evaluated for National Register of Historic Places (NRHP)

INSERT FIGURE 12

eligibility. Although formal evaluation has not yet occurred, these sites are managed on the assumption that they have the ability to "yield information," one of the NRHP criteria for significance.

The sites include chipped lithic tool and debris scatters (often the only existing remnant of the prehistoric occupations in western Oregon), primarily composed of obsidian artifacts. These stone chips are interpreted as the byproducts of hunting and gathering people's ancient tool maintenance, use and manufacture. It is assumed that most of the debris scatters date to the Middle Archaic period of about 6,000 to 2,000 years ago. The ethnic identity of the tool users is unknown; since the sites are largely on or near ridge top travel routes, the people may have been native to the Cascades or traveling through from the Willamette Valley or central Oregon.

RECREATION AND SCENIC RESOURCES

The Trapper planning area provides dispersed recreational opportunities generally associated with scenic driving, dispersed camping, fishing, rock climbing, and hunting. Forest Service Road 15 provides access along Blue River up to and around the base of Wolf Rock. Blue River is a popular fishing stream in the summer months, and receives a fair amount of challenging kayaking use during winter storm surges. Wolf Rock offers a challenging rock climbing experience. Dispersed camping is concentrated along Blue River and near Wolf Meadows immediately adjacent to the Wolf Rock area. Forest Service Roads 1509, 1513, 1516, and 1517 provide access to the upper elevations. Recreational opportunities in this area include hunting, berry picking and other forest product gathering, as well as scenic driving. The Tidbits Trail is accessed immediately off Road 1509. There are no developed recreation sites or facilities in the area.

Although the over-riding NWFP allocation for the planning area is the Central Cascade Adaptive Management Area, the underlying Willamette Forest Plan allocation along Road 15 is Scenic – Partial Retention Foreground. This scenic area is managed to maintain a near natural setting. Although management activities can be noticeable, they should not dominate the view along major travel routes and recreation sites in this area.

PRESCRIBED BURNING AND FUELS

Fuel Loads

The fuel loading is generally higher in native stands with a history of fire suppression and lower in areas treated with harvest and prescribed burning. Fire occurring under normal fire weather in today's landscape would tend toward the low intensity and small size because the fuel loading is lower in treated areas and the fuel bed is fragmented into small areas. In extreme fire weather, large, high intensity fires would have more severe effects in stands where fire has been excluded and would still have the same catastrophic effect in younger stands.

Air Quality

Air quality is managed under the Clean Air Act to maintain national ambient air quality standards. The Trapper planning area is located more than 10 miles from the Three Sisters Wilderness Area, a designated Federal Class 1 Airshed. The Clean Air Act requires the highest level of air quality and management for visibility in Class I areas.

Prescribed Fire

There are two general scheduling recommendations for use of fire in the *BRLS*:

1. Broadcast burn after regeneration harvest. The main purpose of prescribed broadcast burning after harvest is to reduce fuel loading to levels recommended in the Willamette Forest Plan. Reduced fuel loads translate to more planting spots and improve survival, growth and development of natural as well as planted seedlings through temporary reduction of shrub competition.

2. Light underburn about midway through the longer harvest cycles of Landscape Areas 2 and 3 (after the understory trees are 40 to 60 years old and big enough to survive fire). This can also be applied 2 to 3 decades before a scheduled harvest in native stands. The main purpose of this activity is to act on the recognition that fire plays an important, if not fully understood, role in the ecosystem. There is a desire to maintain its presence, though not to the extent that it occurred naturally. These mid-cycle underburns would also serve to reduce fuel buildup during the longer harvest cycles.

Both uses of fire affect vegetation in similar ways (Walstad et al., 1990). A change in species composition and increased diversity in the understory vegetation results from prescribed fire. Forage quality and quantity increases as older plants re-sprout with tender new shoots. Prescribed burns can decrease the total amount of nitrogen on the site through reduction of downed wood, while increasing the amount of nitrogen available to plants in the short term. Burning increases nitrate-nitrogen and ammonium levels in the forest floor, forms of nitrogen that are readily available to plants. The availability of other nutrients is also increased, as is soil pH. Chemical leachates from charred wood stimulate germination of some seeds, and there are fewer seed predators and pathogens for a period of time after a fire.

Plants have different ways of adapting to fire. Individual plants of some species survive by having thick bark or the ability to re-sprout from dormant buds in the bark or on roots and rhizomes. Other species have developed seeds with characteristics that require fire for germination or release from cones, or seeds that are windborne for easy spread into areas where fire has occurred. These plants may need periodic fires to maintain their presence in the landscape.

The season in which burning takes place may be an important factor in how burning affects vegetation. Each season has a distinct combination of soil moisture, fuel moisture, and plant phenology. Most prescribed burning is scheduled in the spring when soil and fuel moisture conditions are such that the fire will consume only the smaller fuels and leave a portion of the

duff layer intact to protect soils. Natural fires tend to burn more in the summer and fall, when plants are in a different phase of growth. With respect to shrubs, mortality is higher and re-growth is decreased when the shrub is burned after a period of rapid shoot growth (Walstad et al., 1990). Long-term monitoring is a critical part of the *BRLS* and will increase our knowledge of vegetation response to fire at various intensities and timing choices.

THREATENED, ENDANGERED, AND SENSITIVE WILDLIFE; MANAGEMENT INDICATOR SPECIES; MIGRATORY LAND BIRDS; AND SURVEY AND MANAGE WILDLIFE

Threatened, Endangered and Sensitive Wildlife

The Endangered Species Act (ESA), administered by the U. S. Fish and Wildlife Service (USFWS), mandates protection of threatened and endangered species. Listed species typically are habitat-specific with narrow geographic and environmental distributions. Proposed, threatened, endangered, and sensitive species (PETS) have specific requirements under the ESA and Willamette National Plan to maintain viability. Protection includes prohibition of disturbance and managing habitat to minimize impacts. Consultation is required with the USFWS on activities that may affect these species or their habitat.

Table 3-2 below lists the PETS wildlife species on the Willamette National Forest (USDA 2001 Regional Forester's Sensitive Species List) and whether there is potential habitat in the planning area. Proposed, threatened, and endangered species, including the northern spotted owl and bald eagle, occur in this landscape analysis area. A brief discussion of these species and their habitats is provided below. Additional detailed information on these species, as well as sensitive species and other species of concern can be found in the Biological Evaluation (Appendix D).

Table 3-2: Threatened, Endangered, Proposed, and Sensitive Wildlife Species on the Willamette National Forest and potential for their occurrence in the Trapper Project planning area.

Species	Habitat Present in Project Area	Federal Status
AMPHIBIANS AND REPTILES		
Oregon Slender Salamander	Yes	USFS Sensitive
Cascade Torrent Salamander	Yes	USFS Sensitive
Foothill Yellow-legged Frog	Yes	USFS Sensitive
Oregon Spotted Frog	No	USFS Sensitive
Northwestern Pond Turtle	No	USFS Sensitive
BIRDS		
Least Bittern	Yes	USFS Sensitive
Bufflehead	Yes	USFS Sensitive
Harlequin Duck	Yes	USFS Sensitive
Northern Bald Eagle	No	USFWS Threatened
American Peregrine Falcon	Yes	USFS Sensitive

Species	Habitat Present in Project Area	Federal Status
Yellow Rail	Yes	USFS Sensitive
Black Swift	No	USFS Sensitive
Tri-colored Blackbird	No	USFS Sensitive
Northern Spotted Owl	Yes	USFWS Threatened
MAMMALS		
Baird's Shrew	Yes	USFS Sensitive
Pacific Shrew	Yes	USFS Sensitive
California Wolverine	Yes	USFS Sensitive
Pacific Fisher	Yes	USFS Sensitive
Pacific Fringe-tailed Bat	Yes	USFS Sensitive
Lynx	No	USFS Sensitive

Northern Spotted Owl

The spotted owl is a management indicator species for old growth habitat (USDA 1990, p. IV-160). Over 13 years of surveying has documented three northern spotted owl activity centers within 1.2 miles of the Trapper Project. All of the owl activity centers have established 100-acre late successional reserves surrounding them. The entire planning area is located in Critical Habitat Unit OR-16.

The U.S. Fish and Wildlife Service has determined that reduction of suitable spotted owl habitat below 40 % of the median home range (1,182 acres) has a notably higher likelihood of leading to disruption of essential breeding, feeding, and sheltering behaviors (USDI, 1990). The median home range is defined by a 1.2 mile radius around the activity centers. Of the three owl pairs within ½ miles of units in the Trapper Project, two currently have suitable nesting, foraging and roosting habitat available within at least 40 % of their home range.

A number of strategies were used in the development of the *BRLS* that respond to managing spotted owl habitat over time. These strategies included: location of reserves; identification of short-term refugia where regeneration timber harvest would not occur for approximately 40 years; and use of data from a long-term spotted owl research program within the watershed to help with harvest scheduling. More detail on recommendations for spotted owl conservation can be found in the *BRLS*.

Migratory Landbirds

A January 11, 2001 Executive Order and a February 2003 Region 6 Memo outline the Responsibilities of Federal Agencies to Protect Migratory Birds. Habitats vary broadly for this large group of species. The planning area contains populations of land and neotropical migratory birds typical of the western Cascades.

There are 85 bird species recognized as neotropical migrants on the Willamette National Forest. Thirty-five of these species found on the Willamette were identified as "species of concern" in "Neotropical Migrants on National Forests in the Pacific Northwest" by Brian Sharp (1992). These species are associated with old growth, riparian, rocky cliffs, or grass

habitats. Snags in the area may be providing important habitat for Vaux's swifts, Williamson's sapsuckers, and American Kestrels. Old growth stands occupy portions of this landscape, which may be supporting Cooper's hawks, olive-sided flycatchers, western wood-pewee, and mountain bluebirds. Riparian habitat associated with streams in the area that may be providing habitat for riparian-associated species such as willow flycatchers, tree swallows, and red-eyed vireos.

A formal breeding bird survey route was established on Forest Service Road 1516 and has been surveyed for several years.

Management Indicator Species

Management Indicator Species (MIS) were addressed in the Willamette National Forest Plan (1990). They include the spotted owl, pileated woodpecker, marten, elk, deer, cavity excavators, bald eagles, fish, and peregrine falcons. The current conditions for the spotted owl and bald eagle are discussed in the Biological Evaluation (Appendix D). Habitat for elk and deer is discussed in the Elk Emphasis Area Management section in this chapter. Late successional forest, which provides the habitat for pileated woodpeckers, marten, and cavity excavators was discussed under the Vegetation section earlier in this chapter. Several former marten and pileated woodpecker management areas designated under the WNF Plan were retained on the landscape to provide additional habitat. Management indicator fish species found in this area were described previously under "Fish." They include cutthroat and rainbow trout, chinook salmon, sculpin, long nose and speckled dace, redside shiner, and large scale sucker.

Survey and Manage Wildlife Species

Survey and Manage and Protection Buffer Species requirements were established in the Northwest Forest Plan (USDA USDI 1994, 2001). These species are genuinely rare or, because of a lack of information about them, the agencies did not know whether they would be adequately be protected by other elements of the NWFP. The wildlife species listed in Table 3-3 occur on the Willamette National Forest.

Table 3-3: Survey and Manage, Protection Buffer, and Mitigation Measure Wildlife Species on the Willamette National Forest (USDA USDI 2001) and results of project surveys.

Species	Management Strategy	Habitat	Potential in Project Area? Survey Results?
Megomphix hemphilli (Linn County)	A = Rare. Pre-disturbance surveys required. Manage known sites. 172' no-harvest buffer*	Forested areas with a hardwood component and down woody material	Yes. **Surveys did <u>not</u> document presence**
Pristiloma arcticum crateris	A = Rare. Pre-disturbance surveys required. Manage Known Sites. 172' no-harvest buffer.	Forested areas with a hardwood component and down woody material	Yes. **Surveys did <u>not</u> document presence**

Species	Management Strategy	Habitat	Potential in Project Area? Survey Results?
Arthropods	F = Status Unknown. Strategic Surveys Required Only. 172' no-harvest buffer.	Unknown	Unknown. Project surveys not required.
Red Tree Vole	C = Uncommon. Pre-disturbance Survey Required. Manage High Priority Sites. 10-acre protection buffer.	Forested stands >10" DBH	Yes. **Surveys did document presence**
Great Gray Owl	A = Rare. Pre-disturbance Survey Required. 0.25 mile protection buffer on known site.	Mature stands near openings natural openings or human-made openings that provide appropriate foraging habitat	No habitat in planning area.
Fringed myotis, silver-haired bat, long-eared myotis, long-legged myotis, and Townsend's big-eared bat.	Protect caves, abandoned mines, abandoned wooden bridges, and abandoned buildings.	Caves, mines, abandoned wooden bridges, and abandoned buildings.	No habitat in planning area.
Black-backed woodpecker	Manage snags to provide for 100% population levels	High elevation forests.	No habitat in planning area
Pygmy nuthatch	Manage snags to provide for 100% population levels	High elevation pine forests.	No habitat in planning area

* 172' = the potential tree height for a tree in this area

CHAPTER 4.
ENVIRONMENTAL CONSEQUENCES

This chapter analyzes, compares, and explains the effects of the alternatives. Direct, indirect, connected, and cumulative effects are described. An emphasis is placed on resources related to the significant issues. Additional information on the environmental consequences of implementing each alternative can be found in the project analysis file.

EFFECTS ON SIGNIFICANT ISSUES

1. Learning and the Adaptive Management Area

Two key components facilitate successful learning:

> ***Monitoring efforts must be in place. This should include the identification up-front of key questions that, when answered, can benefit future management decisions.***

Alternatives A and B include an extensive monitoring effort. The *BRLS* was approved as an administrative study, which provides a framework and support for testing methods in this area. The monitoring plan includes long-term, multi-scale monitoring to evaluate effectiveness. Monitoring of previous projects (Blue River Face Timber Sale and North Fork Quartz Timber Sale) that followed *BRLS* recommendations has already been initiated. Pre-treatment data has already been gathered for the Trapper area for amphibians, trees, vascular plants, lichens, stream channel morphology, and stream temperature. Numerous other on-going monitoring projects are occurring in the adjacent H.J. Andrews Experimental Forest. The varying scales of monitoring for the *BRLS* were shown in Table 2-4, and Appendix F displays the types of monitoring questions being addressed.

> ***A mechanism should be in place that feeds new information back into an adaptive management framework.***

A critical aspect of projects that result from the *BRLS*, such as Alternatives A and B of the Trapper Project, is the emphasis on adaptive management. The Trapper Project lies in an Adaptive Management Area, and the monitoring questions are designed to feed into an adaptive management model (http://fsl.orst.edu/ccem/brls/brls.html). The adaptive management model followed in this study consists of three phases. In the first phase, new information is assessed to determine its potential relevance to the landscape management and watershed restoration strategy. In the second phase, these findings are evaluated to determine their significance and potential implications. Recommendations for change are identified. In the third phase, adjustments to the *BRLS* would be made based on the information produced from the preceding phases, and any other source of new information.

Learning opportunities under Alternative C (No action) have not been documented in a monitoring plan or adaptive management strategy, but they could include gathering information associated with monitoring natural development of late successional stands. This opportunity is not unique on the landscape, and is occurring in other locations.

2. Water Quality/Aquatic Resources

Sediment

Two distinct processes transport sediment to streams:

- Exposed soil surfaces can be eroded and washed directly into streams during storm events. Sediment introduced to streams in this fashion is generally fine textured, ranging from clay particles to fine gravel.

- Sediment can enter streams during mass wasting events that reach stream channels. Mass wasting includes both rapidly moving events such as landslides and debris torrents, as well as slow moving events such as earthflows and creep. Sediment introduced during mass wasting events may include all size classes from clay particles to boulders. Sediment introduced by slow moving earthflows and creep usually occurs as bank erosion as streams undercut toe slopes.

Once sediment reaches a stream, a variety of effects can occur. Fine sediments such as clay and silt particles can suspend in the water, resulting in increased turbidity. Larger silt and sand-sized sediment can lodge in and around larger bed materials if water flow is not great enough to move them on, resulting in "embeddedness." Still larger sediment, such as gravel, is an important component of aquatic habitat. It is the gravel-sized materials that are used by fish to build spawning beds or redds. And the largest sizes of sediment such as cobbles and boulders create important channel and habitat structure such as hiding cover and pools.

Surface erosion is most common on sites where ground disturbance, such as removal of ground covering vegetation and/or soil compaction, has occurred. Other types of disturbance include puddling and rutting of the soil, displacement of topsoil, and detrimentally burned soils. These impacts typically occur on roads, burned areas, and areas where ground-based timber harvest has occurred. An analysis of potential areas of new soil disturbance from logging, road construction, and prescribed fire that would occur with the Trapper Project is shown in Table 4-1.

Table 4-1: Estimated Acres of New Soil Disturbance with the Trapper Project.

Soil Disturbing Activity	Alternative A	Alternative B	Alternative C (No Action)
Ground-based logging	0.5	3.0	0.0
Skyline logging	3.0	6.5	0.0
Helicopter logging	3.5	2.0	0.0
Prescribed fire	4.0	4.0	0.0
Temporary Road	0.1	0.6	0.0
Total	11.1	16.1	0.0

Under all alternatives, drainages will continue to receive fine sediments from existing road crossings and where roads are in close proximity to streams. The frequency of delivery is dependent on the magnitude and frequency of storm events. Although this analysis indicates that there will be more areas with newly exposed soil following implementation of Alternatives A and B, the net result of management activities on the amount of fine sediment reaching streams during storm runoff is not likely to vary significantly between the action and no action alternatives because of the included mitigation measures in Alternatives A and B:

- Mitigation measures including deep ripping, surface scarification, and construction of water bars would minimize the flow of water over compacted and disturbed surfaces. These mechanical treatments are designed to control all but the most severe storm flows on these sites until the vegetation can establish itself.
- Re-vegetation with native plant species and planting trees on disturbed sites would facilitate the restoration of ground-covering vegetation within 2 to 3 years.
- Ground-covering vegetation is conserved in streamside-areas by prohibiting the use of ground-based equipment within 100 feet of class IV and larger streams.

Alternatives A and B would result in levels of detrimental soil disturbance well below the maximum levels permitted by Forest Service Region 6 standards and Willamette National Forest Soil Quality Standards and Guidelines (FW-081).

Even if some sediment does reach the streams from disturbed soil in this area, high stream gradients and flows provide adequate power to process and transport sediment with little adverse effect to aquatic habitat.

Potential for sediment entering streams from newly constructed temporary roads in Alternative A and B has been mitigated by locating road construction on sites that are stable, low-risk ridgetop sites, where infiltrative adjacent soils minimize runoff, or they are greater than a site-potential tree height from streams (approximately 170 feet). The temporary roads in Alternatives A and B do not require stream crossings.

Maintenance of approximately 11.42 miles of existing roads in Alternatives A and B, including culvert upgrades, resurfacing, and maintenance of ditches and other drainage

features, would reduce the amount of sediment available for transport and reduce the likelihood of water flows on the road surface that are capable of transporting sediment. Alternative B also proposes to decommission 0.4 miles of Road 1508435 and store 0.5 miles of Road 1508426. These treatments would reduce the potential of the road surfaces to yield sediment and eliminate a chronic disturbance pathway from the adjacent managed stands to the aquatic reserves along Wolf Creek and Blue River. Alternative B also proposes to store approximately 0.1 mile of Road 1500613, which would remove several headwater fills from a tributary of Mann Creek. This would eliminate a need for constant monitoring and maintenance, and would reduce the risk that sediment generated by crossing failure would be introduced into Mann Creek.

In Alternative C (No Action), no activity would occur, and therefore there is no potential for additional erosion to occur as a result of timber harvest, prescribed fire, or new temporary road construction. Road maintenance would also not occur, and existing levels of sediment transport associated with roads would not be reduced.

Mass Wasting

Mass wasting is an on-going natural process in the project area (USDA 1996), and it is responsible for the vast majority of the total sediment load that occurs naturally in streams. Mass wasting occurs from rapidly moving events -- such as landslides and debris torrents, as well as from slow moving processes -- such as earthflows and creep. Mass wasting processes can transport to streams all sizes of sediment, from clay and silt to gravel, cobble, and boulder-sized material. Mass wasting is also an important transport mechanism for the movement of large wood from hill slopes to streams.

A substantial body of evidence links poorly designed and/or maintained roads, and to a lesser extent timber harvest, with an increase in the frequency of mass failures. Consequently, all areas in Alternatives A and B proposed for harvest and road construction were evaluated for potential increased mass wasting. Mitigation to avoid sediment inputs from mass wasting essentially included identification and avoidance. Areas of active earthflow were mapped in blocks 20 and 21. These areas, as well as other slopes or landforms that could experience decreased slope stability as a result of harvest activities, were dropped from consideration for timber harvest. Road construction in these areas was not proposed. Fifty-percent canopy retention was prescribed for unit 20-2 to minimize the risk of failure during large storm events through the retention of root strength.

During the storms of 1996 and 1997, management-related slope failures not associated with a road occurred within 5 to 20-year-old regeneration units. Although Alternatives A and B propose regeneration harvest, there is a low probability of failure within the units because of mitigation measures of avoiding unstable slopes, heavy tree retention on headwall areas, and no-harvest buffers or heavier green tree retention along riparian areas below sensitive areas.

Road maintenance proposed for Alternatives A and B could result in a cumulative reduction of the risk of road-related mass failures. Maintaining and restoring ditch lines and drainage features and upgrading culverts would reduce the likelihood of fill saturation that can lead to

failure. Removal of unstable fill material would also reduce the likelihood of failure. These activities would not occur under with Alternative C (No Action).

Temperature

In *An Approach to Water Resources Evaluation of Non-Point Silvicultural Sources* (EPA, 1980), transmission of solar radiation as a function of forest crown closure drops to less than 10 % when crown closures of 70 % or greater are maintained. In *Forest Ecosystem Management: An Ecological, Economic, and Social Assessment* (FEMAT, USDA USDI 1993), cumulative effectiveness of stream-side shading as a function of distance from channel reaches 100 % between one-half and one site potential tree height from the channel.

In Alternatives A and B, this information was used to develop site-specific stream prescriptions for all perennial streams that maintain substantive contributing flows to high value downstream habitat. Implementation of these prescriptions maintains existing water temperatures within these streams, as well as in the high value downstream reaches. Table 2-8 displays the prescriptions for riparian areas.

All other streams in the units proposed for harvest, including intermittent streams and very small perennial streams that flow discontinuously above ground, will be managed with retention ranging from 15-50% canopy closure (See Table 2-8). Water temperature will be maintained in these streams even with this level of harvest because these intermittent streams do not flow during the season when elevated stream temperatures occur. The small perennial streams that have no additional shade protection prescribed are heavily influenced by the cooling effects of ground water, and do not provide substantial flows to down-stream reaches of concern. These streams are being specifically monitored for impacts to temperature under the *BRLS* Administrative Study.

In Alternative C, No Action, there would be no alteration of stream-side habitat, and stream temperatures would not change due to management activities.

Water Quantity and Peak Flows

The alternatives were analyzed using the aggregate recovery percentage (ARP) methodology for the years 2001 and 2011. These dates roughly include implementation through 10 years of recovery.

Analysis of Alternatives A and B indicates a reduction in ARP values for Mann Creek planning subdrainage (Table 4-2). This reduction is primarily the result of the proposed forest harvest. Quentin Creek planning subdrainage post-treatment does not differ significantly from the no action alternative. (Only the prescribed burn units 26 and 71 are in Quentin).

In Alternatives A and B, even though ARP is reduced in Mann Creek, the risk level does not drop to midpoint or below upon complete implementation. As with the Alternative C (No Action), 10 years of recovery moves each planning subwatershed substantially further above midpoint. No additional regeneration harvesting is expected in Mann, Quentin, or Cook planning subdrainages in the next 20 years.

Table 4-2: Aggregate Recovery Percentage (ARP) for the Trapper Project Area with Alternatives A and B.

Planning Sub-Watershed	WNFP Midpoint Value	Baseline	Change w/ Alternative A or B (2001)	Estimate following 10 years of recovery (2011)
Mann Creek	65 %	72 %	67 %	78 %
Quentin Creek	70 %	86 %	86 %	95 %

Alternative C (No Action) basically extends the current condition 10 years into the future. As previously discussed, the existing values for each planning subdrainage are above the recommended midpoint values, and 10 years of recovery moves each planning subdrainage further above midpoint (Table 4-3).

Table 4-3: Aggregate Recovery Percentage (ARP) for the Trapper Project Area with Alternative C.

Planning Subdrainage	Baseline	Future (2011)
Upper Lookout	80 %	93 %
Mann Creek	72 %	83 %
Quentin Creek	86 %	95 %
Cook Creek	90 %	97 %

Based on this analysis, it is not likely that either alternative will result in significant increases in peak flows. Consequently, shallow gradient stream reaches where accumulation of large wood and gravel and cobble-size sediments is expected over time are likely to retain these beneficial materials and the channel and habitat complexity that they provide.

Fish Habitat

Much of the supporting analysis for this issue has been discussed above. Additional information can also be found in the Biological Assessment (Appendix B).

Sediment, stream temperatures, peak flows and large wood all have potential to affect aquatic habitat and fish populations.

Sediment

Sediment entering stream channels can affect channel shape and form, stream substrates, the structure of fish habitat, and the structure and abundance of fish populations. Substantial increases in sediment supply from mass movement or surface erosion, bank destabilization, or in-stream storage losses can cause aggradation, pool filling, and a reduction in gravel quality.

Potential for surface erosion is directly related to the amount of bare compacted soil exposed to rainfall and runoff. Road surfaces, landings, skid trails, ditches, and disturbed harvest areas

can contribute fine sediments to stream channels. Not all hillside sediment reaches the stream channel, but roads and ditches form important pathways.

In Alternatives A and B, temporary roads will be built. Sediment routing would only occur during the short life of the road, and increases in sediment are unlikely due to its ridgetop location and absence of stream crossings. Maintenance activities on 11.42 miles of existing permanent roads in Alternatives A and B could deliver small amounts of sediment in the short-term. The long-term effect would be a reduced chance of catastrophic road failure, which could deliver large amounts of fine sediment from road fills. The benefits of road maintenance would not occur under Alternative C.

Since the potential for slope failure is unlikely in Alternatives A or B, it is unlikely that there would be any adverse affects to stream channels such as pool filling or aggradation with its implementation.

No fish-bearing streams exist near areas proposed for prescribed fire. There are intermittent or seasonal streams in these units, and the proposal would allow prescribed fire to burn through the riparian areas. Potential effects to these small streams would be a short-term increase in nutrients delivered from adjacent slopes. Potentially, a few small openings created by the fire in the canopy would increase the stream surface area exposed to sunlight, increasing primary production that would provide more algae/diatoms to grazing aquatic insects. However, these potential effects will most likely not be realized because the fires would be set in the spring when soils are moist, and mortality will be difficult to achieve. The riparian areas will be especially moist and this will make it even more difficult to achieve mortality objectives.

Neither of the action alternatives would have direct or indirect effects on fish-bearing streams or fish. The action alternatives with prescribed fire have the potential to beneficially affect small streams due to increased nutrients, but these benefits would most likely not be realized in the downstream fish-bearing areas due to the distance of proposed fires from fish-bearing streams, and the unlikelihood of achieving mortality objectives due to the need to burn in the spring. Retention trees included as a mitigation measure in alternatives A and B (Table 2-8) should prevent any adverse cumulative effects from occurring.

Temperature

As was previously discussed, temperatures in Cook, Quentin, and Mann Creeks are currently below the designated 64 degree maximum. Resident fish are the primary determinant of water temperature needs for beneficial uses in this area. Both action alternatives retain adequate stream shading that minimizes the potential for stream temperatures to rise above the standard. Stream temperatures will be maintained in important rearing areas of the downstream fish-bearing reaches with either action alternative.

Peak Flows

Substantial increases in peak flows or the frequency of channel modifying flows from increased snowmelt or rain-on-snow events can cause increased bed scour or accelerated bank erosion. This can have negative effects on fish and fish habitat by destabilizing stream

bedloads or inundating spawning gravels with fine sediment. Alternatives A or B are not expected to affect peak flows (see water quantity and peak flows discussion above). Implementation should not result in channel changes that would affect fish habitat. Alternative C (no action) would maintain current conditions and would not affect fish or fish habitat.

Large Wood

Large woody material plays an important role in controlling stream channel morphology, in regulating the storage and routing of sediment and particulate organic matter, and in creating and maintaining abundance of salmonids closely linked with abundance of woody debris, particularly in winter (Hicks et al., 1991). Large woody material creates a diversity of hydraulic gradients that increases microhabitat complexity. This complexity supports the coexistence of multi-species salmonid communities. Loss of stable in-stream woody material by direct removal, debris torrents, or gradual attrition as streamside forests are converted to managed stands of smaller trees will contribute to the loss of sediment storage sites, fewer and shallower scour pools, and less effective cover for rearing fish (Chamberlain et al., 1991). Neither action alternative would directly affect the large wood supply to fish-bearing streams. There are no fish-bearing streams in the areas proposed for harvest or underburning. Table 2-8 in Chapter 2 displays riparian management strategies for Alternatives A and B.

Areas adjacent to non-fish bearing and intermittent streams would be harvested in Alternatives A and B. There could be indirect effects to fish-bearing streams from interception of the supply of large wood that could migrate to the downstream fish-**{** XE "fish" **}**bearing reaches. These effects are difficult to predict and measure since the events that mobilize large wood are also difficult to predict. These indirect effects are not expected to be adverse because areas with potential to provide large woody debris inputs to riparian habitat are protected in no-harvest buffers on earthflow terrain, and on landslide prone terrain, at least 50% canopy is retained to provide large woody material in the future. The assumption that this is adequate is being monitored in the *BRLS* Administrative Study.

Alternatives A and B follow recommendations from the *BRLS* for maintenance of an aquatic reserve system (Figure 4). This system protects several small basins to meet aquatic conservation strategy objectives and to provide contiguous areas of undisturbed habitat for late successional species. One management objective for aquatic reserves is to maintain or establish late-successional forest conditions. The aquatic reserves also include riparian corridors along both sides of all fish-bearing streams. The reserves are essentially linear and occupy the entire valley bottom and adjacent toe slopes. These corridors connect aquatic and riparian areas throughout the watershed and link with the small basin reserves. Along Blue River a streamside reserve was delineated to run from Road 15 on the northwest to two tree-heights on the southeast side of the river. A one tree-height reserve along constrained channels (most of the fish-bearing streams), and a two tree-height reserve along unconstrained segments was designated for all other fish-bearing streams.

With these recommendations in place, neither action alternative would have a negative direct, indirect, or cumulative effect on the recruitment of large wood to fish-bearing streams in the watershed. The aquatic reserve system combined with the retention guidelines, low frequency

harvest, and site specific increases in retention trees to ameliorate fish habitat concerns, will maintain the supply of large wood to streams in the watershed.

Magnuson-Stevens Act

The Magnuson-Stevens Fishery Conservation and Management Act established a new requirement for "Essential Fish Habitat" that requires federal agencies to consult with the National Marine Fisheries Service (NMFS) on activities that may adversely affect essential fish habitat. Essential Fish Habitat for the Pacific coast salmon fishery means those waters and substrate necessary for salmon production needed to support a long-term sustainable salmon fishery and salmon contributions to a healthy ecosystem.

An analysis of Essential Fish Habitat is available in the Biological Evaluation (Appendix B). The finding shows that none of the alternatives result in an adverse affect to Essential Fish Habitat for salmon for the following reasons:

1. Salmon do not inhabit the Blue River watershed upstream of the dam. The Trapper Project area lies upstream of the dam. Therefore, there will not be a direct or indirect affect from any alternative.
2. Trapper Project does not propose any timber harvest or road construction adjacent to, or directly over, any fish-bearing streams in the watershed.
3. Tree retention guidelines will provide for shade to perennial non-fish bearing streams, assure water quality, and protect bank stability.
4. No barriers to salmon migration will be constructed with any proposed action.
5. Aquatic conservation strategy objectives for riparian reserves in the Adaptive Management Area will be met.

Aquatic Conservation Strategy Objectives

Both action alternatives meet the nine aquatic conservation strategy objectives (Appendix A) from the Northwest Forest Plan. Following recommendations from the *BRLS*, the underlying assumption is that the more the future landscape resembles the historical landscape, the higher the likelihood of retaining native habitats, species, and ecological functions.

To meet the aquatic conservation strategy, the *BRLS* recommended a system of aquatic and small basin reserves and a watershed restoration program. The *BRLS* also recommended desired landscape features and prescriptive elements intended to achieve the desired features.

A discussion of each objective is included in Appendix A. The objectives were first analyzed on a landscape level with the *BRLS*. Desired landscape features were identified that would be important in meeting the objectives; then the actions in Alternatives A and B were evaluated for their ability to meet this desired condition.

Cumulative Effects

Reasonably foreseeable activities that could cumulatively add to the impacts of this project to water quality/aquatic resources include future timber harvest, temporary road construction, road maintenance, and road decommissioning. Approximately 600 acres of commercial

thinning and 72 acres of regeneration harvest may occur over the course of the next 20 years in this planning area. This activity may be supported by less than one mile of temporary road construction. The Blue River Watershed Access and Travel Management Plan (in draft) recommends 49 miles of road be decommissioned to improve watershed conditions. The timing of that activity is unknown. It may take decades because of the limited availability of funding. Key roads identified in the Forest Roads Analysis will continue to be maintained to specified standards. The timber harvest and temporary road construction will likely include mitigation measures similar to the Trapper project, resulting in no significant impacts to sediment input, mass wasting, water quantity and peak flows, temperature, or large wood availability for fish habitat. Continued road maintenance and potential road decommissioning may improve watershed conditions.

3. Logging Economics

Alternatives A and B differ by the logging systems required to harvest forest resources (Table 4-4). Alternative A proposes using a helicopter to log more acres than B, which results in higher unit costs. The sum total of unit costs for Alternative A is $3,683,831.50, compared too $2,710,938.50 for Alternative B. Alternative A requires less construction of temporary road to support the activity because it uses less cable and ground-based systems for logging.

Table 4-4: Logging systems, temporary road construction, and total unit costs proposed in the Trapper Project.

	Alternative A	Alternative B	Alternative C (No Action)
Cable	32.0 acres	64.2 acres	0
Helicopter	116.0 acres	66.0 acres	0
Ground-based	1.0 acres	18.8 acres	0
Temporary Road Constructed	200 feet	1,200 feet	0
Total of unit costs	$3,683,831.50	$2,710,938.50	$0

EFFECTS ON OTHER ISSUES

4. Vegetation Pattern and Composition

Plant communities

Forest proposed for harvest in Alternatives A and B include “mature” stands less than 150 years old, with scattered residual trees less than 250 years old. They are dominated by western hemlock and the Pacific silver fir plant series, which are common in this watershed. The prescription calls for leaving the bigger trees in a scattered and clumped pattern within each unit. Alternatives A and B would result in the creation of early seral forest habitat with abundant structure retained, such as snags and down wood.

Alternatives A and B minimize changes in microclimates within non-forested areas by using no-harvest buffers and by limiting direct physical disturbance. Non-forested sites identified in proposed units include small openings in the forest canopy such as cliff and rock outcrops, open talus slopes, shrub/forb communities, and aquatic habitats.

Alternative C (No Action) would have no direct effects to forest or non-forest sites. "Natural" succession of the plant communities will continue with human suppression of fires.

Plant Species of Concern

Surveys were conducted as required by the USDA USDI 2001 FSEIS for all Category A and C Survey and Manage Species. Known Sites of Category B and D species from the 2001 FSEIS were also identified. Both action alternatives maintain Survey and Manage species. With Alternatives A and B, known sites will be buffered from activities such as harvest, road building, and prescribed fire. Protection follows Regional direction (USDA USDI 2001).

The epiphytic lichen specklebelly (*Psuedocyphellaria rainiersis,* Category A*)* is located in remnant old-growth trees near unit 40-1. The location is within a no-harvest riparian reserve outside the unit. There will be no effects with either action alternative.

The rare coral fungus *Ramaria stuntzii* (Category B) is located in unit 21-2. This fungus is associated with the roots of Douglas-fir and western hemlock. Alternatives A and B provide a 172-foot no-harvest/no disturbance buffer around each site. Within the buffer, the host trees for the fungus will be retained and the soil will not be disturbed. This buffer will also maintain the microclimate of the site. Neither action alternative is expected to have an effect on these sites.

Two locations of the epiphytic, nitrogen-fixing lichen *Nephroma occultum* (Category B) exist within unit 40-1. This lichen is endemic to the Pacific Northwest and occurs almost exclusively in stands greater than 200 years old. Alternatives A and B provide a 172-foot no-harvest/no disturbance buffer around each location. This buffer will maintain the substrate and the microclimate of the site. Neither action alternative is expected to have an effect on these sites.

The green bug moss, *Buxbaumia viridis* (Category D), was identified on old decaying logs on the forest floor near 20-1. Because it is greater than 200' from the unit boundary, it does not require additional protection.

None of the alternatives is expected to have effects on any sensitive plants. Potential habitat exists for 14 sensitive species within the project area, but surveys did not document any populations. Contract clauses C9.52 and C6.25 are included as mitigation in Alternatives A and B to protect populations found after a sale is awarded.

The construction of temporary roads in Alternatives A and B increases the chance of noxious weed introduction, more so in B, especially if equipment and materials are contaminated with seeds and introduced into the project area. To reduce this potential, both action alternatives includes 3 mitigation measures: 1) all equipment must be pressure washed prior to use on the

project; 2) a weed-free source of rock will be required; and 3) existing known populations of noxious weeds in the project area will be pulled prior to implementation. With Alternative C, there would be no introduction of new noxious weeds from road construction or harvest activities. Existing populations of weeds would continue to spread.

Snag and Down Wood Habitat

In the short-term, Alternatives A and B will result in a reduction of existing snags in the areas harvested. To manage safety during operations, numerous existing snags will be felled. These will generally include class II-IV trees, which are the more decayed trees that provide the highest quality habitat. Some of these trees may be protected in no-harvest reserves and by marking them as retention trees when they do not pose safety hazards. In the long-term, Alternatives A and B will significantly increase snag availability. To more closely resemble the effects of a natural fire, approximately 3-24 trees per acre will be converted to snags following harvest. This is a 1.5 to 10-fold the number prescribed in the Willamette Forest Plan to meet habitat objectives for primary cavity excavators. This does not imply that the populations of these species will also increase by that amount, since their territorial nature will control their density. However, they will have the opportunity to be abundant in these units.

Alternatives A and B would not remove any decay class III, IV and V down logs, which provide high quality habitat. Additional trees will be felled and left on the forest floor at the rate of 240 lineal feet (or 3 trees) per acre. This material will be class I or II, and greater than 20" DBH at the small end. This will provide wood into the decay cycle. There is a high likelihood that natural events will topple trees retained for snag habitat, increasing this important component on the forest floor.

The availability of snag and down wood habitat will remain the same with Alternative C (No Action). Forest succession will continue, resulting in natural recruitment over time from insects, disease, and competition. Existing snags and down wood will not be removed or disturbed.

Pattern

The units proposed for harvest in Alternatives A and B lie in a landscape heavily fragmented from previous harvests, most of which occurred between 1970 and 1990. These stands were selected for harvest because they are remnants, meaning they are relatively small patches on the landscape, leaving larger patches in the watershed unharvested. Their conversion to early-seral forest minimizes fragmentation at the landscape scale. Alternatives A and B would decrease the amount of edge in the landscape relative to existing conditions. Following recommendations from the *BRLS* that span 260 years, this strategy will eventually create relatively large forested areas of about the same age, that provide contiguous habitat at a large scale. In time, the pattern and distribution of older forest would return to a more natural state with large patch sizes well-distributed across the landscape (Figure 3).

In Alternative C (No Action), these forested stands would continue on their successional paths. There would be no immediate change to existing levels and distribution of early, mid, or late-successional habitat.

Connectivity

Alternatives A and B does convert existing late successional forest into younger stands, but not in the cook or Quentin drainages. A mixture of retained clumps, areas for riparian protection, and Survey and Manage buffers will provide stepping stones throughout the area, maintaining corridor functions for late successional species, albeit of lower quality.

Alternative C (No Action) would not affect late-successional stands within the Cook and Quentin Creek drainages, which provide the primary connection between the South Santiam**{** XE "Santiam LSR" **}** and Hagan Late-Successional Reserves.

Cumulative Effects

Reasonably foreseeable activities that could cumulatively add to the impacts of this project to vegetation include future timber harvest and re-growth of previously harvested areas. Approximately 600 acres of commercial thinning and 72 acres of regeneration harvest may occur over the course of the next 20 years in this planning area. The timber harvest will likely include mitigation measures similar to the Trapper project, resulting in no significant impacts plant species of concern, snags and down wood habitat. The forest communities and their pattern in this planning area will change over time. The *BRLS* details a long-term plan to aggregate patches of older forest and protect sensitive habitats in this watershed.

5. Threatened Northern Spotted Owl

Alternatives A and B would directly affect spotted owls by reducing habitat. Habitat can be degraded, downgraded, or removed. The following definitions apply to these terms:

- *Degraded: habitat, either suitable or dispersal, where the quality has been affected, but the functionality has not been removed. For example, light thinning or underburn that partially removes the overstory, yet maintains a minimum of 70 % average canopy closure, would maintain suitable foraging habitat. If the treatment retains 40 % canopy closure, the habitat would remain dispersal habitat (Units 26 and 71).*

- *Downgraded: habitat where the functionality has been changed from suitable to dispersal. For example heavy thinning that maintains a minimum of 40 % average canopy closure (Unit 20-2).*

- *Removed: habitat, either suitable or dispersal, where the functionality has been eliminated so there is no longer spotted owl habitat of either type present. For example, regeneration harvest or thinning that reduces canopy closure below 40 % (Units 20-1, 20-3, 21-1, 21-2, 21-3, 40-1).*

Concerns for the future productivity and stability of spotted owl sites increases if habitat is altered near the activity center (i.e. within 0.7 miles), or if habitat is removed within home ranges (out to 1.2 mile radius) and below the critical threshold.

Alternatives A and B would not remove any habitat within 0.7 miles of spotted owl activity centers. Unit 71, which is proposed for a prescribed burn, is within 0.7 miles of a spotted owl habitat activity center. This underburn should have minimal direct effects to spotted owl habitat because very few overstory trees will be burned to the point of mortality, and following the fire, the stand will still function as suitable spotted owl habitat.

There are three spotted owl activity centers located within 1.2 miles of Alternatives A and B. One pair would have habitat reduced below the critical threshold (0871). Effects of the habitat degradation and removal displayed in Table 4-5 include a loss of foraging habitat opportunities near the activity center in unit 40-1. It is unknown how much the owls are currently using these areas for foraging. Abundant large woody material, snags, and large green trees will be retained (or in the case of snags, created after logging) in all units to provide for future habitat quality.

Table 4-5: Effects to Spotted Owls with the Trapper Project.

Spotted Owl Site Number	Existing Habitat Acreage (Alternative C No Action)	Acres Removed Alternatives A & B (<40% canopy retained)	Acres Degraded Alternatives A & B (>70% canopy retained)	Alternatives A & B Post-Treatment Habitat Available
2036	1,696	25	0	1,671
0859	1,655	25	0	1,630
0871	1,149	25	0	1,124

Units 26 and 71 (prescribed underburns), lie within 1.2 miles of spotted owl activity centers. The activity would have short-term negative effects on spotted owls, but likely long-term beneficial effects. Because habitat with more than 70% canopy closure is still considered suitable, degraded acres due to the prescribed underburn are still considered habitat. Opening the canopy closure to 70% may reduce spotted owl habitat quality from current levels, however, canopy closure is expected to recover in 8-10 years, and the patchy understory mortality may benefit the remaining trees by improving their growing conditions due to increased nitrogen and increased sunlight. This may allow trees to grow larger faster, benefiting spotted owls in the long term with the important large-tree component of their habitat.

Alternatives A and B responds to USFWS Conservation Recommendations (USDI 1998) for this species to:

- Minimize the loss or degradation of suitable habitat within 0.7 miles of known spotted owl nest sites.
- Facilitate the development of late-successional forests by maintaining the maximum number of large class I and II logs and standing live and dead trees within regeneration harvest units.

If recommendations from the *BRLS* are followed in the long-term, there are additional measures that will aid in the conservation of this species*:*

- long timber harvest rotation lengths;
- high overstory retention levels;
- use of site-specific owl reproductive information to identify reserves;
- augmentation of select 100-acre late-successional reserves;
- reduced landscape fragmentation in the long- and short-term.

The project was submitted to the USFWS for formal consultation (as part of the Wolfmann DEIS). The Biological Opinion was received on September 29, 1998, with the determination that "*the project is not likely to jeopardize the continued existence of the spotted owl or result in the destruction or adverse modification of spotted owl critical habitat."* The project follows the USFWS Biological Opinion by complying with the terms and conditions that implement the reasonable and prudent measures. These measures include seasonal restrictions within ¼ mile radius of known owl activity centers and reporting requirements to USFWS.

Implementation of Alternative C would not affect northern spotted owl pairs because no suitable habitat would be altered.

Cumulative Effects

Reasonably foreseeable activities that could cumulatively add to the impacts of this project to spotted owl habitat include future timber harvest, re-growth of previously harvested areas, and wildlife habitat improvement projects. Approximately 600 acres of commercial thinning and 72 acres of regeneration harvest may occur over the course of the next 20 years in this planning area. The timber harvest will degrade and/or remove spotted owl habitat, but it will follow guidance from the USFWS, the agency that regulates the management of threatened species. The timber harvest will likely contain mitigation measures to provide key elements of future spotted owl habitat, such as large woody material standing and on the forest floor. Habitat improvement projects planned to occur within the next 5 years include the creation of 1600 snags and supplementing forest habitat with 128 downed trees. Planned thinning in existing plantations is designed to provide spotted owl habitat in the long-term.

6. Heritage Resources

Implementation of Alternative A or B would have no effect on known significant heritage sites. The appropriate sample of high and low probability ground has been surveyed according to the State Historic Preservation Office (SHPO) approved Willamette National Forest Cultural Resource Inventory Plan standards. All significant sites will be protected by avoidance. Several landscape blocks contain heritage resources; these are either outside proposed ground-disturbing units or they have been evaluated as non-significant. In all instances, a minimum one-hundred-foot buffer has been established beyond known site boundaries. Federally recognized tribes with an interest in the area have been contacted, and one, the Siletz Tribe, has made specific preservation recommendations that have been incorporated into the preservation plans.

Non-significant sites are defined as isolates with very limited information potential; thus, they do not meet the criteria for eligibility to the National Register of Historic Places (NRHP). Recording these locations is considered adequate mitigation, and monitoring selected isolate locations during proposed project operations will occur. If any sites are found during proposed project activities, a standard contract provision would be invoked that will protect the new locations until they can be evaluated. Known site locations are not identified in this document; such locations are kept secure for site preservation purposes, and are exempt from the Freedom of Information Act.

Cumulative Effects

Reasonably foreseeable activities that could cumulatively add to the impacts of this project to heritage resources include ground-disturbance from future timber harvest and temporary road construction. Approximately 600 acres of commercial thinning and 72 acres of regeneration harvest may occur over the course of the next 20 years in this planning area. This activity may be supported by less than one mile of temporary road construction. The timber harvest and temporary road construction will require surveys to document and protect heritage resources in accordance with the State Historic Preservation Office (SHPO).

7. Prescribed Burning and Fuels

Fuel Loads and Prescribed Fire

In Alternatives A and B, fuel loading would increase temporarily because harvest activities create slash. Prescribed fire in the year following harvest would reduce fuel loading to below pre-harvest levels. With reduced fuel loading, any fires that started in the stands could probably be suppressed using hand crews. If a fire started, intensity and severity of effects would be less than with no action or no slash burning (Table 4-6). Prescribed fire would occur in Alternative A and B where fuel loadings would exceed forest plan standards and guidelines for material 0 to 3 inches. Post-harvest review will be conducted to check the viability of selected fuel treatment.

Low intensity prescribed burning under spring-like conditions is recommended in Alternative A and B to reduce small size class fuels while minimizing impacts to soils and overstory tree mortality. These conditions occur when soil is still wet, duff is at least damp at the soil interface, large fuels (3 to 9 inches diameter) have a moisture content above 35 %, and mortality of overstory trees is less than 10 %. Burning under these conditions allows for retention of existing ground cover, minimal below-ground heat disturbance, and large woody debris consumption is low. Prescribed fire applied during spring-like conditions would not reduce slash on all acres. Shaded areas will not carry fire as well as the sun-exposed areas, creating a mosaic across the landscape.

Existing fuel profiles within the area have fuel loadings ranging from 9 to 32 tons per acre of 0 to 9 inch material. Natural cycles of vegetative progression would continue to increase these levels to the higher end of that range. Past fuel treatments in this area have included broadcast burning to reduce this fuel loading below pre-activity levels. Prescribed burning creates a fuel profile that meets forest plan hazard reduction standards. Opportunities to efficiently reduce fuel loading and associated risk of larger fires occur following timber

harvest. Delaying prescribed burning lengthens the time when fire could occur and fire resistance to control is highest. Consequences to remnant stands and very young stands are also higher with delayed prescribed burning.

Fireline construction and manual clearing of slash are two ways to protect adjacent or included areas. Reproduction areas, unstable soil areas, some special habitats and private land holdings are some specific areas where fire would be excluded. Fireline use near riparian areas would be limited to protection for some of the above reasons. Landscape project objectives include occasional disturbance of the riparian areas as well. Minimal impacts are expected as a result of harvest and retention near riparian areas and the burning conditions prescribed.

Air Quality

Fuel profiles resulting from this project, total amount of suspended particulate from burning those fuels,**{** XE "fuels" **}** and acres of prescribed fire**{** XE "prescribed fire" **}** in Alternative A and B are displayed in Table 4-6 to demonstrate potential effects of on air quality.

While prescribed fires have proven to be very successful in creating the conditions necessary for healthy forests, there is a troublesome side effect. It is smoke. To ensure smoke dispersion, atmospheric conditions are closely monitored before prescribed fires are ignited. Yet even in favorable conditions, the air will still become smoky. Often, although the air is smoky, it still meets federal and state air quality standards.

To ensure that air quality meets federal and state standards while prescribed fires are being conducted, public land managers must meet the requirements of the Oregon Clean Air Act State Implementation Plan.

Before prescribed fires are ignited, public land managers in Oregon submit their plans to the Oregon Department of Forestry. Their meteorologist reviews weather conditions and determines which prescribed fires can be ignited and which, if any, must be delayed to ensure that air quality meets federal and state standards. If air quality begins to approach unhealthy levels, public land managers may be asked to delay igniting prescribed fires. Measurements of impacts on air quality are based on particulate matter produced by the proposed burns.

Table 4-6: Acres Burned and Smoke Particulate**{** XE "particulate" **}** Produced by Alternative A or B of the Trapper Project.

Unit	Harvest Acres Burned	Slash Tons Per Acre**	Burning Pounds Suspended Particulates PM*-10/ac	Burning Total Pounds Suspended Particulates PM-10	Burning Pounds Suspended Particulates PM-2.5/ac	Burning Total pounds Suspended Particulates PM-2.5
20-1	4	17.31	391	1,564	332	1,328
20-2	23	17.31	391	8,993	332	7,636
20-3	8	17.31	391	2,656	332	2,656
21-1	25	17.94	414	10,350	351	8,775
21-2	44	17.94	414	18,216	351	15,444
21-3	1	17.94	414	414	351	351
40-1	50	34.88	690	34,500	585	29,250
71	25	31.80	85.0	2125	72.1	1,803
26	67	20.90	72.0	4824	60.8	4,074

* PM = Particulate Matter described by size in microns.
** The amount of slash produced is used to predict the total suspended particulates produced. Consumption of slash is estimated from a percentage of fuel burned. This value could vary depending on the time of year treated, fuel moisture, etc. Actual conditions at the time of burning could vary slightly: figures above are estimates.

With the implementation of Alternative C (No Action),**{** XE "Alternative 3" **}** ground-fuel loading would continue to increase, especially the larger size classes, as trees continue to age and natural accumulation of residue exceeds rates of decay. Potential for wildfire would exist. If a large fire**{** XE "fire" **}** occurred, it would create large amounts of smoke. Particulate matter produced in wildfires increases from the 400 to 700 pounds per acre PM-10 produced in spring-like conditions to 1500 to 2000 pounds per acre produced in summer wildfire conditions. Smoke would blanket the nearby Three Sisters or Mount Washington Wilderness areas with major negative effects on air quality. Fire would probably occur in the summer months when most human use of the wilderness occurs. Depending on the wind direction, smoke would probably reach either the Bend or Eugene areas, which are designated federal Class I areas that require the highest level of air quality and management for visibility.

Fire, Travel-Routes, and Escapement

Under Alternatives A and B, maintenance of 11.42 miles of existing roads currently open to public use may improve travel conditions allowing fire suppression personnel to respond more safely to fires that may occur along these roads. Alternative C (No Action) would not improve travel routes for fire suppression.

Prescribed fire has some inherent risk of escaping the desired area. When fuels are in a dry enough condition to burn, adjoining stands will also contain fuels available to burn. Agency requirements for prescribed burn plans (FSM 5142.2) require assessment of prescription

elements compared to resource objectives. Where concerns exist for fire escapement, a risk assessment must be completed and a contingency plan developed to prevent such escape before ignition can begin.

Meeting prescription elements (fuel moisture, temperature, wind speed and direction and relative humidity) for low intensity fire is the main mitigation to fire escape. If, having met the prescription elements, fire should escape, it would most likely not exhibit severe fire behavior that would allow it to significantly intrude into adjacent areas. Measures such as control of ignition pattern, constructing fire lines or fuel breaks, wetting adjacent fuels prior to burning and adding personnel to patrol adjacent areas during the burning are commonly used to reduce the risk of fire escape.

Cumulative Effects

Reasonably foreseeable activities that could cumulatively add to the impacts of this project to forest fuels, air quality, and fire risk include future timber harvest and road decommissioning. Approximately 600 acres of commercial thinning and 72 acres of regeneration harvest may occur over the course of the next 20 years in this planning area. The Blue River Watershed Access and Travel Management Plan (in draft) recommends 49 miles of road be decommissioned to improve watershed conditions. The timing of that activity is unknown. It may take decades because of the limited availability of funding. The timber harvest will increase forest fuels. It is likely that future projects will include mitigation measures similar to the Trapper project, resulting in activities to reduce slash levels and protection of air quality. Potential road decommissioning may reduce vehicular access to fire starts in this planning area.

8. Threatened, Endangered, Sensitive Wildlife, Migratory Landbirds, Management Indicator Species, and Survey and Manage Wildlife

Proposed, Endangered, and Sensitive Species (PETS)

Analysis of impacts/effects to PETS species can be found in the Biological Evaluation in Appendix D. Neither action alternative results in a trend towards federal listing of any sensitive species. Mitigation measures that are part of Alternatives A and B minimize effects to Threatened and Endangered species. The exception is the northern spotted owl: Alternatives A and B may affect, but are not likely to adversely affect the northern spotted owl. This determination means that the actions do not jeopardize this species. Alternative C will have no effect to the northern spotted owl.

Migratory Landbirds

A Memorandum of Understanding was signed between the USFS and USFWS to complement the January 2001, Executive Order. Agreed-to measures include the identification of habitats needed by priority species. The Trapper analysis file contains a summary report of neotropical birds on the Willamette National Forest and their habitat associations. Thirty-five neotropical migrant species of concern listed in Sharp's report (1992) are found on the

Willamette National Forest. These species are associated with old growth, riparian, rocky cliffs, or grass habitats.

Mitigation measures within Alternatives A and B provide for retention of several ecosystem components important for these species: abundant down woody material; abundant snags; retention of large older trees; and retention of stream-side forests. No unique non-forest habitats will be altered with either action alternative.

Alternatives A and B would impact land and migratory birds by removing late successional habitat. While this would negatively impact more sensitive mature and late-successional forest-associated birds, for example Hutton's vireo, golden-crowned kinglet, hermit thrush, and Swainson's thrush, species that use the early seral stage such as winter wrens, American robin, and grouse would benefit. Snag habitat used by migratory birds such as western bluebirds or swallows will be lost in Alternatives A and B due to logging and roadside hazard tree removal. Snag creation activities will mitigate this habitat loss, but it will be several years before green trees left for snag retention become functional.

Alternatives A and B include prescribed low intensity forest underburns, scheduled to occur during the spring. This may impact some species of birds that are nesting in these mature stands. The fire could cause nesting failure in some cases, especially for those birds which nest relatively low to the ground such as hummingbirds, flycatchers, warblers, sparrows, and thrushes. Although juveniles of some species may not be able to fly large distances until late summer, many species are independent much earlier. Most neotropical migrants generally will fledge in June or July, although this can be later when second nest attempts are made.

Alternative C (No Action) does not proposed management activities at this time and therefore would not affect the habitat conditions of land and migratory birds. The existing vegetation conditions would continue along the natural succession pathways and bird populations would respond accordingly.

Management Indicator Species

Management Indicator Species (MIS) include the spotted owl, pileated woodpecker, marten, elk, deer, cavity excavators, bald eagles, fish, and peregrine falcons. All of these species occur in the Blue River Watershed.

- Impacts of the Trapper Project for the spotted owl, bald eagle, peregrine falcon, and fish can be found in Biological Evaluation in Appendix D. This project may affect spotted owls, and has no effect on bald eagles or peregrine falcons.

- Persistence for spotted owls, pileated woodpeckers, and marten were evaluated in the 1994 USDA USDI FSEIS (Appendix J2). That document concluded that persistent populations of these species would be maintained under the NWFP Standards and Guidelines, which are incorporated into both action alternatives of the Trapper Project. Populations of spotted owls will not be jeopardized by this project (USFWS 1998). Pileated woodpeckers and marten may be displaced by harvest activities in this area, but their populations throughout their range have not been identified as being in

decline, as indicated by their absence from the Regional Forester's Sensitive Species List (2001).

- Impacts to cavity excavators were evaluated previously under "Vegetation Pattern and Composition." Adequate large wood will be retained or created to provide habitat for these species.

- Impacts to deer and elk were evaluated for the Trapper Project. The results are shown in Table 4-7. The Trapper planning area contains three elk emphasis areas, but there are treatments that affect habitat quality in only one: Quentin. This area is rated as a "moderate emphasis" in the Willamette National Forest Plan. Current conditions were determined by calculating habitat effectiveness (HE) values for big game using a model called HEIWEST. Values were calculated for spacing of habitat, roads, cover, forage and overall habitat effectiveness (Table 4-7).

Table 4-7: Habitat Values For Roosevelt Elk in the Quentin Creek Emphasis Area.

Emphasis Area *(Rating)*	**HE Spacing**	**HE Roads**	**HE Cover**	**HE Forage**	**HEI Overall**
Quentin Creek *Moderate*	0.88 *min. 0.4*	0.36 0.37* *min. 0.4*	0.61 *min. 0.4*	0.32 *min. 0.4*	0.50 *min. 0.5*

Min. = minimum threshold value from the Willamette Forest Plan
* Value with Alternative C.

Use of the HEIWEST model assumes that effective elk management would also provide for the needs of black-tailed deer. Implementation of Alternatives A and B would improve the habitat value for forage, which is currently low. The 15% retention of green trees in units as well as prescribed broadcast and underburning would stimulate growth of grasses and forbs that exist under the canopy. This would not occur with Alternative C (No Action). The road closures in Alternative B helps to increase the availability of secure cover. Additional forage seeding that may be done with KV funding would further improve forage under both action alternatives.

- Impacts to management indicator fish are described in the Aquatic Resources area of this Chapter. There are no fish-bearing streams in the units proposed for treatment. Mitigation measures are prescribed to minimize downstream impacts.

Survey and Manage and Protection Buffer Wildlife Species

Survey and Manage and Protection Buffer Wildlife Species requirements were established in the Northwest Forest Plan (USDA USDI 1994, 2001). Protection for all located wildlife species would follow currently published management recommendations. The analysis of potential habitat for Survey and Manage and Protection Buffer Species was shown in Table 3-3 in Chapter III. Because potential habitat was present, surveys were conducted for *Pristiloma arcticum crateris, Megomphix hemphilli,* and red tree voles. Red tree voles were

found and protected with 10 acre no-harvest and no disturbance buffers. Protection for these species is outlined in Mitigation Measures described in Chapter 2 Table 2-7.

Cumulative Effects
Reasonably foreseeable activities that could cumulatively add to the impacts of this project to TES species, migratory landbirds, MIS, and Survey and Manage wildlife include future timber harvest, temporary road construction, road decommissioning, and wildlife habitat improvement projects. Approximately 600 acres of commercial thinning and 72 acres of regeneration harvest may occur over the course of the next 20 years in this planning area. This activity may be supported by less than one mile of temporary road construction. Habitat for late seral species may be removed or degraded with this activity, and habitat for early seral species may be created. The Blue River Watershed Access and Travel Management Plan (in draft) recommends 49 miles of road be decommissioned to improve watershed conditions for fish. The timing of that activity is unknown. It may take decades because of the limited availability of funding. This activity may result in more secure habitat for management indicator species, including elk. Habitat improvement projects planned to occur within the next 5 years include the creation of 1600 snags, supplementing forest habitat with 128 downed trees, and browse cutback on over 200 acres of young plantations. These activities will improve habitat for some of these species. Planned thinning in existing plantations is designed to encourage the development of diverse, late successional habitat in the long-term, which will benefit many of these species.

INDIRECT, CUMULATIVE, AND UNAVOIDABLE EFFECTS

The above analysis of cumulative effects considered past, present, and reasonably foreseeable future actions on these lands. This Environmental Assessment is tiered to the Final Environmental Impact Statement for the Willamette National Forest Land and Resource Management Plan as amended and the analysis of cumulative effects therein.

Potential changes in the physical and chemical nature of the earth's climate are likely to have impacts on the Nation's agriculture, forest, and related ecosystems. The extent and magnitude of these changes are uncertain at this time. There is a lack of sufficient information to predict and detect changes in health, diversity, and productivity of these systems due to global climatic change. The Department of Agriculture and Forest Service are researching issues of global climate change, and the implications for forest management activities. Current Forest Service direction states that NEPA disclosure documents at the regional or project levels are not the appropriate means for addressing the global climate change issues.

REQUIRED DISCLOSURES

There are no proposed activities on prime farmlands, rangelands, or in floodplains within the planning area, and therefore, there will be no adverse affects to these resources.

American Indian rights, including those covered by the American Indian Religious Freedom Act, would not be affected by the implementation of this project.

Proposed actions would be conducted in a manner that does not exclude persons (including populations) from participation in, deny persons (including populations) the benefits of, or subject persons (including populations) to discrimination because of their race, color, or national origin, as directed by Executive Order #12898.

The proposed action is not likely to adversely affect aquatic systems, recreational fisheries, or designated Essential Fish Habitat. The effects that are likely to occur are based on sound aquatic conservation and restoration principles for the benefit of recreational fisheries, as directed by Executive Order #12962. Since the project is not likely to adversely affect EFH, no further consultation under the Magnuson-Stevens Fishery Conservation and Management Act is required.

The U. S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, religion, sex, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited basis apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's Target Center at 202-720-2600 (voice and TDD). To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue SW, Washington, DC 20250-9410, or call 202-720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

Civil Rights/Environmental Justice

Civil Rights legislation and Executive Order #12898 (Environmental Justice) directs an analysis of the proposed alternatives as they relate to specific subsets of the American population, which include ethnic minorities, people with disabilities, and low-income groups. The Trapper project is not located in a minority community and would not affect residents of low or moderate income. Proposed actions would be conducted in a manner that does not exclude persons (including populations) from participation in, deny persons (including populations) the benefits of, or subject persons (including populations) to discrimination because of their race, color, or national origin.

REFERENCES

Agee, J. 2002. The fallacy of passive management. Conservation Biology in Practice. Vol. 3:1. Pg. 18-25.

Buchanan, D. V., M. L. Hanson, and R. M. Hooton. 1997. Status of Oregon's bull trout. Oregon Department of Fish and Wildlife, Portland.

Chamberlin, T.W., R.D. Harr, and F.H. Everest. 1991. Timber harvesting, silviculture, and watershed processes. American Fisheries Society Special Publication 19:181-205.

Cissel, John H., Swanson, Frederick J., Weisberg, Peter J. 1999. Landscape management using historical fire regimes: Blue River, Oregon. Ecological Applications 9(4):1217-1231.

Endangered Species Act. 1973.

Federal Register. 1999. Endangered and threatened species: Threatened status for three chinook salmon Evolutionary Significant Units in Washington and Oregon, and endangered status of one chinook salmon ESU in Washington; Final Rule. National Oceanic and Atmospheric Administration. Federal Register: March 24, 1999 (Volume 64, Number 56).

Hicks, B.J., J.D. Hall, P.A. Bisson, and J.R. Sedell. 1991. Response of salmonids to habitat changes. American Fisheries Society, Special Publ. 19:483-518.

Jones, J.A. and G.E. Grant. 1996. Peak flow responses to clear-cutting and roads in small and large basins, western Cascades, Oregon Water Resources Research, Volume 32, Number 4.

Kremers, K. 1994. Personal Communication. ODFW McKenzie Hatchery.

National Environmental Policy Act. 1969.

National Forest Management Act. 1976.

Oregon DEQ 1998. Final Water Quality Limited Streams – 303(d) List.

Oregon DEQ 2002. Draft Water Quality Limited Streams – 303(d) List.

Sharp, B. 1992. Neotropical migrants on National Forests in the Pacific Northwest: A compilation of existing information.

US EPA. 1980. An Approach to Water Resources Evaluation of Non-Point Silvicultural

Sources (A Procedural Handbook). United States Environmental Protection Agency. Washington D.C.

USDA Forest Service. 1990. Final Environmental Impact Statement, Land and Resource Management Plan, Willamette National Forest.

USDA Forest Service. 1996. Blue River Watershed Analysis. Willamette National Forest, Blue River Ranger District. Blue River, OR.

USDA Forest Service. 1997. Blue River Timber Sale Environmental Assessment. Blue River, OR.

USDA Forest Service. 1997. Blue River Landscape Strategy.

USDA Forest Service. 2001. Blue River Landscape Strategy.

USDA Forest Service. 1998. Regional Approval for Blue River Landscape Strategy as an Administrative Study. Internal Memo.

USDA Forest Service. 1998. Mid-Willamette Late Successional Reserve Assessment.

USDA Forest Service. 2001. Regional Forester's Sensitive Species List.

USDA Forest Service. 2003. Willamette National Forest Roads Analysis.

USDA Forest Service, USDI Bureau of Land Management. 1993. Forest Ecosystem Management: An Ecological, Economic, and Social Assessment. Forest Ecosystem Assessment Team (FEMAT). Interagency SEIS Team, Portland, OR.

USDA Forest Service, USDI Bureau of Land Management. 1994. Final Supplemental Environmental Impact Statement on Management of habitat for late-successional and old-growth forest related species within the range of the Northwest Spotted Owl. Portland, Oregon.

USDA Forest Service, USDI Bureau of Land Management. 2001. Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines. Portland, Oregon.

USDA Forest Service, USDI Bureau of Land Management, USDI Fish and Wildlife Service. 2000. Regional Ecosystem Office Memo: Proposed policy paper on standards and guidelines for the Adaptive Management Area system.

USDA Forest Service, USDI Bureau of Land Management, USDI Fish and Wildlife Service, USDA Pacific NW Research Station, USDI Geological Survey BRD Service, USDC National Marine Fisheries, and US Environmental Protection Agency. 2002. Interagency Memo: Continued support for the Blue River Landscape Management

Plan.

USDI Fish and Wildlife Service. 1998. Biological Opinion for projects within the Willamette Province.

Walstad, J.D., S.R Radosevich, and D.V.Sandberg. 1990. Natural and Prescribed Fire in Pacific Northwest Forests. Oregon State University Press. Corvallis, Oregon. 317 p.

Weisberg, P.J. 1998. Blue River fire regime analysis and description. PhD Thesis.

Willis, R. A., M. D. Collins, and R. E. Sams. 1960. Environmental survey report pertaining to salmon and steelhead in certain rivers of Eastern Oregon and the Willamette River and its tributaries: Part II – Survey reports of the Willamette River and its tributaries. Fish Commission of Oregon. Research Division. Clackamas, Oregon.