ENVIRONMENTAL ASSESSMENT
BALANCE THINNING and FUELS REDUCTION PROJECT

USDA FOREST SERVICE
MALHEUR NATIONAL FOREST
BLUE MOUNTAIN RANGER DISTRICT
GRANT COUNTY

Malheur National Forest Supervisor Doug Gochnour, Responsible Official, is releasing the Balance Thinning and Fuels Reduction Project Environmental Assessment (a Healthy Forest Restoration Act project) for a 30 day objection period. The project is located on the Blue Mountain Ranger District, Malheur National Forest in the Balance Creek/Coyote Creek subwatershed. The Grant County Community Fire Protection Plan (GCCFPP) identifies County Road 20 as an evacuation corridor from the at risk communities of Austin and Bates. The purpose of this project is to reduce the fire hazard on National Forest System lands (including surface, ladder, and crown fuels) adjacent to County Road 20 resulting in stand conditions that reduce the chances of a ground fire becoming a crown fire, and a small fire becoming an uncharacteristic wildfire. This will not only help protect life and property on both private and public lands, but will also increase the safety for firefighters. The two main tools that are available to accomplish the objective are utilizing prescribed burning and mechanical treatment (commercial/precommercial thinning, slash piling, etc.). Approximately 2,562 acres will be treated through commercial harvest, precommercial thinning, hand and machine piling followed by burning, and applying prescribed fire. In addition, non-significant forest plan amendments to the Malheur National Forest Land and Resource Management Plan (1990), as amended, would be implemented to reduce satisfactory and total cover below Forest Plan standards and moving Dedicated Old Growth Area (DOG) #3122 to more suitable old growth habitat and designating a Replacement Old Growth Area (ROG) for DOG #3122.

This proposed hazardous fuels reduction project is subject to the objection process pursuant to 36 CFR 218, subpart A. It is not subject to the notice, comment, and appeal procedures found at 36 CFR 215 (36 CFR 218.3). Objections, including attachments, must be filed (regular mail, fax, e-mail, hand-delivery, express delivery, or messenger service) with the Regional Forester - Reviewing Officer ATTN: 1570 OBJECTIONS, USDA Forest Service, 333 S.W. First Avenue, Portland Oregon 97204, faxed to (503) 808-2255, or hand delivered to the above address between 7:45 a.m. and 4:30 p.m., Monday through Friday, except legal holidays. Electronic objections, in acceptable [plain text (.txt), rich text (.rtf) or Word (.doc)] formats, may be submitted electronically to appeals-pacificnorthwest-regional-office@fs.fed.us with Subject: Balance Thinning and Fuels Reduction Project. Objections will be accepted only from those who have previously submitted written comments specific to this project during scoping or other opportunity for public comment (36 CFR 218.6(a)).
The objection including attachments must be filed within 30 days of the date of publication of this legal notice in the Blue Mountain Eagle. Notices of objection must

meet the specific content requirements of 36 CFR 218.7. Incorporation of documents by reference shall not be allowed (36CFR218.7(c)). The publication date of this notice is the exclusive means for calculating the time period to file an objection (36 CFR 281.9(a)). Those wishing to object should not rely upon dates or timeframe information provided by any other source.

Objection to this environmental assessment must be in writing and must be fully consistent with 36 CFR 218.7. The objector must provide sufficient narrative description of those aspects of this proposed project addressed by the objection, specific issues and suggested remedies to resolve the objection. At a minimum the objection must include the objectors name and address with telephone number if available, a signature or other verification of authorship, identification of a lead objector if multiple names are listed on the objection, and the name of the project being objected to, the name and title of the Responsible Official and the Forest and Ranger District on which the project will be implemented.

The Responsible Official may not issue a decision for this hazardous fuel reduction project until the Reviewing Officer has responded to all pending objections. When no objections are filed within the 30-day period, the decision may occur on, but not before, the fifth business day following the end of the objection-filing period.

The Environmental Assessment is available on the internet at:
http://www.fs.fed.us/r6/malheur/ www.fs.fed.us/r6/malheur/ For further information or a hardcopy of the environmental assessment, contact Lori Stokes or Bob Crisler at the Blue Mountain Ranger District Office, P.O. Box 909, John Day, Oregon 97845 or at (541) 575-3000.

United States Department of Agriculture

Forest Service

Malheur National Forest Blue Mountain Ranger District

Balance Thinning and Fuels Reduction Project

Environmental Assessment

May 2008

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CHAPTER 1 – PURPOSE AND NEED

Introduction

The Balance Thinning Fuels Reduction Project proposes to reduce hazardous fuels in a portion of the Wildland Urban Interface (WUI) that was designated by the Grant County Community Fire Protection Plan (GCCFPP). The Project Area is adjacent to County Road 20, an evacuation corridor identified in the GCCFPP and within the defined WUI.

The Project Area encompasses approximately 3,530 acres along the Middle Fork of the John Day River on the Blue Mountain Ranger District of the Malheur National Forest. The Project Area is within the 13,775 acre Balance Creek/Coyote Creek Subwatershed that is approximately 80% National Forest System lands and 20% other ownerships (see Map 1- Balance Thinning and Fuels Reduction Project Area located in Appendix D.)

Fire suppression, vegetation growth, partial overstory removal harvests, and insect and disease mortality has resulted in an accumulation of fuels and unacceptable fire hazard to private and public lands. This project proposes to reduce these fuels by a combination of thinning, timber harvesting, slash removal treatments, and prescribed burning. This document is the result of local collaboration, public participation, and interdisciplinary design. Design measures are provided for cultural or historical sites, soil, water, fish, wildlife, range, native plants and trees, scenery, roads, and recreation.

This Environmental Assessment (EA) is being prepared under guidelines contained in the Healthy Forests Restoration Act (HFRA). The HFRA directs Federal agencies to prepare EA's utilizing the collaborative process to implement local community fire protection plans.

Relationship to the Forest Plan

This EA tiers to the Malheur National Forest Land and Resource Management Plan Final Environmental Impact Statement and Record of Decision (1990) and incorporates by reference the accompanying Land and Resource Management Plan (LRMP, also called the Forest Plan)(1990), as amended. Amendments include, but are not limited to, the Regional Forester's Forest Plan Amendment No. 2 (USDA 1995a) and the Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH, USDA 1995b). The project identified in this EA is being proposed to meet appropriate Forest-wide goals and standards (pages IV-1 to IV-45) and to comply with Management Area goals and standards (pages IV-46 to IV-139) of the Forest Plan.

Healthy Forests Restoration Act (HFRA)

The Healthy Forests Restoration Act of 2003 (HFRA) was signed into law on December 3, 2003. The purpose of the Healthy Forest Restoration Act is to improve the capacity on Federal lands to plan and conduct hazardous fuels reduction projects aimed at protecting communities, watersheds, and certain other at-risk lands from catastrophic wildfire, to enhance efforts to protect watersheds and address threats to forest and rangeland health, including catastrophic wildfire, across the landscape. The Balance Thinning and Fuels Reduction Project qualifies under Title 1 - Hazardous Fuel Reduction on Federal Land of the HFRA. The project is an Authorized Hazardous Fuels Reduction Project as described in Section 102 of the HFRA because it is consistent with the Implementation Plan for the 10-Year Comprehensive Strategy and is on Federal lands within a wildland urban interface area identified in a community wildfire protection plan.

HFRA-authorized fuel projects must be designed to retain or culture old-growth forest structure and large trees according to provisions in the law (explained in more detail in the "Desired Conditions" section). Additionally, authorized projects must be conducted consistent with all current laws or policies governing forest management in the area, as outlined in the preceding section.

To expedite authorized projects, HFRA requires collaborative planning. It also contains provisions that streamline the environmental review of a project. These provisions include: limits on appropriate alternatives that may be considered; and internal, administrative review of any objections to a project before a decision is made to approve it or carry it out (as opposed to post-decision appeals).

HFRA, Section 102 (e), states that…"if the management direction in a resource management plan (Forest Plan) for an old growth stand was established before December 15, 1993, that HFRA covered projects shall fully maintain, or contribute toward the restoration of, the structure and composition of old growth stands according to the pre-fire suppression old growth conditions characteristic of the forest type, taking into account the contribution of the stand to landscape fire adaptation and watershed health, and retaining the large trees contributing to old growth structure." "And, review management direction for covered HFRA projects, taking into account any relevant scientific information made available since the adoption of the management direction; and amend the management direction to be consistent with pre-fire suppression old growth conditions, if necessary to reflect relevant scientific information." Consistency with this direction is addressed in the Forest Vegetation section of Chapter 3 in this document.

Grant County Community Fire Protection Plan

The Grant County Community Fire Protection Plan was developed by County citizens, fire districts, county staff or elected officials, State Forestry officials, and agency representatives. The Grant County Community Fire Protection Plan's objective is to reduce the risk of forest fire to life, property, and natural resources in the County. The Grant County Court, Fire Defense Board, and Oregon Department of Forestry approved the plan in June and July of 2005.

The Balance Thinning and Fuels Reduction Project is authorized under the Healthy Forest Restoration Act (HFRA) because the Project Area is adjacent to County Road 20 which is identified as an evacuation corridor for the communities of Austin and Bates, which are identified as Communities-at-Risk in the Grant County Community Fire Protection Plan.

Location and Setting

The project is located along the Middle Fork of the John Day River approximately 12 miles from Austin Junction, the junction of US Hwy 26 and State Hwy 7. The Project Area is approximately 3,530 acres. See the Vicinity Map for the location and extent of the Project Area. The legal description is:

T.10S. R.33E. Sections 17, 18, 20, 26-36

The Dunston Preserve (The Nature Conservancy), and several residences are within and adjacent to the Project Area as well as privately owned lands and lands owned by the Confederated Tribes of Warm Springs. County Road 20 is an evacuation corridor for the communities of Austin and Bates. Every year there are several small wildfires ignited by lightning that are usually rapidly suppressed. Nearby fires in recent history that have escaped initial attack are the 38,000 acre Summit Fire in 1996, the 1,400 acre Indian Rock Fire in 1994, the 2,300 acre Reed Fire in 1994, the 156 acre China Diggins Fire in 2007, and the 180 acre Power Fire in 2007.

Local level collaboration was conducted consistent with the Implementation Plan for the 10-Year Comprehensive Strategy during development of the Proposed Action. This project is designed to complement the treatments that have already been completed and to coordinate with projects being planned. A mix of commercial cutting treatments to primarily treat crown fuels and ladder fuels, precommercial thinning to treat ladder fuels, and piling and burning and/or underburning to treat surface fuels are recommended on a site specific basis depending on the current conditions, the plant association group, and location.

Purpose and Need for Action

Purpose - This project is being proposed to:

Reduce the fire hazard (including surface fuels, ladder fuels, and crown fuels) adjacent to County Road 20 on National Forest System lands.

- Create stand conditions that reduce the chances of a ground fire becoming a crown fire, and a small fire becoming an uncharacteristic wildfire. This will not only help protect life and property on both private and public lands, but will also increase the safety for firefighters.
- Improve forest health and move towards fire-adapted ecosystems.
- Protect, restore, and enhance ecosystem components including but not limited to old growth, aspen, and fish habitat.

Need- The needs for this project include:

- A majority of the timber stands in the Project Area are overstocked, contain excessive surface and ladder fuels, and in some cases the species composition has shifted towards more late seral species (fir) instead of the early seral species (pine and larch) that historically inhabited the forest. There is a need to reduce excess vegetation to increase vigor, health, and growth rates in the forest ecosystem. Competition from excessive vegetation has reduced stand vigor, increasing the possibility that insects, disease, or wildfire will destroy the stands including late and old successional trees. There is a need to improve the health of forested ecosystems which will reduce the long-term risk to the evacuation corridor and protect critical ecosystem components.
- There are numerous dead and dying trees along the 2045 Road. Spot fires contribute to large fire growth and occur more frequently where large woody fuels have accumulated under a forest canopy. Large woody fuel, especially containing large decayed pieces, are a suitable fuel bed for firebrands and can hold smoldering fire for extended periods of time (Brown et al 2003). Spot fires can also be started in rot pockets of standing snags. These dead and dying trees along the 2045 Road are providing fuel beds that spot fires could start in. In order to maintain this road for suppression activities, there is a need to remove the dead and dying hazard trees along the road within the project boundary.
- The existing Dedicated Old Growth (DOG) habitat (DOG # 3122PW) does not currently meet Forest Plan standards for the habitat needs of the pileated woodpecker. The current size of the DOG is below Forest Plan standards for size and includes forest structure types that are not suitable for late and old structure dependent species. Additionally, a Replacement Old Growth (ROG) block, as well as a Pileated Woodpecker Feeding Area (PWFA) have not been designated for this DOG. There is a need to

change the DOG designation and add a ROG and PWFA to this DOG in order to be consistent with the Forest Plan,

- Old Forest Single Structure habitat (OFSS) is largely absent from the Project Area and subwatershed. Old Forest Single Stratum habitats are characterized by the presence of large diameter ponderosa pine trees in the overstory with a relatively open understory broken up by occasional dense patches of young ponderosa pine reproduction. Fire suppression, historic timber harvest activities, the effects of the Summit Fire in 1996, and other factors have reduced the acres of OFSS habitat. This has affected a variety of wildlife species dependent upon that habitat, most notably the white-headed woodpecker. There is a need to provide suitable habitat for this species and others with similar habitat needs in the short-term to manage currently unsuitable habitat to create suitable habitat conditions in the mid to long term.
- Big game forage, particularly browse forage, has been adversely affected by changes in forest stand structure, density, and species composition in the Project Area. Higher stand densities and canopy closures have increased competition for resources and have shaded out browse species, including bitterbrush, mountain mahogany, chokecherry, hawthorn, as well as willow and aspen. Browse forage provides an important winter forage source for elk and an important forage source for deer (mule and whitetail) year around. There is a need to enhance these forage habitats, which can be achieved in part, through changes to the forest vegetation.

Decisions to be Made

Based upon the effects of the proposed action as they relate to the purpose and need, the responsible official will decide:

- The specific areas if any, that will be treated to reduce fuels and/or improve forest health.
- The specific activities that will take place on the areas selected for treatment. These specific activities include the silviculture systems, logging methods, and fuel treatment methods.
- The associated actions that will be included such as temporary road construction, reconstruction, post-activity road management, noxious weed treatments and specific provisions such as Best Management Practices and Design Elements.
- The monitoring that will be done during and after project implementation.

Existing Condition

The Galena Watershed Analysis, 2002, found that the current stocking levels and fuel conditions have increased in the last few decades due largely to aggressive fire suppression and harvesting of more fire tolerant tree species. Higher stocking levels have also contributed to increased insect populations adding to existing fuel loads. The result of these activities has been larger, more severe wildfires burning with reductions in fish and wildlife habitat and impact to soils and water quality.

On the National Forest System lands, both the tree density and the proportion of fire intolerant fir species have increased from historical conditions. The lack of periodic fire and harvesting of large ponderosa pine has resulted in denser, younger, often multi-layered stands of trees that are composed of more fir trees and fewer pines and larches than historically occurred. Surface fuels have increased and are more continuous at these increased loadings across the landscape than were historical conditions. Increased surface fuel loadings increases the potential flame length of a fire thereby increasing the chance of a surface fire moving into the crowns. The smaller understory trees and the lower branches of larger fir trees to provide "ladder fuels", further enabling wildfire to move into the tree crowns and increasing the probability for an active crown fire.

Surface Fuels

The fuel loading is approximately 16 tons per acre, with half or more of this fuel loading being in the 3”+ DBH size class. Litter and duff accumulations are higher than those which historically accumulated. The fuel loading is not consistent with the forest types and fuel loads of Fire Regime 1, the frequently occurring surface fires that historically maintained low fuel loadings.

Ladder and Crown Fuels

The tree canopy is interlocking in many areas, which is not characteristic of historic conditions in the hot dry and warm dry forests. Canopy base height, canopy bulk density, and canopy continuity are key characteristics of forest structure that affect the initiation and sustainability of crown fire. Crown fires are generally considered the primary threat to ecological and human values. Canopy base height is currently low, with many trees providing fuel ladders into the upper crowns. In an uncontrolled fire situation, crown torching would be frequent in many areas. Crown bulk density, the weight of tree crowns over an area, is currently moderate to high. These conditions could result in fire that is difficult to suppress, and which would pose the greatest threat to life and property.

Expected Wildfire Behavior

Wildfire would burn as a stand replacing crown fire, with high rates of spread and severity to the vegetation and the soils. The dense stands of trees provide a continuous path for crown fire to spread across long distances. Fires would have long spotting distances and would show high resistance to control. The potential danger to fire fighters would necessitate using indirect methods that would increase the area burned and restrict the ability to safely protect private property, major access routes, and public safety. In most of the Project Area, natural fire occurrence under these conditions cannot be managed for resource benefit.

Forest Composition and Stocking Levels

Many of the timber stands in the Project Area are overstocked, contain ladder fuels, and in some cases have more late seral species instead of the early seral species that historically inhabited the forest. Due to insect and disease mortality and the absence of periodic fire, surface fuels have increased and are more continuous at these increased loadings across the landscape than historical conditions. Increased surface fuel loading increases the potential flame length of a fire thereby increasing the chance of a surface fire moving into the crowns.

Past harvest of large ponderosa pine and the absence of periodic fire have resulted in denser, younger, and often multi-layered stands composed of more fir and less pine and larch than historically occurred. Smaller understory trees and the lower branches of larger fir trees that provide "ladder fuels" enabling wildfire to move into the tree crowns and increase the probability for an active crown fire.

Overstocked stands of trees provide a continuous path for crown fire to spread across long distances. Fire behavior and severity are dependent on the properties of the surface, ladder, and canopy fuel quantities and continuity both horizontally and vertically.

Small groups of quaking aspen in the Project Area are in declining condition from historical distribution due to reduction in fires, conifer shading and competition, and grazing by both domestic and wild animals.

Desired Condition

Both private and public forestlands are in healthy conditions that cumulatively present a low fire hazard to the mixed land ownerships.

Most of the forest stands would have a high proportion of ponderosa pine with lesser amounts of Douglas-fir and grand fir. Stands would be healthy with low levels of insects and disease such as bark beetles, defoliating insects, and dwarf mistletoe. There would be more single stratum stands and more stands with large trees. These conditions would be characteristic of stands in Fire Regime 1, a low severity, high frequency fire regime. Forested stands are in a condition that allows prescribed and natural fire to be used to maintain low fuel levels and limit regeneration.

Surface Fuels

Based on a review of the historic role of fire in this area—which includes a fire-return interval of less than 35 years ("Fire Regime 1"), and technical guidelines applicable to this predominantly dry forest environment, it is estimated that surface fuel loads should be in the range of approximately seven to eight tons per acre, with half or more of this woody debris consisting of pieces larger than three inches in diameter. Correspondingly, duff accumulations (surface organic residues such as needles, leaves and small twigs) should be relatively low.

Ladder and Crown Fuels

Canopy base height (the height to the base of the live forest canopy) and canopy bulk densities (the combined weight of tree crowns above an area) are the best measures for helping predict crown fire potential. Historically, canopy base height would have been maintained at sufficient height from frequent fires that only occasional torching in less fire-adapted trees would occur (such as grand fir with low, live branches versus ponderosa pine). Canopy bulk density would have been sufficiently low that even if surface flames were high enough to reach the crowns, fire wouldn't spread in a stand-replacing type of crown fire. Historic crown-fire potential in Fire Regime 1 would have been minimal.

Expected Wildfire Behavior

The desired condition is one in which the intensity of a wildfire burning on a hot, dry, breezy day would depend mainly on grasses, pine needles, and small-diameter woody debris—as opposed to larger surface fuels or live tree crowns—and the intensity would vary across the landscape. Fire would remain primarily as a surface fire, with potentially high rates of spread but exhibiting low severity to the larger fire dependent trees and the soils. Fires would have short spotting distances, and would show much less resistance to control compared to a passive or active crown fire.

Forest Composition and Stocking Levels

The desired condition over the Project Area is a mosaic of even-aged and uneven-aged forest stands with a high level of visual diversity in the foreground of County Road 20. Stands in the area should be within the historic range of variability for stages of late and old forest structure and large trees should be common. Stands should be generally healthy and vigorous due to stocking control, with a low risk of developing epidemic levels of bark beetles, and only scattered, individual trees or small pockets being occasionally attacked or killed. Stand species compositions would reflect those expected on these forest sites given the historic fire regimes. Thus, most of the area would be dominated by ponderosa pine with minor components of other species, except for the cool-dry and cold-dry forest environments where a mixed-conifer forest would be supported. Aspen would be in a healthy condition with stands of varying age classes representative of their historic range.

Proposed Action Overview

The proposed action is a set of treatments, and design elements developed by an interdisciplinary planning team in direct response to:

- The stated purpose and need for action;
- Advice obtained through inter-entity collaboration and early public participation;
- Known forest resource conditions and environmental factors of the area requiring management or protection under the Forest Plan or other applicable standards.

The proposal is designed to reduce the fire hazard and improve forest health by reducing fuels and modifying the spatial distribution of the fuels in the three fuel layers:

- Crown or canopy fuels would be reduced by commercial and non-commercial thinning. The trees cut would vary in size from medium to smaller diameters. Some of the smaller sized material may be difficult to economically utilize for products; utilization will be pursued if the opportunity exists.
- Ladder fuels would be reduced by commercial and non-commercial thinning treatments. The trees cut would vary in size from medium to smaller diameters, removing fuels that allow fire to move into the tree crowns.
- Surface fuels would be reduced by one or more of the following methods: yarding tops to landings for utilization or burning, hand piling or mechanical treatment of natural and project generated fuels, burning any created piles, or underburning with hand and/or ATV fireline construction as needed.

Activities included in this proposal include:

- 734 acres of commercial/precommercial thinning to decrease stand density, reduce ladder fuels, and increase crown spacing;
- 355 acres of precommercial thinning to decrease stand density, reduce ladder fuels, and increase crown spacing;
- 99 acres of precommercial (plantation) thinning up to 7 inches dbh;

- 90 acres of thinning around late and old structure trees to reduce ladder fuels and competition;
- 1,290 acres of treatment of natural and project generated slash within treatment units;
- 1,934 acres of post treatment prescribed burning,
- 2.5 miles of temporary road construction;
- 11 miles of prescribed fire control lines; hand, ATV line or a combination of both,
- 10 aspen stands treated by activities that include some combination of the following; conifer removal, piling slash, burning piles, and fencing;
- Removal of hazard trees along the 2045 Road

Chapter 2 contains a complete description of the Proposed Action, specific design elements, monitoring requirements, and the non-significant Forest plan amendments that are proposed to implement this project.

This Proposed Action was developed by Forest Service personnel in collaboration with interested individuals and groups. The proposal presented here is the final result of the collaboration process (see the Collaboration section below for more information about the collaboration process). All figures are approximate. Note that there may be minor variations throughout this document due to rounding and differences in methodology used to generate maps and tables.

Management Direction and Guidance

Forest Plan Management Areas

The Forest Plan uses management areas to guide management of the lands within the Malheur National Forest. Each management area provides for a unique combination of activities, practices and uses. The goals and objectives and desired condition for each management area are summarized below, and their locations are shown on Map 2 in Appendix D. The Forest Plan (Chapter IV) contains a detailed description of each management area.

Land Allocations and Forest Plan Goals

General Forest-MA 1 and Rangeland-MA 2 (425 acres) Emphasize timber and forage production on a sustained yield basis while providing for other resources and values.

Old Growth Habitat-MA 13 (250 acres) Provide suitable habitat for old growth dependent wildlife species, ecosystem diversity, and preservation of aesthetic qualities. Dedicated Old Growth (DOG) areas are to be managed to provide old growth characteristics for old growth dependent species. Replacement Old

Growth (ROG) areas are to be managed to provide future old growth habitat. Fuels are to be managed to maintain or enhance old-growth habitat, and to protect old-growth from “catastrophic” wildfire.

Visual Corridor Foreground-MA 14F (415 acres) Manage corridor view-sheds with primary consideration given to their scenic quality and the growth of large diameter trees. County Road 20 corridor is a sensitivity level II visual corridor. The Visual Quality Objective for the Foreground is Partial Retention and for the Middleground is Modification. Forest Plan Correction #1 allows commercial thinning in visual corridors without a corridor management plan.

Anadromous Riparian Areas-MA3B/RHCA- (425 acres) Manage riparian areas to protect and enhance their value for wildlife, anadromous fish habitat, and water quality. Fuels are to be managed to maintain or enhance fish and wildlife habitat.

Big Game Winter Range-MA4A (1,965 acres) Maintain or enhance the quality of the winter range habitat for deer and elk through timber harvesting, prescribed burning, and other management practices. Manage for elk habitat by balancing cover quality and spacing, forage, and open road densities.

Forest Plan Amendments

Regional Forester Plan Amendment #2 – Revised Riparian, Ecosystem, and Wildlife Standards for Timber Sales – 1995.

Adding to basic direction from the 1990 Forest Plan is the 1995 Regional Forester’s Forest Plan Amendment #2: Interim Management Direction Establishing Riparian, Ecosystem, and Wildlife Standards for Timber Sales. This policy expands and more clearly defines the protection areas bordering streams or other water bodies; it also introduces desired conditions for wildlife habitat, including stands formed or structured with the characteristics of late and old stages of forest succession. Additionally, special forest cover areas for wildlife between late and old structure areas, called connection corridors, are required.

How much, and where, these wildlife-related conditions should occur is determined by reviewing the “historic range of variability” (HRV) for the area. This is an assessment of the physical growing sites represented, and the patterns of forest vegetation that historically occurred there. It includes consideration of site differences (warm and dry, cool and moist, etc.) and associated disturbance factors such as fire, insects, and diseases that affect the establishment and natural development of forest stands. With the HRV assessment in hand, the current assortment of conditions can be compared to their historic range of variability, or occurrence. Projects can then be planned to either maintain current condition patterns—if they are within the desired historic ranges—or change them to imitate historic patterns by increasing or decreasing various conditions through timber harvest, burning, or other treatments.

PACFISH – Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California – 1995.

National Forest Management Act - The National Forest Management Act includes provisions applicable to all projects and requires the following (a) resource plans and permits, contracts and other instruments shall be consistent with the land management plan; (b) insure consideration of the economic and environmental aspects of management, to provide for outdoor recreation, range, timber, watershed, wildlife, and fish; and (c) provide for diversity of plant and animal communities. All of these considerations and requirements are addressed in the EA and the various resource reports in the project record. Therefore, project actions are consistent with these provisions of NFMA.

On December 22nd, 2004 the Under Secretary of Agriculture approved regulations for National Forest System land management planning (36 CFR 219, published in the Federal Register on January 5, 2005). These regulations became known as the 2005 Planning Rule. On March 30, 2007 the court in Citizens for Better Forestry v. USDA Civ. No. 05-1144 and Defenders of Wildlife v. Johanns Civ. No. 04-4512, in the Northern District of California, enjoined the Forest Service from implementation and utilization of the 2005 Planning Rule. On July 3, 2007 the same court refused to amend its prior judgment and affirmed that the March 30, 2007 order applied nationwide. The result of these two rulings is that the entire Forest Service is currently operating under the prior planning rule, adopted in November 2000 at 36 CFR 219 and subsequently interpreted in an Interpretative Rule at 69 Fed. Reg. 58055 (September 29, 2004). This project is planned under the regulation at 36 CFR 219.35 (2000) and the Interpretative Rule of September 29, 2004.

Other Guidance for Management of the Project Area

On August 8, 2000, President Clinton asked the Secretaries of Agriculture and Interior to prepare a report recommending how best to respond to the severe fires of 2000, reduce the impacts of those fires on rural communities, and ensure sufficient firefighting resources in the future. On September 8, 2000, the President accepted their report, Managing Impacts of Wildfires on Communities and the Environment-A Report to the President. This report provided the initial framework for implementing fire management and forest health programs known as the National Fire Plan.

Protecting People and Sustaining Resources in Fire-Adapted Ecosystems, A Cohesive Strategy (2000) is a report providing the strategic framework for reducing hazardous fuels buildup within WUI communities, municipal watersheds, threatened and endangered species habitat, and other important local features. The objective of this strategy is to describe actions that could restore healthy, diverse, and resilient ecosystems to conditions that minimize the potential for uncharacteristically intense fires. Methods recommended include removal of excessive vegetation and dead fuels through thinning, prescribed fire, and other treatments. A Cohesive Strategy responds to Congressional direction to provide guidance on reducing wildfire hazard and restoring ecosystem health as part of the National Fire Plan. Companion publications to the Cohesive Strategy include A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment – 10-Year Comprehensive Strategy (2001) and A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment – 10-Year Comprehensive Strategy Implementation Plan (2002).

This project is within the Grant County Community Fire Protection Plan, signed 2005, defined WUI boundary and is included in the Action Plan. The management objective as stated in the Grant County Community Fire Protection Plan is to enhance fire suppression capabilities by modifying fire behavior inside the zone and providing a safe and effective area for fire suppression activities.

The identification of this project within the Grant County Community Fire Protection Plan, places this project under the authority of the Healthy Forest Restoration Act (HFRA), signed 2003.

Public Involvement and Consultation

Coordination with Agencies, Communities, American Indian Tribes, and Others

The Balance Thinning and Fuels Reduction project has been listed on the Malheur National Forest Schedule of Proposed Actions since 2005. The SOPA is distributed to over 200 people, including a wide array of government agencies, interest groups, and interested individuals. The SOPA is also posted on the Malheur National Forest web site (www.fs.fed.us/r6/malheur).

Collaboration

In December 2005 a letter providing information and seeking public collaboration was mailed to approximately 60 individuals and groups. This included federal and state agencies, the Burns Paiute Tribe, the Confederated Tribes of the Umatilla Indian Reservation and the Confederated Tribes of Warm Springs, municipal offices, businesses, interest groups, and individuals.

There were two meetings and three field trips to the Project Area. In addition there were a number of individual conversations about specific concerns. Changes and improvements were made to the Proposed Action based on the site specific information and concerns the collaborators brought to these meetings and field trips. Following is a summary of the collaboration process for this project. Transcripts of the meeting notes are included in the project record.

- A notice was sent out to “the Malheur NF all projects” mailing list in January 2005 announcing the project and informing the public of a collaborative meeting to be held on January 24, 2006. The Blue Mountain Ranger District also placed an article in the Blue Mountain Eagle. Approximately 10 people attended this first meeting. A variety of comments and suggestions were gathered on how the collaborators thought the area should be managed.
- On July 6, 2006 there was a field trip to Antelope Valley with interested parties to discuss prescribed burning. The prescribed burning conducted in Antelope Valley is similar to the burning proposed in the Balance Thinning and Fuels Reduction Project Area.
- On March 22, 2007 a field trip to the Balance Thinning and Fuels Reduction Project Area was scheduled and twelve people attended. The meeting was held at the Dunston Preserve, (The Nature Conservancy) and many site specific concerns and questions were generated.
- On April 11, 2007, an on-site field trip was held with landowners, interest groups, and members of the Forest Service Interdisciplinary team to further discuss specific concerns and prescriptions.

Consultation

On July 31, 2006, the BMRD Fisheries Biologist reviewed Counterpart Regulations, authorized by 50 CFR 402.04 and National Fire Plan Project Design for Consultation under the Section 7 of the Endangered Species Act (ESA), and made the determination that this project would fit under the Counterpart Regulations. The National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (USFWS) were initially informed of the Balance Fuels Reduction Project and that it would fall under Counterpart Regulations in August, 2006. On May 21, 2007, the Blue Mountain Ranger District (BMRD) presented project information to the Level I Team (USFWS and NMFS). The effects analysis completed and documented in the BE and BA resulted in a call of Not Likely to Adversely Effect (NLAA) to MCR steelhead. This was done under the Section 7 Counterpart Regulations of the Endangered Species Act (Federal Register, December 8, 2003) and is in compliance with those regulations and the March 3, 2004, Alternative Consultation Agreement between the Forest Service, Fish and Wildlife Service, and National Marine Fisheries Service.

Tribal Coordination

In December 2005 letters were mailed to the Burns Paiute Tribe, the Confederated Tribes of Warm Springs, and the Confederated Tribes of the Umatilla Indian Reservation to inform them of and seek collaboration, through a government-to-government relationship, on the Balance Thinning and Fuels Reduction Project. A scoping letter was mailed to Burns Paiute Tribe, the Confederated Tribes of Warm Springs, and the Confederated Tribes of the

Umatilla Indian Reservation in June 2007, providing information and seeking public input on the project. In May 2008, the wildlife biologist for the Confederated Tribes of Warm Springs contacted the Blue Mountain District Ranger, and indicated interest in wildlife issues associated with the project and his intent to participate as a representative of tribal interests throughout the collaborative and planning processes.

Scoping

On January 17, 2006, the Proposed Action that was developed through the collaboration process was sent out to the public mailing list. This included Federal, State and local agencies, Grant County Court, Tribes, permittees, property owners, advocacy groups, and the general public.

See Appendix A for a summary of the relevant external comments received. The summary includes notes explaining how the Forest Service considered or applied the comments to assure environmental quality in the affected environment.

Public participation in this project is open-ended, and continues through all stages of project development, decision-making, and implementation.

Design/Analysis Issues

Fuels and Forest Vegetation – Forested stands within the Project Area are overstocked and contain excessive surface, ladder fuel, and canopy fuels. Excess vegetation has reduced stand vigor, increased the potential for insects, disease, and wildfire, and reduced the ability of firefighters to safely protect private property, the County Road 20 Evacuation Corridor, and public safety.

*The Proposed Action was designed to reduce the fire hazard and improve forest health by reducing fuels and modifying the spatial distribution of surface, ladder, and canopy fuel*s.

Measures or elements for evaluation:

- Fuel loadings in tons per acre immediately after activities of the Proposed Action and in 50 years under No Action and the Proposed Action,
- Crown fire potential and average flame length in 50 years under No Action and the Proposed Action,
- Acres of commercial and noncommercial thinning and number of aspen stands treated to increase the resiliency and sustainability of the forest and reduce the risk of insect and disease to the forest.

Effects of Road Construction, Commercial Timber Harvest, and Prescribed Burning on Soil, Water Quality, and Listed Aquatic Species – Proposed ground disturbing activities associated with temporary road construction, commercial timber harvest, and prescribed burning could degrade water quality and impact soil productivity. The ground disturbing activity may also indirectly impact habitat for aquatic species including listed and sensitive aquatic species. Aquatic species of concern present within the Project Area include summer steelhead, Chinook salmon, bull trout, redband trout, and Columbia spotted frogs. Adverse impacts to soils could include detrimental soil compaction, soil displacement, sediment increases, impacts to soil organisms, decrease of mycorrhizae fungi, and soil nutrient loss. Proposed harvest activities combined with past impacts including past timber harvest and ongoing grazing may cumulatively affect water quality, including 303(d) listed streams. The MFJDR is on the 2002 Oregon Department of Environmental Quality (DEQ) 303(d)) List of Water Quality Impaired Waterbodies and does not meet water quality standards in the Project Area for the parameter of temperature.

The Proposed Action was developed to address this concern. Under Alternative 2 commercial harvest units, landings, and temporary roads would be located outside of Riparian Habitat Conservation Areas. New ground disturbance is minimized by locating temporary roads on existing decommissioned road templates.

Measures or elements for evaluation:

- Miles of temporary road constructed
- Miles of temporary road constructed in RHCAs
- Acres of timber harvest
- Percent detrimental soil impacts pre and post project
- Road construction, timber harvest, and prescribed burning affects on sediment and temperature
- Aquatic Species Biological Evaluation/Assessment by species
- Effects to the temperature of the Middle Fork John Day River

Cover in Big Game Winter Range– Satisfactory cover is currently below Forest Plan Standards in the Coyote Creek/Balance Creek Subwatershed. The subwatershed has approximately 675 acres of satisfactory cover within Management Area 4A – Big Game Winter Range. That is equivalent to 5% of the Big Game Winter Range in a satisfactory cover condition. Forest Plan standards require that 10% be in a satisfactory cover condition. Implementation of the proposed activities would further reduce the percent of satisfactory cover by less than 1% to a total of 4.8% (611 acres) of the subwatershed. A non-significant Forest Plan Amendment is required to further reduce cover below standards.

Total cover is currently above Forest Plan Standards in the Coyote Creek/Balance Creek Subwatershed. The subwatershed has approximately

3,625 acres of total cover within Management Area 4A – Big Game Winter Range. That is equivalent to 28% of the Big Game Winter Range in a total cover condition. Forest Plan standards require 25% to be functioning as cover. Implementation of the proposed activities would reduce the percent of total cover below Forest Plan Standards. Total cover would be reduced by 5% to a total of 23% (2,970 acres) of the subwatershed.

Marginal cover is currently above Forest Plan Standards in Big Game Winter Range and would continue to be so after implementation of the proposed activities.

The Proposed Action was developed to address this concern. Under Alternative 2 hiding and security cover patches would be maintained in all proposed units to mitigate effects and provide diversity and complexity within and between stands. Five percent of each unit would be retained in untreated patches ranging in size from 2 to 5 acres.

Measures or elements for evaluation:

- Acres of commercial and/or precommercial thinning in Big Game Winter Range satisfactory cover,
- Percent satisfactory cover in Big Game Winter Range pre and post project,
- Acres of commercial and/or precommercial thinning in Big Game Winter Range total cover,
- Percent total cover in Big Game Winter Range pre and post project,
- HEI pre and post project

Existing Dedicated Old Growth – The existing Dedicated Old Growth (DOG) is not currently suitable and does not have the potential for suitable habitat in the short to mid term. Analysis of late and old structure habitat in the Analysis Area identified the opportunity to modify the current Dedicated Old Growth to include more suitable habitat for late and old structure dependent species. A non-significant Forest Plan Amendment is required to modify the current Dedicated Old Growth. There is currently no Replacement Old Growth identified.

The Proposed Action was developed to address this concern. Under Alternative 2, the DOG block is modified to include the more suitable habitat. The proposal also identifies a Replacement Old Growth (ROG) and a Pileated Woodpecker Feeding Area (PWFA).

Measures or elements for evaluation:

- Percent of DOG in suitable habitat (OFMS).
- Comparison to Forest Plan Standards

Threatened, Endangered, and Sensitive (TES) species, Management Indicator Species (MIS), Featured Species and Resident and Migratory Landbirds – The activities proposed in the Balance Fuels Reduction Project Area could have an effect on plant and animal TES species, Management Indicator Species, Featured Species, and Resident and Migratory Landbirds.

Measures have been incorporated into Alternative 2 to minimize or eliminate the potential effects to TES, MIS, and Featured species as well as resident and migratory landbirds. Effects to population trends and habitat such as change in existing structure, restoration of open ponderosa pine habitat, and seasonal operating restrictions are discussed in Chapter 3, Environmental Consequences in the Botany and Wildlife Sections and in the Biological Evaluations.

Measures or elements for evaluation:

- Wildlife and Plant Biological Evaluation determinations for TES species
- Wildlife analysis of impacts to Management Indicator Species, Featured Species, landbirds including neotropical migrant bird species and habitat

Snags and Down Wood– Proposed activities could impact snag numbers and primary cavity excavator species habitat and could impact levels of down wood.

Measures or elements for evaluation:

- Comparison to Forest Plan Standards

Old Growth Dependent Species – Proposed harvest and burning activities could adversely affect the habitat of old-growth dependent species. Alterations in habitat components (canopy cover, understory density and structure) in these areas have the potential to alter the value for multi-strata associated species such as pileated woodpecker, American marten, three-toed woodpecker, and northern goshawk.

Measures or elements for evaluation:

- Treated acres and percent of the Balance Creek/Coyote Creek Subwatershed

Noxious Weeds/Invasive Species – Commercial thinning, grapple piling and prescribed burning, and temporary road construction may introduce or spread noxious weeds. Commercial thinning, including the construction of temporary roads and grapple piling, could increase the risk of invasive/noxious weeds due to ground disturbing activities. Prescribed burning has the potential to increase distribution of invasive/noxious weeds in areas where the ground vegetation is burned off and mineral soil is exposed.

Design measures to limit or prevent the introduction and spread of invasive/noxious weeds are incorporated into the Proposed Action (see Chapter 2, description of Alternative 2).

Measures or elements for evaluation:

- Miles of temporary road construction
- Miles of road maintenance;
- Acres of grapple piling
- Acres of prescribed burning

Grazing Permittee Operations – The grazing permittee's operations could be adversely impacted (including rest needs after burning).

Design measures have been developed to reduce the effect to the grazing permittee.

Measures or elements for evaluation:

- Rest period following burning
- Forage amount

Recreation – Timber harvest, temporary road construction, and prescribed burning could impact recreationists using the Project Area and areas adjacent to the Project Area (primarily hunting).

Measures or elements for evaluation:

- Recreation analysis – impacts on recreation

Visual Quality – Proposed harvest, temporary road construction, and burning activities could impact visual quality along County Road 20.

Measures or elements for evaluation:

- Visual quality objectives

Roads – Opening currently closed roads and constructing temporary roads could increase open road densities in the Project Area.

Measures or elements for evaluation:

- Open road densities pre and post project
- Comparison to Forest Plan standards

Economics – The Balance Project could help support local community economics. This includes family income, business stability, and the well being of the community. The effects on jobs and minority and low income populations are discussed in Chapter 3.

Measures or elements for evaluation:

- Present Net Value
- Number of jobs supported over the life of the project

Heritage Resources - Design elements to avoid project related impacts to cultural resources have been incorporated into the Proposed Action. This has resulted in a finding by the Forest Archaeologist of No Effect under Section 106 of the National Historic Preservation Act (NHPA) and concurred with by Oregon State Historic Preservation Office (SHPO) staff.

Measures or elements for evaluation:

- Finding under Section 106 of the National Historic Preservation Act

Project Record Availability

This EA hereby incorporates by reference the Project Record. The Project Record contains Specialist Reports and other technical documentation used to support the analysis and conclusions in this EA. These Specialist Reports are for Fire and Fuels, Forest Vegetation, Wildlife, Soil, Watershed, Fisheries, Botany, Noxious Weeds, Rangeland, Recreation, Visual Quality, Roads, Economics, and Heritage. Relying on Specialist Reports and the Project Record helps implement the CEQ Regulations’ provision that agencies should reduce NEPA paperwork (40 CFR 1500.4). The objective is to furnish enough site-specific information to demonstrate a reasoned consideration of the environmental impacts of the Proposed Action and how these impacts can be mitigated, without repeating detailed analysis and background information available elsewhere.

The Project Record is available for review at the Blue Mountain District, John Day, Oregon. Portions of the Project Record such as the Environmental Analysis, Appendices, and maps can be found on the website www.fs.fed.us/r6/malheur.

CHAPTER 2 – PROJECT ALTERNATIVES

This chapter describes the alternatives considered by the Forest Service for the Balance Fuels Reduction. It includes alternatives considered and eliminated from detailed study, a discussion of how the Proposed Action was developed, a description of the activities, design elements, and monitoring for the Proposed Action. The No Action Alternative will be presented and compared to the Proposed Action to showcase the probable results of not implementing the Proposed Action as well as the reasonably expected outcome from implementation.

Chapter 3 contains the detailed scientific basis for establishing baselines and measuring the potential environmental consequences of each of the alternatives.

Alternative Development Process

This chapter describes in detail the Proposed Action that was developed with collaboration under Healthy Forests Restoration Act (HFRA) authorities to meet the purpose and need as stated in Chapter 1 of this EA. The Proposed Action was modified during the collaboration process using site-specific public input, including on-site visits with private landowners and interested members of the public, and interdisciplinary team knowledge of the planning area.

Normally, issues identified during scoping are used to generate alternatives. However, because this project is being prepared under the Healthy Forest Restoration Act (HFRA) authorities, and the Proposed Action implements the recommendations of the Community Wildfire Protection Plan, no alternatives to the Proposed Action are required [HR 1904, Section 104(d)(3)]. Instead, the Interdisciplinary Team (IDT) considered all of the issues proposed during scoping and where feasible adjusted the original Proposed Action to resolve those issues the agency considered significant.

Alternatives Considered but Eliminated from Detailed Study

Two additional alternatives were considered during the planning process, but were not included in the EA for detailed study. They are briefly described, along with the reasons for not considering them further.

Alternative A – No mechanical treatment in trees greater than 12 inches

During scoping, an alternative was suggested that used a diameter limit and more specifically in a second comment a diameter limit of 10 to 12 inches. The IDT carefully reviewed this suggested alternative and considered whether it was another reasonable course of action, to meet the purpose and need of the project.

The IDT determined that the alternative would not be studied in detail because it would not respond to the project purpose and need—needs that were identified in collaboration with partners to the Grant County Community Fire Protection Plan and with other interested parties who participated in the project-planning sessions.

Concerning the treatments included in the alternative, the IDT recognizes that noncommercial cutting and underburning alone could reduce surface and lower-canopy fuel hazards in the Project Area; yet to reduce upper-canopy density and crown-fire potential to a level at which the area is likely safe for effective firefighting and public evacuation in the event of a large wildfire, some commercial cutting must be added to these treatments. Thus, targeted commercial thinning is an essential design criterion of the project, if it is to cause the changes in potential wildfire behavior expected by partners to the Grant County Community Fire Protection Plan.

There are many sources to support fuels reduction to modify fire behavior. In The Effects of Thinning and Similar Stand Treatments on Fire Behavior (Graham et al. 1999), the authors reviewed numerous studies and concluded that the best general approach for lowering wildfire intensities, damage, and mortality was combining a mix of thinning (managing tree density by thinning from below and altering species composition), surface fuel treatment, and use of prescribed fire at a landscape scale.

In Science Basis for Changing Forest Structure to Modify Wildfire Behavior and Severity (USDA Forest Service 2004), thinning is noted as an important element of a forest fuel reduction strategy. The report states that the most appropriate fuel treatment strategy is often thinning (removing ladder fuels and decreasing tree crown density) followed by prescribed fire, piling and burning of fuels, or other mechanical treatments that reduce surface fuel amounts. This approach reduces all three fuel layers (canopy, ladder, and surface), thereby reducing both the intensity and severity of potential wildfires

The study Final Report: Effect of Fuels Treatment on Wildfire Severity (Omi and Martinson 2002) investigated the severity of wildfires that burned into existing fuel treatments areas. Treatments included repeated use of prescribed fire, single prescribed fires, debris/slash removal, and mechanical thinning with and without slash removal. All of the reduction treatments had been conducted less than ten years prior to being burned in wildfires. The authors concluded that treated stands burned less severely than untreated areas, and that it was important to treat the entire fuel profile, including thinning of the canopy. Crown density, which is reduced through thinning, significantly affected the stand damage rating in the study.

Thinning and prescribed fire can be useful tools to mitigate fire hazard in dry forests. In Basic Principles of Forest Fuel Reduction Treatment (Agee and Skinner 2005) the authors reviewed numerous studies, modeled effects of fire behavior, and evaluated the effects of fuel reduction projects on five empirical examples. The article “summarized a set of simple principles to address in fuel reduction treatments: reduction of surface fuels, increasing the height to live crowns, decreasing crown density, and retaining large trees of fire resistant species.”

Cram et al (2006) examined whether forest stands in New Mexico and Arizona treated recently using silvicultural practices would be less susceptible to stand-replacing crown fires, and more ecologically and functionally resilient compared to untreated stands following extreme wildland fire. Results indicated fire severity in pine-grassland forests was lowered when surface and aerial fuel loads were reduced. Specifically, as density (stems/ac) and basal area (ft2/ac) decreased and mean tree diameter (in) increased, fire severity and fireline intensity decreased. The more aggressive the treatment (i.e., where the canopy bulk density was reduced), the less susceptible forest stands were to crown fire. However, mechanical treatments where slash was scattered rendered stands susceptible to near stand-replacement type damage when wildfire occurred within 4 years of treatment. On their study sites, mechanical treatment followed by prescribed fire had the greatest impact toward mitigating fire severity (i.e., both aerial and surface fuels were reduced).

Alternative B – No use of closed roads or construction of temporary roads

During scoping, concerns were raised about the use of closed roads and construction of temporary roads in the Proposed Action. These included a concern of the lasting impacts including forest fragmentation, loss of trees and plants, loss of canopy, and soil impacts as a result of temporary road construction and a concern of using closed roads because it defeats the purpose of the closure. The IDT carefully reviewed an alternative that did not include temporary road construction or the use of closed roads and considered whether it was another reasonable course of action, to meet the purpose and need of the project.

The IDT determined that the alternative would not be studied in detail because it would not respond to the project purpose and need—needs that were identified in collaboration with partners to the Grant County Community Fire Protection Plan and with other interested parties who participated in the project-planning sessions.

This alternative would not meet the project purpose and need because, without the use of 6.5 miles of closed roads and construction of 2.5 miles of temporary road, approximately 465 acres of the 734 acre (or 63%) proposal to reduce fire hazard by commercial thinning would not be operationally or economically feasible. Crown or canopy fuels would not be reduced on these acres. Although the precommercial thinning could still occur to reduce some of the ladder fuels, these units were identified to reduce the fire hazard by reducing fuels and modifying the spatial distribution of the fuels in the three fuel layers: crown or canopy fuels, ladder fuels, and surface fuels.

There is support for treating all three fuel layers. In Science Basis for Changing Forest Structure to Modify Wildfire Behavior and Severity (USDA Forest Service 2004), thinning is noted as an important element of a forest fuel reduction strategy. The report states that the most appropriate fuel treatment strategy is often thinning (removing ladder fuels and decreasing tree crown density) followed by prescribed fire, piling and burning of fuels, or other mechanical treatments that reduce surface fuel amounts. This approach reduces all three fuel layers (canopy, ladder, and surface), thereby reducing both the intensity and severity of potential wildfires.

In response to the concern that use of closed roads defeats the purpose of the closure, closed roads (Maintenance Level 1) are intermittent service roads during the time they are closed to vehicular traffic and may be managed at any other maintenance level during the time they are open to traffic (Malheur National Forest Roads Analysis).

The Soils specialist report states under the Proposed Action, temporary road construction will cause small, localized, temporary increases in erosion hazard, as the existing ground cover is disturbed, the decommissioned road beds are re-compacted, and ruts form. This erosion would disappear within two years of rehabilitation of the roads.

No additional detrimental impacts on soil are expected from temporary road construction, because all temporary roads are located on existing decommissioned roads, so that soil is already detrimentally impacted. Rehabilitation of temporary roads will minimally decrease detrimental soil impacts, because rehabilitation will not correct soil displacement on most of the temporary roads.

Temporary road construction will not increase forest fragmentation because all temporary roads are located on existing decommissioned road beds, so any fragmentation has already occurred. The decommissioned road beds are not grown in with trees.

Alternatives Considered in Detail

No Action (Alternative 1) allows the current situation to continue and the forest would remain subject to natural or ongoing changes. The Project Area would receive no fuels reduction treatments at this time.

The Proposed Action (Alternative 2) was developed using a collaborative process with local residents and other interested parties to meet the Purpose and Need and other multiple resource needs.

Maps of the existing condition and the Proposed Action Alternative are provided in Appendix D. Additional maps are included that display the anticipated effects of both No Action and the Proposed Action alternatives. Larger-scale maps of the alternatives are contained in the project record.

Alternative 1 (No Action)

Study of this legally required alternative indicates changes that would occur in the human environment if the project did not take place. The effects of “no action” establish a point of reference for the analysis, against which the Proposed Action can be measured and compared for its environmental impacts—whether beneficial, benign, or adverse.

This alternative proposes no timber harvesting, precommercial thinning, or fuels reduction treatments in the Project Area at this time. It does not preclude activities in other areas at this time or from the Project Area at some time in the future.

The maps for Alternative 1 show the current distribution of stand structure and crown fire initiation potential (see Map 3- Existing Structural Stages and Map 5-Existing Crown Fire Potential in Appendix D) and the expected conditions in 50 years with no treatment (see Maps 4- No Action Structural Stages in 50 years and Map 6- No Action Crown Fire Potential in 50 Years in Appendix D).

The No Action Alternative does not move the Project Area towards the desired condition and does nothing to reduce the fire hazard. Existing fuels conditions would worsen over time as more fuel builds up in both the understory and in the canopy. This alternative retains existing wildlife cover habitat, until such time as it no longer meets cover requirements (loss by insect, disease or fire, or shading by the dense overstory).

Alternative 2 (Proposed Action)

The Proposed Action was developed as an iterative process involving National Forest staff, the collaborators, and comments from the public scoping process. As stated in Chapter 1, the purpose of this project is to reduce the fire hazard (including surface fuels, ladder fuels, and crown fuels) adjacent to County Road 20 on National Forest System lands creating stand conditions that reduce the chances of a ground fire becoming a crown fire, and a small fire becoming an uncharacteristic wildfire. This will not only help protect life and property on both private and public lands, but will also increase the safety for firefighters. The two main tools that are available to accomplish the objective are utilizing prescribed burning and mechanical treatment (thinning, slash piling, etc.). The Proposed Action is designed to reduce the fire hazard and improve forest health in the Project Area by reducing fuels and modifying the spatial distribution of the fuels in the three fuel layers:

- Crown or canopy fuels would be reduced primarily by commercial thinning (when too dense) and shelterwood treatments (where tree species are not suitable or sustainable). The trees to be cut are often large enough to be utilized for commercial products.

- Ladder fuels would be reduced by commercial and non-commercial thinning treatments and understory removal. The trees cut would vary in size from medium to smaller diameters and some of the smaller sizes may be difficult to economically utilize for products, utilization will be pursued if the opportunity exists.
- Surface fuels would be reduced by one or more of the following methods: yarding tops to landings for utilization or disposal by burning, hand piling or mechanical treatment of natural and project generated fuels, burning any created piles, or underburning with hand fireline construction as needed.

In addition, the purpose of this project is to protect, restore, and enhance ecosystem components including but not limited to old growth, aspen, and fish habitat. The Proposed Action is designed enhance old-growth trees by reducing ladder fuels and competition from other trees around them. The Proposed Action is designed to enhance aspen by reducing conifer competition and protecting the stands from browsing to allow regeneration growth.

Wildlife connectivity corridors were designed to connect the late and old forest stands to meet Forest Plan Amendment #2 standards (see Map 9 in Appendix D). Collaborators expressed interest in maintaining travel connectivity for deer and elk movement and recommended additional corridors based on local knowledge. These travel corridors were located to minimize conflicts with fuels reduction.

Activity Descriptions

Commercial Thinning/Precommercial Thinning/Thinning Around Large Trees

Treatment prescriptions were determined on a site specific basis considering the biophysical environment, current condition of the stand, other resource concerns, and the location. A variety of mechanical vegetation treatments are prescribed to reduce the fire hazard and to promote forest health. (See Appendix B Unit Data Sheet and Map 8-Proposed Action in Appendix D)

- Commercial/Precommercial Thinning - 734 acres
- Precommercial Thinning to 9” DBH – 355 acres
- Precommercial Thinning to 7” DBH – 99 acres
- Thinning around Large Trees – 90 acres

All proposed thinning—both noncommercial and commercial—would be conducted using thinning from below methods, which remove mainly lower- or mid-level trees to reduce ladder fuels, increase the crown base height while also favoring and redistributing growth potential to upper-level large trees. Trees to be removed would be those currently contributing to crown-fire potential, up to a size limit of 21 inches in diameter at breast height (DBH). The thinning would retain an increased proportion of fire-resilient species such as ponderosa pine, while still maintaining a variety of native tree species currently present. Thinning around large trees is designed to enhance individual old-growth trees by removing understory trees that are ladder fuels into the crowns of the large trees. This will also improve the health and vigor of the large trees by reducing the competition for water and nutrients. A limited number of trees larger than 21 inches DBH may be removed if necessary for temporary road development, hazard tree removal, or log landings, as provided by current policy.

Variable Spacing with Retention of Medium Sized Older Trees and Clumps

To enhance structural diversity for wildlife and visuals while reducing fuel loadings, trees would be left at a varied spacing opposed to even spacing. Higher tree density and unthinned areas should provide higher levels of security/hiding cover in the short-term. Lower density areas will open up forest stands, breaking up the fuel continuity. The approximate following range of densities would be used:

Basal Area (ft^2/acre)	Percentage of Stand
25	10%
40	15%
50	50%
60	15%
80-100	10%

Unthinned areas for wildlife habitat are not accounted for in this range of densities

The spacing of leave trees in the areas to be precommercial thinned would also be varied by as much as 50% to provide a variety of habitats and visual diversity. Unthinned areas are to be left for wildlife habitat that are 2 to 5 acres in size and cover 5% of the area to be treated.

Occasionally trees are found that are less than 21" dbh but are obviously older than the second growth trees in the rest of the stand. Often they are growing near old growth trees that are over 21" dbh and would normally be removed during thinning treatments to reduce competition with the larger trees. These medium sized trees generally lack lower branches and do not pose a ladder fuel risk, and they comprise a relatively minor component of the forest. Therefore, they are not considered much of a fire hazard and most are to be retained.

Precommercial Thinning in RHCAs

Approximately 142 acres of precommercial thinning within Riparian Habitat Conservation Areas (RHCAs) would occur in portions of units 50, 60, 64, 68, 72, and 74. The RHCAs are being thinned with the objectives of reducing the fire hazard and improving the health and resiliency of riparian stands. All thinning and fuel treatment would be by hand, with no ground disturbing machinery permitted in the RHCAs.

Logging Systems

Ground based equipment will be used for the 734 acres of commercial thinning.

Temporary Road Construction and Maintenance

- Commensurate use road maintenance – 29.2 miles
- Installation of 3 temporary culverts; two 15" to 18" culverts on FS road 2045475 and one 18" culvert on FS road 2000082
- Temporary road construction and rehabilitation after use - approximately 2.5 miles. These would be rehabilitated after this project. All proposed temporary roads are located on existing decommissioned roads that are located outside of RHCAs.
- Opening of 13 closed roads (to be re-closed) – 5.9 miles

To accomplish timber harvest activities, temporary road construction and commensurate use road maintenance would occur to provide adequate access for harvest and fuel treatment. The roads planned to be maintained are shown on Map 9- Balance Roads in Appendix D. Commensurate use road maintenance means the amount and type of road maintenance performed will depend on the existing road condition, the season of use, and other factors.

The following work is classified as maintenance under the definition listed in the Federal Register but will be listed as reconstruction in any timber sale contracts: construct drain dips, waterbars, and outlet ditches, place geotextile on existing road surface, repair or replace existing cattle guards.

Typical road maintenance could include: blading and shaping roadbed, reshaping drain dips or grade sags, reshaping waterbars/cross ditches, spot rocking in roadbeds, brushing, removing hazard trees, minor realignment of road junctions, cleaning culverts, and seeding.

These maintenance actions would be done on both open and closed roads as needed for harvest activities and fuel treatments. Roads that are currently closed but needed for proposed actions (approximately 5.9 miles of road) would be opened temporarily and reclosed, including pulling the temporary culverts, after project activities are concluded.

Temporary roads would also be needed to support timber harvest. All temporary roads would be rehabilitated after use. Rehabilitation would eliminate future use of the road with the objective of restoring hydrological function. This will include subsoiling and seeding as necessary and discouraging continued use by constructing an earth berm or placing large boulders at the entrance.

Activity Fuel Treatments

There are several methods proposed to treat thinning wood residue (see Appendix B – Unit Information Sheet):

- Whole Tree Yarding/Grapple Piling – 519 acres
- Whole Tree Yarding/Hand Piling – 56 acres
- Whole Tree Yarding/Grapple Piling/Hand Piling - 108 acres
- Grapple Piling/Handpiling – 156 acres
- Handpiling - 439 acres

Whole tree yarding occurs during the logging operations by bringing tops and limbs to a landing, where it may be utilized as chips or firewood, or if there is no market it is piled and burned. Portions of the tops or limbs will remain within the activity units through breakage during the felling/yarding operations and be available for nutrient recycling.

Mechanical piling is done with a low ground pressure (<8 psi) track excavator and is restricted to slopes less than 35%. Hand piling is primarily used on slopes greater than 35% with moderate to high fuel loads. Piles from both methods are burned in the late fall after sufficient moisture has fallen to minimize fire spread.

Prescribed Fire

Prescribed underburning unit boundaries were developed incorporating concerns of resource specialists and collaborators. This included excluding fire from Dedicated Old Growth, specific RHCAs, and areas identified as important for big game security. Prescribed burning would occur on approximately 1,934 acres and includes:

- Lighting approximately 26 acres of RHCAs
- Allowing fire to back into approximately 77 acres of RHCA
- Lighting approximately 394 acres of non-forest land
- Lighting in approximately 20 acres of Late and Old Structure (LOS)

There are two objectives of prescribed burning with this project as described below which address all or some of the following burning objectives; reduce surface fuels, reduce litter and duff depth, and increase canopy base height. Approximately 650 acres will have mechanical treatments before under burning. Burning would be accomplished in the spring and fall seasons when weather and moisture conditions are appropriate. Ignition would be by hand or by ATVs. Multiple prescribed burning entries may be needed to reduce the ladder and surface fuels to reach the desired fuel composition and conditions for maintenance burning. These prescribed burn entries will be accomplished over the next 10 years. Future maintenance burning would be needed to limit regeneration of ladder fuels and maintain low levels of surface fuels after the first 10 years.

Control lines may include the use of roads, the use of natural features, fire line construction by hand or ATV, black line construction, (creating a wide black line by burning along the boundary when there is higher moisture content), wet-line construction, or use of weedeaters to create mow lines. Approximately 11 miles of constructed fire line would be needed to implement the prescribed burning.

Underburning would occur in three allotments; 926 acres within the Lower Middle Fork-Balance, and 700 acres within the Lower Middle Fork-Susanville and 21 acres within the Upper Middle Fork- Ragged. These burn operations would be coordinated with the Grazing Permittee and the Range-land Management Specialist administering the affected allotments. Where possible the burning would be fitted to the grazing systems being used on the affected allotments to minimize impacts to the permittee’s operations. The recovery of vegetation, including forage production and species diversity, would be monitored after prescribed burning to ensure the areas are ready to support livestock grazing on a sustainable level.

General Burning Objectives

The objectives of utilizing prescribed fire are to reduce surface fuels, reduce litter depth, and increase canopy base height. Prescribed fire is not being utilized to change the structural stage of any the stands. Some tree mortality is expected and acceptable in forested stands. Acceptable mortality ranges are as follows:

- Trees 0–5 inch dbh, tree mortality is acceptable from a range of 5 to 35% but expected to be 5-15%.
- Trees 5–10 inch dbh, tree mortality is expected to range from 5 to 10%.
- Trees 10–20+ inches and larger dbh, tree mortality is acceptable from a range from 1 to 5%, but expected to be 1-2%.

These mortality levels are based on averages over the whole burning area and recognize the fact that fire is a relatively inexact tool and that there would be some localized areas where mortality reaches 100% in trees less then 10 inches. Mortality patches should be kept to less than 2 acres wherever possible and preferably to the ¼ to ½ acre size, in stands that have not had previous mechanical treatments that were thought to exist under historic conditions (Agee, 1993).

Burning Objectives for RHCAs, late and old structure stands, big game travel corridors, and satisfactory cover

- RHCAs - 102 acres including 26 acres of Category 1, Sunshine Creek
- Late and old structure – 20 acres
- Big game travel corridors – 50 acres

Within the RHCAs, late and old structure stands, satisfactory cover, and big game travel corridors, the objective of utilizing prescribed fire is to reduce surface fuels and litter depth. Prescribed fire is not being utilized to change the structural stage or canopy cover of the stands in these identified areas. Some tree mortality is still expected and acceptable in these forested stands but is less than in the general forest.

- Trees 0–10 inch dbh, tree mortality is acceptable up to 5%.
- Trees 10 inches and larger, tree mortality is acceptable up to 2%

Ignition may occur within RHCAs in burn units 102 and 115. Within these RHCA's lighting would not occur within 25 feet of live or intermittent streams or green line (which ever is greater), in riparian vegetation, or within lower benches adjacent to stream channels. By utilizing different lighting patterns, prescriptions within the RHCAs would minimize consumption of coarse wood greater than 4 inches at the small end especially where adjacent to stream channels and would maintain ¼ inch of duff. Large coarse wood that may ignite in stream channels will have suppression action taken to limit consumption.

Ignition would not occur within the RCHA's in burn units: 100, 101, 103,104, 105, 108, 109, 110, 111, 112, 113, 117, and 118 but fire would be allowed to back into them. Past district experience has shown that when fire is allowed to back into RHCAs the effects are dependent on the existing vegetation. As soon as vegetative species and moisture regimes within the RHCA change and become more shaded with more moisture and higher humidity, the fire would not burn, so riparian vegetation is rarely affected. Shrubs and conifers providing streamside shade and riparian vegetation are rarely affected because they do not burn with enough intensity to cause mortality.

Ignition will occur within the four mapped aspen stands and any other upland stands discovered during implementation within the burn boundary. Most aspen stands within the Project Area are within RHCA boundaries and generally are more shaded with higher humidities and not expected to carry fire through the stand.

Aspen Treatments

Ten aspen stands are proposed for treatment for a total of approximately 8.5 acres. Treatments would enhance aspen by falling conifers to reduce shading and fencing the stands to protect regeneration from big game and cattle browsing.

One aspen stand is within commercial thinning unit 8. In this stand, conifers will be removed with the harvest. All conifers less than 21 inches DBH to a distance of 60 feet from the outermost aspen (including suckers) would be cut and removed.

Four of the aspen stands are partially or completely within RHCAs and six are within Management Area 3B. Conifers would be felled or girdled where they interfere with response of existing aspen or where they might block light to sprouted trees. When in a RHCA, conifers may be felled across a stream when a hydrologist assists in determining possible directional felling if for preferred placement in stream. Other conifers would be felled away from the stream. In all aspen stands, cut trees would be used for fencing material if possible and residual slash from limbs and tops would be piled or scattered. Piles will be burned in eight stands and left in place in the two stands along Sunshine Creek. All existing large woody debris will be left in place. All stands will be fenced to protect regeneration.

Project Schedule

Depending on which alternative is decided upon by the Responsible Official, activities included in the decision would occur in approximately the following timescale.

Table 2-1: Timeframe for Balance Thinning and Fuels Reduction

Activity	2008	2009	2010
Timber Harvest	X	X	
Precommercial Thinning	X	X	X
Activity Fuel Treatment	X	X	X
Temp Road Construction	X	X	
Road maintenance	X	X	
DOG/ROG Relocation/establishement	X		
Reestablishing Road Closures	X	X	X
Prescribed Burning		X	X
Aspen Treatments	X	X	X
Monitoring	X	X	X

Forest Plan Amendments

Reduce Satisfactory Cover and Total Cover in Big Game Winter Range below Forest Plan Standards

A non-significant Forest Plan amendment is required to reduce cover below standards. Satisfactory cover is currently below Forest Plan Standards in the Balance Creek/Coyote Creek Subwatershed. The Subwatershed has approximately 675 acres of satisfactory cover within Management Area 4A – Big Game Winter Range. That is equivalent to 5% of the Big Game Winter Range in a satisfactory cover condition. Forest Plan standards require that 10% be in a satisfactory cover condition. Implementation of the proposed activities would further reduce the percent of satisfactory cover by less than 1% to a total of 4.8% (611 acres) of the subwatershed.

Total cover is currently above Forest Plan Standards in the Balance Creek/Coyote Creek Subwatershed. The subwatershed has approximately 3,625 acres of total cover within Management Area 4A – Big Game Winter Range. That is equivalent to 28% of the Big Game Winter Range. Forest Plan standards require total cover be 25% in Big Game Winter Range. Implementation of the proposed activities would reduce the percent of total cover below Forest Plan Standards. Total cover would be reduced by 5% to a total of 23% (2,970 acres) of the Subwatershed. Marginal cover is currently above Forest Plan Standards in Big Game Winter Range and would continue to be so after implementation of the proposed activities.

The reduction in the amount of satisfactory and total cover is necessary to meet the purpose and need of reducing the fire hazard adjacent to County Road 20. The proposal as described would treat 64 acres of satisfactory cover and 591 acres marginal cover. Hiding/security cover patches would be maintained in proposed units to mitigate effects. Five percent of each unit would be retained in untreated patches ranging in size from 2 acres to 5 acres. Big game travel corridors were identified during collaboration. Where located in proposed treatment units, these corridors would be left untreated.

The treatments would occur in Dry Forest types. These stands are considered outside the historic range of variation (HRV), i.e., overstocked and likely unsustainable given the high risk of uncharacteristically severe fire and insect epidemics. Most of these stands would likely fall out of cover within the next 25 years if not treated. In a 2003 letter to the Eastside Forests, the Regional Office provided direction encouraging Forests to use site specific Forest Plan amendments to move the landscape towards HRV (USDA FS June 11, 2003).

Relocate Dedicated Old Growth (DOG) 3122 (see Map 7 in Appendix D)

An assessment of Dedicated Old Growth block (DOG #3122PW) found that existing habitat within the DOG is not currently suitable or doesn't have the potential for suitable habitat in the short to mid term. Analysis of late and old structure habitat in the subwatershed found the opportunity to modify the current designation to include more suitable habitat for late and old structure dependent species. The current designation contains 287 acres of habitat. The proposed Dedicated Old Growth block includes 303 acres of high quality habitat, identifies a 189 acre Replacement Old Growth (ROG) block, and an additional 150 acre Pileated Woodpecker Feeding Area (PWFA).

Design Elements

Fire and Fuels		
Design Elements	Objective	Responsible Person
Burn Units 101, 102, 103, 104, 108, 109, 110, 112, 113, 117 will allow for a low intensity underburn to back into RHCAs. Timing will depend on completion of mechanical treatments that are adjacent to RHCAs.	Restrict ignition in RHCAs	Project Fuels Planner and Project Burn Boss
In Burn Units 103,104,108 low intensity under-burn (backing fire) through the aspen will be allowed only after mechanical treatment is completed. This will be followed by fencing of aspen. This will be done in the fall.	Underburn through upland aspen stands to stimulate growth	Fuels Planner/Burn Boss, District Wildlife Biologist, District Silviculturist
Wildlife		
Design Elements	Objective	Responsible Person
From December 1st to April 1st, management activities will be restricted within big game winter range (MA4A). Restricted management activities include all Forest Service and contracted activities, including but not limited to, such activities as timber harvest, precommercial thinning, fuel treatment, prescribed burning, and roadwork. This EA permits waiver or adjustments to seasonal restrictions if the District wildlife biologist determines that disturbance effects to big game would be minimal or non-existant.	Restrict activities that disturb wintering deer and elk.	Sale Administrator, District Wildlife Biologist, Engineering Representative, Burn Boss
In known calving/fawning areas, timber harvest, precommercial thinning and road work will be prohibited from May 1st to June 30th. For prescribed burning activities, burning crews will avoid known calving/fawning areas from May 1st to June 30. In areas not specifically identified for calving and fawning, burning crews will watch for lone elk or deer. If crews see lone animals, they will search the immediate area for calves and fawns and avoid igniting fire where young animals are discovered. Burning crews do not need to monitor elk and deer outside the May 1st to June 30th window. This EA permits waiver or adjustments to seasonal restrictions if the District wildlife biologist determines that disturbance effects to known calving and fawning areas would be minimal or non-existent.	Restrict activities that disturb deer and elk during the birthing season.	Sale Administrator, Burn Boss, District Wildlife Biologist

In treatment units, maintain security cover/hiding cover patch for big game by using the variable tree density strategy described in the Activity Descriptions section above. Untreated patches should provide higher levels of security/hiding cover in the short-term. Lower tree density areas will open up portions of forest stands, permitting natural regeneration to occur; which in turn should provide cover patches in about 20 years.	Maintain security/hiding cover for deer and elk.	District Silviculturist, COR, District Wildlife Biologist , Burn Boss
Closed roads that are re-opened for this timber sale will be closed again following use. This will ensure that open road density is not increased with this project	Protect elk and deer habitat, maintain adequate buck and bull escapement, and promote quality hunting.	Engineering Representative, Sale Administrator, District Wildlife Biologist
Retain wildlife snags (dead trees) at levels to provide for 100% population levels of primary cavity excavators. Retain a minimum of 2.39 snags per acre, 21 inches dbh or greater. If 21-inch dbh snags are not available, retain 2.39 snags per acre of the largest representative diameter. To help protect snags 12 inches dbh and greater, take advantage of variable spacing in thinning units to retain more live trees around the snags. Retain trees damaged during logging operations in harvest areas lacking in snag habitat, unless determined to be a safety hazard. Apply these guidelines unless snags are considered to be a safety hazard during logging operations or if they need to be removed for roadwork or landings.	Retain dead wood habitats for species such as woodpeckers.	Sale Administrator, District Wildlife Biologist
To help retain wildlife snags during prescribed burning operations, there will be no ignition within 50 feet of standing dead trees > 12" dbh. Larger snags can be of greater value to some primary cavity excavators and less easily replaced if destroyed.	Protect dead wood habitats for species such as woodpeckers.	Burn Boss
Maintain down logs for wildlife habitat and long-term site productivity by maintaining Forest Plan standard levels indicated where they currently exist (see Table 2-2 below). Fire prescription parameters will strive for less than 3 inches total diameter reduction on the required large logs.	Provide wildlife habitat and long-term productivity.	Sale Administrator, Burn Boss

Raptors are particularly sensitive to disturbance during the reproduction season. See Table 2-3 below which displays seasonal restriction and nest protection standards for known raptor nests. District wildlife personnel will be contacted for up-to-date raptor nest locations and activity status before implementation of management activities. Unoccupied sites require no timing restrictions. Only those raptor species with known nests sites in or adjacent to the project are listed in the table. If new nests or different raptor species are discovered during project implementation, nest protection and disturbance standards will be applied. Prohibited management activities include all Forest Service and contracted activities, including but not limited to, such activities as timber harvest, precommercial thinning, prescribed fire, and roadwork. Effects to raptors can vary depending on the loudness and duration of the management activity and the topographical or vegetation screening between the management activity and the nest tree. This EA permits waiver or adjustments to seasonal restrictions if recommended by the District wildlife biologist and approved by the District Ranger.	Protect existing and new raptor nests from alteration and disturbance.	Sale Administrator, Engineering Representative, District Wildlife Biologist
To provide blue grouse winter roosts, retain large mistletoe infected or “wolfy” Douglas-fir trees along ridge tops and large scab openings, where available.	Protect Blue Grouse Winter Roosts	Sale Administrator, District Silviculturist, District Wildlife Biologist

Table 2-2 - Forest Plan Standards for Down Woody Debris

Species	Pieces per acre	Minimum Diameter at Small End (inches)	Minimum Piece Length	Total Length feet/acre
Ponderosa Pine	3-6	12”	>6 feet	20-40-ft.
Mixed Conifer	15-20	12”	>6 feet	100-140-ft
Lodge pole Pine	15-20	8”	>8 feet	120-160-ft.

Table 2-3 - Summary of Raptor Timing Restrictions

Description	Timing-Activities Prohibited	Buffer for Timing-Activities Permitted	Timing – Activities Permitted	Management Restrictions At All Times
Occupied goshawk nest sites	Activities are prohibited: April 1-September 30	Within PFA or within ½ mile of nest sites	Activities can occur: October 1-March 31	No management within 30 acre nest stands
Occupied red-tailed hawk nest sites	Activities are prohibited: March 1 – July 31	Within 660 feet of nest tree	Activities can occur: August 1-February 28	No management within 100 feet of nest tree
Great Gray Owl	Activities are prohibited: March 1 – August 31	Within 500 feet of nest tree	Activities can occur: September 1 – February 28	

Soils		
Design Elements	Objective	Responsible Person
Grapple piling shall be done with low ground pressure (< 8.5 psi) on dry, frozen, or snow covered soil, and machinery will stay on existing skidtrails where possible. "Dry" means July through September, or obviously dry during other months. "Frozen" means frozen to a depth of 4 inches or more. "Snow covered" means sufficient snow depth to prevent soil disturbance and compaction.	Keep soil impacts as small as practical, especially long-lasting impacts; and keep detrimental soil impacts from this project to less than 20% of the area of each unit. Limit soil damage	COR
Skid trail locations shall be designated and approved prior to logging. On areas where existing skidtrails spaced 100-140 feet apart can be reused, reuse the old skidtrails. Otherwise, space skidtrails about 120 feet apart (except where they converge at landings and junctions), using existing skidtrails where possible and appropriate. Draw bottoms are not appropriate.	Limit soil damage	Sale Administrator, Soils Specialist
Avoid skidding on slopes steeper than 35%, where feasible; use directional felling and tractor winching. There shall be no skidding on slopes from 35 to 45% except for short pitches and none on slopes steeper than 45%.	Limit soil damage.	Sale Administrator, Soils Specialist
No skidding will be done under wet soil conditions, when ruts six inches or deeper would form on a continuous 50 feet or more of skid trails.	Limit soil damage.	Sale Administrator, Soils Specialist
Re-use existing landings where feasible and where they are away from shallow soil areas and ephemeral draws unless approved by the hydrologist, soil scientist or fisheries biologist.	Limit soil damage.	Sale Administrator, Soils Specialist

Skidders shall not be allowed off skidtrails except on frozen soil. Directional felling and/or winching shall be used when necessary. Low ground-pressure equipment (<8.5 psi) can be allowed off of skidtrails under, dry, frozen, or snow covered conditions.	Limit soil damage.	Sale Administrator, Soils Specialist
The purchaser shall subsoil landings and revegetate (plant trees or seed grass) except where soils are not suitable for subsoiling, such as in rock pits.	Speed recovery of damaged soil.	Sale Administrator, Soils Specialist
Runoff and erosion from skidtrails, and tractor-winch furrows shall be controlled by the use of cross drains or comparable measures. Outfalls of the cross drains shall be clear and located on soil where water will infiltrate, not on shallow or impermeable soil. Cross drains on skidtrails should be spaced appropriately for the terrain.	Limit long-lasting soil damage.	Sale Administrator, Soils Specialist
Seeps will be treated as Category 4 wetlands protected by a no entry 100ft RHCA.	Comply with Pacfish	Layout
Meet Forest Plan ground cover standards when conducting prescribed burning.	Meet Forest Plan Standards	Burning Boss
Watershed		
Design Elements	Objective	Responsible Person
RHCAs for Category 1, 2 and 4 streams and for Category 3 and 4 wetlands shall be consistent with PACFISH. (100-300’)	Protect fishbearing, perennial, and intermittent streams with PACFISH buffers.	Fisheries Biologist, Hydrologist
Ephemeral draws will have site specific, no-cut buffers (10-50’ on each side).	Protect ephemeral draws	Timber Layout Forester, Sales Administrator
Equipment will be permitted in ephemeral draw buffers only at designated crossings. If skidding across draw bottoms that show signs of water flow, skid only when the soil in the draw is dry or frozen, and place slash or other ground cover on the skidtrail after use with approval of aquatic specialist.	Protect ephemeral draws/Reduce erosion-sediment transport	Sale Administrator, Aquatic Specialist

Activities associated with removal, replacement, improvement or addition of culverts in RHCAs and ephemeral draws will be completed during dry conditions or after consultation with fish biologist and hydrologist or their designate. Cease all work if storm events occur and increase stream flows. Control sediment during installation and removal of culverts using approved erosion control practices	Reduce sediments; protect perennial and fish-bearing streams	Fisheries Biologist, Hydrologist, Engineering Representative
Use erosion control measures (i.e., sediment filters, straw bales) to protect streams from construction sediment, where needed.	Reduce sediment transport to streams.	Sale Administrator, Engineering Representative
Cross drains and other drainage structures should be spaced appropriately for the terrain	Reduce erosion and sedimentation	Sale Administrator, Engineering Representative
For roadwork, operate machinery only on road prism.	Reduce erosion and sedimentation	Engineering Representative
Temporary roads will be located outside of sediment delivery zones (as determined by soil type, ground vegetation, and slope), will meet Best Management Practices for controlling surface run-off and erosion, and will be hydrologically closed. Machinery used to build temporary roads shall remain within approved roadway.	Reduce erosion/sedimentation potential	Sale Administrator, Engineering Representative
Decommission/obliterate temporary roads by some combination of the following: recontouring slopes; subsoiling compacted soils to a depth of 16" (unless prevented by bedrock or soil rock content soil); pulling berm; pulling slash (where available); planting or seeding disturbed areas to achieve a minimum of 35% ground cover; restoring natural drainage patterns (may include pulling waterbars) and waterbarring as needed; and /or disguising the first hundred yards of travel way with large pieces or organic material such as cull logs and tops of trees.	Reestablishment of natural drainage. Decompaction of travel way. Restoration of ground cover. Preventing access to decommissioned road. Prevent/reduce potential for erosion/sedimentation.	Sale Administrator, Hydrologist, Fisheries Biologist, Soil Scientist, Silviculturist. Methods for individual roads will be determined in consultation with the District Hydrologist, Fisheries Biologist, or Soil Scientist.

The Forest Service will require a Hazardous Substances Plan and a Prevention of Oil Spill Plan from contractor to be reviewed and approved prior to implementation of activities including prescribed fire.	Prevent petroleum products or other deleterious materials from entering stream systems.	Sale Administrator, Engineering Representative, Burn Boss, COR
Treat fuels in RHCAs and ephemeral draw buffers by hand. Avoid placing hand piles in RHCAs except when fuels treatments (eg precommercial thinning) are implemented in RHCA's. Hand piles in RHCA's shall be located at least 50 feet away from live and intermittent stream channels and not in riparian vegetation. Distribute ignition of closely spaced piles (less than 75 ft. apart) in RHCA's over a minimum of two years; an alternative schedule of ignition may be implemented after consulting with soil scientist, hydrologist, or fish biologist.	Reduce erosion/sedimentation transport.	COR, Fuels Planner, Silviculturist
Fisheries		
Design Elements	Objective	Responsible Person
Screen water pump intakes with appropriate size mesh (3/32") to prevent entrapping fish. Require pump containment kit.	To prevent fuel and oil spills and avoid entrapping fish in pumps.	Engineering Representative
Keep refueling and fuel storage at least 150 feet away from live streams.	To prevent fuel and oil spills.	Engineering Representative
Avoid fire lines within RHCAs. This will ensure that there is a vegetated area where sediment and water can settle prior to entering a live or intermittent stream channel. Properly rehab hand fire lines i.e., waterbar, scatter woody debris, etc.	Control amount of sediment entering streams.	Burn Boss, Fish Biologist
Minimize consumption of >4"dbh coarse wood near stream channels.	Protect and maintain stream channels during high water or floods.	Burn Boss, Fish Biologist

Heritage		
Design Elements	Objective	Responsible Person
All NRHP eligible and potentially eligible (unevaluated) sites will be avoided/protected from any ground disturbing impacts during all timber harvest activities.	Site Protection	Sale Administrator, Contracting Officer, Zone Archaeologist
There will be no piling, hand or with ground-based-based machines (i.e., grapple), within the boundaries of a NRHP eligible or potentially eligible (unevaluated) site; all hand and grapple piling and burning of slash or fuel concentrations will take place outside of the site boundaries.	Site Protection	Sale Administrator, Contracting Officer, Zone Archaeologist
All NRHP eligible and potentially eligible (unevaluated) historic properties with structural remains or other wooden feature types, and/or can and bottle refuse areas will be avoided/protected during all burning activities. Eligible historic remains will be identified on the ground and proper protection measures will be conducted during the burning activities. There will be no hand lines constructed through the boundaries of NRHP eligible or potentially eligible (unevaluated) sites. Under the terms of the Management Strategy for the Treatment of Lithic Scatter Sites (Keyser et al. 1988), low intensity burning (<300° C.) will have no effect on the prehistoric lithic assemblages.	Site Protection	Burn Boss, Zone Archaeologist
If cultural resources are encountered during project implementation, all ground-disturbing activities will cease until the Zone Archaeologist is contacted, assesses the situation, and recommends appropriate action.	Site Recording and Protection	Sale Administrator and/or Contracting Officer, Zone Archaeologist

Range		
Design Elements	Objective	Responsible Person
All existing structural range improvements (fences, gates, spring developments, etc.) and permanent ecological plots will be contractually protected (ATPs).	Protect government and permittee investments	Sale Administrator
If structural improvements are damaged during project operations they will be repaired to Forest Service standards prior to livestock scheduled use. This will be accomplished by whoever caused the damage. Repairs will be required of purchaser if damage was done during timber sale operations, by thinning or fuel treatment contractors, or by force account where appropriate.	Protect government and permittee investments	Sale Administrator, COR, Burn Boss
If livestock are present on either side of a fence, means will be taken to protect the integrity of the grazing schedule. This could include contractual requirement to assure gates are kept closed, placement of temporary cattle guard or presence of a "gate keeper". If no livestock are present, gates and fences shall be operable prior to logging activities proceeding to the next subdivision.	Prevent the movement of livestock to other pastures.	Sale Administrator
Fence right of ways, trails, other developments and access to them will be cleared of slash produced by logging or post sale activities.	Protect government and permittee investments	Sale Administrator

Noxious Weeds		
Design Elements	Objective	Responsible Person
Conduct road blading, brushing and ditch cleaning in areas with high concentrations of invasive plants in consultation with District or Forest-level invasive plant specialists, incorporate invasive plant prevention practices as appropriate.	Prevent the introduction, establishment and spread of invasive plants.	Engineering Representative
Actions conducted or authorized by written permit by the Forest Service that will operate outside the limits	Prevent the introduction, establishment and spread of invasive plants.	Sale Administrator, Engineer Representative

of the road prism (including public works and service contracts) require the cleaning of all heavy equipment (bulldozers, skidders, graders, backhoes, dump trucks, etc.) prior to entering National Forest System Lands.		
Inspect active gravel pits, quarry sites, and borrow areas for invasive plants before use and transport. Require treatment of infested sources before any use of pit material. Use only gravel and rock that are judged to be weed free by USFS weed specialists.	Prevent the introduction, establishment and spread of invasive plants.	Engineer Representative
Botany		
Design Elements	Objective	Responsible Person
Vehicles and off-road equipment should avoid scabland areas and vernally moist meadows. Known sites in the Sunshine Flat area are to be mapped and flagged prior to implementation. Sites are to be avoided during operations, including direct lighting and ATV travel during prescribed burning..	To protect *Eleocharis bolanderi* species habitat.	Botantist, Burn Boss
Vehicles and off-road equipment should avoid seeps, springs, and riparian areas. Monitoring of temporary culvert locations will be conducted during spring 2008 prior to road reconstruction.	To protect *Botrychium* species habitat and *Carex interior* habitat	Botanist
Areas supporting false hellebore (*Veratrum californicum*) and vernally moist meadows should be avoided by vehicles and heavy equipment, even if these areas dry out late in the season	To protect *Phacelia minutissima* habitat.	Botanist
Local native seed mixes or non-persistent weed-free certified seed will be used for areas requiring erosion control or rehabilitation measures	To avoid additional introduction of non-native species within the Project Area	Botanist

Monitoring

1. Vegetation Monitoring (Silviculturist)

Tree marking will be monitored to ensure compliance with the silvicultural prescription and marking guide. Monitoring will check for correct selection and designation of trees expected to live and snags to be left for wildlife habitat and resource protection.

After harvest, a post sale examination will be done to determine the actual need for precommercial thinning and fuel treatment. Plans will be adjusted to the actual post harvest conditions and need for further treatment.

2. Watershed and Fisheries (District Hydrologist and Fisheries Biologist)

Monitor Best Management Practices (BMPs): Three to five percent of tractor yarded units will be monitored to ensure BMP implementation and effectiveness. Monitoring would be done by the District hydrologist, fisheries biologist, soil scientist, or trained technicians, and the Sale Administrator and would occur during project implementation and after completion of the project.

Monitor Unit Boundaries along RHCAs: Monitor three to five percent of units adjacent to RHCAs to ensure adequate buffering of mechanized harvest/fuels reduction activities.

3. Fire and Fuels Monitoring (Fuels Specialist)

Monitoring of work conducted under thinning, grapple and handpiling contracts would consist of periodic inspections while work is in progress and after completion to determine compliance with contract standards.

Prescribed burning implementation monitoring includes burn day monitoring to ensure burning is conducted within the parameters stated in the Burn Plan. This monitoring is completed by fire personnel. Weather, flame length, and smoke dispersal would be a minimum of what is recorded. Fuel reduction will be monitored through fuels plots and would be conducted by fire personnel.

Prescribed burns are to be monitored during and after the burn for the amount of effective ground cover remaining after the burn, the amount of fuel reduction, and post burn mortality and crown scorch.

Burning in RHCAs will be monitored for the amount of ground cover that is exposed and the mortality levels of riparian shrubs and trees.

4. Monitor Forage Recovery (Range Specialist)

Monitor vegetation recovery after prescribed burning to determine when grazing may resume. Rangeland conditions including forage production and species diversity will be monitored after burning to ensure the areas are ready to support livestock grazing on a sustainable level.

5. Monitor Noxious Weeds (Range Specialist)

Disturbed areas within the Project Area will be periodically monitored to identify the establishment of noxious weed species. New infestations will be included in the Forest weed database and will be treated using appropriate methods.

6. Visuals

Upon completion of the activities proposed in this effort, personnel with training in scenery management should review the end result. The results of this review should guide subsequent actions as well as planning efforts in other areas. If activities were determined to be unacceptable, then a site-specific scenery restoration action plan may be designed and implemented.

Comparison of Alternatives

This section provides a tabular comparative summary of the effects of No Action and of implementing the Proposed Action as derived from Chapter 3 effects analysis.

	Alternative 1	Alternative 2
Fuels and Forest Vegetation		
Fuel loadings in tons per acre immediately after activities of the Proposed Action	16.15	5.8
Fuel loading in tons per acre in 50 years	27.03	15.15
Acres of High to Extreme Crown Fire Potential in 50 years	2,812	2,022
Average flame length in 50 years	6 ft.	4.5 ft.
Acres of commercial thinning and non commercial thinning to increase resiliency and sustainability of the forest and reduce the risk of insect and disease to the forest	0	Commercial/Precommercial Thinning - 734 Precommercial Thinning to 9" DBH – 355 Precommercial Thinning to 7" DBH – 99 Thinning around Large Trees – 90
Aspen Stands Treated	0	10
Soil, Water Quality, Listed Aquatic Species		
Miles of temporary road constructed	0	2.5
Miles of temporary road constructed in RHCAs	0	0
Acres of timber harvest	0	Commercial Thinning - 734
Percent detrimental soil impacts pre and post project	No Impacts	No units exceed 20% detrimental impacts (units average 7%)
Road construction, timber harvest, and prescribed burning affects on sediment and temperature	No Impacts	No measureable increase
Aquatic Species Biological Evaluation/Assessment by species	See Table 2-4	See Table 2-4
Effects to the temperature of the MFJDR	No Effect	No measurable Effect
Cover		
Acres of commercial and/or precommercial thinning in satisfactory cover	0	64
Percent satisfactory cover in Big Game Winter Range pre and post	5%	4.8%

project		
Acres of commercial and/or precommercial thinning in Big Game Winter Range total cover	0	1,278
Percent total cover in Big Game Winter Range pre and post project	28%	23%
HEI pre and post project	.51	.50
Dedicated Old Growth and Replacement Old Growth		
Percent of DOG in suitable habitat (Old Forest Multi Strata)	30%	83%
Comparison to Forest Plan Standards	Does not meet Forest Plan Standards	Meets Forest Plan Standards
TES, MIS, Featured Species, and Migratory Birds		
Wildlife and Plant Biological Evaluation determinations for TES species	See Tables 2-5 and 2-6	See Tables 2-5 and 2-6
Wildlife analysis of impacts to Management Idicator Species and landbirds including neotropical migrant bird species and habitat	No Impact	Limited short term impacts, Long term beneficial impacts
Snags and Down Wood		
Snag Comparison to Forest Plan Standards	Meets Forest Plan Standards	Meets Forest Plan Standards
Down Wood Comparison to Forest Plan Standards	Meets Forest Plan Standards	Meets Forest Plan Standards
Old Growth Dependent Species		
Treated acres and percent of the Balance Creek/Coyote Creek Subwatershed	0	1,278 acres treated mechanically (9% of the subwatershed)
Noxious Weeds/Invasive Species		
Miles of temporary road construction	0	2.5
Miles of road maintenance	0	27.2
Acres of grapple piling	0	156 acres
Acres of prescribed burning	0	1,934
Grazing Permittee Operations		
Rest period following burning	No Impact	No anticipated impact
Forage amount	No Impact	Mid to long term increase
Recreation		
Recreation analysis – impacts on recreation	No Impact	Limited Short term impact
Visual Quality		
Visual Quality Objectives	Meets Forest Plan Standards	Meets Forest Plan Standards
Roads		
Open road densities pre and post project	2.1	2.1

Comparison to Forest Plan standards	Meets FP Standards	Meets FP Standards
Economics		
Present Net Value	0	$18,548
Number of jobs supported over the life of the project	0	6
Heritage	No Effect	No Effect

Table 2-4: Aquatic TES Species Effects Determinations

Aquatic Species	Status	Alt. 1 - No Action	Alt. 2 - Proposed Action
Columbia River Bull Trout Salvelinus confluentus	T, MIS	NE	NE
Mid-Columbia River Steelhead Oncorhynchus mykiss	T, MIS	LAA	NLAA
Mid-Columbia Steelhead Designated Critical Habitat	D	NLAA	NLAA
Chinook Salmon EFH[1]	MS	NAE	NAE
Interior Redband Trout Oncorhynchus mykiss	S, MIS	MIIH	MIIH
Westslope Cutthroat Trout Oncorhynchus clarki lewisi	S, MIS	NI	NI
Mid-Columbia River Spring Chinook Oncorhynchus tshawytscha	S	MIIH	NI
Columbia Spotted Frog Rana luteiventris	S, C	MIIH	MIIH
Malheur Mottled Sculpin Cottus bairdi ssp.	S	NI	NI

1Chinook salmon waters are designated Essential Fish Habitat by the Magnuson-Stevens Act.

Table 2-5: Wildlife TES Species Effects Determination

Species	Status	Occurrence	Alternative 1 No Action	Alternative 2 Proposed Action
Gray Wolf (*Canis lupus*) (removed from list 2008)	S	HD/N	NI	NI
Northern Bald Eagle (*Hailaeetus leucocephalus*)	S	HN/S	NI	NI
North American Lynx *(Lynx canadensis*)	T	HN/N	NE	NE
American Peregrine Falcon (*Falco perigrinus anatum*)	S	HN/N	NI	NI
California Wolverine (*Gulo gulo luteus*)	S	HN/N	NI	NI
Pygmy Rabbit *(Brachylagus idahoensis*)	S	HN/N	NI	NI
Pacific Fisher (*Martes pennanti*)	S	HN/N	NI	NI
Western Sage Grouse (*Centrocercus urophasianus phaios*)	S	HN/N	NI	NI
Gray Flycatcher (*Empidonax wrightii)*	S	HN/N	NI	NI
Bobolink (*Dolichonyx oryzivorus*)	S	HN/N	NI	NI
Upland Sandpiper (*Bartramia longicauda*)	S	HN/N	NI	NI
Tricolored Blackbird (*Agelaius tricolor*)	S	HN/N	NI	NI
Bufflehead (*Bucephala albeola*)	S	HN/N	NI	NI

E = Federally Endangered, T = Federally Threatened, S = Sensitive species (RF List)
HD = Habitat documented or suspected with the planning area or near enough to be impacted by project activities
HN = Habitat Not within the Project Area or affected by its activities
D = Species Documented in general vicinity of project activities
S = Species Suspected in general vicinity of project activities
N = Species Not documented and not suspected in general vicinity of project activities
NE = No Effect, NI = No Impact, NLAA = May Effect, Not Likely to Adversely Affect
MIIH = May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species

Table 2-6: Plant Sensitive Species Effects Determination

Sensitive Species	Occurrence in Project Area	Habitat Status Within Project Area	Alt 1 (No Action)	Alt 2 (Proposed Action)
Achnatherum hendersonii Henderson's ricegrass	Not Found	Not Present	NI	NI
Achnatherum wallowensis Wallowa ricegrass	Not Found	Not Present	NI	NI
Astragalus diaphanus var. diurnus South Fork John	Not Found	Not Present	NI	NI

Day milkvetch				
Astragalus tegetarioides Deschutes milkvetch	Not Found	Not Present	NI	NI
Botrychium ascendens upswept moonwort	Not Found	Present	MIIH	MIIH
Botrychium crenulatum crenulate moonwort	Not Found	Present	MIIH	MIIH
Botrychium lanceolatum lance-leaf moonwort	Not Found	Present	MIIH	MIIH
Botrychium minganense Mingan moonwort	Not Found	Present	MIIH	MIIH
Botrychium montanum mountain moonwort	Not Found	Present	MIIH	MIIH
Botrychium pinnatum pinnate moonwort	Not Found	Present	MIIH	MIIH
Calochortus longebarbatus var. peckii long-bearded sego lily	Not Found	Not Present	NI	NI
Camissonia pygmaea dwarf evening primrose	Not Found	Not Present	NI	NI
Carex backii	Not Found	Present	NI	MIIH
Carex idahoa Idaho sedge (formerly *C. parryana*)	Not Found	Present	NI	MIIH
Carex interior inland sedge	Found	Present	NI	MIIH
Cypripedium fasciculatum clustered lady slipper	Not Found	Not Present	NI	NI
Dermatocarpon luridum silverskin lichen	Not Found	Not Present	NI	NI
Eleocharis bolanderi Bolander’s spikerush	Found	Present	NI	MIIH
Leptogium burnetiae var. hirsutum hairy skin lichen	Not Found	Not Present	NI	NI
Listera borealis northern twayblade	Not Found	Not Present	NI	NI
Lomatium erythrocarpum redfruit desert parsley	Not Found	Not Present	NI	NI
Lomatium ravenii Raven's lomatium	Not Found	Not Present	NI	NI
Luina serpentine colonial luina	Not Found	Not Present	NI	NI
Mimulus evanescens vanishing monkeyflower	Not Found	Not Present	NI	NI
Pellaea bridgesii Bridge's cliff-brake	Not Found	Not Present	NI	NI
Phacelia minutissima least phacelia	Not Found	Suspected	NI	MIIH
Pleuropogon oreganos Oregon semaphore grass	Not Found	Not Present	NI	NI
Thelypodium eucosmum arrow-leaved thelypody	Not Found	Not Present	NI	NI

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL EFFECTS

Introduction

This chapter provides information concerning the affected environment of the Balance Thinning and Fuels Reduction Project Area, and potential consequences to that environment from implementing the Proposed Action (Alternative 2) or the likely results of taking No Action (Alternative 1). Direct, indirect and cumulative effects, are disclosed. Effects are quantified where possible, or discussed qualitatively. The means by which potential adverse effects will be reduced are described (see also Chapter 2).

The discussions of resources and potential effects take advantage of existing information included in the Malheur National Forest Plan's FEIS, other project EA's or EIS's, project-specific resource reports and related information, and other sources as indicated. Where applicable, such information is briefly summarized and referenced to minimize duplication.

Specialist Reports and Project Record

This Environmental Assessment hereby incorporates by reference the, Fire and Fuels, Forest Vegetation, Wildlife, Soil, Watershed, Fisheries, Botany, Noxious Weeds, Rangeland, Recreation, Visual Quality, Roads, Economics, and Heritage Specialist Reports located in the Balance Thinning and Fuels Reduction Project Record (40 CFR 1502.21). These reports contain the detailed data, methodologies, analyses, conclusions, maps, references, and technical documentation that the resource specialists relied upon to reach the conclusions in this environmental assessment. The project record also contains information resulting from public involvement efforts. The project record is located at the Blue Mountain Ranger District Office in John Day, Oregon, and is available for review during regular business hours.

Analyzing Effects

Direct, Indirect and Cumulative Effects

Direct environmental effects are those occurring at the same time and place as the initial cause or action.

Indirect effects are those that occur later in time or are spatially removed from the activity.

Cumulative effects are those effects that result from the incremental impact of the action when added to other past, present or reasonably foreseeable future actions regardless of the agency or person that undertakes such other actions (40 CFR 1508.7). Cumulative effects can result from individually minor, but collectively significant actions taking place over a period of time. These “related actions” may be influencing current conditions. If so, their current (or foreseeable) effects are relevant to considerations of whether the proposed action would add to their effects.

In the descriptions of cumulative effects of the proposed action, relevant related actions that are known are identified and discussed. (A full listing of relevant related actions is provided in Appendix C.) Each cumulative effects analysis, for each environmental component, is guided by and consistent with the Council on Environmental Quality letter, “Guidance on the Consideration of Past Actions in Cumulative Effects Analysis” of June 24, 2005.

Irreversible and Irretrievable Commitments

NEPA regulations also state that the Forest Service must show any irreversible or irretrievable commitments of resources that may result from the alternatives. An irreversible commitment is a permanent resource loss including the loss of future options. It usually applies to nonrenewable resources, such as minerals or cultural resources, or to factors that are renewable only over long periods, such as soil productivity. Such commitments are considered irreversible because the resource has deteriorated to the point that renewal can occur only over a long period of time, at a great expense or because the resource has been permanently destroyed or removed. An irretrievable commitment is the loss of use or production of a natural resource for some time. One example is when suitable timberland being used for a winter sport site. Timber growth on the land is irretrievably lost during the time the land is used as the winter sport site, however, if the use changed, timber growth could be resumed. The growth lost is irretrievable, but the timber resource is not irreversibly lost because the land could grow trees again in the future.

Forest Plan Consistency

The proposed action is consistent with the Malheur National Forest Land and Resource Management Plan (Forest Plan - USDA Forest Service 1990) and its amendments. Applicable forest-wide and land use designation standards and guidelines have been incorporated. The Forest Service uses design measures in the planning and implementation of land management activities. The application of these measures begins during the planning and design phases of a project.

Plans of Other Agencies

The CEQ regulation implementing NEPA requires a determination of possible conflicts between the proposed action and the objectives of Federal, State, and Local land use plans, policies, and controls for the area. See the “Findings and Disclosures section at the end of this chapter for a discussion of compliance with various laws.

Existing Conditions and Environmental Consequences

The following sections contain information on the existing condition of individual resources and the reasonably likely outcome of taking No Action - Alternative 1 at this time. The effects (direct, indirect, and cumulative) of the Proposed Action - Alternative 2 on those resources and reasonably likely outcome of project implementation are also disclosed. More detailed discussions on methodology, analytical arguments, and further scientific discussions are contained within the various specialists’ reports in the project file. These are available upon request.

Analysis of effects considers the cumulative effects of future maintenance burning since we desire to continue maintaining the County Road 20 Safety Corridor and reduced risk to homes and other property that this project is designed to provide. Prescribed burning is one of the best tools to maintain the forest in a healthy and fire safe condition and is a general goal of forest management throughout the Blue Mountains.

Fuels

Introduction

This section of the EA summarizes existing fuels conditions and the effects of the No Action and Proposed Action alternatives on fire and fuels. Additional details can be found in the Fire and Fuels Specialist Report located in the project record.

The objectives of this project are to reduce horizontal and vertical fuel loading, and the continuity of hazardous fuels. The longer term goal is to reduce the hazard of high-severity wildland fire to the County Road 20 travel route, adjacent private lands and the environment.

Fire hazard for any particular forest stand or landscape reflects the potential magnitude of fire behavior and effects (severity) as a function of fuel condition. Fuels have been traditionally characterized as crown fuels (live and dead material in the canopy of trees), surface fuels (grass, shrubs, litter, and wood in contact with the ground surface), and ground fuels (organic soil horizons or "duff"), and buried wood (Peterson et al. 2004).

Fire risk is defined as the potential and frequency for wildfire ignitions. Fire risk is often defined as the number of fires per 1,000 acres per decade. Areas that have a fire start every one to ten years are considered to have a high fire risk. The Balance Creek/Coyote Creek Subwatershed classifies as having a high fire risk.

Wildland fires can be classified into 2 different types, surface fires and crown fires. Crown fires are often divided into two different types, passive and active. Passive crown fire exhibits torching of individual trees or groups of trees. Active crown fire occurs when fire moves through the tree crown, burning all crowns in the stand.

Surface fires burn in surface fuels and ground fuels. The size, arrangement, loading, and moisture of the surface fuels and ground fuels along with weather and topography dictate fire intensity and rate of spread. Surface fuel sizes from 0-3 inches are the primary contributors to fire spread and intensity. Fire intensity can be measured in terms of flame length. Flame lengths of less than 4 feet are considered to be a low enough intensity that direct fire control efforts by hand crews can still be effective. Flame lengths greater than 4 feet indicate the need for machine constructed fireline or an indirect suppression strategy would be required to control the fire by handcrews.

Crown fires are generally considered the primary threat to ecological and human values. Crown fires occurs when surface fires create enough energy to preheat and combust fuels well above the surface (Agee 2002). Crown fires pose the greatest threat to fire fighter safety from increased fire line intensities and long distance spotting. These risks force the fire fighter to an indirect suppression strategy, which increases acres burned and thus increases fire severity on the landscape.

Fuels Management

Surface and crown fuels can be manipulated in several different ways to affect their size, arrangement (both horizontal and vertical), density, and loading to affect fire behavior. Two primary treatments were considered for this project: underburning and commercial/non-commercial thinning from below combined with activity fuel treatment.

Late or early season underburning reduces surface and ground fuels, primarily in the 0-3" size class. It also has the effect of raising canopy base height by scorching lower branches, killing smaller trees, and less fire adapted species. The effects from underburning vary widely depending on the weather and fuel conditions at the time of the burn and the skill of the fire managers in directing how the fire will burn. Generally spring burning has better results when mortality in small diameter trees is desired. Several burn entries may be needed to meet the objectives for an area. The combined effects of reduced surface fuels and increased canopy base height reduce the potential for crown fire. Once the desired surface fuel loadings and canopy base height have been achieved, maintenance burning would need to continue and primarily be done in the fall.

Thinning from below removes trees with smaller diameters, usually intermediate and suppressed trees. It has the effect of raising the canopy base height and decreasing canopy bulk density, both of which reduce the potential for crown fires. Canopy base height (CBH) is the height from the ground at which there is sufficient fuel in the form of needles and limbs to sustain torching. The higher the canopy base height, the less likely the potential for torching. Canopy bulk density (CBD) is the highest average fuel loading in the canopy. The higher the CBD, the greater the potential is for stand replacing fire. Surface fuels created from the thinning may need to be treated or they would negate the benefits of thinning by increasing flame lengths and igniting the canopy. Slash on steep slopes is generally treated by hand piling and burning or jackpot burning. On gentler slopes, slash can be treated by machine piling and burning or jackpot burning.

Definition of Terms

Plant Association Group (PAG)/Biophysical Environment –Vegetation classification using similar moisture and temperature environments resulting in similar fire regimes. See Forest Vegetation section for discussion of individual PAGs.

Canopy base height – The lowest height above the ground at which there is a sufficient amount of canopy fuel to propagate fire vertically into the canopy.

Canopy bulk density – The mass of available canopy fuel per unit of canopy volume. It is stand characteristic as opposed to a tree characteristic.

Condition Class - (fire regime condition class) a classification of the amount of departure from the natural regime (Hann and Bunnell 2001). There are three condition classes for each fire regime. The classification is based on a relative measure describing the degree of departure from the historical natural fire regime. This departure results in changes to one (or more) of the following ecological components: vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated disturbances (e.g. insect and diseased mortality, grazing, and drought).

Fire intensity –the rate of heat release along the flaming fire front. Higher intensities require more complex fire fighting resources (dozers and airtankers). Lower intensities require less complex resources (handcrews, engine crews).

Fire risk - the chance of a fire starting from any ignition source, determined by using the frequency of past fire starts.

Fire hazard - the potential magnitude of fire behavior and effects as a function of fuel conditions for any particular forest stand or landscape.

Ladder fuels - vegetation of varying heights that allows a fire to move from surface fuels to lower growing plants which can ignite higher fuels such as small trees or low hanging branches of taller trees.

Active Crown Fire – The fire moves through the tree crowns, burning all crowns in the stand.

Passive Crown Fire – some crowns will burn as individual trees or groups of trees torch

Regulatory Framework

Malheur Forest Plan and the Malheur Fire Management Plan

The Malheur National Forest Land and Resource Management Plan (Forest Plan), (USDA 1990) includes Forest-wide fire management direction consistent with other resource goals. The Malheur National Forest Fire Management Plan (FMP), (USDA 2004) is an annually updated operational guide that defines how the Fire Management Program will be implemented on the Malheur National Forest.

The Forest Plan provides forest-wide goals and identifies direction for fire and residue management:

- Initiate initial suppression action that provides for the most reasonable probability of minimizing fire suppression costs and resource damage. These suppression actions should be consistent with probable fire behavior, resource impacts, safety, and smoke management considerations.
- Identify, develop and maintain fuel profiles that contribute to the most cost-efficient fire protection program consistent with management direction (Forest Plan IV-4).

Additional Forest-wide fire and residue management direction is included in the Fuels Specialist Report located in the project record.

National Fire Plan

The National Fire Plan (USDA Forest Service & USDI Bureau of Land Management 2001) provides national direction for hazardous fuel reduction, restoration, rehabilitation, monitoring, applied research, and technology transfer. The USDA Forest Service and Department of Interior (DOI) are developing a common strategy for reducing fuels and restoring land health in fire-prone areas. The USDA Forest Service prepared a document outlining strategies for protecting people and the environment by restoring and sustaining land health; Protecting People and Sustaining Resources in Fire-adapted Ecosystems – A Cohesive Strategy (USDA Forest Service 2000).

Healthy Forest Restoration Act

In 2003 the Healthy Forest Restoration Act (HFRA) was signed into law. This act is designed to expedite hazardous-fuel reduction and forest-restoration projects on specific types of Federal land that are at risk of wildland fire or insect and disease epidemics. All proposed HFRA actions must be consistent with the applicable resource management plans and they must be on lands managed by the USDA Forest Service or DOI BLM. For a project to meet the requirements of HFRA, the actions must occur in one of four areas. The Balance Thinning and Fuels Reduction project occurs in one of those areas; the Wildland Urban Interface as defined in the Grant County Community Fire Protection Plan.

Air Quality

Activities that will create smoke emissions must follow the State of Oregon Smoke Management Plan.

In compliance with the Clean Air Act, burning of any kind will not occur unless prior approval is granted by Oregon Department of Forestry. The Clean Air Act sets air quality standards for particulate matter (PM) for particles less than 10 microns in diameter (PM 10) and less than 2.5 microns in diameter (PM 2.5). All amounts of PM10 and PM 2.5 emissions will be calculated using the CONSUME software in the Fastracks reporting system, which is also submitted with planned burn operations to the Oregon Department of Forestry to determine compliance with the Clean Air Act.

Analysis Methods

The three primary direct and indirect effects analyzed in this report are crown base height/crown bulk density, fire behavior, and smoke management. The Analysis Area is the Balance project boundary and the Balance Creek/Coyote Creek Subwatershed.

- Informs was used to assess fire hazard in the analysis area and the effects of treatments, the FVS/FFE was used and acres and existing condition/no action (in 50 years) were compared. (Measures for comparison will be tons/per/acre and fire behavior).
- To assess fire behavior, INFORMS Fuels Reduction Analysis has been run for the analysis area. To calculate fire behavior, data for 97th percentile weather was used and fuels data obtained from INFORMS, Most Similar Neighbor (MSN) and photo series. INFORMS and MSN use past stand exam data and satellite imagery to impute stand attributes into stands without existing data. (Measures for comparison will be flame length and fire type). Four representative stands from the project area were selected to display the measures for comparison. These four stands are used throughout the analysis and are also used in the Forest Vegetation analysis.
- To assess smoke management, differences in smoke emissions that are required to be monitored (PM2.5) will be compared by alternative.

To assess the cumulative effects, past fire activity and fuels modification activities from past, present and future projects in the Balance Creek/Coyote Creek Subwatershed will be considered.

Balance/Coyote Historic Condition

Fire Regime

A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human intervention, but including the influence of aboriginal burning (Agee 1993, Brown 1995). Coarse scale definitions for natural (historical) fire regimes have been developed by Hardy et al. (2001) and Schmidt et al. (2002) and interpreted for fire and fuels management by Hann and Bunnell (2001). The five natural (historical) fire regimes are classified based on average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire on the dominant overstory vegetation. These five regimes include:

- I – 0-35 year frequency and low (surface fires most common) to mixed severity (less than 75% of the dominant overstory vegetation replaced);
- II – 0-35 year frequency and high (stand replacement) severity (greater than 75% of the dominant overstory vegetation replaced);
- III – 35-100+ year frequency and mixed severity (less than 75% of the dominant overstory vegetation replaced);
- IV – 35-100+ year frequency and high (stand replacement) severity (greater than 75% of the dominant overstory vegetation replaced);
- V – 200+ year frequency and high (stand replacement) severity:

Plant Association Groups (PAG) and Fire Regime- The subwatershed is classified mostly as warm dry, cool moist, hot dry with a small amount of cold dry. The natural fire regime for the warm dry/hot dry PAG is one of frequent, low intensity, non-stand replacement fire. Mortality from fire would be light and patchy. The cool moist and cold dry PAG areas are primarily in the riparian habitats directly adjacent to high frequency fire regimes. Under this situation the natural fire regime is one of mixed frequency, and mixed severity fire. The PAG for each stand was gathered from stand exam data and photo interpretations and assigned to each stand in the analysis area. Fire regimes were develop for the Tri Forests (Malheur, Umatilla, Wallowa/Whitman) and assigned to the PAG's of the Blue Mountains. Table F-1 shows the percent of the Balance/Coyote Project area by PAG and Fire Regime.

Table F-1: Plant Association Groups and Fire Regimes within the Project Area

Plant Association Group/ Fire Regime	Acres in the Project Area (3,530 ac)	% of the Project Area
Hot-Dry (FR-1/10% stand replacment)	208	6%
Warm-Dry (FR-1/24% stand replacement)	2,617	74%
Cool-Dry	0	0%
Cool-Mois t(FR-3/30% stand replacement)	264	7%
Cool-Wet	0	0%
Cold-Dry (FR-4/57% stand replacement)	17	<1%
Non-Forest	420	12%
Non-Veg	3	<1%

Fire, from both natural and human-caused ignitions, was an integral part of stable and healthy ecosystems within this project area. Fires served to maintain seral vegetation species, maintain lower stand densities, and maintain forage and browse for wildlife. Under these conditions, the fires would have burned with a low to mixed severity, creating a mosaic of condition across the landscape. The majority of the Balance Project Area (80%) would be a fire regime I with a low to mixed fire severity.

Desired Condition

Surface Fuels

The desired maximum surface fuel load would be 5-15 tons per acre in the warm dry and hot dry PAGs. The 3" plus size class of fuels would make up a majority of the loading. Duff accumulations would be fairly low. This surface fuel loading alters fire behavior, to allow firefighting resources to safely and effectively suppress wildfire, by reducing flame length and fire intensity.

For much of the warm dry plant association group, the closest representative photo to show desired surface fuel conditions is (4-PP-4) from the Photo Series for Quantifying Natural Forest Residues in Common Vegetation Types of the Pacific Northwest (May 1980). This photo indicates that the desired surface fuels be less than 10 tons per acre with disturbance from the natural fire regime (Table F-2).

Table F-2: Desired surface fuel conditions (from Photo Series 4-PP-4)

Size Class	Loading
0”- 0.25”	0.2 Tons per Acre (Approx.)
0.26” – 1”	1.2 Tons per Acre (Approx.)
1.1” – 3”	2.3 Tons per Acre (Approx.)
3” +	4.7 Tons per Acre (Approx.)
Total	8.4 Tons per Acre (Approx.)

Canopy Fuels

Canopy base height (CBH) and canopy bulk densities (CBD) are the best measures for helping predict crown fire potential. CBH would be maintained at sufficient height from frequent fires that only occasional torching in less fire adapted trees would occur. CBD, the weight of tree crowns over an area, would be lowered sufficiently enough that even if surface flame lengths were high enough to reach the crown, fire wouldn’t spread in a stand replacing type of crown fire. Historic crown fire potential was minimal.

Fire behavior

Over much of the project area, fire behavior during extreme weather would show the character of a fire modeled with fuel model 2, 8, or 10. Fire intensity would be dependant on the fine fuels, grasses, pine needles and small down wood and would vary across the landscape. Fire would remain primarily as a surface fire, with high rates of spread but exhibiting low severity to the larger fire dependent trees and soils. Fires would have short spotting distances and would show much less resistance to control compared to a passive or active crown fire.

Air Quality

Future wildland fires would burn with less severity due to less available fuels. Smoke particulate matter produced from these fires would be lower than fires in stands that are further removed from the historic fire return interval. Smoke created from prescribed fires would continue to be monitored for compliance with the Clean Air Act through the State Implementation Plan with Oregon Department of Forestry.

Existing Condition

Topography and Weather

Most of the Project Area has gentle terrain with slopes less than 35%. The area has a diverse range of aspects. Winds are generally out of the southwest but can be influenced by terrain. Terrain influenced upslope/up river afternoon winds from west, which bisect the project area, may increase fire spread and spotting distances.

County Road 20 Corridor and Structures

County Road 20 runs through the middle of the project area. The road is a paved road managed for recreational and administrative use. The road corridor is considered to have good potential as a location to limit the spread of potentially large fires in the area. Several summer residences and out-buildings are located within the vicinity of the project area and County Road 20 Road. There is private land within and adjacent to the project area, with one summer cabin completely enclosed by Forest Service lands. The risk to private lands is primarily from spotting created from a crown fire or from a running crown fire approaching private lands.

Fire History

Using past fire history information from 1980 to 1998, the probability of a fire (1 for every thousand acres in the watershed) occurring in the next 10 years within the Balance Creek/Coyote subwatershed is 1.3. In other words there is likely to be 1.3 fires per/1000 acres in the subwatershed in the next 10 years. There is a high probability that a fire will start in the project area over the next 10 years. There is also a moderate to high risk (50% of the watershed) that a fire will develop into a crown fire. Since 1981, 32,961 acres have burned from wildfire within a few miles of the Balance Creek/Coyote subwatershed. Of these acres, 5,680 acres of the subwatershed burned during the Summit Fire of 1996. The Summit Fire started as several small fires that escaped initial attack and quickly grew together and covered approximately 28,286 acres on the Blue Mountain District.

Fuels

Current fuel conditions in the project area are primarily the result of the exclusion of fire over the past 75 to 100 years, timber harvest, and livestock grazing. The lack of fire has allowed a build up of crown, surface and ground fuels. Grazing has reduced the fine fuels in the form of grasses. Past harvest activities changed the structure and species composition to higher levels of smaller less fire resistant trees. The combination of these management activities has changed the natural composition, arrangement and size of surface and crown fuels.

Surface Fuels

An inventory of surface fuels was completed in the summer of 2006. The Photo Series for Quantifying Natural Forest Residues in Common Vegetation Types of the Pacific Northwest (GTR-PNW-105) was used for this inventory. Three groupings of fuel loads are found in the project area. The moderate concentrations of surface fuels found in some stands, is from insect induced mortality and past harvest activities. Photo 7-PP-3 is the photo used to represent these areas. Most stands have light/moderate surface fuel loads. These areas are best represented by photos 2-PP- 2 and 3-PP-2. Table F-3 shows the results of that inventory. Duff levels over much of the project area range from .25" to 1" in depth. The exception is directly under the larger ponderosa pine trees. Bark from ponderosa pine constantly flakes off and accumulates within the first few feet of the bole of the tree. With the exclusion of fire over the past century these bark flakes have reached depths of 6" to 10" under many of the larger ponderosa pine. When these duff mounds burn completely, under low moisture conditions, high stress can be placed on the tree.

Table F-3: Current fuel loading in the Balance Project Area

Size Class	Fuel Loading
0"- 0.25"	.50 Tons per Acre (Approx.)
0.26" – 1"	.77 Tons per Acre (Approx.)
1.1" – 3"	1.31 Tons per Acre (Approx.)
3" +	13.57 Tons per Acre (Approx.)
Total	16.15 Tons per Acre (Approx.)

Fuel loads are averages across the landscape using 4 representative stands.

Crown Fuels

As a result of past harvest activities and the effects of fire exclusion, stand structure over much of the project area has moved from primarily single storied stands with large trees to overstocked stands with multiple stories of mid size and small trees. In most stands, canopy base height is low enough and canopy bulk density is high enough that when combined with current surface fuel conditions, the potential for passive and active crown fire is high. Much of the larger ponderosa pine and western larch in the project area have smaller grand fir and Douglas fir growing as ladder fuels underneath.

Expected Fire Behavior

As shown on Map 5- Existing Crown Fire Potential in Appendix D, most of the stands would burn with extreme to moderate fire intensities at 97th percentile weather. See Table F-4 for 97th percentile weather data used for fire behavior predictions. In the fire regime 1 stands, an uncharacteristic very high intensity fire can be expected with passive or active crown fires and long range spotting. Table F-5 displays fire behavior characteristics if a fire were to occur. Fire intensity (flame length) would well exceed the capability of suppression forces to use a direct attack strategy. Fire severity is expected to be high with damage to soils and mortality in all size classes of trees.

Table F-4: 97th percentile weather and corresponding fuel moistures

Attribute	Fire Season (97th Percentile)
% 1 hr. Fuel Moisture	4%
% 10 hr. Fuel Moisture	4%
% 100 hr. Fuel Moisture	5%
% 1000 hr. Fuel Moisture	10%
% Herbaceous Fuel Moisture	70%
% Woody Fuel Moisture	70%
20’ Wind Speed	20.0
Dry Bulb Temperature (oF.)	91.0

Fuel and weather parameters represent the 97^{th}% weather. In other words 3% of the time weather and fuel conditions exist on the forest that contributes to large fire growth.

Table F-5: Fire behavior characteristics - Existing Condition

Stand Number	Crown bulk density	Crown base height	Fire Type	Crown Fire Potential
302170259	.106	7	Surface Fire	Medium
302170271	.121	8	Passive Crown Fire	Medium
302210152	.048	4	Passive Crown Fire	Very High
302210143	.063	23	Surface Fire	High

Air Quality

The Strawberry Mountain Wilderness is a Class I airsheds. The Strawberry Wilderness is approximately 27 air miles south of the project area. In Class I areas, only very small increments of new pollution above existing air pollution levels are allowed and these pollution levels are monitored by the state. At this time there is no monitoring for smoke impacts in eastern Oregon. The State has designated visibility protection periods for Class 1 airsheds from July 1st to September 15th for Central Oregon and the Cascades. At this time these protection periods have not been set for Class 1 airsheds in Eastern Oregon. Monitoring has not shown that visibility within the area is degraded, the state is considering including Strawberry Mountain Wilderness in the long-term strategy. See draft Oregon Regional Haze State Implementation Plan at http://www.deq.state.or.us/aq/haze/index.htm.

The prevailing winds are from the southwest and west. During the day, diurnal heating forces air up valley and up slope out of the area. During the night, air follows the drainages in the area downstream. Inversions affect air quality the most during the winter months, but during the rest of the year inversions sometimes develop in the morning hours and dissipate by noon.

Currently, air quality in surrounding sensitive areas is limited to short term impacts. These impacts result from wood burning, prescribed burning, and field burning to the west. The greatest impact to the wilderness area is from field burning in Central Oregon. This burning causes haziness which can last for several days in the spring and summer.

Smoke produced from a potentially large crown fire exceeds PM 10 and PM 2.5 emission levels described as unhealthy in the State Implementation Plan of the Oregon Smoke Management Plan. Smoke produced from other burning, such as prescribed fire, is monitored and managed by the State of Oregon to meet the requirements of the Clean Air Act.

Carbon Cycle and Climate Change

Forests sequester large amounts of carbon from the atmosphere which can be released by wildfires. Globally, about 1/3 of the total carbon inputs to the atmosphere are from burning forests. Currently the material in the Balance Project Area is likely to be released back into the atmosphere rather than be sequestered in durable products or replacing fossil fuels in energy production.

Environmental Consequences

Alternative 1 - No Action

Direct and Indirect Effects

Without vegetation and fuels treatments, much of the County Road 20 corridor would continue to be at risk for potential crown fire. As seen on Map 5- Existing Crown Fire Potential and Map 6- No Action Crown Fire Potential in 50 Years in Appendix D, modeling of crown fire potential within the Balance Project Area and the County Road 20 corridor shows the potential for high to very high potential for crown fire. This leaves the County Road 20 corridor in poor condition to be used for a location to slow or stop the spread of a large fire moving through the area.

Without treatments, the stands adjacent to private land would continue to depart from historical conditions, making for increased potential for crown fires and loss of structures. These conditions make for unsafe locations for firefighter to attempt efforts to protect structures and private land.

Surface and Canopy Fuels

Under the No Action Alternative, species composition, stocking levels, fuel loads, and median tree sizes and ages would continue their departure from historic conditions. Surface fuels are expected to be similar to the existing condition over the next few years. Depending on the amount of mortality from future bark beetle attacks and other mortality causing pathogens, overall surface fuel loading may increase which would increase the departure from the historic condition. Duff levels around the larger ponderosa pine would remain at high levels.

Table F-6: Fuel Loadings in tons per acre - in 50 years no treatments

Size Class	Fuel Loading (Approximate)
0"- 0.25"	.94 Tons per Acre
0.26" – 1"	2.45 Tons per Acre
1.1" – 3"	2.88 Tons per Acre)
3" +	20.83 Tons per Acre
Total	27.03 Tons per Acre

Fuel loads are averages across the landscape using 4 representative stands.

Canopy fuels and ladder fuels would continue to increase with less fire adapted species such as white fir, and over stocking of Douglas fir and ponderosa pine seedlings and saplings. There would be an increase in ladder fuels under the larger ponderosa pine. Canopy base height would become lower and canopy bulk density would continue to increase.

Expected Fire Behavior

The effect of no action would result in an increased potential for uncharacteristic, crown fire behavior. Map 5- Existing Crown Fire Potential and Map 6- No Action Crown Fire Potential in 50 Years in Appendix D display current crown fire potential and crown fire potential for 50 years without treatment. With increases in ladder fuels from the high stocking levels in the understory, low canopy base height, and high canopy bulk density, the expected fire behavior for much of the project area is not of low severity surface fires, as it was historically but has the potential for high severity effects to the vegetation and soils. Table F-7 shows two measures of fire behavior for four sample stands and corresponding crown fire potential as modeled using the fire modeling tools in INFORMS.

Table F-7: Fire behavior characteristics - in 50 years no treatments

Stand Number	Flame Length	Fire Type	Crown Fire Potential
302170259	6.0	Passive Crown Fire	Very High
302170271	7.8	Active Crown Fire	Very High
302210152	4.7	Passive Crown Fire	Very High
302210143	5.6	Surface Fire	High

Air Quality

Due to an continued increase in available canopy fuels, duff and surface fuels, smoke produced from a large wildland crown fire would exceed PM 10 and PM 2.5 emission levels described in the State Implementation Plan of the Oregon Smoke Management Plan as unhealthy.

Carbon Cycle and Climate Change

No action would have an adverse effect on the carbon cycle and climate change. The biomass that has accumulated is prone to be released back into the atmosphere by either combustion in a wild fire or by decomposition.

Cumulative Effects

All of the past, present, and reasonably foreseeable actions in Appendix C were considered for their cumulative effects on fire and fuels. The following discussion focuses on activities that may contribute effects to fire or fuels.

Past actions including fire suppression, timber harvest, and grazing have contributed to the current fuel conditions and the departure from the natural disturbance regime. These actions have resulted in increases in understory vegetation and surface fuels, changes in species composition and vegetative continuity.

Some of the 150 miles of road within the Project Area has enabled fire suppression personnel to more easily access fire starts and contributed to successful fire suppression. Fire suppression would continue as an ongoing activity but would get increasingly more difficult as fuels increase.

Alternative 2 – Proposed Action

Following treatments planned with the proposed action, fire hazard to the County Road 20 road corridor, structures and adjacent private land would be reduced. In the event of a large crown fire moving into the Project Area, fire behavior would moderated towards more of a surface fire. Firefighters would have options to use the roads within the Project Area as a containment line to burnout from with reduced long range spotting potential. Map 11- Post Treatment Proposed Action Crown Fire Potential in Appendix D displays the crown fire potential after treatments of the Proposed Action.

Direct and Indirect Effects

Surface Fuels

In the short term (1-5 years) surface fuel loads would become closer to historic conditions. Following activity fuel treatments and prescribed underburning, surface fuel loadings are expected to be within 5 to 10 tons per acre. Larger size classes of down woody fuels would make up a majority of the total fuel loading but would be greatly reduced from current loading. The resulting fuel model used to predict surface fire behavior, in treated areas, would best be described as either fuel model 8/10 or fuel model 2. Fuel model 8 has the least surface fire intensity of all of the fuel models. Fuel model 2 is a grass model that may have high fire intensities depending how soon the grasses and forbs respond under the residual tree canopy and the effect of continued livestock grazing. Fall burning will better meet objectives to reduce 0”-3” surface fuel loads as fuel moistures are generally lower than in the spring, allowing near full consumption of the 0”-3” size fuels. Fall burning will also consume more of the larger size classes of downed woody fuels. Down logs and snags will be protected during prescribed underburning to reduce consumption of these large woody fuels needed for wildlife habitat and meet to Forest Plan Standards (See the Design Measures in Chapter 2).

Table F-8: Fuel loadings in tons per acre - after Proposed Action treatments

Size Class	Fuel Loading (Approximate)
0”- 0.25”	.22 Tons per Acre
0.26” – 1”	.44 Tons per Acre
1.1” – 3”	.65 Tons per Acre
3” +	2.72 Tons per Acre
Duff	1.76 Tons per Acre
Total	5.8 Tons per Acre

Fuel loads are averages across the landscape using 4 representative stands.

Table F-9: Fuel Loadings in tons per acre - 50 years after Proposed Action treatments

Size Class	Fuel Loading (Approximate)
0”- 0.25”	.24 Tons per Acre
0.26” – 1”	.98 Tons per Acre
1.1” – 3”	1.24 Tons per Acre
3” +	10.95 Tons per Acre
Duff	1.24 Tons per Acre
Total	15.15 Tons per Acre

Fuel loads are averages across the landscape using 4 representative stands.

Grasses and forbs are expected to increase after the first season. In late summer, as these plants cure, they become available as fine fuels in the event of wildfire. These fuels tend to burn with high intensity but with lower severity than dead woody fuels.

Duff depths are expected to decrease by as much as 50% following underburning. Fall burning generally consumes more duff than spring burning as the duff layer has much higher moisture content in the spring.

In the mid to long term (5-15 years), as small trees and limbs killed by the underburning begin to fall, surface fuel loads will start to increase again and would need to be managed with future underburning.

Fire is a useful tool to stimulate regeneration of aspen and reduce competition. Increasing aspen regeneration, in the long run, would increase its use as a fire break due to the inherently low flammability and higher moisture regime (Pathway literature 2002 – Fire and Aquatic Ecosystem). This would be a long term goal.

Canopy Fuels

In the short term, reducing stand density in the thinned and underburned stands will greatly increase canopy base height (CBH) and reduce canopy bulk density (CBD). Ladder fuels under residual stands would be reduced. The residual stand would consist of a higher proportion of fire dependant and adapted tree species.

Thinning is proposed in three units that are satisfactory cover stands. Two of these units (80 and 82) were brought forward by collaborators to thin and handpile ladder fuels from under larger dominant trees to preserve and enhance the old growth characteristics. This would increase CBH and reduce CBD while maintaining fire dependant and adaptive trees. The remaining unit (unit 30) is proposed to have a combination of commercial and non-commercial thinning. This treatment contributes towards meeting the project objective of reducing the chances of a ground fire becoming a crown fire, and a small fire becoming an uncharacteristic wildfire by increasing CBH and reducing CBD in conjunction with adjacent treatments. Underburning is proposed to follow treatment in this unit but not to change stand structure beyond what the thinning would accomplish.

Stands that are treated by underburning would have an increased CBH due to mortality in small diameter trees (ladder fuels) and scorching of lower limbs on residual trees. Mortality following spring underburning is generally higher than with fall underburning. In the spring, during bud burst, small trees are more susceptible to heat damage. A spring burn will better meet the objective of reducing then number of small trees. Fall burning generally results in increased consumption of surface fuels and duff.

Maintenance underburning and increased growth of the residual stands would further increase CBH and CBD would begin to decrease. Without continued maintenance burning, the growth of ladder fuels would begin reducing CBH and increasing CBD.

Trees identified as Hazard trees (typically snags) along the 2045 Road would be removed to reduce risk to firefighters and public. This road is used heavily by the public for recreation and would be the most logical road for suppression efforts access and egress to fires in the area. Hazard trees (danger trees) are standing trees that present a hazard to people due to conditions such as, but not limited to, deterioration or physical damage to the root system, trunk, stem, or limbs and the direction of the lean of the tree. Hazard trees would be identified using the direction in the FSM 7700 chapter 30 and Field Guide for Danger Tree Identification and Response (R6-NR-FP-PR-03-05) by Richard Toupin.

Expected Fire Behavior

Map 11- Post Treatment Proposed Action Crown Fire Potential and Map 12 – Proposed Action Crown Fire Potential in 50 Years in Appendix D show crown fire potential for the Proposed Action compared to No Action. In many stands, crown fire is reduced after completion of the treatments. Areas with expected very high and high crown fire potential are broken into smaller scattered areas. Future crown fire potential will continue to decrease if maintenance underburning treatments continue. Table F-10 shows fire behavior characteristics after treatments of the Proposed Action and Table F-11 shows fire behavior characteristics 50 years after those treatments.

Table F-10: Fire behavior characteristics - after Proposed Action treatments

Stand Number	Crown bulk density	Crown base height	Fire Type	Crown Fire Potential
302170259	.032	34	Passive Crown Fire	Low
302170271	.104	18	Passive Crown Fire	Medium
302210152	.046	30	Surface Fire	Low
302210143	.032	34	Surface Fire	Low

Table F-11: Fire behavior characteristics - 50 years after Proposed Action treatments

Stand Number	Crown bulk density	Crown base height	Fire Type	Crown Fire Potential
302170259	.045	37	Surface Fire	Low
302170271	.086	29	Surface Fire	Medium
302210152	.038	36	Surface Fire	Low
302210143	.029	36	Surface Fire	Low

In stands that receive a high proportion of thinning, surface fire intensity and rate of spread may increase due to increased fine flashy fuels (cured grasses) and increases in effective wind speed. In the short term, fires occurring during extreme weather conditions will be primarily surface fires. Direct attack from ground forces will be more effective in most of the project area from reduced crowning potential. Fire severity will be much lower, with less mortality in the residual stand, and reduced soil impacts due to lower duff depths.

Table F-12: Fire behavior characteristics in 50 years

Stand Number	50 years after Treatments	Flame Length	Fire Type
302170259	No Action	6.0	Passive Crown Fire
	Proposed Action	3.1	Surface Fire
302170271	No Action	7.8	Active Crown Fire
	Proposed Action	6.6	Surface Fire
302210152	No Action	4.2	Passive Crown Fire
	Proposed Action	1.2	Surface Fire
302210143	No Action	5.6	Surface Fire
	Proposed Action	7.2	Surface Fire

In the mid term, following the proposed treatments, much of the area will exhibit far less fire severity under extreme fire weather conditions. Table F-12 shows a comparison between the No Action Alternative and the Proposed Action of fire behavior characteristics modeled 50 years after treatment in four sample stands.

1. 302170259 will receive precommercial thinning and handpiling followed by pile burning. Surface fuels and ladder fuels are reduced to a level that flame lengths are reduced and fire type changes from a passive crown fire to a surface fire.

2. 302170271 will receive a combination of precommercial thinning, handpiling and underburning with the proposed action. Surface fuels and ladder fuels are reduced to a level that flame lengths are reduced and fire type changes from an active crown fire to a passive crown fire (isolated torching). The model illustrates the need for maintenance burning to continue in the future to control ladder fuels.

3. 302210152 will receive a combination of commercial thinning with whole tree yarding followed by an underburn under the Proposed Action. Surface fuels and ladder fuels are reduced to a level that flame lengths are greatly reduced and fire type changes from a passive crown fire to a surface fire.

4. 302210143 will receive commercial thinning/precommercial thinning and pile burning. Surface fuels and ladder fuels are reduced to a level that flame lengths are slightly higher and the fire type remains a surface fire. This is because of increased effective wind speed through the canopy and being modeled as a fuel model 2, a grass fuel type, with increased rates of spread and high flame lengths. Even though flame length increases, the fire remains as a surface fire and the crowning potential is reduced from a high to a low. These factors, surface fires and reductions in crowning potential, increase firefighter safety and ability to successfully suppress wildfires. Table F-10 and F-11 display these characteristics.

Table F-13: Comparison of fire characteristics by alternative in 50 years

	No Action	Proposed Action
High to Extreme Potential Crown Fire	2,812 acres	2,022 acres
Average Flame Length	6 ft.	4.5 ft.

Table F-13 shows a comparison of fire behavior characteristic for a hypothetical 97th percentile fire in 50 years. The Proposed Action reduces the amount of area with high to extreme potential crown fire by 790 acres (in the project area) by modifying the surface and canopy fuels. Average flame lengths decrease by more than 1.5 foot due a reduction of surface fuels. This effect suggests improved firefighting capability even under difficult circumstances, and also reduced fire severity (resource impacts). These expected outcomes are the result of less crown-fire potential and thus lower overall intensity, as depicted in Map 11- Post Treatment Proposed Action Crown Fire Potential in Appendix D.

Air Quality

Smoke intrusions are not expected to impact the neighboring communities as a result of the prescribed burning. The prevailing winds are from the west/southwest, and will force the smoke to the east/northeast. The towns of Baker City and Sumpter are the closest communities and are approx 20/40 air miles to the northeast of the project area. They are not expected to be impacted adversely since most of the smoke will be diluted/dispersed. A west or northwest wind could transport smoke to the town of Unity, approximately 20 air miles away, but is also expected to be dispersed and not have an adverse affect to the community. Burning should be planned for times when transport winds are sufficient to displace much of the smoke from the area. Smoke generated form pile burning and underburning is expected to affect the surrounding area, especially downwind to the community of Galena, in the form of an inversion. These impacts are expected to be short term. The communities of John Day and Canyon City are not expected to be impacted by smoke production from activities proposed in this project. Both towns are to the southwest of the project area and not in line with typical prevailing winds.

Visibility protection periods have been designated for Class 1 wilderness areas in Oregon, the implementation of this project will adhere to the designated visibility protection periods from July 1st to September 15th.

See Table F-14 for a comparison of smoke impacts from a potential passive or active crown fire and underburning per burning day. Total acres of underburning and pile burning were used to calculate particulate matter (PM) for the proposed action. Acres of high to extreme crown fire were used to calculate PM for wildfire.

Table F-14: Tons of particulate matter production by alternative (PM 2.5 only)

	Particle Size	Underburning and Pile Burning (lbs/pm/per/day)	Wildfire at 97th Percentile	Total Pounds of Particulate Matter per Day
No Action	PM 2.5	0	2,471,000	2,471,000
Proposed Action	PM 2.5	460,080	810,720	1,270,800

PM 2.5 is considered respirable and has the most implications to human health.

Carbon Cycle and Climate Change

The Proposed Action would have a positive effect on the carbon cycle. Harvest does not release stored carbon into the atmosphere; that carbon remains stored in the logged wood. The trees removed no longer have carbon fixing capacity but the carbon is not being released into the atmosphere, it remains in the harvested wood. There is an increased carbon sequestering capacity in remaining trees as tree sizes increases due to improved growth rates. Converting a portion of the accumulated biomass into durable products like lumber or into paper that would eventually either be recycled or buried in a landfill would take that portion out of the atmosphere. Additionally, any biomass used for power generation would allow that amount of fossil fuels to remain sequestered in the ground.

Cumulative Effects

All activities in Appendix C have been considered for their cumulative effects on fuels. For large fire behavior, the area of consideration for cumulative effects of the proposed action is past activities within 20 years within the Balance Creek/Coyote Creek Subwatershed. The Balance Creek/Coyote Creek Subwatershed is the logical break for considering cumulative effects for fire behavior. Ridge lines and roads are often used by fire suppression forces as locations to contain a large fire. The first primary ridge lines separating the subwatershed from adjacent subwatersheds will most likely be used to contain a large fire, as will the County Road 20, Forest Service Road 2045, and 045 from starts in the Project Area. Current and reasonably foreseeable activities include grazing, commercial and noncommercial thinning and prescribed fire. These actions are expected to occur in the subwatershed.

Fire Behavior and Forest Condition – A total of 5,680 acres have burned in wildfires within the past 20 years within the Balance Creek/Coyote Creek Subwatershed. Fuels reduction from the fire and the following fire salvage had the effect of reducing fire hazard on 41% of the subwatershed for the near future. Much of the fire area has been returned to the stand initiation stage of structure development.

Several past management practices including harvest, precommercial thinning, reforestation, fuels treatment and grazing activities have occurred in the subwatershed on both National Forest System and private lands that affected the stand structure, stand composition, ground vegetation, and overall fire behavior. Reforestation and natural regeneration of the Summit Fire in the mid/late 90's to the north/east of the project area placed much of the area back into an early succession stage of vegetation growth with high stocking levels and low surface fuel levels. Other reforestation activities related to timber harvest have also placed scattered areas into a condition class of 3. Fuels from harvest activities were treated primarily by machine or hand piling followed by burning of the piles. In small scattered areas activity fuels were treated with broadcast burning, in preparation for planting. The combined effect of these treatments along with the exclusion of low intensity, frequent fire, places the Balance Creek/Coyote Creek Subwatershed in the current condition. The cumulative effects of past activities along with the proposed actions of the Balance Project will be to improve the overall condition of the subwatershed. The effect to overall fire behavior for the subwatershed is minimal except to the area within the proposed action or adjacent to the project

Portions of the subwatershed have active livestock grazing allotments. As long as grazing continues in the area, fine fuels in the form of cured grasses will be altered from historic conditions. This action will reduce fire intensity over much of the Project Area and subwatershed increasing fire suppression capabilities on surface fires. The combined effect of continued grazing added with the proposed action will improved fire suppression capabilities across the entire subwatershed.

Air Quality – To asses the cumulative effects of air quality, areas where smoke from the proposed action and other forest burning may combine to increase levels beyond the previously mentioned will be considered. The Blue Mountain Ranger District maintains a target of approximately 3,000 acres of fuels reduction burning per year. Of this, approximately 2,500 acres is jackpot burning or underburning and the rest is pile burning. To have a cumulative effect, other forest burning would need to occur within a day or two of the Balance Project burning and be somewhat upwind or down wind from each other. Beyond two days, smoke dissipates enough to reduce the potential for negative impact. Other District underburning planned that could occur during the same season as the Balance Project underburning is the Crawford Project approximately 10 miles to the east or the Antelope2 project which is approximately 30 miles to the south. In the event that either of these projects will be implemented during the same season as the Balance Project, all underburning will be in compliance with the Clean Air Act.

Other pile burning will occur during the same time period as the pile burning planned for the Balance project. All pile burning will also be in compliance with the Clean Air Act.

Burning of any kind will not occur unless prior approval is granted by Oregon Department of Forestry. All amounts of PM10 and PM 2.5 emissions will be calculated using the CONSUME software in the Fastracs reporting system, which is also submitted with planned burn operations to the Oregon Department of Forestry to determine compliance with the Clean Air Act.

Consistency With Direction and Regulations

Forest Plan and Fire Management Plan – The Proposed Action meets the direction in the Forest Plan by managing fuel levels that will minimize the potential of high intensity, catastrophic wildfires and also results in a cost-effective protection program. Alternative 1 does nothing to manage fuels levels, increasing the potential for a high intensity wildfire.

National Fire Plan – The Proposed Action meets the direction in National Fire Plan primarily by reducing the threat to life and property from an uncharacteristic wildfire and restoring natural ecological systems to minimize uncharacteristic fire intensities.

Healthy Forest Restoration Act - The Proposed Action reduces the threat of uncharacteristic wildland fire in areas designated Wildland Urban Interface (WUI) by the Grant County Community Wildfire Protection Plan. The WUI designation is specific to County Road 20 because it is an evacuation route for an at-risk community.

Air Quality Regulations – State and federal air quality regulations will be followed. All burning will be done in accordance with the Oregon State Smoke Management Plan to ensure that clean air requirements are met.

Irreversible and Irretrievable Commitments

Irreversible Commitments

There are no long term irreversible commitments of resources that may result from the proposed action with respect to fire and fuels. Some short term growth loss is expected do to mortality in seedling and saplings from prescribed burning but nutrient recycling could aid in increase growth of the residual stands.

Irretrievable Commitments

There are no known irretrievable commitments of fuels caused by the Proposed Action.

Forest Vegetation

Introduction

This section of the EA summarizes existing vegetation and the effects of the No Action and Proposed Action alternatives on vegetation. Additional details can be found in the Forest Vegetation Specialist Report located in the project record. This section is based on the assumption that all of the project design features for each alternative are carried out as described in Chapter 2 of the EA.

Definition of Terms

Mechanical Treatments – Vegetation changes done by mechanical cutting methods instead of by other means, such as prescribed burning.

Precommercial thinning – Thinning in tree stands where the trees to be cut are not merchantable saw log sized material (1” to 9” dbh). The objective is to reduce ladder fuels, reduce the amount of live and dead fuels, and increase tree growth. Thinning would emphasize the retention of seral species, increasing their representation in some stands.

Commercial thinning – This prescription would thin small/medium size trees (7 to 20.9” dbh) in immature forest stands by thinning from below to reduce stocking levels. The goal is to reduce canopy fuels, enhance individual tree growth, and to allow for the reintroduction of fire. Thinning from below means the majority of the trees to be cut are in the smallest diameter sizes (up to approximately 14” dbh) and relatively few trees would be cut in the medium diameters (15 to 20.9” dbh). Thinning would also emphasize the retention of seral species, increasing their representation in some stands.

Historical (Reference) Condition - The vegetation resulting from conditions and disturbances that existed prior to European - American settlement, which began in the 1850’s. Used as a baseline for “natural” conditions.

Existing (Current) Condition - The current forest vegetation resulting from actions taken over the last 150 years, in combination with natural processes. Some of the actions include grazing, mining, logging, and fire suppression.

Desired Condition – Forest vegetation resilient to natural disturbances and where disturbances result in historic patch sizes.

Historic Range of Variability (HRV) – The percentage of each structural stage thought to have existed across the landscape before European - American settlement.

Plant Association Groups – (PAG) - Vegetation classification using similar moisture and temperature environments resulting in similar fire regimes.

Structural Stage – Classification of forest stands by developmental stage and size.

Figure-2: Description of forest structural classes by developmental stage and size.

Stand Initiation (SI). Following a stand-replacing disturbance such as wildfire or timber harvest, growing space is occupied rapidly by vegetation that either survives the disturbance or colonizes the area. Survivors literally survive the disturbance above ground, or initiate growth from their underground roots or from seeds stored on-site. Colonizers disperse seed into disturbed areas, the seed germinates, and then new seedlings establish and develop. A single canopy stratum of tree seedlings and saplings is present in this class.

Stem Exclusion (SECC or **SEOC)**. In this stage of development, vigorous, fast-growing trees that compete strongly for available light and moisture occupy the growing space. Because trees are tall and reduce sunlight, understory plants (including smaller trees) are shaded and grow more slowly. Species that need sunlight usually die; shrubs and herbs may become dormant. In this class, establishment of new trees is precluded by a lack of sunlight (**stem exclusion closed canopy**) or of moisture (**stem exclusion open canopy**).

Understory Reinitiation (UR). As a forest develops, new age classes of trees (cohorts) establish as the overstory trees die or are thinned and no longer fully occupy growing space. Regrowth of understory vegetation then occurs, and trees begin to develop in vertical layers (canopy stratification). This class consists of a sparse to moderately dense overstory with small trees underneath.

Young Forest Multi Strata (YFMS). In this stage of forest development, three or more tree layers are present as a result of canopy differentiation or because new cohorts of trees got established. This class consists of a broken or discontinuous overstory layer with a mix of tree sizes present (large trees are absent or scarce); it provides high vertical and horizontal diversity. This class is also referred to as "multi-stratum, without large trees" (USDA Forest Service 1995).

Old Forest (OFMS). Many age classes and vegetation layers mark this structural class and it usually contains large, old trees. Decaying fallen trees may also be present that leave a discontinuous overstory canopy. On cool moist sites without recurring underburns, multi-layer stands with large trees in the uppermost stratum may be present.

Old Forest (OFSS). Many age classes but only a single fairly distinct overstory layer marks this structural class and it usually contains large, old trees. Decaying fallen trees may also be present that leave a discontinuous overstory canopy. The diagram shows a single-layer stand of ponderosa pine that evolved with high frequency, low-intensity fire

Sources/Notes: Based on Oliver and Larson (1996) and O'Hara and others (1996). Modified, Tatum 2006

Canopy base height – The lowest height above the ground at which there is a sufficient amount of canopy fuel to propagate fire vertically into the canopy.

Fire regime – A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human intervention, but including the influence of aboriginal burning (Agee 1993, Brown 1995). Coarse scale definitions for natural (historical) fire regimes have been developed by Hardy et al. (2001) and Schmidt et al. (2002) and interpreted for fire and fuels management by Hann and Bunnell (2001). The five natural (historical) fire regimes are classified based on average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire on the dominant overstory vegetation.

Quadratic Mean Diameter – the diameter corresponding to the mean basal area (the diameter of a tree of average basal area in a stand).

Regulatory Framework

Forest Wide Standards and timber management constraints set forth in the Malheur National Forest Land and Resources Management Plan, as amended, are followed. Much of the Project Area is in Management Area 4A (Big Game Winter Range), 1,965 acres (56% of the Project Area) with 425 acres (12% of the Project Area) each of MA1 (General Forest) and MA3B/RHCA (Anadromous Riparian Areas, 415 acres (12%) of MA14F (Visual Corridor Foreground), and 250 acres (7%) of MA13 (Old Growth Habitat).

Balance Thinning and Fuels Reduction Project qualifies under Title 1 - Hazardous Fuel Reduction on Federal Land of the HFRA. The project is an Authorized Hazardous Fuels Reduction Project as described in Section 102 of the HFRA because it is consistent with the Implementation Plan for the 10-Year Comprehensive Strategy and is on Federal lands within safety corridor identified in a community wildfire protection plan. This project is identified in the Grant County Community Fire Protection Plan (GCCFPP) and included in the GCCFPP Action Plan.

The Galena Watershed Analysis (1999) recommendations for dry forests include: managing vegetation species and density to better balance proportion of structural types, increase tree vigor to better resist insect and disease attacks, and reduce potential for crown fire.

Additional details on Regulatory Framework including applicable Forest Plan standards and goals can be found in the Forest Vegetation Specialist Report located in the project record.

Analysis Methods

Data used for this analysis was gathered from a combination of stand exams, photo interpretation, GIS, and site visits. The Integrated Forest Resource Management System (INFORMS) software program was used for project analysis. INFORMS was designed for project level analysis and provides an interface to a variety of analysis tools such as the Most Similar Neighbor (MSN), Forest Vegetation Simulator (FVS), and the Fuels and Fire Extension for FVS (FFE-FVS). Using this, stand attributes from sampled stands were imputed to non-sampled stands, treatment prescriptions developed, stand growth with and without treatments modeled, and potential fire intensities and severities modeled. The modeling was completed on the Balance Creek/Coyote Creek Subwatershed. The effects of the actions and of no action are discussed at both the subwatershed and at the Project Area. Four representative stands from the Project Area were selected for comparative purposes. These four stands are used throughout the analysis and are also used in the Fuels analysis. The modeling is used for comparative purposes only and is not meant to accurately predict actual future conditions. Long-term projections become estimates at best; however, results do show trends and are useful for comparison. Additional information on analysis methods and assumptions is available in the Forest Vegetation Specialist Report in the project record.

Existing Condition

The combination of timber harvest and fire suppression gradually converted forests from early seral species to a higher proportion of late seral species. Stand densities and multi-layer canopies also increased across the forests. These late seral trees are not resistant to forest insects, diseases, or to fire.

The Summit Fire in 1994 burned approximately 5,680 acres (approximately 41%) in the Balance Creek/Coyote Creek Subwatershed. In addition, there have been numerous other smaller fires in the subwatershed that have burned in the last 20 years. These have been fueled by the increased dead and down timber, dense stands, and multiple crown layers creating ladder fuels into the upper tree crowns.

Timber harvest in the last 15 years has begun to correct the past changes, concentrating on thinning overstocked stands and shifting the species composition of late-seral species stands to more resilient early-seral species. The commercial thinnings have been mostly in small to medium diameter ponderosa pine stands but have had limited improvement of tree growth due to the high densities that were left.

Biotic Conditions

The area for determining the Historic Range of Variation (HRV) is the 13,778 acres Balance Creek/Coyote Creek Subwatershed. Map 3- Existing Structural Stages in Appendix D displays the structural stages within the subwatershed. The Project Area is approximately one-quarter of the subwatershed at 3,530 acres. The Analysis Area is

85% forested. Within the Balance Creek/Coyote Creek Subwatershed, most of the area is covered by conifer forest vegetation with a smaller amount of nonforested vegetation, and a very small area of nonvegetated land.

Table V-1: Subwatershed vegetation group acres and percent

Vegetation Groups	Acres	Percent of Area
Forest Vegetation	11,728	85%
Non-Forest Vegetation	2,000	15%
Non-Vegetated	50	<1%

The lower elevations and south facing slopes are generally ponderosa pine plant associations with ground vegetation of pine grass, elk sedge, and common snowberry. Other tree species include western larch, Douglas-fir, lodgepole pine and grand fir. These stands are generally young and even-aged due to the nature of past harvests. There is low structural diversity, overstocking, and a lack of larger diameter trees and snags. The limiting factors to vegetative growth are competition for water, sunlight and soil nutrients.

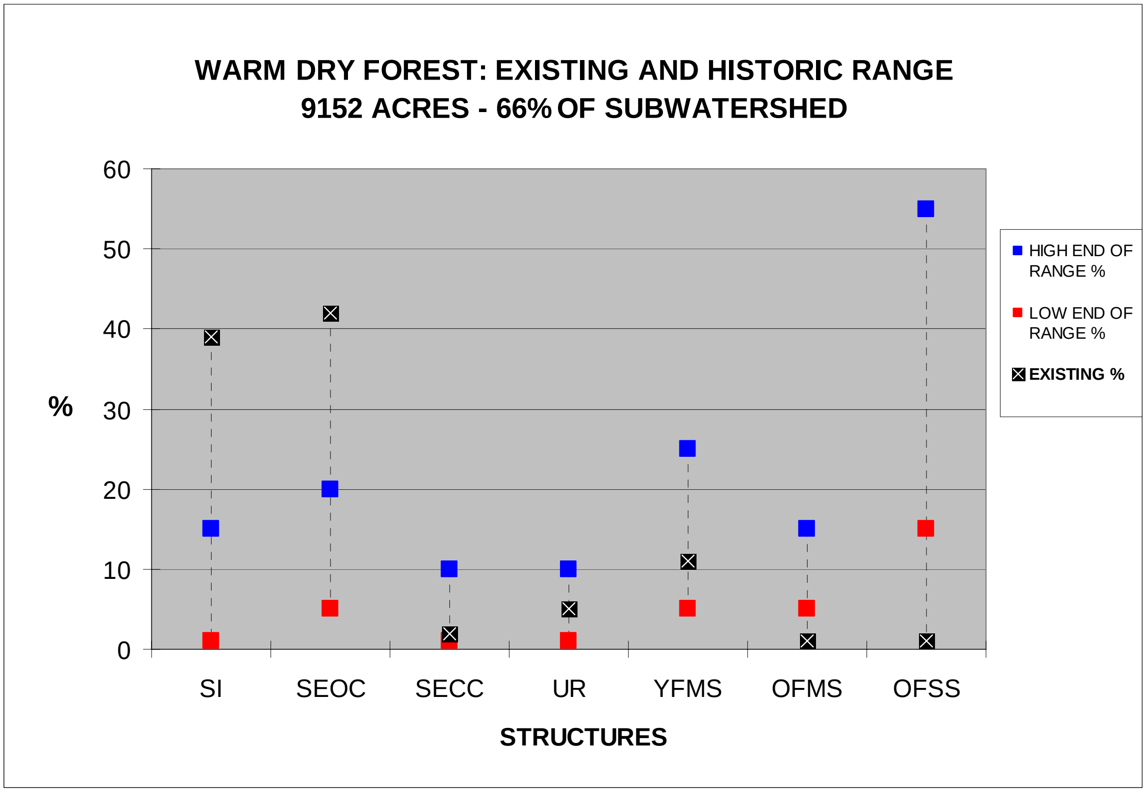
The rest of the plant associations are predominantly Douglas-fir and grand fir climax. The grand fir series contain grand fir, Douglas-fir, western larch, lodgepole pine and ponderosa pine. Pinegrass, twinflower, grouse huckleberry, and big huckleberry dominate ground vegetation. These stands are typically overstocked multi-stratum canopies that are at high risk for insect and disease problems and stand replacement fire.

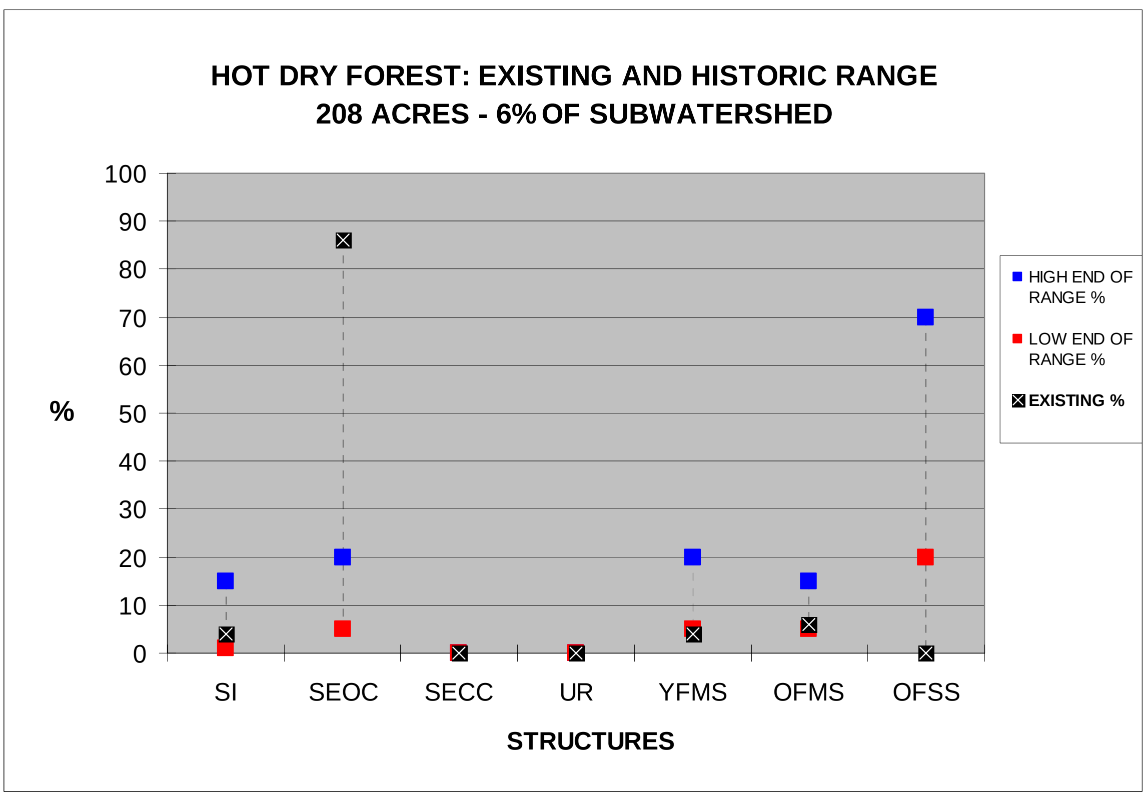
The forest vegetation can be grouped into eight plant association groups (PAGs). There are six forested plant association groups that occur within the subwatershed as displayed in the Table V-2. Of these, the Warm Dry plant association group is the most prevalent, and is even more so within the Project Area (see Table V-2).

Table V-2: Subwatershed and Project Area Plant Association Groups

Plant Association Group	Acres in Subwatershed (approx. 13,775)	% of the Subwatershed	Acres in the Project Area (3,530)	% of the Project Area
Hot Dry	369	2%	208	6%
Warm Dry	9,152	66%	2,617	74%
Cool Dry	95	1%	0	0%
Cool Moist	1,826	13%	264	7%
Cool Wet	20	<1%	0	0%
Cold Dry	265	2%	17	<1%
Non-Forest	2,000	15%	420	12%
Non-Veg	50	<1%	3	<1%

Warm Dry and Hot Dry Plant Association Groups





The items of most importance displayed in the Warm Dry and Hot Dry HRV Graphs are:

- The OFSS and OFMS structural stages are below HRV in the Warm Dry PAG
- The SI and SEOC are above HRV in the Warm Dry PAG
- The OFSS structural stage is below HRV but the OFMS structural stage is within HRV in the Hot Dry PAG

Warm Dry forests are the most prevalent plant association group in the subwatershed and the Project Area. Hot Dry forests occupy far less area. Both PAGs occur across a range of soils (volcanic ash as well as mixed and residual soils - gravely to cobbly loams, clay loams). Warm dry forests occur on all aspects ranging from high to lower elevations. Hot-dry forests occur on southerly to flat aspects along mid to lower elevations.

Warm dry forests are represented by an array of plant associations, indicating the wide range of environments they occupy. Species compositions range from nearly pure ponderosa pine to mixes of ponderosa pine, Douglas-fir, grand fir, western larch, and lodgepole pine. The warm dry forest includes most of the Douglas-fir plant associations and the drier grand fir plant associations (up to and including the grand fir/grouse huckleberry assoc.), since they all were subject to frequent, low intensity fires that maintained early seral species in the stands.

Species composition in hot dry forests include nearly pure stands of ponderosa pine to mixes where ponderosa pine is the dominant species and Douglas-fir, grand fir, western larch, and lodgepole pine occur in lesser amounts. The hot dry forests were subject to frequent, low intensity fires that maintained the ponderosa pine in the stands.

Species Compositions and Successional Development

The low intensity/high frequency disturbance regime common in these forest types favored fire resistant species (ponderosa pine, and to a lesser extent western larch and Douglas-fir) and development of more open stands with little vertical structure. Shade tolerant species (grand fir and Douglas-fir) were generally susceptible to these fires due to their thinner bark when young and persistent, low hanging crown characteristics. Smaller understory trees were vulnerable to periodic fires surviving in areas with too little fuels to carry a fire. The extent of these ground fires likely varied from small areas (less than 10 acres in size) to entire slopes covering thousands of acres depending upon the season, topography, and climatic conditions. The intensity also varied in response to vegetative conditions. Areas missed by frequent fires (wetter northerly aspects) developed conditions where subsequent fires could potentially be of moderate to high intensity, resulting in patches of stand replacement/regeneration.

Overall, the frequency of these fires made them an agent of stability in these forest ecosystems. They kept the ground vegetation dominated by fire adapted grasses (such as pine grass and elk sedge), while promoting and maintaining mature forest vegetation dominated by ponderosa pine.

Disturbance Processes

Warm-dry and hot-dry forests have been affected by a variety of disturbances. These include: insects; diseases; fire; and human related disturbances such as timber harvest, fire suppression, and grazing. Fire is by far the major natural disturbance agent in dry forests. Other disturbance agents in this forest type include a variety of insects and diseases. In general, these disturbance agents added to the structural diversity of these stands by providing small areas/openings for understory vegetation to establish. Additional information about disturbance processes can be found in the Silviculture Specialist Report located in the Project Record.

Fire

Historic fire disturbance regimes in these forest environments can be best characterized as high frequency/low intensity. Fires started by natural ignition (i.e. lightning) or American Indian people burned in the form of underburns and small areas of lethal fires on a frequency of every 10-35 years in these forest types (Agee 1993, Hall 1977). Fire regimes have been identified for all plant associations occurring across the Blue Mountains. In addition, fire frequency with the percent of any fire that may be mixed severity or stand replacing has been identified. Approximately 74% of the Project Area has been identified as plant associations within the warm-dry plant association group and in Fire Regime 1 with an average fire frequency of 22 years and 24% of any fire potentially being stand replacing. Approximately 6% of the area has been identified as plant associations within the hot-dry plant association group and in Fire Regime 1, with an average fire frequency of 15 years and 10% of any fire potentially being stand replacing. These fires were agents of stability, helping to maintain stands with high proportions of fire tolerant species and large areas of relatively open park-like conditions. Small areas of denser forest patches occurred in areas missed or more resistant to fire (draws, spring seep areas, wetter aspects).

Recent fires on the Malheur National Forest have been large, stand replacement events that are very out of character with the historical fires that occurred. For example, the Summit Fire burned a portion this subwatershed and covered 30,000 acres, of which over half was in the warm-dry and hot-dry forests. The Summit Fire burned with stand replacement intensity across ¾ of the area.

Insects and Disease

Bark beetles are the most common insects present in the dry forests. The western pine beetle keys in on highly stressed larger overstory ponderosa pine. Denser stands with a high proportion of sapling to pole sized ponderosa pine have increased levels of mountain pine beetle and Ips beetle activity and associated mortality. Fir engraver activity is prevalent due to the combination of high stand densities and increased proportion of grand fir occupying these sites. At endemic levels, these forest insects play an important role in contributing to structural diversity, and providing dead wood habitat important for wildlife and soil productivity. Scattered individual tree mortality created small openings in stands where pockets of understory could establish. At epidemic levels, they create excessive dead fuel conditions that can lead to disturbance intensities outside the historic range.

The primary root diseases in dry forests are Annosus and Armillaria that result in small "centers" of mortality and associated gaps in the forest canopy. Annosus has been identified in the Project Area. These areas provided openings for understory vegetation (grasses, shrubs and seedlings) to establish and added to structural diversity. Annosus root disease is most prevalent in stands previously entered with overstory and partial overstory removal harvests. Annosus related mortality is usually associated with large old stumps and harvest related disturbance (skid trails). These past harvests resulted in varying degrees of disturbance to the soils and ground vegetation, facilitating the spread of Annosus root disease through wind-borne spores infecting large stumps. Mortality from the disease has been identified in both ponderosa pine and grand fir indicating that both the P-strain (pine strain) and S-strain (true fir strain) of the Annosus root disease are present. In the planning area the incident of Annosus is relatively minor.

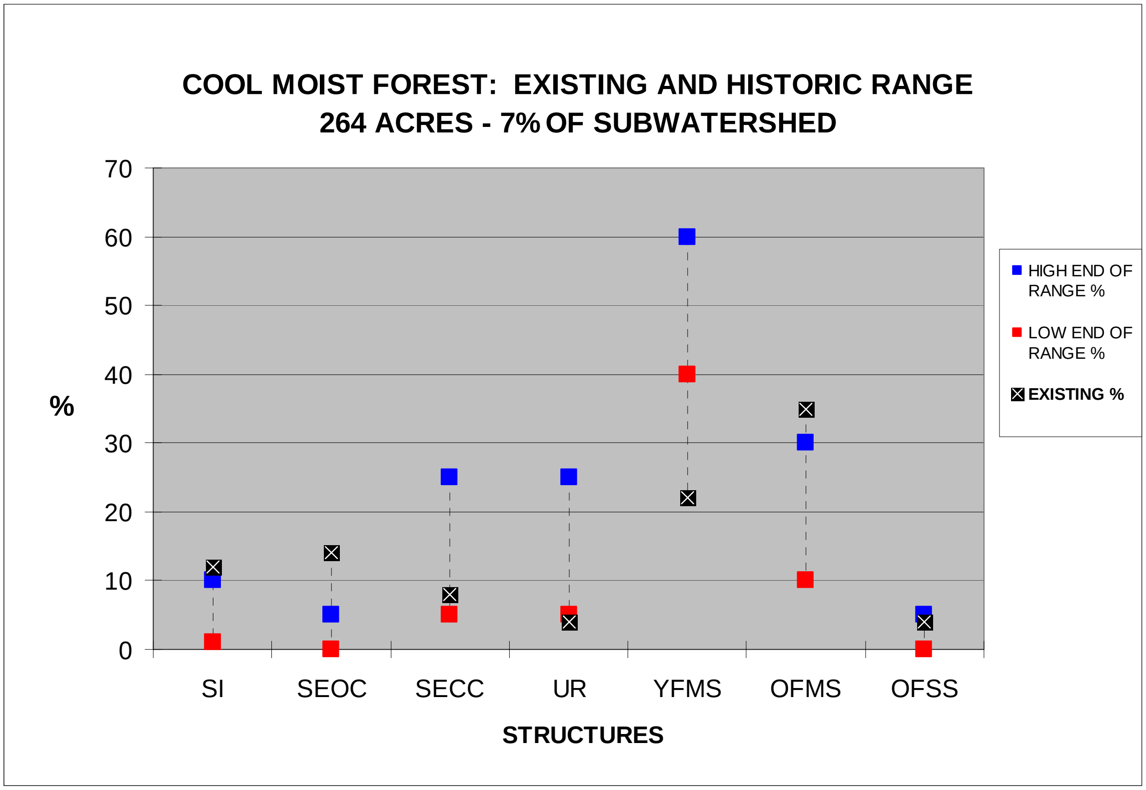
Dwarf mistletoe is present in varying levels of infection. The brooms created by mistletoe infections predisposed the occasional tree to bark beetle attack or torching by fire. Thus, frequent fires likely helped keep overall levels of mistletoe low due to the "fire pruning" of infected branches and negative impacts of the heat and smoke on developing mistletoe plants.

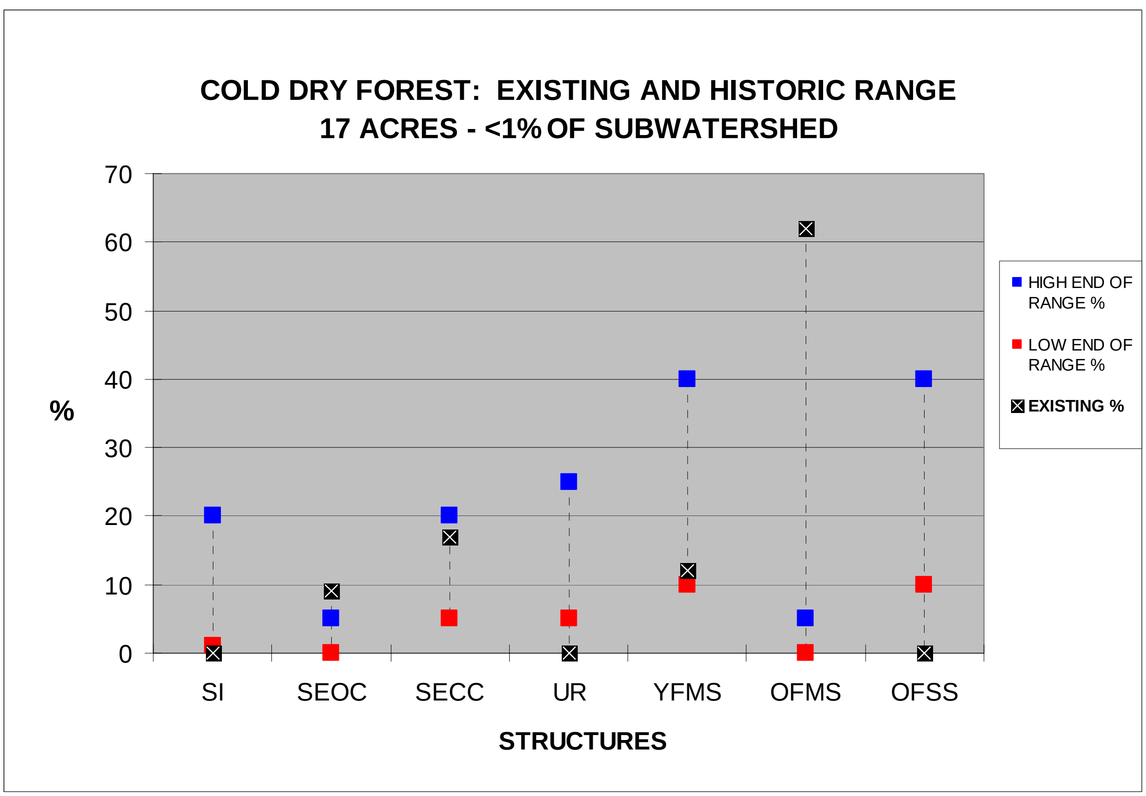
Insects and diseases play an important role in creating structural diversity of snags and down logs, and providing important wildlife habitat and recycling nutrients "locked up" in trees and logs to maintain soil productivity. At severe levels, these diseases can greatly inhibit the growth of trees and old forest structure.

Human

Human related disturbances (timber harvest, fire exclusion) have affected the warm-dry and hot-dry forests more than the other forest types across the Subwatershed. In the past, the most harvests focused on the removal of the larger overstory ponderosa pine. The most noticeable feature is the absence of large ponderosa pine trees in many stands. This is particularly evident in the lower and mid elevations due to early logging; there are few large trees and an abundance of young, small to medium sized trees.

Cool Moist and Cold Dry Plant Association Group





The item of most importance displayed in the Cool Moist HRV Graph is:

- The OFSS structural stage is within HRV and the OFMS structural stages is above HRV in the Cool Moist PAG.

Cool-Moist forests occupy approximately 1,922 acres of the subwatershed and 353 acres of the Project Area (14% and 10% respectively). Cold-dry forests occupy approximately 265 acres of the subwatershed and 17 acres of the Project Area (2% and <1% respectively). Both occur on northerly aspects, mid elevations, and in the cooler, wetter draw bottoms.

In the absence of a major disturbance (fire) cold-dry and cool moist forests will develop forest vegetation dominated by grand fir, Douglas-fir, and spruce. Where frost is frequent, lodgepole pine will be the dominant species. Ponderosa pine, western white pine, western larch, and lodgepole pine are early seral species that are dependent on disturbances to maintain suitable growing conditions.

Species Compositions and Successional Relationships

Species compositions and structural characteristics of the cool moist forests are largely dependent upon the stage of succession of the stand and associated landscape as dictated by the time since the last major disturbance (namely high intensity fire). The historic species composition of the cool moist forest had higher proportions of fire tolerant early seral species (ponderosa pine, lodgepole pine, and western larch) and lesser amounts of fire intolerant species (grand fir, Engelmann spruce, and Douglas-fir) prior to European influences. The conditions that affect disturbances in the cool moist forests have not changed as substantially over time as has happened in the drier forest types, resulting in less change in the fire severity from historic times to the present.

In cool dry forests species composition varies depending upon the successional development stage, past disturbances, and microclimate or microsite differences. In the absence of a major disturbance such as fire, cool dry forests will develop forest vegetation dominated by grand fir, Douglas-fir, and western larch. Earlier successional stages are dominated by early seral species such as lodgepole pine, ponderosa pine, western white pine, and western larch; while later stages show increased proportions of climax species such as grand fir, Douglas-fir, or spruce (in wetter areas). Western larch increases in abundance where past disturbance created bare soil conditions and an adequate seed source was present to re-colonize the disturbed areas. Wetter and cooler areas (such as along riparian areas and headwater areas) have increased amounts of Engelmann spruce. Western white pine was likely present in greater proportions since blister rust, an exotic disease, had not been introduced.

Where frost is frequent, lodgepole pine will be the dominant species. Lodgepole pine is the primary early seral species that would initially occupy a site. In stands with a longer fire-free interval, climax species such as grand fir would become established. Stands with a short fire return interval were maintained in lodgepole pine because succession was continually reset never getting past the early seral stages.

Disturbance Processes

These forests have been affected by a variety of disturbances. These include: insects; diseases; fire; and human related disturbances such as timber harvest, fire suppression, and grazing.

Fire

The historic/natural fire disturbance regime in the cold-dry forest types is best characterized as a high frequency, low intensity regime overlaid with a low frequency, high intensity regime. The relatively frequent disturbances were generally low severity, ground fires which would occur every 10-50 years. Every 100 to 200 years there would be an infrequent disturbance that was generally a high severity, stand replacing fire. The extent of the fires was variable due to the topography and could be as large as several hundred acres to over a thousand acres. Fire return intervals in these forest environments were on the magnitude of 50-275+ years (Agee 1993).

Tree mortality was variable, as the tree species that grow in the moist forest have both thin and thick bark, and shallow and deep roots. Western larch and ponderosa pine have thick bark on medium to large trees. Grand fir, western white pine, Engelmann spruce, and Douglas-fir have thinner bark, especially when young and are most susceptible to mortality from ground fires. The persistent branches of grand fir and Douglas-fir make them very susceptible to torching, often resulting in crown fires which kill all of the trees in a patch. The moist forests occupying the transitional areas with the dry forests experienced more frequent, low to moderate intensity fires, resulting in vegetative and structural characteristics more similar to the dry forests (see Dry Forest section).

Historically, wildfire was the major disturbance affecting cool moist forests. The historic/natural fire disturbance regime in these forest types is best characterized as a low frequency, high intensity regime. These relatively infrequent disturbances were generally high severity, stand replacing fires. Between high intensity fires; other disturbance agents, such as wind throw, insects, and diseases, also played a role in shaping stand structures and compositions across the landscape. The low frequency of stand replacement fires allowed for the development of large contiguous stands (large patch sizes) that provided high quality core habitats ranging from 200 to 2,000 acres. Fires generally kept the forest in a fairly vigorous condition, which reduced the role of insects and disease as a disturbance process.

Fire starts are frequent, due to the higher elevation location of the cool dry forest stands. The extent of fires was highly variable due to topography and the extent of flammable lodgepole stands. Fire size could be as small as one stand of trees or as large as several thousand acres. Fire return intervals in these forest environments were on the magnitude of 50-275+ years (Agee 1993).

Tree mortality from fires is high; many of the trees in this group retain branches to the ground for a long time and grow in dense, multistory patches. This predisposes them to torching and crowning fire behavior which kills all of the trees in the stand. Additionally, the thin bark of these species does not protect them from basal heating, making them easily killed, even by light ground fires. Stand establishment after disturbance is often very rapid.

Fire is still the most influential disturbance process occurring in cool-dry forests. The impact of fire suppression is much less in this forest type than in other types, due to long fire return intervals. The main effect of fire suppression over the last 70 plus years has been to increase the species diversity, allowing more fir and spruce to occupy the stands than would naturally occur.

Insects

Between the high intensity fires, other disturbance agents (such as insects and diseases) played a role in shaping stand structures and compositions across the landscape.

Epidemic levels (populations that maintain themselves in a local area below outbreak population levels) of insects periodically occur in cool-dry forest types. Fir engraver and Douglas-fir bark beetles are other common insects in the moist forests. Historically, these two insects are endemic causing low levels of mortality. Presently fir engraver is increasing it’s activity in the Project Area and causing noticeable mortality in the fir trees.

Defoliating insects such as western spruce budworm and Douglas-fir tussock moth also act at disturbance agents in these forest types. They caused minor damage, weakening some trees and predisposing them to subsequent attack by mountain pine beetles and fir engraver.

Diseases

Root diseases such as Annosus and Armillaria generally infected stands at small scales (less than 1 acre). Root disease mortality centers created gaps in stands helping to develop multi-stratum structural characteristics enhancing both horizontal and vertical structural diversity. Severe levels of root disease resulted in significant tree mortality, hindering development of late structural characteristics while maintaining understory reinitiation and young forest multi- strata structural characteristics. These areas of high mortality were also at increased risk to stand replacing fires which ultimately returned stands to early seral species with greater tolerance to root diseases. Areas that escaped fires and developed large areas of suitable hosts likely showed increased levels of root diseases resulting in changes to the stand structure and composition as levels of root disease intensified.

Other diseases such as gall rust and atropellis canker occur in these forest types affecting lodgepole growing in humid areas, resulting in stem malformation and subsequent breakage, adding to the diversity of tree forms within stands. Dwarf mistletoe, a parasitic plant, is another disease present throughout these forest types.

Human

Fire exclusion, sheep and cattle grazing, and past harvest activities have also changed the condition of the cool forests. These human disturbances have affected the structural character, patch size, and species compositional across the watershed. In general, human disturbance has reduced large tree structures, reduced patch sizes, increased fragmentation, and reduced the proportions of fire tolerant species.

All of these disturbance processes played an important role in providing a diversity of vegetative conditions and associated habitats across the landscape.

Aspen and Understory Vegetation

Non forest areas occupy approximately 2,000 acres of the subwatershed and 420 acres of the Project Area (15% and 12% respectively). Dry meadows and grasslands are found in several locations within the Subwatershed area and are characterized by generally shallow and rocky soils. With fire suppression there has been varying degrees of ingrowth of juniper and ponderosa pine trees. Moist meadows are scarce due to the geography of the Subwatershed. When they are found they are usually relatively small riparian meadows scattered through the area.

Small groups of quaking aspen are found in moist areas. There are ten aspen stands totaling 8.5 acres on National Forest System lands within the Project Area. The stands are declining as conifers overtop and shade out stands and suckers are not growing to become a stand component. These stands typically consist of one main age of 2 to 10 overstory trees with low levels of suckering. The existing suckers have all been browsed or grazed continuously over the years. The conifers are overtopping and shading out the shade intolerant aspen in most stands. Four of the aspen stands are partially or completely within RHCAs and six are within Management Area 3B. They are in declining condition from historical distribution due to reduction in fires, conifer shading and competition, and grazing by both domestic and wild animals.

Shrubs, which were adapted to sprout after frequent fires and need sunlight, are declining in health and vigor in where conifer density has increased above historical levels.

Project Area Insect and Disease Review

The Project Area was reviewed by the Blue Mountains Entomologist and Pathologist on two different dates. Their findings are summarized below. The full reports can be found in the Balance project record.

- In areas of mixed conifer fire-successional communities that have been invaded with shade-tolerant true firs and fewer Douglas-fir as a result of general reduction of natural disturbance regimes, fir engrave beetle-caused mortality has been occurring for the last several years.

- Minor to moderate amount of western pine beetle-caused mortality, mainly in the larger pine was noted in the lower slope, dry ponderosa pine dominated community types. Also noted was Ips and mountain pine beetle caused mortality in the smaller diameter pine.
- Western dwarf mistletoe is scattered throughout the stands on the north side of the Middle Fork, with some areas having severe incidence and severity of infection. There appeared to be a correlation between dwarf mistletoe infection and bark beetle activity which is expected as trees in overstocked conditions with additional stress induced by dwarf mistletoe infestation are attractive and predisposed to bark beetles.
- Annosus root disease was identified as being a contributing factor to some grand fir mortality in stands visited along the 2045 Road.

Environmental Consequences

Alternative 1 - No Action

This alternative does not reduce or increase fuels by commercial harvest, pre-commercial thinning, mechanical surface fuel treatment, or prescribed fire. This alternative does not reduce conifers in aspen stands. The effects of no action would be stands would continue to move away from the Historical Range of Variability (HRV) for most stand structures. There would be high amounts of multi-story structure in the dry forest. This would mean more difficult and less successful fire suppression because of increased potential for uncharacteristic, crown fire behavior. Wildfire severity with detrimental effects to vegetation and soils would be high. Aspen would continue to disappear from the landscape.

Direct and Indirect Effects

Composition and Density

The effect of no action would be an increased potential for uncharacteristic, crown fire behavior. With increases in ladder fuels from the high stocking levels in the understory, low canopy base height, and high canopy bulk density, the expected fire behavior for much of the Project Area is not of low severity surface fires, as it was historically but has the potential for high severity effects to the vegetation and soils.

The forest is now mostly overstocked compared with historical levels except where recent management has thinned forest stands. Along with the overstocking, there has been a large increase in the proportion of Douglas-fir and true firs in both the hot dry and warm dry forest types due to both past harvest that removed the early seral species of large diameter and to the exclusion of fire that would have removed most of the fire susceptible species in favor of the fire resistant species of ponderosa pine and western larch.

Since there would be no treatment with Alternative 1 to reduce overstocking or to shift the species composition, the stands would continue to become more overstocked, growth would continue to slow, the quadratic mean diameter of stands would remain low, and the trees would become increasingly susceptible to disturbance from insects, disease, and fire. The more crowded and dense the timber stands become over time increases the likelihood and potential severity of disturbance events such as uncharacteristic wildfire. The overall resiliency to withstand natural disturbances would continue to decrease.

Structural Stages

In the Warm-Dry and Hot-Dry Plant Association Groups (PAG) there is currently a lack of old forest single story stand structure. Overstocked stands will result in slow growth rates, therefore the development of old forest stand structures would continue to develop slowly. In the Warm- Dry PAG, old forest single strata increases from <1% to 4% and old forest multi strata increases from 1% to 30% in the next 50 years. In the Hot-Dry PAG, old forest single strata increases from 0% to 8% and old forest multi strata increases from 6% to 43% in the next 50 years. Meanwhile, there is an increasing risk of large-scale, stand-replacing fires that would set back old forest development, resulting in large areas of young trees and longer time spans to develop old forest structures. Disturbances would continue to be at a larger scale than historically occurred, with “out of scale” adverse effects to water, fish, wildlife, vegetation, and other resources. Stands would not be within the Historical Range of Variability (HRV) for stand structure.

Aspen and Understory Vegetation

Aspen would continue to decline. As aspen is considered a shade-intolerant species, conifers would continue to overtop the aspen and in time, they would disappear from these locations (Shirley et al. 2000). Any aspen regeneration would continue to be browsed by livestock and big game.

Shrubs, which were adapted to sprout after frequent fires and need sunlight, will continue to decline as the stands become more closed. Pine grass, and other ground vegetation, will continue to decrease in vigor and forage quality with increasing shade and lack of nutrient cycling provided by burning.

Resiliency and Sustainability

The resiliency and sustainability of the forest will continue to decline and it will remain at risk to natural disturbances that have larger outcomes and are uncharacteristic of what occurred historically. Overstocked forest stands will continue to slow in growth and decrease in vigor as stand density continues to increase. Trees will slowly increase in size, but stands will remain multi-storied. The bulk of the stands which will grow into old forest will continue to be OFMS structural stage with very few growing into OFSS, continuing the imbalance compared to the HRV. Late seral species will continue to increase occupancy in the mixed conifer stands. The quantity and vigor of grasses and shrubs in the understory will continue to decline due to the shading and competition for nutrients and water.

Insect and Disease

Risk of attack by bark beetles will increase as the trees lose vigor and are less able to pitch out the beetles. Observations and research indicate that for some tree species and bark beetles, bark beetle activity is related to stocking levels and there is a critical stand density. Critical stand density differs by site; below this density bark beetle risk tends to be low and above this density, mortality can be serious (Cochran 1992, Cochran et al. 1994). With no action, stocking levels would continue to be high and increasing. Stands currently considered at risk would continue to be at risk and more stands would reach the critical stand density. Where ponderosa pine is the dominant species in combination with heavily stocked stands, there is an elevated risk of mountain pine beetle and western pine beetle increasing to epidemic levels and killing large numbers of ponderosa pine trees in the subwatershed and Project Area.

Risk of outbreaks of defoliating insects would continue to increase as the stand composition continues to shift to more late seral species, as the late seral species like grand fir and Douglas-fir are much more susceptible to defoliating insects. Widespread defoliation and mortality would increase the fuel loads greatly. The dense, slow growing stands would remain a high risk for fir engraver attacks; further increasing mortality and fuel loading.

Dwarf mistletoe infections can be expected to increase as trees slow in height growth and the crowns grow closer together. Stem and root diseases would continue to spread in the host fir trees, causing increasing mortality and further adding to surface fuel loadings.

Cumulative Effects

All activities in Appendix C have been considered for their cumulative effects on vegetation in the Balance Creek/Coyote Creek Subwatershed. The time period considered for cumulative effects begins with the initial operations and continues for 50 years. The following discussion focuses on those past, ongoing, and foreseeable activities that may contribute effects to vegetation.

Past actions including fire suppression, timber harvest, wildfire, and grazing have contributed to the current conditions of vegetation and the departure from the HRV. These actions have resulted in increases in understory vegetation and surface fuels, changes in species composition and vegetative continuity. Past grazing reduced fine fuels at varying levels depending on the intensity of grazing which reduced potential fire spread. Grazing of aspen suckers has also contributed to the condition of aspen. Some of the 150 miles of road enabled fire suppression personnel to more easily access fire starts and contributed to successful fire suppression. Fire suppression would continue as an ongoing activity but would get increasingly more difficult as fuels increase.

There would be no change to the existing condition and there would be no additional cumulative effects from this project.

Treatments on other ownerships reduce the chance of a severe wildfire on those ownerships. Not treating the Project Area doesn't contribute to fuel reduction or improve forest health within the identified County Road 20 Safety Corridor. The subwatershed would continue to be outside of HRV. No action of this project effects other present and ongoing actions described in Appendix C in that the potential for high intensity and high severity wildfire increases and would effect all actions if one were to occur.

Alternative 2 - Proposed Action

As stated earlier, the purpose of this project is to reduce the fire hazard (including surface fuels, ladder fuels, and crown fuels) adjacent to County Road 20 on National Forest lands creating stand conditions that reduce the chances of a ground fire becoming a crown fire, and a small fire becoming an uncharacteristic wildfire. The two main tools that are available to accomplish the objective are prescribed burning and mechanical treatment (thinning, slash piling, etc.). The proposed action is designed to reduce the fire hazard and improve forest health in the Project Area by reducing fuels and modifying the spatial distribution of the fuels in the three fuel layers: Crown or canopy fuels and ladder fuels would be reduced by commercial and precommercial treatments. Surface fuels would be reduced through hand or grapple piling and burning the piles, and/or underburning.

Commercial fuel reduction treatments would be accomplished by generally thinning the smaller diameter trees and retaining the larger trees at a variable spacing. There would also be some species conversion from fire and insect prone late seral species to more resistant early seral species both by selective thinning and by regeneration harvesting. The focus of the thinning would be largely on smaller diameter trees found either below the main forest canopy or within the canopy where tree crown density would allow the spread of crown fire. Mechanical treatments would remove ladder fuels that carry fire into the tree crowns.

Non-commercial falling of small diameter trees would also reduce ladder fuels and the continuity of the tree crowns. This is proposed both within the areas treated by the commercial fuel reduction treatments and in areas where there is little commercial material but there is still a need to remove the smaller trees.

Direct and Indirect Effects

Composition and Density

Commercial thinning in overstocked stands would enable the remaining trees to respond by increasing their crowns and roots, increasing their ability to utilize nutrients, sunlight, and water. Growth would increase and the trees would grow into old forest structural stages sooner. The increased vigor of the trees would decrease their susceptibility to disturbance from insects and disease; and lessen the likelihood and potential severity of bark beetle outbreaks and mistletoe infestation. Trees would be left at a varied spacing instead of a uniform spacing to enhance structural diversity while reducing fuel loadings. In addition, unthinned patches would be left within stands being treated. Higher tree density and unthinned areas should provide higher levels of security/hiding cover to wildlife in the short-term. These areas may also experience some level of insect mortality in the short to long term because of the higher density; however, any mortality would add snags. Lower density areas will open up forest stands, breaking up the fuel continuity. The overall decreased stand density, the increase in tree size, and the increase in the height to the bottom of the live crown will reduce the chances of torching and the potential of an active crown fire.

Observations by Cram (2006) that mechanical treatment followed by prescribed fire (including pile burning) had the greatest influence toward mitigating fire severity. Specifically, as density and basal area decreased and mean tree diameter increased, fire severity decreased. Canopy base height, canopy bulk density, and canopy continuity are key characteristics of forest structure that affect the initiation and propagation of crown fire (See the Fire and Fuels section for descriptions of these characteristics).

The Proposed Action would treat approximately 64 acres of satisfactory cover that would contribute towards meeting the purpose and need of the project. This includes thinning around large pine in units 80 and 82 and commercial thinning in unit 30. Treatment would reduce the density of the stands and reduce ladder and canopy fuels. The following table displays examples of stand changes to characteristics that affect fire initiation and fire severity. See the Fuels Environmental Consequences section for additional changes to characteristics that affect fire behavior.

Table V-5: Forest Structure Characteristics that Affect Fire Hazard in 4 Sample Stands Before and After Proposed Action Treatments

Stand Tag	Treatment	CBH - Existing	CBH – After Treatment	QMD - Existing	QMD – After Treatment
302210152	HTH/SPC/Burning	4	28	6	12
302210143	HTH/SPC/Burning	23	34	9	16
302170259	SPC	7	30	7	16
302170271	SPC/Burning	8	18	7	15

CBD = Canopy Base Height QMD = Quadratic Mean Diameter

The Proposed Action reduces density on 1,278 acres or 36% of the Project Area through some combination of mechanical treatments and prescribed burning. This would reduce density and break up fuel continuity sufficiently to meet the purpose of the project.

Structural Stages

As a result of the Proposed Action, approximately 224 acres of Warm-Dry PAG and 10 acres of Cold Dry PAG young forest multi-structure stands would be converted to single story open stands within the design elements of the project. This would reduce ladder and canopy fuels, increase tree growth and improve tree vigor. The decrease in YFMS still leaves this structure within HRV for both plant association groups.

The Proposed Action would treat approximately 11 acres of OFMS in the Cool-Moist PAG in unit 42 along the 2045 Road. This thinning treatment would reduce the density, raise the crown base height, and move the stand towards OFSS however, it would not actually change the structure. The OFMS would still be slightly above HRV and OFSS would still be within HRV as a result of the Proposed Action.

The Proposed Action would treat approximately 10 acres of OFMS in the Hot-Dry PAG in unit 82. The OFMS structure in the Hot-Dry PAG is within HRV. The treatment would enhance individual old-growth trees by removing understory trees that are ladder fuels into the crowns of the large trees. Although this treatment would move the stand towards OFSS it would not actually change structure as the entire stand in not being treated, just the area around large trees. The OFMS would still be within HRV and OFSS would still be far below HRV as a result of the Proposed Action.

The rest of the treatments (commercial, precommercial, and underburning) would not change the structural stage of the stands but would decrease stand density and increase tree growth rates. This would reduce the time required for stands to attain sufficient large trees to be considered late and old structure.

The increased tree growth from thinning would cause the development of old forest structural stages to accelerate, allowing the thinned stands to grow into the large size classes sooner as compared to the No Action Alternative. In the warm dry plant association group, OFSS is projected to increase from less than 1% to 15% and OFMS from 1% to 19% in the next 50 years. At that point in time, OFSS would be within HRV and OFMS would be above HRV. As a result of the Proposed Action, approximately 70% of the stands treated are projected to be OFSS within 50 years.

Aspen and Understory Vegetation

As a result of the Proposed Action, conifers would not directly overtop 10 aspen stands unless the conifer is 21inches dbh or greater. Aspen would be able to reproduce and develop in an environment relatively free of competition from other more shade tolerant species. Underburning would occur in the upland aspen stands to stimulate suckering. Fencing the aspen stands would protect them from browse allowing the suckers to develop and the aspen stands to improve in health and vigor.

Shrubs, which were adapted to sprout after frequent fires and needing sunlight, would increase as the stands become more open due to thinning. Pine grass, and other ground vegetation, will increase in vigor and forage quality with decreasing shade and increased nutrient cycling provided by burning.

Prescribed fire would be ignited in some RHCAs and in others, low intensity fire may back into these areas during the burning operations from nearby uplands, since no fire lines are proposed along RHCAs. (See Chapter 2 – Alternative descriptions for where lighting in RHCAs would occur). Past experience has shown that the different moisture regime in the RHCAs moderates the fire behavior so that there are only minor effects to the streamside vegetation. Shrubs and conifers providing streamside shade are rarely affected since they do not burn with enough intensity to cause mortality.

In the outer portions of the RHCAs where the moisture regime transitions into drier conditions similar to the surrounding uplands, the result is more of a mosaic of burned and unburned areas with some shrub and small conifer mortality. This creates an opportunity for more shrubs, which were adapted to sprout after frequent fires, to increase as the stands become more open.

Resiliency and Sustainability

Thinned stands will increase in growth and vigor as the stand density is reduced. The quantity and vigor of grasses and shrubs will increase due to the reduction in shading and competition for nutrients and water.

Insect and Disease

The additional light and warmth in thinned stands is inhospitable for bark beetles, providing an immediate degree of protection to the trees. As the trees respond with increased growth over the next several decades after the thinning, their increased vigor will allow them to withstand attempted beetle attacks by successfully pitching out the invading insects. As fewer attacks are successful, the population outbreaks will decrease to low levels, reducing the amount or size of pockets of mortality. The reduction in the proportion of late-seral species will reduce the potential extent of defoliation by spruce budworm and Douglas-fir tussock moth (Mason 1998, Powell 1994).

The host tree species for spruce budworm, tussock moth, and fir engraver will be reduced by thinning mixed conifer stands. Experience has shown that when late seral species make up less than 25% of the stand composition, defoliation is very light with little effect to tree growth or survival. The incidence of fir engraver would also be reduced as the proportion of fir is reduced, and the remaining fir trees would be healthier and less susceptible to attacks. Stands not treated would benefit from the reduction of host species in nearby stands, which would lessen the severity and size of outbreaks.

Stem and root diseases will be reduced since thinning will reduce the primary host (late seral species). The removal of late seral species during the thinning operations will reduce the amount of trees susceptible to root diseases. Thinning will increase height growth rates which will allow the remaining trees to outgrow dwarf mistletoe infections, gradually decreasing the amount of crown infected. The increased spacing will reduce the lateral spread of mistletoe.

Cumulative Effects

All activities in Appendix C have been considered for their cumulative effects on vegetation. The area considered for cumulative effects is the Balance Creek/Coyote Creek Subwatershed. The time period considered for cumulative effects begins with the initial operations and continues for 50 years. The following discussion focuses on those past, ongoing, and foreseeable activities that may contribute effects to vegetation.

Past actions including fire suppression, timber harvest, wildfire, and grazing have contributed to the current conditions of vegetation and the departure from the HRV. These actions have resulted in increases in understory vegetation and surface fuels, changes in species composition and vegetative continuity. Past grazing reduced fine fuels at varying levels depending on the intensity of grazing which reduced potential fire spread. Grazing of aspen suckers has also contributed to the condition of aspen. Some of the 150 miles of road enabled fire suppression personnel to more easily access fire starts and contributed to successful fire suppression. Fire suppression would continue as an ongoing activity but would get increasingly more difficult as fuels increase.

Past activities in the 1990's in this Subwatershed have made some small scale positive changes in the overall forest health and sustainability. The planned actions in this alternative, in combination with these past actions, will create a matrix of treated stands over much of the Subwatershed. These treatments, in addition to the area of the Summit Fire, will be over a sufficient proportion of the landscape to serve to reduce the severity and extent of wildfire and also the chance of insects and disease reaching an outbreak situation. Disturbances within treated stands are expected to be reduced in intensity and duration, as a result of better growing conditions and a more resistant species mix. Disturbances in stands not treated will be smaller in geographic scope and more within historic scales as there will be less unbroken blocks of stands in unhealthy condition. The treatments on other ownerships reduce the chance of a severe wildfire on those ownerships.

Future grazing would continue to affect fine fuels. This can impact the implementation of prescribed fire and meeting objectives if it removes the fuel (grasses) to carry fire. Future prescribed burning would be necessary to maintain fuels at desirable levels and limit ingrowth.

Consistency With Direction and Regulations

Forest Plan

The Proposed Action Alternative (Alternative 2) addresses Forest wide standards to apply integrated pest management principles to minimize the impacts of the mountain pine beetle, western spruce budworm, tussock moth, and other insect and disease infestations. Avoid the creation of vegetation conditions that could promote insect and disease infestations. The No Action alternative does not address this at all.

The Proposed Action meets Forest Plan direction in General Forest and Big Game Winter Range to schedule timber harvest on the portion of the management area classified as suitable for timber management and emphasize even-aged silvicultural systems.

Regional Forester Forest Plan Amendment #2 (Eastside Screens)

All alternatives meet the direction to not decrease old forest structural stages, since no live trees over 21 inches dbh are to be harvested (except for incidental trees cut for road and landing construction and for safety with Alternative 2).

There is no regeneration harvesting in old forest structural stages. In Alternative 2, there is thinning around large trees in some Old Forest Multi Story designed to make these stands more resilient to natural disturbances such as fire and insects. There is no net loss of old forest (LOS) structure with either of the alternatives.

There is no treatment within the Amendment #2 connectivity corridors between old forest structure stands under either Alternative.

The Proposed Action better meets the objective to protect existing old forest structure and to shorten the time to grow additional old forest structural stages, since thinning overstocked stands will increase growth rates and resiliency against loss to insects, disease, and fire.

Requirements of 36 CFR 219.28, which are part of the NFMA regulations, will be met. Specifically: 1) Harvest will occur only on suitable timberlands; 2) Following commercial thinning activities, none of the action alternatives will require reforestation activities as the stands will remain fully stocked.

Irreversible and Irretrievable Commitments

Irreversible Commitments

There are no anticipated long-term irreversible commitments of the forest vegetation since it is renewable as long as the soil productivity is maintained.

Irretrievable Commitments

There are irretrievable commitments of the growth of forest vegetation for about 5 years because of the new landings constructed for the thinning operation. They are to be rehabilitated after use, but there will be a lag in reforestation and growth since the sites are impacted more heavily than the surrounding forestland.

There are no other known irreversible or irretrievable commitments of forest vegetation resources that would be caused by the Proposed Action.

Wildlife

Introduction

Wildlife is an important component of the affected human environment, because the public places high value on this resource, and has expressed these values through many public laws, regulations, and policies that pertain to the project. External review and comments on the proposal confirmed these values.

This report summarizes existing habitat conditions for various wildlife species and the effects of the No Action and Proposed Action alternative on these species. Effects to threatened, endangered and sensitive species are summarized in this document; detailed analysis can be found in the "Balance Biological Evaluation/Biological Assessment of Threatened, Endangered, Proposed, and Sensitive Species located in the Project Record.

Regulatory Framework

The three principle laws relevant to wildlife management are the National Forest Management Act of 1976 (NFMA), the Endangered Species Act of 1973 (ESA), and the Migratory Bird Treaty Act (MBTA) of 1918. Direction relative to wildlife follows:

- NFMA requires the Forest Service to manage fish and wildlife habitat to maintain viable populations of all native and desirable non-native wildlife species and conserve all listed threatened or endangered species populations (36CFR219.19).
- ESA requires the Forest Service to manage for the recovery of threatened and endangered species and the ecosystems upon which they depend. Forests are required to consult with the US Fish and Wildlife Service if a proposed activity may affect the population or habitat of a listed species.
- MBTA established an international framework for the protection and conservation of migratory birds. This Act makes it illegal, unless permitted by regulations, to "pursue, hunt, take, capture, purchase, deliver for shipment, ship, cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird . . ."

Forest Service Manual Direction provides additional guidance: identify and prescribe measures to prevent adverse modifications or destruction of critical habitat and other habitats essential for the conservation of endangered, threatened, and proposed species (FSM2670.31 (6)). The Forest Service Manual directs the Regional Forester to identify sensitive species for each National Forest where species viability may be a concern.

The principle policy document relevant to wildlife management on the Forest is the 1990 Malheur National Forest Land and Resource Management Plan, referred to as the Forest Plan for the remainder of this section. The Forest Plan provides standards and guidelines for management of wildlife species and habitats. Standards and guidelines are presented at the Forest level (LRMP, pp. IV-26 to IV-33) or Management Area level (LRMP pp. IV-50, IV-53, IV-56 to IV-57, IV-105 to IV-107, and IV-108). Management Areas include General Forest (MA-1), Rangeland (MA-2), Anadromous Riparian Area (MA-3B), Old Growth (MA-13) and Visual Corridors (MA-14).

The 1995 Regional Forester's Eastside Forest Plans Amendment #2 amended Forest Plans for the National Forests in Eastern Oregon and Eastern Washington, including the Malheur National Forest. Amendment # 2 established interim wildlife standards for old growth, old growth connectivity, snags, large down logs, and northern goshawks. The Regional Forester has periodically distributed letters clarifying direction in Amendment #2 (Regional Forester, October 2, 1997; October 23, 1997; June 11, 2003).

Additional management direction is provided for conservation of migratory landbirds. This direction is consolidated in the Forest Service Landbird Strategic Plan and further developed through the Partners in Flight Program. The Oregon-Washington Partners in Flight Conservation Strategy for Landbirds in the Northern Rocky Mountains of Eastern Oregon and Washington (Altman 2000) identifies priority bird species and habitats for the Blue Mountains in Oregon.

Analysis Methods

Effects on wildlife species and habitat have been assessed within National Forest lands in the Balance Project Area, focusing on the effects of activities within proposed treatment units. For several wildlife species, the effects boundary has been expanded to the sub-watershed level. Each wildlife section will identify the analysis boundary used in the effects analysis. The Project Area is approximately 3,350 acres and is located within the wildlife analysis area which is the 13,778 acre Coyote Creek/Balance Creek Subwatershed (See Map 1- Balance Project Area in Appendix D).

The duration of effects on the wildlife resource is described according to the following terms and definitions:

- Immediate – Approximately one growing season or several months or less
- Short-term – 0 to 5 years
- Mid-term – 5 to 25 years
- Long-term – 25+ years

Direct, indirect, and cumulative effects of alternatives are identified and discussed.

Rather than addressing all wildlife species, the Forest Plan focuses on three categories of wildlife: management indicator species (MIS); threatened, endangered and sensitive (TES) species, and featured species. In addition, interest has been raised for landbirds including neotropical migratory birds. Categories and wildlife species are summarized below:

- Management Indicator Species (MIS) — The Malheur Forest Plan, as amended, identifies 15 MIS and their associated habitat requirements. MIS habitat requirements are presumed to represent those of a larger group of wildlife species, and act as a barometer for the health of their various habitats. Pine marten, pileated woodpecker, and northern three-toed woodpeckers represent old growth habitats, Rocky Mountain elk represent big game species, and primary cavity excavators (most woodpeckers) represent dead wood habitats. Effects to MIS species will be discussed in the Dedicated Old Growth, Late and Old Structure and Connectivity Habitats, Big Game Habitat, and Primary Cavity Excavator sections respectively.

- Threatened, Endangered and Sensitive (TES) Species — An endangered species is an animal or plant species listed under the Endangered Species Act that is in danger of extinction throughout all or a significant portion of its range. A threatened species is an animal or plant species listed under the Endangered Species Act that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. A sensitive species is an animal or plant species identified by the Forest Service Regional Forester for which species viability is a concern either a) because of significant current or predicted downward trend in population numbers or density, or b) because of significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution. Threatened, endangered, and sensitive species and the effects are summarized in this section and additional detail can be found in the Balance Biological Evaluation located in the Project Record.
- Featured Species — The Malheur Forest Plan defines a featured species as a wildlife species of high public interest or demand. The featured species associated with the Project Area are northern goshawk, and blue grouse. Effects to northern goshawk and blue grouse will be discussed in the Featured Species section – Northern Goshawk, and the Featured Species – Blue Grouse sections, respectively.
- Landbirds including Neotropical Migratory Birds (NTMB) — Landbirds, including Neotropical migratory birds, are discussed because many species are experiencing downward population trends. Discussion can be found in the section Species of Concern – Landbirds including Neotropical Migratory Birds (NTMB).

Species presence/absence determinations were based on habitat presence, limited wildlife surveys, recorded wildlife sightings, observations made during non-Forest Service databases, and status/trend and source habitat trend documented for the Interior Columbia Basin. Due to budget constraints, formal wildlife surveys were not conducted for most species. Effects on habitats are discussed, with the assumption that if appropriate habitat is available for a species, then that species occupies or could occupy the habitat. This strategy is based upon science that demonstrates connections between species populations and viability and the quantity and condition of habitat at appropriate scales of analysis (Baydack et al. 1999). There is a high confidence level that some species discussed in this document are currently present in the area.

Effects on species will be determined by assessing how the No Action and the

Proposed Action alternatives affect the structure and function of vegetation relative to current and historical distributions. The Forest Vegetation section of this document defines the historical vegetation patterns and structure within the Balance/Coyote subwatershed. Field reconnaissance information, aerial photos, and Geographic Information System databases provided additional information.

Some wildlife habitats require a detailed analysis and discussion to determine potential effects on a particular species. Other habitats may either not be impacted or are impacted at a level which does not influence the species or their occurrence. The level of analysis depends on the existing habitat conditions, the magnitude and intensity of the proposed actions, and the risk to the resources.

Old growth habitat was analyzed using the District's GIS old growth map layer, vegetation and management activity layers, stand exams extrapolated using most nearest neighbor analysis, Dedicated and Replacement Old Growth surveys, and field reconnaissance.

Elk habitat was evaluated using the Habitat Effectiveness Index (HEI) (Thomas et al. 1988), marginal and satisfactory cover percentages, and open road densities. Big game cover was designated using stand exams, most similar neighbor analysis, aerial photographs and ground reconnaissance. Open road densities were calculated using the District access travel management database. Values were estimated for National Forest lands at the subwatershed level.

Snag densities and sizes were estimated using data obtained through stand exams, most similar neighbor analysis and field reconnaissance. DeCaid was not used for this analysis for several reasons: During extensive field reconnaissance it was noted that snags in some units exceeded 10 per acre; snags exceed the Forest Plan standard of 2.39/acre in some RHCA's; there have been 3 fires in Balance Creek/Coyote Creek Subwatershed including the Summit, China Diggings and Powerline fires which have resulted in the creation of hundreds of snags across the Subwatershed; in the Project Area, pathogens were noted in numerous large diameter trees which will result in snag recruitment over time; large diameter trees/snags will be protected as much as possible from prescribed fire, but inevitably prescribed fires may result in some mortality; and 90 acres within the DOG is classified as LOS habitat which includes large diameter snags. The Proposed Action is only treating 1,021 acres of the 9,152 acres in the warm dry and 85 acres of the 369 in the hot dry; 15 acres of the 265 in the cold dry; and 62 acres of the 1,826 in the cool moist plant association groups.

In addition, according to DeCaid literature in USDA Forest Service GTR PSW-GTR-181 2002 Inventory Data, "data from plots in reserved areas, which we assume to represent unharvested conditions, are used to estimate range of natural conditions or historic levels of dead wood. This approach works better for wetter areas west of the Cascade Crest where fire suppression has had less influence on dead wood resources than in drier habitats. In some wildlife habitat types especially east of the Cascade Crest, a combination of fire suppression, insect outbreaks, salvage and firewood cutting might limit our ability to determine natural levels of dead wood based on existing conditions. The data and our synthesis do not explicitly represent some features of snags found to correlate well with some wildlife use. DeCaid addresses terrestrial and upland conditions. Additional considerations need to be made for snags and down wood in riparian, aquatic and wetland environments. Data on stand averages of snag or down wood density may or may not represent unmanaged conditions. Often, we could not determine this from the literature."

Effects to threatened, endangered and sensitive (TES) species are summarized in this Chapter and then described in more detail in the Wildlife Biological Evaluation located in Appendix G.

Landbirds, including neotropical migratory birds (NTMB), were analyzed based on high priority habitats identified in the Oregon-Washington Chapter of Partners in Flight, Northern Rocky Mountains Bird Conservation Plan (Altman 2000). While the Forest has not conducted official NTMB surveys in the Project Area, the Oregon Breeding Bird Atlas (Adamus et al. 2001) includes observational data for this area. Much of the data for the Malheur National Forest was obtained from local biologists and ornithologists. Most NTMB species that are expected in the Project Area were recorded within the atlas' hexagons for the area. Based on a review of the District's wildlife database and observations made during reconnaissance of the proposed treatment area, there is a high confidence level that some species discussed in this report are currently present in the area.

Alternative 1, the No Action Alternative, is required by NEPA. It is used as a benchmark to compare and describe the differences and effects between taking no action and implementing the action alternative. The No Action Alternative is designed to represent the existing condition; resource conditions are then projected forward in time to estimate resource changes expected in the absence of the proposed management activities.

Effects on species will be determined by assessing how the No Action and Proposed Action Alternative affect the structure and function of vegetation relative to current, projected and historical distributions. Effects on habitats are discussed with the assumption that if appropriate habitat is available for a species, then that species occupies or could occupy the habitat. This strategy is based upon science that demonstrates connections between species populations and viability and the quantity and condition of habitat at appropriate scales of analysis (Baydack et al. 1999).

Cumulative effects have been analyzed in respect to past, ongoing and foreseeable future activities listed in Appendix C. Effects were first analyzed within the context of the Project Area (3,381 acres). If there were no negative or positive contributions to cumulative effects at this scale, then no further analysis was conducted

The Wildlife section is subdivided into sub-sections: 1) Dedicated Old Growth, Late and Old Structure and Connectivity Habitats, 2) Big Game Habitat, 3) Primary Cavity Excavators, Snags and Down Wood, 4) Featured Species -Northern Goshawk, 5)Featured Species - Blue Grouse, 6) Landbird Species including Neotropical Migratory Species, and 7) Threatened, Endangered and Sensitive Species. Sub-sections will summarize specific analysis methods.

Dedicated Old Growth, Late and Old Structure, and

Connectivity Habitats - Existing Conditions

Introduction

The following terms for old-growth are used interchangeably throughout this section. Nuances in the vocabulary are defined throughout the section. The Analysis Area boundary used for this section is the subwatershed.

- Old-Growth
- Late and Old structure (LOS)
- Dedicated Old-Growth (DOG)
- Replacement Old-Growth (ROG)
- Old Forest Multi-Stratum (OFMS)
- Old Forest Single Stratum (OFSS)

Dedicated and Replacement Old Growth

Dedicated Old Growth 3122 is located within the Project Area, in the lower 1/3 of the Dunston Creek drainage (Map 2- Management Areas in Appendix D displays the DOG). The DOG is designated for pileated woodpecker, although it may also provide suitable habitat for the American marten as well. The current designation is 287 acres. This does not meet Forest Plan Standards of 300 acres. No Replacement Old Growth (ROG) or Pileated Woodpecker Feeding Area (PWFA) has been designated for DOG 3112. Approximately 90 acres (30%) of the DOG is classified as having old forest multi-stratum (OFMS) structure, indicating old growth or late and old structure (LOS) habitat but it is comprised primarily of mid-seral stands of young forest multi-stratum (YFMS), Stem Exclusion (SE), or understory reinitiation (UR). Approximately 92 acres of the DOG is YFMS. These stands demonstrate multi-structure conditions, but do not have enough large trees (greater than 21"dbh) to be identified as LOS. Approximately 102 acres is stem exclusion open canopy (SEOC) or understory reinitiation (UR) structure. These stands do not have the canopy closure or the large tree structure to qualify as LOS or quality pileated woodpecker habitat. Approximately 6 acres in the DOG are composed of scattered small natural openings that are not forested. Existing habitat is not considered optimum for the pileated woodpecker.

LOS - Old Forest Multi-Strata Habitat (Pileated Woodpecker, American Marten)

Old Forest Multi-Strata stands are important to several wildlife species that are dependent upon what is typically called old growth habitat. The Forest Plan identifies the pileated woodpecker and the American marten as two indicator species of dense multi-strata old growth habitats. Both species are dependent upon habitats with high stand densities and canopy closures, complex multi-strata forest canopies, and an abundance of dead wood habitats in the form of large snags and down logs.

Old Forest Multi-Strata Habitat

Stands with OFMS structure are considered Late and Old structure (LOS) habitat. This habitat is limited in the Project Area by several factors. First is the historic timber harvest that has occurred over the past 100 years. Intensive harvest focused on the large ponderosa pine, Douglas fir, and, to a lesser extent, grand fir trees over that time period reduced the OFMS habitat in the Project Area. Currently, approximately 79 acres of OFMS habitat exist in the Project Area. To a lesser extent, the forest vegetation communities present in the Project Area also limit the development of OFMS habitat. Warm dry and hot dry plant association groups dominate the Project Area, with its lower elevation and more southerly aspect slopes.

There is a total of 889 acres of OFMS in all plant association groups within the Subwatershed, although it is located only south of the Middle Fork John Day River (MFJDR). OFMS is within HRV in the hot dry, above HRV in the cool moist, and cold dry, and is below HRV in the warm dry plant association group. Two primary factors influence this: past timber harvest actions and impacts of the Summit Fire in 1996. Past timber harvest actions resulting in removal of substantial large tree habitat in the Analysis Area.

Young Forest Multi-Strata is more abundant in the Project Area than OFMS with approximately 517 acres. Such areas demonstrate similar stand structure conditions to that of the OFMS habitats, however, have fewer large trees (greater than 21”dbh). This habitat type essentially functions as a “secondary” habitat type for species dependent upon OFMS habitats, such as the pileated woodpecker and American pine marten. Approximately 1,430 acres of YFMS habitat are present in the Analysis Area. Here again, previous harvest history and the impacts of the Summit Fire affected the abundance and distribution of this habitat feature.

Habitat quality and condition in the areas of OFMS and YFMS habitats are generally good. The range of canopy closures include stands greater than 60% for both OFMS and YFMS stands. Snag densities range from 0-7 snags/acre, 20”dbh and greater with an average snag density of .5 snags/acre .Therefore, some stands are below standards, and some are above. However, there is an abundance of snags 10” dbh-20”dbh which helps ameliorate some of the deficiencies in the larger snags. Habitat conditions for pileated woodpeckers would be considered good to high quality south of the MFJDR. In the nearly pure ponderosa pine stands north of the river, habitat conditions would be considered poor due to the extensive clear-cutting of mature ponderosa pine during historic railroad logging. However, the Summit fire has created snags in all size classes which provides habitat for primary cavity excavators. There is a strong distribution of OFMS/YFMS habitat type with some fragmentation located south of the MFJDR, in the Balance, Dunston, and upper Sunshine Creek drainages. This area likely meets the needs of one or more pair of pileated woodpeckers in the Analysis Area.

American Marten (Martes americana)

Martens prefer mature old-growth forest with a well-developed multi-storied canopy.

Cover and prey species largely determine their distribution and abundance. Snags and downed woody material are important for winter and summer dens, resting sites, and cover for prey species. Martens show a strong avoidance of open areas, possibly for predator avoidance (Hawley and Newbry 1957). Dry forest types and those that lack structure near the ground are used very little (Buskirk and Powell 1994). Movement and dispersal over the landscape is maintained by providing corridors with consistent overhead cover (Ruggerio et al. 1994). Home range for a breeding pair has been identified by different sources as ranging from 160 acres (Campbell 1979) to 1,400 acres (Freel 1991).

Habitat trend information derived from Interior Columbia Basin studies indicated that about 50% of the watersheds in the Blue Mountains showed a decreasing trend in American marten habitat and 35% showed an increasing trend. The distribution of American marten within the Interior Columbia Basin has been fairly stable, but population changes are not known (Wisdom et al. 2000).

Pileated Woodpecker (*Dryocopus pileatus*)

Pileated woodpeckers inhabit mature and old-growth forests, and second growth forests with large snags and fallen trees (Bull and Jackson 1995, Aubry and Raley 1996). Large snags and decaying live trees in older forests are used by pileated woodpeckers for nesting and roosting throughout their range (Mellen et al. 1992, Bull and Jackson 1995, Aubry and Raley 2002b.).

According to "*Source Habitats for Terrestrial Vertebrates of Focus in the Interior Columbia Basin,"* which references the Breeding Bird Survey indicates significant decreases in populations of the pileated woodpecker in eastern Oregon and Washington.

LOS - Old Forest Single Strata Habitat (White-Headed Woodpecker)

Old Forest Single-Strata Habitat

Old Forest Single-Strata habitat (OFSS) important for species such as the white-headed woodpecker, is very limited in the Project and Analysis Area. Old Forest Single-Strata accounts for 84 and 95 acres of habitat in the Project Area and Analysis Area respectively. In OFSS habitat average trees per acre >21" dbh is 16. Average canopy closure is around 32%, which is typical of such habitats.

In absence of OFSS habitat, OFMS (approximately 86 acres) in the warm dry and hot dry plant association groups likely provides habitat for white-headed woodpeckers. . Although the subwatershed provides habitat, levels are substantially lower than existed historically (See Chapter 3, Forest Vegetation discussion on HRV for historic levels of OFMS and OFSS).

The relative absence of OFSS habitat in the Subwatershed diminishes the quality and suitability of habitat for the white-headed woodpecker and similar habitat-dependent species. The primary feature absent in the Analysis Area is large trees in an open structure condition which are important in providing high quality foraging opportunities, as well as future large snag recruitment for nesting needs.

White-Headed Woodpecker

Although the white-headed woodpecker is not listed specifically as a MIS for old growth in the Forest Plan, it does serve as an excellent indicator of the health of Old Forest Single Stratum (OFSS) habitats and will be used as such in this document. The Regional Forester's Amendment #2 states that since 1993, the Forest Plan as amended has directed the Forest to conduct timber sales in a manner that moves stands towards OFMS and OFSS.

The white-headed woodpecker differs from many of the other primary cavity excavators in its near exclusive selection of mature, single- stratum ponderosa pine dominated habitats. This species relies almost exclusively upon the seeds from large ponderosa pine cones for its foraging needs as well as utilizing insects gleaned off ponderosa pine trees. Large ponderosa pine snags are utilized for nesting purposes. Because of its more limited need and use of snags as foraging sites, the species snag requirements are less than those required by other primary cavity excavators such as the pileated, downy, and hairy woodpeckers.

Habitat trend information derived from Interior Columbia Basin studies (Wisdom et al. 2000) indicated that about 70% of the watersheds in the Blue Mountains showed a decreasing trend in white-headed woodpecker habitat and 30% showed a static or increasing trend. Basin-wide, >50% of watersheds had strong negative declines in the availability of source habitats (old growth ponderosa pine, aspen/cottonwood/willow, large diameter ponderosa pine snags). Breeding Bird Survey (BBS) data indicated a 3.0% annual increase in populations in Oregon and Washington from 1966 through 1994 (Wisdom et al. 2000). The current condition and availability of habitat for this species across the Project Area and subwatershed is extremely limited. Past harvest focused on the removal of mature ponderosa pine. Fire suppression allowed stocking of smaller trees to increase dramatically, shifting structural stage to SECC, UR and YFMS.

The lack of OFSS habitats may not meet the needs of the white-headed woodpecker, flammulated owl, or other species that depend upon open, mature ponderosa pine stands for foraging, nesting, and roosting. Species dependent upon these habitats would likely remain at low densities, with populations poorly distributed in isolated marginal habitats. It is assumed that with a greater availability of OFSS habitat, white-headed woodpecker population densities would increase.

Connectivity

The distribution of connectivity habitats is generally poor within the subwatershed on the north side of the Middle Fork of the John Day River. Multiple factors have contributed to this condition, and include past timber harvest activity, effects of the Summit Fire in

1996, and limitations of vegetation communities present. Late and old structure habitat is essentially confined to the south of the Middle Fork John Day River, and much of that habitat is in the upper reaches of the subwatershed, outside the Project Area. As such, connectivity habitat within the Project Area, as described in Forest Plan Amendment #2, is limited.

Several connectivity corridors are located in the Analysis Area. These corridors meet the Forest Plan Amendment #2 standards for the condition and quality of connectivity habitat. In most cases, they represent the upper 1/3 site potential for the vegetation community present, and have a multi-strata structure condition. In several situations, however, the best available habitat was selected in order to provide the most direct connection between late and old structure stands. Suitable connections between existing late and old structure habitats is provided within the Project Area and the Analysis Area. See Map 7- Balance Old Growth and Connectivity in Appendix D for the location of connectivity corridors.

In the Balance project, collaborators expressed interest in maintaining connectivity for deer and elk movement as well. Corridors established for old growth species typically serve big game as well. Collaborators identified corridors to support deer and elk movement (see Map 7- Balance Old Growth and Connectivity in Appendix D). These big game travel corridors provide additional connectivity, but are not to meet Forest Plan standards.

Dedicated Old Growth, Late and Old Structure, and Connectivity Habitats - Environmental Consequences

Alternative 1- No Action

Direct and Indirect Effects

Dedicated and Replacement Old Growth

Alternative 1 would maintain the existing DOG designation and would not change the forest habitat types designated as DOG habitat. This 287 acre designation would continue to not meet Forest Plan (FS) Standards of 300 acres. As a result of the No Action Alternative there would be no Replacement Old Growth (ROG) or Pileated Woodpecker Feeding Area (PWFA) designated for DOG 3112. Therefore, the existing DOG does not meet the needs of pileated woodpeckers and is not contributing towards a network of DOGS and ROGS that the FP has established to provide for this species.

LOS-Old Forest Multi-Strata Habitat (Pileated Woodpecker, American Marten)

Alternative 1 would maintain the existing condition of habitat for multi-strata dependent species, such as the pileated woodpecker and the pine marten. In the short-term, existing canopy closure, stand structure, and dead wood habitats would be maintained across the Analysis Area as described in the existing condition section. Multi-strata stands would become denser in the mid- to long-term. Standing and downed wood densities would increase in the mid- and long-term as stand densities increase, and projected insect and disease infestations occur. In the Analysis Area, OFMS in all plant association groups combined would continue to develop, increasing from 7% to 31% over the next 50 years. In the Project Area, OFMS would increase from 4% to 50% over the next 50 years.

There is a strong distribution of OFMS/YFMS habitat type with some fragmentation located south of the MFJDR, in the Balance, Dunston, and upper Sunshine Creek drainages. This area likely meets the needs of one or more pair of pileated woodpeckers in the Analysis Area.

An effect of no action would be to see increased potential for uncharacteristic, crown fire behavior that could set back structural stage development, resulting in large areas of young trees and longer time spans to develop old forest structures. In the warm dry and hot dry plant association groups, disturbances would continue to be at a larger scale than historically occurred, with “out of scale” adverse effects to many wildlife species. A fire of this magnitude and severity would convert suitable pileated woodpecker and pine marten habitat to an unsuitable condition.

LOS-Old Forest Single Strata Habitat (White-Headed Woodpecker)

In the short-term, implementation of Alternative 1 would result in no additional acres of OFSS being restored or created. Due to the slow growth rates of the overstocked stands, development of old forest stand structures would develop slowly.

As mentioned in the existing condition section, the lack of OFSS habitat does not meet the needs of species such as the white-headed woodpecker, flammulated owl, and other neotropical landbird species that depend upon open, mature ponderosa pine stands for foraging, nesting, and roosting. Over the next 50 years, old forest single strata increases from <1% to 4% and from 0% to 8% in the Warm-Dry and Hot-Dry plant association groups, respectively.

There is an increasing risk of large-scale, stand-replacing fires that would set back structural stage development, resulting in large areas of young trees and longer time spans to develop old forest structures. Stand replacement fires would further reduce OFSS habitats, and the species that rely on them.

Connectivity

Current and long-term connectivity between LOS is maintained by a system of connectivity corridors. With the No Action alternative, no activities would occur within existing connectivity corridors; these corridors would continue to provide for the free movement of LOS associated species in the short- to mid-term.

Cumulative Effects

All of the activities in Appendix C have been considered for their cumulative effects on old growth associated species. For a complete list of activities, see Appendix C. The Analysis Area used for this Cumulative Effects analysis is the Balance Creek/Coyote Creek Subwatershed.

The No Action Alternative has no direct effects on existing old growth. In the short-to mid-term, the DOG would remain in its current condition and location. OFMS and OFSS located both inside and outside the DOG would remain in their current condition. Existing stand structures and high stocking levels would persist.

Two factors limit the availability of OFSS habitat type in the Analysis Area. The most influential is the historic timber harvest that has occurred in the area over the past 100 years. Historic OFSS habitats were targeted for their large ponderosa pine trees and relative ease of logging due to the gentle slopes and open forest conditions. Most of the large ponderosa pine trees were removed with these actions. A lesser, but important influence is the impacts of the Summit Fire in 1996. The effects of the fire were cumulative, as the fire did burn through areas already impacted by previous timber harvest. However, some OFSS habitat was consumed in that fire as well.

In the long-term, stands would move towards old growth conditions. White-headed woodpecker habitat would not change in the short- to mid-term. Habitat for pileated woodpeckers and pine martens would increase as stand density and canopy cover increases. Populations would not be expected to change in the short- to mid-term. In the long-term (50 years), OFMS habitat would increase. Populations of marten and pileated woodpecker would potentially increase. Current and long-term connectivity between LOS is maintained by a system of connectivity corridors. With the No Action alternative, no activities would occur within existing connectivity corridors; these corridors would continue to provide for the free movement of LOS associated species in the short- to mid-term. Fire hazard would remain high in the Project Area.

Alternative 2 – Proposed Action

Direct and Indirect Effects

Dedicated and Replacement Old Growth

Analysis of late and old structure habitat in the subwatershed found the opportunity to modify the current DOG designation to include more suitable habitat for late and old structure dependent species. The Proposed Action would relocate the DOG designation with some overlap of the existing DOG, resulting in a 303 acre DOG. It would also identify a 189 acre replacement old growth (ROG), and identify an additional 150 acres of pileated woodpecker feeding area (PWFA) habitat. The newly identified ROG would be primarily within the original DOG designation and the PWFA would be identified on ground that is currently Big Game Winter Range (MA4). See Map 7-Balance Old Growth and Connectivity in Appendix D for location of the DOG, ROG and

PWFA. As a result of the Proposed Action, Forest Plan Standards for Management Area 13 – Old Growth, would be met. These actions would require a non-significant Forest Plan amendment.

The effects of the Proposed Action, include approximately 83% of the DOG would be comprised of OFMS stands. This would better meet habitat needs of old growth dependent species.

The Proposed Action includes 11 acres of precommercial thinning in the (new) DOG (Unit 42) and 34 acres of thinning around large pine in the ROG (Unit 80). Thinning would reduce the ladder fuels which would minimize the risk of uncharacteristically severe fires, and increase the growth rates on the remaining trees. This would benefit old growth obligate species by protecting existing habitat constituents.

Temporary roads would not be constructed in LOS stands, DOGS, ROGS, or connectivity corridors. Prescribed fire may reduce snags and down wood in the short term, but may create snags in the long term. There may be short term impacts to pileated woodpecker, marten and white-headed woodpecker. However, adhering to the Forest Plan, a network of DOGS, ROGS, and connectivity habitat would be maintained throughout the Analysis Area which would continue to allow for movement for these species. RHCA integrity would be maintained including down wood and snags; and shrubs and conifers would be maintained which would continue to provide shade and bank stability in the short and long term.

Old Forest Multi-Strata Habitat (Pileated Woodpecker, American Marten)

The Proposed Action includes 21 acres treatment in OFMS including 11 acres of precommercial thinning (Unit 42) and 10 acres of thinning around large pine (Unit 82). The canopy cover and structure in these stands would be reduced after treatment. Treating other stands of any structure by thinning and burning would reduce habitat for canopy dependent species such as pileated woodpecker and pine marten and improve habitat for species such as white-headed woodpecker and flammulated owl. Thinning and prescribed underburning is intended to reduce surface, ladder, and canopy fuels and shift stands towards historic conditions.

Overall, the long-term shift in old growth type from OFMS to OFSS would increase, rather than decrease wildlife species diversity. Restoring natural vegetation conditions and fire regimes would make these habitats far more self-sustaining for associated wildlife species. Overall, proposed timber management and prescribed burning would contribute positively toward the viability of species that use old growth habitats. Although conversion from OFMS to OFSS reduces habitat for pileated woodpecker and, American marten, it is assumed that the DOG/ROG network will continue to provide habitat for these two species across the landscape.

Old Forest Single Strata Habitat (White-Headed Woodpecker)

No current OFSS is proposed for treatment. The main benefit from thinning and underburning treatments would be realized in the long-term. Treatment of YFMS, UR, SECC and SEOC stands would increase tree growth rates, accelerating the development of OFSS as compared to the No Action alternative. Treated stands would be moved towards OFSS, currently, the most limiting forest habitat. Within 50 years, many stands or forest patches would closely resemble desired conditions: a large-tree, single-layered canopy with an open, park-like under-story dominated by herbaceous cover with scattered shrub cover and pine regeneration. As a result of the Proposed Action, approximately 70% of the stands treated are projected to be OFSS within 50 years. In the short-term, stands would still not have the requisite number of large diameter trees to classify as old growth, but desired species such as the white-headed woodpecker would still be expected to respond favorably. Populations of white-headed woodpecker would not be expected to change in the short- to mid-term, and could increase in the long-term.

Connectivity

There are no treatments proposed in Late and Old Structure (LOS) connectivity corridors. In the short term, corridors would continue to provide for the free movement of old-growth dependent species. In the long term, corridors would become higher risk to insects or fire which could degrade or eliminate habitat.

In summary, habitat for canopy dependent species such as pileated woodpecker and American marten would be maintained and habitat would be improved for species such as white-headed woodpecker and flammulated owl. Thinning and prescribed underburning is intended to reduce understory cover and open up stands, shifting stands towards historic conditions. Modifying the current DOG designation to 303 acres would increase old growth habitat which would benefit obligate species. The Forest's network of Dedicated Old Growth (DOG) would also continue to maintain populations of marten and pileated woodpecker.

Cumulative Effects

The area considered for cumulative effects is the Balance Creek/ Coyote Creek subwatershed. All of the activities in Appendix C – Cumulative Effects have been considered for their cumulative effects on old growth, connectivity habitat and associated species. The following discussion focuses on those past, ongoing and foreseeable future activities that may contribute positive or negative effects. Past timber harvest and road building have significantly reduced and fragmented the amount and effectiveness of old growth habitat. . In the past there have been numerous timber sales in the Balance Creek/Coyote Creek subwatershed and many in the surrounding area totaling approximately 7088 acres. Prescribed fire has occurred on approximately 1,700 acres.

From 1980 to present, wildfires have impacted approximately 42,497 acres in several subwatersheds surrounding and including Balance Creek/Coyote Creek Subwatershed.

Old growth is deficient in the Analysis Area as reflected in the HRV tables in the Vegetation Section of this document. OFSS is below HRV, particularly in the hot dry and warm plant association groups. Loss of OFSS is due to a combination of timber harvest and fire suppression activities. Fire suppression allowed tree densities to increase, shifting many stands from OFSS to OFMS. Removal of large diameter trees then converted these stands to YFMS or younger, even-aged structural stages. OFMS is within or above HRV for all biophysical environments expect the warm dry type. OFMS habitats in the warm dry biophysical environment have been reduced below HRV, primarily due to past timber harvest and road construction.

Forest Plan, Management Area 13 (MA–13) provides for the management of old growth habitat through a system of Dedicated Old Growth (DOG) and Replacement Old Growth (ROG) areas. Under the Proposed Action, the additional protections afforded through the DOG, ROG, and PWFA designations would create a beneficial cumulative effect on the viability of old growth MIS by ensuring management of those habitat conditions needed for these species. These areas would be managed in the future to maintain their suitability (habitat conditions and size) for American marten and pileated woodpecker, and help ensure the viability of these species within the analysis area. The No Action Alternative does not meet Forest Plan standards for MA–13, and therefore, may not be as effective as the Proposed Action in protecting old growth species.

Since 1993, the Forest Plan as amended has directed the Malheur National Forest to conduct timber sales in a manner that moves stands towards OFMS and OFSS structural stages, regardless of whether or not they are in Management Area 13. Timber sales planned since that time have not contributed to loss of late and old growth forest, although understory stocking may have been reduced to shift stands from OFMS to OFSS to better reflect HRV.

Shifting stands from OFMS to OFSS would reduce habitat for canopy dependent species such as pileated woodpecker and pine marten and improve habitat for species such as white-headed woodpecker and flammulated owl. This shift in old growth type would increase, rather than decrease the wildlife species diversity. Cumulatively, restoring natural vegetation conditions and fire regimes would make these habitats far more self-sustaining for associated wildlife species. The Balance Sale only thins 21 acres. Overall, proposed treatments would contribute positively toward the viability of species that use old growth habitats.

Past management activities have reduced snags and down wood in old growth habitats. Design measures for the action alternatives would minimize additional loss of these habitats; additional losses would be considered incidental. The Forest's firewood policy prohibits the cutting of firewood in DOG/ROG areas, so prescribed snag and downed wood levels should be maintained. In OFMS and OFSS outside the DOG/ROG network, snags along roads would continue to be removed as firewood, reducing habitat for pileated woodpeckers, pine martens, white-headed woodpeckers, three-toed woodpeckers and other species that use deadwood habitats. Due to the low level of effect that is expected under the Proposed Action it is not expected that adverse cumulative effects on snag and downed wood habitat and the species that depend on these habitats would result when combined with the residual and anticipated effects of past, present, and reasonably foreseeable future activities.   Effects to these habitats are described in the Primary Cavity Excavator section.

Generally, adjacent Tribal and private lands have been managed with different management objectives. These areas are not expected to provide OFMS or OFSS habitat in the near future.

Old growth and connectivity corridors in adjacent subwatersheds were considered when designing connectivity corridors in the Balance Analysis Area.

The No Action and Proposed Action Alternatives proposed in Balance would not have an adverse cumulative effect on the quantity and quality of connectivity. Connectivity corridors would continue to allow for movement not only within the Project Area, but in the analysis Area. There are no foreseeable future activities that would affect connectivity.

In the short-term, the Proposed Action would not contribute to cumulative losses of mature and old growth habitat because stands would not be treated except to enhance old growth attributes. In the long-term, the action alternatives would contribute positively to cumulative effects by helping to accelerate the development of OFSS and maintaining connectivity habitat between LOS. Therefore, proposal activities would contribute positively toward the viability of species that use these habitats. There are no significant adverse cumulative effects to pileated woodpeckers or pine martens or their habitat from any of the alternatives; there are positive effects to white-headed woodpeckers from OFSS development.

Following treatment, some stands or forest patches would closely resemble desired conditions: a large-tree, single-layered canopy with an open, park-like understory dominated by herbaceous cover with scattered shrub cover and pine regeneration. In the short-term, stands would still not have the requisite number of large diameter trees to classify as old growth, but desired species such as the white-headed woodpecker would still be expected to respond favorably. Populations of white-headed woodpecker would not be expected to change in the short- to mid-term, and could increase in the long-term.

Restoring natural vegetation conditions and fire regimes would make these habitats far more self-sustaining for associated wildlife species.

Cattle generally use high quality stands of LOS sparingly because these habitats tend to have little forage and moderate to high downed wood densities that make access difficult. Cattle grazing would have no impact on forested overstories or dead wood structure, and therefore, there would be no effect to pileated or three-toed woodpeckers. Livestock grazing could affect American marten habitat by removing understory vegetation that serves as cover/resting sites for both marten and their prey; however, most of the preferred marten habitat has abundant down material and is generally less accessible to livestock. .

Big Game Habitat Existing Condition

Rocky Mountain elk and mule deer are big game species of concern due to their high public value. Species are considered wildly distributed across the District, Forest and the Blue Mountain Region. Rocky Mountain elk are identified in the Forest Plan as a management indicator species (MIS); habitat quality is evaluated in terms of forest cover, forage quality, and open road density.

The Project Area lies within big-game summer range (909 acres) and winter range (12,866) in ponderosa pine and mixed conifer stands above 3500 feet elevation. Most elk don't leave the area until December or January and then concentrate further downstream. Oregon Department of Fish and Wildlife (ODFW) flights in March validate concentrations outside the Analysis Area.

Elk Habitat was evaluated using the Habitat Effectiveness Index (HEI) (Thomas, et al. 1988), marginal and satisfactory cover percentage, and open road densities. Values were estimated at the subwatershed level and winter/summer range classification.

Big Game Populations

Big game management on the Malheur National Forest is a cooperative effort between the Forest Service and the Oregon Department of Fish and Wildlife (ODFW) where the Forest Service manages habitat while ODFW manages populations. The agencies cooperate by managing big game according to pre-established Management Objectives (MOs) for each big game management unit. The Balance Project Area lies within portions of the Desolation and Northside big game management units. In 2008 ODFW population trends estimate 1,195 (93%) and 1,637 (82%) animals in each unit, respectively. See the Wildlife Specialist Report for additional information on elk populations, bull to cow ratios, and calf to cow ratios by Management Unit . Population numbers and management objectives fell slightly below in Northside and Desolation Management Units. This could be an effect from heavy snows last winter. The amount of big game sign; pellets and beds, and animals seen indicates a moderate use of the area overall.

Wintering elk populations have generally met population MOs in Desolation and Northside. ODFW stated that although animal numbers fell below MOs in some years in both Desolation and Northside the lower values are considered insignificant and adjustments in hunting permits in future years is expected to bring the population back up quickly. Elk population levels have remained relatively stable over the last 11 years in both management units in spite of past forest management activities.

Wintering elk populations have generally met population MOs except for 2004 in Desolation. ODFW Biologists Darren Bruning and George Keister (personal communication, 2004/5/6) stated that although animal numbers fell below MOs in Desolation the lower values are considered insignificant and adjustments in hunting permits in future years is expected to bring the population back up quickly. Elk population levels have remained stable over the last 11 years in both management units in spite of past forest management activities.

Bull to cow ratios has generally dropped below MOs in the Desolation Management Unit., but has remained fairly stable in the Northside Unit. As bull/cow ratios decline below 10 bulls/100 cows, breeding dynamics within a herd also change, and there can be a corresponding reduction in cow/calf ratios (ODFW 2003). Bull to cow ratios are influenced by a number of factors including numbers of hunters, length of hunting seasons, including the rutting period in the hunting season, lack of restrictions of antler class in harvest, lack of hiding cover, and high open road densities (Wisdom and Thomas 1996, Irwin et al 1994, Schommer and Johnson 2003).

Fawning and Calving Habitat

To determine the amount of fawning/calving habitat within the Balance Creek/Coyote Subwatershed a GIS analysis was conducted. The following habitat variables were considered in this analysis; slopes < 15%, canopy cover > 37%, and proximity to water (streams, pond, and springs) < 400 meters (Toweill and Thomas 2002). This analysis determined that there are approximately 207 acres of fawning/calving habitat that meet the criteria within the subwatershed. However, this could be an underestimate due to the variable nature of fawning/calving habitat selection by does and cow elk.

HEI

Past management activities have altered cover, forage and road densities. Thomas, et al. (1988), developed the Habitat Effectiveness Index (HEI) model for estimating elk habitat effectiveness on the landscape. HEI incorporates four variables or indices: cover quality (HEc), size and spacing of cover (HEs), quality and quantity of forage (HEf) and open road density (HEr). The Forest Plan established minimum standards for these indices. In addition, the Forest Plan established minimum standards for both winter range and summer range for retention of satisfactory cover (%S), marginal cover (%M), total cover (%S and M), and open road density. These Standards differ between winter and summer range. Within the Balance Creek/Coyote Creek Subwatershed, there are approximately 12,866 acres of winter range and 909 acres of summer range. No summer range is within the Project Area.

WL-1 HEI

	HEc	HEs	HEr	HEf	HEcsfr (HEI)	%S	%M	Total Cover %	Open Road Density (miles per square mile)
Winter Range Forest Plan Standards	.40	.30	.50	.40	.50	10%	10%	25%	2.2
Existing Condition	.59	.51	.45	.50	.51	5%	23%	28%	2.4
Proposed Action	.60	.45	.45	.50	.50	4.8%	18%	23%	2.4
Summer Range Forest Plan Standards	.30	.30	.40	n/a	.40	12%	5%	20%	3.2
Existing Condition	.59	.57	.60		.56	8%	38%	46%	1.02
Proposed Action	.59	.57	.60	n/a	.56	8%	38%	46%	1.02

HEI = HEcsfr = Habitat Effectiveness Index.
HEr = habitat effectiveness derived from the density or roads open to vehicular traffic
HEc = habitat effectiveness derived from the quality of cover.
HEf = habitat effectiveness derived from the quality of forage
HEs = habitat effectiveness derived from the size and spacing of cover
%S = Satisfactory Cover. %M = Marginal Cover. % Total Cover = %S + %M.

Forage

Current forage conditions are primarily the result of site productivity, timber and grazing management. Forage is present on 9,683 acres of the subwatershed. The 1994 Summit Fire burned approximately 5,680 acres in the Balance Creek/Coyote Creek Subwatershed creating large amounts of forage for a period of time.

Cover

To determine cover amounts in the Balance Creek/Coyote Creek Subwatershed, a GIS analysis (using the Most Similar Neighbor, MSN, and a combination of ground truthing and aerial photo interpretation was conducted for both satisfactory and marginal cover. The 1994 Summit Fire burned approximately 5,680 acres in the Balance Creek/Coyote Creek Subwatershed reducing total cover until stands obtain cover. The Forest Plan defines satisfactory cover for elk as a stand of coniferous trees 40 or more feet tall with an average canopy closure equal to or exceeding 50% for ponderosa pine and 60% for mixed conifer. Satisfactory cover in winter range equals 675 acres or 5% of the winter range which is below the Forest Plan standard of 10%. Marginal cover is defined as a stand of coniferous trees greater than 10 feet tall with an average canopy cover meeting or exceeding 40 percent. Marginal cover in winter range equals 2,950 acres or 23% of the winter range which is above Forest Plan Standards of 10%. Total cover includes marginal and satisfactory and is 28% which is above Forest Plan standards for winter range of 25%. Total cover in summer range is 46% which is above Forest Plan Standards of 20%.

Hiding cover provides a visual barrier between big game animals and disturbance sources. This is especially important during hunting season when big game animals alter their travel patterns to avoid humans. Satisfactory cover is typically multistoried and often meets elk hiding cover criteria. Many stands have been pre-commercially or commercially thinned in the Balance Creek/Coyote Creek Subwatershed due to historic railroad logging. Hiding cover has been reduced in size and quality. Due to the relatively flat topography this condition is not mitigated by landforms.

Approximately 9,520 or 68% of the Balance Creek/Coyote Creek Subwatershed is in the hot dry and warm dry plant association groups. These stands typically do not support high densities of conifer stems for more than 40 years, which is needed to provide quality hiding cover.

Roads

Open road densities were calculated for the Balance Creek/Coyote Creek Subwatershed, and include both National Forest System lands and other ownerships. The open road density in summer range for the Balance Creek/Coyote Creek subwatershed is 1.02 mi/mi^2. This is below the 3.2 mi/mi^2 standard in big game summer range identified in the Forest Plan (USDA 1990, IV–6). The open road density in winter range is 2.4 mi/mi2 which is above Forest Plan Standards of 2.2 mi/mi2. High open road densities in winter range likely have some effect on big game distribution.

Even though the open road density in winter range exceeds Forest Plan Standards, the main road (2045) comprises 7.4 miles out of the 16.3 total open miles in the subwatershed. Activities in the Balance project will not increase open roads permanently. However, there will be a temporary increase in open roads during operations.

Road closures have not been effective in some areas of the subwatershed. The greatest potential for impact is during hunting seasons, when hunter traffic, and the associated “stimulus” associated with those activities are at their highest level. Road closures are difficult to enforce, even those with barricades and gates, due to flat topography, open forest vegetation and a lack of enforcement personnel. Restriction periods reduce some traffic in the fall and correspond to general deer and elk hunting seasons.

Rowland et al. 2000 and Wisdom et al. 1999 concluded that open road density does not address all impacts to big game from roads. They suggested that distance to open roads also plays a role in big game use and movement. Elk tended to use areas more that were at least 1,000 meters or greater from roads. Most habitats in the Analysis Area are within 1,000 meters of an open road. About 80% of the area is within 500 meters of an open road. Therefore, the presence of open roads likely reduces the habitat effectiveness of the area, and this effect would gradually decrease as distance from open roads increased.

Although road densities are above Forest Plan Standards in winter range, the road densities in the smaller Project Area are lower. Opportunities for road closures are very limited in the Project Area and were not considered in this EA.

Big Game Habitat Environmental Consequences

Alternative 1 - No Action

Direct and Indirect Effects

In the short- to mid-term, the existing condition would be maintained in the Analysis Area, resulting in no change in the Habitat Effectiveness Index (HEI) for elk. HEI would remain as described in Table WL-1. The existing cover to forage ratio would be maintained. In the short-term, there would be no changes in cover. Total cover would remain in excess of Forest Plan standards. Satisfactory cover would remain deficient in the subwatershed. In the mid- to long-term (with continued fire suppression), development of multi-strata stands would create additional satisfactory and marginal cover stands, increasing both thermal and hiding cover. Forage habitats would not be affected in the short- to mid-term. The current quality and distribution of forage habitat within the Analysis Area would be unchanged. In the mid- to long-term, forage would decrease as tree canopies close and shade the ground. Total cover is well in excess of Forest Plan standards for this subwatershed. Satisfactory would remain below Forest Plan Standards.

Summer range comprises approximately 2% of the Analysis Area. None of the summer range is within the Project Area, so there would be no impacts under either alternative.

Deer and elk are believed to use thermal cover to reduce the effects of weather and temperature extremes and to hide from predators. It is important to note that recent research at the Starkey Experimental Station in La Grande, Oregon (Cook 1998) has raised the concern that resource managers may be overstating the importance of thermal cover, i.e., marginal and satisfactory cover, on elk condition. Studies suggest that the energetic benefits of thermal cover may be inconsequential to elk performance, and that it is forage or nutritional effects that may have the greater impact on individual animal performance. However, these studies do not dispute elk's preference for dense forest stands or the numerous studies that show elk using dense stands disproportionately to their availability. Dense conifer cover contributes to better distribution of elk across available habitat, and may be more of a disturbance/hiding cover issue than a thermal regulation issue. This alternative would not result in direct effects to big game security.

Implementation of this alternative would construct no temporary roads, but at the same time, it would do nothing to modify existing open road densities or road management. Open road densities would be maintained at current levels as described in the Existing Condition section. Open road densities in summer range are below Forest Plan standards in the subwatershed, but above standards in winter range. Relationships between the spatial distribution and disturbance associated with open roads and hiding cover habitat would also not change, as existing road densities and levels of use are expected to remain the same in the short-, mid- and long-term. Increased tree stocking may increase the chance of a high severity wildfire. A fire of moderate to intense magnitude and severity could convert multi-strata cover habitat to stand initiation forage habitat in the short- and mid-term, increasing vulnerability of big game to hunting in the roaded portion of the Analysis Area. Use of these habitats would not change from the way they are currently utilized by deer and elk. As discussed in the Existing Condition section, elk populations have met population MOs for the most part. Elk population levels have remained relatively stable over the last 10 years. Under the No Action Alternative there would not be a Forest Plan Amendment written to further reduce satisfactory cover, which is below Forest Plan Standards of 12%.

Cumulative Effects

See Alternative 2 Cumulative Effects for a discussion cumulative effects on big game habitat and associated species

Alternative 2 – Proposed Action

Direct and Indirect Effects

The proposed action reduces cover, and reduces overall HEI from .51 to .50. However, total HEI still meets FP Standards. Several Design Elements in Chapter 2 help to mitigate impacts to big game. These include: timing restrictions in big game winter range; timing restrictions in calving and fawning habitat; reclosing roads that would be used during project activities, and maintaining security/hiding cover patches.

Current levels of aspen are limited in the subwatershed. Proposed treatments that would benefit aspen would include treating 10 stands by reducing encroaching conifer and fencing for protection.

Summer range comprises approximately 2% of the analysis area. There are no project activities planned in summer range so there would be no impacts under this alternative.

A Forest Plan Amendment is required to further reduce satisfactory cover in winter range; and reduce total cover below Forest Plan Standards. Satisfactory cover is already below Forest Plan Standards of 12%. Sixty-four acres from 3 units in satisfactory cover would be treated. However, in two of the units totaling 44 acres, the proposed treatment thins around large ponderosa pine so the entire unit would not be thinned. The remaining 20 acres would be commercial and precommercial thinned. When looking at the amount of marginal cover surrounding these 3 units, the impacts of treatment would be minimal. As discussed previously, studies suggest that the energetic benefits of thermal cover may be inconsequential to elk performance, and that it is forage or nutritional effects that may have the greater impact on individual animal performance.

All habitats in the Analysis Area are within 1,000 meters of an open road. About 97% of the area is within 500 meters of an open road. Therefore, the presence of open roads likely reduces the habitat effectiveness of the area, and this effect would gradually decrease as distance from open roads increased. This is particularly important given the levels of cover loss from harvest and the level topography for much of the area.

The proposed action would treat 1,934 acres by prescribed burning over the next 3 to 5 years. Much of this burning would be accomplished after the mechanical work is completed. Multiple entries may be needed to gradually reduce the litter layer that has increased beyond historical conditions.

Prescribed burning occurs in a mosaic fashion and not all acres are blacked at one time. Tree mortality ranges for forested stands are as follows:

- Trees 0-5" dbh, tree mortality could be 35% but is expected to range from 5 to 15%.
- Trees 5-10" dbh, tree mortality could be 15% but is expected to range from 5 to 10%.
- Trees 10-21"+ dbh, mortality could be 10% but is expected to range from 1 to 2%.

While prescribed burning will likely reduce hiding cover for the short-term most of this will recover with higher quality forage within 1 -3 years. This increased forage will remain beneficial to big game for at least 10 years after harvest activities. It is anticipated that understory growth should begin to provide some measure of hiding cover within 10 years.

Burning would occur during spring or fall periods; burning could occur annually for five years; scheduling is highly dependent on weather conditions.; a maximum of 3,000 acres per year would be burned; burning limited to one grazing pasture per year; burning would not occur within harvest or commercial thinning units until these activities including activities fuels treatments are completed.

Open road densities would increase during project implementation but effects are short term and localized. The proposal would construct 2.5 miles of temporary road, also increasing disturbance to big game. However, roads will be decommissioned after project implementation. Following completion of the project, open road densities would revert back to levels pre-treatment. Therefore, affects to big game would be short term and localized.

Wintering elk populations have generally met population MOs in Desolation and Northside Management Units. Elk population levels have remained relatively stable over the last 10 years in both management units. Management activities may have effects on big game distribution, but not on populations.

Cumulative Effects

All of the activities in Appendix C – Cumulative Effects – have been considered for their cumulative effects on big game habitat and associated species. The following discussion focuses on those past, ongoing and foreseeable future activities that may contribute positive or negative effects.

Table WL-1 reflects the effects of past management on big game habitat. In the past there have been numerous timber sales in the Balance Creek/Coyote Creek Subwatershed and many in the surrounding area totaling approximately 4,569 acres.

From 1980 to present, wildfires have impacted approximately 40,197 acres in several subwatersheds surrounding and including Balance Creek/Coyote Creek Subwatershed.

Livestock grazing and allotment management including fence maintenance for Lower Middle Fork, Upper Middle Fork and Balance allotments has been ongoing. Livestock grazing can be beneficial or detrimental to big game/habitat. A mature bull elk eats over 70 pounds of forage a day. A mature bull (livestock) eats over 30 pounds of forage a day. Range standards and AUMs (animal unit months) are set to meet the forage needs for both livestock and big game.

Satisfactory cover will be reduced in the short term, but by retaining wildlife habitat patches in treatment units, short to long term effects would not be significant

Summer range comprises approximately 2% of the analysis area. There are no project activities planned in summer range so there would be no cumulative impacts.

In winter range, approximately 64 acres would be treated in 3 units. Cumulative impacts should be minimal given the mitigation measures listed in the Design Measures section and the fact that the majority of treatment entails thinning around pine to help reduce ladder fuels which would reduce the possibility of catastrophic wildfires.

On private land, riparian enhancement has occurred including area fencing (cattle exclusion), water trough developments and shrub/tree planting along the Middle Fork of the John Day River. The cover, road density and HEI values in Table WL-1 reflect habitat conditions on federal, Tribal and private land. HEI runs indicate that most of the Tribal and private land classify as forage; landowners typically mange these lands as such and therefore, would be expected to remain as forage into the future.

Recent results from long-term big game studies at the Starkey Project indicates that elk avoided the short-term disturbance of logging activity itself, but elk did not avoid the harvests units or the log-hauling roads during and after timber harvest. In general, the elk populations become more disperses during and after timber harvest which suggests that elk were moving farther over larger areas to meet their needs. Elk productivity was not negatively affected by timber harvest; however, the vulnerability of elk to hunting did increase. Open landscapes and relatively flat topography make elk more visible to hunters. This would increase hunter success, but would have little effect on elk performance (weight gain, general body condition). (PNW Science Update Issue 13)

A Forest Plan Amendment is required to further reduce satisfactory cover; and reduce total cover to 23%. Currently, satisfactory cover is below Forest Plan Standards of 12%.

Through an analysis of elk population census data for the Desolation and Northside Management units, a stable, level, population trend was noted. It appears that past forest management has not been detrimental to elk populations in this area. It is not anticipated that planned activities will cause a decline in elk populations. However, it will likely cause a redistribution of animals across the landscape, and possibly on to privately owned lands.

Approximately 150 miles of road has been constructed from 1916 to present with approximately 52 miles open within the subwatershed and 16 miles in the project area respectively. There have been 45 miles of road closed and 53 miles of road decommissioned in the subwatershed. Disturbance of elk by hunting along open roads and off-road vehicle use would have more impact on big game populations than future big game cover conditions created by this alternative. However, the trend in the Forest Service is to reduce open road densities below Forest Plan Standards whenever possible.

Off-road vehicle use reduces big game security and increase the potential for disturbance, especially given the lack of hiding. During the hunting season, elevated human use and hunting pressure in the cover-deficient area will likely force animals into adjacent privately owned lands.

Primary Cavity Excavators, Snag and Down Wood Habitat Existing Condition

At least one fourth of all bird species in the western forests (McClelland et al. 1979) and perhaps even as much as 45% of native North American bird populations (Balda 1975; Scott et al. 1980) are snag dependant; that is, they require the use of snags at some point in their life cycle. Snags and downed wood are essential ecological components of the Interior Columbia Basin (ICB) ecosystem. Standing snags provide foraging, roosting, denning and nesting habitat for a number of wildlife species. As snags decay and fall to the ground, and become down wood, they provide food and shelter for different species. Down wood also stores nutrients and moisture, and aids in soil development. Down wood in stream channels influences channel morphology; especially in forming pools and in-stream cover, retention of nutrients and storage and buffering of sediment (Lee and others 1997).

In the Snags and Downed Wood in the Interior Columbia Basin Ecosystem Management Project 2002, models indicated that small snag amounts increased slightly (7 percent) from the historical conditions on FS/BLM-administered lands but declined by 14% across the basin. Most of the increase on FS/BLM administered lands occurred in the Dry Forest PVG, with some minor increases in the Cold Forest PVG. This occurred because the amount of forests in the mid-seral stage increased in the Dry Forest PVG, while the amount in the late-seral stage declined. In general, mid-seral stage forests contain fewer small snags per hectare than the late-seral forest especially in manager areas (Ohmann and Wadell, 2001). However, much of the increase in mid-seral forests on FS/BLM lands occurred in unroaded and wilderness areas. In these areas, fire suppression allowed the development of dense stands of stressed shade tolerant trees having low resistance to insect and disease attack and consequently, abundant small snags. Large snag amounts declined by approximately 8% on FS/BLM administered lands and 31% across the basin, compared to the historical levels. The largest losses occurred in the Dry Forest and Moist Forest PVGs due to increases in mid-seral forests and decreases in late-seral forests. Late seral stage forests typically contain higher levels of large snags. Large fire-created snags may also be present in early-seral forests, but fall quickly. Few large snags remain standing in the mid-seral stage (Everett and others (In press). There are generally fewer surviving large trees in early and mid seral forests and, hence, reduced sources for snag recruitment. Furthermore, the new cohort of live trees does not become large enough to generate large snags until well into the mid-seral stage and often not until the late seral stage. Large snag declines on FS/BLM lands are compounded in managed or roaded areas by harvest and firewood cutting.

Primary Cavity Excavators (PCEs) depend on standing and downed wood for foraging, nesting, and roosting. These species create cavities in dead and live trees. Secondary cavity users (flying squirrels, etc.) can use cavities excavated by these species. Cavity nester habitat can occur in a variety of vegetative communities and various structural conditions.

The Forest Plan identifies 10 primary cavity excavators as Management Indicator Species for the availability and quality of dead and defective wood habitat: black-backed woodpecker, three-toed woodpecker, Lewis' woodpecker, white-headed woodpecker, pileated woodpecker, downy woodpecker, hairy woodpecker, northern flicker, Williamson's sapsucker, and red-breasted sapsucker (USDA 1990, IV-32). Because sapsucker species have been re-classified in recent years, the red-naped sapsucker will be used as a surrogate for the red-breasted and yellow-bellied sapsuckers. See the Old Growth section for discussions on Pileated woodpecker and white-headed woodpecker For further information on species ecology, see the Wildlife Specialist Report in the Project Record.

Habitat trend information derived from Interior Columbia Basin studies (Wisdom et al. 2000) was reviewed. Habitat trends vary across the Blue Mountains with some watersheds experiencing increased habitat and others decreased habitats, but overall, the trend is towards a loss of habitat. Population trends show declines for several species including the pileated, white-headed, Lewis' and black-backed woodpeckers.`

In general, existing and potential habitat can be found throughout the Analysis Area, except for non-forest areas and forest stands in the process of regeneration (stand initiation and stem exclusion structures). Few large snags and down logs occur in many of the previously harvested stands. Untreated stands have relatively high snag densities when compared to previously harvested stands.

Three-toed Woodpecker (*Picoides arcticus*)

The three-toed woodpecker is designated in the Forest Plan as a MIS species for old-growth lodgepole pine. There are no pure lodgepole pine stands within the Project Area.

Black-backed Woodpecker (*Picoides arcticus*)

The black-backed woodpecker is an indicator of primary cavity nesting habitat. It inhabits standing dead lodgepole pine, ponderosa pine, western larch and mixed coniferous forests (Dixon and Saab 2000, Kotliar et al. 2002). This species dependence on burned forests and forests that have undergone other types of large scale disturbances is well documented (Hutto 1995, Caton 1996, Kreisel and Stein 1999, Dixon and Saab 2000, Kotliar et al. 2002). They have a scattered distribution with populations responding to prey abundance (Caton 1996).

Lewis' Woodpecker (*Melanerpes lewis*)

The Lewis' woodpecker is a Management Indicator Species (MIS) for the Malheur National Forest. According to The Source Habitats for Terrestrial Vertebrates of Focus in the Interior Columbia Basin, source habitats declined in 70% of watersheds basin wide between the current and historical periods. Declines in source habitats for family 1 (including Lewis' and white-headed woodpeckers) are related largely to reductions in the old-forest lower montane community type.

Unlike most other woodpecker species in Oregon, Lewis' woodpecker inhabits primarily open forest and woodlands since its primary foraging strategy is fly catching. Nesting habitat consists of two distinct types in eastern Oregon: riparian areas with large cottonwoods, and fire maintained or burned old-growth ponderosa pine forests (NatureServe 2005).

The 38,000 acre Summit fire (which a large portion is within the Analysis area) provides foraging and nesting habitat for this species and large populations have been observed.

Hairy Woodpecker (*Picoides villosus*)

Suitable habitat for this species includes open stands with low basal areas along ridges, low slopes, and southerly aspects in the ponderosa pine forest types. It is more common in older forests, but readily uses burned areas and forest edges for foraging (Csuti 1997). Hairy woodpeckers are most common in burns or in areas with trees that are dead from or infested with mountain pine beetles (Bull, 1983). Habitat for this species is well distributed throughout the Analysis Area. However, low snag densities in the ponderosa pine hot dry communities may inhibit occupation in these areas.

Downy Woodpecker (*Picoides pubescens*)

Preferred habitat for this small woodpecker includes cottonwood and aspen stands and riparian areas, but they will use coniferous-deciduous and sometimes coniferous forests. Territories are 5 to 9 acres. Nesting occurs in trees and snags greater than 8 inches dbh at heights over 15 feet (Marshall et al. 2003). They forage by a variety of means such as pecking and flaking bark for insects, gleaning leaves, and fly catching (Csuti 1997).

Potential habitat for this species is currently found in riparian areas and to a more limited extent in aspen stands in the Project Area. However, this species may be relegated to breeding at lower elevations (Csuti 1997), and may not breed in the elevations found in the Balance Project Area.

Williamson's Sapsucker (*Sphyrapicus thyroideus*)

In northeastern Oregon Bull et al. (1986) described this species as occurring in mature and old-growth mixed conifer forests at 3,500 – 6,500 feet elevations. Nesting occurs in both live and dead tree species comprised mainly of western larch, but also ponderosa pine, Douglas-fir, and grand fir, in trees and snags averaging 27 inches diameter at breast height with 53% of nesting occurred in grand fir forest types. Home range size ranged from 10-22.5 acres. A majority of foraging consisted of feeding at sapwells of western larch and Douglas-fir with diameters averaging 8.5 inches.

Suitable old-growth comprises approximately 7.5 % of the subwatershed; however snags are variable throughout the southern portions of the Project Area; and very limited in the northern portion. Sapsucker foraging sign was noted during surveys and one nest site was located in the southern area of the Project Area.

Red-Naped Sapsucker (*Sphyrapicus nuchalis*)

The red-naped sapsucker, *Sphyrapicus nuchalis*, is a woodpecker that breeds in coniferous forests and montane riparian woodlands of the western United States and southwestern Canada. These habitat types are found in the Balance Project Area as well as the Analysis Area.

Northern Flicker Northern Flicker (*Colaptes auratus*)

This species uses a wide variety of plant communities and successional stages. It prefers open habitats, and is commonly found foraging on the ground in open woodlands, meadows, field and regeneration harvest areas (DeGaaf et al. 1991 and Csuti 1997). Thomas et al. (1979) report this species using all forest successional stages for foraging and young (40 to 79 years) to old-growth (160+ years) for reproduction. Limited reproductive use of earlier stages is due to the absence of snags that this species requires for nesting. Nesting occurs in open areas in snags with some decay. Marshall (2003) noted 71% nest trees had broken tops. Average nest tree diameter was 22 inch dbh and nest holes were averaged 49 feet. Flickers and their nest cavities were seen within the Project Area during surveys.

Snag Habitats and Down Wood Existing Condition

The Forest Plan establishes standards and guidelines for dead standing and downed wood for various levels of biological potential in each management area for Primary Cavity Excavators (PCEs). The Plan was amended in 1995 by the Regional Forester's Forest Plan Amendment 2, also known as the "Eastside Screens." This amendment requires the retention of snags and green replacement trees greater than or equal to 21 inches diameter breast height (or the representative diameter in the overstory) at 100 percent potential population levels for PCEs or the best available science. The Forest Plan, as amended, requires that an average 2.39 snags per acre, 21 inches dbh and greater, be maintained within forested stands. It is assumed that these snag and down log levels will provide the minimum level required for 100% of potential population levels of primary cavity excavators (USDA 1990).

Table WL–2: Estimated Snag Densities in Balance Analysis Area by Habitat Type and Diameter

Wildlife Habitat Type	Snag Diameter at Breast Height (dbh) DecAID Categories	
	> 10 inches	> 20 inches
Ponderosa Pine/Douglas–fir	7 snags/acre	1 snags/acre
Eastside Mixed Conifer – East Cascades/Blue Mountains	11 snags/acre	3 snags/acre
Lodgepole Pine	9 snags/acre	3 snags/acre

1 Snag density is for snags greater than or equal to 12 inches dbh. Data was not collected down to the 10–inch level.
2 Snag density is for snags greater than or equal to 21 inches dbh. Data was not collected down to the 20–inch level.

Therefore, snag estimates are likely conservative.

Down Wood

Informal surveys were conducted in 2006/7. Generally, warm-dry and hot-dry stands met or exceeded Forest Plan Standards. In cold/dry, and cool moist stands, down log densities ranged from 100-140 feet which meets Forest Plan Standards.

Large snags created by insects and fire often fall within 10 to 30 years (Bull, 1983, Harrington 1996, Keen 1929, Lyon 1977, Mitchell and Priesler 1998, Schmid and others 1985), though some may last much longer. Increase in large down wood levels on FS/BLM lands are most likely due to a larger proportion of acres in non-roaded and wilderness areas where there is less removal of large down wood and large snags. Areas that exhibited declines in large down wood amounts included northwest Montana, much of the Washington and Oregon Cascade foothills, the lower elevations forests of northeast Washington, and the mid and lower elevation Blue and Wallowa Mountains in Oregon.

Currently, retention of downed logs is based on the Forest Plan, as amended by the Regional Forester's Eastside Forest Plan Amendment 2. Forest Plan Standards and current downed wood densities within the Analysis Area are displayed in Table WL – 3. DecAID was not used to analyze the effects of treatment on downed wood in the Analysis Area for several reasons. DecAID provides estimates of percent cover of downed wood. Available data for the Analysis Area could be converted to percent cover; however, without the length of each piece of wood counted (data which was unavailable), this analysis would likely underestimate percent cover.

Table WL –3: Forest Plan Standards and /Existing Downed Wood Densities

Regional Forester's Forest Plan Amendment 2			Balance Analysis Area		
Species	Minimum Log Size Criteria	Down Wood Density	Species	Minimum Log Size Criteria	Down Wood Density
Ponderosa Pine	Small end diameter >12" & piece length >6'	3 -6 pieces 20' – 40' total length	Ponderosa Pine/Douglas-fir	Small end diameter >12" & piece length >6'	20' - 60'per acre
Mixed Conifer	Small end diameter >12" & piece length >6'	15 – 20 pieces 100' – 400' total length	Mixed Conifer	Small end diameter >12" & piece length >6'	100' – 140' per acre

Primary Cavity Excavators, Snag and Down Wood Habitat Environmental Consequences

Alternative 1-No Action

Selection of the No Action alternative would maintain existing levels of snags and downed wood in the Analysis Area. No activities would be implemented, so there would be no creation or loss of existing snags or downed wood. Snags would continue to be recruited and fall at existing rates. In the short- and mid-term, the number of large diameter snags would continue to be below Forest Plan standards. In the long term, continued fire suppression and multi-strata development would increase the chance of insect infestations and disease. These occurrences would potentially increase snag densities. Downed wood densities, on average, would continue to meet Forest Plan standards now and into the future. Logs would be expected to increase as existing or created snags fall.

In the short- to mid-term, the No Action alternative would have minimal effects on the MIS species for dead wood habitats including 10 PCE species and the American marten. Habitat would remain unchanged in the short- and mid-term. Snag and downed wood used by these species would have the same availability, distribution, and density described in the existing condition section. Dead wood habitat would remain stable for species such as the pileated woodpecker, downy, and hairy woodpeckers, and other species identified at the beginning of the section. These habitats would continue to provide snags for foraging and nesting, as well as higher canopy closures and near ground level canopy development that provides protection from predators. Populations would remain the same. In the long-term, disease and insects would increase foraging and nesting habitat for these species. Snag levels would be expected to meet or exceed Forest Plan standards in 50 years and exceed historic levels reported by Matz. Populations would likely respond positively to these increases. Increases in canopy could have additional benefits to pileated woodpecker and pine marten and adverse effects to white-headed woodpeckers; canopy cover effects are discussed in detail in the Old Growth Habitat section. The red-naped sapsucker, Williamson's sapsucker, and downy woodpecker could show a slight negative effect to habitat due to continued decline in aspen habitats. Deciduous habitats only comprise a small portion of the Analysis Area, so no changes to existing populations would be expected.

Higher fuel loads would increase the chance of a high severity wildfire within the Analysis Area. A fire of this magnitude and severity would more dramatically affect snag and downed wood densities. Stand replacement wildfire would benefit some species (Lewis', black-backed, northern three-toed, and hairy woodpecker, and the northern flicker) while reducing habitat for other species (pileated, white-headed, and downy woodpecker, and the red-naped and Williamson's sapsucker) less associated with fire. Increases in stand densities resulting from continued fire suppression would increase canopy densities. The growth of understory hardwood shrubs required by some PCE species would be inhibited by reduced sunlight reaching the forest floor.

Effects to Primary Cavity Excavators (PCE) species were evaluated using the following information: species' ecology, project design features, Forest Plan Standards, local historic snag data and projected snag and down log levels. The Balance Project is a green timber sale. As such, harvest would only remove live trees. Snags would not be targeted for removal under this project. Some snags may be lost in treatment units for safety reasons, however, these would be incidental to the harvest of live trees, and any snags felled for safety reasons would be left on the ground.

The effects of harvest activities and prescribed burning on the pileated woodpecker and white-headed woodpecker are discussed here as well as in the Old-Growth section of this document. This section also examines effects on other MIS species, including the downy and hairy wood-peckers, Lewis' woodpecker, the black-backed woodpecker, various sapsuckers, and other primary cavity excavator species described in the Forest Plan (IV – 32, Standard 61) as they relate to reductions in snags and downed wood habitat elements.

Downed wood densities would continue to meet Forest Plan Standards in the future. Where densities of these habitats are currently high, such as the unmanaged mixed conifer stands, habitat needs for a variety of deadwood dependent species would be met. Within stands where densities of deadwood habitats are low or non-existent, habitat needs for deadwood dependent species would not be met in the short- and mid-term. In the long-term, continued fire suppression and multi-strata development would increase the chance of insect infestations and disease. These occurrences would potentially increase down log densities.

Habitat for MIS would remain unchanged in the short- and mid-term with the selection of the No Action Alternative. As described above, snag and downed wood used by these species would have the same availability, distribution, and density within this time frame (0 to 20 years). Dead-wood habitat would remain stable for species such as the pileated woodpecker, downy, and hairy woodpeckers, and others. These habitats would continue to provide snags for foraging and nesting, as well as higher canopy closures and near ground level canopy development that provides protection from predators. The growth of understory shrubs required by some PCE species could be inhibited by reduced solar radiation. In the long-term, insect infestations, disease, and fire would have varying impacts on the quantity and quality of PCE habitat. Disease and insects would increase foraging and nesting habitat for these species.

In the long-term, without management, snag densities may meet or exceed Forest Plan Standards. Higher fuel loads could increase the chance of a high severity wildfire. A fire of this magnitude and severity could affect snag and downed wood densities to varying degrees. Stand replacement fires would benefit some species (Lewis', black-backed, northern three-toed, hairy woodpecker, and northern flicker) while reducing habitat for other species (pileated, white-headed, and downy woodpecker, and red-naped and Williamson's sapsucker) less associated with fire.

Cumulative Effects

All of the activities in Appendix C have been considered for their cumulative effects on species that use dead wood habitats. Past timber harvest, fire suppression, road construction, wildfire, and firewood cutting have impacted the quantity, quality, and distribution of dead wood habitats and PCE populations dependent on these habitat features across the Analysis Area. These activities have created the existing condition of dead wood habitats described in the existing condition section. Large snags are currently below Forest Plan standards, but densities are similar to historic snag data reported by Matz in 1927. Down logs, on average, exceed Forest Plan standards.

Past timber harvest projects were generally very intensive; focusing upon the removal of the larger, more valuable ponderosa pine, Douglas-fir, and western larch trees (green tree replacements). Likewise, merchantable snags and downed wood were also removed, burned, or otherwise disposed of. The extensive road network in the Analysis Area (largely a result of past harvest) has impacted snag densities by increasing accessibility of the area to firewood cutting. Firewood cutting has impacted snag habitat in close proximity to open roads. Fire suppression has resulted in dense, multi-strata stands; snag and down log densities are generally higher in these stands than less dense ponderosa pine stands.

Current trends indicate that snags and down log numbers are increasing due to reduced harvest over the past decade and increased retention levels required by Regional Forester's Eastside Forest Plans Amendment #2. Any future thinning or prescribed underburning would be designed to retain a suitable snag and down wood component. Such management strategies are expected to improve habitat for cavity dependent species.

Appendix C lists additional thinning/burning projects expected in the future. Harvest would fell only incidental snags for safety reasons and landing/temporary road construction. Future underburning activities have the potential to both consume existing snags and downed logs and to create new snags. Design features would be included to minimize consumption of existing habitat. Overall, snags and down logs would be expected to stay about the same or increase.

Private lands typically do not provide large diameter snags and large down wood. In the past, adjacent landowners have generally salvaged damaged or dying trees to capture their economic value before they decay to a level where they no longer have a market value. Timber management has favored harvest of large diameter trees because of their higher economic value; removal of overstory trees releases smaller trees that are then managed over the next harvest cycle. Public firewood cutting is expected to continue along open roads.

Cumulatively, management activities across the Forest are distributed sufficiently to minimize disturbance impacts at the population levels. Seasonal restrictions are applied on a project by project basis as needed.

Due to the low level of effect that is expected under the No Action and Proposed Action alternatives, it is not expected that adverse cumulative effects on snag and downed wood habitat and the species that depend on these habitats would result when combined with the residual and anticipated effects of past, present, and reasonably foreseeable future activities. Future snags projections indicate a gradual increase in snags over time. Populations of species associated with dead wood habitats would be maintained.

Alternative 2-Proposed Action

Direct and Indirect Effects

Today, green timber sales are conducted differently than they were in the past. The Balance project is a green timber sale. As such, harvest would only remove live trees. Snags would not be targeted for removal under this project. Some snags may be lost in treatment units for safety reasons, however, these would be incidental to the harvest of live trees, and any snags felled for safety reasons would be left on the ground. Project design criteria, such as retaining clumps of live trees around snags and locating landings and temporary roads where there are few or no snags, would help minimize losses. Retention of untreated patches of trees would continue to provide avenues for snag creation.

Generally, the effects on existing snags and downed wood and the affected PCE populations would not vary considerably between the different treatment types. During harvest operations, it is expected that individual snags and pieces of downed wood may be lost through felling of snags that pose a hazard to workers and equipment. Snags felled to provide access to units or within treatment units would be left on site to provide downed wood. Generally, snags would be avoided during these operations. Downed wood could be directly affected by ground based (skidder/tractor) harvest operations. It is assumed that some level of direct impact would occur, as OSHA regulations requirements and the realities of ground based operations and activities would inevitably result in those impacts. The degree of the impact that these activities would have is expected to be low and negligible at the subwatershed scale. Project design criteria, such as retaining clumps of live trees around snags and locating landings and temporary roads where there are few or no snags, would help minimize losses.

Analyses indicate that timber harvest would have minimal effects on snag levels at the landscape scale because of the relatively small portion of the landscape being treated and the low expected snag loss in the harvest units. A 10% snag loss in harvest units equates to a less than 1% loss of snags at the landscape level. Average snag levels at the landscape scale would essentially remain the same. This analysis only analyzes the effects of timber harvest during logging; the effects of fuels treatments are described below.

Within harvest units, activity fuels would be treated during harvest or soon after harvest. Where whole tree yarding is proposed, the vast majority of activity fuels would be located at landings. The area around landings would generally be made snag free in order to ensure the safety of workers at the sites; otherwise, whole tree yarding would have little effect on snags and down logs. Grapple piling or hand piling combined with burning would minimize impacts to snags; only smaller material would be targeted for piling, so affects to large down logs would also be limited.

Prescribed burning would be expected to have the most effect on deadwood habitats. Burning can alter or remove vertical and horizontal stand structure including snags and down wood. Snags can be both lost and recruited during prescribed burning. The level of loss and replacement is dependent on fire intensity, time of year, local weather conditions, and fuel load.

Prescribed fires would be expected to burn relatively cool, move slowly and burn in a mosaic of burned and unburned patches. There is a potential for existing snags to burn through and fall. Design measures would require that ignition be avoided within 50 feet of snags 12 inches dbh and greater. Greater protection would be given to trees 21 inches dbh and greater. In other Project Areas, this appears to have been successful in maintaining most hard snags; however, some larger snags probably would be burned. Many, if not most, soft snags would probably be lost.

Tree mortality directly from the implemented burns, and indirectly from subsequent insect attacks, would likely result in the creation of new snags. Fire would be expected to cause localized single or clumped tree mortality. Accepted mortality limits: trees 0-5” dbh 5-35%; trees 5-10” dbh 5-10%; trees 10-20”dbh 1-5%, but expected to be 1-2%. Although it is not the intent of this project to kill many dominant or co-dominant trees, some may be lost. Tree mortality would be greater under fall burns than spring burns due to drier weather conditions and lower fuel moistures. Fire-induced mortality could help offset snags lost during burning. This “snag exchange” may even increase local woodpecker numbers if fire created snag recruitment exceeds losses. Because the Project Area is considered deficient in snags, increased snag habitat would be considered a benefit to snag-dependent species. Because most of the mortality would be in trees smaller than 7 inches dbh, most of the benefits would be to foraging habitat rather than nesting habitat. Most snag dependent species prefer larger snags, those greater than 10 inches dbh, for nesting opportunities.

Generally, prescribed burning would be expected to maintain or increase numbers of primary cavity excavators. The influx in woodpecker species is a response to increased forage and nesting opportunities created by fire-killed or stressed trees and changes in accumulations of ground litter/ladder fuels, senescent shrubs and dense regeneration. Species that are strongly associated with fire-burned trees would likely benefit the most, particularly species such as the black-backed, three-toed, white-headed, hairy and Lewis' woodpeckers and northern flickers. Population increases would depend on the intensity of the burn and the resultant tree mortality.

Black-backed and three-toed woodpeckers, in particular, have been shown to respond favorably to these small pulses in snag creation (Knotts 1998). Foraging habitat should temporarily improve with the increase of fire-killed trees less than 7 inches dbh due to the increase in insect populations. These species require smaller diameter snags for nesting than other species; therefore, burning may provide additional opportunities. Once the insects decline and these snags fall, black-backed and three-toed woodpecker should return to pre-burn levels. With repeated burnings over the life of the project, habitat should be created and higher populations should be maintained for 2 to 5 years after each burn. If no more burning projects are implemented in the area, woodpecker numbers would be expected to decline to pre-burn levels.

Hairy and Lewis' woodpeckers and northern flickers show a positive correlation with burning. The influx in woodpecker species is a response to increased forage and nesting opportunities created by fire-killed or stressed trees and changes in accumulations of ground litter/ladder fuels, senescent shrubs and dense regeneration. Killing of smaller diameter trees, i.e., those less than 7 inches dbh would increase foraging habitat; although larger snags are preferred for foraging, these species would utilize the smaller snags. Increases in nesting opportunities would be more limited as these species prefer larger diameter snags, particularly the Lewis' woodpecker and northern flicker. The "exchange of snags" described previously may have a somewhat greater effect on Lewis' woodpecker. This species prefers soft snags, and a portion of the existing soft snags would be expected to be lost during burning, although design measures would minimize losses. Burning could eventually increase numbers of Lewis' woodpeckers, but may be delayed for several years until newly created snags decay and shrub densities increase.

White-headed woodpecker populations would likely stay the same or increase slightly. White-headed woodpeckers prefer Old Forest Single Stratum (OFSS). Harvest and burning treatments would be expected to increase OFSS habitats in the long-term as discussed in the Old Growth Habitat section.

The action alternative would have a slightly negative impact to pileated woodpecker and American marten habitat. Snag habitat for these species would increase, but treatment could also degrade (char) down log habitat and reduce cover. There could be a loss of foraging substrate because some large down logs could be consumed by fire; however, sufficient amounts would remain to meet Forest Plan Standards. Effects to cover are discussed in the old growth section. The network of designated old growth areas would continue to provide for pileated woodpecker and American marten populations (see Old Growth section for additional effects).

Pileated woodpeckers could benefit from increases in snags, but creation of large diameter snags would be low. The pileated woodpecker prefers moist, dense sites dominated by grand fir, sub-alpine fir, western larch, and Douglas fir cover types. The dry forest types in the Balance Project Area are probably not conducive to supporting pileated woodpeckers.

Populations of Williamsons and red-naped sapsucker, and downy woodpeckers would change little with this alternative. Species prefer larger snags for nesting and only a limited number of large snags would be created. Some riparian areas would be burned, potentially affecting downy woodpeckers and red-naped sapsuckers, but the fire would be low intensity and few logs and snags would be expected to burn in the RHCAs. With time, expansion of aspen stands would benefit both downy woodpeckers and red-naped sapsuckers. At the project level, large snag and aspen habitat is limited and would be expected to increase only slightly; consequently, populations of these species would not be expected to change with this project.

Fires would be kept at a low enough intensity to meet standards for large down logs as specified in Regional Forester's Eastside Forest Plans Amendment #2. Burning in a mosaic of burned and unburned patches would help maintain levels. With spring burning, many large, sound down logs are charred or partially consumed, but few are completely consumed by the fire if fuel moistures are high. A sufficient number of uncharred logs would remain to provide habitat for species that prefer them. The Forest Plan, as amended, requires that no more than 3 inches of the log diameter, 1.5 inches on either side of a log, be consumed. There is no requirement to prevent charring. During fall burning, more logs would be charred or consumed by the fire; however, Forest Plan standards probably would be met. Few uncharred logs would remain in units that are burned in the fall which could affect species that prefer uncharred logs. Although fire would be allowed to back into RHCA's, larger logs in RHCA's would probably be uncharred.

Temporary road construction could reduce snags, but given the low snag levels in the Project Area, road locations could be tweaked enough to minimize the need to remove snags. The Action Alternative would construct about 2.5 miles of temporary road. Hazard trees may need to be removed along haul routes, but firewood cutting has removed most snags along open road systems.

Disturbance associated with implementation of the Action Alternative could cause PCE species present in treatment units to temporarily move elsewhere. These movements are expected to be temporary; these species would return to treated stands following completion of activities.

Indirect effects on deadwood habitats include impacts to future deadwood habitats (removal of live trees, i.e., future snag replacements). The relative effect to the species that would use post treatment habitats is expected to be minor because all stands would be fully stocked following treatment. Forest Plan standards for green tree replacements would be met following treatment. Sufficient snag replacement trees would be available to meet future needs in all treatment units.

As the incidence of insects and disease decreases in treated stands, it can be expected that these agents will create fewer snags; however, endemic levels of insect and disease would continue to operate in the stands providing a flow of future snags. Retention of untreated patches of trees would also continue to provide avenues for snag creation. This would be expected given proposed thinning treatments would be designed to help reduce the levels of insect and disease operating in the Project Area. Thinning would accelerate growth of large trees; large diameter trees would be plentiful and a portion could be converted to snags to supplement naturally-occurring levels and address any shortfalls. In the future, snags would be expected to exceed historic levels reported by Matz (1927).

Overall, the project may have some effects on primary cavity excavators and other animals that use snags and down logs. Existing snags and downed wood used or potentially used by PCE species for nesting, foraging, or roosting could be affected by treatment activities. Effects would be minimal given alternative design including design measures that would be used to protect existing snags and down wood. Changes in snags from timber harvest would be expected to be minor due to the small area affected and the fact that snags would not be targeted for removal; snags felled for safety would be incidental to the harvest of live trees and at the most would impact 10% of the existing snags in the harvest units and less than 1% of snags at the landscape level. Prescribed fire would result in a snag exchange with some snags being lost and some snags being created; overall, fire would likely increase snags. Although the Analysis Area is below Forest Plans Standards, additional impacts are considered incidental and not expected to adversely affect PCE populations. Stand treatments would accelerate growth of large diameter trees that could provide snag replacements in the future. Because snag densities would be expected to stay the same or increase, no adverse effects to primary cavity excavator populations would be expected.

Cumulative Effects

All of the activities in Appendix C – Cumulative Effects have been considered for their cumulative effects on PCE species. The Analysis Area boundary is the Balance Creek/Coyote Creek Subwatershed.

Typically private and Tribal lands are not managed for snags and downed logs at the same levels that the Forest Service is required to manage for.

Populations of Williamsons and red-naped sapsucker, and downy woodpeckers may remain stagnant. Some PCE species prefer larger snags for nesting and only a limited number of large snags would be created. Some riparian areas would be burned, potentially affecting downy woodpeckers and red-naped sapsuckers, but the fire would be low intensity and few logs and snags would be expected to burn. With time, expansion of aspen stands would benefit both downy woodpeckers and red-naped sapsuckers. At the project level, large snag and aspen habitat is quite limited and would be expected to increase only slightly; consequently, populations of these species are not expected to change with this project.

Livestock grazing can have indirect adverse impacts on habitat for Williamson’s and red-naped sapsucker and downy woodpecker. Aspen stands are heavily browsed so regeneration/snag recruitment is limited to nearly non-existent. Habitat features such as riparian foraging areas and cover patches may be affected if overgrazing occurs and results in loss of ground vegetation, particularly shrubs.

Timber harvest, fire suppression, road construction, wildfire, and firewood cutting have impacted the quantity, quality, and distribution of deadwood habitats and PCE populations dependent on these habitat features across the Analysis Area. These activities have created the existing condition of deadwood habitats in the Analysis Area. The effects of past management is reflected in the existing snag and down wood conditions displayed in Tables WL-2 and WL-3.

Past timber harvest projects were generally very intensive, focusing upon the removal of the larger, more valuable ponderosa pine, Douglas-fir, and western larch trees that were abundant in this area. Past timber harvest resulted in the near complete removal of large, mature trees (green tree replacements) in many of the stands entered. Timber harvest also fragmented large blocks of suitable habitat for PCE species. Likewise, merchantable snags and downed wood were also removed, burned, or otherwise disposed of. The extensive road network in the Analysis Area (largely a result of past harvest) has impacted snag densities by increasing accessibility of the area to firewood cutting. Firewood cutting has impacted snag habitat in close proximity to open roads. Fire suppression has resulted in dense, multi-strata stands. Snag densities in these stands are generally higher than less dense ponderosa pine stands. Down wood densities meet or exceed Forest Plan standards, primarily due to fire suppression efforts that reduced the consumption of down logs under typical fire regimes.

Future projects with a potential to affect snag and downed wood habitat include underburning. Prescribed burning has the potential to consume existing snags and downed logs and create additional snags in treated stands. Prescribed fire also has the potential to create snags of all size classes within the affected area. Snags created by prescribed fire would provide PCE habitat and increase snag densities (as singles and clumps) in burned portions of the Analysis Area. Underburning would be timed to create a low intensity ground fire. A portion of existing downed wood (generally smaller diameter fine fuels) would be consumed by a low intensity underburn of the type proposed. Effects would be minimal given project design and protection measures that would be used to protect existing snags and down wood. The Regional Forester's Eastside Forest Plans Amendment 2 requires the retention of snags and down logs at the 100% potential population level; for snags, this equates to 2.39 snags per acre 21 inches or greater or whatever is the best representative dbh of the overstory layer. Due to the low level of effect that is expected under all alternatives, it is not expected that adverse cumulative effects on snag and downed wood habitat and the species that depend on these habitats would result when combined with the residual and anticipated effects of past, present, and reasonably foreseeable future activities.

Featured Species: Northern Goshawk Existing Condition

The northern goshawk inhabits conifer-dominated forests. Goshawks utilize a wide range of forest structural conditions, often hunting prey in more open stands, yet relying on mature to old growth structure for nesting and fledging. Nests are commonly on north aspects in drainages with dense canopy (60 – 80%), in large trees, and near water or other forest "edges" (Reynolds et al. 1992 and Marshal 1992). Habitat trend information derived from Interior Columbia Basin studies (Wisdom et al. 2000) indicated that about 50% of the watersheds in the Blue Mountains showed a decreasing trend in goshawk habitat and 35% showed an increasing trend. Breeding Bird Survey (BBS) data suggests stable populations in western North America from 1966 through 1995; trend information derived from a study in the southwest indicated a 4% annual decline in populations.

Potential nesting habitat, classified as old growth, is interspersed within the Analysis Area. Approximately 889 acres of nesting habitat exists in the Analysis Area. One known goshawk territory existed within the Project Area. The nest tree died and the nest eventually deteriorated. The original nest site and adjacent nesting habitat were surveyed for goshawks 1999 – 2003 and in 2005. No nesting goshawks were identified within or immediately adjacent to that site. No new nest has been located by surveyors. Foraging goshawks have been regularly sighted in the Project Area. There will be provisions to protect and create a 30-acre nest site and 400-acre post-fledging area (PFA) if a nest is located as per Forest Plan direction, as amended.

Goshawks are highly sensitive to disturbance during the breeding season. When seasonal restrictions on management activities were disregarded in the past, breeding success may have been reduced. Since 1990, seasonal restrictions on activities within ½ mile have been regularly used in the vicinity of occupied nests. Known goshawk territories are to be monitored annually; if monitoring identifies occupied nesting habitat, seasonal restrictions would be applied to all management activities.

Featured Species: Northern Goshawk Environmental Consequences

Alternative 1 - No Action

Direct and Indirect Effects

Under the No Action Alternative, habitat for northern goshawk would increase as stand density and canopy cover increases. Populations would not be expected to change in the short- to mid-term, and could potentially increase in the long-term. See the Old Growth Section of this Chapter for additional effects on goshawks and their preferred nesting habitat.

Fire hazard would remain high in the Project Area as discussed in the Fuels section of this EA. Long-term development of old growth could be diminished if stand development is disrupted by epidemic bark-beetle activity (likely) or severe fire effects (possible).

Cumulative Effects

The area considered for cumulative effects to nesting habitat is the subwatershed. All of the activities in Appendix C have been considered for their cumulative effects on northern goshawk. The following discussion focuses on those past, ongoing and reasonable foreseeable future activities that may contribute adverse effects to the species or its habitat.

Past timber harvest and wildfire have reduced mature and old growth habitat preferred for nesting and fledging. Since 1993, the Forest Plan as amended has directed the Malheur National Forest to conduct timber sales in a manner that moves stands towards OFMS and OFSS structural stages. Since that time, timber sales should not have contributed towards loss of mature and old-growth forest. In the short- to mid-term, the No Action alternative would not contribute to cumulative losses of old growth because stands would not be treated. In the long-term, the No Action alternative, by forgoing action, could negatively contribute to the loss of old growth and associated species if a stand-replacing event such as wildfire occurs.

Alternative 2-Proposed Action

Direct and Indirect Effects

The Proposed Action includes 21 acres of treatment in OFMS including 11 acres of precommercial thinning (Unit 42) and 10 acres of thinning around large pine (Unit 80). The canopy cover and structure in these stands would be reduced after treatment. Under the Proposed Action, there would be a reduction in nesting habitat for the northern goshawk. Thinning and prescribed underburning is intended to reduce surface, ladder, and canopy fuels and shift stands towards historic conditions. The acres affected would be considered incidental at the Analysis Area level. Primary and secondary habitat would remain plentiful; stand growth projections indicate habitat would increase in the long-term. Temporary roads would be rehabilitated when project work is completed. See the Old Growth Section of this Chapter for additional effects on goshawks and their preferred nesting habitat.

Harvest would alter foraging habitat by reducing canopy and possibly shifting prey assemblages from canopy gleaners to open forest type birds. Because goshawks will prey on primary cavity excavators, retention of dead wood habits will help improve goshawk foraging habitat. Goshawks prey on a variety of small mammal species as well. Adult goshawks foraging in the area are not likely to be disturbed by project activities.

Prescribed burning could also reduce cover, but generally burning kills smaller trees and would have minimal effect on canopy cover. As with timber harvest, seasonal restriction would be applied to burning activities if nesting goshawks are identified. Any known goshawk territories would be monitored annually for goshawk activity. If active nests are identified within or immediately adjacent to the Project Area, management activities would be prohibited within ½ mile of the nest sites from April 1 to September 30 to avoid disturbing goshawks during the breeding season.

Research (Reynolds et al. 1992 and Marshal 1992) varies on conclusions as to the effects of harvest in and adjacent to nest stands and whether or not goshawks will use these stands following harvest. Several studies (Marshal 1992) have suggested that selection harvest of trees can reduce nesting; however, goshawk management recommendations by Reynolds et al. (1992) do not exclude timber harvest. Four studies comparing prey abundance at goshawk locations and random points suggested that goshawks did not select stands on the basis of prey abundance but rather on forest structure (Fischer 1986, Beier and Drennan 1997, Good 1998, Drennan and Beier 2003).

Greenwald et al. (2005) states that current goshawk management plans in the western United States may be inadequate. Most studies found that goshawks avoided open areas and logged early seral stands. Three studies demonstrated avoidance of clear-cut and seedlings, sapling and young stands (Austin 1993, Titus et al. 1996, Bloxton 2002). Austin (1993), and Beier and Drennan (1997)) documented avoidance of stands with <40% canopy closure. (Bright-Smith and Mannan (1994) documented avoidance of more open, partially logged old-growth forest.

Proposed treatments would reduce the hazards associated with insect epidemics and stand-replacement fire. Old growth would more likely persist into the future than under the No Action Alternative. Restoring natural vegetation conditions and fire regimes would make these habitats far more self-sustaining for associated wildlife species. Seasonal restrictions would be applied as needed to minimize disturbance during the reproduction season. Primary and secondary habitat would remain plentiful; stand growth projections indicate nesting habitat would increase in the long-term. Overall, proposed timber management and prescribed burning would contribute positively toward the viability of this species.

During project operations (pre-commercial and commercial thinning, machine work, road work and use, burning) degrees of disturbance and displacement of wildlife would be likely. Overall, disturbance from activities would be limited in time and place, and therefore, would not be expected to change populations of species at the landscape level. The Forest Plan requires protection for raptors during the reproduction periods, including northern goshawk, a species associated with old growth. Seasonal restrictions for nesting raptors would be applied for any active territories for this project.

Prescribed burning could also reduce cover, but generally burning kills smaller trees and would have minimal effect on canopy cover. As with timber harvest, seasonal restriction would be applied to burning activities if nesting goshawks are identified.

Cumulative Effects

Nesting habitat is typically the limiting factor for goshawks. Past timber harvest reduced mature and old growth habitat preferred for nesting and fledging. Since 1993, the Forest Plan as amended has directed the Malheur National Forest to conduct timber sales in a manner that moves stands towards OFMS and OFSS structural stages, and timber sales planned since that time should not have contributed to loss of mature and old growth forest. Future thinning and burning projects listed in Appendix C would adhere to this management direction.

Adjacent private lands have been logged. In the past these timber stands have generally not provided nesting habitat for goshawks. These stands are not being managed for old growth conditions, and therefore are not expected to provide nesting habitat in the future.

Forage is not considered a factor limiting goshawk population viability in the area, and consequently cumulative changes to foraging habitat, whether positive or negative, would not contribute to a measurable change in goshawk populations.

In the short- to mid-term, the No Action alternative would not contribute to cumulative losses of old growth because stands would not be treated. In the long-term, the No Action alternative, by forgoing action, could negatively contribute to the loss of old growth and associated species if a stand-replacing event such as wildfire occurs.

In the short- to mid-term, the Proposed Action would contribute to a potential reduction in nesting habitat. In the long-term, proposed treatments would reduce the hazards associated with insect epidemics and stand-replacement fire. Old growth would more likely persist into the future than under the No Action alternative. Restoring natural vegetation conditions and fire regimes would make these habitats far more self-sustaining for associated wildlife species. Known goshawks territories would be maintained; seasonal restrictions would be applied as needed to minimize disturbance during the reproduction season. Primary and secondary habitat would remain plentiful; stand growth projections indicate nesting habitat would increase in the long-term. Cumulatively, management actions would not be expected to reduce population viability.

Featured Species – Blue Grouse Existing Condition

Blue grouse prefer coniferous forests with a mixture of deciduous trees and shrubs near edges, openings and meadows. They use large mistletoe infected Douglas-fir trees, generally located within the upper 1/3 of slopes, as winter roosts. There is little winter roost habitat in the Project Area. The Forest Plan requires the maintenance of winter roost habitat.

Habitat trend information derived from Interior Columbia Basin studies (Wisdom et al. 2000) indicated that about 80% of the watersheds in the Blue Mountains showed a decreasing trend in blue grouse habitat and 10% showed an increasing trend. Declines in source habitat are primarily attributed to a reduction in late seral forest. No population data is available, but populations are likely lower than they were historically (Wisdom et al. 2000).

Blue grouse have been documented in the Balance Creek/Coyote Creek Subwatershed. The current distribution and abundance of this species in the Project Area is unknown.

Featured Species – Blue Grouse Environmental Consequences

No Action-Alternative 1

Direct and Indirect Effects

Under the No Action alternative, there would be no direct or indirect effects to winter roost habitat. Habitat conditions would remain the same in the short- to mid-term. Over the long-term, increased stand densities and related stress could result in increased mistletoe and therefore increased winter roost habitat. Populations of blue grouse would be maintained.

Alternative 2 – Proposed Action

Direct and Indirect Effects

Under the Proposed Action, harvest of trees potentially providing winter roost habitat could occur, however, as directed by the Forest Plan, design features (See Chapter 2) would be incorporated into harvest prescriptions to maintain winter roost habitat. Populations of blue grouse would be maintained.

Cumulative Effects

Past harvest and thinning, fire suppression, wildfire, and personal use woodcutting have affected the quality and quantity of winter roost habitat in the Analysis Area. Past harvest and thinning reduced stand densities and in some cases selectively removed infected trees that would have otherwise provided potential winter roosting habitat. Past fire suppression has allowed the encroachment of shade tolerant tree species to invade fire-prone habitat types, increasing stand densities. Increased stand densities throughout the Analysis Area have increased stress, allowing for an increased incidence of insects and disease, including dwarf mistletoe. Mistletoe is elevated over historic levels.

On Forest Service lands, future prescribed burning activities described in Appendix C would be designed to meet Forest Plan standards for winter roost habitat. Treatment on private land is uncertain, but generally, timberlands are intensively managed and mistletoe trees removed. Cumulatively, management activities across the Forest are distributed sufficiently to minimize disturbance impacts at the population levels.

Because design features would be included in all thinning and prescribed burning projects on Forest Service lands to help protect winter roost habitat, cumulative adverse effects would not be expected to reduce population viability of blue grouse.

Species of Concern: Landbirds, Including Neotropical Migratory Birds - Existing Condition

Landbirds, including neotropical migratory birds (NTMB), were analyzed based on the high priority habitats identified in the Oregon-Washington Chapter of Partners in Flight, Northern Rocky Mountains Bird Conservation Plan (Altman 2000). Some neotropical migratory birds respond positively to logging, pre-commercial thinning and prescribed burning, while others respond negatively. The following sections summarize the effects of the project on the high priority habitats listed in Table WL-6 Terrestrial Wildlife Species.

Neotropical migratory birds breed in temperate North America and spend the winter primarily south of the United States-Mexico border. Of the 225 migratory birds that are known to occur in the western hemisphere, about 102 are known to breed in Oregon and about 82 are known to breed on the Malheur National Forest. They include a large group of species, including many raptors, cavity excavators, warblers and other songbirds, with diverse habitat needs spanning nearly all plant community types and successional stages. Long-term population data on many of these birds indicate downward population trends although not all species populations are declining (Sharp 1996, Saab and Rich 1997, Altman 2000, USFWS 2002). Habitat loss is considered the primary factor in decline of neotropical migratory birds.

In 2000, the Oregon-Washington Chapter of Partners in Flight published its Northern Rocky Mountains Bird Conservation Plan (Altman 2000). The Plan provides conservation recommendations for the various species of landbirds that occupy the Oregon and Washington portions of the Interior Columbia Basin. The Plan identified the following priority habitats for landbird conservation: old-growth dry forest, old growth moist forest, riparian woodland and shrubland, and unique habitats including alpine and sub-alpine forests, shrub-steppe, montane meadow and aspen habitats. The Conservation Plan also identified burned old forest as a limited habitat due to fire suppression. Many of the avian species/habitats identified in the Northern Rocky Mountains Bird Conservation Plan (Altman 2000), are also addressed in the USFWS's Birds of Conservation Concern (USFWS 2002).

Table WL–4 lists those priority habitats and associated focal species that would be expected in the Project Area. Existing condition and effects discussions will focus on changes to priority habitats, and less on the individual species that use these habitats. No alpine or sub-alpine habitats are present. The Project Area consists of 264 acres of moist and wet forests. Effects on these priority habitats will not be discussed.

Table WL–5 lists species identified in the USFWS's Birds of Conservation Concern (USFWS 2002), Bird Conservation Regions (BCR) 10. The Project Area is best characterized by BCR 10, the Northern Rockies Region. Effects on species listed in Table WL–5 will be analyzed in the context of changes in high priority habitats/focal species listed in Table WL –4

Some neotropical migratory birds respond positively to thinning and prescribed burning, while others respond negatively. Existing habitat conditions are described for the subwatershed. The following sections summarize the effects of the project on the high priority habitats listed in Table WL –4 and WL-5.

Table WL-4: Neotropical Migratory Birds – Focal Species found in the Project Area by Habitat Type and Habitat Feature.

Habitat Type	Habitat Feature/Conservation Focus	Focal Species
Dry Forest Types	Large patches of old forest with large trees and snags – i.e. OFSS	White headed woodpecker
	OFSS with interspersions grassy openings and dense thickets	Flammulated Owl
	OFSS- open understory with regenerating pines	Chipping sparrow
	Patches of burned old forest	Lewis' woodpecker
Riparian Woodland	Large snags	Lewis' woodpecker
	Canopy foliage cover	Red-eyed vireo
	Understory foliage and structure	Veery
Riparian Shrubland	Dense willow/alder shrub pat ches	Willow flycatcher
Monatane Meadow	Wet/dry meadows	Upland sandpiper
Aspen	Aspen large trees/snags with regeneration	Red-naped sapsucker
Steppe Shrublands	Steppe shrublands	Vesper sparrow

Table WL -5: List of species of BCR 10, Northern Rockies Region, species status as present or absent from the Project Area, and how each species is addressed

Species	Presence/Absence	Reason for Absence/Where Addressed if Present
Swainson's Hawk	Absent	Habitat Not Affected by Proposed Activities
Ferruginous Hawk	Absent	Habitat Not Affected by Proposed Activities
Golden Eagle	Present	Habitat Not Affected by Proposed Activities
Peregrine Falcon	Absent	No Suitable Habitat
Prairie Falcon	Absent	No Suitable Habitat
Yellow Rail	Absent	No Suitable Habitat
American Golden-Plover	Absent	Outside Range
Snowy Plover	Absent	Outside Range
Mountain Plover	Absent	Outside Range
Solitary Sandpiper	Absent	Outside Range
Upland Sandpiper	Absent	No Suitable Habitat
Whimbrel	Absent	Outside Range
Long-Billed Curlew	Present	Habitat Not Affected by Proposed Activities
Marbled Godwit	Absent	Outside Range
Sanderling	Absent	Outside Range
Wilson's Phalarope	Absent	No Suitable Habitat
Yellow-Billed Cuckoo	Absent	Outside Range
Flammulated Owl	Present	Landbird Discussion
Black Swift	Absent	Outside Range
Lewis' Woodpecker	Absent	No Suitable Habitat
Williamson's Sapsucker	Present	MIS - Primary Cavity Excavator Discussion
Red-Naped Sapsucker	Present	MIS - Primary Cavity Excavator Discussion
White-Headed Woodpecker	Present	MIS - Primary Cavity Excavator Discussion
Loggerhead Shrike	Absent	No Suitable Habitat
Pygmy Nuthatch	Present	Landbird Discussion
Virginia's Warbler	Absent	Outside Range
Brewer's Sparrow	Absent	Habitat Not Affected by Proposed Activities
McCown's Longspur	Absent	Outside Range

Treatments are proposed in hot-dry, warm-dry, cool moist and cold dry plant association groups. Thinning treatments would move stands towards OFSS but would not change structural stage classification immediately after harvest. Thinning would remove understory trees that have grown in due to fire suppression. Following treatment, stands would be more open and better mimic historic conditions.

Locally, treatments at such levels would improve habitat for species such as the white-headed woodpecker, flammulated owl and chipping sparrow; at the landscape level, treatment levels would be insignificant. Cumulatively, the proposed action when combined with past, present and future project practices would not be expected to reduce viability of landbird species including neotropical migratory species; rather, proposed management activities would slightly improve species richness.

Dry Forests

In the Balance Creek/Coyote Creek Subwatersheds, OFSS occurs on <1% and 0% of the warm-dry and hot-dry biophysical environments, respectively. Historically, this habitat type occurred on 15 to 55% and 20 to 70% of the warm-dry and hot-dry biophysical environments, respectively. In addition, some cold dry plant association groups, particularly those in grand fir/grouse huckleberry plant associations, are currently overstocked, multi-strata stands; historically many of these sites were also dominated by OFSS stands.

The Conservation Strategy (Altman 2000) identifies four habitat components of the dry forest types that are important to landbirds: OFSS, OFSS with patches of regenerating pines, OFSS with grassy openings, and burned habitats. Large-scale declines in OFSS have raised concern for such species as the white-headed woodpecker, flammulated owl, chipping sparrow, white-breasted nuthatch, pygmy nuthatch, Williamson's sapsucker, and Lewis' woodpecker. These bird species have likely suffered some of the greatest population declines and range retractions (Altman 2000).

OFSS habitat is quite deficit in the Balance Creek/Coyote Creek Subwatershed, particularly in the warm dry and hot dry plant association groups. In the Analysis Area, OFSS occurs on <1% and 0 % of the warm dry and hot dry plant association groups respectively. Historically, this habitat type occurred on 15-55% and 20-70% of the warm dry and hot dry biophysical environments, respectively. Young Forest Multiple Strata (YFMS) and Understory Re-Initiation (UR) habitats with low canopy coverage likely provide the opening/ thicket/ regeneration conditions used by flammulated owl or chipping sparrow. A query of habitat data in the Forest GIS database identified about 1,420 acres of potential habitat for these species. Burned old forest in the Project Area is lacking. However, old forest in the Analysis Area including Summit and China Diggings wildfires has contributed to the development of snags. Fire suppression continues to eliminate snag development. Therefore, post-fire habitats for species such as the Lewis' woodpecker are limited.

Riparian Woodlands including Aspen and Shrublands

Riparian woodlands and shrub habitats are typified by the presence of hardwood tree and shrub species, along with associated wetland herbaceous species. Water is obviously an important component of these habitats, whether it is in the form of standing wetlands, spring and seeps, or flowing water (rivers and streams). Although these habitats generally comprise only a small portion of the landscape, they usually have a disproportionately high level of avian diversity and density when compared to surrounding upland habitats.

The Conservation Strategy (Altman 2000) identifies three habitat components within the riparian woodlands and one within the riparian shrub habitats that are important to many landbirds. They include large snags, canopy foliage cover, understory shrub cover, and dense shrub patches (see Table WL-4). In addition, the Conservation Strategy identifies aspen and montane grasslands as unique habitats important to landbirds. In the Balance area, many of these habitats are associated with riparian areas or ephemeral draws, so they are included in this section.

Within the Project Area, riparian woodlands and shrublands are generally associated with Category 1 streams and Category 2 streams. Most streams have a patchy distribution of forest and non-forest, open vegetation types along their length. Dense willow and alder canopies historically dominated riparian shrublands. Today, shrubs condition is variable and likely not at their maximum potential. Habitat is available for species such as the red-eyed vireo, veery, and willow flycatcher.

Upland sandpipers are the focal species for montane meadows. The species is not reported in the Project Area.

Small, remnant aspen stands are scattered over the Project Area and equal 10 acres. Stand size ranges from <1acre to 2.5 acres in size. Stands are found in Category 1, 2 and 4 streams and ephemeral draws. Most aspen stands are old and decadent, exhibit poor vigor, and lack regeneration. Due to fire suppression, conifers are encroaching on these stands and compete for water and light. Heavy grazing by domestic livestock and browsing by deer and elk often inhibit hardwood regeneration. Habitats are declining for such species as red-naped sapsucker.

Shrub-steppe/Scab-land Habitats

Shrub-steppe habitats are comprised primarily of dry woodlands, shrublands and grasslands. Small openings are also scattered throughout the forested areas, and can include both grasslands and shrublands. Shrub species include sagebrush as well as mountain mahogany and bitterbrush; these areas provide additional habitat for landbird species that use dry shrub-steppe habitats. Livestock grazing, fire and road construction have impacted habitat quality. Conifer encroachment along the edge of openings may have reduced the extent of these habitats. Species that use these habitats include vesper sparrow, Brewer’s sparrow, lark sparrow, and long-billed curlew.

Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects

Dry Forests

With the implementation of Alternative 1, there would be no direct effects to the various neotropical migratory/landbird species inhabiting the Project Area. Habitat modifications would not occur, nor would individuals be directly affected, as no activities are proposed under this alternative. Habitat conditions would remain limited in the short- and mid-term as described in the existing condition section. Species distributions, densities, and overall population levels would remain relatively unchanged in the short- and mid- term.

The quantity of habitat of OFSS habitats is currently poor due to past management and other factors within the Analysis Area. Stands thinned within the last 20 years would be expected to develop into OFSS over time. In 50 years, FVS projects that 4% of the warm dry plant association group and 8% of the hot dry plant association group would classify as OFSS.

Indirectly, the implementation of the No Action alternative would affect some neotropical migratory bird species in the long-term. By selecting this alternative, opportunities to create and enhance OFSS habitats for adapted species would be foregone. In 50 years, the No Action alternative would still not meet HRV for OFSS.

As described in the existing condition section, habitat for the white-headed woodpecker, flammulated owl, chipping sparrow, white-breasted nuthatch, pygmy nuthatch, Williamson's sapsucker, and Lewis' woodpecker is lacking throughout the Analysis Area. Habitat would increase, but would still not meet HRV in 50 years.

Riparian Woodlands including Aspen and Shrublands

With the implementation of the No Action alternative, there would be no direct effects to the various neotropical migratory/landbird species that utilize riparian areas. Riparian conditions would be as described in the existing condition section. Snags would likely remain limited. Riparian cover would likely remain static or improve. Meadow conditions are likely to remain the same. Mature aspen trees would continue to decline and regeneration would be low or nonexistent. By forgoing prescribed burning, riparian areas would remain at high risk to stand replacing fire that could eliminate habitat.

Riparian conditions would continue to affect use by riparian landbird species such as Lewis' woodpecker, red-naped sapsucker, downy woodpecker, red-eyed vireo, willow flycatcher, veery, willow flycatcher, ash-throated flycatcher, tree swallow, house wren, Swainson's thrush, calliope hummingbird, song sparrow, spotted towhee, western wood pewee, warbling vireo, American redstart, orange-crowned warbler, and mountain chickadee.

Shrub-steppe/Scab-land Habitats

With the implementation of the No Action alternative, there would be no direct or indirect effects to shrub-steppe habitats or to the landbird species that use them. Habitat conditions would be as described in the existing condition section. Species such as vesper sparrow, Brewer's sparrow, lark sparrow and long-billed curlew would be expected to continue to use the area.

Cumulative Effects

Mature aspen trees would continue to decline and regeneration would be low or nonexistent across the analysis area for the short to long term. By forgoing prescribed burning, riparian areas would remain at high risk to stand replacing fire that could eliminate habitat for the short to mid term, but increase in the long term (if protected from grazing).

Alternative 2 – Proposed Action

Direct and Indirect Effects

During project operations (logging, noncommercial thinning, machine work, road work and use, burning) degrees of disturbance and displacement of wildlife are likely. Disturbance and displacement of wildlife away from forestry operations depends upon the season of the year and the tolerance of the species and individual. Overall, disturbance from activities would be limited in time and place, and therefore, would not be expected to change populations of species at the landscape level. The Forest Plan requires protection for raptors during the reproduction periods. Seasonal restrictions for nesting raptors would be applied in active territories for this project.

Dry Forests

Under the Proposed Action alternative, treatments in warm dry and hot dry biophysical environments would shift stands towards OFSS. In 50 years 15% of the warm dry biophysical environment and 15% of the hot dry biophysical environment would classify as OFSS. The Analysis Area would meet HRV for OFSS in the warm-dry but be slightly below in hot dry.

Following treatment, many stands or forest patches would closely resemble desired conditions: a large-tree, single-layered canopy with an open, park-like understory dominated by herbaceous cover with scattered shrub cover and pine regeneration. Design requirements would retain non-thinned patches for species such as the flammulated owl and chipping sparrow. Common flickers, pileated woodpeckers, Williamson's sapsucker, northern goshawks and hairy woodpeckers currently using young to mature ponderosa and mixed conifer stands would also be expected to continue using habitat in the Project Area.

Burning and thinning treatments conducted in the spring can affect landbirds during the breeding season. The analysis concludes that effects to avian populations would be minimal due to avian ecology, the number of acres treated in any one year, the mosaic nature of burning, and the recovery rates of ground vegetation. The majority of the prescribed fire would occur in the hot dry and warm dry plant association groups.

Restoring natural vegetation conditions and fire regimes would make dry forest habitats far more self-sustaining for priority landbird species. MIS or priority landbirds that would directly benefit from treatment include the white-headed woodpecker, flammulated owl, chipping sparrow and Lewis' woodpecker.

Proposed OFSS development treatments would have a much greater influence on these species. The action alternative prescribes commercial and/or precommercial thinning of mid-successional stands (YFMS, UR, SECC, and SEOC) to help develop OFSS habitat over the mid- to long-term. The majority of the proposed thinning units are in the warm-dry biophysical environment. OFSS development in treated stands would depend upon the current availability of large diameter trees (21 inch and greater dbh), the thinning intensity, and the resultant time it takes for small diameter trees to grow into large diameter trees. Thinning from below designed to emulate understory fire in reducing fuels in an old growth forest in Oregon, did not alter use of the site by pileated woodpeckers or Vaux's swifts, another bird that uses the tree canopy in old-growth forests (Bull and others 1995).

Although proposed thinning would be intended to benefit OFSS-dependent species in the mid- to long-term, some habitats may actually be used soon after treatment. In the short-term, canopy cover would be reduced and herbaceous vegetation and shrub growth would be stimulated. Populations of OFSS-dependent species would be expected to increase. Under the action alternative, prescribed burning would be utilized in many of these stands to maintain open conditions.

Prescribed fire has the potential to impact landbirds species both directly and indirectly. Of greatest concern would be implementation of spring burning actions where the effects of direct mortality as well as the loss of and or disturbance to nests and nesting activities could result in adverse effects to individuals or numbers, depending on the scale of the activities, as well as the timing. However, bird populations respond favorably changes in food, cover and nesting habitat caused by fire. The season of burning is important to birds in two ways: Fires during the nesting season may reduce populations more than fires in other seasons; and migratory populations may be affected only indirectly, or not at all, by burns that occur before their arrival in spring or after their departure in fall. Bird nest site selection, territory establishment, and nesting success can be affected by season of fire. Spring burns may destroy active nests (Ward 1968). Nesting success also depends on the quality of the habitat before fire. Most birds nesting in areas burned by stand-replacing fire in the northern Rocky Mountains used broken-topped snags that were present before the fire (Hutto 1995). Many species of woodpeckers show substantial population increases and disperse into areas burned by stand-replacing fire. Ground-dwelling bird populations are likely to be affected by fires of any severity; whereas canopy-dwelling populations may not be affected by understory fire.

Riparian Woodlands including Aspen and Shrublands

Precommercial thinning, pile burning and prescribed burning would be conducted in Riparian Habitat Conservation Areas (RHCA's). Design features would retain untreated patches to maintain nesting, foraging and security cover. Precommercial thinning would have a greater impact than burning, but the number of acres being treated is considered incidental. Burning activities would mimic low intensity fires that are characteristic of natural burning patterns in riparian areas. Meadows would be generally avoided. Some mortality of understory trees would occur in burned patches, with only a few overstory trees being killed. Created small openings in the canopy may induce establishment of shrubs, grasses and forb species, benefiting such species as Lewis' woodpecker, red-eyed vireo, veery and willow flycatcher. The occasional killing of a large, overstory tree would provide additional snag habitat for species such as the Lewis' woodpecker. Aspen stands have been identified for treatment. Aspen stands would increase in size and complexity and be protected from grazing. Approximately 10 stands (8 acres) would be treated by thinning encroaching conifers, piling burning, then fencing. Commercial harvest units, landings and temporary roads would not be located in RHCA's, avoiding adverse impacts.

Shrub-steppe Habitats

Prescribed fire is not proposed in any open shrublands or grasslands, although a small amount of light burning may occur along the fringes of these habitats and in small inclusions scattered throughout the forested areas. In fringe areas, any shrubland areas burned would do so in a mosaic of burned and unburned patches.   In studies in Idaho, (Smith 2000), prescribed burns killed bout 50% of the shrubs; total bird abundance declined significantly in the first year after fire, and then rebounded in years two and three to levels similar to those in unburned areas. Scattered loss of shrubs is not expected to have significant impacts on shrub-steppe habitats or the landbird species that use them. Species such as vesper sparrow, Brewer's sparrow, lark sparrow and long-billed curlew would be expected to continue to use the area.

Cumulative Effects

Old growth was analyzed at the subwatershed or Analysis Area level; riparian, meadow, aspen and shrub steppe habitats were analyzed at the Project Area level. All of the activities in Appendix C have been considered for their cumulative effects on neotropical migratory birds. The following discussion focuses on those past, ongoing and reasonable foreseeable future activities that may contribute adverse effects to the landbirds or their habitat.

Habitat loss is considered the primary factor in decline of neotropical migratory birds. Previous sections identified high priority habitats for conservation of neotropical migratory birds: old-growth dry forest including burn habitats, riparian woodland and shrubland, montane meadow, aspen habitats, and shrub-steppe habitats. For the Balance Project, the Northern Rocky Mountains Bird Conservation Plan (Altman 2000) was the primary source used to determine target species for management. Restoring historic habitats is assumed to be the best strategy for assuring local viability of landbird species.

In the Balance Project Area, bird species that historically preferred open, park-like ponderosa pine forests and mixed conifer stands have been negatively affected by forest management practices that emphasized removal of large diameter trees, fire exclusion or suppression, and continuous or long-term grazing (Altman 2000). These practices produced a closed forest of dense, young to mid-aged trees with limited understory diversity, fragmented landscapes and, removed much of the structure that provided diversity at the stand-level and at the landscape-level.

Cumulatively, this project combined with other recent and ongoing prescribed burning and understory thinnings would help restore open dry forest habitats, benefiting the landbird species that use them. All ongoing projects have considered design features in the Northern Rocky Mountains Bird Conservation Plan (low intensity/low severity burns, retention of snags and large trees, and mosaic patterns with refuge areas of untreated habitat among others), which should allow for restoration while reducing short-term impacts on nesting birds.

Cumulative effects on mature and old growth coniferous forest, particularly OFSS habitats, are discussed in the Old Growth section, and conclude that the Proposed Action alternative would have varying positive effects for mature and old growth habitat and for the species that use those habitats. Cumulative effects to snags and down logs are discussed in the Primary Cavity Excavator Species section. This project includes design features to protect snags and down logs; overall, changes in dead wood habitats would be considered incidental.

Riparian vegetation within and adjacent to the Project Area has been altered by a variety of management activities, including timber harvest, road construction, mining and livestock. Many years of livestock grazing, primarily earlier in this century, concentrated use in riparian areas. Livestock grazing also negatively affected grasslands by reducing native species' abundance and diversity. Fire suppression allowed encroachment of conifers, which shaded out hardwoods such as aspen. The condition of some riparian areas and grasslands has been improved by new management practices and restoration activities in more recent years, but many are still not fully restored to conditions that are most suitable for associated native wildlife species. The Balance project would have minimal adverse effects on riparian habitats; therefore, cumulative effects to riparian habitats would also be considered minimal.

Shrub-steppe/scabland habitats have probably changed due to 100 years of fire suppression. Other conifer species have encroached on these habitats, reducing their size. On residual acres, juniper density probably has increased. Livestock grazing, primarily early in the century, may have caused changes in shrub, grass and forbs composition or abundance. Under the Balance Project, prescribed burning avoids most of these habitats; design features have been included to minimize effects in forest openings.

Future projects would have to abide by existing management direction to maintain or enhance mature and old growth habitat, maintain snags and down log standards, and protect or enhance riparian areas, grassland and woodland communities. Future planning will consider potential effects to neotropical migratory birds.

Cumulatively, management activities across the Forest are distributed sufficiently to minimize disturbance impacts at the population levels.

The proposed action proposes few activities within riparian areas, aspen stands, shrublands and grasslands, habitats considered a high priority for landbird conservation. Restoration of dry forest habitats, particularly OFSS habitats, would improve conditions for landbirds that rely on these habitats. Cumulatively, this project when combined with future and burning projects would not be expected to reduce viability of any landbird species including neotropical migratory species; rather, proposed management would likely improve species richness.

Threatened, Endangered and Sensitive (TES) Wildlife Species Existing Condition

Table WL-6 displays the TES wildlife species that have habitat within the Project Area. There is no habitat present to support the presence of the pygmy rabbit (*Brachylagus idahoensis*) bufflehead *(Bucephala albeola*); or peregrine falcon (*Falco peregrinus*); so they are not addressed in this document.

Threatened, Endangered and Sensitive (TES) Wildlife Species Environmental Consequences

Direct, Indirect and Cumulative Effects

Table WL-6 displays the overall effects determination for all alternatives. Further information on the effects of proposed activities on TES species can be found in the Balance Terrestrial Wildlife Biological Evaluation located in the Project Record.

Table WL-6 TES Species Effects Determination

Species	Status	Occurrence	Alternative 1 – No Action	Alternative 2 – Proposed Action
Gray Wolf Canis lupus (removed from list 2008)	S	HD/N	NI	NI
Northern Bald Eagle (*Hailaeetus leucocephalus*)	S	HN/S	NI	NI
North American Lynx *(Lynx canadensis*)	T	HN/N	NE	NE
American Peregrine Falcon (*Falco perigrinus anatum*)	S	HN/N	NI	NI
California Wolverine (*Gulo gulo luteus*)	S	HN/N	NI	NI
Pygmy Rabbit *(Brachylagus idahoensis*)	S	HN/N	NI	NI
Pacific Fisher (*Martes pennanti*)	S	HN/N	NI	NI
Western Sage Grouse (*Centrocercus urophasianus phaios*)	S	HN/N	NI	NI
Gray Flycatcher (*Empidonax wrightii)*	S	HN/N	NI	NI

Bobolink (*Dolichonyx oryzivorus*)	S	HN/N	NI	NI
Upland Sandpiper (*Bartramia longicauda*)	S	HN/N	NI	NI
Tricolored Blackbird (*Agelaius tricolor*)	S	HN/N	NI	NI
Bufflehead (*Bucephala albeola*)	S	HN/N	NI	NI

E = Federally Endangered
T = Federally Threatened
S = Sensitive species from Regional Forester's list
HD = Habitat documented or suspected with the planning area or near enough to be impacted by project activities
HN = Habitat Not within the Project Area or affected by its activities
D = Species Documented in general vicinity of project activities
S = Species Suspected in general vicinity of project activities
N = Species Not documented and not suspected in general vicinity of project activities
NE = No Effect
NI = No Impact
NLAA = May Effect, Not Likely to Adversely Affect
MIIH = May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species

Consistency With Direction and Regulations

The Forest Plan directs continued review of DOG/ROG areas, with adjustments to boundaries as appropriate to ensure suitable levels of old growth habitat are provided for species dependent upon them and to ensure those units meet Forest Plan Standards and Guidelines.

Regional Forester's Eastside Forest Plans Amendment #2 (USDA 1995) amended the Forest Plan to manage late and old structure (LOS) stands within the Historic Range of Variability (HRV). Under the project, harvest and prescribed burning projects were designed to move the Project Area towards the historic balance of OFSS and OFMS. In addition, Amendment #2 directs land managers to maintain connectivity between LOS habitats to allow the free movement of old growth wildlife species.

Big game habitat would be modified. Satisfactory cover, already below Forest Plan standards, would be further reduced. A non-significant Forest Plan amendment would be required to reduce cover below standards. In a 2003 letter to the Eastside Forests, the Regional Office provided direction encouraging Forests to use site specific Forest Plan amendments to move the landscape towards HRV (USDA FS June 11, 2003). Harvest treatments would occur primarily in warm dry and hot dry biophysical environments. These stands are considered outside HRV, i.e., overstocked and likely unsustainable given the high risk of uncharacteristically severe fire and insect epidemics.

Snags do not meet Forest Plan standards as a result of past management. Down logs, on average, do meet standards. In the Proposed Action alternative, design features have been incorporated to protect existing snags and large down logs that contribute to the Forest Plan standards. Snags would not be targeted for removal, although incidental snags may be lost during logging to meet operational/safety needs during logging. Project design criteria, such as retaining clumps of live trees around snags and locating landings and temporary roads where there are few or no snags, would help minimize losses. Retention of untreated patches of trees would continue to provide avenues for snag creation. Prescribed fire would likely increase snags although most would be smaller in diameter. Only incidental losses of additional dead wood habitats would be expected.

For northern goshawks, the Proposed Action alternative is consistent with the Forest Plan and the Regional Forester's Eastside Forest Plans Amendment #2. For blue grouse, the Proposed Action alternative includes design features to protect winter roost habitat as directed by the Forest Plan.

The Proposed Action alternative has been designed to enhance landbird richness. The Proposed Action is consistent with the 1918 Migratory Bird Treaty Act (MBTA) and the Migratory Bird Executive Order 13186. The Proposed Action was designed under current Forest Service policy for landbirds. The Northern Rocky Mountains Bird Conservation Plan (Altman 2000) and the U.S. Fish and Wildlife Service's Birds of Conservation Concern (USFWS 2002) were reviewed for effects disclosure. The Proposed Action alternative was designed to protect or enhance priority habitats for landbird species, including neotropical migratory species.

The Proposed Action is consistent with the Endangered Species Act (see the Wildlife Biological Evaluation in Appendix G). The Proposed Action is expected to have No Effect on threatened and endangered species and No Impact on sensitive species. Based on these effects calls, consultation with the US Fish and Wildlife Service was not considered necessary.

Irreversible and Irretrievable Commitments

The project as described would not result in any irreversible or irretrievable effects to the wildlife resource. The project moves habitat conditions towards HRV.

Soil

Introduction

This section of the EA summarizes existing soil conditions and the effects of the No Action and Proposed Action Alternatives. Additional details can be found in the Soils Specialist Report located in the Project Record.

Regulatory Framework

The Malheur National Forest Land and Resource Management Plan (LRMP) meets all legal and regulatory requirements for soil conservation. Forest Service Manual R6 Supplement No. 2500.98-1, section 2520.2 says objectives of soil management are "To meet direction in the National Forest Management Act of 1976 and other legal mandates. To manage National Forest System lands ... without permanent impairment of land productivity and to maintain ... soil ... quality. .... Soil quality is maintained when soil compaction, displacement puddling, burning, erosion, loss of organic matter and altered soil moisture regimes are maintained within defined standards and guidelines." So if an action maintains detrimental impacts within the standards and guidelines of the Forest Plan, legal requirements for soil conservation would be met.

LRMP Forest-Wide Standards 101 and 125-129 relate to soils.

Analysis Methods

The project soil specialist collected data about impacts of past and ongoing activities on 12 proposed commercial thinning units. Impacts on these units were less than 3% of the unit, so the soil specialist inspected 10 other commercial thinning units to verify that they also had similar very low impacts. Unit 28 was not inspected on the ground, but it has similar soil type to nearby units, and appears similar on aerial photos. During the assessments, the soil specialist also determined what design elements are necessary to protect the soils. These assessments reveal all impacts from past and ongoing activities, including timber harvest, landings, roads, fuel treatments, livestock grazing, and Off Road Vehicles.

Spatial boundaries for soil effects are proposed unit boundaries. Unless otherwise stated, effects are described for the time period immediately after the proposed actions, when effects are maximum.

Detrimental impacts expected under Alternative 2 are calculated as described in another report (McNeil 2007). Briefly, effects are calculated based on existing condition, volume to be removed, the amount of draws, the amount of slopes steeper than 35%, the presence of a volcanic ash cap and coarse fragments, the amount of uphill skidding, the presence of short skidtrails, and the prescription of dry soil skidding.

Existing Condition

Soil Types

Soils in the commercial thinning units formed in Clarno volcanic breccia parent material, which weathers to clayey soil. The main soil types are 181 and 182. Soil 181 is deep to very deep. For 181, texture is clay loam to clay for both the surface and the subsurface, resulting in very slow permeability. Because of the very slow permeability, erosion hazard is "moderate to high." Soil 182 is similar to 181, except it has a volcanic ash cap 6 to 12 inches deep, and in places it is only moderately deep. The volcanic ash cap has a high permeability, and the cap also encourages the development of continuous forest floor. These factors decrease surface erosion hazard to "low." Volcanic ash is more easily displaced than other soil. Soil 181 is most abundant on the generally south facing slopes north of the Middle Fork whereas soil 182 is most abundant on the generally north facing slopes south of the Middle Fork. The steeper parts of these soils contain ancient slumps, especially steeper slopes south of the Middle Fork. Also, several small seep/wetlands occur near and in commercial thinning units (see Design Elements section of Chapter 2).

Soil Detrimental Impacts

The results of the soil assessments on commercial thinning units are presented in Table 1, Alternative 1. Detrimental impacts on the units range from 3% to 14% and average 7%. The majority of the impacts are from roads, including decommissioned roads that had no active restoration. Roads impact an average of 6%, whereas off of roads, impacts on units with transects average 1%. Generally units have recovered from previous logging, because decades have passed since previous logging.

Organic Matter & Nutrients

Decades of fire suppression have resulted in heavier forest floors on most soils than would occur under the natural frequent fire regime. Soil nutrients have become more concentrated in litter and duff. If moderate or high severity fires do occur, there is a potential for more loss of nutrients than under a frequent, low severity fire regime.

Nitrogen has accumulated since fire suppression became effective, so that nitrogen levels are higher than in the 1800s. Fire usually decreases the amount of nitrogen on the land (though easily available nitrogen often increases for one to a few years). Significant fires have not burned in the area for many decades, so the loss of nitrogen during fires has not occurred. Nitrogen has accumulated as nitrogen from the atmosphere is stored in the organic matter of biomass, forest floor, and soil, especially due to the fixation of nitrogen by Ceanothus.

Environmental Consequences

Table S-1: Detrimental Soil Impacts

Unit	Transect?	Existing Impacts Off Roads % of unit*	Roads % of unit	Alternative 1 % of unit	Alternative 2 % of unit
2	y	2	4	6	11
4	y	0	4	4	10
6	y	0	3	3	9
8	n	2*	1	3	10
10	y	1	4	4	11
12	y	3	3	6	13
14	y	1	7	8	16
16+40	y	1	7	8	16
18	y	0	6	6	14
20	y	2	3	5	16
22	y	0	4	5	13
24	n	2*	11	13	19
26	n	2*	7	9	16
28	n	2*	5	7	14
30	y	0	4	4	12
32	y	2	5	7	16
34	n	2*	8	9	16
42	n	2*	7	9	18
44	n	2*	12	14	19
46	n	2*	11	13	19

* For units without transects, impacts were counted as 2%, which is near the upper end of impacts on the transects.

Alternative 1 – No Action

Direct and Indirect Effects

Under this alternative, no additional soil will be compacted, puddled, or displaced. No additional soil will be eroded by ground disturbing activities. No organic matter or nutrients would be removed.

Cumulative Effects

Effects Under Both Alternatives

Existing impacts include the impacts from all past and ongoing actions. Existing impacts are shown under Alternative 1 in Table 1. Past actions include logging, roads, fuel treatments, fire suppression, grazing, firewood cutting, and Off Road Vehicles.

Root action, animals that burrow in the soil, and freezing water will gradually loosen compacted soil over the course of decades.

Ongoing and foreseeable future actions, such as grazing, firewood cutting, and ORV use, would continue to compact a negligible amount of soil, at about the same rate as in the past. This compaction would be counter-balanced by recovery from similar impacts in the past, so the level of detrimental impacts from these ongoing and foreseeable actions would remain at about current levels.

If a wildfire occurs, the hazard of erosion would greatly increase on severely burned areas due to inadequate ground cover and possibly hydrophobic soil. In addition nutrients and organic matter would be lost.

Cumulative Effects of Alternative 1

As shown in Table S-1, existing detrimental impacts range from 3% to 14% and average 7% of each unit. Natural recovery would slowly decrease impacts over decades.

The hazard of a severe crown fire is higher under this Alternative than under Alternative 2. Therefore the hazard of erosion is higher under Alternative 1.

Alternative 2 – Proposed Action

Direct and Indirect Effects

Tractor Logging

Skidding on steep slopes or unsuitable land often causes displacement. Water bar construction also often causes displacement. Skidding also bares soil, decreases infiltration, and channels overland flow, and thus can accelerate erosion. This acceleration occurs especially on steep slopes. Sites that have steeper slopes are expected to be more impacted than sites with flatter slopes. Uphill skidding is expected to have more impacts than downhill. The experience of the project soil specialist indicates damage on widely spaced skid trails on slopes less than 45% is acceptable because only moderate amounts of displacement occur, and because of the small size of the area affected.

Displacement and erosion from steep slope skidding would be limited, because slopes steeper than 35% occupy a small proportion of tractor units and because extensive ground cover in forests absorbs sediment. Design measures, including directional felling and winching, would also help to limit displacement and erosion. Usually erosion of skid trails decreases through one to three years, until it stops. Decreased productivity due to severe displacement and erosion can last hundreds of years. But, design elements would keep displacement and erosion to a minimum, within acceptable levels. Design elements that effectively control displacement and erosion include prohibitions on skidding on steep slopes (>45% downhill, >35% uphill), limitations on skidding in draws, and water bar requirements.

Skidding would cause negligible sediment export from the units, despite sediment movement within units as described in the preceding paragraphs. Sediment normally is deposited less than 15 feet down slope from skid trails as the water is slowed by ground cover and percolates into the soil.

Except for areas that happen to be harvested under winter conditions, much of the skidtrails would be compacted, and some of the soil tracked only once or twice would be compacted. Compaction usually lasts more than 20 years; some compaction lasts more than 50 years. Table S-1 presents expected detrimental impacts on the tractor units. If the unit happens to be harvested over deep snow or on deeply frozen soil, compaction would be about 0.5%. Design measures that are effective at limiting compaction include designating skidtrail locations, requiring skidtrails to be widely spaced, reusing existing skidtrails where appropriate, prohibiting skidding under wet conditions, allowing only low ground pressure machinery off of skidtrails. These design measures would keep compaction to a practical minimum and indicate the Forest Plan standard would be met in all units.

Landings are severely impacted. Design elements that encourage re-use of appropriately located landings, and subsoiling of landings, would keep these impacts to a minimum.

Subsoiling

Landings would be subsoiled where suitable. Subsoiling landings would decrease detrimental impacts due to landings from about 3% un-subsoiled to about 1% of the unit after subsoiling.

Subsoiling bares soil, forms channels, makes soil particles more easily detachable, and disrupts roots, thus raising the risk of erosion for a few years. However, subsoiling also increases infiltration which decreases the risk of erosion. This increased infiltration, and the subsoiling design elements, means that sediment production from erosion due to subsoiling would be negligible.

Grapple Piling

A design element in Chapter 2 requires grapple piling equipment to have a low ground pressure, to operate on dry soil, and to operate on skid trails where possible. With this design element, the project soils specialist expects grapple piling would compact about 1% of each unit where it is used. Feller-bunchers of similar ground pressure operating off skidtrails compacted about 1.5% of a unit (McNeil 1996). This would be in addition to impacts caused by harvest.

Some soil beneath grapple piles would be detrimentally burned. The project soil specialist has rarely, if ever, observed detrimentally burned soil that occupied more than 1% of a unit and similar results are expected for this project.

Temporary Road Construction

Temporary road construction will cause small, localized, temporary increases in erosion hazard, as the existing ground cover is disturbed, the decommissioned road beds are re-compacted, and ruts form. This erosion would disappear within two years of rehabilitation of the roads.

No additional detrimental impacts on soil are expected from temporary road construction, because all temporary roads are located on existing decommissioned roads, so that soil is already detrimentally impacted. Rehabilitation of temporary roads will only decrease detrimental soil impacts a little, because rehabilitation will not correct soil displacement on most of the temporary roads.

Summary of Detrimental Impacts

As shown by the difference between Alternative 1 and Alternative 2 in Table S-1, increases in detrimental impacts range from 5 to 11%, and average 7%.

Prescribed Burning

Soil effects from prescribed burning would be minor. Ground cover would decrease, especially during fall burns. However, burning would be controlled so as to avoid decreasing ground cover below LRMP standards; erosion would not be significant.

Soil effects from fireline construction would be minor. No dozer lines would be constructed - the only construction would be hand or ATV lines. Erosion would be further controlled by a design element in Chapter 2 that requires waterbars on slopes steeper than 25%, and bans waterbars that go up or down draw bottoms. Fire lines impact a negligible area of soil.

Organic Matter and Nutrients

Logging would remove nutrients and organic matter in logs, and fuel reduction treatments would remove nutrients and organic matter during burning. The removal, especially removal of nitrogen, may decrease site productivity a few percent on some sites. However, on many or most sites, productivity likely is not limited by nutrients or organic matter. Also, a relatively small amount of nutrients would be removed, because wood has a low concentration of nutrients (compared to foliage, small branches, and the remaining forest floor), and because many trees would be left. Removing organic matter and nutrients by logging and fuel control would move many sites back toward their fertility status before Euro-Americans arrived, because nutrient and organic matter loss in fires was common then. Little dead wood existed before fire suppression became effective, because fires burned it up. These high fire frequency ecosystems persisted for thousands of years with low levels of forest floor and dead wood, so these ecosystems are adapted to low levels of organic matter, so removal of the unnatural organic matter would have only a small adverse effect.

Cumulative Effects

See Alternative 1, Cumulative Effects, Changes Under Both Alternatives section for a description of changes that would occur under both alternatives.

Detrimental impacts from the proposed operations (harvest, subsoiling, fuels control) add to past actions. Table 1 shows what the expected site-specific condition would be. For Alternative 2, detrimental impacts would range from 9% to 19%, and average 14%. Thus the Forest Plan standard of 20% or less would be met in all stands. This result would be attained without special design elements such as subsoiling (except landings) or requiring winter logging.

If a wildfire occurs, hazard of erosion would greatly increase on severely burned areas due to low ground cover and possibly hydrophobic soil. However, fuels treatment would decrease the hazard of a severe crown fire occurring and the proposed fuels treatments would decrease soil fire severity, so Alternative 2 would decrease the hazard of erosion, compared to Alternative 1.

Consistency With Direction and Regulations

All alternatives are consistent with Forest wide standards for the soils resource.

Irreversible/Irretrievable Effects

There are no irreversible and irretrievable commitments of resources that may result from the alternatives with respect to the soils resource.

Watershed

Introduction

This section of the EA summarizes existing watershed conditions and the effects of the No Action and Proposed Action alternatives. Additional details can be found in the Watershed Specialist Report located in the project record.

Regulatory Framework

An extensive regulatory framework is included in the appendices to the Watershed Specialist's Report. This framework includes a review of the Forest Plan, as amended, standards for riparian areas, streams, and water quality. Generally speaking, Forest Plan Amendment 29 standards are considered stricter than PACFISH; these standards are discussed in more detail in the Fisheries Specialist's Report. The Clean Water Act delegates authority for regulating water quality to the Oregon Department of Environmental Quality (ODEQ). Discussion of how this project affects water quality, including the application of water quality standards established by ODEQ, is found in the Environmental Consequences section. The application of Best Management Practices (BMPs) to project activities to control non-point source pollution is summarized. Additional discussion of BMPs is included in the appendices to the Watershed Specialist's Report. Because a Total Maximum Daily Load (TMDL) plan for water pollutant management is in progress by ODEQ and the Forest Service is expected to prepare Water Quality Restoration Plans (WQRPs) in conjunction with the publication of a TMDL, the actions that are included in this analysis which may be incorporated in to a WQRP are summarized in the appendices of the Watershed Specialist's Report.

Analysis Methods

Analysis methods are summarized in appendices to the Watershed Specialist's Report. Several sources of field data were reviewed, evaluated, interpreted, and summarized. Sources of data include riparian and stream surveys from 1992, 1993, and 2004 and soil assessments from 2006-07, informal stream evaluations from 2000-2001 and 2005-2007, the Galena Watershed Analysis, Oregon Department of Environmental Quality web site, resource data provided by other interdisciplinary team members, and personal observations and professional knowledge of the local area. The Existing Condition and Environmental Consequences discussions are organized by landscape element in order to address watershed processes of the Project Area. Legacy condition descriptions were incorporated into the Existing Condition discussion. Best Management Practices were included in the Proposed Action and are included in the Environmental Consequences discussion. The Analysis Area for watershed effects is defined as that part of the Coyote Creek/Balance Creek subwatershed within the Project Area, including the Middle Fork of the John Day River at the lower subwatershed boundary.

Existing Condition

Hillslopes (including Ephemeral Swales):

The shallow, clay and clayey hillslope soils (of volcanic origin), including those covered with an ash cap and those supporting forest stands, are considered hydrologically "flashy". "Flashy" soils are ones which usually have little storage capacity for infiltrating run off with the result that a sizeable proportion is shed as overland flow.

Springs and seeps are a common distinguishing feature of ancient landslide material and of the volcanic parent material. Other small areas may remain saturated, such as those that support aspen stands, due to the presence of perched water tables. Seeps, springs, other wetlands, and aspen are discussed in the RHCAs and Management Area 3B Section below.

The hydrologic response from the hillslopes, where many of the proposed, ground-disturbing activities and much of the prescribed burning would be implemented, is generally typical of that expected based on the natural soil and vegetation characteristics. The Soil Specialist's Report indicates that impacts from past activities inside proposed units are relatively low.

Past management activities, implemented before the development or application of Watershed Best Management Practices, have caused several discontinuous rills and incipient gullies. On the north side of the Middle Fork of the John Day River (MFJDR) they appear to be legacy effects of mining. They are limited in size and distribution and appear stabilized; needle litter is accumulating and limiting active erosion. On the south side they appear to be caused by overland flow concentrated by roads (at some ditch relief culverts and culverts at swales and other local topographic low points) and past logging and grazing. They are often associated with natural or created openings in the Sunshine, Dunstan, and Balance drainages and above the unnamed tributaries to the MFJDR.

These areas do not appear to be vulnerable to accelerated erosion during common precipitation events because they are not extensive, are inactive, or have downcut to rock. Vulnerability is considered to increase during periodic high run off events typical of the local climate. They also extend the drainage network and route overland flow downslope more efficiently.

Authorized roads, unauthorized roads and decommissioned road beds appear to cause little change in the hydrologic response of the forested hillslopes themselves. Local erosion was observed below ditch relief culverts and culverts in swales and other topographic lows within forested stands; however discharge generally infiltrated within fifty feet of culvert outlets, except as previously described. These culvert discharges were often associated with interception of spring flow (on ancient landslide material) by road ditches or culvert inlets. Most decommissioned road beds are grassed in; they do not appear to be intercepting subsurface flows or redirecting surface flow since they are generally outsloped or on the contour. Ground cover is adequate to slow overland flow and prevent erosion on decommissioned roads which parallel slopes.

Riparian Habitat Conservation Areas (RHCAs) and Management Area 3B (MA 3B) (including valleys, ephemeral draws, wetlands, and aspen stands):

Standard width RHCAs (PACFISH) are defined for fish-bearing, perennial, and intermittent streams and riparian areas in the Project Area. Most Management Area 3B (MA 3B) lies within these standard width RHCAs. Exceptions include MA 3B associated with ephemeral draws or aspen stands. These features may be included in RHCAs when other riparian features, with defined RHCAs, such as streams or wetlands, are present.

A variety of landforms are included in RHCAs and MA 3B. Most RHCAs associated with streams include valleys, toeslopes, and the lower portions of the adjacent hillslopes. Under the standard width delineations, a large proportion of RHCAs associated with streams (Categories 1, 2 and 4) commonly include the adjacent lower hillslopes because most valleys and streams are narrow. Riparian vegetation is commonly found on the valley flats adjacent to stream channels. Ephemeral draws (MA 3B) provide drainage connections between hillslopes and the stream system. Stream channel condition is discussed in a separate section below. Seeps, springs, other wetlands, and aspen are widely (Categories 3 and 4 or MA 3B) distributed through the Project Area on a variety of landforms from stream banks to hillslopes.

The hydrologic response within RHCAs/MA 3B is based on natural geomorphic, soil and vegetation characteristics. Like the hillslope soils, soils in the RHCAs/MA 3B are considered naturally “flashy”. Continuing legacy effects and some on-going activities now contribute to a highly altered and “flashier” hydrologic response. Field observations indicate that disturbance probably increased and concentrated run off in the past, resulting in downcut streams and eroded valleys throughout the Project Area. The water table has been lowered. Observations indicate that valley bottom soils are probably drier and less deep and floodplains less extensive than before Euro-American settlement. The connections between channels and even narrow floodplains, which facilitate water storage, have been reduced in extent, disrupted, or eliminated entirely in some places. Soil water storage capacity is reduced; overland flow is routed downslope more efficiently.

Many of the alterations are due to past management activities which were implemented before the development and application of Watershed Best Management Practices. Past activities tended to be concentrated in valleys because they provided the easiest access. Rills and incipient gullies are present in Sunshine and Dunstan and their tributary drainages, in tributaries to Balance Creek, and near the easternmost tributaries to the MFJDR. Past harvest has altered soils on the lower hillslopes and reduced large woody debris available for recruitment into some stream segments in Dunstan and Sunshine creeks and their tributaries. Created openings appear more numerous and comprise a larger area in some valleys, such as those in the Balance, Dunstan, and Sunshine drainages than on the adjacent hillslopes.

Changes in some of the natural and created openings in valleys and ephemeral draws have reduced the ability of soils to infiltrate and store water. These conditions resulted in greater overland flow, exposure of mineral soil, and the formation of rills and incipient gullies. Exposure of mineral soil and loss of storage capacity are difficult to reverse, depending on local site conditions. Erosion remains active in some areas; areas of inactive erosion are common. Erosion hazard and vulnerability are increased.

Rills and gullies that eroded in some ephemeral draws and within RHCAs now function as channels. These conditions combined with the previously described changes to valley soils increase the efficiency of and effectively extend the drainage network. The hydrologic response in the RHCAs/MA 3B is considered “flashier” than prior to Euro-American settlement. These areas are also receiving “flashier” run off from some topographic lows on the adjacent hillslopes.

The conditions contributing to altered run off response include: logging, grazing, mining, roading, and construction of railroad grades. Authorized (open and closed) roads and unauthorized roads, road crossings, relic roadbeds remaining from past decommissioning, historic railroad grades, and skid trails and landings are common. Roads and old railroad grades, constructed without drainage and parallel to streams (within about 100 feet), often route overland flow toward streams. Stream crossings on closed or decommissioned roads where culverts remain or where fill was not re-shaped contribute sediment and channel overland flow to streams. Road densities appear higher in some valleys than in other parts of the Project Area. Alteration of soil conditions appears severe in some isolated locations, probably because of multiple and repeated activities over 150 years and their legacy effects. These conditions are found along segments of Sunshine, Dunstan, and Balance creeks and their tributaries and along unnamed streams on both sides of the MFJDR. These conditions continue to reduce availability of riparian storage and other riparian and stream functions

Springs, seeps, and other wetlands of various sizes are distributed throughout the Project Area from hillslopes to stream banks. Some of these systems appear to extend onto private land below the Project Area. They may contribute to wetlands along the MFJDR and to its flow. Some seeps, especially those on stream banks and in ephemeral draws, have been impacted by past management activities similar to those described above (especially valley erosion) and remain as remnants (off road 2045300 in an old skyline unit, in ephemeral draws in the Balance drainage, along the named creeks). Some show evidence of recent or past post-holing by large ungulates (in ephemeral draws in Balance drainage and between Dunstan and Balance creeks).

These conditions reduce the capacity for soil water storage and route seep and other wetland flow downslope more efficiently. These alterations contribute to increased “flashiness” in the hydrologic response and to increased vulnerability to erosion.

Vegetation condition on the hillslopes is often similar to that found beyond the standard RHCA boundary. Typically, composition, vigor, abundance, condition class (fuels) and fuel continuity are similar to those of the surrounding area as described in the Forest Vegetation and Fuels Specialist's reports.

Soil moisture regimes, strongly controlled by the connections between stream channels, subsurface flows, and associated floodplains, the distribution and size of wetlands, and other soil or ground water characteristics, influence the distribution of valley vegetation. Valley vegetation typically occurs in zones based on soil moisture availability and ranges from obligate herbaceous wetlands to drier pine forests.

Some forest stands, shrub communities, and herbaceous communities appear nearly intact although they are probably reduced in extent and stand structure has been influenced by fire exclusion. Vegetation along other stream segments is clearly altered as result of changes in soil moisture regimes and past vegetation management practices. It appears patchier; age classes are more variable and stand structure is more complex. Conifer plant communities, similar to or moister than those on the adjacent hillslopes, are considered to be more common in the valleys due to drier conditions resulting from lowered water tables. Like other conifer communities small trees are becoming more common and increasing fuels. Conifer encroachment on aspen stands, riparian hardwoods, and riparian herbaceous communities is present.

Moister, more intact conifer communities are found in valleys where less evidence of disturbance is present or where ancient landslide deposits strongly influence soil moisture regimes as along Middle Fork of Sunshine Creek and lower Balance Creek.

Riparian vegetation is found along streams, seeps, and other wetlands. The extent of riparian communities is probably reduced due to alterations in valley soil and stream conditions. Abundance, seral stage, and vigor are highly variable depending on local land-use history.

Ten aspen stands (MA 3B) are mapped; they are found on both sides of the MFJDR. Five stands of aspen lie completely or partially in RHCAs associated with Cress Creek, Sunshine Creek and an intermittent tributary to the MFJDR. Stream channels adjacent to these stands are downcut.

One aspen stand lies in an ephemeral draw in which the grasses are pedestalled, indicating on-going, low amounts of erosion. Four stands appear to be associated with locally perched water tables, where water table conditions are high during part of the growing season and may be disconnected from other riparian features. One of these stands is in a created opening adjacent to an ephemeral draw where ground cover does not appear to meet Forest Plan standard and overland flows run off. The aspen stands are generally reduced in size and contain only a few mature or decadent trees with conifer encroachment and little regeneration. Aspen condition is described in more detail in various specialists' reports including those of the silviculturalist, fuels specialist, and wildlife biologist. They provide limited, local shade to Sunshine Creek and Cress Creek and potential large woody debris.

Stream Channels

Most stream channels have been altered as a result of past management activities implemented before the application of Watershed Best Management Practices (BMPs). Impacts of past management practices on important stream characteristics such as channel dimensions, patterns (such as meandering), and gradient persist in the Project Area, despite management changes in recent years (and, for some practices, decades ago).

Although many of the factors which caused the disturbance are no longer active, the channel-modification processes initiated after Euro-American settlement continue. Other management activities implemented without watershed best management practices higher in the watershed continue to have secondary or indirect effects on stream channel condition and function. As a result, streams are not currently in balance with the Project Area landscape and channel conditions are not adequate to dissipate kinetic energy associated with stream flow and sediment transport, as described in Rosgen (1997). Stream channels continue to adjust. The drainage network is more efficient due to the extension of channels.

Sunshine, Middle Fork of Sunshine Creek, Balance, and Dunstan creeks were surveyed using the Region 6 Stream Survey protocol and the Eastern Oregon/Washington Riparian Survey protocol in 1992-1993. The results of stream surveys indicate that most stream segments classified as fish-bearing (and generally perennial-flowing) meet Forest Plan standards or PACFISH Riparian Management Objectives (RMOs) for wetted width ratio and stream bank stability. FP Standards and RMOs for pool frequency and large woody debris are met or approached in the Middle Fork of Sunshine Creek but not in the other streams surveyed. See the Fisheries Report for more details. Informal surveys conducted between 2004 and 2007 indicate that these conditions probably remain on many stream segments.

The Region 6 protocol has been modified to incorporate parameters included in the Riparian Protocol which is no longer used on the Forest. Bank stability was estimated according to the protocol in 1992-93; however stream banks are poorly defined on several of the streams in the Project Area making interpretation of bank stability surveys difficult. The lack of stream bank integrity and the hardening of the bottom of the stream channel indicate that channel resiliency to high flows may be reduced; additional erosion would typically occur laterally. Other unsurveyed perennial and intermittent channels are considered to be in similar condition based on field review.

These changes have contributed to increasing the naturally “flashy” hydrologic response by making the stream network more efficient. Because of these changes and, especially, where they have not stabilized, the drainage network remains vulnerable.

Water Quantity and Hydrology

The dominant streamflow regime is snowmelt dependent although summer convection storms may influence run off patterns. Basin storage capacity is low resulting in low base flows. Base flows appear to be dependent on groundwater. Most overland flow originating from the hillslopes appears to infiltrate immediately downslope and probably does not influence the overall hydrologic response to common precipitation events. Some changes such as the accumulation of organic material decrease vulnerability to erosion during large storm events, but may increase vulnerability to catastrophic fire. Alterations to the drainage network (described in previous sections) probably accelerate run off under common precipitation events. The drainage network is probably not resilient under rare run off events due to these alterations.

Water Quality

The Oregon Department of Environmental Quality (ODEQ) has identified eleven Beneficial Uses for the John Day River and all of its tributaries, including the streams in the project area. Fish and Aquatic Life is the Beneficial Use most likely to be of concern with this project. Fish and Aquatic Life is a Beneficial Use sensitive to water quality. ODEQ has established water quality criteria to protect this beneficial use in the Middle Fork of the John Day and its tributaries. The criteria related to the listing of the MFJDR segment in the project area on the ODEQ Clean Water Section 303(d) List of Water Quality Impaired Waterbodies (List) (Oregon, 2004) are Core Cold-Water Habitat and Designated Salmon and Spawning Use September 1- June 15. This segment of the MFJDR is included in the ODEQ water quality database with respect to other water quality parameters but ODEQ indicates that insufficient data are available for additional 303(d) Listing.

The MFJDR segment in the Project Area is included on the List for Salmon and trout rearing and migration (18 degree Celsius, 7-day average maximum) and Year Around (Non-spawning temperature; Core cold water habitat: 16.0 degrees Celsius, 7-day average maximum).

ODEQ has applied the criterion of Core Cold-Water Habitat to the Beneficial Use of Fish and Aquatic Life in the tributaries to the MFJDR which lie in the project area. ODEQ does not include the tributaries on the List for any parameter or criteria. Seasonal monitoring in 2007 in Dunston and Balance Creeks showed that the 7-day maximum average was 18.6 degrees Celsius for Balance Creek about 0.2 mile above the private land boundary and 28.4 degrees Celsius for Dunston Creek at a comparable location. The difference in temperatures is probably attributable to an extensive seepy area above the sample point on Balance Creek where flow is noticeably increased by the groundwater contribution and to the fact that Dunston Creek appears to be exposed to solar radiation along much of its length.

Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects

Hillslopes

Under common run off events and in the absence of uncharacteristic fire, conditions described in the Existing Condition would be maintained. Areas of active erosion would likely continue to erode. Areas of inactive erosion would be likely to continue to recover. As downed wood accumulates over time in the absence of additional ground disturbing activity, areas of active erosion may slow and begin to recover. Under rare storm events in the short term, areas of active or inactive erosion remain vulnerable to accelerated erosion. Vulnerability decreases at most areas over time as down woody material accumulates. In the event of uncharacteristic fire and either common or rare run off events, areas of active and inactive erosion would be vulnerable to accelerated erosion.

RHCAs/MA 3B

The most likely effect under Alternative 1 is little to no change in RHCA condition since neither rare (medium/large) run-off events nor uncharacteristically intense fire are likely to occur in a given year. Riparian vegetation condition would be maintained or improved as other or on-going management activities are implemented with BMPs. Fuel loads would slowly accumulate as described in the Fuels Specialist Report. Alternative 1 would be consistent with PACFISH standard FM 1 and 4 since conditions would generally be maintained or improved. In the event of a rare run-off event, channel and valley bottom erosion is likely to affect riparian conditions and processed in the inner RHCAs.

Numerous small trees would contribute to fuel loads as described in the Fuels Specialist Report. In the event of uncharacteristic fire, the outer portions of some RHCAs are likely to burn severely. Mineral soil would be exposed and hydrophobic soils may form. These conditions increase vulnerability to erosion. Most trees in some RHCAs would be killed, providing relatively coarse woody material within ten years and delaying the growth and recruitment of large woody debris for decades. Shade in many of the RHCAs would be reduced until forest or shrub stands are re-established. Some larger trees may be killed. They would provide large woody debris for future recruitment earlier than in the absence of fire.

Aspen stands would be likely to become less vigorous as described by other specialists. Shade and riparian recovery would be delayed. Contributions of aspen to riparian health, such as the ability to slow some wild fire, would be lost.

Wetland, floodplain, and valley bottom conditions would remain a function of legacy effects. Wetland and floodplain vegetation may be burned off temporarily following uncharacteristic wild fire but would be expected to re-grow fully the following season. Mineral soil would be exposed, increasing the likelihood of erosion.

Stream Channels

Stream characteristics such as channel dimension, patterns (such as meandering), and gradient would remain altered until large woody debris is recruited in 100-200 years. Channel resiliency to high flows, whether caused by rare run off events or uncharacteristic fire, would remain reduced. Stream channels would be expected to migrate laterally; in steeper, narrower valleys terraces may erode. The drainage network would remain more efficient due to the extension and straightening of channels, maintaining or increasing the current “flashy” response. In the absence of rare run off events or uncharacteristic fire, stream bank vegetation would become more abundant as other management activities are managed to FP standards.

Water Quantity

The hydrological response has been modified by the effects of past management activities on the drainage system. The hydrological response would continue to be modified until hillslope, valley and stream channel function recovered.

Water Quality

Water quality (temperature) would not be expected to change under the common run-off events. Under rare events, caused by either storms or following fire, bank erosion may occur in many of the streams. Bank erosion would likely lead to shallow, wide stream flow in summer, and, possibly, warmer water. Loss of shade associated with uncharacteristic wildfire would probably cause increases in stream temperature.

Cumulative Effects

The Project Area is relatively small and includes only a portion of the named streams. Run-off from common events, in the presence or absence of local fire or in the absence of uncharacteristic fire combined with run-off from above the Project Area may contribute visibly increased flow and sediment to the MFJDR due to current levels of legacy effects. Additional Increases would be proportionate to the size of rare run-off events and the intensity and magnitude of uncharacteristic fire.

Alternative 2 – Proposed Action

Direct and Indirect Effects

Hillslopes

The most likely effect on the hydrologic response is little or no change across the landscape compared to the Existing Condition since BMPs associated with the proposed activities and design elements are expected to control most run off and sediment transport under common run-off events. Rills, gullies, and other vulnerable areas would be avoided. Because the proposed activities would be implemented in areas previously impacted by management activities, a slight probability exists that previous disturbance would become connected to ground disturbance associated with the proposed activities.

While these connections would be expected to extend channels headward or concentrate overland flow, run off is not expected to be channelized sufficiently to cause accelerated erosion. Detached sediment would not be expected to reach streams under common rainfall events. A window of greater vulnerability to common run-off events would exist for about a year during which implementation of BMPs would be completed. The potential for an extended drainage network to develop may magnify the response during rare run-off events. Generally the reasons for increases in watershed vulnerability are ground disturbance related to tractor operations, landings, and temporary roads.

Sufficient ground cover to prevent increased run off is expected to remain following underburning. Small areas of mineral soil may be exposed under piles. Relative humidity and ground moisture levels at the time of burning are likely to prevent complete consumption of piles; some coarse material is likely to remain to trap sediment.

Wildfire that enters the area after treatment is expected to remain on the ground and burn with lower intensity. Sufficient ground cover to control run off and sediment transport is expected to remain. Local areas where fuels are concentrated may burn with moderate to high intensity and potentially expose mineral soil. Run off from these areas is expected to be controlled by downslope ground cover which typically remains following low intensity burns.

RHCAs/MA 3B

Underburning in RHCAs is not expected to expose mineral soil due to the design elements described in Chapters 1 and 2. Relative humidity and ground moisture present during the burning windows for piles in aspen stands are expected to prevent complete consumption of the coarse wood. The incompletely consumed coarse wood would provide sediment trapping where burning piles consumed finer ground cover. Consequently underburning burning activities or burning piles in aspen stands are not expected to contribute to concentration of overland flows or to sediment transport or to detrimentally affect stream or riparian condition.

Under Alternative 2, small material would be thinned in the outer part of several RHCAs. Fuels would be handpiled and burned. In addition to effects as described above, burning piles in the outer part of RHCAs is not expected to create continuous paths where overland flow may become concentrated because of design elements included in Chapters 1 and 2. Areas of active or inactive erosion would be avoided.

Thinning would result in healthier stands in which large trees would be expected to live and grow more rapidly than under the existing condition. Large woody debris would be available for recruitment into streams sooner. Shade associated with aspen stands is expected to increase locally as stands expand slightly and trees mature. Fire hazard would also be reduced which would be likely to result in low intensity fire. In the event of wildfire entering these areas, little mortality would be expected. Prescribed fire could be used routinely to maintain healthy stand conditions.

Conditions in other RHCAs where fuels would not be treated and fuel loads would remain high would be similar to those described for Alternative 1. Locally higher severity burns are likely to result with effects similar to those described for the No Action.

Vegetation in the inner portion of RHCAs is not expected to be affected by the proposed activities as they would be implemented at least 25 feet away and because of higher humidities generally found closer to streams. Future prescribed fire or wildfire would be expected to burn with low intensity. It is unlikely that low intensity fire would fully consume soil organic matter and expose mineral soil so erosion hazard would not be changed. Low intensity fire is not expected to burn wetter riparian vegetation; it would naturally die out within the inner RHCAs. Consequently the proposed activities in RHCAs are consistent with PACFISH standards FM1 and 4 because they would maintain or improve conditions in RHCAs.

Wetland and floodplain vegetation is not expected to burn severely during a low intensity wildfire or during underburning. Wetlands are not expected to be affected by most of the proposed activities because the implementation of PACFISH RHCAs is expected to be sufficient to protect wetland functions. Precommercial thinning and piling in RHCAs and aspen treatments are expected to move these areas toward desired conditions and to alleviate legacy effects on floodplain function.

Riparian vegetation condition would be maintained or improved as other or on-going management activities are implemented with BMPs. Under rare run-off events, channel and valley bottom erosion is likely to affect riparian conditions and processes in the inner RHCAs.

Stream Channels

Stream characteristics such as channel dimension, patterns (such as meandering), and gradient would remain altered until large woody debris is recruited in 100-200 years. Channel resiliency to high flows, whether caused by rare run off events or uncharacteristic fire, would remain reduced, although uncharacteristic wild fire would become less likely. Stream channels would be expected to migrate laterally; in steeper, narrower valleys terraces may erode. The drainage network would remain more efficient due to the extension and straightening of channels, maintaining or increasing the current “flashy” response. In the absence of rare run off events or uncharacteristic fire, stream bank vegetation would become more abundant as other management activities are managed to FP standards. Conditions on segments of Sunshine, Cress, and unnamed intermittent streams are likely to improve sooner as aspen mature and become available as large woody debris.

Water Quantity and Hydrology

The hydrological response has been modified by the effects of past management activities on the drainage system. The hydrological response would continue to be modified until hillslope, valley and stream channel function recovered as described for Alternative 1.

No measurable changes in water quantity are expected because less than 30% of the vegetation in the Project Area would be cut and because less 30% of the vegetation in any drainage would be cut.

Felling of conifers in aspen stands along stream channels may initiate watershed recovery in those local areas as down wood is placed on the ground and, possibly, across channels above bankfull width. Local water storage may increase but it is not expected to be large enough to have a measurable effect on flow in the MFJDR. Similarly, treatments of aspen stands above the private domestic spring are not expected to be extensive enough to change flow measurably at the spring. Increasing local water storage above the spring by felling large wood across the gullied intermittent stream and in the associated RHCA and tributary ephemeral draw (MA 3B) may increase local water storage and provide a more even flow downslope after one or two decades. Treatments proposed in the aspen stands and nearby conifer treatment units would not be expected to contribute concentrated overland flow downslope due to the increase in downed material, aspen regeneration, and BMPs and design elements that are expected to control run off and sediment transport under common run off events. Since treatments are expected to have little-to-no change on run off patterns or are expected to slow overland flow, they are not expected to exacerbate overland flow under rare run off events.

Water Quality

No measurable effects on water quality or 303(d) listed streams are expected because none of the proposed actions are expected to remove vegetation which shades streams; nor is shade expected to increase enough to reduce stream temperature. Proposed actions to improve stand conditions by pre-commercial thinning would remove vegetation only from the outer portions of fish-bearing and intermittent RHCAs. Conifers that would be removed during pre-commercial thinning of aspen stands near perennial or fish-bearing streams probably do not provide shade currently due to their size. Prescribed burning and hazard tree felling would not reduce shade sufficiently to cause a measurable change in temperature because few trees near perennial streams would be killed. As described in the RHCAs/MA3B section, riparian vegetation conditions would improve, possibly resulting in locally, increased shade where stream side aspen stands expand. Due to the short linear distances treated along perennially flowing streams, these improvements in vegetation are not expected to result in measurable decreases in stream temperatures.

The Forest Service responsibilities under the Clean Water Act defined are defined by the May 2002 Memorandum of Understanding (MOU) with the State of Oregon. This MOU recognizes watershed Best Management Practices as the primary mechanism for controlling non-point source pollution on National Forest System lands. The Design Elements in Chapter 2 incorporate watershed Best Management Practices which are also listed in an appendix to the Watershed Specialist's Report. Monitoring of BMPs is conducted under the District BMP monitoring program to evaluate implementation and effectiveness and to determine if changes to BMPs are needed. This document follows the Forest Service and Bureau of Land Management Protocol for addressing 303(d) listed streams (only the Middle Fork of the John Day River in this project). The Malheur National Forest is coordinating with the State on developing a Total Maximum Daily Load plan (in progress) for the MFJDR.

Cumulative Effects

The list of past, on-going, and foreseeable activities displayed in Appendix C (Cumulative Effects) of the EA was reviewed.

Since direct or indirect adverse effects are expected to remain within unit boundaries under common run-off events, adverse cumulative effects from the proposed activities are not expected. Run-off from rare events would be likely to behave overall as described for Alternative 1. Although additional flows and sediment may reach the MFJDR following rare run-off event before year 5, possible increases in run-off are not expected to be measurable because of the magnitude of the response expected from the existing conditions under Alternative 1 and the variability associated with measuring watershed parameters.

Reduction in fire behavior in the Project Area may influence fire behavior and reduce watershed hazard within and in adjacent areas. Because fire behavior is expected to change from uncharacteristic to low intensity, the proposed activities combined with treatments on private land, uncharacteristic wildfire is less likely to enter private land in the middle of the Project Area. The proposed activities break up the continuity of fuels and limit fire spreading from the mixed conifer and cold forest zones onto private land where active watershed restoration is occurring and reduce the possibility of fire spread into adjacent subwatersheds.

Consistency with Direction and Regulations

The project is consistent with the Malheur National Forest Plan, as amended. Treatments in RHCAs/MA 3B will improve riparian condition and move the Project Area toward meeting Forest Plan standards and PACFISH Riparian Management Activities. The project is also consistent with the Clean Water Act as described in the Water Quality section for Alternative 2, the Proposed Action, above

Irreversible/Irretrievable Effects

The project as described will not result in any irreversible or irretrievable effects to the watershed resource since effects are expected to be limited in distribution and to recover as soil conditions recover. Thus this project is consistent with guidelines for watershed included in the Forest Plan.

Fisheries

Introduction

This section summarizes the species and status of fish present in the Balance Fuels Reduction Project Area as well as existing conditions for aquatic species and their habitat. This report builds on conclusions from Soils and Watershed sections and determines direct, indirect and cumulative effects on aquatic species and their habitat.

Regulatory Framework

The Executive Order 12962 of 1995 (aquatic systems and recreational fisheries) requires federal agencies to conserve, restore, and enhance aquatic systems to provide for increased recreational fishing opportunities nationwide. The Order requires federal agencies to evaluate the effects of federally funded actions on aquatic systems and document those effects relative to the purpose of this order.

The two principle laws relevant to fisheries management are the National Forest Management Act of 1976 (NFMA) and the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.). Direction relative to fisheries is as follows:

NFMA requires the Forest Service to manage fish and wildlife habitat to maintain viable populations of all native and desirable non-native wildlife species and conserve all listed threatened or endangered species populations (36CFR219.19).

ESA requires the Forest Service to manage for the recovery of threatened and endangered species and the ecosystems upon which they depend. Forests are required to consult with the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS) if a proposed activity may affect the population or habitat of a listed species.

The Malheur National Forest Land and Resource Management Plan (Forest Plan) as amended (USDA 1990), provides direction to protect and manage resources. The Specialist report cites a detailed list of the portions of the Forest Plan relevant to fisheries and fisheries habitat requirements. In addition Forest standards and guidelines along with relevant laws are cited. Of special interest are Forest Plan amendment 29 and PACFISH (1995). Recommendations regarding fisheries habitat within the Balance Project Area would adhere to this regulatory framework.

Balance Creek and Sunshine Creek, both fish-bearing streams, are protected by 600-foot wide (total width) RHCAs (as defined within PACFISH). RHCA widths along other streams in the Project Area vary depending on whether streamflow is perennial or intermittent (see Watershed section).

The Coyote Creek-Balance Creek Subwatershed in the Camp Creek Watershed in the Middle Fork of the John Day (MFJD) River Subbasin meets the three criteria for a PACFISH Key Watershed. The intent of designating Key Watersheds is to provide a pattern of protection across the landscape where habitat for anadromous fish would receive special attention and treatment. Priority within these watersheds would be to protect, or restore habitat for listed stocks, stocks of special interest or concern, or salmonid assemblages of critical value for productivity or biodiversity. Criteria considered to designate Key Watersheds are:

1. Watersheds with stocks listed pursuant to the ESA, or stocks identified in the 1991 American Fisheries Society report as "at risk" or subsequent scientific stock status reviews; or

2. Watersheds that contain excellent habitat for mixed salmonid assemblages; or

3. Degraded watersheds with a high restoration potential.

Analysis Methods

The fisheries Analysis Area encompasses all aquatic habitats that have the potential for effects from the Balance Thinning and Fuels Reduction project. Based on topography, drainage patterns and the effects analysis, the fisheries Analysis Area includes the following streams: Balance Creek, Dunstan Creek, and Sunshine Creek from Forest Service Road (FSR) 2045 downstream to their confluence with the MFJD River, and the MFJD River from about 0.8 miles upstream of its confluence with Sunshine Creek, downstream to approximately the mouth of Camp Creek. Coyote Creek, although fish bearing and within the Coyote Creek-Balance Creek Subwatershed was not included in the fisheries Analysis Area because there are no activities planned within this drainage.

The Project Area lies within the Balance Creek/Coyote Creek Subwatershed (HUC 170702030205) in the Camp Creek Watershed in the MFJD Subbasin. As mentioned in the Watershed report, the Project Area lies on the lower hillslopes on both sides of the MFJD River and includes the lower portions of several independent catchments, each of which drains to the MFJD River. Information was compiled from the Galena Watershed Analysis (USDA 1999) and Galena Watershed Analysis – Supplement (USDA 2002), stream surveys based on Region 6 Level II Stream Survey protocol (1992 and 1993), and the Malheur National Forest Geographic Information System (GIS). Where data gaps existed (e.g., Data available from some earlier stream surveys was not available to adequately type streams based on Rosgen stream classification or to quantitatively determine the percent of particles less than 2mm), the Baseline Condition was evaluated qualitatively, based on the principles of applied fisheries and watershed science, professional judgment and knowledge of the area. Field surveys were conducted during the 2007 field season and GIS was updated in fall 2007 to incorporate data gathering during field surveys.

Unknown and Unavailable Information: With the exception of the Aquatic Inventory of the MFJD River (ODFW 1996, 2005), and stream restoration monitoring report and pilot restoration summary (ODFWb 2007), stream conditions on the private land within the Fisheries Analysis Area are generally unavailable; however, because much of the land is visible from existing roads, the land use practices are readily observable.

Existing Condition

Aquatic Species

The Camp Creek Watershed is home to populations of Middle Columbia River (MCR) summer-run steelhead (*Oncorhynchus mykiss*), redband trout (*O. mykiss gairdneri*), MCR spring-run Chinook salmon (*O. tshawytscha*) and the MFJD River is listed by Buchanan et al. (1997) as migratory habitat for bull trout (*Salvelinus confluentus*). Nongame fish such as northern pikeminnow (*Ptychocheilus oregonensis*), mountain whitefish (*Prosopium williamsoni*), sucker species (*Catostomus macrocheilus or C. columbianus*), speckled dace (*Rhinichthys osculus*), longnose dace (*Rhinichthys cataractae*), redside shiner (*Richardsonius balteatus*), sculpin (*Cottus spp*.), pacific lamprey (adults and amocoetes – *Lampetra tridentata*) have been documented in the fisheries Analysis Area. Columbia spotted frogs (*Rana luteiventris*) have also been documented within the Analysis Area.

Management Indicator Species, Threatened, Endangered and Sensitive Species

Management Indicator Species (MIS) are species of vertebrates and invertebrates whose population changes are believed to best indicate the effects of land management activities. Through the MIS concept, the total number of species found within a Project Area is reduced to a subset of species that collectively represent habitats, species, and associated management concerns. The MIS are used to assess the maintenance of populations (the ability of a population to sustain itself naturally) and biological diversity (which includes genetic diversity, species diversity, and habitat diversity), and to assess effects on species in public demand. Forest Plan Standard 61 (p. IV-32) lists species and gives direction to provide for habitat requirements of MIS species. Aquatic MIS in the Project Area include: rainbow/redband trout, bull trout and steelhead trout.

Threatened and endangered species are listed under the ESA; whereas, sensitive species are identified by the Forest Service Regional Forester. An endangered species is an animal or plant species that is in danger of extinction throughout all or a significant portion of its range. A threatened species is an animal or plant species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. A sensitive species is an animal or plant species for which species viability is a concern either a) because of current or predicted downward trend in population numbers or density, or b) because of current or predicted downward trends in habitat capability that would reduce a species' existing distribution. Forest Plan Standard 62 (p. IV-32) gives direction to meet all legal and biological requirements for the conservation of threatened and endangered plants and animals. Standard 62 states, “Assess all proposed projects that involve habitat changes or disturbance and have the potential to alter the habitat of threatened, endangered or sensitive plant and animal species.” When threatened or endangered species or habitats are present, follow the required biological assessment process, according to the requirements of the ESA (Public Law 93-205). Forest Plan Standard 64 further states, “Meet all consultation requirements with the USFWS and state agencies.” Effects to aquatic threatened, endangered, and sensitive species are analyzed in the Aquatic Biological Evaluation located in the Project Record.

Four threatened, endangered and sensitive (TES) salmonid species and one sensitive amphibian species are found in the Balance Project Area:

- Summer-run steelhead of the Middle Columbia River (MCR) Distinct Population Segment (DPS) are listed as threatened under the ESA and their critical habitat was designated on September 2, 2005 including the MFJD River, Balance Creek, and Sunshine Creek within the fisheries Analysis Area. They are also on the State of Oregon sensitive species list.
- Spring-run Chinook salmon of the MCR Evolutionarily Significant Unit (ESU) are listed on the Region 6 sensitive species list; they are also covered under Essential Fish Habitat (EFH) for consultation with the NMFS under the Magnuson-Stevens Fishery Conservation and Management Act (MSA).
- Redband trout are considered the native, resident form of rainbow trout and they are on the State of Oregon and Region 6 sensitive species lists.
- Bull trout of the Columbia River Basin DPS are listed as threatened under the ESA. They are seasonally present in the MFJD River. They are also on the State of Oregon sensitive species list.
- Columbia spotted frogs are also on the State of Oregon and Region 6 Sensitive Species lists.

On January 31, 2008, Regional Forester Linda Goodman released an updated Sensitive Species List which includes federally listed, federally proposed and sensitive species lists. In the cover letter for the updated species list the Regional Forester states that projects initiated prior to January 31, 2008 may use the updated sensitive species list or the list that was in effect when the project was initiated. The Responsible Official for the project has the authority to decide which list to use. “Initiated” means that a signed and dated document such as a project initiation letter (PIL), scoping letter, or Federal Register Notice for the project exists. The PIL was signed on February 9, 2007. Consequently, the 2004 Regional Forester Sensitive Species list in effect at that time was used for field reconnaissance and the Aquatic Biological Evaluation (BE). The BE is located in the Project Record.

Summer-run Steelhead Trout

Steelhead (Middle Columbia DPS, MCR steelhead) was listed by NMFS as threatened under the federal ESA on March 25, 1999 (64 FR 15417). MCR steelhead are also a Malheur National Forest MIS. Critical habitat for MCR steelhead was designated on September 2, 2005 (70 FR 52630). Critical habitat is present in the fisheries Analysis Area.

Steelhead trout are the anadromous form of *O. mykiss*. Adult summer steelhead return to freshwater from June through September. Adults overwinter in large rivers while sexually maturing. Adults resume migration to spawning streams in early spring. Spawning takes place from March through May. Eggs incubate during the spring and emergence occurs from April through July depending on water temperatures. Juveniles typically spend 2 to 3 years in freshwater. Juvenile steelhead generally utilize habitats with higher water velocities than juvenile Chinook salmon. In winter, juveniles utilize deep pools with abundant cover. Juveniles may reside in their natal stream for their entire freshwater rearing phase or may migrate to other streams within a watershed. Smoltification occurs during late winter and emigration to the ocean occurs during spring. Summer steelhead adults normally rear for 1 to 2 years in the ocean.

Middle Fork John Day Subbasin:

MCR steelhead runs in the John Day River Basin are composed entirely of native stocks. However, hatchery fish do stray into the John Day Basin from the Columbia River (NWPCC 2005). The MFJD River Subbasin contributes approximately 22% of the total run for the basin. Redd counts have displayed wide variability since 1964. Redds per mile have been below ODFW management objectives (5.8 redds per mile) since 2003. MCR steelhead are widely distributed in the MFJD Subbasin. Spawning and rearing takes place in all major tributaries of the MFJD River.

Balance Fisheries Analysis Area:

Some spawning may occur in Sunshine Creek during years when water conditions are favorable, however spawning in Balance Creek is unlikely because the stream is captured by an irrigation ditch on private land and does not have a direct connection with the MFJD River in most years. Spawning is unlikely in Dunstan Creek given the gradient at the mouth and small watershed size.

There are about 10.4 miles of steelhead habitat in the fisheries Analysis Area. MCR steelhead utilize the MFJD River for migration, spawning and juvenile rearing habitat (7.3 mi). Spawning and rearing habitat is present in Sunshine Creek (1.8 mi) and potentially Balance Creek (1.3 mi). Juvenile rearing habitat is present on Dunstan Creek (0.2 mi).

Redband Trout

Redband trout are a Region 6 sensitive species and a Malheur National Forest management indicator species. Redband trout are the resident form of *O. mykiss*.

Redband trout may or may not be reproductively isolated from steelhead. Redband and steelhead trout from the same geographic area may share a common gene pool.

Redband trout are sensitive to changes in water quality and habitat. Adult redband trout are generally associated with pool habitats, although various life stages require a wide array of habitats for rearing, hiding, feeding, and resting. Pool habitat functions as important refugia during low water periods. An increase in sediment lowers spawning success and reduces the quantity and quality of pool and interstitial habitat. Other important habitat features include healthy riparian vegetation, undercut banks and large woody debris (LWD).

Redband trout may reside in their natal stream or may migrate to other streams within a watershed to rear. Habitat requirements are similar for redband trout and juvenile steelhead.

Spawning occurs during the spring, generally from March to June. Redds tend to be located where velocity, depth and bottom configuration induce water flow through the stream substrate, generally in gravels at the tailout area of pools. Water temperatures influence emergence of fry, which is typically from June through July.

Middle Fork John Day Subbasin:

Neither ODFW nor the Forest Service routinely monitors abundance and distribution of redband trout in the John Day Basin. Juvenile *O. mykiss* with resident (redband trout) and anadromous (steelhead) life history types are difficult to differentiate where the two populations coexist, making independent monitoring difficult. At this time, abundance of John Day trout redband populations is unknown. Currently in the John Day Basin, redband trout are present in the North Fork, Middle Fork, Main stem, and South Fork John Day Rivers and their tributaries. Redband trout are present in all fish-bearing streams in the MFJD Subbasin. Summer distribution of redband trout is generally limited to headwater areas.

Balance Fisheries Analysis Area:

There are about 11.0 miles of redband trout habitat in the fisheries Analysis Area. Redband trout utilize the MFJD River for spawning and juvenile rearing habitat (7.3 mi). Spawning and juvenile rearing habitat is present in Balance Creek (1.9 mi), Dunstan Creek (0.2 mi), and Sunshine Creek (1.8 mi). A Region 6 Level II stream survey was completed in 1993 and noted rainbow trout (probably resident redband trout) found upstream from Balance Lake. The redband trout were confined to only 0.2 miles of stream above Balance Lake, and were reported in jeopardy of being lost in 1993. A field scout on October 11, 2007 failed to locate any fish in this 0.2 mile reach of Balance Creek upstream from Balance Lake. It is unknown whether fish exist in Balance Lake or whether that population of rainbow trout observed in 1993 was a result of unauthorized stocking.

Spring-run Chinook Salmon

Spring Chinook salmon are a Region 6 sensitive species. Essential Fish Habitat (EFH) for spring Chinook salmon has been designated by NMFS in the fisheries Analysis Area. Salmon are sensitive to changes in water quality and habitat. Juvenile Chinook salmon are generally associated with pool habitats. An increase in sediment lowers spawning success and reduces the quantity and quality of pool and interstitial habitat. Other important habitat features include healthy riparian vegetation, undercut banks and LWD.

Adult spring Chinook salmon return to the MFJD River during the spring. Adults hold in deep pools during the summer while sexually maturing. Spawning occurs during fall, generally from August through September. Embryos incubate over the winter and emergence occurs the following spring. Juveniles generally rear for one year in freshwater. Juveniles use habitats with slower water velocities (pools, glides, and side channels). Juveniles overwinter in deep pools with abundant cover. Smoltification and emigration to the ocean occurs in the spring of their second year. The ocean rearing phase lasts from 1 to 3 years.

Middle Fork John Day Subbasin:

Spring Chinook salmon runs in the John Day River Basin are composed entirely of native stocks. Spring Chinook salmon are known to be present in seven streams in the Camp Creek Watershed. The MFJD River Subbasin has historically contributed approximately 12% of the total run for the basin. The population has been generally increasing since 1959 but has been declining since 2002 (see Figure 3 – Fisheries Specialist Report located in the Project Record). However, due to the low population size (<500) and current habitat conditions, the MFJD River population would be at risk during any future periods of adverse environmental conditions (NWPPC 2005). Spawning habitat for the MCR spring Chinook is present in the Big Creek, Camp Creek, and Upper Middle Fork John Day River Watersheds. Main spawning areas are located along the MFJD River with minor amounts of spawning occurring in Clear Creek. Juvenile rearing primarily occurs in Squaw Creek, Clear Creek, Granite Boulder Creek, Camp Creek, and the MFJD River downstream to the confluence with the North Fork John Day River.

Balance Fisheries Analysis Area:

There are about 7.3 miles of spring Chinook spawning and rearing habitat within the MFJD River.

A die-off during July 2007 resulted from the combination of high water temperatures (measured up to 84 degrees) and low stream flows (one-third the average during this period) in the MFJD River. Approximately 118 wild adult spring Chinook salmon were found dead near the mouth of Big Boulder Creek and the mouth of Vinegar Creek (ODFWa 2007).

Bull Trout

Bull trout were listed by the USFWS as threatened under the federal ESA on June 10, 1998 (63 FR 31647). Critical habitat for bull trout was not designated in the Analysis Area by the USFWS (70 FR 56212). Bull trout are also a Malheur National Forest MIS. The Analysis Area is located in the John Day bull trout subpopulation area.

Middle Fork John Day Subbasin

Bull trout in the MFJD Subbasin persist at low abundance levels. In 1999, population surveys were conducted by ODFW, the Malheur National Forest and others in Clear Creek, Big Creek, Deadwood Creek, and Granite Boulder Creek to estimate abundance. Total numbers of bull trout consisting of primarily juvenile and sub-adult fish, were estimated to be 1,950 individuals in Big Creek, 640 individuals in Clear Creek, and 368 individuals in Granite Boulder Creek (Hemmingsen 1999). Four local populations currently exist within the MFJD Subbasin. Local populations include Clear Creek, Granite Boulder Creek, Deadwood and Big Creeks (Buchanan et al. 1997). The Malheur National Forest identifies upper Big Boulder Creek, Badger Creek, Indian Creek, and Vinegar Creek as potential habitat for bull trout local populations (potential local populations).

Current distribution in the MFJD Subbasin is based on isolated sightings with the primary distribution restricted to tributaries and limited to 22% of stream miles previously known to support bull trout (Claire and Gray 1993, Buchanan et al. 1997). Summer distribution of bull trout, based on the 1990 and 1992 ODFW Aquatic Inventory Project, indicated bull trout occupy approximately 16 miles of stream in the MFJD Subbasin, including: 5.5 miles in Big Creek, 2.5 miles in Deadwood Creek (a tributary to Big Creek), 4 miles in Granite Boulder Creek; and 4 miles in Clear Creek. Bull trout migration from these tributary streams during the summer is highly unlikely due to high water temperatures and habitat modifications in the MFJD River. Aquatic inventory surveys conducted by the ODFW in 1990 and 1991 detected 60 bull trout in the MFJD River Subbasin; two fish were measured at 260 millimeters (10 inches) and 360 millimeters (14 inches), all others were less than 210 millimeters (8 inches) in length (Buchanan et al. 1997). In the 1999 and 2000 surveys of Clear Creek, eight redds were observed each year (Prairie City Ranger District redd survey data).

Balance Fisheries Analysis Area:

Bull trout are seasonally present in the MFJD River (7.3 mi.). Bull trout use the River as a migration corridor and for winter rearing habitat. Bull trout are not present in Balance Creek, Dunstan Creek or Sunshine Creek where habitat is unsuitable. Spawning and summer rearing habitat for bull trout is not present in the Analysis Area.

Columbia Spotted Frog

Spotted frogs are highly aquatic and are rarely found far from permanent water. They are usually found along the grassy margins of low gradient streams, lakes, ponds, springs, and marshes.

During winter, spotted frogs burrow into banks adjacent to streams, ponds, and springs. Breeding occurs in the spring varying with elevation. In the Columbia basin of Washington, breeding occurs from March to April in lower elevations, and from May to June in the higher elevations. Breeding habitat is usually found in shallow water in ponds or other quiet waters along streams. Breeding may also occur in flooded areas adjacent to streams and ponds. Adults may disperse overland in the spring and summer after breeding.

Condition and Trend of Population

This species occurs in extreme southeastern Alaska, southwestern Yukon, northern British Columbia, and western Alberta south through Washington east of the Cascades, eastern Oregon, Idaho, and western Montana to Nevada (disjunct, Mary's, Reese, and Owyhee river systems), southwestern Idaho (disjunct), Utah (disjunct, Wasatch Mountains and west desert), and western and north-central (disjunct) Wyoming. Disjunct populations occur on isolated mountains and in arid-land springs. In Oregon, Columbia spotted frogs are widely distributed east of the Cascade Mountains.

USFWS lists livestock grazing and introduction of nonnative fish (salmonids and bass) as threats to the Great Basin population of Columbia spotted frogs (66 FR 1295).

The Columbia spotted frog (*Rana luteiventris*) is on the Regional Forester's Sensitive Species List and is a candidate for Federal listing under the ESA. The spotted frog is considered present in all subbasins on the Malheur National Forest. It is assumed this species is widely distributed in the MFJD Subbasin. Limited habitat surveys have been conducted specifically for spotted frogs; however, habitat probably exists along low gradient perennial streams. Fish surveys record incidental sightings of frogs but most do not differentiate species. During 1996 fish surveys, spotted frogs were reported in the Vinegar Creek Subwatershed; along Davis Creek and Placer Gulch. Spotted frogs have also been documented in the MFJD River. In 2003 and 2004, Forest Service personnel conducted spotted frog surveys and spotted frogs were found near the mouth of Camp Creek and in the MFJD River near Camp Creek, and Crawford Creek. Egg masses of spotted frogs were also found in a pond adjacent to Bridge Creek and Highway 26 near Austin Junction.

Aquatic Habitat

Legacy Conditions and Upland Influence

For over one hundred years the Camp Creek Watershed has been subjected to a variety of land-use practices. Practices have included placer mining, railroad logging, fire suppression, road construction, and grazing activities on public and private land. These activities have reduced aquatic TES species habitat quality and complexity of streams within the Analysis Area.

Historically, wildfires within the Watershed would have had a higher frequency of occurrence, but fires would generally have been of lower intensity than under a fire-suppression strategy. Sediment inputs would probably have been more frequent due to this fire pattern but would have been short-lived as vegetation returned quickly to the burned areas. Recent fires that have occurred in the Analysis Area have burned approximately 32,961 acres since 1981. Areas of high mortality have been planted with native conifers. Wildfire suppression may have altered natural disturbance regimes that contribute to watershed structure and function. Fire exclusion has caused the build-up of fuels, overstocking of trees, and has created a situation where the possibility exists for an uncharacteristic wildfire. With a probable historic fire-return interval of 10 to 35 years, as many as 10 fire cycles have been eliminated from this ecosystem. Evidence suggests that fires and disturbance in general can pose greater threats to fishes when their habitats become fragmented and otherwise altered by human activities (Dunham et al. 2003). Other human influences can interact with fire and when taken cumulatively can negatively affect aquatic TES species (e.g. habitat loss, degradation, fragmentation, nonnative species invasions) (Dunham et al. 2003).

Data on earlier harvests is not available; however logging of forest lands has been occurring in the Watershed since about 1916 when the Oregon Lumber Company constructed narrow gauge railway from the town of Bates down the MFJD River toward the mining towns of Susanville and Galena (Galena Watershed Analysis – Supplement 2002). Since 1984 timber harvest has occurred on approximately 4,569 acres of Forest Service lands within the Analysis Area. Past logging within RHCAs reduced canopy cover within these areas, resulting in less shade over streams. These harvest activities likely reduced the amount of LWD in perennial streams within the Analysis Area. The amount of LWD and coarse wood available for delivery from intermittent drainages during storm events was also likely reduced. Pre-commercial thinning has occurred on approximately 3,900 acres since 1960.

Within portions of the Analysis Area, legacy effects from historic mining activity appears to have resulted in several discontinuous rills and incipient gullies (see Watershed section). Within portions of the MFJD Subbasin, and possibly within the Project Area, historic mining may have resulted in straightened channels and may have reduced the presence of large log complexes in the MFJD River (Galena Watershed Analysis – Supplement 2002). Mining and exploring for locatable mineral resources continues within the Subbasin through the present day.

Roads can account for most of the sediment problems in a watershed because they are a link between sediment source areas (skid trails, landings, and cut slopes, etc.) and stream channels. They directly affect the channel morphology of streams by accelerating erosion and sediment delivery and by increasing the magnitude of peak flow (Furniss et al. 1991). Wemple (1994) focused on the interaction of forested roads with stream networks in western Oregon and found that nearly 60% of the road network drained into streams and gullies, and are therefore, hydrologically integrated with the stream network. From a qualitative standpoint, the following assumptions can be used as general indicators of sediment delivery risk associated with roads: 1) the higher the road density the higher the potential for sediment yield increases due to the larger acreage of exposed surfaces, 2) the more drainage ways that are crossed the higher probability that direct sediment introduction would occur, and 3) the greater the distance, or higher on the slope, that the road is from the drainage network, the less probability for delivered sediment to occur (erosion may occur but is less likely to be routed to the stream). Drainage structure, function, and spacing are keys to minimizing the amount of surface flow, which directly affects surface erosion. The spacing of drain or ditch relief structures depends on the road gradient, road surface and ditch soil types, runoff characteristics, and the effects of concentrated runoff on slopes below the road. Forest Service Handbook and other manuals provide guidelines for drainage structure spacing. Drainage structures should be close together on silt-sand soils with little to no binder on steep slopes and further apart on gravel road surfaces with moderate binder and little to no fines on flat or minimum grades.

Surface erosion is highly dependant on soils, road surfacing and condition, road grade, traffic volumes, and the effectiveness and spacing of drainage structures. The greatest surface erosion problems occur in highly erodible terrain, particularly landscapes underlain by granitic soils, soils of the Clarno formation, and certain highly fractured or weathered rock types. Studies have found that sediment delivery to stream systems is highest in the initial years after road construction, although raw ditch-lines and road surfaces with little binder can remain chronic sources of sediment. Native surface roads (mostly Maintenance Level 1 and 2 roads) are generally greater chronic sediment sources than surfaced, higher standard roads. Approximately 41% of RHCA roads in the Coyote Creek/Balance Creek Subwatershed and approximately 61% of RHCA roads in the Balance Project Area are native surface roads. Native surface roads are more likely to contribute fine sediment to streams that can adversely affect aquatic habitat compared to roads with other surface types. Most native surface roads, if used other than during dry or frozen conditions cannot tolerate much traffic without rutting causing other resource problems. Adverse affects to aquatic TES species are more likely to occur where native surface roads are located adjacent to Category 1 streams (Table FI-1).

Stronghold populations of salmonids are associated with higher-elevation forested lands and the proportion declines with increasing road densities (Quigley et al. 1996). The higher the road density, the lower the proportion of subwatersheds that support strong populations of key salmonids. Specifically, Quigley et al. (1996) shows a strong correlation with road densities of 2 miles/mile2 or higher and reduction of strong populations of salmonids. Further reductions of strong salmonid populations were identified at densities of 3 miles/mile^2 and 4 miles/mile^2 or greater. Roads in the Project Area that occur within 100 feet of streams or cross streams commonly impact fish and fish habitat more than roads located in uplands (TableFI-1).

Table FI-1: Road/Stream Interaction Information

	Entire Subwatershed (Public & Private)[1]				
Subwatershed	**Total Road Miles**	**Road Miles within 100 ft. of Cat. 1-4 Channels**	**Stream Crossings on Roads (Cat. 1 or 2)**	**Stream Crossings on Roads (Cat. 4)**	**Total Road Density (Mi/ Mi^2)**
Coyote Creek/Balance Creek	81.2	6.8	43	24	3.77
	Project Area (Public & Private)[1]				
	Total Road Miles	**Road Miles within 100 ft. of Cat. 1-4 Channels**	**Stream Crossings on Roads (Cat. 1 or 2)**	**Stream Crossings on Roads (Cat. 4)**	**Total Road Density (Mi/ Mi^2)**
Balance Project Area	27.3	2.1	12	2	5.17

1 Note: Rounding road miles during calculations may result in minor (0.1) mile discrepancies. This information was derived from the Malheur National Forest GIS.

Road densities would remain above 3 miles/mile^2 in the Balance Creek/Coyote Creek Subwatershed and miles within 100 feet of Category 1-4 channels would remain fairly high (Table FI-1). There are slightly over 6.8 miles of roads that likely impact streams due to proximity (100 feet or less). Road densities and roads in close proximity to streams would remain at moderately detrimental levels in the Balance Creek/Coyote Creek Subwatershed.

Within the Analysis Area closed and decommissioned roads and other tracks currently classified as unauthorized roads ("ghost roads") are present. They often dam and redirect subsurface flow on old landslide debris which sometimes results in concentrations that initiate rilling. Ditch relief culverts and culverts which concentrate flow from seeps above the roads also discharge concentrated flows which have initiated rilling. Near stream areas in the vicinity of culvert crossings, were attractive for past management activities, such as log landings and grazing. Today some of these same locations are occasionally used as pump chances and/or continue to be grazed, however salting no longer occurs at these type of locations.

Approximately 150 miles of road have been constructed in the Analysis Area for fire suppression, timber harvest, and public access. Approximately 52 miles are still open for use at this time within the Subwatershed and 20 miles are still open for use within the Project Area. Some 45 miles of road have been closed and 53 miles of road have been decommissioned within the Subwatershed. Most decommissioned roads are moving towards less disturbed conditions at natural rates, however mineral soil remains exposed near streams in some RHCAs creating localized areas of increased erosion potential. These conditions are found along segments of Sunshine and Balance creeks and their tributaries and along unnamed streams on the north side of the MFJD River. These conditions continue to reduce availability of riparian storage and other riparian and stream functions. Several of the roads that were previously decommissioned are currently being driven, as barricades have been breached.

Beaver

Beaver sign has been recently found along portions of the MFJD River on private lands within the Analysis Area (C. Kranich pers. com.) and it is possible that beaver utilize the lower portions of other streams within the Analysis Area where conditions are suitable. Beaver play a crucial role in the maintenance of stream channels and associated RHCAs. Beaver dams trap sediment, reduce water velocity, and can redistribute water as hyporheic flow. The net effect of beaver dams may be to lower water temperatures by increasing bank storage, which leads to increased base flow levels.

PACFISH RMOs and Forest Plan Amendment 29 DFCs

Important aquatic habitat elements as defined by PACFISH and/or Forest Plan Amendment 29 include: 1) pool frequency, 2) water temperature/stream shading, 3) large woody debris, 4) bank stability, 5) width to depth ratio, and 6) embeddedness. These habitat elements are important in maintaining aquatic habitat function and health. Stream survey information was analyzed to compare existing habitat conditions to Forest Plan Riparian Management Objectives (RMO)/Desired Future Condition (DFC) for aquatic habitat. (See specialist report for more information).

Pool Frequency

Pool frequency is a gauge of aquatic habitat diversity, and is an indicator of the degree to which streams are capable of supporting a varied and complex community of fish species. Pools are important for providing rearing habitat for juvenile fish and cool-water refuge areas for adult fish during periods of low flow and elevated temperatures. Pool spacing varies by channel morphology (Rosgen 1996). Deep pools also provide important habitat for adult Chinook salmon and steelhead trout.

Stream surveys indicate that the Forest Plan DFC/PACFISH RMO for pool frequency is not being met in Balance Creek, Dunstan Creek, Sunshine Creek or Middle Fork Sunshine Creek. However, pool frequency is being met in Coyote Creek and is approaching Forest Plan DFC in Middle Fork Sunshine Creek.

Water Temperature/Stream Shading

Water temperature influences the metabolism, behavior, and health of fish and other aquatic organisms. Fish can survive at temperatures near extremes of suitable temperature ranges. However, growth is reduced at low temperatures because all metabolic processes are slowed. At the opposite extreme, growth is reduced at high temperatures because most or all energy from food must be used for maintenance needs. Fish are also more susceptible to diseases near the extremes of a species suitable temperature ranges.

The Forest Plan water temperature standard is for no measurable increase in maximum water temperature, and maximum water temperatures below 64°F within migration and rearing habitat and below 60°F within spawning habitats (PACFISH RMO). In general, juvenile and Chinook salmon, redband trout, and juvenile steelhead will occupy water that is from 55 to 64°F. Upper lethal temperatures range from about 75°F for steelhead to about 80°F for Chinook salmon. Water temperatures were measured up to 84 degrees in the MFJD River when the die-off of Chinook salmon occurred in July 2007.

Large Woody Debris

LWD plays an important role in forested stream reaches. LWD aids in dissipating stream energy, trapping sediment, and the formation of pools and associated aquatic habitat.

Quantity of LWD in streams can be altered by removal of streamside trees for timber production or salvage of instream pieces. Timber has been harvested from areas adjacent to streams in the Analysis Area.

Riparian forests, especially individual trees that are within ½ to ¾ tree length of the stream channel, produce LWD that is recruited into a stream where it creates critical habitat features for aquatic species. The Malheur National Forest recognizes the role of LWD. Forest Plan Amendment 29 specifies a range in the number of pieces of LWD to be maintained for each mile of stream in certain ecotypes.

Level II Stream surveys indicate that the Forest Plan DFC for LWD quantity is not being met in Balance Creek, Dunstan Creek, or Sunshine Creek, while Coyote Creek and Middle Fork Sunshine Creek are exceeding Forest Plan Amendment 29 standards. All streams where Level II stream surveys have been completed meet or exceed PACFISH RMOs for LWD quantity. Sunshine Creek just meets the standard with 20 pieces of LWD per mile.

Embeddedness/Fine Sediment

Composition of the stream substrate is an important feature of aquatic habitat. Cobble and gravel substrates provide habitat for a diverse assemblage of benthic macroinvertebrates as well as eggs and early life stages of numerous fish species. Macroinvertebrates represent a substantial portion of the diet available to various fish species.

Filling of interstitial spaces (i.e. the gaps between rocks on the stream bottom) with fine sediment (particles < 2 mm in size) eliminates habitat for many macroinvertebrates. Fish eggs and early life stages can also be buried and smothered when interstitial spaces are embedded with fine sediment. Winter habitat for juvenile salmonids is also lost as interstitial spaces are embedded with fine sediment.

Increases in fine sediment can occur from both increases in transport of fine sediment from upland areas and from destabilized stream banks. Increases can result from both episodic sources such as wildfires or from chronic sources such a native surface roads. Episodic sources normally result in short-term increases that return to pre-disturbance levels through recovery processes. Chronic sources can result in long-term changes of stream channels and aquatic habitat.

Embeddedness was rated as either yes or no at the time Level II stream surveys were completed on streams within the fisheries Analysis Area. In order for embeddedness to have been rated as yes for that reach, the substrate must have been embedded to a degree greater than 35 % for the majority of the reach.

These early stream surveys simply recorded whether measured units were embedded to a degree greater than 35 percent, not greater than 20 percent, and they did not conduct pebble counts, therefore without conducting new stream surveys it is not possible to determine whether these streams meet or do not meet Forest Plan DFC (see Analysis Methods section above).

Width-to-Depth Ratio

The Forest Plan DFC/RMO for width-to-depth (WID) ratio is based on wetted width and depth. A large wetted WID ratio indicates a wide shallow stream channel morphology. Wide shallow streams are prone to increases in stream temperatures due to their high surface area to volume ratio. Shallow streams also provide little habitat for fish, due to the lack of water depth.

WID ratios can be increased by increases in peak flows, direct bank alteration, increases in sediment or a combination of these factors. Conversely, reductions in these factors can lead to reductions in width to depth ratios.

Balance Creek, Dunstan Creek, Sunshine Creek, and Middle Fork Sunshine Creek were all within the Forest Plan DFC/PACFISH RMO for WID ratio in 1993 (See Table 8 – Aquatic Specialist Report located in the Project Record). Data was not gathered on East Fork Sunshine Creek and data is not valid for Coyote Creek, therefore W/D Ratios are not available for these two streams.

Bank Stability

The Forest Plan DFC for stream bank stability is for 90% of the banks to be stable. Channel types differ in their sensitivity to management activities due to differences in bank erosion potential and the influence of streamside vegetation on bank stability. Data available from the 1993 stream surveys was not adequate to type streams based on Rosgen stream classification, therefore channel typing was not done on Sunshine Creek, Balance Creek or Dunstan Creek. Riparian Area Pace Transect surveys were conducted in 1992 and determined that streambank stability in Coyote Creek was within Forest Plan DFC/PACFISH RMOs. Transect surveys completed in 1993 determined that Balance Creek, Dunstan Creek, Sunshine Creek, East and Middle Fork Sunshine Creek all were within Forest Plan DFC/PACFISH RMOs. Recent field observations by the project fishery biologist concur with these earlier observations.

Environmental Consequences

Alternative 1 - No Action

Direct and Indirect Effects

Temperature

With no vegetative treatments, haul activities or prescribed burning in riparian areas, there would be no short term effect on water temperature. Riparian areas within this Project Area are not large enough to act as fire breaks for higher intensity wildfires. Because fuels would remain untreated under this alternative, all streams in the Analysis Area, except for the MFJD River, with existing conifer or hardwood shading would be at risk for losing shade and incurring increasing summer water temperatures in the future due to an increasing risk, over time, of an uncharacteristic wildfire. Increased WID ratios from sediment pulses following such a wildfire could raise stream temperatures by increasing the surface area exposed to solar radiation. Additionally, the immediate water temperature increase resulting from a high intensity fire as it burns through a riparian area (over the stream) can lead to direct mortality of fish and spotted frogs.

Ongoing road maintenance activities located within RHCAs would not reduce existing stream canopy cover so as to adversely affect streamside shading or water temperature. Considering the risk of an uncharacteristic wildfire under the No Action Alternative, there is the slight potential for adverse direct and indirect water temperature affects to aquatic TES species over the long term.

Sediment

The activities with the highest potential for affecting sediment input to streams are related to road maintenance, or a lack thereof. Road related impacts most likely to contribute high sediment inputs would be plugged culverts leading to washed out road fills, undersized culverts at stream crossings leading to high water velocities and subsequent erosion at culvert outlets, or sediment channeled on road surfaces and routed through road-side ditches and cross-drain culverts to streams. Under this alternative, there would be no road management activities other than routine road maintenance. This can be considered a no effect, or no change from the existing condition, in the short term, however, at existing funding levels road maintenance is not expected to keep up with all needs. This alternative would not do anything to reduce impacts of the existing road system. Therefore it would be expected that sedimentation from existing open and closed roads and some previously decommissioned roads would increase over time, unless other projects are implemented to address these impacts.

The quality of fish habitat could be reduced because fuels would remain untreated under this alternative. A high intensity, stand replacement wildfire could result in a scale and severity of effects that is uncharacteristic of this habitat type. Such a wildfire may transport fine ash, remove soil cover, kill bank-stabilizing plant roots, and potentially increase water run-off rates. The quality of fish habitat would decline until vegetation along burned portions of streams recovered (an estimated 5-10 years). Indirectly, given the risk of a high intensity, stand replacement wildfire under the No Action Alternative, a higher erosion potential exists for a certain period following such an event. Intense storm events (greater than a six year event) immediately following a wildfire that burned in steep terrain and had large areas of high severity burn may result in concentrated run-off, resulting in more sediment transport directly into fish bearing streams and potentially resulting in increased width-to-depth ratios. This could result in short term adverse affects and a recovery of the stream ecosystem from the effects of fire that is slower, more sporadic, and potentially incomplete, in cases where natural stream processes are already impaired (see below).

As noted by Dunham et al. (2003), the effects of wildfires depend on a variety of factors including their timing, location, area, extent, and intensity. Other factors include the characteristics of the ecosystems and the species affected along with other indirect physical and ecological linkages. While such events can cause short term negative effects, such as those listed below, over long time periods the resulting habitat conditions may be more productive then in areas where natural disturbance has been suppressed (Dunham et al. 2003). Wildfires can have a number of detrimental effects to stream channels such as decreasing stream channel stability, increasing discharge and affecting discharge variability, altering coarse woody debris delivery and storage, increasing nutrient availability, increasing sediment delivery and transport, increasing solar radiation and altering water temperature regimes (Dunham et al. 2003). In cases where natural stream processes are already impaired such as Balance Creek, Dunstan Creek and Sunshine Creek, the recovery of the stream ecosystem from the effects of severe wildfire is likely to be slower, more sporadic, and potentially incomplete (Minshall 2003).

In summary, these future impacts could reach a magnitude of "Likely to Adversely Affect" for MCR steelhead. The short term water temperature increase due to a high intensity fire burning through the riparian area could lead to direct mortality of fish or spotted frogs in the stream(s) at that time. These impacts would not cover a large enough area to result in a WIFV determination for redband trout, Chinook salmon, or Columbia spotted frog (see Table FI-5 definitions). Due to the fact that none of the Critical Habitat indicators are likely to be degraded under this alternative, but there may be minor affects that are considered insignificant, the Malheur National Forest has made the determination that this alternative is “May Affect, but is Not Likely to Adversely Affect” Mid-Columbia steelhead Critical Habitat and No Adverse Effect to Chinook salmon Essential Fish Habitat (Table FI-5). Because the MFJD River is migratory habitat for bull trout and they are not likely to be found within this portion of the River during summer months, there will be no direct or indirect effects to bull trout.

Cumulative Effects

The cumulative effects boundary is the same as the Aquatic Analysis Area described above. The list of past, on-going, and foreseeable activities displayed in Appendix C (Cumulative Effects) of the EA was reviewed.

As mentioned in the Watershed section, the conditions contributing to altered run off response include: logging, grazing, mining, roading, and construction of railroad grades. Roads and old railroad grades, constructed without drainage and parallel to streams (within about 100 feet), often route overland flow toward streams. Stream crossings on closed or decommissioned roads where culverts remain or where fill was not re-shaped contribute sediment and channel overland flow to streams. Alteration of soil conditions appears severe in some isolated locations, probably because of multiple and repeated activities over 150 year and their legacy effects. These conditions are found along segments of Sunshine, Dunstan, and Balance creeks and their tributaries and along unnamed streams on both sides of the MFJD River.

Such conditions continue to reduce availability of riparian storage and can be detrimental to juvenile salmon by introducing suspended particulate matter that interferes with feeding and territorial behavior (Berg and Northcote 1985). Increased fine sediment deposition in the substrate can also decrease salmonid egg-to-fry survival. Increased sediment associated with roads such as those described above would be small in comparison to naturally occurring high levels during high flows (which often coincide with steelhead spawning and/or incubation).

Inputs of fine sediment can reduce benthic invertebrate abundance and lead to a shift in species composition. Studies have shown that sediment inputs resulting in substrate embeddedness of greater than one-third can result in a decrease in benthic invertebrate abundance and thus a decrease in food available for juvenile salmonids (Waters 1995). Higher level effects are mostly due to roads, including former logging roads (some of which are currently decommissioned, however are producing sediment), past grazing, and past riparian harvest. Lesser effects (sediment) may be due to the recent culvert replacement on County Road 20, from channel restoration activities on private land immediately upstream of the fisheries Analysis Area, and private land grazing adjacent to the Project Area.

The aquatic habitat and water quality effects of future activities described in Appendix C of the EA are negligible, except for the short-term effects from the actions mentioned in the preceding sentence. The effects of use and maintenance of roads which are not decommissioned would remain about the same as at present. The effects of County Road 20 culvert replacement and channel restoration in the MFJD River would start to decrease in 2008, and would be negligible by 2010.

The Nature Conservancy (TNC) has proposed and implemented several aquatic and floodplain restoration projects on their 1,200 acre Dunstan Homestead Preserve (DHP). ODFW conducted surveys on the DHP, during the summers of 2005 and 2006 to validate fish response to instream restoration work. More recently, instream restoration work on the MFJD River was completed by TNC during the summer of 2007 (ODFWb 2007). This work was designed to alter fish habitat. Post-treatment monitoring recorded a greater quantity of large woody debris associated with pools. Post-treatment monitoring also showed that pool depth and volume were greater than the control reach. No fish counts were conducted during this post-treatment monitoring, however large numbers of small fish, several mountain whitefish, and four live adult spring Chinook salmon were observed holding in one of the newly treated pools (ODFWb 2007).

The Confederated Tribes of Warm Springs Reservation of Oregon (Tribes) continue habitat enhancing activities on their 1,022-acre Oxbow Conservation Area property on the MFJD River. Annual habitat maintenance includes management of riparian fences, weed control activities and care for the trees and shrubs planted in 2006. Plans are underway to enhance instream habitat and floodplain connectivity on the reach of the river between Beaver Creek and Ragged Creek. Removal of all non-native rock barbs, installed in the 1970s, is part of the effort to assist the River in naturally adjusting. The project also includes addition of large woody debris jams to maintain large pools for holding adult Chinook and instream habitat for rearing juvenile salmonids. This project is planned to be implemented in 2008 or 2009. The Tribes will also be addressing similar habitat enhancement activities for the rest of their property in various phases from 2010 to 2015, including channel construction efforts in the dredged reaches of the property.

The Tribes also plan to coordinate with the Malheur National Forest to perform a 90-acre prescribed burn in tandem with the Balance Fuels Reduction Project. This burn would occur on the western edge of the property in the Ragged Creek watershed, adjacent to National Forest Land.

The Tribes also are actively engaged in project monitoring, as well as status and trend monitoring of habitat conditions on the Oxbow Conservation Area, with most attention given to aquatic ecosystems. Weather, stream temperature, riparian vegetation survival, photo point, snorkeling, steelhead spawning, and adult Chinook salmon holding counts are some of the monitoring efforts performed. An ODFW aquatic habitat survey was conducted in 2005 on private land just upstream from the Balance fisheries Analysis Area, at TNC and the old Oxbow Ranch parcel's property boundary. The channel was unconstrained within a broad valley floor. The average valley width index was 5.5 (range: 4.0-7.0). Land uses for the reach were large timber and light grazing. The average unit gradient was 0.7 percent. Riffles (79%) were the dominate stream habitat. Cobble (34%) and gravel (42%) were the primary stream substrates. Erosion was low (3% of the entire reach length had evidence of eroding banks). Wood volume was very low at 0.4m3/100m. The tree species found most frequently in the riparian zone were hardwoods 3-15cm (based on two riparian transects), however the riparian consisted primarily of grasses and shrubs.

Additionally, private landowners in the area are working towards restoration of aquatic habitat through active stream restoration and working with the Oregon Water Trust during the irrigation season to keep water in the MFJD River for spring Chinook, summer steelhead, redband trout and bull trout (Wright 2006). The Big Boulder Creek Project is planned for construction in summer 2008 and will consist of moving the stream into a historic alignment for approximately 2,400 feet on the Boulder Creek Ranch (BCR) property and installing small rootwad structures in the new channel and the remainder of the stream on BCR and TNC property. The existing channel to be re-routed is incised and held against the toe of the slope with very little chance to enhance riparian conditions. The goal of moving the channel is to have more flood plain interaction, greater diversity, improved water table elevation, and better environment for riparian vegetation growth. The rootwad structures will enhance pools, trap spawning gravels, and provide overhead cover (M. Croghan pers. com.).

Either alternative would permit natural slow, partial recovery from effects of past grazing, past riparian road construction, and past riparian harvest. This recovery would occur as riparian trees grow larger, as large wood falls into the streams, as channel types change to more stable, narrow configurations, as sediment from past actions is washed out, and as riparian shrubs and sedge communities recover and contribute to more stable stream banks. While some decommissioned roads are reverting to less disturbed soil and vegetation conditions at natural rates, recovery of other areas would be only partial because ongoing impacts from some existing roads would not permit full recovery.

The current grazing standards are designed to eliminate any effects on aquatic habitats that could carry over to the following year. There are no cumulative effects from current grazing practices within the USFS portion of adjacent allotments.

If a severe crown fire occurs, shade would be reduced, and water temperatures would increase. Sediment would increase from channel and upland sources, and a pulse of woody debris would fall into the Analysis Area streams. Both low flows and peak flows would increase for perhaps 10 years, until evapotranspiration recovers.

Alternative 1 – No Action

Under the No Action Alternative, there would be no management activities associated with the fuels treatments, commercial and precommercial thinning in the Project Area; therefore, there would be no direct effects to aquatic species. This would eliminate the need for construction of landings, temporary roads and felling of danger trees. It would also eliminate the need for haul activities including water withdrawals for dust abatement. Road maintenance activities if performed on a regular basis would help to ensure that culverts are cleaned out and maintained, waterbars and other drainage features are properly constructed and maintained, and would result in reduced levels of fine sediment entering streams within the Analysis Area. It would be expected that sedimentation from existing roads would increase over time, unless other projects are implemented to address these impacts. .

The hazard of a severe crown fire is higher, as described in the Fire and Fuels section. Most of the forested stands in the Project Area are identified as moderate to high risk for stocking induced mortality and related infestation of pests or disease. Without silvicultural treatment and/or the controlled re-introduction of fire into the Project Area, current stand conditions would worsen and increase the chance of a stand replacement fire. A stand replacement wildfire would result in the loss of shading along stream channels, loss of instream wood structures, and relatively short-term (5 to 10 years) loss of streamside vegetation. This could adversely affect fish habitat in Balance Creek and Sunshine Creek. In addition, localized extirpation of these fish could occur as the result of severe wildfires (Rinne 1996).

Alternative 2 – Proposed Action

Direct and Indirect Effects

Temperature

Timber harvest units, landings, and all temporary roads would be located outside of RHCAs under Alternative 2. Restricting these activities to areas outside of RHCAs would prevent adverse impacts to existing stream shading. No measurable effects on stream temperature are expected because none of the proposed actions are expected to remove vegetation which shades streams. Hand thinning, prescribed burning, and limited pile burning is planned for Unit 68, along fish-bearing reach of Sunshine Creek. No thinning would occur within 25 feet of these streams or within bankful channel or lower benches, and trees would not be directionally felled into the no cut zone. Additionally, hand piles in RHCAs will be located at least 50 feet away from live and intermittent stream channels and not in riparian vegetation. Ignition of closely spaced piles (less than 75 ft. apart) in RHCAs will be distributed over a minimum of two years (See Chapter 2 Design Elements – Watershed). Proposed actions to improve stand conditions by pre-commercial thinning would remove vegetation only from the outer portions of fish-bearing and intermittent RHCAs, consequently there are not expected to be any measurable effects on stream temperature.

Enhancement of two aspen stands along Sunshine Creek would include felling conifers to reduce shading of and competition with young aspen and protecting regeneration from big game and cattle browsing by installing fencing or placement of the fallen material. Generally conifers would be felled where they interfere with the growth of existing aspen or where they block light from reaching aspen sprouts. Conifers may be preferentially felled across streams under the guidance of a hydrologist or other designated specialist. Felled trees may be used for fencing. Residual slash (limbs and tops) from felled trees would be scattered or piled and burned. Existing large wood debris would be left in place and protected from burning by piling slash away from the debris or by designating ignition locations during prescribed burning. Aspen stands would be fenced to protect regeneration. Felling of conifers along two aspen stands would not result in increases in stream temperature to Sunshine Creek because the two stands total only 0.8 acres and only a few conifers would be felled in each of the two units which could act to shade the stream. Slash piles would not be burned in these two aspen stands near Sunshine Creek.

Prescribed fire activities would occur in RHCAs. Burning activities would mimic low intensity fires that are characteristic of natural burning patterns that tend to occur in riparian areas. This technique would result in a patchy distribution of burned and unburned areas in RHCAs based on the Malheur National Forest's experience with past prescribed burning activities in RHCAs using the same technique. Ignition of prescribed fire is planned within RHCAs on approximately 210 acres and would occur under strict burn prescriptions. In other burn blocks, fire from upslope burning units which is within prescription, would be allowed to back into RHCAs. Design elements include retention of at least 95% of stream shade and a goal of less than 5% actual exposed mineral soil within RHCAs. The prescribed burning would occur when moisture and climate conditions would minimize the potential for a high intensity burn. Although some mortality of overstory trees may occur, loss of shade which could affect stream temperature is not expected to occur. Burning in the ponderosa pine communities along Sunshine Creek is expected to be low intensity and rarely kill trees in this fire adapted community. Longer term beneficial effects could result from increased riparian vegetative vigor, as a result of these low intensity, mosaic burns in riparian areas. In a recent study, Beche et al. (2005) found that a fall prescribed fire within the riparian zone of a mixed-conifer forest in El Dorado County, California was patchy in terms of intensity, consumption, and severity. Additionally they found that although 49.4% of all tagged trees (>11.5 cm/4.5 in.) and snags were scorched by the prescribed fire, only 4.4% of all tagged trees were dead one year after the prescribed fire. In general the trees killed by the prescribed fire were small and located near areas of high litter accumulation (Beche et al. 2005).

Water for application (water withdrawals) would come from the following designated water sources: Sunshine Creek and Ragged Creek at the FSR 2045 crossing, and Cress Creek at FSR 2000-045 crossing in Section 17. Water withdrawals would be in accordance with the 2005 Malheur National Forest Road Maintenance Biological Assessment (BA) and NMFS guidance (with the exception that drafting would be permitted before sunrise and after sunset - see Aquatic Biological Evaluation located in Appendix F). Use of these procedures would ensure that water withdrawals do not result in a measurable increase in water temperatures.

Sediment

Commercial harvest units, landings, and temporary roads would not be located in RHCAs under Alternative 2. Restricting these activities to areas outside of RHCAs would minimize the potential for sediment delivery to fish bearing streams. There would be soil disturbance associated with commercial thinning and other proposed activities, primarily as a result of tractor skidding, and subsoiling of skid trails and landings. The risk of sediment from these activities reaching streams providing fish habitat is negligible, due to the likelihood that sediment will remain within unit boundaries as described in the Soils section. In most cases sediment generated from these activities, which has the potential to move off-site during rare large storm events, would be captured in the RHCA buffer.

There is also the potential for generating sediment from non-commercial thinning operations and burning hand piles. The risk of sediment from these activities reaching fish habitat is negligible because they do not involve heavy equipment and design elements have been developed to reduce the risk of sediment delivery to streams (See Chapter 2 - Design Elements: Soils, Watershed and Fisheries).

While high intensity prescribed fire has the potential to result in exposed soil, which in turn poses a potential for sediment transport off-site, the design elements for the proposed prescribed burning in this project would minimize that risk. Burn plan prescriptions would include parameters for weather and fuel moisture conditions, percent duff removal, percent mineral soils exposed, and others, which will set the sideboards to keep fire intensity to a level that would not result in soil loss. The ignition and limited use of fire within RHCAs described above would result in a low risk of generating sediment along perennial streams. Fire lines would not be permitted within RHCAs, except for one location along Cress Creek (not fish-bearing) where control lines would tie into an existing road located between Cress Creek and the treatment area; thus reducing the risk of sediment being channeled to intermittent or perennial stream channels. Beche et al. (2005) conducted intense post-prescribed fire monitoring (e.g. pebble counts, longitudinal profiles, cross-sections) and observed little to no change in stream sediment composition 1 year post-fire. Similarly, they observed little to no change in stream channel morphology and no substantial change in erosion or deposition in the surveyed reaches (Beche et al. 2005). The prescribed burning would be expected to burn across Category 4 RHCAs, since these would be dry during the burning operations. However, as mentioned in the Soils section, because burning would take place so as to avoid decreasing ground cover below Forest Plan standards; the potential for erosion from these areas would not be significant. The potential for some sediment movement in some of these intermittent channels which could reach fish habitat is low, except under rare, intense storm events.

Temporary Road Construction

Approximately 2.5 miles of temporary road are proposed to be constructed on previously decommissioned road beds. These road beds were previously considered authorized roads and have been decommissioned under previous NEPA. None of these previously decommissioned road beds shows signs of sediment transport or unauthorized use and all are currently grassed in to some degree. Temporary roads are not part of the Forest road system, and they would be returned to their existing state after use. Personal observations by the soil scientist indicate that sediment generated from temporary road construction and use would be deposited within 50 feet of the road edge (R. McNeil pers. com). All temporary roads are located entirely outside of RHCAs. Because of the location and design elements for these roads, it is not expected that any sediment generated from the construction, use, or "decommissioning" of these roads, would reach fish bearing streams.

Haul Road Use

There will be an opportunity to perform road maintenance on up to approximately 29.2 miles of Forest roads commensurate with commercial uses associated with project activities. The type of road maintenance activities which may occur on roads used for commercial haul could include:

- Blading and shaping of road surface and ditches
- Construction or reshaping of drain dips or grade sags
- Construction of waterbars/cross ditches
- Spot rocking of road surface
- Brush removal from roadway
- Felling and or removal of hazard trees
- Minor realigning of road junctions
- Cleaning culverts
- Seeding
- Removing excess materials from roadway

Because the maintenance work accomplishments will be commensurate with use, the amount actually accomplished will vary depending on existing road conditions, season of use and other factors. When road maintenance work is accomplished, commensurate with use, it would help to ensure that haul roads are kept in an appropriate condition so as to avoid deterioration of conditions and reduce erosion and sediment output from haul roads.

Approximately 6.1 miles of commercial haul routes are located within RHCAs. Of these 6.1 miles within RHCAs, approximately 2.1 miles are over native surface roads. The Malheur National Forest has a policy (with direction from PACFISH RF-2) to regulate traffic during wet periods to minimize erosion and sediment delivery. This includes log haul, as well as, any other vehicle traffic. Mitigation measures such as dust abatement (mainly for safety reasons), hauling on dry or frozen ground, and ceasing haul activities during muddy conditions are highly effective at minimizing sediment input to streams.

Because haul roads would receive pre/during and post haul maintenance, commensurate with use, and the majority of these roads are upstream from fish habitat; the magnitude of haul road use on sedimentation is insignificant, and therefore would result in a neutral effect.

Reopening of Closed Roads

Approximately 5.9 miles of currently closed roads would be opened for timber harvest and then effectively re-closed after project activities are concluded. Of these 5.9 miles to be opened, approximately .5 miles are located within RHCAs. These closed roads were previously analyzed to derive subwatershed road densities under baseline condition (Table FI-1). The baseline condition of these roads was considered to be similar to open roads, with respect to the level of vegetation recovery, even though two of these roads have grown-in to varying degrees with grass (2000983) and reprod (2000083).

Reopening these closed roads would not change road densities already analyzed under the baseline. Road densities and roads in close proximity to streams would remain at moderately detrimental levels within the Subwatershed.

As mentioned in the Watershed section, Best Management Practices (BMPs) associated with the proposed activities are expected to control most run-off and sediment transport under common run-off events. However, because the proposed activities would be implemented in sub-drainages which have been previously disturbed by management activities, including roading at densities in excess of five miles/square mile within the Project Area (Table FI-1), a slight probability exists that previous disturbance would become connected to ground disturbance associated with the proposed actions.

The magnitude of reopening closed roads on sedimentation is insignificant, and therefore would result in a neutral effect for the following reasons: 1) reopened roads would receive pre/during and post haul maintenance, commensurate with use, and would be effectively reclosed after use, and 2) the majority of these reopened roads (5.4 miles) are not located in RHCAs and only (<0.1 mile) of one reopened native surface road (FSR 2045475) is located within the RHCA near Sunshine Creek, a fish bearing stream. Three temporary culverts would be installed on this road, however, none would be installed on the portion within the RHCA and all are cross drains which would be dry when the work is completed.

Road Maintenance

Roads used within the sale area would receive road maintenance at a level commensurate with use. Road maintenance includes several activities that potentially result in sedimentation from the road prism to the ditch line, or the adjacent slope. Typical road maintenance activities could include: blade and shape road including existing drainage dips, grade sags, and waterbars, repair damaged culverts, place rock in some existing drainage dips and grade sags, place rock in wet areas of road, brushing, remove hazard trees, and dust abatement.

Project design elements and protective measures from the 2005 Malheur National Forest Road Maintenance BA would be followed for the replacement, removal, or installation of ditch-relief culverts.

The longer term effects of road maintenance, commensurate with use, are to maintain or improve existing road conditions. Road maintenance, commensurate with use, may decrease chronic sedimentation in some locations. Improving drainage, removing ruts and rills from the driving surface, and adding less erosive surfacing material would reduce detachment and transport of sediment. This is especially important for roads within RHCAs. Because road maintenance activities would be commensurate with use, it is possible that if winter logging occurs, little to no road maintenance may be necessary and therefore would not occur. Alternatively, if operations occur in the summer, road maintenance, commensurate with use, may occur on all or nearly all of the roads.

The overall effect of the proposed action to the baseline conditions of sediment is that the negligible effects over the short or long term would be insignificant to measurably increase the baseline levels of sediment in spawning habitat of MCR steelhead, Chinook salmon and redband trout.

Chemical Contaminations/Nutrients

The Forest Service would require the purchaser to adhere to all requirements within the timber sale contract related to oil spills and hazardous substances. Refueling and fuel storage sites would be located at least 150 feet away from live streams. Other chemicals used may include saw gas and oil, and fuels used to ignite fires. All have the potential to adversely affect aquatic TES species, if they were to enter nearby stream systems. Handling procedures and spill plans would minimize the risk of potential effects. In the event of the need for fire suppression actions, no chemicals or retardant would be used within 300 feet of water or wetlands. There is minimal risk of an accidental spill from logging equipment, vehicles used to transport crews, equipment, ignition materials, or fire suppression activities in the event of an escaped prescribed burn.

Beche et al. (2005) found that ash deposition from the prescribed fire appeared to have a minimal impact on stream water chemistry with increases in some water chemistry parameters ($SO4^-$, total P, $CA2^+$, and $Mg2^+$). It should be noted that their study area had low to moderate hillslopes and so accelerated erosion and ash delivery would not be expected. It might be expected that these same water chemistry parameters would also increase with the proposed prescribed burning in this alternative, at least temporarily.

Dust abatement procedures would adhere to the Road Maintenance Specification in the Dust Abatement plan. Only water would be used for dust abatement, as needed, during periods of heavier vehicle use associated with commercial timber harvest activities and/or rock haul activities. Water for application would come from the following designated water sources: Sunshine Creek and Ragged Creek at the FSR 2045 crossing, and Cress Creek at FSR 2000-045 crossing in Section 17.

Because handling procedures, refueling restrictions and spill plans would be in place and there is a low probability of a fuel spill when lighting in RHCAs, there is a neutral effect of the project to streams from chemical or nutrient contamination. No change to baseline levels of nutrients or chemical contaminants are expected.

Large Woody Debris (LWD):

Approximately 6.1 miles of commercial haul routes are located within RHCAs. Felling of danger trees for human safety along haul routes in RHCAs has the potential to reduce the supply of LWD to stream channels and therefore pool habitat. Under PACFISH, trees may be felled in RHCAs when they pose a safety risk (PACFISH Standard RA-2). All trees felled in RHCAs for safety reasons would be kept on site in accordance with PACFISH Standard RA-2 to meet woody debris objectives. Proposed road maintenance, road reconstruction and/or haul activities would not likely result in a reduction of LWD to Category 1, 2 or 4 stream channels because in most cases, trees that can only safely be felled across the road, often have a lean away from the stream channel and would be less likely to fall into stream channels where they could function in the formation of pools and/or contribute coarse particulate organic matter directly to the stream.

Prescribed fire activities would occur in RHCAs. Burning activities would mimic low intensity fires that are characteristic of natural burning patterns in riparian areas. This technique would result in a patchy distribution of burned and unburned areas in RHCAs. Using these techniques, mortality of understory trees may occur in burned patches but few overstory trees would be killed. Fire intensities would not be high enough to consume trees or downed wood large enough to function as LWD (> 20" dbh) in stream channels therefore burning activities would not result in a reduction of pool habitat. Consumption of coarse wood near stream channels greater than 4"dbh would be minimized. Beche et al. (2005) found that prescribed fire did not change the amount or movement of LWD in their study reach relative to unburned streams. They did note, however, that in other less intensely studied reaches snags fell into the stream channel.

There is a neutral or slightly positive effect to LWD and its recruitment from the project because instream wood will not be physically removed from RHCAs where it has the potential to fall into live streams, snags may fall into streams as a result of prescribed fire activities, and as a result of aspen treatments along Sunshine Creek LWD may be felled into the stream. Some roadside danger trees may be felled into stream channels, ephemeral draws or floodplains, and the reduction in stocking densities following burning activities may increase the vigor of larger trees in the overstory.

In summary, the risk of sediment from proposed activities reaching streams providing fish habitat is negligible, due to the likelihood that sediment will remain within unit boundaries as described in the Soils section, the fact that all temporary roads would be located outside of RHCAs, and the likelihood that sediment generated from temporary road construction and use would be deposited within 50 feet of the road edge. In most cases sediment generated from proposed activities, which has the potential to move off-site during rare large storm events, would be captured in the RHCA buffer.

The effects determination for Alternative 2 is "May Affect, but is Not Likely to Adversely Affect" Mid-Columbia steelhead and steelhead Critical Habitat, "No Effect" to bull trout, "No Adverse Effect" to Chinook salmon Essential Fish Habitat, the effects determination to Chinook salmon is No Impact, and the effects determination to redband trout and spotted frog is “May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species” (see Table FI-2).

Cumulative Effects

Alternative 2 – Proposed Action

These cumulative effects are in addition to those discussed under Alternative 1. Under Alternative 2 the hazard of a severe crown fire is lower than under Alternative 1, as described in the Fire and Fuels section of Chapter 3.

Under the proposed action, commercial/pre-commercial thinning, log and rock haul, prescribed burning, and road maintenance may result in negligible increases in fine sediment, however it is unlikely that these increases would result in cumulative adverse effects when combined with other past, ongoing, or future actions.

Short-term increases in fine sediment from prescribed burning is unlikely to result in measurable increases in fine sediment in stream channels. Timber harvest units, landings, and all temporary roads would be located outside of RHCAs under Alternative 2. Restricting these activities to areas outside of RHCAs would prevent adverse impacts to existing stream shading and reduce the chance of sediment input to streams.

Of the activities proposed under this alternative, only prescribed burning, pile burning, limited pre-commercial thinning, and certain road maintenance and haul activities could affect sediment input to fish bearing streams. All other activities would occur outside of RHCAs, and associated buffering should be sufficient to trap any mobilized soil resulting from external ground disturbance. Prescribed burning, as described in the direct and indirect effects section, could creep down to streams and remove soil cover and although ground cover would decrease, especially during fall burns, effects from prescribed burning would be minor. Burning would take place so as to avoid decreasing ground cover below Forest Plan standards, so erosion would not be significant (see Soils section). As a result, the cumulative increase in sediment would likely be brief and not measurable. Consequently no cumulative effects on Balance Creek, Dunstan Creek, Sunshine Creek or the MFJD River are expected to develop from the proposed activities following common run-off events.

Consistency With Direction and Regulations (Forest Plan)

Alternative 1 - No Action

Alternative 1 would be consistent with: MA 3B standards, and PACFISH standards and guidelines. Roads that are having known adverse impacts to aquatic resources would remain in their current condition under Alternative 1.

Alternative 2 – Proposed Action

Alternative 2 is consistent with the following applicable MA 3B and PACFISH standards:

- PACFISH RF-2b: Proposed temporary roads and landings are located outside of RHCAs.
- PACFISH RF-3a & b: Roads that will be used for proposed vegetation management activities will have drainage problems repaired and will be brought up to standards prior to haul.
- PACFISH RA-2: Hazard trees felled in RHCAs will be left on site where woody debris objectives are not being met.
- Forest Plan DFC's/RMOs: Activities proposed under Alternative 2 would not retard the attainment of Forest Plan RMOs for aquatic habitat (LWD, replacement LWD, pool frequency, bank stability, width-to-depth ratio, sediment/substrate, shading, and water temperature). Design elements will be used to minimize the amount of fine sediment resulting from proposed activities.
- Design prescribed burn projects and prescriptions to contribute to the attainment of RMOs (PACFISH Standard FM-4).
- Prohibit storage of fuels and other toxicants within RHCAs. Prohibit refueling within RHCAs unless there are no other alternatives. Refueling sites within a RHCA must be approved by the Forest Service and have an approved spill containment plan (PACFISH Standard RA-4).
- Locate water drafting sites to avoid adverse effects to listed anadromous fish and instream flows, and in a manner that does not retard or prevent attainment of RMOs (PACFISH Standard RA-5).
- Design fuel treatment and fire suppression strategies, practices, and actions so as not to prevent attainment of RMOs, and to minimize disturbance of riparian ground cover and vegetation. Strategies should recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuel management actions could perpetuate or be damaging to log-term ecosystem function, listed anadromous fish, or designated critical habitat (PACFISH Standard FM-1).

Endangered Species Act

The Endangered Species Act requires the Forest Service to manage for the recovery of threatened and endangered species and the ecosystems upon which they depend. Forests are required to consult with the USFWS or the NMFS if a proposed activity may affect the population or habitat of a listed species.

The following is a summary of effects determinations for alternatives documented from the Aquatic Biological Evaluation for the Balance Thinning and Fuels Reduction Project (Table FI-2):

Table FI-2 - Threatened, endangered and sensitive (TES) species considered in this analysis of the Balance Fuels Reduction project and the effects determination for the No Action and Action alternatives.

Aquatic Species	Status	Alt. 1No Action	Alt. 2Proposed Action
Columbia River Bull Trout Salvelinus confluentus	T, MIS	NE	NE
Mid-Columbia River Steelhead Oncorhynchus mykiss	T, MIS	LAA	NLAA
Mid-Columbia Steelhead Designated Critical Habitat	D	NLAA	NLAA
Chinook Salmon EFH[1]	MS	NAE	NAE
Interior Redband Trout Oncorhynchus mykiss	S, MIS	MIIH	MIIH
Westslope Cutthroat Trout Oncorhynchus clarki lewisi	S, MIS	NI	NI
Mid-Columbia River Spring Chinook Oncorhynchus tshawytscha	S	MIIH	NI
Columbia Spotted Frog Rana luteiventris	S, C	MIIH	MIIH
Malheur Mottled Sculpin Cottus bairdi ssp.	S	NI	NI

1Chinook salmon waters are designated Essential Fish Habitat by the Magnuson-Stevens Act.

See below reference tables for an explanation of the abbreviations used above.

Table FI-3: Federal listing status abbreviations

T	Federally Threatened
S	Sensitive species from Regional Forester’s list
C	Candidate species under Endangered Species Act
MIS	Management Indicator Species
D	Designated Critical Habitat
MS	Magnuson-Stevens Act designated Essential Fish Habitat

Table FI-4: Threatened and Endangered Species effects determinations Abbreviations

NE	No Effect
NLAA	May Effect, Not Likely to Adversely Affect
LAA	May Effect, Likely to Adversely Affect
BE	Beneficial Effect

Table FI-5: Sensitive Species determinations Abbreviations

NI	No Impact
MIIH	May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species
WIFV	Will Impact Individuals or Habitat with a Consequence that the Action May Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species
BI	Beneficial Impact

Table FI-6: Designated critical Habitat effects determinations Abbreviations

NE	No Effect
LAA	May Effect, Likely to Adversely Affect
NLAA	May Effect, Not Likely to Adversely Affect

Table FI-7: Chinook salmon Essential Fish Habitat effects determinations Abbreviations

NAE	No Adverse Effect
AE	Adverse Effect

Magnuson-Stevens Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires the inclusion of Chinook salmon Essential Fish Habitat (EFH) descriptions in Federal fishery management plans. In addition, the MSA requires Federal agencies to consult with NMFS on activities that may adversely affect EFH.

Recreational Fisheries

Alternative 1 – No Action

Alternative 1 would maintain the current aquatic habitat conditions. The current aquatic habitat conditions are not resulting in reduced recreational fishing opportunities.

Alternative 2 – Proposed Action

Alternative 2 is not likely to impact the quantity, function, sustainable productivity, and distribution of recreational fisheries per Executive Order 12962, Recreational Fisheries.

Irreversible and Irretrievable Commitments

Irreversible effects are not expected. Reduced population viability for steelhead trout, redband trout, bull trout, Chinook salmon, and Columbia spotted frog is not expected. PACFISH established explicit goals and objectives for anadromous fish habitat condition and function. By following PACFISH standards and guidelines as well as design elements specific to this project, it is believed that irretrievable commitment of this resource can be avoided. The goal is to achieve a high level of habitat diversity and complexity through a combination of habitat features.

Botany

Introduction

This section describes and displays effects to proposed, endangered, threatened, and sensitive floral species associated with the Balance Thinning and Fuels Reduction Project. The type of actions, scope of present, future, and past activities, and duration of activities, influence the size of impacts to these uncommon plants.

Table B-1: Status of Species, Habitat, and Effects Summary displays the status of species and habitat within the Project Area, and effect findings for species suspected or documented on the Blue Mountain Ranger District.

Table B-1: Status of Species, Habitat, and Effects Summary

Sensitive Species	Occurrence in Project Area	Habitat Status Within Project Area	Alt 1 (No Action)	Alt 2 (Proposed Action)
Achnatherum hendersonii Henderson's ricegrass	Not Found	Not Present	NI	NI
Achnatherum wallowensis Wallowa ricegrass	Not Found	Not Present	NI	NI
Astragalus diaphanus var. diurnus South Fork John Day milkvetch	Not Found	Not Present	NI	NI
Astragalus tegetarioides Deschutes milkvetch	Not Found	Not Present	NI	NI
Botrychium ascendens upswept moonwort	Not Found	Present	MIIH	MIIH
Botrychium crenulatum crenulate moonwort	Not Found	Present	MIIH	MIIH
Botrychium lanceolatum lance-leaf moonwort	Not Found	Present	MIIH	MIIH
Botrychium minganense Mingan moonwort	Not Found	Present	MIIH	MIIH
Botrychium montanum mountain moonwort	Not Found	Present	MIIH	MIIH
Botrychium pinnatum pinnate moonwort	Not Found	Present	MIIH	MIIH
Calochortus longebarbatus var. peckii long-bearded sego lily	Not Found	Not Present	NI	NI
Camissonia pygmaea dwarf evening primrose	Not Found	Not Present	NI	NI
Carex backii	Not Found	Present	NI	MIIH
Carex idahoa Idaho sedge (formerly C. parryana)	Not Found	Present	NI	MIIH
Carex interior inland sedge	Found	Present	NI	MIIH

Cypripedium fasciculatum clustered lady slipper	Not Found	Not Present	NI	NI
Dermatocarpon luridum silverskin lichen	Not Found	Not Present	NI	NI
Eleocharis bolanderi Bolander's spikerush	Found	Present	NI	MIIH
Leptogium burnetiae var. hirsutum hairy skin lichen	Not Found	Not Present	NI	NI
Listera borealis northern twayblade	Not Found	Not Present	NI	NI
Lomatium erythrocarpum redfruit desert parsley	Not Found	Not Present	NI	NI
Lomatium ravenii Raven's lomatium	Not Found	Not Present	NI	NI
Luina serpentine colonial luina	Not Found	Not Present	NI	NI
Mimulus evanescens vanishing monkeyflower	Not Found	Not Present	NI	NI
Pellaea bridgesii Bridge's cliff-brake	Not Found	Not Present	NI	NI
Phacelia minutissima least phacelia	Not Found	Suspected	NI	MIIH
Pleuropogon oreganos Oregon semaphore grass	Not Found	Not Present	NI	NI
Thelypodium eucosmum arrow-leaved thelypody	Not Found	Not Present	NI	NI

Analysis Methods

A pre-field review is used to determine the likelihood that TEPS species, or their respective habitats, are located within or adjacent to the Project Area. Information from the pre-field review, in conjunction with the project description, is used to determine the need and intensity of field surveys and, in part, fulfills the standards and procedures for conducting a BE (Forest Service Manual 2672.42). Potential sensitive species habitat was surveyed during the 2005 field season. Potential habitat was noted for eleven species, two of which were documented within the Project Area (Table B-1:- Status of Species, Habitat, and Effects Summary).

The Botany Specialist report located in the Project Record contains more information on sources of information used and a listing of plants designated as sensitive (USDA, July 2004) that are considered as potentially having habitat on the Blue Mountain Ranger District.

Existing Condition

Potential habitat for sensitive plant species occurs especially in the Balance and Dunstan Creek areas. These cooler mixed-conifer riparian corridors are full of seeps and tributary streams, and in the vicinity of Balance Creek some bog-like expanses of wet habitat are present. Nine species of orchids were observed in the Dunstan Creek drainage within the Dedicated Old Growth area. Rocky habitat occurs along the north edge of the project, as well as smaller meadows. The Sunshine Meadow (Sunshine Flat) area contains numerous *Eleocharis bolanderi* plants.

Eleven sensitive plant species have potential habitat within the Analysis Area: *Botrychium ascendens, Botrychium crenulatum, Botrychium lanceolatum, Botrychium minganense, Botrychium montanum, Botrychium pinnatum, Carex backii; Carex idahoa; Carex interior, Phacelia minutissima,* and *Eleocharis bolandari*.

Carex interior was documented during a survey of proposed water developments on a tributary to Dunstan Creek, August 2002. Additional populations of *Carex interior* were located along Dunstan Creek and tributaries in June and July of 2005. Several patches of *Eleocharis bolandari* were documented in the Sunshine Flat area of the project in 2005.

Carex interior sites are found one to three miles west of the Project Area in the Upper Gibbs, Jungle, and Bear Creek Drainages. *Botrychium crenulatum* is documented four miles west of the Project Area at 4700 feet in the Hawkins Creek drainage. Additional *Botrychium* spp. have been documented during surveys conducted along Big Creek, northwest, and Vinegar Creek, northeast, of the Project Area.

In addition, *Eleocharis bolandari* was documented within the Project Area. This plant has been added to the Regional Forester's 2008 Sensitive Species list (USDA, 2008), and will be considered in this analysis.

Environmental Consequences

In this section, the effects determination is given for the Proposed Action or the No Action alternative for species with similar habitats. Individual species descriptions and effects discussions follow.

Plant Species Associated with Dry Habitat

These species are found in rock outcrops, talus slopes, rocky scabs in ponderosa pine stands, or grass steppe habitats.

Table B-2: Status of Species, Associated with Dry Habitat

Sensitive Species	Common Name	Federal Status:	State Status:	Region 6 Status:
Carex backii	Back's sedge	none	Candidate	Sensitive

Alternative 2 – Proposed Action

Carex backii (Back's sedge)

Environmental Baseline:

There is scant information on this species on the Malheur National Forest. On the Emigrant Ranger District (Malheur National Forest) this species has been found on a terrace above a stream in association with ponderosa pine (*Pinus ponderosa*), common snowberry (*Symphoricarpos albus*), and scattered Douglas-fir (*Pseudotsuga menziesii*), but generally in less shrubby areas of this plant association. At higher latitudes the preferred habitat of this sedge species is lowland to mid-montane sites that show substrate movement on steep slopes or are closely associated with rock outcrops. On the Wallow-Whitman National Forest it has been found in dappled to deep shade and includes a shrub component or are within ponderosa pine forests on rocky ridge tops, or growing in proximity to basaltic rock outcrops. Associated species include red alder (*Alnus rubra*), red osier dogwood (*Coses sericea s. sericea*), mountain alder (*Alnus incana*), other dry land sedges, and old man's whiskers (*Geum triflorum*). The flowering period is July to August.

Direct Effects and Indirect Effects

Project impact to this habitat group is low or limited since these plants inhabit non-forested or sparsely forested habitat. The Proposed Action may impact individuals or habitat, but should not contribute to a trend towards federal listing or cause a loss of viability to the species.

No populations of the Back's sedge have been found within the Analysis Area, but potential habitat may exist.

Ground disturbing activities, such as use of logging equipment or fireline construction, would be detrimental to the species and habitat, however, such activities are not likely to occur within close proximity to riparian habitat or rocky outcrops.

Cumulative Effects

Past road building, yarding and log landing use may have reduced habitat by changing water availability. Invasive species such as red top (*Agrostis stolonifera*) and Kentucky blue grass (*Poa praetensis*) have invaded from riparian areas and may be the most serious threat this species.

Plant Species Associated with Seasonally Moist Habitat

These species are found in isolated areas where localized moisture is only available in the spring and are found within forested stands, *veratrum* meadows, or grass-steppe habitats.

Table B-3: Status of Species, Associated with Dry Habitat

Sensitive Species	Common Name	Federal Status:	State Status:	Region 6 Status:
Carex idahoa (formerly *Carex parryana*)	Idaho sedge	none	none	Sensitive
Phacelia minutissima	least phacelia	Species of Concern	Candidate	Sensitive
Eleocharis bolanderi	Bolanders Spike Rush	Non	Sensitive	Sensitive (2008 list)

Alternative 2 – Proposed Action

Carex idahoa **(Idaho sedge)**

Environmental Baseline:

No populations of Carex idahoa have been found within the Analysis Area, although there are areas of potential habitat.

This sedge is a loosely tufted perennial that grows from lowlands to moderate elevation. Its range is chiefly east of the continental divide but it extends onto the Pacific slope in central and east Idaho and northern Utah; it is also known from northeast Oregon and central Nevada.

Carex idahoa grows in the driest communities of moist meadows, swales, and moist, low ground around streams and lakes, and on prairies and high plains as well. Associated plants found on a wetland classification plot on the Emigrant Creek Ranger District were *Poa pratensis, Agrostis stolonifera, Juncus balticus*, and *Carex praegracilis.* *Carex idahoa* can reproduce via creeping rhizomes, and by seed production. Because it is wind-pollinated, it requires no pollinator insects.

Direct and Indirect Effects

The proposed activities could impact individuals or habitat. Activities would not contribute to a trend towards federal listing or cause a loss of viability to either species.

Because of its habitat, *Carex idahoa* is not likely to be affected by logging or thinning activities, as long as vehicles and machinery avoid meadows and moist ground around streams.

There is no information about the effects of fire on *Carex idahoa*. Because it grows in the driest associations of moist meadows, its habitat could be affected. If a fire is low to moderate in severity, the creeping rhizomes will probably survive and sprout after the burn. This sedge's overall habitat would probably not be negatively affected by low intensity prescribed burning, especially fall prescriptions.

Noxious weeds, knapweeds in particular, can spread rapidly in this species' preferred habitat. Knapweed sites are documented along roads within and adjacent to the Project Area. Dalmation toadflax, white top, St. Johns wort, and Canada thistle are also documented.

Cumulative Effects

Historic heavy grazing, including late season use that removed the seed crop may have reduced occurrences of this sedge in NE Oregon.

Lowered water tables associated with stream channel degradation, and the loss of beaver created wetlands may have reduced potential habitat.

Phacelia minutissima **(least phacelia)**

Environmental Baseline

No populations of *Phacelia minutissima* have been found within the Analysis Area, although potential habitat is present. Elevation of the Project Area may be slightly lower than optimum for this plant.

Phacelia minutissima is a regional endemic of the Pacific Northwest, found in Oregon, Washington, Idaho, and Nevada. It grows at moderate elevations (generally 5000 to 7000 feet) in the mountains, in micro-habitats that are at least vernally moist. It is known from the Wallowas, from the Aldrich Mountains, and from one upland site, near upper Camp Creek, a tributary to the Middle Fork John Day River and southwest of the Project Area.

According to Atwood (1996), least phacelia grows along streambanks in sagebrush communities and in aspen stands. In the Blue Mountains it often occurs in association with *Veratrum californicum* (false hellebore) and *Wyethia helianthoides* (white mules ears) in vernally moist meadows and small scablands that are common throughout the forest. In currently known sites, it exists in relatively disturbed habitat where its greatest threat may be invasion by exotic plant species such as *Lotus corniculatus* (birdsfoot trefoil).

Populations of least phacelia are most abundant in wet years, though its diminutive size, along with its annual life cycle, makes this plant difficult to locate. For this reason it is possible that it is more widespread than current records indicate. The first population to be found in the Middle Fork John Day watershed was documented in summer, 2001.

Direct and Indirect Effects

Timber harvest activities have little effect on least phacelia as long as they avoid wet meadows and riparian habitat. Meadows supporting *Veratrum californicum* (California false hellebore) should be avoided with vehicles and heavy equipment, even if they dry out late in the season.

Prescribed fire allowed to creep is not likely to adversely impact favored habitat if conducted in the fall. Wet meadows and scabs supporting least phacelia should be avoided by heavy foot or ATV traffic in spring. Burning through these areas early spring would likely not be possible because of moisture and lack of flammable vegetation. Because the population documented in the upper Camp Creek area has continued to produce new plants after various disturbances, proposed activities would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Cumulative Effects

Historic heavy grazing and overuse of riparian zones and meadows, as well as invasion by weeds, may have reduced the extent and abundance of least phacelia throughout its range, and may have degraded potential habitat as well. While it can exist in areas of moderate disturbance, its survival on severely impacted soils is in question.

Eleocharis bolanderi **(Bolander's spikerush)**

Environmental Baseline:

Several sites containing *Eleocharis bolanderi* have been found within the eastern half Analysis Area, along vernal channels in an area called Sunshine Meadow (Gibson 2005). FS road 2045 is the northern boundary to this meadow.

Little information is available about *Eleocharis bolanderi*, which was known only from historic records (1940's) until it was located in Grant and Malheur counties in 2002 (J.Wood, 2007). This spikerush is a densely tufted, grass-like perennial that grows in seasonally wet meadows and channel edges in grass steppe-scablands, from foothills to moderate elevations in the mountains. Its range occurs within Oregon, Idaho, California, Nevada, Utah, and Colorado. Flowering period is June through July.

Direct and Indirect Effects

Because of its habitat, *Eleocharis bolandari* is not likely to be affected by logging or thinning activities, as long as vehicles and machinery avoid meadows and moist ground around streams. Temporary road construction across meadows or scabs is to be avoided.

There is no information about the effects of fire on *Eleocharis bolanderi*. Previous year's leaves and culms often persist, possibly providing some fuel to carry a ground fire late season. If a fire is low in severity, the plant will probably survive and sprout from rhizomes after the burn. This spikerush's overall habitat would probably not be negatively affected by low intensity prescribed burning, especially fall prescriptions.

Cumulative Effects

Historic heavy grazing or trampling may have reduced occurrences of this spike rush in NE Oregon. Lowered water tables associated with stream channel degradation may have reduced potential habitat.

Plant Species Associated with Riparian Habitat

These seven species are found in perennially moist ground at the edges of riparian areas, including bogs and wet meadows, seeps, springs, or streams.

Table B-4: Status of Species, Associated with Dry Habitat

Sensitive Species	Common Name	Federal Status:	State Status:	Region 6 Status:
Botrychium ascendens	ascending moonwort	Species of Concern	Candidate	Sensitive
Botrychium crenulatum	crenulate moonwort	Species of Concern	Candidate	Sensitive
Botrychium lanceolatum	lance-leaf moonwort	None	None	Sensitive
Botrychium minganense	Mingan moonwort	None	None	Sensitive
Botrychium montanum	mountain moonwort	None	None	Sensitive
Botrychium pinnatum	pinnate moonwort	None	None	Sensitive
Carex interior	inland sedge	None	None	Sensitive

Alternative 1 - No Action

Direct and Indirect Effects

Because the no action alternative may increase vegetation susceptibility to high intensity fire, it may adversely impact *Botrychium* species by affecting habitat: by removing shade, damaging rhizomes, or reducing or temporarily eliminating necessary mycorrhizal associations. However, no action will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Alternative 2 – Proposed Action

Riparian areas, seeps, and springs should be avoided by vehicles and all off-road equipment and logging activity. While *Botrychium* plants were not located during the survey period, habitat exists in several drainages and seeps, particularly in the Balance and Dunstan drainages within the Project Area. Prescribed fire allowed to back into riparian areas may impact individual plants, but as long as fire intensity is low, impact to surrounding habitat and overstory trees and shade should be minimal.

Proposed activities should have minimal impact on individuals and will not likely contribute to a trend towards federal listing or cause a loss of viability to the species.

***Botrychium* Species**

None of the six *Botrychium* species have been documented within the Project Area, however several species are documented in similar habitat in adjacent drainages west, northwest, and northeast of the Project Area. In this evaluation, all *Botrychiu*m species with occurrence potential on the district are treated under a single analysis because they have common habitat requirements and are frequently found growing together.

Environmental Baseline:

Botrychiums, also known as moonworts, are small primitive plants closely related to ferns. They reproduce by spores, and are known to be mycorrhizal, though many details of their life history and growth requirements are still unknown. Although green and apparently photosynthetic, the species considered here are all capable of surviving for years with only sporadic above-ground growth, apparently drawing reserves from the host plants with which they have mycorrhizal connections. As a result, populations of these moonworts appear to fluctuate from year to year, depending on how many plants produce visible leaves and/or fruiting bodies. The factors determining yearly growth are not yet understood.

These six *Botrychium* species are found sporadically throughout the mountains of the Pacific Northwest and the Rockies, and *B. minganense* is known across Canada to the eastern part of the continent. In the Blue Mountains they have primarily been found between 5000 and 7500 feet elevation.

Preferred habitat of these species is perennially moist ground at the edges of small streams, wet meadows, springs, and small seeps within forest openings. It should be emphasized that even the smallest spring or seep provides good potential habitat, especially above 4500 feet elevation.

Plants often favor shade from an overstory of conifers or riparian shrubs such as alder and red-osier dogwood, but also occur in openings or meadows with only grasses and forbs providing shade. Wet meadow edges with encroaching lodgepole pine are prime habitat sites, as are the mossy openings around springs in mixed conifer forest that includes sub-alpine fir and Engelmann spruce. On the Umatilla National Forest several *botrychium* species are found under young spruce in moist tree plantations that are 20 to 40 years old. Plants frequently associated with *botrychiums* in the Blue Mountains include strawberries and violets, *Pinus contorta, Picea engelmannii, Alnus incana, Vaccinium scoparium, Carex aurea, Geum macrophyllum, Hypericum anagalloides, Mimulus moschatus, Orthilia secunda, Platanthera dilatata, Ranunculus uncinatus*, and other *botrychium* species.

In many instances, moonworts appear to be "seral" species favored by one-time ground disturbance, tending to appear 10 years or more after such disturbance occurs. It is possible that they die out eventually, as forest succession shades out understory plants. A mosaic of forest habitats that shift over time, providing new openings as old ones fill in, may best ensure the long-term survival of *botrychiums*. However, until this is definitively known and the needs of these moonworts are better understood, it is important to preserve existing populations. Since most of the plants are quite small and are difficult to find, they may be easily overlooked except in intensive surveys. Their habitat, on the other hand, is readily identified and protected or avoided during management activities. Reproduction of these plants is accomplished by the dispersal of spores by wind and water, and pollinators are not required.

Direct and Indirect Effects

Ground disturbance, such as soil disruption by logging and yarding activities, would reduce the quality of habitat, and could disrupt needed mycorrhizal connections, and cause direct mechanical damage to above-ground plants during the growing season. Loss of individual above-ground stems, by herbivores, unseasonable frost, or mechanical damage, may not harm plants in the long run, considering that they do not appear above ground every year, and probably rely on nutrients obtained from the mycorrhizal connections to persist.

Along with ground disturbance, changes in moisture availability such as loss of ground water sources or hydrological changes, are probably the most potentially damaging to moonwort populations. While existing plants may have the capacity to survive droughty periods through their mycorrhizal connections, germination and establishment of new plants require ample moisture.

The effects of fire are not known. Because moonworts are limited to very wet microhabitats in the Blue Mountains, they are unlikely to be directly affected by fire, unless it is severe. However, the death of overstory trees due to burning may remove a necessary mycorrhizal host and impact an entire population, as in those that grow at the edges of meadows around small lodgepole pine. Loss of the shade that many populations favor could also affect long term survival of these species. It is not known what consequences such fire effects might have, or whether an existing population could persist under these circumstances.

Because sites capable of supporting *botrychiums* are usually classified as riparian, they should not be affected by harvest activities. For the same reason, low intensity prescribed fire is unlikely to damage potential habitat or any plants that may be present. Because the six sensitive species considered here have a broad distribution on the continent, possible impacts to individuals from this project would not jeopardize the survival of the species as a whole.

Cumulative Effects

Loss of undisturbed wet sites capable of supporting *botrychiums*, whether due to water "developments" for livestock, water uses, or to upstream, upslope hydrologic disturbance can most effectively eliminate potential habitat. The Forest Plan, as amended by PACFISH, should adequately protect potential habitat.

Carex interior **(interior sedge)**

Environmental Baseline:

Interior sedge has been documented within the Project Area, in 2002, and new populations were located in 2005. All sites are located associated with seeps and tributaries found in the Dunstan Creek drainage.

Carex interior is a densely tufted sedge that grows in lowland to mid-montane elevations. It is a widespread North American species found throughout the range of the Pacific Northwest, as defined by Hitchcock and Cronquist; however, it is apparently uncommon in Oregon. It is known to inhabit saturated riparian areas with year-round surface water. It thrives in full sun, but can survive with small amounts of shade. Associated species include *Alnus incana, Carex cusickii, Carex utriculata, Cicuta douglasii, Deschampsia cespitosa, Juncus* spp., and *Menyanthes trifoliata*. *Carex interior* is not rhizomatous and reproduces only by seed.

Direct and Indirect Effects

Inland sedge grows in very wet habitats that are unlikely to be affected by prescribed fire. If fire did creep into an area where this sedge grows, it would likely only affect the above ground portions of the plant. The rhizomes embedded in wet mud can probably survive all but the most severe fires, allowing the plants to resprout rapidly after a burn.

The use of heavy equipment associated with logging and road construction can harm fragile, wet soils on which *Carex interior* grows. Because of its location in wet areas, its habitat is protected from mechanical disturbance by Forest Plan standards.

Cumulative Effects

Heavy domestic livestock grazing and wild ungulate use may have decreased the abundance of this sedge across the landscape. Like other sedges, *Carex interior* remains palatable fairly late in the summer and may become preferred forage when other plants are drying and late season grazing can remove the seed crop, negatively impacting this species' reproduction. Excessive use by ungulates can also harm the fragile, wet soils this sedge inhabits.

Water developments such as cattle troughs and ditches for irrigation have decreased wet meadow habitat. Lowered water tables associated with stream channel degradation and loss of beaver wetlands has also reduced wetland habitat that has the potential to support *Carex interior*.

Noxious Weeds

Introduction

The lands comprising the Balance Project Area on the Malheur National Forest are to be managed to achieve a desired condition as described in the Forest Land and Resource Management Plan (FLMP) and to maintain a healthy ecosystem. Additionally the desired condition requires they are managed so that healthy native plant communities remain diverse and resilient, and damaged ecosystems are being restored. The Malheur National Forest goal is not to allow invasive plants to jeopardize the ability of the Forest to provide goods and services the local communities expect. The need for invasive plant treatment is reduced due to the effectiveness and habitual nature of preventative actions, and the success of restoration efforts (Invasive Species ROD, 2005).

The Malheur National Forest recognizes and emphasizes the first and most important aspect of noxious weed management is prevention. The most effective strategy against noxious weeds is to prevent them from ever being introduced and established. The primary method to the prevention of noxious weeds is to detect and ameliorate the conditions that cause or favor the presence of competing or unwanted vegetation. Undisturbed or otherwise healthy, vigorous native plant communities are fairly resistant to invasion by weeds. Much of the Project Area has been actively managed, creating various and many windows of opportunity for noxious weed introduction and establishment. Several noxious weed sites currently exist within or adjacent to the Project Area.

Once introduced, noxious weeds interfere with achievement of desired conditions. Therefore, to achieve desired conditions on the land, noxious weeds must be managed. Areas of soil disturbance or plant communities of low health and vigor are more susceptible to weed establishment than areas with healthy, diverse vegetation. Simply killing a weed is an inadequate objective in most situations, especially for large scale infestations. Management must foster a healthy, weed-resistant plant community which consists of a collection of species diverse enough to fill all the niches (Sheley, et, al).

Sometimes considered the “second line of defense” after prevention, early detection and rapid response is a critical component of the Forest’s weed management program. When new weed sites are discovered, a quick response can reduce environmental and economic impacts. With limited resources, effective prevention, detection and rapid response must include education of both administrative personnel, contractors, permittees and the public.

Regulatory Framework

Site-specific treatment decisions will be based on location, biology and size of the target invasive plant species, site conditions, and integrated resource objectives. Invasive plant treatment projects will be subject to future National Environmental Policy Act (NEPA) and Endangered Species Act (ESA) analysis before being implemented (Invasive Species ROD, 2005).

The Malheur National Forest does not have an approved noxious weed chemical treatment plan. This has limited control to manual and biological treatments. A treatment analysis is currently underway on the Malheur National Forest. With this analysis, the Malheur National Forest hopes to increase the variety of invasive plant control methods available for use, including herbicide application for noxious weed control and management.

For this project, weed risks were evaluated in the planning stage. Risk includes: the spread of existing weed sites, the introduction of new weeds and the transport of weeds from within the Project Area to new locations.

Analysis Methods

Noxious weeds will be discussed based on inventoried and known noxious weed sites that occur in the Project Area. Location, site density and size, weed species and characteristics, the potential and rate of spread, along with soil disturbance will be the basis for this analysis. Additional information can be found in the Noxious Weeds Specialist Report located in the project record.

Existing Condition

A majority of the current weed infestations within the Balance Project Area are relatively small in both number of sites and their size. They are primarily located along roads, old logging units and landings, dispersed recreational sites, rock-pits and other disturbed areas. The majority of the Project Area has not been formally inventoried for noxious weeds. Eight (8) Oregon Department of Agriculture and Grant County listed noxious weed species and two (2) noxious weed species not listed but monitored are known to occur within the Project Area. They are found in approximately 36 different locations (sites). See Attachment A for State listed weed species known to occur or be of concern to Grant County and Attachment B for those within the Project Area and the extent of weed infestation in the Noxious Weeds Specialist Report in the Project Record.

The high priority noxious weed species (Grant County “A” Rated) of greatest concern within the Balance Project Area are, Plumeless Thistle, Spotted knapweed, Diffuse Knapweed, and St. Johnswort. High priority weeds are considered such because they are invasive, persistent, prolific reproducers and are difficult to eradicate once established. They displace desirable vegetation, but presently occur in infestations at scales which are feasible to treat.

Lower priority weeds (Grant County “B” Rated) known to occur within the Project Area are Scotch thistle, Canada Thistle, White Top, Sulfur Cinquefoil, and Dalmatian Toadflax. The “B” rating indicates their present scale of infestation within the county or state is most often unfeasible to treat. In addition, the design measures used to deter the spread and establishment of high priority noxious weeds are effective in the deterrence of lower priority noxious weed species. The present scale of infestations of a majority of the “B” rated weeds within the Balance Project Area is feasible to treat, even with the limited methods available to the Malheur National Forest.

Table NW-1: Known noxious weed occurrence within Balance Project Area.

Common Name	Acres
Canada Thistle	17.9
Dalmatian Toadflax	0.4
Diffuse Knapweed	2.2
Spotted Knapweed	0.2
St. Johnswort	16.1
Whitetop	11.1
Musk Thistle	7.2
Plumeless Thistle	.1
Sulfur Cinequefoil	0.3
Scotch Thistle	1.2

The specialist report contains a more detailed listing, map and classification of these species

Many sites have had various species of biological controls applied to different infestations with varying degrees of success. Individual site records include size of infestation, plant numbers and density, type of treatment implemented, follow-up treatments and effectiveness. Sites monitored since 1989 show that the treatments have effectively reduced spread or eradicated many of the small sites. Because weed seeds remain viable for many years, monitoring weed sites will be required for several growing seasons, and will determine the extent of follow-up treatments.

A file containing site specific information on all inventoried noxious weed sites is maintained in the Blue Mountain Ranger District Office. All sites have been entered into the Forest TERRA data base and mapped.

Environmental Consequences

Ongoing Control of Existing Noxious Weeds

Under all alternatives the ongoing noxious weed prevention and treatment activities would continue, along with implementation of the management direction in the Pacific Northwest Region, Preventing and Managing Invasive Plants Final Environmental Impact Statement and Record of Decision. (Some of the standards have a longer phase-in period (see ROD, Appendix 1 for an implementation schedule for each standard). The current noxious weed program involves inventory, monitoring, biological control through the release of approved species specific insect predators, and manual methods through the hand-pulling and clipping of weeds, and use of a gas powered brush cutter.

Alternative 1- No Action

Direct and Indirect Effects

Under Alternative 1 there would be no new disturbance to existing vegetation and therefore, the existing vegetation's ability to deter invasion by invasive species would not be reduced. The risk of experiencing new infestations of invasive species is lower under Alternative 1 when compared to Alternative 2. Similarly, Alternative 1 poses the lowest risk of the promoting the spread and establishment of invasive species because there would be no project related disturbance to vegetation and soil. Without disturbance, there would be fewer opportunities for invasive species introduction and establishment. Therefore, invasive species seed would not be transported from existing sites to new sites by management activities. The introduction of new invasive species and spread of existing sites would continue from other vectors such as forest visitors, animals, wind, and water. Conditions favorable for invasive species introduction and establishment (an increase in bare soil, reduced competition among plants, or increased light and nutrient levels) would not occur under Alternative 1. Without treatment many of the forested hot-dry and warm-dry biophysical environments will remain outside of the "Historical Range of Variability" (HRV). This would result in overstocked stands that cannot be sustained in the long term. Retaining the current forest vegetation and eliminating new soil disturbance would increase prevention effectiveness as compared to Alternative 2, but at the expense of other land management objectives. Under Alternative 1 fuels would not be managed in response to changing fire condition classes and the goals of the Healthy Forests Restoration Act of 2003, which are intended to result in adequate protection and maintenance of healthy native vegetation, would not be met. The probability of a high intensity, stand replacing wildfire would continue to increase.

Excluding fire from dry forest ecosystems has led to large catastrophic wildfires, increasing the potential for invasions by weeds and further altering ecosystems (Harrod, et. al. 2000). These fires result in increased exposure of mineral soil, reduced plant competition, and increased light and nutrient levels-conditions that are favorable to invasive species. In addition, fire can reduce or eliminate biological control agents previously released to control invasive species. By creating conditions favorable to rapid expansion of invasive species wildfires can set the stage for an unprecedented invasion of new invasive species and expansion of established invasive species (RMRS-RN-23-7-WWW). In addition to the effect of wildfire on invasive species, many fire-suppression related management practices can result in habitat disturbance that promote invasive species invasion and expansion, as well as increasing the opportunity of new introductions via use of nationwide suppression resources

Cumulative Effects

There are a number of activities which occur within the Project Area which can and do provide a moderate to high risk of introducing and spreading invasive species propagules. These past, ongoing, and reasonably foreseeable future activities include (but are not limited to) timber harvest, road construction, reconstruction, and maintenance, prescribed burning, motorized and non-motorized recreation, livestock grazing and associated rangeland improvement projects, and resource enhancement projects (for a detailed description of these activities refer to Appendix C). Although Alternative 1 removes a disturbance factor which provides a moderate to high risk of spreading invasive species propagules, it will not move the project area towards a healthier, resilient, diverse and sustainable ecosystem that is less susceptible to invasive species establishment.

A foreseeable future event in the project area is wildfires. Dense multi-storied stands act as “ladder fuels”, bringing ground fire into the crowns of trees, greatly increasing the burn severity, as seen in the Summit, Indian Rock, Reed, Buck, China Diggins, and Power Fires (refer to Appendix C). Alternative 1 does nothing to reduced stand densities and ladder fuels. Wildfires create a high risk for the introduction and spread of invasive species due to several factors. A high severity fire creates a bare ground seedbed with no native plants to provide competition against aggressive invasive species that can quickly occupy a site. The second high risk factor is the act of fire suppression. Equipment brought in from different areas may be harboring weed seed. Due to the emergency nature of wildfire, prevention measures such as equipment cleaning are not used. Dozer lines, hand lines, drop points, safe areas, staging areas, etc all create bare ground with heavy travel and disturbance. Vehicle traffic increases substantially.

Grazing has been occurring since the early days of settlement, is occurring, and will continue into to the foreseeable future. Grazing of the Lower Middle Fork, Upper Middle Fork, Balance, and Camp Creek Allotments is currently permitted within the subwatershed. Cattle can contribute to noxious weed spread in several ways; they act as a physical vector and affect native plant communities. All animals (domestic and wildlife) can transport viable weed seeds attached to their hair and hooves, or can carry them in the digestive tract. Cattle can also disturb soil; disturbed areas are more susceptible to invasive species establishment than areas occupied by healthy native vegetation.

Alternative 2 - Proposed Action

Direct and Indirect Effects

The Proposed Action is designed to promote a change in species composition and structure to develop healthy, resilient historical vegetation conditions in forested stands while capturing some of the economic value of trees to provide wood products and jobs. This alternative would treat forested stands to decrease tree density and increase representation of fire-adapted tree species as well as decrease existing and activity generated fuel levels. Log hauling will require constructing temporary road and maintaining existing roads.

Most activities that disturb soil or create new areas of bare soil create conditions favorable for invasive species introduction, establishment, and invasion. Alternative 2 would create areas of bare soil and/or disturb existing vegetation through the use of ground based harvest methods, temporary road construction, road maintenance, and subsoiling. Ground disturbance creates open seedbeds and invasive species have a competitive edge over native plants allowing them to rapidly invade, establish, and dominate disturbed sites. Vehicle or equipment travel, road blading or log skidding that has the potential to spread material containing root matter or seeds may spread invasive species. Likewise, invasive species seed or root matter may be transported into the project area on vehicles, equipment, gravel or other material. This creates the potential for introducing invasive species not currently present in the project area.

Increased travel on roadways may disturb roadside invasive species sites and spread seed. As invasive species go to seed in mid to late summer, seed may be picked up by vehicles and transported to new sites where the new sites establish.

Known invasive species sites located near units have been identified (see attachment B, Noxious Weed Specialist Report in the Project Record). These sites would be avoided and not disturbed by project activities. However, they may provide a potential seed source leading to the spread of invasive species through seed blowing into proposed units and becoming established in disturbed soil and by seed picked up on the tires and undercarriages of utility vehicles and equipment that may be transported into proposed harvest units where it gains access to disturbed soil. Activities along roads such as road blading, brushing, ditch cleaning, etc. will be conducted in consultation with District or Forest Invasive Species Specialists and would incorporate practices to prevent the introduction, establishment, and spread of invasive species.

Whole tree yarding, grapple and hand piling, and prescribed underburning will be used to reduce fuel loading and fire severity. Fuels management appears to be the best method to reduce fire hazard and restore natural ecosystem processes, at least in plant communities with historically frequent, low severity fire (RMRS-RN-23-7-WWW). Burning impacts on plant species varies in response to conditions such as the weather, season of burning, plant morphology, current plant condition and vigor, accumulated dead leaves, soil moisture, and ultimately fire intensity. Fire intensity probably has the most influence on individual plants and may create a loss of ground cover throughout the treatment units. The wide variation in burning intensity (light to severe) will create variability in results and recovery. A very low intensity burn will have light impacts and stimulate plant vigor after recovery. More fuel, dryer fuel, and longer burning fuel all produce more heat. Plant loss is expected to increase with heavier fuel loads but less mortality is expected where this fuel is spread or scattered. All understory cover may be lost under heavy slash and at piles because fire intensity will be severe.

Timber harvest and fuel treatment activities may increase the short term risk of noxious weed spread but may also accelerate the recovery of the ecosystem in the long term. Healthy, vigorous native plant communities are fairly resistant to invasion by weeds. Future reductions in noxious weed populations will have positive effects upon rangeland vegetation, soil stability, biological diversity, and watershed condition.

The probability of spreading existing infestations or bringing new weeds in from outside the planning area is moderate to low when all prevention measures are followed. Prevention measures are described in detail in the Noxious Weed Report and in Chapter 2 of this environmental assessment. The risk of bringing in weeds from outside the project area is proportional to exposure to noxious weeds prior to coming on the District or exposure during project activities such as log haul to and from mill yards. The increased risk of new weed establishment is also proportional to the increase in disturbed soil. This is especially true along travel corridors. The risk of invasive species introduction from heavy equipment is reduced through design elements that require cleaning equipment before entering lands administered by the Forest Service. Heavy equipment such as skidders and harvesters would be free of weed seed, dirt and debris. This substantially reduces the risk of introducing new infestations. Vehicles, however, including log trucks used for hauling are exempt from this requirement, and therefore still pose a risk. Forest Service vehicles are another possible source of weed spread, especially when coming from other Districts and Forests where weeds may be prevalent.

Cumulative Effects

In addition to the cumulative effects described below refer to the cumulative effects discussion analyzed under Alternative 1. In addition, past activities that may have contributed to current invasive species locations and populations are also reflected in the Affected Environment Section previously discussed. The cumulative effects analysis area is consistent with the project area as well as noteworthy adjacent infestations or infestations in rock source sites and road right of ways along haul routes.

Certain invasive species populations will almost certainly continue to expand, regardless of the alternative chosen, due to the natural increase of existing populations from all the complex ways these species are spread. However, other species that occupy limited areas (plus other species that are not yet here) would be managed to the extent possible to stop the spread. Existing invasive species populations may continue to spread onto adjacent or intermingled private and other agency lands; similarly, populations from other-ownership lands will continue to spread onto the Forest. Both conditions require coordination with country weed and pest offices to manage populations and their effects regardless of land ownership and property boundaries.

Disturbance (whether management induced or not) of soil and vegetation creates habitat for, and often, a vector of dispersal for noxious weeds. Many infestations currently occur within and in relatively close proximity to the area under analysis. Dry forests representative of the type in which the project area occurs are particularly susceptible to noxious weed infestation (Interior Columbia Basin Ecosystem Management Project 69). Noxious weed infestation and expansion has the potential to profoundly alter ecosystem functions and processes (Interior Columbia Basin Ecosystem Management Project 784-785).

Cumulatively there are a tremendous number of activities that occur within the Area which can and do provide a moderate to high probability of the introduction and spread of noxious weed propagules. These reasonably foreseeable future activities include (but are not limited to): domestic livestock grazing, mining, motorized and nonmotorized recreation, road maintenance, and resource enhancement projects. As identified in the Range Specialist Report for the Balance Thinning and Fuels Reduction Project, Alternative 2 could increase the level of accessibility and use by domestic livestock (as well as wildlife and recreationists), increasing the transport of weed seeds by these vectors. This increased accessibility could result in cumulative spread of noxious weeds.

Long term impacts of fuels reduction and prescribed burning are anticipated to be positive in terms of moving treatment units towards the historic condition objective and improving both watershed values and production of rangeland resources. Burning "effects" include the release of nutrients which have been tied up in the system so that there is a stimulant (fertilizer affect) on the understory. Stimulation and recovery of vigor and production in the herbaceous species is quickest for pinegrass and elk sedge, and with low intensity fires, dry site bluebunch wheatgrass and Idaho fescue should also be stimulated by the defoliation.

Application of the design elements (refer to Chapter 2) to this project as well as future projects within the project area are expected to substantially reduce the risk of noxious invasive species establishment and spread through vectors controlled and administered by the Forest Service.

Invasive species monitoring and early treatment would continue to complement the prevention strategy incorporated into Alternative 2 and would reduce the risk of new invasive species populations becoming established. A site specific treatment analysis is currently underway on the Malheur National Forest. Following completion of this analysis the Forest hopes to increase the variety of invasive species control methods available for use, including herbicide application for the control and management of invasive species.

Consistency With Direction and Regulations

All alternatives are consistent with Forest wide standards for noxious weeds.

Irreversible/Irretrievable Effects

There are no irreversible and irretrievable commitments of resources that may result from the alternatives with respect to noxious weeds.

Rangeland

Introduction

The Balance Project is located within the boundaries of three active grazing allotments on the Malheur National Forest. This section will discuss management direction, current conditions, and environmental consequences of the alternatives. The rangeland resource evaluation will include the Balance Project Area and portions of three grazing allotments; Upper Middle Fork, Lower Middle Fork, and Balance. Livestock grazing on these three allotments is currently authorized to five grazing permittees.

Livestock grazing has been a part of the landscape of the Malheur National Forest since the 1860's, when the first miners and homesteaders entered this area. Although livestock grazing on National Forest System lands has decreased since the early 1900s, the ranching industry remains an important part of the Grant County economy.

Livestock are primarily characterized as grazing animals that preferentially select herbaceous vegetation such as grasses and forbs. Because of fire suppression woody vegetation has dramatically increased throughout the Project Area.   Densely stocked conifer stands limit water and sunlight availability to the herbaceous understory. As a result, many of the allotments within the Project Area are not as productive for livestock grazing as they once were. In addition, many areas are now so thick with trees of varying age class that livestock have a difficult time traveling through them, resulting in livestock concentrating around remaining open meadows or stream corridors.

Regulatory Framework

Laws, regulations, and policies direct Forest Service rangeland management. The specialist report in the Project Record details the regulatory framework in which rangeland management operates.

Analysis Methods

The Analysis Area for evaluating rangeland resources is consistent with the Project Area. This report provides basic rangeland resource information within the Balance Project Area. However, discussions may at times divide the Project Area into subunits (4 separate grazing allotments and their respective pastures) for the purpose of addressing specific environmental consequences, administrative impacts or effects, or impacts to permittees. The following table provides acreage information for allotments within the Project Area.

Table R-1: Pasture Acres and Percent within the Project Area

Range Allotment: Pasture Name	Pasture Acreage	% within Project Area
Upper Middle Fork		
Caribou	9,596	<1%
Upper Vinegar	5,584	0%
Lower Vinegar	7,000	0%
Austin	4,418	0%
Deerhorn	13,871	0%
Butte	11,184	
Total	51,653	<1%
Lower Middle Fork		
Balance Lake	6,623	33%
Pizer	8,909	0%
Granite Boulder	23,116	<1%
Sunshine	19,745	5%
Total	58,393	<35%
Balance		
Balance	150 (NF land)	100%

Information was gathered from various sources; permanent camera points, multiple indicator monitoring, Area 3 Ecologists notes, file review of the current and previous unfinished analysis (1950), 2210/2230/2240/2270, 2600 files, along with the history of the allotments/pastures, past permittee performance & compliance, on the ground knowledge of area, conversations with permittees, professional judgment, team input and literature review were used to determine current resource conditions.

Existing Condition

The Galena Watershed Analysis (1999) found that current stocking levels and fuel conditions have increased in the last few decades due largely to aggressive fire suppression and harvesting of more fire tolerant tree species. Higher stocking levels have also contributed to increased insect populations adding to existing fuel loads. The result of these conditions has been larger, more severe wildfires with reductions in fish and wildlife habitat as well as impacts to soils and water quality. Overgrazing was common in many parts of the southern Blue Mountains in the first half of the century. Fire has had the most profound influence on the quality of the plant communities following the intensive grazing period. Fire suppression has had a pronounced effect on plant communities within the Project Area over the past 50 years. These plant communities are now far outside the natural range of variation, which effects the overall forest and rangeland health and production. (Charles G. Johnson, Jr; Summary Report for Rangeland Health on Selected Allotments, 6/6/95). Although his report was prepared for the renewal or continuation of grazing permits, he adds the health of the land relates to the incursions by administrative projects to harvest trees. Harvesting larger trees coupled with removing fire from the ecosystem has led to promotion of late seral tree species.

Forested Understory Vegetation Conditions

Cover types available for livestock use are primarily Forested Uplands (about 84% of the Project Area). Forested upland vegetation, especially mixed conifer types, is considered transitional range, where forage production/quality is closely related to canopy cover and varies greatly over time with seral stage and forest management activities. These communities consist mainly of Warm Dry Upland Forest with mixed conifer overstories (Douglas fir, grand fir, larch, ponderosa pine) supporting shrub, grass and/or sedge-forb understories. Also found but less common is Dry Upland Forest (PAG) with ponderosa pine overstory and mainly shrub-bunchgrass understories. Low preference for use of this area by livestock is evidenced at times where forage yields are under-utilized, shading is high from dense canopies (stock prefer open grown forage), slopes are steep or there is more desirable forage elsewhere. Forage available in these forested uplands, depending on site potential, is primarily pinegrass, elk sedge, Ross sedge, western needlegrass, western fescue, Idaho fescue, Junegrass, Wheeler bluegrass, with some shrub use (i.e. bitterbrush, mtn. mahogany, serviceberry) later in the season. Within the Cool Shrub Potential Vegetation Group, 60-80 percent of the area is dominated by native grasses and shrubs with an overstory layer of shrubs; 15-40 percent of the area contains mixtures of perennial grasses and shrubs. Closed canopy sagebrush and conifers dominate the remaining area.

Roadsides, old landings, overgrazed scabs, and other disturbed sites support an array of introduced species, including weedy annual grasses such as cheatgrass (*Bromus tectorum*), and perennial grass species that have been seeded to reduce erosion and combat the spread of noxious weeds. Moister and colder forest types at higher elevations harbor understory species that are generally adapted to a longer fire return interval. All species must be more shade tolerant, or are dependent on gaps in the forest canopy for both establishment and maximum growth. The shrub component of the understory vegetation is depauperate throughout the watershed for the same reasons as noted for drier forest types. Grasses tend to be sparse, while forbs provide the largest proportion of the understory plant community. (C. Johnson, pers. comm.).

Ground vegetation and shrub species vary throughout the Project Area from small areas of grass and shrub steppe at lower elevations near the Middle Fork John Day River, through meadows and riparian shrub stands, to the species adapted to survival under forest canopy from open ponderosa pine stands to the heavy shade of higher elevation fir forests.

Riparian Vegetation Conditions

The riparian vegetation in the watershed ranges from cool moist conifer-dominated and moist meadow communities in the upper stream reaches, to mixed conifer/hardwood types in the middle elevation reaches, to grass/sedge dominated communities in the lower elevation wider valley bottoms. The upper elevation conifer dominated reaches sustain diverse mixes of conifers including Engelmann spruce and subalpine fir. Hardwoods (primarily alder) in these upper reaches are generally limited to areas where there are natural or created openings in the canopy. Mid-elevation reaches currently show the effects of historic harvest, livestock grazing and poor road location. The large diameter conifer component is lacking in most accessible reaches. Hardwoods increase in these reaches, especially alder, willow, dogwood, and occasional cottonwood and aspen trees. These hardwoods often show reduced vigor due to the effects of excessive browsing pressures and lack of natural disturbances such as fire or beaver.

Wider valley bottom areas, lower in the watershed, sustain wet meadow grass communities consisting of Kentucky Bluegrass and various sedges and rushes. These areas are heavily used for grazing (often on private land) because of their productivity and proximity to water. Native grass species are largely displaced due to a combination of factors which include changes in watertable levels and seeding of non-native grasses that are both highly productive and palatable to livestock.

Rangeland and Allotment Management

The allotments within the Project Area have been grazed by cattle and horses since the creation of the National Forest, however, the present allotment boundaries were established in 1943. Despite the lack of early records on stocking levels in these allotments, grazing levels were probably well above those recommended for maintaining high ecological conditions of the arid or semi-arid rangelands which exist in this allotment. Moreover, livestock handling techniques of the day would have produced relatively poor livestock distribution and continuous deferment of selected feed areas, hampering recovery of the overstocked range. In 1962 and 1963 the Middle John Day Allotment was divided into the Lower Middle Fork, Upper Middle Fork, and Balance Allotments. The Lower Middle Fork Allotment was divided into three pastures. The objective of this change in boundaries was to "delineate a manageable unit confined to natural and topographical barriers from the Middle Fork John Day Allotment." The boundaries of the Lower Middle Fork Allotment are similar to those in effect around 1934, before the allotment was enlarged by incorporating neighboring sheep allotments.

Allotments are managed to be consistent with the Forest Plan, as amended by PACFISH standards and guidelines (GM1-GM4) or other site specific endpoint indicators as developed through the adaptive management process. Rangeland management strategies, based on the best available range science, are incorporated into the Allotment Management Plans and Annual Operating Instructions specific to each allotment/pasture and resource needs. The objective behind these strategies is to manage for rangeland and riparian resource conditions that meet or are moving toward attainment of desired future conditions. The objectives are met through an ongoing monitoring and adjustment process (adaptive management). The strategies define criteria for modifying grazing operations when progress towards achieving the desired conditions is not being made. Management strategies are subject to change in response to various resource conditions, climate, natural events, listed species, or guidance.

Three active grazing allotments are located within the Balance Project Area. One of these allotments (Balance) has an on/off provision which allows the landowner to utilize National Forest System lands in conjunction with their private land without separately fencing land bases apart. Two other active allotments can be categorized as falling under standard term grazing permits. In all of these cases permits are issued for a 10 year period. Currently three grazing permittees hold these four term grazing permits. All of these allotments combined are subdivided into 11 pastures and other small holding units. Because the project boundary was not established to correlate with allotment boundaries, only five of the pastures are located within the Project Area. For purposes of management all allotment pastures were included in the following analysis. The Upper Middle Fork Allotment contains three pastures, Lower Middle Fork Allotment contains two pastures, and the Balance Allotment contains one pasture within the Project Area.

Permitted cattle are pairs and bulls since calving is completed prior to turnout. Season of use is normally summer until early fall as shown above, however, the actual turnout dates are set annually depending on weather and current growing conditions. Closing dates are then determined by either the culminations of the permitted season of use or when utilization standards are met, whichever happens first.

Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects

Under the No Action Alternative there would be no commercial/noncommercial thinning, temporary road construction, road reconstruction and maintenance, prescribed burning, or mechanical slash treatment. Fire would not be used as a method to reduce fuels and the potential for high intensity wild fires. The ability to manage fuels in response to changing fire condition classes would be reduced and achieving the goals of the Healthy Forests Restoration Act of 2003 would not be realized. The Healthy Forests Restoration Act is intended to result in adequate protection and maintenance of healthy native vegetation, decreasing the potential for high intensity, stand replacing wildfires.

Taking no action would leave the range vegetation in its present improving trend, however available forage would decrease over time due to the continued encroachment of trees into the rangelands. This will lead to livestock concentrating on a continuously shrinking area of suitable rangeland. If more suitable rangeland is not created through active management or natural disturbance, permitted livestock (stocking rates) will need to be adjusted to avoid unacceptable environmental effects. This would most likely have a negative impact on the permittees operations and/or economic situation.

With no action many of the forested hot-dry and warm-dry biophysical environments will remain outside of the "Historical Range of Variability (HRV), with overstocked stands that cannot be sustained in the long-term. Because fire has not been permitted to perform its natural role of frequent under burning, forest stand density has increased and vigor has diminished. This diminished health has contributed to more frequent outbreaks of insects and disease epidemics that have further increased the probability of large stand replacing fires (Hall 1980).

Fire exclusion in dry forest ecosystems has led to large catastrophic wildfires, increasing the potential for invasion by weeds and further altering ecosystems. (Harrod, et. al. 2000) These fires result in increased exposure of mineral soil, reduced plant competition, and increased light and nutrient levels-conditions that are favorable to exotic weed species (see Noxious Weed Report).

Under Alternative 1 structural rangeland improvements or ecological plots will not be at risk of damage or destruction by management activities. Access to spring developments, salt grounds and fence lines would remain unchanged. In the long term, as forest health declines, the abundance of downed logs is likely to make it more difficult to heard livestock and reduce access to available forage.

Cumulative Effects

The following discussion of cumulative effects is based on the past, present, and reasonably foreseeable future activities described in Appendix C. Past and ongoing activities were also incorporated into the existing condition because they affect the current condition of the resource.

Prior to European-American settlement of this area, fire played a dominant role in shaping the landscape. Current fire suppression policies have significantly altered the ecosystem. Areas of open park-like stands of ponderosa pine have been converted to dense, overstocked, dead and dying stands of diseased forest which provide little in the way of forage for grazing animals. Conifers have now encroached upon areas that were once open meadows and dry rangeland. Much of the densely stocked forest stands have succumbed to insects, disease and reduced vigor because of over crowding. Where significant tree mortality has occurred, fallen trees often restrict the movement of livestock, thereby further limiting the amount of forage produced and available for domestic livestock.

Under the canopy of dry forests most species are adapted to relatively frequent forest fires. Many shrubs are dependent on gaps in the forest canopy for both establishment and maximum growth, and tend to be sparsely represented in much of the watershed due to historic fire suppression and current canopy closure (e.g. mountain mahogany, Scouler willow, snowbush ceanothus). Browsing pressure by domestic and wild ungulates on surviving individuals is intense, limiting their ability to set seed and reproduce.

Aspen and cottonwood stands are mostly stagnant or decadent due to a combination of human impacts: changes in hydrologic regimes, fire suppression, and intense browsing by unnaturally high populations of ungulates.

Reasonably foreseeable future activities include but are not limited to motorized and non-motorized recreation, road construction and maintenance, and resource enhancement projects. Alternative 1, No Action, removes a disturbance factor which vegetation of the Blue Mountains is adapted to and stimulated by. It also will not move the Project Area towards a healthier, resilient, diverse and sustainable ecosystem.

If no action is taken resources would continue to decline within the Analysis Area. Forage quality and production will decline reducing the quantity of primary, secondary and suitable rangeland over time. In the long term it is unlikely that the area could be managed for open forest conditions, consistent with the historic range of variability. This would have a negative cumulative effect on available forage. The amount of forage developed within dense ponderosa pine/ fir is well below forage quantities associated with an open forest that is consistent with the historic range of variability. Forest stocking levels will continue to increase, along with conifer encroachment into meadows, grasslands and riparian areas. Less available forage in uplands would increase use by ungulates (both domestic and wild) in more open riparian areas and could result in potential detrimental impacts to fisheries as well as aquatic resources. The continued decline in forest health will contribute to more frequent outbreaks of insects and disease epidemics and further increase the probability of large stand replacing fires (Hall 1980).

Alternative 2 – Proposed Action

Direct and Indirect Effects

Under the Proposed Action commercial thinning, pre-commercial thinning, grapple piling, hand piling, burning piles, and prescribed fire would be used to reduce fuels and potential fire severity. Much of the burning would be accomplished after the mechanical work is completed. Multiple entries may be needed to gradually reduce fuel levels that have increased beyond historical conditions.

Treatments are designed to reduce fire danger, improve stand health, and develop vegetation more representative of historic conditions. They will provide long term benefits to the rangeland management program, rangeland resources and the management of livestock. Design elements (refer to Chapter 2) have been incorporated into Alternative 2 to protect government investments, help resolve resource conflicts, reduce impacts to the range program and economic impacts to the permittees.

Commercial/Precommercial Thinning

Commercial and pre-commercial thinning would open up densely shaded stands and allow herbaceous forage production to increase, especially pinegrass, elk sedge, and dry site bunchgrasses (Idaho fescue, bluebunch wheatgrass). The amount of bitterbrush has declined in recent years as stands have closed and shade increased. Bitterbrush is a light sensitive shrub and should be more abundant after treatment on environments where it was previously suppressed by shade. Forage production will begin to improve rapidly because of reduced competition for light. Higher yields may continue for a decade or more depending on light conditions in this “transitory range” environment. Open grown feed is more palatable and is preferred by livestock. This higher quality forage will attract livestock and encourage them to use open areas ultimately improving livestock distribution over the pastures. It may also reduce pressure on riparian zones early in the season, especially if active management is used to encourage this action. Livestock management/herding would be improved with more open vegetation since livestock movement would be less restricted and stock would be much more visible to ranchers. The anticipated flush in forage production could be a positive impact on the permittee economic situation especially if open stands can be maintained over time, as in historic periods. Historic stand conditions that are very open and grassy may result in some late season fire danger, where dry flashy fuel can be easily ignited and quickly spread and in areas where grazing is completed before soil moisture is depleted. Late season showers initiate fall green up, leafy regrowth and produce fresh high quality feed that will attract wildlife before snow covers the area. The nutritious regrowth will improve the condition of wintering animals and benefit local ranches by delaying the movement of some animals down onto private land and haystacks.

Meadows, natural grassland openings, and previously undisturbed sites could be impacted by piling, landings and temporary road construction, and equipment storage. The impacts of these activities would be mitigated by avoiding these sites. Plants may be impacted by ground disturbance and the loss of growing space if heavy slash and thinning debris remains untreated for long periods of time. Soil disturbance and compaction in treated units may delay understory recovery.

Exotic and invasive species are expected to be evident in the years following the project at some disturbance sites (refer to Noxious Weed Report).

Treatment activities may adversely affect the livestock grazing program by adding to the potential for livestock and vehicle accidents, altering stock use in treated areas, and by damaging range improvements. Several commercial and pre-commercial thinning units are adjacent to or include fences. This is a concern if harvest operations are conducted during the grazing season because fences need to remain intact from June 1 through October 15 when livestock are on either side of the fence. Design elements have been incorporated into the Proposed Action to avoid or reduce the likelihood of damage to range improvements.

Prescribed Burning

The use of fire to reduce fuel loads and thin regeneration (with or without commercial/pre-commercial thinning) generally has long term benefits to the grazing program and the health of the ecosystems being treated. The vegetation of the Blue Mountains is highly adapted to periodic fire in forest, shrubland and grassland ecosystems and fire was once an integral function of the majority of ecosystems in northeast Oregon (Johnson, 1998). Depending on plant community composition, condition, structure, and the buildup of dead biomass, fire resulted from the ignitions with varying intensities, effects, and extension across the landscape. The shorter the return interval between fire events, the less dramatic would be the changes in plant composition (Johnson, et. al. 1994).

An economic impact to the permittees may occur if the prescribed fire burns out of prescription and a rest period is required, as specified in the Malheur Forest Post-Fire Grazing Guidelines, 2003. Two of the allotments within the project have large portions of pastures in the Project Area, so the cumulative affect of multiple pasture closures for an extended period is a major concern and possible hardship. Burned areas would be evaluated to determine if rest is needed to promote bunch grasses and other herbaceous vegetation. A rest period from grazing after prescribed fire is not anticipated as the majority of the area within the burn boundary supports an understoy dominated by rhizomotous grass & sedge, such as pinegrass and elk sedge (Psme/Caru, Psme/Cage, Pipo/Caru, Pipo/Cage, Abgr/Caru, Abgr/Cage), which are fire resistant and recover very quickly after fire. Generally speaking, in these communities, pinegrass and elk sedge increase with disturbance. In plant communities with understory vegetation dominated by snowberry or grouse huckleberry prescribed fire promotes pinegrass (Caru), ponderosa pine regeneration and bunchgrasses (Agsp, Feid). Within the grassland and/or bunchgrass dominated understory plant communities (Pipo/Feid, Pipo/Agsp, Juoc/Feid-Agsp) prescribed fire helps provide vitality, stimulates grass vigor, promotes bunchgrasses, and controls stocking.

The impacts of burning on plant species will vary in response to a variety of conditions such as the weather, season of burning, plant morphology, current plant condition and vigor, accumulated dead leaves, soil moisture and ultimately the fire intensity. Fire intensity probably has the most pronounced effect on individual plants and can create areas with no ground cover throughout treatment units. The variation in burn intensity across treatment units (light to severe) would create wide variability in results and recovery. A very low intensity burn will have a light impact and stimulate vigor after recovery. More fuel, dryer fuel, and longer burning fuel all produce more heat. Under scattered heavy slash and at piles burn intensity would be high and the result may be a short term loss of all understory cover.

Low intensity burn is expected where fuel loads are mostly herbaceous and there is very little woody material (less than 1 ton per acre) as in open grassland with light shrub cover. When prescriptions call for broadcast burning scattered fuels, the impacts will be spread over the entire unit with surviving plants interspersed throughout the unit. In areas where slash is bunched or where landing piles are burned all understory species may be killed but the impact will be more confined and less wide spread.

The long term impacts of prescribed burning are anticipated to be positive in terms of moving treatment units towards the desired condition and improving watershed values and the production of rangeland resources. Burning “effects” include the release of stored nutrients stimulating (fertilizer affect) the understory. Recovery of vigor and production in the herbaceous species is quickest for pinegrass and elk sedge, and with low intensity fires, dry site bluebunch wheatgrass and Idaho fescue should be stimulated by the defoliation. However, maintenance of historic-like conditions, long term, will require more follow-up treatment so that shrub recovery may not reach pretreatment levels or dominate understories. Historic conditions on these sites probably did not have heavy shrub cover in many places since fire return intervals probably thinned the shrub cover repeatedly.

The long term effects on rangeland management are positive. Higher forage yields and availability on upland sites may result in more AUMS to be harvested, held in reserve, or less pressure on riparian zones because of better livestock distribution. Because the grazing pastures are large and treatments are staggered and varied, there will be little effect on the carrying capacity of this transitory range. Treatments that open up stands previously not accessible to livestock would distribute the effects of grazing more uniformly across the pasture resulting in improved utilization of forage, water, and salt. Long term maintenance costs may also be reduced due to improved access along fences and water sources. With the projected increase in the quantity of available forage impacts on riparian herbaceous and hardwood species may be reduced.

The risk of damage to some range improvements is high if not identified in advance and avoided. Fences within or bordering burning units may have fire run through the fence line. Workers may cut and remove fencing for vehicle and worker access. Valuable monitoring study plots (permanent ecological plots, enclosures) may be affected, and special habitats at upland water sources (springs) may be at risk. Design elements (refer to Chapter 2) have been incorporated into the Proposed Action and provide for protection and/or reconstruction of these structures and monuments. The area ecologist will be notified of any impacts to existing ecological plots or their monuments.

Active forest management of vegetation would help move forest stands to more open conditions with more grasses and forbs. In the short term the more open forest conditions would increase forage quality and quantities. This is expected to provide increased forage availability within commercial thinning units and areas treated with prescribed fire. In addition, prescribed fire has been shown to promote plant production and vigor. Increased forage for grazing animals, both domestic livestock and wildlife, is expected to be available as a result of these activities.

Cumulative Effects

Early management activities had a profound effect on current conditions. Many streams within the planning area were affected by mining activities, changing the substrate and resultant vegetative capabilities. Railroad logging, then roading provided livestock increased access to riparian areas and changed the forested area composition to favor less fire resistant species. Fire suppression has maintained this composition.

Actions taking place within the watershed today include: recreation (hiking, camping, horseback riding, off-road vehicle use, fishing, hunting, etc.), prescribed burning, commercial thinning, and livestock grazing and maintenance of range improvements. The impacts these activities have on the resources in the Project Area depend on intensity of the activity and resource resiliency.

Cumulative effects of past, present and foreseeable projects in association with the proposed action would have a positive effect on transitory range availability and livestock distribution in the affected allotments. Previous harvest and thinning activities have generally had a positive impact on all range resources by reducing the overstory and allowing forage species to thrive. This project would treat forested stands by thinning and burning, which would also increase forage availability, improve livestock distribution, and long-term protection of range improvements. There are no expected negative cumulative effects

Consistency With Direction and Regulations

All alternatives are consistent with Forest wide standards for rangeland resources.

Irreversible/Irretrievable Effects

There are no irreversible and irretrievable commitments of resources that may result from the alternatives with respect to rangeland management.

Recreation

Introduction

This section of the EA discusses existing recreation uses and the effects of the No Action and Proposed Action alternatives on recreation. Additional details can be found in the “Recreation Specialist Report” located in the Project Record.

Regulatory Framework

The Forest-wide goals for recreation are to ensure high quality recreation experiences through facility location and design and provide a diverse system of trails for the enjoinment of all users and to meet administrative and resource management needs (LRMP, IV-1 [4 & 5]). The Forest objective for dispersed recreation is to provide roaded recreation opportunities on the Forest, including constructing, reconstructing, and managing recreation resources to protect the resources and meet the objective of each Recreation Opportunity Spectrum (ROS) class. The Project Area consists of ROS classes Roaded Natural (RN) and Roaded Modified (RM). Additional Standards and Direction regarding the recreation resource is available in the Recreation Specialist Report.

Analysis Methods

The Malheur National Forest used ROS classes to develop management direction for recreation on the forest. Therefore, this analysis will use the ROS classes assigned during Forest Plan development as the basis of recreation assessment. Other tools that will be used or created for the recreation analysis are ROS direction contained in management area descriptions and a ROS map provided by the Forest.

The source of the recreation information is the Forest GIS data base. First, the treatment layer was determined. Second, the treatment layer was over laid with the Management Areas, ROSs and the recreation sites layer to determine the design features needed to meet the applicable ROS Class for each area. Last, the design measures were written based on the treatment descriptions assigned to each Visual Quality Objective per Management Area following the ROSs guidelines. Additional information about ROS class guidelines can be found in the Recreation Specialist Report located in the project record.

Existing Condition

Dispersed Camps

There are 7 GIS identified dispersed recreation campsites within the project boundary. The Balance Project Area receives low to moderate recreation use. The dispersed campsites are rustic in nature with common features of meat poles, rock fire rings, and benches. User constructed toilets can be found at some sites. Campsites are concentrated primarily in flat areas off main transportation systems where water can be accessed. Many are near springs or creeks. Camp size ranges from very small to fairly large. Use of these sites varies throughout the year, with the majority of sites showing heaviest use during the fall hunting season.

Dispersed camp sites where there is concentrated use are used year after year the ground appears compacted and the vegetation is not as vigorous as non-dispersed use areas; i.e. the concentrated use off Forest Road 2045 and Sunshine Creek. Other concentrated use areas are along Forest Road 2000045.

Other Uses

Currently, the Balance Project Area plays an important role by providing settings for various types of outdoor recreation hunting, camping, driving in the woods, hiking and winter activities. Due to ease of access from U.S. Highway 26 and 7, County Road 20, and Forest Road 36 this area is popular with recreationists. FSR 2045 and 36 provides the main access for roaded admission from U.S. Highway 26 and 7 into the Project Area. The major roads are gravel-surfaced, one-lane, and native surface routes initially developed to provide timber access, which now provide access for recreation type activities.

The Balance Project Area lies within the Northside and the Desolation Big Game Management Units. The area is popular during general big game bow and rifle seasons. The seasons are in late summer and fall. It is anticipated that Oregon Department of Fish and Wildlife will continue to offer hunting opportunities in this area as part of their management of big game. General bow-hunting and controlled hunts will have similar seasons and numbers of tags. Bow-hunter numbers have increased in recent years and this trend may continue.

Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects

Dispersed Camps

As a result of the No Action Alternative, no change is anticipated in the diversity of camping styles or use patterns in this area. No change in the availability of dispersed camping is expected for the typical use in spring, summer, and fall.

Other Uses

Recreational visits within the Project Area would remain near the same levels as previous years and under this alternative traditional use patterns and recreational opportunities would not be impacted. Hunting and fishing access and opportunities are expected to remain unchanged.

Alternative 2 - Proposed Action

Direct and Indirect Effect

Affects to recreation are measured in terms of change in the recreation opportunity spectrum (ROS). There would be no effect on the ROS class for this area.

Dispersed Camps

As a result of the Proposed Action short-term effect with harvest activities may displace some recreationists to new camping areas in the short term. Noise may be heard from harvest activities resulting in some impacts on recreationists and may adversely affect the experiences of some people. It is useful to keep in mind that activities vary in importance over time. Therefore, dispersed campsites that are there today may not be in the future. So this data is valid only over an intermediate length of timeframe over the life of this document. Dispersed recreation will continue to occur in the Project Area.

Other Uses

Short-term effect with harvest activities may displace some recreationists to new areas to hunt or to travel due to decreased aesthetic appeal of the Forest resulting in displacing some forest visitors over a broader area on the landscape. Noise may be heard from harvest actions resulting in some impacts on recreationists during this type of activity and may adversely affect the experiences of some people. It is useful to keep in mind that activities vary in importance over time. Haul routes will be heavily used by logging traffic, creating a higher level of safety concern for the recreating public using roads. Closure of some roads within the Project Area to public use during logging and hauling activities would improve public safety, but would have a short-term negative effect on recreational access to the area. Long-term effects will provide safe and adequate roaded and trail access for the recreating public, through the cutting of hazard trees.

It is anticipated that Oregon Department of Fish and Wildlife will continue to offer hunting opportunities in this area as part of their management of big game. General bowhunting and controlled rifle hunts will have similar seasons and numbers of tags. The number of bowhunters has increased in recent years and this trend may continue. It is anticipated that temporary road and/or area closures will be in place during harvest and fuel reduction activities. This may affect traffic patterns, recreation use and duration of stay in the short term. Noise and other disturbances may affect the tranquility of the recreation experience for an individual regardless of the proximity to the activity. The recreational experiences available may be changed in the short term by harvest and fuel treatment. The possible effects include increased sights and sounds of equipment and people.

Fishing opportunities are expected to be unchanged under the action alternative. The recreational experiences available may be changed in the short term by fuel treatment. The possible effects include the sights and sounds of equipment and people during burning for a short period of time.

The recreational experiences may also be changed in the short term by the smoke caused by the fuel treatment. Smoke may affect someone who has trouble breathing and their vision may be obscured for a short period of time.

While recreational visits within the Project Area would remain near the same levels as previous years, under this alternative, traditional use patterns and recreational opportunities would not be impacted. Road maintenance would provide access for harvest and fuel treatment on 29.2 miles of road. Recreating public will benefit from this road work because visitor travel would improve.

Cumulative Effects

In areas where reasonably foreseeable vegetation treatment may occur within or immediately adjacent to a dispersed site, recreationists may not use that site again for many years. If recreationists feel that treatment may disperse animals out of traditional hunting areas, they may decide to hunt elsewhere. Other recreationists could feel that hunting success may increase after treatment of the area. The hunting experience will be changed. As ground cover grows, it will provide more forage for big game animals. Hunting may be less desirable until new under-story vegetation is established. Hunters should anticipate a change in game use due to a loss of cover and changes in forage. Although future recreation use within the Project Area is difficult to determine, visitation has increased rapidly in the past few years. As the Project Area changes over time, so may the make-up of visitors and the activities they pursue. Recreationists will have to either adapt to the new situations or seek another area in which to recreate.

Consistency with Direction and Regulations

This proposed project is consistent with Forest Plan direction and regulations. The proposed project will meet Forest Plan Standards for the Recreation (ROS) of roaded natural and roaded modified. Proposed activities are consistent with Forest Plan direction to manage General Forest and Rangeland (MA 1 & 2) to maintain dispersed camping opportunities in a roaded setting and manage these areas for partial retention as roaded natural, and to provide roaded recreation opportunities.

Recreation in MA 3B (Anadromous Riparian) is managed as roaded natural but standards include limiting and distributing recreation use as necessary to protect and/or rehabilitate riparian areas.

Irreversible and Irretrievable Commitments of Resources

There are no irreversible and irretrievable commitments to the recreation resource associated with the either of the alternatives analyzed.

Visual Quality

Introduction

This visual report is an integrated look at the Project Area and its resources in order to define the desired landscape character, assess existing conditions, and determine what means would be necessary and appropriate to maintain, and/or move the conditions of the area toward the desired landscape character. It is not a definitive answer, there are, no doubt, several approaches that would address the fuels and forest health situation and meet the objectives set forth at this time.

Many factors affect the character of the landscape. Landscape attributes such as landform, vegetative pattern and vegetation species makeup, water characteristics, and architectural elements, all contribute to the aesthetic character in this area. Desired landscape character, as used in this report, is the combination of attributes that contribute to a positive sustainable experience. This report addresses social, physical and biological elements of the ecosystem we are operating within. The desires of the people who value this area determine what is desired and the conditions defined by the historical range of variability indicate what is sustainable, or desirable. This area was listed as an area worthy of consideration for this analysis by the Grant County Community Fire Protection Plan

The terms scenic stability and scenic integrity are used as general ratings of the existing landscape character. Scenic stability refers to the ability of a landscape to sustain desirable characteristics over time, how healthy is the system. As one looks at scenic stability, it would not be unrealistic to be looking out 50 or more years in the future.

Scenic integrity is a measure of the degree to which a landscape, a landscape element or proposal deviates from the desired landscape character. It can be used to reference a proposed action, an existing situation, or a desired condition. It is much more dramatic, immediate, and understood, many times reflecting changes being introduced by timber harvest, road construction or building construction. The framework for both ratings is the public lands within the planning area, as seen from within the planning area or from afar, according to land management standards.

Scenic integrity in this case is driven by viewpoints within or immediately adjacent to the Project Area. County Road 20, the main transportation link through the area, is classified as a sensitivity level 2 travel corridor.

Regulatory Framework

The goals for the sensitivity level 2 corridors on the Forest, of which County Road 20 is one, are stated in the Land and Resource Management Plan, Malheur National Forest, 1990, page IV-108. They are to “manage corridor view sheds with primary consideration given to their scenic quality and the growth of large diameter trees. Visual quality objectives of retention, partial retention, and modification will be applied while providing for other uses and resources." Forest Plan standards for foreground retention limit the size of created openings to 5 acres in level 2 corridors, stress the use of uneven aged management, and limit the percentage of foreground area that can be in a created opening at any one time to 14%. The intent is to create stands composed of large over story ponderosa pine in an open park like setting which features the large trees as well as healthy under story trees, both contributing to a multi aged appearance.

The Landscape Aesthetics Handbook requires an analysis that considers more than effects that impact natural appearing landscapes. We are directed "to prescribe management which promotes sustainability" (Agriculture Handbook number 701, Landscape Aesthetic, A Handbook for Scenery Management, 1995, pg. 23.) We are directed to use an interdisciplinary process that integrates the physical, biological and cultural/social information available to us relative to the ground we manage. It is not the existing landscape against which we ultimately base comparisons, but what is ecologically sustainable and desirable.

Analysis Methods

This report addresses the effects to the visual quality of the Balance Project Area. Effects to visual quality are measured in terms of whether alternatives, or elements of a proposal, meet the visual quality level outlined in the Forest Plan, is the scenic integrity maintained, and, if so, at what level. Effects to landscapes are measured in terms of positive or negative impacts to scenic stability and scenic integrity.

Scenic integrity is a measure of the intactness of the landscape; to what level has a proposal deviated from a natural appearance. Impacts that introduce negative elements to the landscape reduce the scenic integrity. In general, activities that reduce the sustainability of natural forest eco-systems decrease scenic stability. Impacts that improve or support sustainability of the forest eco-system increase forest stability. Determinations of what visual quality levels (a measure of scenic integrity) have been accomplished or introduced was determined in conjunction with individuals including an interdisciplinary team, a forest landscape architect, the public and Forest staff personnel. Plan standards were used for comparison to field results.

Existing Condition

Scenic Integrity

Currently this area shows a moderate, obvious level of evidence of past logging. Clear cut units located on both sides of Middle Fork John Day River are obvious but most meet or exceed visual quality objectives of maximum modification, the standard for the area in which they are located. Harvesting through commercial thinning and partial cutting has occurred in zones visible as travel corridors. All are currently fully re-stocked or over stocked, meeting or exceeding current stocking level guidelines Past over story removals followed by pre-commercial thinning have left a substantial amount of stand structure for manipulation to meet various objectives. The scenic stability has suffered as a result of past developments. Due to high fuel loadings and high stocking levels stability has begun to decline as well as scenic integrity.

Scenic Stability

Existing scenic stability is an indication of the sustainability of a landscape. A landscape with a low rating would likely be difficult to manage, or maintain over time, even with extensive vegetative management intervention. The existing scenic stability is determined by considering the current condition of key resources and the current trends that exist.

Currently, there are numerous trends in this planning area that indicate that the scenic stability is in poor condition, or would be rated low. The coniferous forest is generally overstocked, in both ponderosa pine types as well as mixed fir types, with excess ground fuels and ladder fuels. This condition will make it difficult to keep wildfire starts from expanding rapidly and burning intensely. These conditions will make it difficult to maintain insect levels at endemic levels. The suppression of fires has resulted in a change in species and structural stage composition. These developmental trends are critical to the scenic stability of this landscape because these trends and the condition of the forest affect so many other resources. These trends are difficult to maintain.

For a more in-depth discussion of the current area condition relative to the potential, refer to Silviculture Existing Condition in Chapter 3.

It is not realistic to expect to achieve the balance of stand types in the planning area that would be desirable in a short period of time. It may never be accomplished. However it is desirable to move in that direction. From a visual standpoint it is desirable to work within ecological frameworks and meet established visual quality objectives or work towards that end in the long term. It is desirable to work in conjunction with other resource areas and identify sustainable situations, as well as conditions that lead to a mutually beneficial treatment or even a maintenance of the existing situation.

Visual Quality Objectives

There are still high quality options available to meet visual quality objectives in foreground and middle ground views in the long term due to natural levels and arrangement of stand diversity. Foreground and middle ground views from County Road 20 carry visual quality objectives of partial retention and modification. These areas offer good opportunities to meet visual quality objectives and address forest health concerns once the issues surrounding over stocked stands, high fuel loadings, and poor species composition have been addressed. There is a fair amount of natural and induced variety.

Recommendations

Efforts should be made to move the existing condition toward the desired, sustainable landscape character. An improvement in the sustainability of this area will not be accomplished by not treating the stands in this area, or by adopting a no action alternative. Efforts need to be made to move conditions towards a balance that can be sustained. Forest stand health needs to be improved. Efforts to restore a more fire resistant forest should be considered a high priority for the future of the areas scenic and ecological stability.

The scenic integrity is dependent on the care taken in designing projects to minimize impacts that detract from natural appearing landscapes. If project implementation creates long lasting (10+ years) impacts of large magnitude that totally detract from a naturally appearing landscape, scenic integrity will be severely degraded. However, to preserve scenic integrity entirely (no action) would be to maintain the low scenic stability and to encourage the persistence of the existing risk of large stand replacement fire and/or epidemics of insect and disease. In the event that the lack of ecological stability of the area drives alternative selection, silvicultural prescriptions should reflect a desire to lessen the impacts to the visual experience and retain as much diversity in the way of large healthy trees as is consistent with forest health objectives.

Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects

Scenic Stability

The perpetuation of existing trends would negatively impact scenic stability. Many of the stands are currently overstocked and fuel loadings are high. As long as these conditions exist, the potential for epidemics of insects or disease, or large stand replacement fire is high and continues to increase because the forest landscape has lost its characteristics of sustainability. Tree form and development is being driven by less than natural conditions. In the event of an uncharacteristic fire, fueled by a build up of dead material and over stocked stands, many of the desirable elements of landscape character would be lost for an extended period of time. If nothing is done to deal with forest characteristics associated with over stocking and high fuel loading, large, intense wildfires will occur more frequently, insect levels would continue to build and continue the cycle of increasing fuel loadings.

Scenic Integrity

The effects of no action to the Visual Quality of the area are minimal. The visual quality objectives would be maintained. The existing landscape character would not be directly altered.

Overstocked stands reduce the visual interest by reducing sight distances, restricting light from reaching the forest floor, prompting trees to grow shorter crowns and reducing the variety of color, line and form. These are direct effects to scenic variety. The desired landscape character of open park-like stands of pine and larch is being diminished. The No Action Alternative will perpetuate this trend. Many of the natural elements of the landscape system are currently being reduced and show little promise of retuning naturally. The indirect effect to scenic integrity would be greater due to the existing trends that would not be addressed. The scenic integrity would be low to very low in 25+ years. An opportunity to introduce visual variety to a somewhat mundane landscape and improve landscape viewing quality would be foregone by not pursuing treatment of stands at this time.

Cumulative Effects

The Malheur National Forest has experienced large replacement type fires in the last decade. Summit Fire burned about 38,000 acres and Flagtail Fire burned about 7,000 acres. Shake Table burned about 14,000 acres. Pre fire conditions in these areas burned acres that were in similar condition to those found in the Balance Project Area.

The most pressing need in this area is to re-establish a healthy forest climate. Every growing season that passes without reducing stocking levels and high fuel loadings results in more dead trees, more shade tolerant species becoming established, and more fuel accumulating. Tree form and stand structure are being driven by high stocking levels and changes in species composition.

A progression towards open, park like stands with a good representation of age classes will not occur under the No Action Alternative. Visual integrity and stability will suffer, and ultimately conditions will culminate in a large uncharacteristic stand replacement fire. Risks to personal dwellings in the area will be maintained or increased and fire resistance to control and rate of spread risks will increase.

Alternative 2 - Proposed Action

Direct and Indirect Effects

At this time the Project Area appears as a large gently sloped face that has been partially logged in the past. Much of it is over stocked and the trees and stands are showing signs of overstocking. There is a significant amount of visual variety offered by natural, shallow soiled openings. There are pockets of mixed conifer where the canopy takes on a deeper, denser appearance. Large ponderosa pine and Douglas-fir stumps are present throughout the area. The prescribed treatments will move the existing stands to being composed of large overstory ponderosa pine and Douglas-fir mixed with a healthy mix of intermediate sized trees, with scattered pockets of regeneration becoming established. Over stocked pockets of mixed conifer and ponderosa pine will be maintained throughout the area for escapement cover. There are low levels of large trees. The large trees will be more visible over time, intermediate trees will be maintained to replace these large trees, and the area can be under burned to maintain this appearance. The scenic integrity and stability of the area would be improved as the health and vigor returns to the trees as a result of lower stocking levels.

Scenic Integrity

Commercial thinning creates minimal negative impacts to scenic integrity. This practice could improve the landscape character by opening up the foreground views and allowing more light to reach the forest floor, which would create a more pleasing visual appearance. Tree form would improve. The effects would include improved health by reducing competition for those fire resilient tree species that are left, a shift in size classes as openings are invaded by pioneer species, and improved growth rates in trees left on the site. Commercial thinning at variable densities can successfully introduce variation and desirable change into even the most closely scrutinized foreground views. Changes in form, structure and color can result from commercial thinning.

People view the issue of roads in very different ways. Many people enjoy and appreciate the access to the area provided by roads. Others desire a roadless experience. From a visual perspective, roads are created lines that are not natural appearing, often with cut and fill slopes that detract from the natural view. These effects will be evident. Road construction can have a major impact on visual quality. The proposed action calls for approximately 2.5 miles of temporary roads. All are outside of areas which would generally be considered to detract from expected visual experiences.

Associated with silvicultural treatments are the elements of logging practices that can negatively impact the scenic integrity of the area. During harvest operations, logging activities will disrupt the visual experience. Slash will create unsightly views until it has been treated. Stumps will appear unnatural until weathering takes place. These impacts will diminish over a relative short period of time, and some, such as those imposed.

Tractor skidding will directly impact foreground views. These effects consist of soil, duff and vegetation ground cover disturbance. The impact is not wide spread but will be evident for 1 to 5 years after harvest.

Prescribed fire often creates a natural mosaic pattern of tree scorch and crown fires. However, there are events that create pockets of torched trees that can impact foreground views if they occur along roads or trails. Hand line or ATV line placed to control prescribed fire are very necessary but create a line of disturbed soil and vegetation that detracts from the natural setting. Hand lines will be evident for 1 to 5 years. Fuel treatments are expected to consist of hand piling and burning, which will be evident for a short period.

Scenic Sustainability

Commercial thinning would reduce stand densities, and produce more favorable conditions for the ponderosa pine and western larch species. Shade tolerant species would be discriminated against in the presence of more sunlight reaching the forest floor. Effects would include lowered risk of stand replacement fire that is impacted by the presence of mid canopy layers, and/or epidemics of insects and disease. Individual tree form would improve over time as crowns expand and produce higher crown ratios.

Visual Quality Objectives

The current visual quality objectives would be met by the proposed harvesting and thinning. Burning prescriptions in the Proposed Action in foreground and middle ground units along the sensitivity level 2 County Road 20 would also meet visual quality objectives. This project will not require a corridor plan at this time because we are proposing treatments in response to unnatural fuel conditions in a high risk area. This would result in a landscape with healthier, more natural appearing boles, and more diversity of age classes and habitat type, and a higher level of scenic (landscape) stability.

Cumulative Effects

The evidence of past logging is evident in this area, there are several regeneration harvest units that have been implemented in the last ten years, and pre-commercial and commercial thinning have been used throughout. Harvesting in the foreground and middle ground views has been done with mixed success. Some did not meet visual quality objectives. Much, however, has healed over time, and increased growth rates and natural regeneration in shade tolerant species has improved scenery conditions.

The most impressive need in this area is to re-establish a healthy forest climate. Every growing season that passes without change being introduced to stocking levels and high fuel loadings results in more dead trees, more shade tolerant species becoming established, and more fuel accumulating. By initiating treatment sequences at this time, and not delaying them, we can reduce the impacts of future insect epidemics, and/or fire.

There are five broad categories of stands that have been identified in the area that are in need of silvicultural treatment to return to a structure class that would occur here naturally, or on a sustainable basis. These stands dominate the landscape both in the visual corridors and other management allocations in the area.

Progression towards open, park like stands with pockets of a good balance of age classes will not occur under the No Action proposal. Visual integrity and stability will suffer, and ultimately conditions will culminate in a large uncharacteristic stand replacement fire. Risks to personal dwellings in the area will increase, and fire resistance to control and rate of spread risks will increase.

Harvesting at the levels established by the interdisciplinary team, as well in the pattern established will meet the purpose and need. It will afford protection to dwellings in the area, work within parameters established by other resource areas, as well as involved publics, and provide a measure of safety for firefighters that subsequently fight fire in this area. Silviculture prescriptions are responsive to opportunities to retain healthy trees to lessen visual impacts.

Consistency with Direction and Regulations

The project is consistent with the Malheur National Forest Plan, as amended.

Irreversible and Irretrievable Commitments

The project as described will not result in any irreversible or irretrievable effects to the scenery resource. This project is consistent with guidelines for scenery set forth in the Forest Plan.

Roads

Introduction

The main Forest Service roads that access the Balance Fuels and Vegetation Project Area include all or portions of roads 2045, 2000045, 3670 and 3600.

Most of the roads in the Project Area are Forest Service roads and were constructed to support timber related land management objectives. The Project Area also includes many roads that were previously decommissioned and removed from the transportation system.

Activities proposed that would effect access management include road maintenance and temporary road construction. All closed roads that would be opened for project activities would be re-closed after harvest activities are complete. All temporary roads constructed for project activities would be rehabilitated and restored after harvest activities are complete.

Regulatory Framework

A Forest Level Roads Analysis (FLRA) for the Malheur National Forest was completed in December 2004, which addressed the "potential minimum primary transportation system" throughout the Forest, including some of the primary access roads in the Project Area. A project specific roads analysis for this project was not done because the Responsible Official determined it was not needed. This determination is consistent with current direction because the proposed alternative does not propose any new permanent road construction, reconstruction, decommissioning or long-term changes to motorized access, current road use, traffic patterns, roads standards or propose changes anticipated to result in any road related adverse effects of soil and water resources, although some short temporary roads would need to be constructed.

Analysis Methods

Road Condition Surveys (RCS) were completed for all roads in the Project Area during the spring and summer of 2007. The surveys included completing a road log during the field inspection of each road. The RCS road log forms included data on whether the road is currently closed or opened, the surface type, erosion concerns and maintenance needs.

Each road in the project was field checked and road logs updated to reflect existing conditions. This information was used to update the GIS data base (INFRA Travel Routes).

Existing Condition

The Project Areas encompass approximately 3,530 acres, which equals approximately 5.47 square miles. The primary access into the Project Area is County Road 20. The road surface is a double lane asphalt and starts on U.S. Highway 7 and continues west to U.S. Highway 395, but access for this project use only the portion east of Forest Service Road (FSR) 36.

FSR 36 is also one of the main access routes into the Project Area and could be used for timber haul depending on which way the haul is assessed. The portion of the 36 Road that could be used for access or haul starts on County Road 18 and ends at County Road 20. The 36 Road is a maintenance level 4 road with an aggregate surface. A small portion of the 3670 road will also be used which is a maintenance level 3 road with an aggregate surface.

Other main road access into the Project Area is FSR 2045 and FSR 200045, both maintenance level 2 roads. The road surface for maintenance level 2 roads is normally native, but there are a few roads in the Project Area with crushed aggregate or improved surfaces. The Maintenance Level 1 roads in the Project Area are typically native surface roads. Additional information on Maintenance Levels and Roads can be found in the Roads Specialist Report located in the Project Record.

Table RD-1: Existing Road Miles Inside the Balance Project Area

Operational Maintenance Level	Miles
OML 1 (closed roads)	11.0
OML 2	16.3
OML 3	0.0
OML 4	0.0
Total 2, 3 and 4 (total open roads)	27.3
All Roads	27.3

Note: Rounding road miles during calculations may result in minor (0.1) mile discrepancies.

The numbers and mileages listed in the above table are compiled using all Forest Service System Roads and private roads that are in the USFS GIS database. The mileages are based upon USFS GIS lengths for each road segment.

Most of the maintenance level 1 or 2 roads that are proposed for timber haul will require some type of maintenance to meet current road maintenance objectives. This will bring the road up to a standard needed for commercial timber haul.

The road condition surveys revealed minor discrepancies between actual on-the-ground conditions, and the conditions that were recorded and stored in the Forest INFRA database. The following changes were made in the INFRA database to reflect the actual current conditions on the ground:

The following roads were found to have a portion of the road open or closed on the ground due to road closure devices installed in different locations than what was in

INFRA. Portions of the following roads were changed in INFRA from Maintenance Level 1 (closed) to Maintenance Level 2 (open) or vice versa.

- Roads: 2045300, 2045380, 2045560 and 2045562

The following roads would require temporary culverts installed before timber haul:

- Roads: 2045475 – (2) 15” to 18” culverts and 2000082 (1) 18” culvert

Environmental Consequences

Alternative 1 – No Action

Direct/Indirect effects

Under the No Action Alternative, all existing open and closed roads would be left in the same condition they are in now. No Maintenance Level 1 roads would be temporarily opened to accommodate timber haul or other activities.

Brush and tree encroachment over time will result in decreased sight distance on most roads; a few roads may close naturally as a result of encroaching vegetation and very little use. There would be no foreseeable opportunities to improve existing road conditions through funded maintenance activities. The roads would continue to deteriorate over time until and unless other funding opportunities become available.

Any road related sediment delivery into streams would continue at the current level or increase over time, along with the related effects to water quality, fish and other riparian habitat. Recurrent maintenance cost to the Federal government to meet road maintenance standards would not change.

Cumulative Effects

The existing road system assigned Maintenance Levels were developed in association with past timber harvest and other activities. Past and proposed activities that affect roads and access have been analyzed under direct and indirect effects.

Considering past, ongoing and foreseeable actions, future road maintenance (or lack of maintenance) combined with administrative and recreational use could have some cumulative effects. Routine road condition surveys will provide condition information to drive future management and maintenance of roads.

The cumulative effects related to the maintenance costs for the entire road system would remain the same.

Alternative 2 – Proposed Action

Direct/Indirect Effects

This alternative proposes to do road maintenance in association with timber harvest activities. With this alternative, there will be an opportunity to fund road maintenance commensurate with any commercial uses associated with project activities. Closed roads would be temporarily opened for the project and be closed after harvest activities are complete.

Most roads in the planning area will temporarily experience increased levels of traffic and use associated with Balance Thinning and Fuels Reduction project activities. Because of the maintenance work that is accomplished, overall road conditions should have at least a slight upward trend during the project activities and for at least five years afterwards.

Based on road condition surveys, roads used for timber haul and harvest activities would receive pre-and post-haul maintenance commensurate with use as needed to bring the roads up to standard. A list of roads proposed for use with this project is included in the Project Record. In many cases functional road drainages and road surface conditions will be improved, reducing road related impacts to other resources. Spot rocking will be used in select areas as needed to reduce the impacts of road use.

The miles listed in Table RD-2 include all haul roads proposed for use with this project.

Table RD-2 – Haul Road Miles (Inside and Outside Project Area Boundaries)

Proposed Haul Road Miles OML = operational maintenance level	**ALTERNATIVE 2**		
	Inside	Outside	Total
OML 1 Miles*	5.1	0.0	5.1
OML 2 Miles	17.8	2.8	20.6
OML 3	0.0	0.1	0.1
OML 4	0.0	2.4	2.4
Haul road miles on private land	0.3	0.7	1.0
Total Miles	23.2	6.0	29.2

These road miles will be temporarily opened for proposed project activities, and closed after post harvest reforestation is complete.

Water will be used for dust abatement during timber haul activities as needed to provide user safety. Haul routes would include some roads that are currently closed, which would be temporarily opened to accommodate timber haul and closed again after post harvest activities are completed.

The condition of haul roads would be improved by maintenance activities associated with timber harvest. A list of roads proposed for use with this project is included in the Project Record. Direct beneficial effects from the proposed action alternative would include improved road drainage and surface conditions. These improvements would result in a reduction in road related impacts to nearby water quality and fish habitat for an extended period on roads that are closed and for an estimated 5 to 10 years on roads that remain open. Overall road conditions could be expected to decline gradually over time or until appropriated funding or other projects occur that can fund future maintenance activities. Brush and tree encroachment will gradually decrease sight distance and a few roads may close naturally as a result of encroaching vegetation and very little use.

The following Maintenance level 1 roads are closed naturally on the ground and would need to be reopened for timber harvest activities:

- Road: 2000083 and 2000983

Following harvest the 2000083 and 2000983 would be effectively closed by either constructing a dirt berm or placing slash, logs or boulders along roadbed.

Approximately 2.5 miles of temporary roads will be constructed and effectively decommissioned after activities are completed. The temporary roads would result in a short term loss of productivity, but those areas would be returned to productivity when the roads are rehabilitated.

Consistency with Direction and Regulations

Alternative 1 – No Action - would not bring road related effects within the Project Areas any closer to meeting the Standards and Guidelines for fish habitat or water quality as described in the Forest Plan.

Alternative 2 – Proposed Action - would improve drainage and surface conditions on haul routes and would be consistent with Forest Plan direction and regulations. These improvements would result in a reduction in road related impacts to nearby water quality and fish habitat for an extended period on roads that are closed, and for an estimated 5 to 10 years on roads that remain open.

The action alternative would result in temporary increase in open road densities within and adjacent to the Project Area, but would not result in changes to the Project Area in terms of long-term road densities.

Irreversible and Irretrievable Commitments

The action alternative could use rock on roads for spot rocking. This would be an irreversible commitment of the rock material resources. This rock material would come from one of the following sources: Camp – Lick Material Source off of the 2045 road which is a grid rolled material or the Crocket Knob Material Source off the 4500642 road which is more of a crushed aggregate pit with existing stockpiles.

Potential water sources include either Ragged Creek or Sunshine Creek on the 2045 road or Cress Creek on the 2000045 road for roads that require maintenance work.

Economics

Introduction

Although individuals and communities over a wide geographic area use national forest resources, the residents and businesses of counties near the forest depend most heavily on the availability of the resources. Consequently, the effects of forest management on social and economic factors are strongest within these areas. For this reason, the Malheur National Forest primary zone of influence is defined as Grant and Harney counties in Oregon

Regulatory Framework

The Malheur Forest Plan includes forest-wide management goals to:

- Provide a sustained flow of timber for lumber, fiber, and/or associated wood products at a level that will contribute to economic stability, while providing for regional and national forest management.
- Contribute to the social/economic health of communities, which are significantly affected by national forest management.
- Provide an economic return to the public.
- Provide and utilize wood fiber in the form of sawtimber, fiber, and/or associated wood products, while minimizing losses and maximizing outputs in a cost-effective manner, consistent with the various resource objectives and environmental standards.

The Code of Federal Regulations (CFR) is a codification of the general and permanent rules published in the Federal Register by the Executive departments and agencies of the Federal Government. Minimum specific management requirements are identified in 36 CFR 219.27, to accomplish goals and objectives for the National Forest System.

- Section (B) Vegetative Manipulation: (1) Multiple-use; (3) Not chosen for greatest dollar return; (7) Practical transportation, harvest requirements, and preparation and administration.
- Forest Service policy sets a minimum level of financial analysis for project planning (FSH 1909.17).
- The National Environmental Policy Act requires integrated use of the natural and social sciences in all planning and decision-making that affects the human environment. The human environment includes the natural and physical environment, and the relationship of people to the environment (40 CFR 1508.14).

- Title 40, Code of Federal Regulations for NEPA (40CFR 1502.23) addresses non-commodity values, stating "For the purposes of complying with the Act, the weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost-benefit analysis, and should not be, when there are qualitative considerations."
- 36 CFR 219.3 – National Forest System Land and Management Planning
- Executive Order 12898 (February 11, 1994) on Environmental Justice directs federal agencies to identify and address agency programs that may have a disproportionately high and adverse environmental effects on minority populations, low-income populations, or Indian tribes. The order directs federal agencies to focus attention on the human health and environment effects to ethnic minorities (American Indians, Hispanics, African Americans, and Asian and Pacific-Islander Americans), disabled people, and low-income groups.

Analysis Methods

The social and economic effects of the proposed management alternative were assessed in terms of viability of harvestable timber, employment supported and income provided. The following sections describe each of these criteria in detail.

Viability of Harvest

Although the Balance Project has both a commercial and non-commercial component, harvest viability is only relevant to the commercial component. Therefore, viability of harvest was only analyzed for those units that had a commercial component.

The computer program, TEA_ECON, was used to estimate the sale revenues based upon the estimated tentative advertised bid rates per hundred cubic feet ($/ccf) for the commercial acres of the action alternative. These bid rates indicated the economic viability of harvesting timber. The estimates of these bid rates were based on the most current estimates of the following:

- Estimated volume per acre — estimated from local knowledge of stands. All volume is in hundreds of cubic feet (ccf). An average commercial unit volume was estimated at 3.6 ccf per acre.
- Species Composition — estimated at 95 percent ponderosa pine, and 5 percent Douglas-fir and other species for the sale as a whole.
- Estimated Volumes of Sawtimber are shown in Table EC-1.

TEA_ECON: An economic analysis tool that allows the user to perform timber sale accounting at the planning or sale layout level. The program uses price and cost data and the quarterly updated regional record of timber sale transactions to generate gross timber values, estimated advertised rates, and cash flow estimates.

Table EC-1: Commercial Acreage and Volume Estimates

	Alternative 1 –No Action	Alternative 2 – Proposed Action
Commercial Unit Area (Acres)	0	734
Ponderosa Pine Sawtimber (ccf)	0	2553
Other Sawtimber (ccf)	0	133
Total Sawtimber (ccf)	0	2686

•Preliminary Value of Timber Removed — based on a weighted average for all sales actually sold within Appraisal Zone 3 (primarily Blue Mountain forests) within the last 12 months.

•Costs — logging systems, log haul, road maintenance, contractual, brush disposal, erosion control, and other development. These costs are shown in Table 2 and were discounted to present net values at a rate of 4 percent.

Table EC-2: Assumed Costs of Commercial Sale

Cost Center	Cost ($/ccf)	Year
Sale Preparation	16	0
Sale Administration	10	1-2
Stump to Truck	110	2
Log Haul	30	2
Road Maintenance	4	2
Brush Disposal and Erosion Control	2	2

An initial tentative advertised sawtimber bid rate ($/ccf) was determined by subtracting the costs associated with logging from the base period prices adjusted for the quality of the material and current market conditions. This rate was reduced by 10 percent per current appraisal methods (Transaction Evidence Appraisal) to account for competition between bidders. It is important to note that advertised bid rates have fluctuated over the last few years reflecting the volatility of the timber market. Prices would likely change in the future (e.g. when the actual sale appraisal occurs), depending on market conditions at that time. Therefore, these estimates should only be considered rough approximations of future conditions. As a result, calculated bid rates were rounded to the nearest dollar. Timber sale revenues were also discounted to present values at a rate of 4 percent.

- Base Period Price: The volume-weighted average bid price of competitively sold timber sales in the previous 4 quarters. This value is updated quarterly.

Employment and Income

Employment and income effects from the commercial units were derived from multipliers obtained from the IMPLAN (Impact Analysis for Planning) model, and from the forest-level Timber Sale Program Information Reporting System (TSPIRS) analysis in fiscal years 1996 to 1998 (USDA 1998, USDA 2000). Analysis of employment (jobs) and income assumed that all harvesting would occur over the next one to two years. Two years was used for this analysis. Employment coefficients were 0.0029 direct jobs per ccf and 0.0018 indirect jobs per ccf. The direct income coefficient was $83.84 per ccf and the indirect and induced income coefficient was $54.12 per ccf.

Job estimates were based on the assumption of a direct relationship between changes in harvest volumes and manufactured output. In other words, a percentage change in harvest volume would result in an equal percentage change in manufactured output and employment. The model assumed that the price of timber is constant in response to changes in the supply of timber; the mills would not adjust their use of the factors of production (labor and equipment) to increase efficiency as a response to changes in the price or supply of timber; and the mills would not change their output per timber input in response to changes in timber supplies or changes to their mix of labor and equipment. Job estimates included temporary, permanent full-time, and part-time employment. Employment effects from recreation and domestic-livestock grazing activities were not analyzed because only minor or no changes were expected in the level of use for these activities. The estimates provided by this analysis also did not include unpaid family workers or sole proprietors. Estimates apply to communities and counties in the regional impact zone and not necessarily to any one county.

Levels of harvest volume by alternative would affect employment and income in several ways:

- directly - (employment associated with harvesting, logging, mills and processing plants for sawtimber, pulp, chips, veneer and plywood)
- indirectly - (industries that supply materials, equipment, and services to these businesses)
- induced - (personal spending by the business owners, employees, and related industries)

Several factors would influence the ability of any one county or community to experience the largest extent of the harvest-related employment and income effects. The financial viability of the timber sale proposals would influence whether potential purchasers closest to the Project Area could compete with other purchasers to acquire the majority of the supply. Changes to bid rates would likely occur during appraisal, depending on actual market conditions at that time. Employment projections would depend on other factors such as market conditions, quality and quantity of the volume offered for sale, timing of the offerings, and financial conditions of local firms.

There are no IMPLAN employment multipliers for non-commercial thinning projects, so direct and indirect employment from the thinning of the non-commercial units could not be estimated. However, the cost paid for this work was assumed to go directly into the local economy as direct income. Indirect income was estimated as being in the same proportion to direct income as in a commercial timber sale.

Environmental Justice

The population of the area is predominately white, followed by American Indians. The region is sparsely populated, and contains low populations of minorities (3.4% of the Grant County population, 3.7% of Baker County, 7.6% of Harney County (United States Census Bureau 2007). The primary American Indian tribes involved are the Burns Paiute Tribe, Confederated Tribes of the Umatilla Reservation and Confederated Tribes of the Warm Springs. With the Exceptions of the Burns Paiute Tribe, minorities are scattered throughout the counties.

Data regarding minorities or people with disabilities employed in the region in the timber, mining, ranching, road construction, forestry services, and recreation sectors is unavailable. Some contracts are reserved for award to minority businesses under the USDA Office of Small and Disadvantaged Business Utilization and the Small Business Administration, although overall contract amounts to these groups has declined since 1998 (Kohrman 2003).

With implementation of the proposed action alternative, there would not be disproportionately high and adverse human health or environmental effects on minority or low-income populations. The actions would occur in a remote area and nearby communities would mainly be affected by economic impacts as related to contractors implementing harvest and thinning activities. Racial and cultural minority groups are often prevalent in the work forces that would implement prescribed fire, tree planting, herbicide application, or thinning activities. Contracts contain clauses that address worker safety.

Effects on civil rights, including those of minorities and women, would be minimal. Activities associated with the action alternative would be governed by Forest Service contracts, which are awarded to qualified purchasers regardless of race, color, sex, religion, etc. Such contracts also contain nondiscrimination requirements. While the activities identified here would create jobs and the timber harvest would provide consumer goods, no quantitative output, lack of output, or timing of output associated with these projects would affect the civil rights, privileges, or status quo of consumers, minority groups, and women.

Economic Efficiency

Economic efficiency is a term used to describe how well inputs are used to achieve outputs when all inputs (activities) and all outputs (including market and non-market) are identified and valued. All costs and all benefits to society are included; amounts of each output are not pre-established but are produced in amounts that maximize net public benefits" (FSH 1909.17, §11.1).

Due to unavailable information, the non-wood outputs from this project could not be valued. Therefore, the economic efficiency of this project was measured by cost effectiveness, as recommended by FSH 1909.17. Cost effectiveness analyses attempt to determine the least costly alternative to produce the desired result. The objective of the cost effectiveness analysis was to show a relative measure of difference between alternatives. Where harvest viability was analyzed for only the commercial units, cost effectiveness was analyzed for all units, together. The analysis focused on identifiable and quantifiable ecosystem benefits and costs for each alternative in terms of the present net value to assess which alternative came nearest to achieving the purpose and need over the largest land area at the least cost. All dollar values were discounted in terms of the present net value (2004 dollars). The real (exclusive of inflation) discount rate used was 4 percent.

The measurement of economic efficiency differs from the measurement of harvest viability in that economic efficiency attempts to put values on the full range of inputs and outputs (both market and non-market) associated with the project, while harvest viability is more an accounting procedure that only considers the costs and revenues of the project as expressed in timber markets.

Present net value is defined as the discounted present benefit value (PVB) of the stream of benefits less the discounted present cost value (PVC) of the schedule of costs.

Discounting is a process whereby the dollar values of costs and benefits that occur at different time periods are adjusted to a common time period so that they can be compared.

Table EC-3: Comparison of Employment and Income

	Alternative 1 –No Action	**Alternative 2 – Proposed Action**
Volume (ccf)	0	2686
Employment		
Direct (Jobs)	0	8
Indirect (Jobs)	0	5
Total (Jobs)	0	13
Income		
Direct ($)	0	$225,194
Indirect & Induced ($)	0	$145,366
Total ($)	0	$370,560

Employment coefficients are 0.0029 direct jobs per ccf and 0.0018 indirect jobs per ccf. The direct income coefficient is $83.84 per ccf and $54.12 indirect and induced income per ccf

Employment Coefficients for non-commercial thinning projects are unavailable.

In this project, cost effectiveness was measured in terms of present net value (PNV) per acre or:

PNV/acre = Present Net Costs/acre – Present Net Revenues/acre

Measurable costs and benefits on commercial units were based on costs and revenue from timber volume proposed for harvest and described under the assumptions for harvest viability.

Existing Condition

Viability of Harvest

The viability of harvest is dependent upon the market prices for raw wood fiber and the costs of harvest that are identified in the above Methodology and Assumptions section. Market prices are determined by the supply and demand relationships that exist for wood fiber on a global scale.

Local sawmills that could bid on the sawtimber from this project are located in La Grande, Pilot Rock, Prairie City, and John Day. In addition to local sawmills, three to four large logging contractors usually bid on local timber sales, and if successful, could sell the sawtimber to the same local sawmills.

Employment and Income

Agriculture, manufacturing (particularly wood products), and food processing are important sources of employment and income in this region. Reliance on timber and forage from federal lands is moderate to high in several counties in the impact zone (Haynes et al. 1997). Many communities in the impact zone are closely tied to the forest in both work activities and recreation. Cattle production and forest products provide the core employment for Grant and Harney counties. Forest Products industries include 3 major lumber mills and numerous logging companies. Wood products employment totaled 410 direct jobs (ie mill workers and loggers) and 102 indirect jobs, approximately five % of the total non-farm employment in Grant and Harney counties (average annual in 2007). Local government, retail trade, and services employ the most people in Grant and Harney counties, (Oregon Employment Department 2007). The area surrounding the Project Area is rural, and has a disproportionately high unemployment compared with the Oregon state average and the National average.

Economic Efficiency

Volumes, costs, and revenues from the commercial units were analyzed for cost effectiveness. The derivation of the commercial unit data is described in the Harvest Viability section of this report.

Environmental Consequences

Alternative 1

Direct and Indirect Effects

Harvest Viability

The No Action alternative would not harvest timber, so would not affect harvest viability.

Employment and Income

This alternative would not harvest timber and therefore, would not support direct, indirect, and induced employment, or increased income to local economies. Declining trends in timber harvesting from National Forest lands would continue in the future and contribute to declines in wood products employment over the next two decades. Changes in the economic base and wood products infrastructure for the impact area would also continue to be influenced by fluctuations in market prices, international market conditions, changes in technology, and industry restructuring.

Economic Efficiency

The public would incur no costs, nor realize any benefits of timber harvest in this area. No Action would yield a present net value of 0 due to the data limitations (described in the "Methodology and Assumptions" section) for quantifying economic benefits and costs beyond those identified at the project level. This value ignores the risks to forest health, vigor, and fire resistance that would increase without implementation of this project, and the resulting losses in timber values and non-market benefits. Data limitations do not allow for the quantification of this risk, however, this risk would negatively affect present net value.

Ongoing costs associated with management of the area, including the continuation of economic losses in stand values from recurring forest health problems.

Cumulative Effects:

The economic efficiency of other past, ongoing, or foreseeable future activities would not affect, and not be affected by any effects not already described.

The Malheur National Forest Land and Resource Management Plan established an allowable sale quantity (ASQ) for the forest of 38.4 million cubic feet or 211 million board feet (MMBF) average per year. An ASQ is an upper limit for the plan period, not proposals for sale offerings or an assigned target. Actual sale levels, depend on factors such as limitations of modeling, changes in law and regulations, changes in budgets, and site-specific conditions. The Regional Foresters Eastside Forest Plans Amendment

2 (1995) and PAC FISH and INFISH in 1995 are Forest Plan amendments that were developed in response to some of these changing factors. A combination of the factors listed above has resulted in a trend of overall decline in the Malheur National Forest's annual offering of timber volume since the 1990 Forest Plan went in to effect.

The selection of the No Action Alternative has the potential to continue the decline of timber-related employment in the rural communities of Grant and Harney counties. Continued declining trends in timber harvesting from the National Forest System (NSF) lands would potentially continue to impact wood products employment and associated indirect employment. The cumulative loss in timber-related jobs could affect the remaining infrastructure and capacity of the local rural communities, and could disrupt the dependent local goods and services industries.

Alternative 2

Direct and Indirect Effects

Harvest Viability

The TEA_ECON program was run for harvest viability. The results of each program run, and the effects of all alternatives on harvest viability, are shown in Table EC-4. As shown in Table EC-4 this alternative would produce revenue, estimated at $102,742. Its costs would also be $84,194. This would produce an estimated present net value of $18,548 for the commercial component.

Table EC-4: Estimated Average Bid Prices and Net Present Value for Commercial Units ($/ccf)

	Alternative 1 –No Action	Alternative 2 – Proposed Action
Average Bid Price ($/ccf)*	0	41
Discounted Sale Revenues**	0	$102,742
Discounted Sale Costs	0	$84,194
Present Net Sale Value	0	$18,548

* The average bid price is rounded to the nearest dollar.   * Sale revenues and costs are rounded to the nearest $1,000.

Commercial harvests show positive value. This indicates the proposed action would produce a viable harvest.

Employment and Income

In general, the primary effect on timber harvest-related employment would occur from commercial harvesting associated with the action alternative over the next two years. Financially viable sales would be necessary to provide opportunities for timber harvest-related employment. Based upon the harvest data and the IMPLAN multipliers provided, small increases in employment would be expected (Table EC-3).

Contracts for the noncommercial areas and activities will also provide jobs through contracting; this is not estimated in the employment estimates in Table EC-3.

The distribution of economic impacts would depend on the location of the timber purchaser awarded the contracts at the time of the sale, the availability of equipment and skills in the impact area, and the location and availability of the wood processing facilities and related infrastructure. Processors outside of Northeast Oregon could also potentially bid on the sales and distribute the jobs and income effect to other counties in the Blue Mountains or outside of the area entirely.

As Table EC-3 shows, the proposed action would generate $370,560 in direct, indirect, and induced local income.

Based upon the commercial volume harvested, the proposed action would support approximately 13 jobs over the 2-year period, both direct and indirect, and contribute approximately 2 percent toward the 2007 annual average of 410 jobs of timber-related employment.

Economic Efficiency

Market benefits that could occur as a result of the proposed activities include increases in forest productivity and value for the remaining trees by eliminating competitive stress and reducing the risk of growth-limiting insect attack.

Table EC-5 shows the Proposed Action would have a present net value of $18,548 and would have a net value per acre $25.

Table EC-5: Estimated Net Present Value of the Proposed Action

	Alternative 2 – Proposed Action
Total Project Area (Acres)	734
Commercial Units	
Average Bid Price ($/ccf)	$40.86
Discounted Revenues	$102,742
Discounted Costs	$84,194
Present Net Value	$18,548
Present Net Value per Acre	$25

Externalized costs such as those resulting from damage to soils, losses in wildlife habitat, and mobilized sediment in local streams are not well defined or measurable at the project level in terms that provide comparison of assigned dollar values. Refer to other sections on environmental consequences in this EA discussions on whether these external effects would occur. The other sections of this EA also discuss the non-economic benefits to human and environmental resources for a relative comparison between alternatives.

This economic analysis assessed the proposed action in terms of harvest viability, local employment and income, and economic efficiency as measured by cost effectiveness. Table EC-6 summarizes the results of the analysis.

Table EC-6: Summary of Economic Measurement Criteria by Alternative

	No Action	Proposed Action
Area Treated (Acres)	0	734
Commercial Volume (ccf)	0	2686
Commercial Bid Rates ($/ccf)	0	$40.86
Local Employment* (jobs)	0	6
Local Income	0	$370,560
Discounted Revenue	0	$102,742
Discounted Costs	0	$84,194
Present Net Value	0	$18,548
Present Net Value per Acre	0	$25

Cumulative Effects

Harvest Viability

Estimates for tentative advertised sawtimber bid rates for the proposed action are within the range of rates experienced by the three Blue Mountain forests (Malheur, Umatilla, and Wallowa-Whitman) within the last two years (Musgrove, 2004). Because of the competitiveness of the market, and its global nature, the No Action Alternative or Alternative 2 would not affect prices, costs, or harvest viability of other present or future timber sales in the economic impact zone. There are also residual effects from past timber sales within the subwatershed which would not have a detrimental effect on the viability of harvest of the proposed action alternative. These past actions are described in Appendix C:

The Malheur National Forest Land and Resource Management Plan established an allowable sale quantity (ASQ) for the forest of 38.4 million cubic feet or 211 million board feet (MMBF) average per year. An ASQ is an upper limit for the plan period, not proposals for sale offerings or an assigned target. Actual sale levels, depend on factors such as limitations of modeling, changes in law and regulations, changes in budgets, and site-specific conditions. The Regional Foresters Eastside Forest Plans Amendment 2 (1995) and PAC FISH and INFISH in 1995 are Forest Plan amendments that were developed in response to some of these changing factors. A combination of the factors listed above has resulted in a trend of overall decline in the Malheur National Forest's annual offering of timber volume since the 1990 Forest Plan went in to effect.

Alternative 2 would provide some potential short-term economic relief by utilizing commercially thinned sawlogs. This material would potentially be used to support the three saw mills operating in the John Day/Prairie City area. The amount of local economic relief would be determined by whether the purchaser is local or distant, what mills(s) local or distant actually received the logs, and the price for the lumber. These cumulative economic effects could cause beneficial “quality of life” social effects, especially when combined with other ongoing Forest Service Timber sales within Grant and Harney Counties that are providing employment and income. There are foreseeable projects in the two counties in various stages of planning that potentially may add to the Forest’s annual timber offerings for 2008 or 2009. For example, the Knox and Dans projects on the Prairie City Ranger District, the Crawford, Can, CC, and Dads projects on the Blue Mountain Ranger District, and the Green Ant, Ryd3 and Silvies projects on the Emigrant Creek Ranger District. These ongoing and foreseeable projects are expected to add cumulatively to the employment and income of Grant and Harney counties within the life of the Balance Project.

Economic Efficiency

The economic efficiency of other past, ongoing, or foreseeable future activities would not affect, and not be affected by any effects not already described.

Heritage

Introduction

The purpose of this report is to analyze the effects of fuels reduction activities proposed on cultural resources in the Balance Thinning and Fuels Reduction project.

Cultural resources are fragile and irreplaceable resources that chronicle the history of people utilizing the forested environment. Cultural resources, or Heritage resources, include:

- Historic properties, places which are eligible for inclusion to the National Register of Historic Places (NRHP) by virtue of their historic, archaeological, architectural, engineering, or cultural significance. Buildings, structures, sites, and non-portable objects (e.g., signs, heavy equipment) may be considered historic properties. Traditional Cultural Properties (TCP's), localities that are considered significant in light of the role it plays in a community's historically rooted beliefs, customs, and practices (Parker and King, 1998), are also considered historic properties. Historic properties are subject to the National Historic Preservation Act's Section 106 review process.
- American Indian sacred sites located on federal lands. These may or may not be historic properties.
- Cultural uses of the natural environment (e.g., subsistence use of plants or animals), which must be considered under NEPA.

No significant issues involving cultural resources have been identified during the scoping efforts for the project.

Regulatory Framework

The legal framework that mandates the Forest to consider the effects of its actions on cultural resources is wide-ranging. In this case, Section 106 of the National Historic Preservation Act (NHPA) of 1966 (amended in 1976, 1980, and 1992) is the foremost legislation that governs the treatment of cultural resources during project planning and implementation. Implementing regulations that clarify and expand upon the NHPA include 36 CFR 800 (Protection of Historic Properties), 36 CFR 63 (Determination of Eligibility to the National Register of Historic Places), and 36 CFR 296 (Protection of Archaeological Resources). The Pacific Northwest Region (R6) of the Forest Service, the Advisory Council on Historic Preservation (ACHP), and the Oregon State Historic Preservation Office (SHPO), signed a programmatic agreement (PA) regarding the management of cultural resources on National Forest system lands in 2004. The 2004 PA outlines specific procedures for the identification, evaluation, and protection of cultural resources during activities or projects sponsored by the Forest Service. It also establishes the process that the SHPO utilizes to review Forest Service undertakings for NHPA compliance.

The National Environmental Policy Act (NEPA) of 1970 is also a cultural resource management directive as it calls for agencies to analyze the effects of their actions on sociocultural elements of the environment. Laws such as the National Forest Management Act (NFMA) of 1976, the Archaeological Resources Protection Act (ARPA) of 1979, the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990, and Executive Order 13007 (Indian Sacred Sites) also guide Forest Service decision-making as it relates to Heritage. The American Indian Religious Freedom Act (AIRFA) of 1978 requires that federal agencies consider the impacts of their projects on the free exercise of traditional Indian religions.

The Malheur National Forest Land and Resource Management Plan (1990), as amended, tiers to the previously mentioned laws and corresponding Forest Service manual direction as it sets forth resource management goals, objectives, and standards. Forest-wide management standards that are pertinent for this cultural resource effects analysis include:

- Conduct a professionally supervised cultural resource survey on National Forest lands to identify cultural resource properties. Use sound survey strategies and the Malheur National Forest Cultural Resource Inventory Survey Design (Thomas 1991).
- Evaluate the significance of sites by applying the criteria for eligibility to the National Register of Historic Places.
- Consider the effects of all Forest Service undertakings on cultural resources. Coordinate the formulation and evaluation of alternatives with the State cultural resource plan, the State Historic Preservation Office and State Archaeologist, other State and Federal agencies, and with traditional and religious leaders of Native American Indian groups and tribes with historic ties to the project planning area.

Consultation with Others

Many of the previously described laws, regulations, and directives instruct the Forest Service to consult with American Indian Tribes, the state, and other interested parties on cultural resource management issues. This consultation has been conducted through the NEPA process and under the terms of existing agreements with American Indian Tribes. To date, there have been no concerns raised during scoping regarding the effects of thinning and fuels activities on cultural resources. Documentation of compliance with the NHPA is currently being prepared for referral to the Oregon SHPO in accordance with the 2004 PA, and consultation with that agency will be completed prior to the publication of the Balance Thinning and Fuels Reduction Final Environmental Assessment.

Tribal consultation on a government-to-government basis is ongoing with the Burns Paiute Tribe, the Confederated Tribes of the Umatilla Indian Reservation, and the Confederated Tribes of Warm Springs Reservation. At this point in the consultation process no concerns regarding the effects of the thinning and fuels proposals on cultural resources have been identified.

Analysis Methods

The Balance planning area includes all National Forest system lands administered by the Blue Mountain Ranger District that are within the designated boundary established for this project. The cultural resources effects analysis will focus on cultural properties identified within the Balance planning area. The proposed action does not have potential to have indirect effects (i.e., visual, auditory, atmospheric) on cultural resources that are distant from the project.

Existing Condition

Cultural resource identification efforts in the vicinity of the Balance planning area have focused on three primary types of resources: prehistoric archaeological sites, historic archaeological sites, and places that support resources of contemporary tribal interest.

There have been twelve cultural resource inventories previously conducted within areas of the Balance Project (Dunston Timber Sale 645-80-002, Crocket Knob Timber Sale 645-81/017, Sun Timber Sale 645-87/043, Top Timber Sale 87/048, Lance Timber Sale 89/126, Elk Planning Area 645-93/169, Silviculture 1992 645-92/183, Middle Fork Burn Project 645-93/188, Middle Fork Road Realignment 645-94/211, Balance/Lower Middle Fork Allotment Range NEPA Assessment 645-95/224, Summit Fire Recovery Project 645-97/236, and Middle Fork John Day Range Planning Area Project 645-05/251).

Additionally, there are portions within the Project Area that have been resurveyed and areas newly surveyed for the current project. These surveys have resulted in the discovery of nine heritage sites within or adjacent to the Project Area boundary. Of these, there are five prehistoric sites and four historic sites. Five of these sites are considered eligible for inclusion on the National Register of Historic Places (NRHP), three are ineligible, and the eligibility of one site is undetermined.

Table H-1: Cultural resource sites located within or adjacent to the Balance Project Area

Site Number	Description	NRHP Eligibility	Protection Measures
645-0075	Prehistoric lithic scatter	Eligible	Avoid/Protect
645-0076	Prehistoric lithic scatter	Eligible	Avoid/Protect
645-0077	Historic ditch (Badger Ditch)	Eligible	Avoid/Protect
645-0084	Historic Susanville Guard Station	Unevaluated	Avoid/Protect
645-0089	Prehistoric lithic scatter	Not eligible	Removed from management consideration
645-0220	Historic railroad line (Oregon Lumber Company Railroad)	Listed on NRHP (part of Sumpter Valley Railway Historic District)	Avoid/Project
645-0522	Historic trash refuse	Not eligible	Removed management consideration
645-1729	Prehistoric lithic scatter	Eligible	Avoid/Protect
645-1734	Prehistoric lithic scatter	Eligible	Avoid/Protect

The Balance Thinning and Fuels Reduction Project Area is located north and south of the Middle Fork John Day River. The Middle Fork John Day River is a natural conduit of least resistance for movement of peoples seasonally from the direction of the Columbia River area to the north and the John Day River Valley to the west and south. It is likely that both Columbia River Indians (Plateau tradition) and Northern Paiute (Northern Great Basin tradition) utilized this area where the proposed project is located.

The east-west trending Middle Fork John Day River is the dominant topographic feature of the Project Area. Besides the river, other water sources in and adjacent to the Project Area include numerous springs and Sunshine, Dunston, Balance, Cress, and Horse Creeks and unnamed tributaries to the Middle Fork John Day River. Elevations vary from 3,400 to 4,400 feet.

The prehistoric information for this Project Area is sparse and limited to data gathered on the previous projects. Surveys to date indicate use of Horse and Cress Creeks, numerous unnamed tributaries and most noteably, the Middle Fork John Day River. Based on the ground stone artifacts observed in the archaeological sites, a wide range of resources may have been utilized including seeds, roots, berries, fish and game. Plant resources commonly used by Native Americans, i.e., wild onion, lomatium, camas, balsamroot, willow, and berries, are distributed throughout the Project Area and have been observed to be associated with the prehistoric sites recorded. The Middle Fork

John Day River and its tributaries would have historically had steelhead and salmon migrating up their waters.

The Southern Blue Mountains were home to people representing the adaptive traditions of both the northern Great Basin and the southern Columbia Plateau (Burtchard 1998). Known prehistoric sites in the Project Area consist primarily of waste flakes associated with the manufacture of stone tools and occasional tool fragments. Sites are mostly small, and represent expedient tool manufacture or reworking, most likely associated with modest seasonal use of the area for hunting and gathering. The ground stone tools observed at several of the sites, hopper mortar base, metate, mano, and pestle, are fairly rare artifact types for the Malheur National Forest and suggest processing of seeds and root plants. Although several archaeological sites in the area have been tested for subsurface cultural deposits, only one was identified from test excavations to have an intact cultural deposit which might suggest heavy and long-term use. A second archaeological site which occupies the southern edge of a wet and dry meadow contains the highest frequency of ground stone implements of any of the sites located in this area. Dates associated with age diagnostic projectile points indicate use of the area throughout much of the Holocene Epoch.

Historic uses of the Project Area are reflected in the form of sites related to mining, railroad logging, and Forest Service administration. The Oregon Lumber Company Railroad (OLC) linear site which runs along the Middle Fork John Day River was listed on the National Register of Historic Places in 1987 as the Sumpter Valley Railway - Middle Fork John Day River Spur (1916-1946). The historic Susanville Guard Station has an undetermined eligibility.

Overall, historic use of the area has been related to the extensive mining within the Susanville Mining District which is within the Middle Fork of the John Day River Drainage. Much of the land that comprised the mining district, including the town of Susanville, is located on patented lands. The early placers are primarily located on the northern side of the river and are especially concentrated on Elk Creek, which is located west of the proposed project boundary. A placer boom, following the strike on Elk Creek in 1864, spanned the period between 1864 and 1870. In 1870, the production of the Susanville placers began to decline. During this “inter-boom” period, ranching and homesteading became important in Susanville and mining played a lesser role. Chinese miners arrived in greater numbers and began working and reworking many of the placers. A lode mining boom in the Susanville District began as the Sumpter Valley Railroad reached the city of Sumpter in 1896. This period of productive lode mining persisted from about 1900 to 1905. After 1910 mining activity in the Gold Belt of the Blue Mountains generally decreased and Depression Era subsistence mining was the predominant land use until the beginning of World War II.

The Oregon Lumber Company Railroad main line which was part of the Sumpter Valley Railroad system played a key role in the settlement and use of this area along the Middle Fork John Day River. The OLC extended northwestward down the Middle Fork John Day River from Bates, past the mining towns of Susanville and Galena. Logging activities along the Middle Fork and adjacent areas were associated with the OLCs Bates mill. The OLC railroad also serviced and accommodated lumber camps, and the mining and livestock industries.

Historic archaeological resources situated in Balance Planning Area have also sustained impacts from 20th century land use. Resources that were deposited by cultural occupation during the middle of the 20th century are almost always situated at or very near to the surface of the ground and are therefore more vulnerable to surface disturbances such as trampling, burning, and artifact collecting.

Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects

Alternative 1, the No Action Alternative, would cause no direct or indirect effects to known or unknown cultural resources.

Alternative 2 – Proposed Action

Direct and Indirect Effects

Alternative 2 is expected to have no, or extremely minor, direct effects on all known heritage sites within the Project Area. In most cases sites would be avoided throughout the lifetime of any of the proposed actions. The small number and size of known heritage sites within the Project Area make avoidance a practical alternative in most cases.

Alternative 2 could possibly cause direct effects on undiscovered heritage resources. This possibility is addressed in the project design elements that state that if cultural resources are located during project implementation, work will be halted and the Zone Archaeologist will be notified. The cultural resource will be evaluated, and a mitigation plan developed in consultation with the Oregon State Historic Preservation Office (SHPO), if necessary. In most cases these effects, should they occur, would be minor and unlikely to cause a significant impact.

Some habitat for plants that are traditionally important to the regional tribes of American Indians may be enhanced by the vegetation treatments of this alternative. Riparian dependent species such as willow and cottonwood will realize some long-term benefits as fuel loading is reduced and there is a natural reestablishment of native vegetation. Cultural plant stands in upland areas may realize a limited positive effect under the alternative as fuel loading is addressed across the landscape.

The primary indirect effect of all alternatives on heritage resources would be the potential for increased erosion of the site matrix for those sites with intact buried components. Although three of the archaeological sites were tested for subsurface cultural material, it was determined that none of the sites had identified intact buried components. Since all known sites will be avoided/protected and extensive soil protection project design features are in place, no or minimal indirect effect on known and unknown heritage resources are expected under all alternatives.

Also, indirectly, reducing the accumulations of fuels through commercial thinning will reduce the severity of potential wildfires and will enhance the long term stability of archaeological and historic resources within lands adjacent to the Balance project.

Cumulative Effects – Alternatives 1 and 2

Past, ongoing and foreseeable actions that have effected and may continue to effect heritage resources in the Project Area include previous timber harvest projects, livestock grazing, wildfires, road construction and dispersed recreational use. Cattle and sheep grazing, particularly before the middle twentieth century, likely caused direct effects through trampling of artifacts and indirect effects through soil erosion. Some level of artifact removal by workers and recreational visitors has most certainly occurred, and likely continues at a reduced rate. Past road construction and maintenance has caused the most significant direct effects to those sites where a road passed through. Timber harvest has mostly occurred relatively recently and to a limited extent. Direct and indirect effects to heritage sites by timber harvest activities have been minimal.

However, most potential impacts that heritage sites might incur from such foreseeable future actions as noxious weed treatment, prescribed burning, hazard tree treatment and livestock grazing and improvements would be mitigated as per Stipulation III. A. of the 2004 Programmatic Agreement with Oregon SHPO.

Alternative 1 - No Action

Alternative 1, the No Action Alternative, would cause no cumulative impacts to known or unknown cultural resources.

Alternative 2 -Proposed Action

Alternative 2, the proposed action, could possibly cause limited cumulative impacts to known and unknown heritage resources. These could include unintentional direct effects to unknown sites and potential for artifact removal. Overall these potential cumulative impacts, should they occur, will only result in a minimal effect to heritage site integrity.

With the implementation of the project design elements for cultural resources (Chapter 2, Design Measures), there is minimal risk of additional incremental degradation of historic properties associated with the Proposed Action.

Consistency with Direction and Regulations

Heritage and Tribal interests are regulated by federal laws that direct and guide the Forest Service in identifying, evaluating and protecting heritage resources. The proposed action would comply with federal laws. The Malheur National Forest Plan tiers to these laws, therefore the proposed action will meet Forest Plan standards. With the completion of the Heritage inventory under the terms of the 2004 PMOA and by providing the interdisciplinary team with appropriate input as per NEPA, all relevant laws and regulations have been met.

Findings and Disclosures

Several laws and executive orders require project-specific findings or other disclosures and are included here. The project complies with the following and other relevant legal requirements and coordination, and regulations. These apply to both alternatives considered in detail in this EA.

National Forest Management Act

All project alternatives fully comply with the Malheur Forest Plan. This project incorporates all applicable Forest Plan forest-wide standards and guidelines and management area prescriptions as they apply to the Project Area, and complies with Forest Plan goals and objectives. This includes additional direction contained in all amendments. All required interagency review and coordination has been accomplished; new or revised measures resulting from this review have been incorporated.

The Forest Plan complies with all resource integration and management requirements of 36 CFR 219 (219.14 through 219.27). Application of Forest Plan direction for the Balance Thinning and Fuels Reduction project ensures compliance at the project level.

The National Environmental Policy Act (NEPA) of 1969, as amended

NEPA establishes the format and content requirements of environmental analysis and documentation, such as the Balance Thinning and Fuels Reduction Project. This project is consistent with all requirements.

Treaty with the Walla Walla, Cayuse, and Umatilla Tribes, June 9, 1855, and Treaty with the Tribes of Middle Oregon, June 25, 1855

These treaties established "That the exclusive right of taking fish in the streams running through and bordering said reservation is hereby secured to said Indians, and at all other usual and accustomed stations, in common with citizens of the United States, and of erecting suitable house for curing the same; also the privilege of hunting, gathering roots and berries, and pasturing their stock on unclaimed lands, in common with citizens, is secured to them." All actions to be taken must fully consider and comply with Native American treaty rights. The Project Area falls within lands ceded by the Confederated Tribes of Warm Springs. It is south of the ceded lands of the Confederated Tribes of the Umatilla Indian Reservation but within their declared area of interest.

Law 92-488 recognizes the Burns Paiute Tribe and their reservation. As a Federally recognized tribe, the Burns Paiute Tribe retains rights of inherent sovereignty.

The Project Area is within the traditional and current use area of the Burns Paiute Tribe and is not on land that is part of their former Indian reservation.

Relationship Between Local Short-term Uses of Man's Environment and the Maintenance and Enhancement of Long-term Productivity [42 U.S.C. 4332 (C)(iv)]

The Multiple Use - Sustained Yield Act of 1960 requires the Forest Service to manage National Forest System lands for multiple uses (including timber, recreation, fish and wildlife, range, and watershed). All renewable resources are to be managed in such a way that they are available for future generations. Maintaining the productivity of the land is a complex, long-term objective. The Proposed Action protects the long-term productivity of the area through the use of specific Forest Plan standards and guidelines, design criteria, and design measures.

Endangered Species Act (ESA) of 1973, as Amended and the Magnuson-Stevens Fisheries Conservation and Management Act of 2000.

Neither alternative is anticipated to have a direct, indirect, or cumulative effect on any threatened or endangered species in or outside the Project Area. Biological evaluations have been completed. Concurrences from the responsible federal agency, for any threatened or endangered species potentially inhabiting the Project Area were not required for this project because the Biological Evaluation determined that there are no effects to any threatened or endangered species. The NMFS and the USFWS were initially informed of the Balance Fuels Reduction Project and that it would fall under Counterpart Regulations in August, 2006. On May 21, 2007, the Blue Mountain Ranger District (BMRD) presented project information to the Level I Team (USFWS and NMFS). The effects analysis completed and documented in the BE and BA resulted in a call of Not Likely to Adversely Effect (NLAA) to MCR steelhead. This was done under the Section 7 Counterpart Regulations of the Endangered Species Act (Federal Register, December 8, 2003) and is in compliance with those regulations and the March 3, 2004, Alternative Consultation Agreement between the Forest Service, Fish and Wildlife Service, and National Marine Fisheries Service.

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires the inclusion of Chinook salmon Essential Fish Habitat (EFH) descriptions in Federal fishery management plans. In addition, the MSA requires Federal agencies to consult with NMFS on activities that may adversely affect EFH. All alternatives are consistent with the Magnuson-Stevens Fishery Conservation and Management Act.

The Migratory Bird Treaty Act of 1918 and the Migratory Bird Executive Order 13186

The purposes of this Act are to establish an international framework for the protection and conservation of migratory birds. The Proposed Action has been designed to enhance landbird richness. The Proposed Action is consistent with the 1918 Migratory Bird Treaty Act (MBTA) and the Migratory Bird Executive Order 13186. The Proposed Action was designed under current Forest Service policy for landbirds. The Northern Rocky Mountains Bird Conservation Plan (Altman 2000) and the U.S. Fish and Wildlife Service's Birds of Conservation Concern (USFWS 2002) were reviewed for effects disclosure. The Proposed Action was designed to protect or enhance priority habitats for landbird species, including neotropical migratory species.

Clean Water Act

The project is consistent with the Clean Water Act, other applicable laws and related regulations, and with the Malheur National Forest Plan, as amended, for water resource protection because it would not measurably increase watershed effects, including stream temperature, over the existing condition. Planning, application , and monitoring of watershed Best Management Practices (BMPs) are recognized as the primary means to control non-point source pollution on Forest Service lands by the State of Oregon. BMPs are included in the Design Elements listed in Chapter 2; monitoring of BMP implementation is incorporated into the Forest Plan monitoring program and into the District watershed monitoring program. Neither of the alternatives would measurably raise temperatures in the Middle Fork of the John Day River, which is the only 303(d) listed water body potentially affected by the project nor in any of its tributaries within the Project Area.

Floodplains and Wetlands (Executive Orders 11988 and 11990) and Prime Farmland, Rangeland, and Forestland

Wetlands are not expected to be affected by the proposed activities because the implementation of PACFISH RHCA's is expected to be sufficient in extent to protect wetland functions. Floodplain function is not expected to be reduced compared to the existing condition by any project activities. There are no prime farmlands, or wild and scenic rivers within the Project Area. All alternatives are in accordance with the Secretary of Agriculture Memorandum 1827 for prime farmland, rangeland, and forestland.

Executive Order 12962 (aquatic systems and recreational fisheries)

This project is not likely to impact the quantity, function, sustainable productivity, and distribution of recreational fisheries per Executive Order 12962, Recreational Fisheries.

Executive Order 13112 (invasive species)

All alternatives are consistent with the Forest Plan and other direction with respect to invasive species.

Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974 (as amended):

This act directed the Secretary of Agriculture to prepare a Renewable Resources Assessment and updates. The USDA Forest Service Forest Inventory and Analysis unit provides updates for this assessment.

National Historic Preservation Act

Cultural resource surveys of varying intensities have been conducted following inventory protocols approved by the State Historic Preservation Officer SHPO). Native American communities have been contacted and public comment encouraged. The consultation and concurrence process with SHPO has been concluded. No significant effects on known cultural resources are anticipated. The Forest Specialist has certified that for this project the Forest complies with Section 106 of the National Historic Preservation Act, under the terms of the 2004 Programmatic Agreement between Advisory Council on Historic Preservation (ACHP), SHPO, and the United States Forest Service, Region 6.

Air Quality and Clean Air Act of 1977, as Amended

During project implementation, underburning will adhere to the Oregon Smoke Management Plan and the State Implementation Plan of the Clean Air Act. Burning will be accomplished under smoke dispersion conditions that will minimize smoke impacts and protect air quality. Conducting during air mass instability will allow a high percent of the smoke to disperse. Past experience has shown that significant air quality declines are limited in scope to the general burn area and are of short duration. Those that will most likely be impacted are residences along the Middle Fork of the John Day River. The roads in the area will be signed as necessary during implementation. The proposed activities will not significantly affect public health or safety.

Environmental Justice (Executive Order 12898)

Executive Order 12898 requires that federal agencies adopt strategies to address environmental justice concerns with the context of agency operations. With implementation of any of the proposed actions, there would be no disproportionately high or adverse human health or environmental effects on minority populations or low-income populations. There will be short term smoke impacts from prescribed burning to some of the residences along the Middle Fork of the John Day River. Racial and cultural minority groups could be in the work forces that implement project proposals. Contracts for the proposed work contain clauses that address worker safety and employment practices. Implementation of any project activities is not anticipated to cause disproportionate adverse human health or environmental effects to minority or low-income populations.

Energy Requirements and Natural or Depletable Resource Requirements and Conservation Potential:

The Balance Thinning and Fuels Reduction Project has been designed to conform to applicable laws and regulations pertaining to natural or depletable resources, including minerals and energy resources. In terms of petroleum products, the energy required to implement any of the action alternatives is negligible when viewed in light of production costs and the effects on the national and worldwide petroleum reserves.

Congressionally Designated Areas

Wilderness: There are no lands designated in the Project Area as wilderness; therefore, there would be no impacts on Wilderness. (See discussion on potential wilderness areas included in this section).

Wilderness Study Areas: There are no lands designated in the Project Area as Wilderness Study Areas or recommended for wilderness classification; therefore, there would be no impacts on any Wilderness Study Areas.

National Recreation Areas: There are no lands designated in the Project Area as National Recreation Areas; therefore, there would be no impacts to National Recreation Areas.

Inventoried Roadless, Potential Wilderness and Areas with Undeveloped Character

Inventoried Roadless Areas:

As part of the Land and Resource Management Planning process (LRMP 46 CFR 219.27 (c)) the 1990 Malheur Forest Plan identified areas of at least 5,000 acres, without developed and maintained roads, and substantially natural conditions. These areas were called Inventoried Roadless Areas (IRAs). The IRAs for the Malheur National Forest can be found in Appendix C of the LRMP Final Environmental Assessment.

On 1/12/2001, the Department of Agriculture adopted the Final Roadless Area Conservation Rule (RACR), intended to protect and conserve inventoried roadless areas on National Forest System lands. Since adoption of the 2001 RACR, the term IRA has been defined to refer to areas identified in the set of maps published for the 2000 FEIS for that rule. The IRAs identified in the 1990 Malheur National Forest LRMP, Appendix C were included in the Final EIS RACR.

There are no IRAs within or adjacent to the Balance Project Area, therefore, the proposed treatments are consistent with management direction regarding IRAs in the Malheur Forest Plan (1990).

Potential Wilderness:

The Malheur National Forest, in coordination with the Umatilla and Wallowa-Whitman National Forests, is involved in a tri-forest plan revision process, referred to as the Blue Mountain Forest Plan Revision. This process started in 2005 and there have been several reiterations of Forest wilderness potential inventory following the inventory criteria outlined in FSH 1909.12 Chapter 71. Existing inventoried roadless areas (IRAs) served as a starting point for the inventory.

In order to be consistent with the other forests, the Malheur made the following assumptions: forest roads would be buffered with a 300 foot buffer and past timber harvest activities would not meet potential wilderness inventory criteria. A potential wilderness area is an area that qualifies for placement on the potential wilderness inventory if they meet criteria as outlined in Forest Service Handbook 1909.12, Chapter 71. This inventory of potential wilderness is not a land designation, nor does it imply any particular level of management direction or protection in association with the evaluation of these potential wilderness areas. It is completed with the express purpose of identifying all lands that meet the criteria for being evaluated for wilderness suitability and possible recommendation to Congress for wilderness study or designation.

During the Forest Plan Revision inventory process, maps were consulted to determine what areas met the potential wilderness inventory criteria. Areas with wilderness potential were inventoried in 2005, 2006, and 2007. Within the Balance Project Area, there were no areas identified that met wilderness potential criteria as outlined in Forest Service Handbook 1909.12, Chapter 71.

For a project specific review, the Balance Project Area was again reviewed for areas that met the potential wilderness inventory criteria, with the use of GIS generated maps, following guidelines in FSH 1909.12, Chapter 71. Due to the extent and location of forest roads and the amount of past harvest in the Project Area, the determination of “no areas identified that met wilderness potential criteria” was substantiated because the acres in the Balance Project total 3,350 and therefore do not contain 5000 acres or more of land that do not contain forest roads, the acres cannot be preserved due to physical terrain and natural conditions, they do not contain acres that are self-contained ecosystems nor are they contiguous to existing wilderness. Since there are no areas that meet the criteria, the Balance Project would not remove any potential wilderness from inventory.

Areas with Undeveloped Character:

Areas with undeveloped character include large areas without roads or other developments that may have special characteristics unique to that general area.

The Balance Project Area was reviewed for areas of undeveloped character using GIS generated maps. Similar to the discussion in the Potential Wilderness section, due to the extent and location of forest roads and the amount of past harvest in the Project Area, there are no undeveloped areas within or adjacent to the Balance Project that provide high quality or undisturbed soil, water, and air; sources of public drinking water; diversity of plant and animal communities; habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land; primitive, semi-primitive non-motorized, and semi-primitive motorized classes of dispersed recreation; reference landscapes; natural appearing landscapes with high scenic quality; traditional cultural properties and sacred sites; nor other locally identified unique characteristics.

Facilitation of Hunting Heritage and Wildlife Conservation: (Executive Order 13443)

The purpose of this 2007 Order is to direct Federal agencies that have programs and activities that have a measurable effect on public land management, outdoor recreation, and wildlife management, including the Department of the Interior and Department of Agriculture, to facilitate the expansion and enhancement of hunting opportunities and management of game species and their habitat. Federal agencies shall evaluate the effect of agency actions on trends in hunting participation; consider the economic and recreation values of hunting in agency actions; manage wildlife and wildlife habitat on public lands in a manner that expands and enhances hunting opportunities and work collaboratively with State governments to manage and conserve game species in their habitats.

With the implementation of the action alternative, there will be limited short-term effects to hunters. Harvest activities and smoke from fuel treatment activities may displace some recreationists to new areas to camp, hunt, or to travel.

The economic values of big-game hunting would depend on changes in population levels and special distribution across the landscape. Hunting opportunities, as managed by Oregon Department of Fish and Wildlife, are expected to be unchanged. Elk population census data for the Desolation and Northside Management Units indicate a relatively stable, level, population trend. It appears that past forest management has not been detrimental to elk populations in these management units. It is not anticipated that planned activities under the action alternative would cause a decline in elk populations either. However, activities would likely cause a short-term redistribution of animals across the landscape.

Climate Change

The Global Climate Change Prevention Act (7 USC 6701) authorizes and directs the Secretary of Agriculture to take steps towards researching climate change, including establishing a Global Climate Change Program; a technical advisory committee; an Office of International Forestry; urban forestry demonstration projects; biomass energy demonstration projects. The Secretary is also directed to study the effects of global climate change on agriculture and forestry, and the interaction between forest greenhouse gas emissions and climate change. Supplemental information on the Global Climate Change Prevention Act (7 USC 6701) is in Appendix G.

Section 6701 of the Act directs the Secretary of Agriculture to establish a Global Climate Change Program in order to have within the Department of Agriculture a focal point for coordinating all issues of climate change. The Secretary must designate a director, who shall: coordinate policy analysis, long range planning research, and response strategies relating to climate change issues; provide liaison with other federal agencies, through the Office of Science and Technology Policy, regarding issues of climate change; perform other enumerated duties. The specific list of Director Tasks includes:

The Director shall—

(1) coordinate policy analysis, long range planning, research, and response strategies relating to climate change issues;

(2) provide liaison with other Federal agencies, through the Office of Science and Technology Policy, regarding issues of climate change;

(3) inform the Department of scientific developments and policy issues relating to the effects of climate change on agriculture and forestry, including broader issues that affect the impact of climate change on the farms and forests of the United States;

(4) recommend to the Secretary alternative courses of action with which to respond to such scientific developments and policy issues; and

(5) ensure that recognition of the potential for climate change is fully integrated into the research, planning, and decision-making processes of the Department.

- Item #5 notes that the Secretary should ensure that the potential for climate change is noted in planning and decision processes of the Department, but nothing in the Act directs the Forest Service to conduct any specific analysis or disclose any specific effects in a NEPA document for specific forestry projects. However, the Forest Service has looked at what modeling of climate change is possible in planning projects. In a recent analysis, three Forest Service research scientists considered a methodology for modeling climate change in forest planning. In a letter to Lisa Freedman, Director of Resource Planning and Monitoring for the Pacific Northwest Region of the Forest Service, Pacific Northwest Research Station Deputy Director Cynthia West stated, "…the science of modeling climate change lacks certainty due to large spatial and temporal variation in the interactions of terrestrial, atmospheric, oceanic and human systems…"   4070 Letter of July 26, 2005 from Cynthia West. In a follow-up policy letter, Ms. Freedman concluded, "…there is no consensus or experience regarding how to model climate change at the subregional scale and it would require substantial research, model development and testing to provide such an approach." 1920 Letter of July 28, 2005 from Lisa Freedman.

CHAPTER 4 – CONSULTATION AND COORDINATION

The Forest Service consulted the following individuals, tribes, Federal, state and local agencies, and non-Forest Service persons during the development of this environmental assessment:

List of Preparers

Interdisciplinary Team

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Vicki Lundbom	Engineering and Transportation Planning
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Ed Clark	Fire and Fuels Management
Mary Lou Welby	Hydrology
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Agencies and American Indian Tribes

Federal, State, and Local Agencies

Bureau of Land Management (BLM), John Day

USDI, United State Fish and Wildlife Service

National Oceanic and Atmospheric Administration (NOAA) Fisheries

Oregon State Historic Preservation Office (SHPO)

Oregon Department of Fish and Wildlife

Grant County Court

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Confederated Tribes of the Umatilla Indian Reservation

Burns Paiute Tribe

Collaborators

We would like to acknowledge those Collaborators that were involved in developing the Proposed Action for the Balance Thinning and Fuels Reduction Project.

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Balance Thinning and Fuels Reduction Appendices

Appendix A – Summary of External Comments on the Proposal

Appendix B – Unit Information Tables

Appendix C – Cumulative Effects

Appendix D – Maps

Map 1- Balance Project Area

Map 2- Management Areas

Map 3- Existing Structural Stages

Map 4- No Action Structural Stages in 50 Years

Map 5- Existing Crown Fire Potential

Map 6- No Action Crown Fire Potential in 50 Years

Map 7- Balance Old Growth and Connectivity

Map 8- Proposed Action

Map 9- Balance Roads

Map 10- Proposed Action Structural Stages in 50 Years

Map 11- Post Treatment Proposed Action Crown Fire Potential

Map 12- Proposed Action Crown Fire Potential in 50 Years

Appendix E – National Fire Plan Project ESA Compliance Statement

Appendix F – Aquatics Biological Evaluation

Appendix G – Wildlife Biological Evaluation

Appendix H – Plant Biological Evaluation

APPENDIX A: SUMMARY OF EXTERNAL COMMENTS ON THE PROPOSAL

This report summarizes information, advice, concerns, and ideas about the project received to date from members of the public or other interested parties, in response to formal “external scoping” of the project proposal.

The proposal and invitation to comment was issued on June 19, 2007 and mailed to approximately 220 parties, including adjacent landowners; other citizens who had previously requested such notice; interested American Indian tribes; interested agencies of federal and state governments; interested environmental, conservation, and recreation interest groups; and interested businesses or industry associations. Five parties responded to the proposal by letter or email in the timeframe requested. Public participation in this project is open-ended, and continues through all stages of project development, decision-making, and implementation.

Comments received were included in this summary if they appeared to address *natural-resource conditions or human environmental values that are related to the proposed action by policy, design, or effect*. The full text of comments received is contained in the project record.

Similar comments are grouped together and comments are summarized below. Statements preceding each group of comments explain how the Forest Service considered or applied the comments.

The following comments indicate disagreement with the original proposed action based on its inclusion of commercial thinning. See detailed discussion of this concern under “Issues” in EA Chapter 2.

- Don’t remove trees that provide useful shade to keep fuels cool and moist or that helps suppress the growth of future ladder fuels
- Consider a NEPA alternative that treats only surface and ladder fuels and controls stocking while retaining canopy cover that maintains cool, moist fuels, suppresses future ladder fuels, and provides wildlife habitat
- Set a relatively small diameter limit in this project.
- Need to protect mature trees as replacement old-growth for wildlife habitat. Suggests a 10-12 inch dbh maximum cutting limit for restoration and fuels reduction.

- Not necessary to reduce canopy closure to reduce fire risk, most flammable fuels are 3 inches dbh and less. Lower branches can be pruned.

The following comments indicate disagreement with the original proposed action based on its inclusion of 40 acres of commercial thinning and 47 acres of precommercial thinning in satisfactory cover. See detailed discussion of this concern under “Issues” in EA Chapter 2.

- Meet the Forest Plan Standard for satisfactory cover. Don’t treat in satisfactory cover.

The following comment indicates a need to clarify the proposed action to improve the description of aspen treatments and indicates a disagreement with the original proposed action based on its inclusion of cutting conifers greater than 10 inches within the aspen stands. See detailed discussion of this concern under “Issues” in EA Part 2.

- Would only like conifers up to 10 inches dbh cut in the aspen stands. Older trees co-existed with aspen without harm to them.

The following comments indicate disagreement with the original proposed action based on its use of temporary and closed roads caused the Forest Service to add a more detailed discussion of roads under the Proposed Action in EA Chapter 2. These comments were also used to help determine the subject matter that is discussed in the analysis of impacts—EA Chapter 3.]

- No temporary roads because of their lasting impacts re: forest fragmentation, loss of trees and plants, loss of canopy, soil impacts.
- Don’t open closed roads as it defeats the purpose of closure.
- Avoid temporary road if possible.

The following comments indicate components of the environment that may be affected by the proposed action and factors affecting them; and the team used the comments to refine or clarify the proposed action, add or refine design elements – EA Chapter 2 and to help determine the subject matter that is discussed in the effects analysis—EA Chapter 3, under virtually all of the environmental components discussed.

The following comments indicate components of the environment that may be affected by the proposed action and factors affecting them; and was used to help determine the subject matter that is discussed in under the environmental consequences section—EA Chapter 3, under virtually all of the environmental components discussed.

The following comments indicate components of the environment that may be affected by the proposed action and factors affecting them. These concerns are already decided by law, regulation, Forest Plan, or other decisions. They are determined to be non-significant for those reasons.

- Buffer streams from the effects of heavy equipment and loss of bank trees and trees that shade streams.
- Avoid impacts to raptor nests.
- Consider closing or decommissioning some of the many miles of existing roads that are unneccessary for future management.
- When conducting commercial thinning projects take the opportunity to implement other critical aspects of watershed restoration especially reducing the impacts of the road system and livestock grazing and establishing the ecological processes that will allow streams and fire regimes to recover.

Concern Summary: Consider a NEPA alternative that treats only surface and ladder fuels and controls stocking while retaining canopy cover. It is not necessary to reduce canopy closure to reduce fire risk.

The Forest Service reviewed this suggested alternative that would only treat surface and ladder fuels and considered whether it was another reasonable course of action, to meet the purpose and need of the project.

The Forest Service determined that the alternative would not be studied in detail because it would not respond to the project purpose and need—needs that were identified in collaboration with partners to the Grant County Community Fire Protection Plan and with other interested parties who participated in the project-planning meetings and field trips.

The Forest Service recognizes that noncommercial cutting and underburning alone could reduce surface and lower-canopy fuel hazards in the project area; yet to reduce upper-canopy density and crown-fire potential to a level at which the area is likely safe for effective firefighting and public evacuation in the event of a large wildfire, some commercial cutting must be added to these treatments. Thus, targeted commercial thinning is an essential design criterion of the project, if it is to cause the changes in potential wildfire behavior expected at this location by partners to the Grant County Community Fire Protection Plan. Chapter 2, Alternatives, Alternative A – No mechanical treatment in trees greater than 12 inches contains additional information regarding this concern.

Concern Summary: There is a concern with the authority of the Forest Service to undertake this project according to its stated purpose and need, as an authorized hazardous fuel reduction project under the Healthy Forests Restoration Act (HFRA).

The HFRA directs Federal agencies to prepare analyses utilizing the collaborative process to implement local community fire protection plans. The purpose of the Healthy Forest Restoration Act is to improve the capacity on Federal lands to plan and conduct hazardous fuels reduction projects aimed at protecting communities, watersheds, and certain other at-risk lands from catastrophic wildfire, to enhance efforts to protect watersheds and address threats to forest and rangeland health, including catastrophic wildfire, across the landscape. The Balance Thinning and Fuels Reduction Project qualifies under Title 1 - Hazardous Fuel Reduction on Federal Land of the HFRA as described in Section 102 of the HFRA because it is consistent with the Implementation Plan for the 10-Year Comprehensive Strategy and is on Federal lands within a wildland urban interface area identified in a community wildfire protection plan. Consistent with collaboration requirements, after an initial mailing, there were two meetings and three field trips to the project area. In addition there were a number of individual conversations about specific concerns. Changes and improvements were made to the Proposed Action based on the site specific information and concerns the collaborators brought to these meetings and field trips. Additional information about this project's Collaboration can be found in Chapter 1 of the EA under the Collaboration section.

Concern Summary Snags and down wood provide important habitat. They should be retained and effects of activities recognized.

- Snag habitat is important, don't harvest any dead or dying trees over 21" dbh.
- Retain abundant snags and course wood and green trees for future recruitment of snags and wood. Retention should be both distributed and in clumps so that thinning mimics natural disturbance. Retention of dead wood should generally be proportional to the intensity of the thinning.
- Recognize that thinning captures mortality and that plantation stands are already lacking critical values from dead wood due to the unnatural stand history of all logged and planted stands.
- "Capturing mortality" reduces future snag habitat that is already deficient. Increasing vigor via thinning delays recruitment of snag habitat that is already deficient.

Concern Summary: Uniform thinning spacing is not desirable. Instead use variable density thinning including leaving patches and thinning heavy enough to stimulate patches of understory. Retain trees with old-growth characteristics.

Variable density thinning and retention of trees with old-growth characteristics is a component of the Proposed Action. This is described in more detail under Activity Descriptions and Design Elements in Chapter 2. There is also discussion under the Proposed Action Direct and Indirect Effects of the Vegetation and Wildlife sections.

- Thin from below, retaining the largest trees, or use "free thinning" with a diameter cap so that some trees of all size classes are retained. Retain all large trees and most medium sized trees so they can recruit into the larger classes of trees and snags. Regardless of size, retain all trees with old-growth characteristics such as thick bark, yellowing bark, flat top, asymmetric crown, broken top, forked top, etc.
- Don't thin to uniform spacing. Use variable density thinning techniques to establish a variety of microhabitats, break up fuel continuity, create discontinuities to disrupt the spread of other contagious disturbances such as disease, bugs, weeds, fire, etc. Retain patchy clumps of trees which is the natural pattern for many species.
- Retain and protect under-represented species of conifer and non-conifer trees and shrubs. Retain patches of dense young stands as wildlife cover and pools for recruitment of future forests.
- Use the historic range of variability as a guide, but don't just focus on seral stage. Consider also the historic abundance of ecological attributes like large trees, large snags, roadless areas, etc. all of which have been severely reduced from historic norms.

- Use your creativity to establish diversity and complexity both within and between stands. “Gappy and clumpy” is often use to describe the distribution of trees in dry forests. Use skips and gaps within units to help achieve diversity. Gaps should be small, while skips should be a little larger.
- Prioritize treatment of the dense young stands that are most "plastic" and amenable to restoration. Another priority is to carefully plan and narrowly target treatments to protect specific groves of fire-resistant, old growth trees that are threatened by ingrowth of small fuels, but don’t focus on rigid density reduction targets. Leave all medium and large trees that show old-growth characteristics.
- Thin heavy enough to stimulate development of some patches of understory vegetation, but don’t thin so heavy that future development of the understory becomes a more significant fuel problem than the one being addressed by the current project.
- The scale of patches in variable density thinning regimes is important. Ideally variability should be implemented at numerous scales ranging from small to large, including: the scale of tree fall events; pockets of variably contagious disturbance from insects, disease, and mixed-severity fire; soil-property heterogeneity; topographic discontinuities; the imprint of natural historical events; etc.

Concern Summary There is a concern about the spread of noxious weeds due to commercial logging and soil disturbance.

Design elements have been included in the project to be proactive in avoiding the spread of weeds such as; actions conducted or authorized by written permit by the Forest Service that will operate outside the limits of the road prism (including public works and service contracts) require the cleaning of all heavy equipment (bulldozers, skidders, graders, backhoes, dump trucks, etc.) prior to entering National Forest System Lands and inspection oft active gravel pits, quarry sites, and borrow areas for invasive plants before use and transport. See Chapter 2 Design Elements – Noxious Weeds for all design elements. Additional information concerning noxious weeds including those present in the project area and effects of proposed action is in the Noxious Weed Chapter 3.

- Take proactive steps to avoid the spread of weeds. Avoid and minimize soil disturbance. Retain canopy cover and native ground cover to suppress weeds.
- Take proactive steps to avoid the spread of weeds.
- Commercial logging tends to present significant risks of weed infestations because of soil disturbance and canopy reduction;

Concern Summary: Thinning can make fire hazard worse because it creates slash, increases solar radiation causing fuels to dry, and increases wind speeds.

Actions in the proposal that will reduce fire hazard include reducing surface, ladder, and crown fuels. Some studies of harvest without fuel treatment have shown increased fire intensity. This project includes treatment of activity generated fuels; and other research shows reduced fire intensity when the slash is treated. Local observations have been that thinned stands with fuel treatment have lower fire intensity than untreated areas

The fuels created by activities in this project are planned to be treated

- Dislcose conflicting science – removing canopy fuels can reduce crown to crown spread but also increase fire hazard by increasing solar insolation which causes fuels to warm and dry and increase wind speeds
- Recognize that thinning affects fire hazard in complex ways, possibly even making fire hazard worse because thinning: creates slash; moves fine fuels from the canopy to the ground (increasing their availability for combustion); thinning increases ignition risk; thinning makes the forest hotter, dryer, and windier; and makes site resources available that could stimulate the growth of future surface and ladder fuels. Fuel reduction must find the “sweet spot,” by removing enough of the small surface and ladder fuels while retaining enough of the medium and large trees to maintain canopy cover for purposes of microclimate, habitat, hydrology, suppression of ingrowth, etc.
- Removal of commercial sized logs can make the stand hotter, dryer, and windier, making fire hazard worse instead of better
- The unavoidable adverse impacts of logging and roads must be balanced against the rather uncertain benefits of fuel reduction. There is actually a very low probability that moderate intensity fire will affect any given stand during the relatively brief time period that fuel reduction is alleged to be reduced. Fuel reduction has little or no beneficial effect on low severity fires (controlled by favorable weather conditions) or on high severity fires (controlled by unfavorable weather conditions).
- Effects of drying out sites and increasing wind speeds/fire risk by opening the canopy too much.

Concern Summary: Road construction, ground based logging, bum piles can have adverse impacts on soil and water. Avoid exceeding 20% impacts, don’t just mitigate.

Design measures are included as part of the Proposed Action to minimize impacts to soil and water. See Chapter 2 Design Measures under Soils and Watershed for a complete list. Design measures that are effective at limiting compaction include designating skidtrail locations, requiring skidtrails to be widely spaced, reusing existing skidtrails where appropriate, prohibiting skidding under wet conditions, allowing only low ground pressure machinery off of skidtrails. These design measures would keep compaction to a practical minimum and indicate the Forest Plan standard would be met in all units.

As a result of the Proposed Action, the most likely effect on the hydrologic response is little or no change across the landscape compared to the Existing Condition since BMPs associated with the proposed activities are expected to control most run off and sediment transport under common run-off events. No measurable changes in water quantity are expected because less than 30% of the vegetation in the project area would be cut and because less 30% of the vegetation in any drainage would be cut. Effects to soil and water as a result of the Proposed Action are discussed in detail in Chapter 3 – Environmental Consequences section of Soils, Watershed, and Fisheries.

- Protect soils by avoiding road construction, minimizing ground-based logging, and avoiding numerous large burn piles.
- Areas exceeding 10 or 20% soil impacts (detrimental disturbance) currently should not be impacted further. Mitigation may not be 100% successful in eliminating soil impacts and may not even be funded or implemented. Forest Plan intention is to avoid exceeding 20% impacts not just to mitigate.
- In regards to temp roads being used to support timber harvest and that they would be rehabilitated after use – subsoiling may not remove all soil impacts.
- Grapple piling and burning can result in soil sterilization and should be avoided or minimized.
- Removing commercial sized logs, and associated roads and slash disposal, often conflicts with other resource values such as soil, water, weeds, wildlife habitat, fire hazard, and carbon storage.
- Removal of commercial logs necessitates road related impacts on soil and water resources.
- Machine piling and pile burning tend to cause significant adverse impacts on soil and water, especially when combined with road impacts and other logging disturbances.
- Our water quality is in jeopardy in the project area. Prescribed burning and thinning will affect our water as well as LaVelle Holmes and Roger Upshaws
- Brush, trees, vegetation keep snow from melting so quickly, saving water for our ranches and Camp Creek. The north slope is where all of our water comes from for our springs – our ranches.
- Should prioritize winter logging to avoid soil impacts and road maintenance.

Concern Summary: prescribed burning

- The effects of spring burning on the life-cycles of plants and wildlife must be fully considered in the NEPA process.

- Fall burning should be considered because that is when nature would have done most of the burning.
- There is growing evidence that in order to be effective, mechanical treatments must be followed by prescribed fire. But the effects of such fires must also be carefully considered

#7 Wildlife concerns

- Impacts on such species as goshawk, bats, canada lynx......

- If using techniques such as whole tree yarding or yarding with tops attached to control fuels, the agency should top a portion of the trees and leave the greens in the forest in order to retain nutrients on site.

- Explain why you are igniting in burn unit 16.

- There should be no fuel reduction in moist forest types.

- Consider potential negative ecological impacts to older stands

- Address the environmental impacts of fireline construction in the EA

Soil effects from fireline construction would be minor

- New evidence indicates that far more of the “dry” forests, rather than being typified low severity fire regimes, were in fact dominated by mixed severity fire regimes (including significant areas of stand replacing fire), so mixed severity fire is an important part of the historic range of variability that should be restored.

Appendix B - Unit Information

These tables list the various actions incorporated into the treatment units. Refer to Map 8- Proposed Action in Appendix D for the locations of the units and a graphic representation of the treatments.

Table B-1: Unit Information

Unit Number	Silv Rx[1]	Includes SPC in RHCAs	Fuel Treatment[2]	Rx Fire[3]	Travel Corridor within Unit[4]	Acres
2	HTH/SPC		GP/HP	Underburn	Y	22
4	HTH/SPC		WTY/GP	Underburn	Y	43
6	HTH/SPC		GP/HP			29
8	HTH/SPC		WTY/GP	Underburn	Y	96
10	HTH/SPC		WTY/GP	Underburn	Y	168
12	HTH/SPC		WTY/GP			25
14	HTH/SPC		WTY/GP	Underburn		13
16	HTH/SPC		WTY/GP	Underburn		56
18	HTH/SPC		WTY/GP/HP	Underburn		32
20	HTH/SPC		WTY/GP	Underburn		13
22	HTH/SPC		WTY/HP	Underburn	Y	16
24	HTH/SPC		WTY/GP			18
26	HTH/SPC		WTY/GP	Underburn		82
28	HTH/SPC		WTY/GP/HP	Underburn		13
30	HTH/SPC		WTY/GP/HP	Underburn		20
32	HTH/SPC		WTY/GP/HP	Underburn		43
34	HTH/SPC		WTY/GP	Underburn		5
40	HTH/SPC		WTY/HP			5
42	HTH/SPC		WTY/HP			11
44	HTH/SPC		WTY/HP			8
46	HTH/SPC		WTY/HP			10
50	SPC9	Y	GP/HP	Underburn		13
52	SPC9		GP/HP			63
54	SPC9		HP	Underburn		92
56	SPC9		GP/HP	Underburn		19
58	SPC9		HP	Underburn		25
60	SPC9	Y	HP			44
62	SPC9		HP	Underburn		4
64	SPC9	Y	HP			22
66	SPC9		GP/HP	Underburn		10
68	SPC9	Y	HP	Underburn		22
72	SPC9	Y	HP	Underburn		15
74	SPC9	Y	HP			26
76	Thin Around Large Pine		HP			23
78	Thin Around Large Pine		HP			23

Unit Number	Silv Rx[1]	Includes SPC in RHCAs	Fuel Treatment[2]	Rx Fire[3]	Travel Corridor within Unit[4]	Acres
80	Thin Around Large Pine		HP			34
82	Thin Around Large Pine		HP			10
84	SPC7		HP	Underburn		26
86	SPC7		HP	Underburn		13
88	SPC7		HP	Underburn		29
90	SPC7		HP	Underburn		31

1. Silvicultural Prescriptions
    HTH/SPC - Commercial Thin and Precommercial Thin
    SPC7 - Precommercial Thin to 7" DBH
    SPC9 - Precommercial Thin to 9" DBH
2. Fuel Treatment
    WTY – Whole Tree Yarding
    GP – Grapple Piling
    HP – Hand Piling
3. This table only shows the underburning that is planned inside the mechanical treatment units. There is additional burning planned in areas not proposed for mechanical treatment. Refer to the prescribed burning Map 8 in Appendix D for the total area planned to be burned.
4. This table shows the travel corridors identified during collaboration. No treatment is occurring in Amendment #2 Connectivity Corridors.

Table-B-2: Aspen Information

Aspen site number	Treatment	Rx Fire	Acres
04300077	Reduce conifers; pile and burn slash; fence		2.1
04300078	Reduce conifers; pile and burn slash; fence		2.5
04300079	Reduce conifers; pile and burn slash; fence	Underburn	.4
04300080	Reduce conifers; pile and burn slash; fence	Underburn	.3
04300081	Reduce conifers; pile and burn slash; fence		.5
04300084	Reduce conifers; pile and burn slash; fence		.3
04300141	Reduce conifers; pile and burn slash; fence		.3
04300144	Reduce conifers; pile and burn slash; fence	Underburn	1.2
04300145	Reduce conifers; pile and burn slash; fence		.8
04300147	Reduce conifers; pile and burn slash; fence	Underburn	.1

Table B-3: Prescribed Burn Units

Prescribed Burn unit number	Mechanical Treatment units within burn units	RHCA	Aspen Stand in Burn Units	Acres
101	2, 50	Backing Fire		174
102	4	Lighting in Cat XX		141
103	8	Backing Fire	04300147	50
104	8, 10	Backing Fire		104
105	10			95
106	14, 16	No RHCA		67
107	16	No RHCA		61
108	22, 54	Backing Fire	04300079 04300080	80
109	18, 54	Backing Fire		116
110	20, 56	Backing Fire		36
111	26, 84, 86, 88	No RHCA		119
112	58, 62 84	Backing Fire		128
113	28, 66	Backing Fire		154
114		No RHCA		37
115	68	Lighting in Cat 1		80
116	90	No RHCA		30
117	30, 32, 34, 72	Backing fire		153
118		Backing Fire		53

Appendix C - Cumulative Effects

Introduction

This appendix discloses actions considered in the cumulative effects sections of each resource in Chapter 3. In most cases, past and ongoing activities are incorporated into each resource's existing conditions because they help explain the current condition of the resource. Past and ongoing activities are also considered in cumulative effects in the context of how past or ongoing actions affect present conditions and how future actions increase, reduce, or do not change these conditions. This list includes all reasonably foreseeable projects expected to occur within each resources' defined scope of analysis (including all projects that overlap each resources cumulative impact area). This listing is consistent with the Council on Environmental Quality guidance letter of June 24, 2005.

Table C-1: Actions Considered in Cumulative Effects Analysis for the Balance Project

Past Actions	Description	Date
Wildfires	Every year there are usually several small wildfires ignited by lightning and are usually rapidly suppressed. Fires in recent history that have escaped initial attack are the 38,000 acre Summit Fire, 1,400 acre Indian Rock. Fire, the 2,300 acre Reed Fire, the 460 acre Buck Fire, the 156 acre China Diggins Fire, and the 181 acre Power Fire.	1980-present
Reforestation of burned areas and clearcuts	Areas of high mortality and clearcuts have been planted to native conifers	1980-1995
Mining	"Hydraulic" Mining in the Galena Watershed	1864
Timber harvest on National Forest and associated activities	Regeneration harvest on 600 acres, overstory removal on 520 acres, final removal on 1,040 acres, partial removal on 1,013 acres, commercial thinning on 43 acres and salvage on 1,055 acres has occurred since 1980. This includes units that were harvested prior to 1996, were burned by the Summit Fire, and then salvaged. During this early harvest period removal of large ponderosa pine, western larch and Douglas fir trees was done by the Sumpter Valley Railroad. See Following Table for more specific information on sales.	1917-1947
Precommercial thinning and slash treatment	Precommercial thinning on approximately 3,900 acres	1960-1999
Prescribed Fire	Holloway, Dry Coyote, and Cress Prescribed Fire projects have occurred since 1987. Approximately 1,700 acres were burned with these projects.	1987-1996
Road building and maintenance	Approximately 150 miles of road have been constructed in the subwatershed for fire suppression, timber harvest, and public access. Many of the roads were built for tractor logging and are in stream bottoms and poorly located in steeper areas for skyline yarding. Approximately 52 miles are still open for use at this time within the subwatershed and 20 miles area still open for use within the project area.	1916-present
Road closures	45 miles of road have been closed and 53 miles have been decommissioned within the subwatershed.	1990-present

Noxious weed treatments	Treatment of noxious weeds sites by hand pulling of weeds near or within the subwatershed	1990-present
Livestock grazing and installation of grazing improvements	Grazing has been occurring in this area since the early days of settlement. Both sheep and cattle were grazed in the beginning, but since the 1940's only cattle have been grazed.	1850-present
Timber harvest on private lands	Some private lands have been harvested and few old growth trees remain, most stands are younger small diameter trees.	1850-present
Precommercial thinning and fuel treatment on private lands	Thinning of trees and slash treatment	1990-present

Past Timber Harvest

Year	Sale Name	Treatment **	Acres
1990	Sun	HCC,HSH	167
1988	Sun	HPR	106
2001	Badge	HSV	8
1991	Badger	HPR	118
1992	Badger	HCR	29
2001	Beaver	HSV	371
2001	Coyote	HSV	572
1984	Crockett	HFR	45
1984	Crockett	HPR	31
1984	Dun	HFR	34
1987	Dun	HCC	36
1987	Dun	HOR	34
1987	Dun	HPR	135
1984	Dun	HFR	34
1986	Dunston	HFR	617
1990	Dunston	HPR	256
1988	GraniteBoulder	HOR	344
1994	Granite Pine	HTH	27
1994	Lance	HPR	212
1994	Lance	HOR	43
1994	Lance	HSH	99
2001	Leek	HSV	101
1998	Quick	HSV	236
1993	Rant & Rave	HTH	43
1994	Ray Salvage	HRS	183
1985	Rock	HFR	344
1992	Top	HPR	155
1992	Top	HOR	101
1994	Top	HSH	88

Harvest TreatmentDefinitions

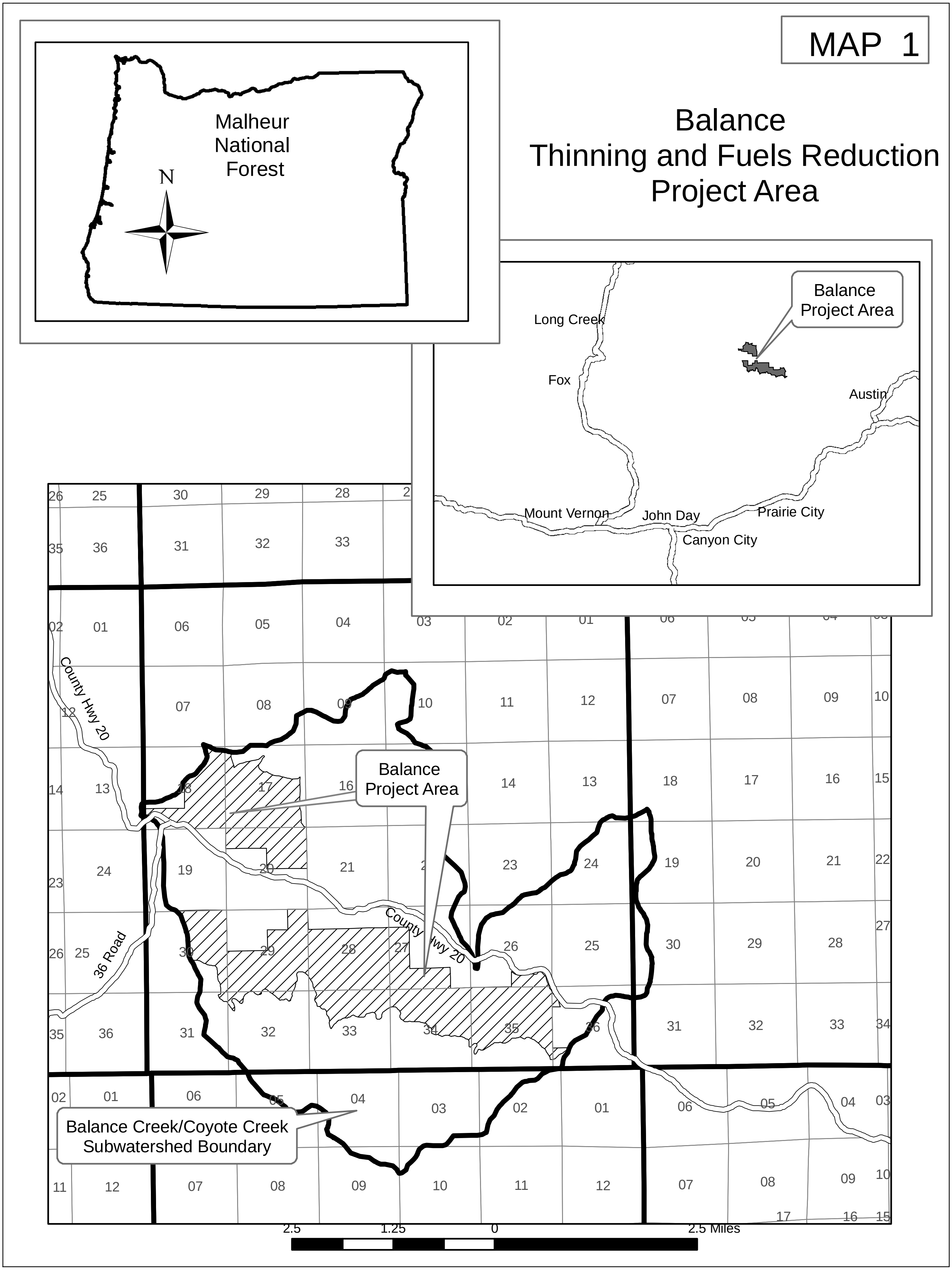
HTH - Commercial Thinning (HTH) -
HCC- Clearcut
HCR – Clearcut with reserve trees
HOR- Overstory Removal
HFR - Final removal of mature overstory to release established immature crop tree

HPR - Partial Removal
HSV - Salvage

Present and/or Ongoing Actions	Description
Fire suppression	Every year there are usually several small wildfires ignited by lightning and the goal is to rapidly suppress them as there is an unnatural buildup of live and dead fuels.
County Highway	Use and maintenance of County Road 20
Livestock grazing and installation of grazing improvements	Grazing on the Lower Middle Fork, Upper Middle Fork, Balance, and Camp Creek grazing allotments is currently permitted within the subwatershed.
Noxious weeds	Inventory, monitoring, biological control through the release of approved species specific insect predators, and manual methods through the hand-pulling and clipping of weeds, and use of a gas powered brush cutter.
Road maintenance	Ongoing maintenance of Forest Service roads including ditch cleaning, vegetation removal, and culvert replacement.
Special Use Permits (SUP)	Right of ways
Hazard tree treatment	Ongoing identification and felling of hazard trees along public roads.
Private roads	Ongoing use for access and routine maintenance.
Private land	Ongoing timber harvest and fuel reduction projects.
Stream improvement activities on private land	Planting ponderosa pine to enhance future shade and large woody debris near the river. Planting willow along the river and sloughs

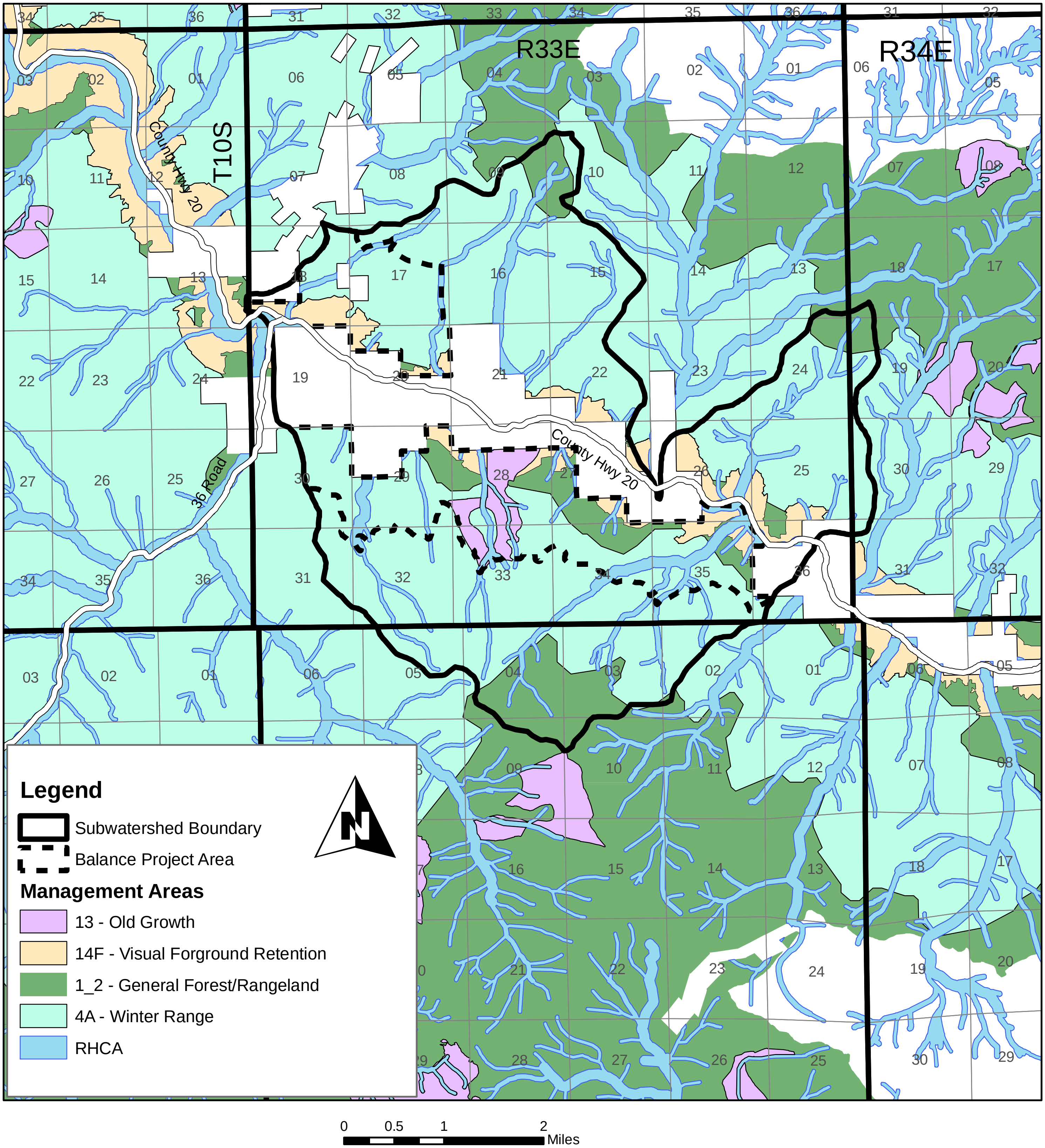
Future Actions	Description	Date
Prescribed burning	Once stands are treated to reduce the current fuel loads they will be in suitable condition to begin reintroducing fire into blocks of land within the project area.	2010 and into the future
Stream improvement activities on private land	Aquatic habitat enhancement along Big Boulder Creek	2008

Appendix D – Maps


MAP 1
Balance
Thinning and Fuels Reduction
Project Area
Malheur
National
Forest
N
Balance
Project Area
Long Creek
Fox
Austin
Mount Vernon
John Day
Prairie City
Canyon City
County Hwy 20
Balance
Project Area
36 Road
County Hwy 20
Balance Creek/Coyote Creek
Subwatershed Boundary
2.5
1.25
0
2.5 Miles

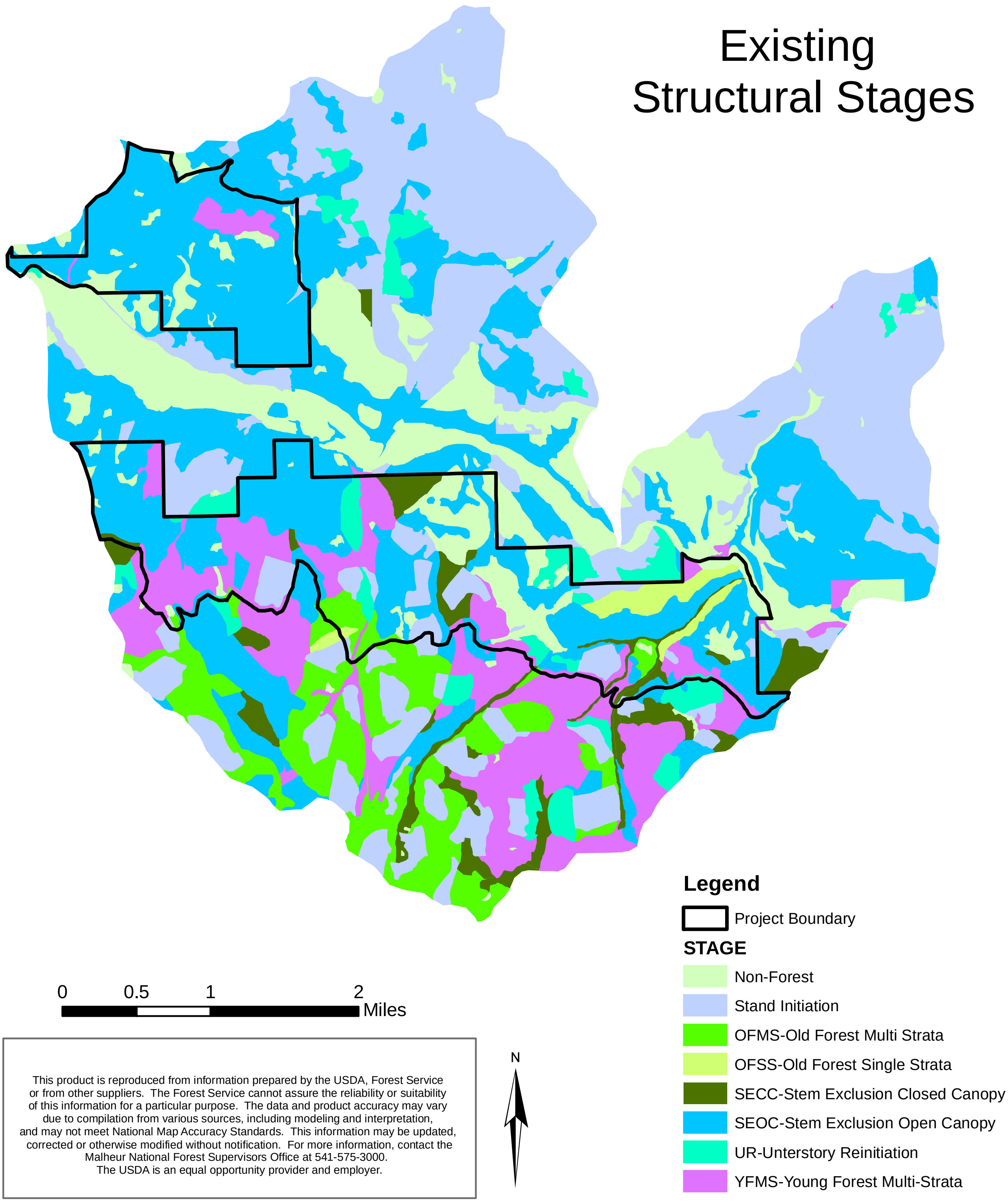
Management Areas

MAP 2



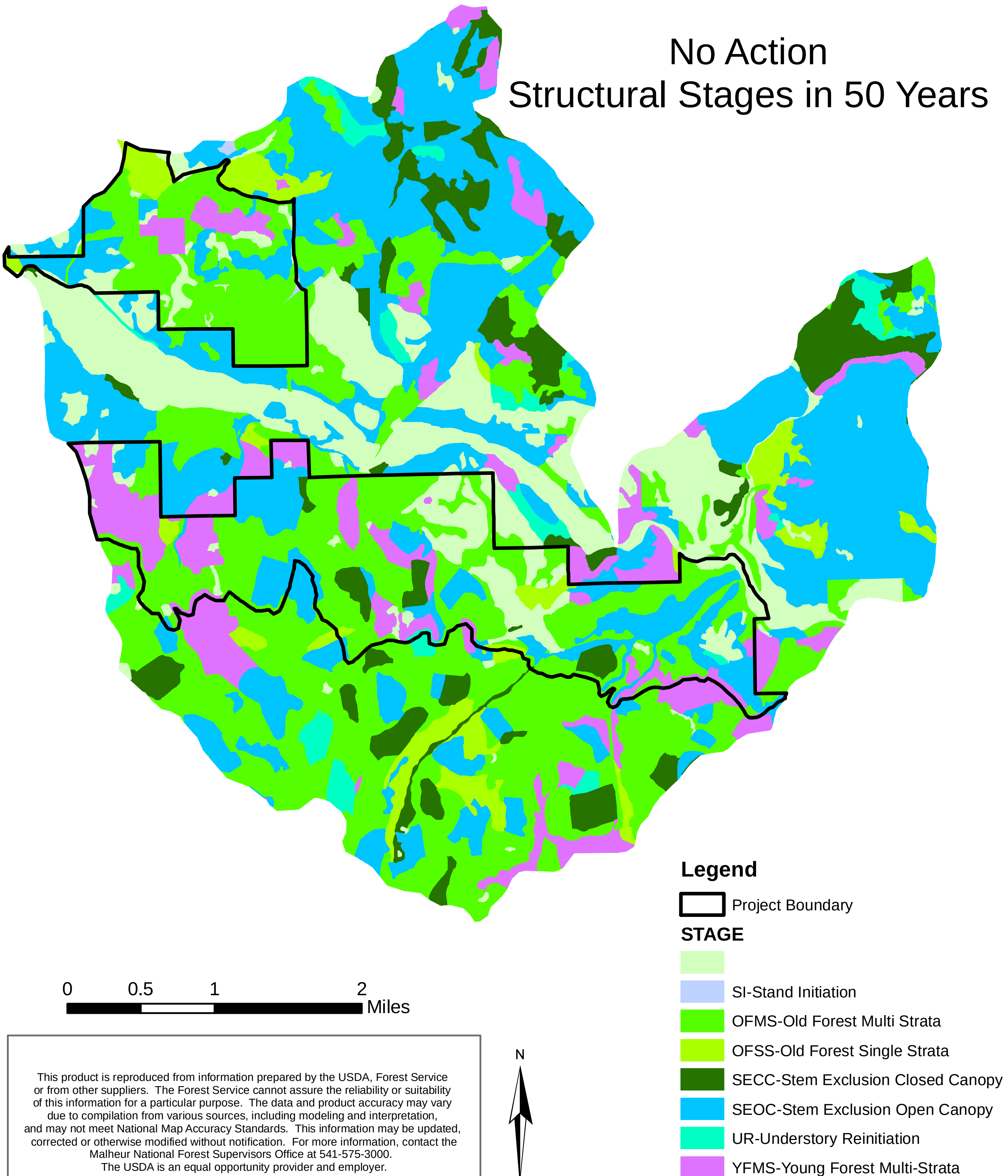
MAP 3

Existing Structural Stages



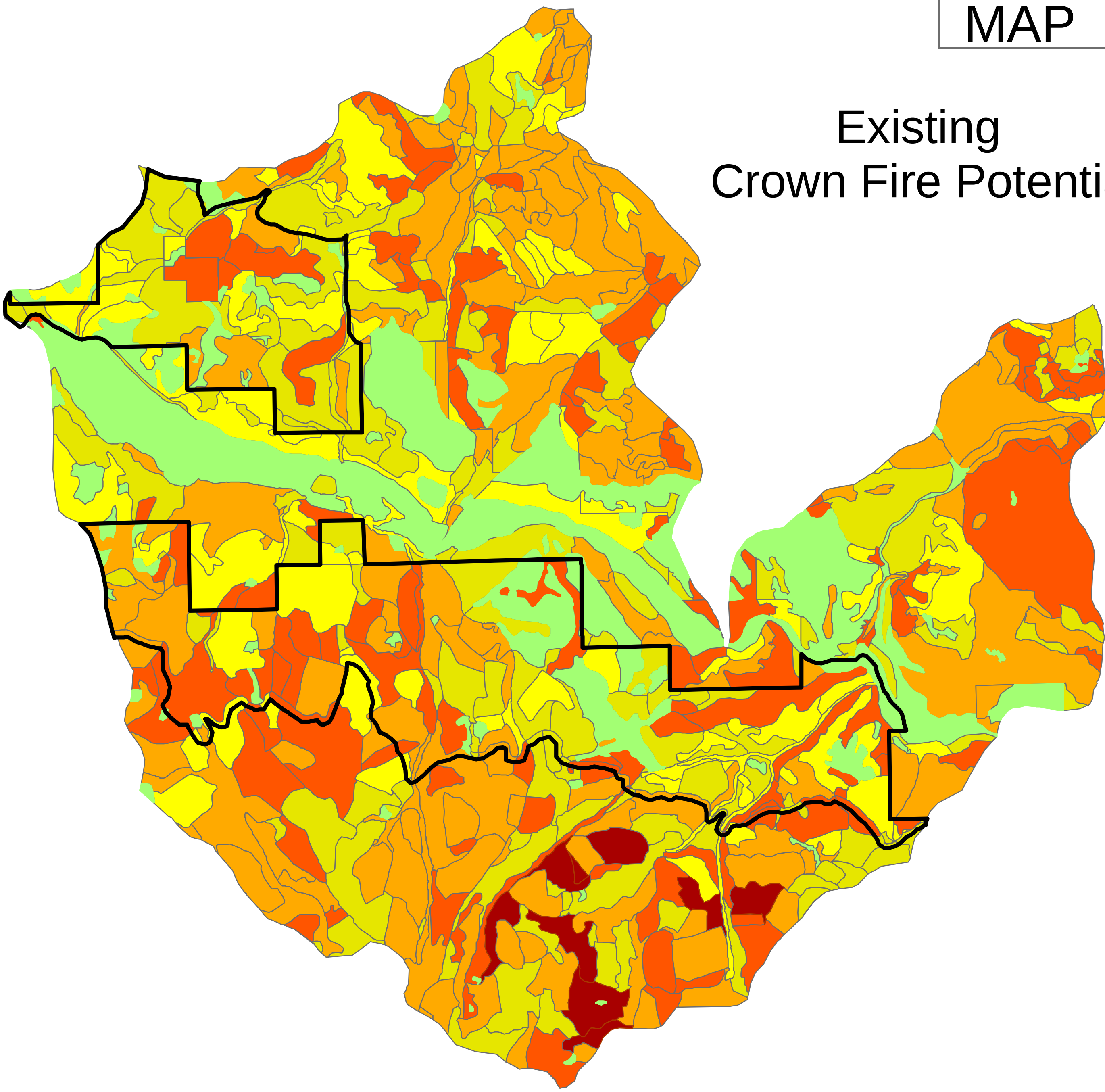
MAP 4

No Action
Structural Stages in 50 Years



MAP 5

Existing Crown Fire Potential



0 0.5 1 2 Miles

N

Legend

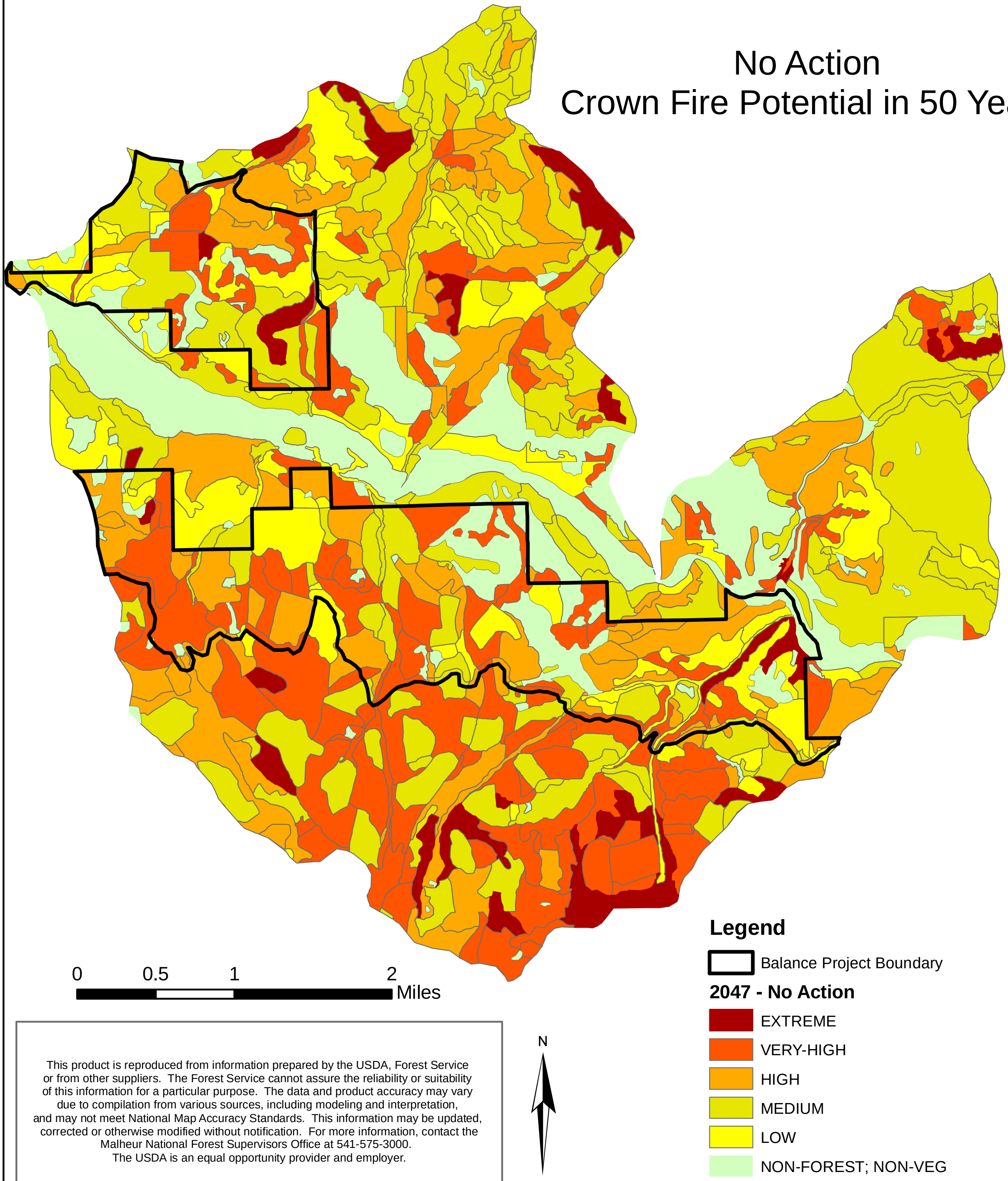
Balance Project Boundary

Crown Fire Initiation Potential-Existing

- EXTREME
- VERY-HIGH
- HIGH
- MEDIUM
- LOW
- NON-FOREST; NON-VEG

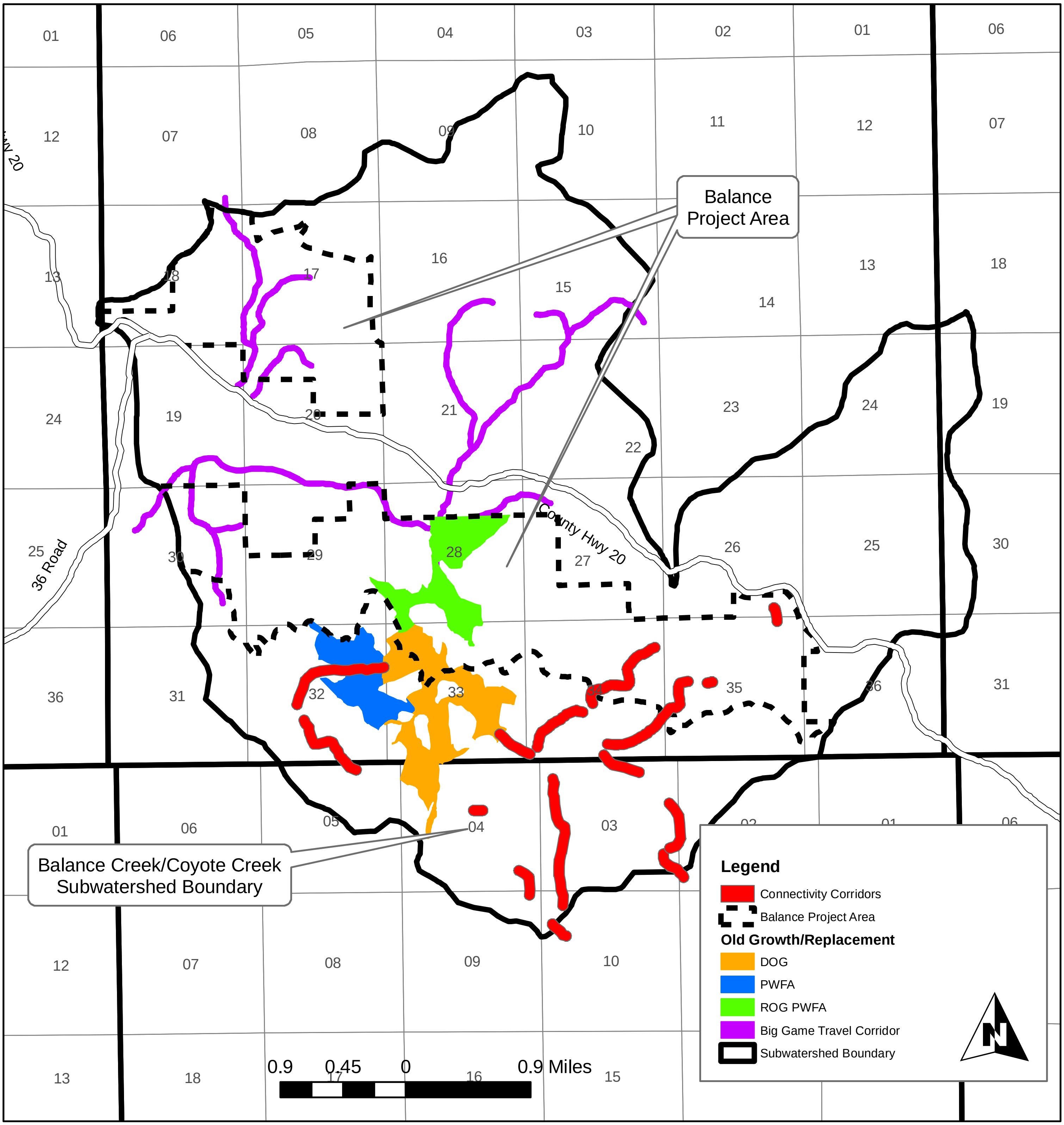
MAP 6

No Action
Crown Fire Potential in 50 Years



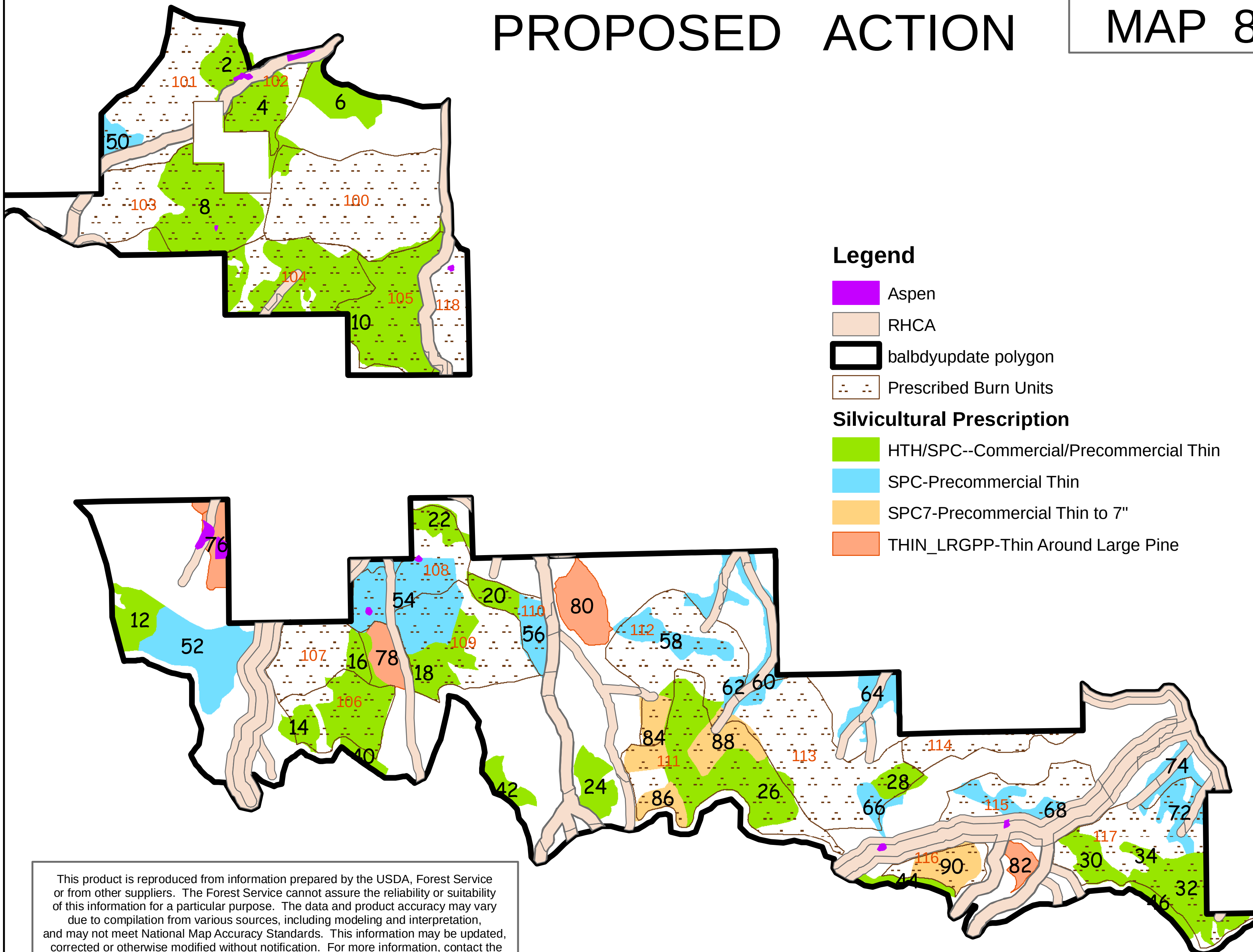
Balance Old Growth and Connectivity

MAP 7



PROPOSED ACTION

MAP 8

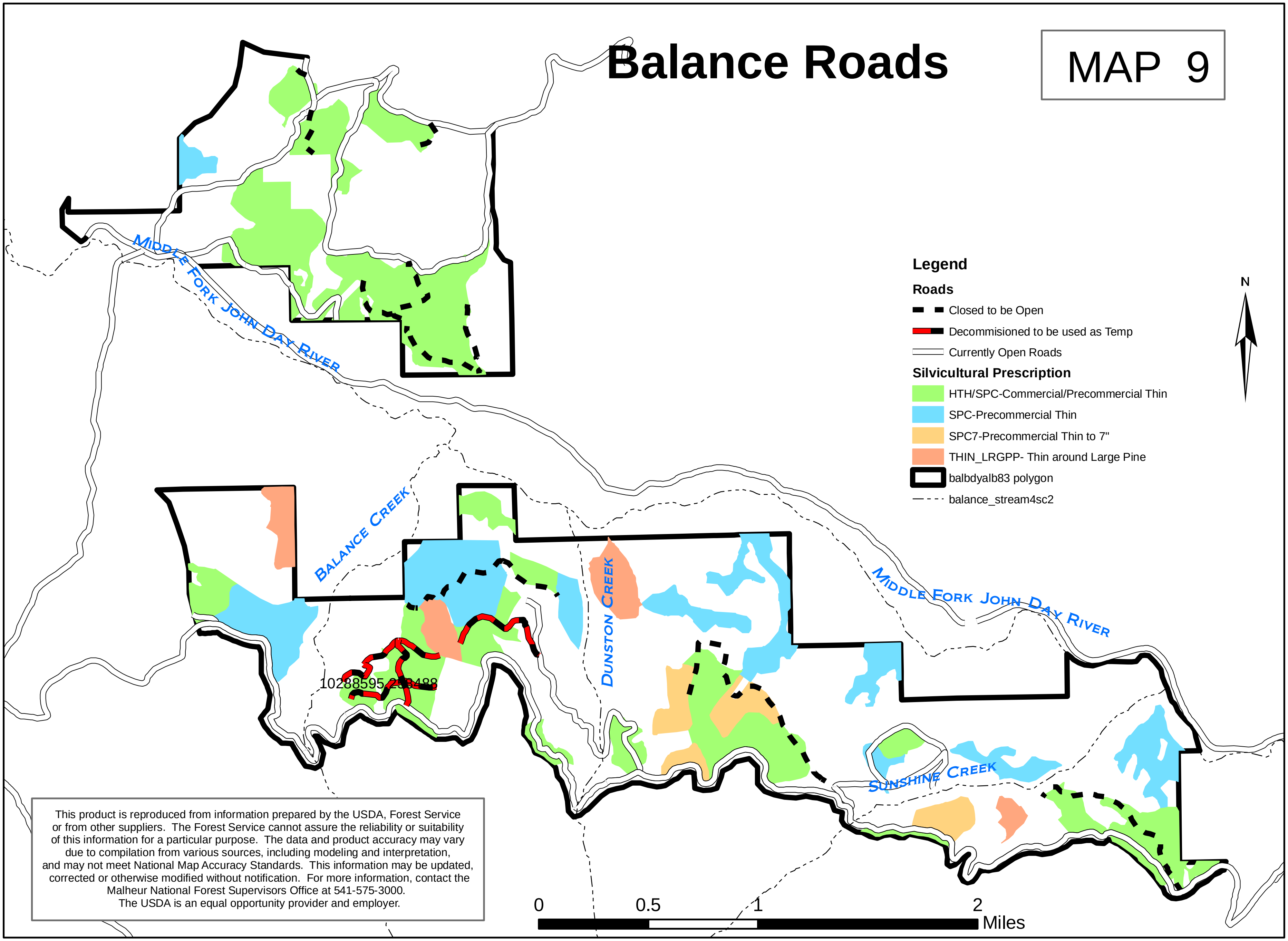


Legend

- Aspen
- RHCA
- balbdyupdate polygon
- Prescribed Burn Units

Silvicultural Prescription

- HTH/SPC--Commercial/Precommercial Thin
- SPC-Precommercial Thin
- SPC7-Precommercial Thin to 7"
- THIN_LRGPP-Thin Around Large Pine


Balance Roads
MAP 9
Legend
Roads
Closed to be Open
Decommisioned to be used as Temp
Currently Open Roads
Silvicultural Prescription
HTH/SPC-Commercial/Precommercial Thin
SPC-Precommercial Thin
SPC7-Precommercial Thin to 7"
THIN_LRGPP- Thin around Large Pine
balbdyalb83 polygon
balance_stream4sc2
N
Middle Fork John Day River
Balance Creek
Dunston Creek
Sunshine Creek
Middle Fork John Day River
10288595.283488
0
0.5
1
2
Miles
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corrected or otherwise modified without notification. For more information, contact the
Malheur National Forest Supervisors Office at 541-575-3000.
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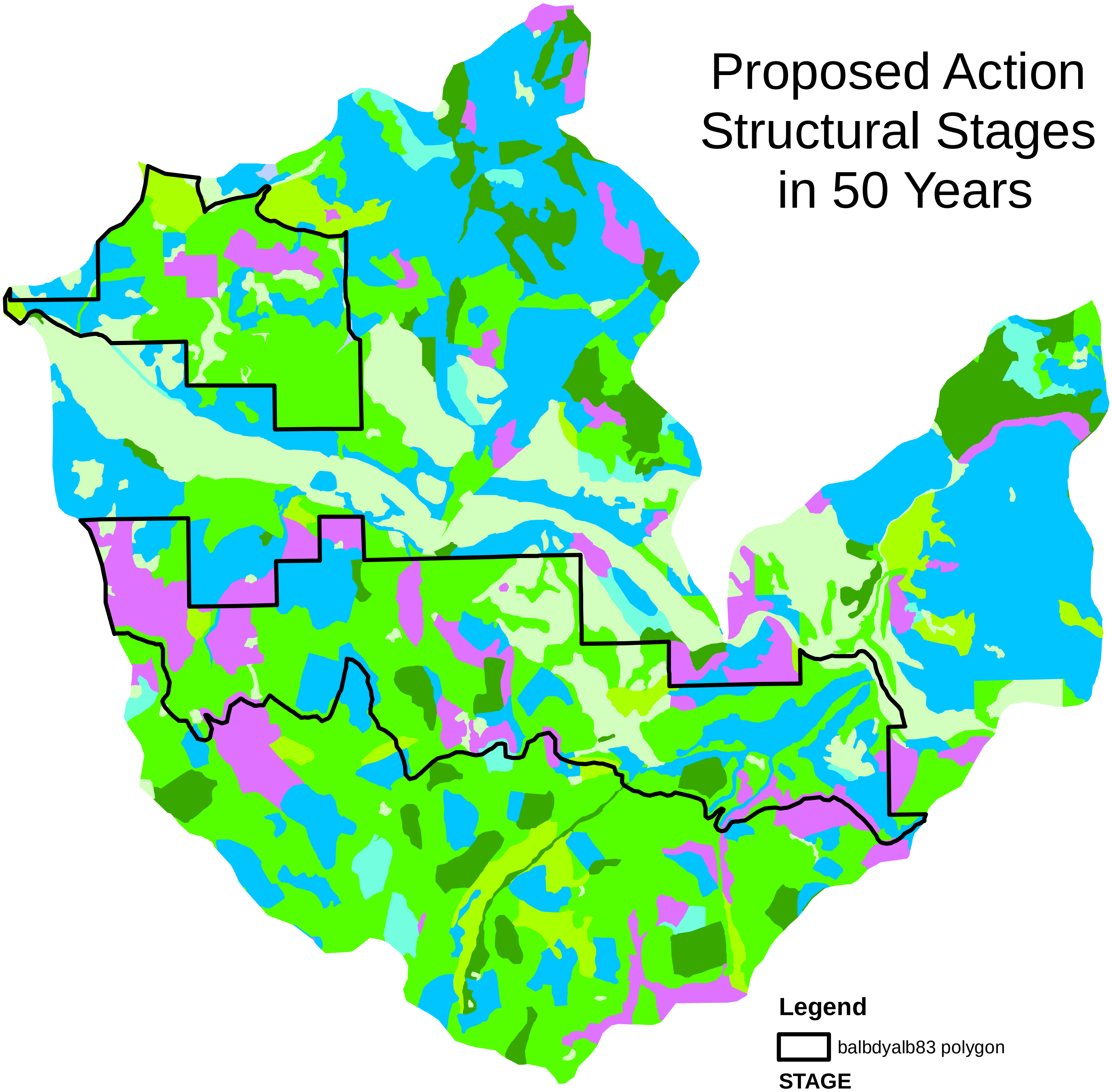
MAP 10

Proposed Action Structural Stages in 50 Years



Legend

balbdyalb83 polygon

STAGE

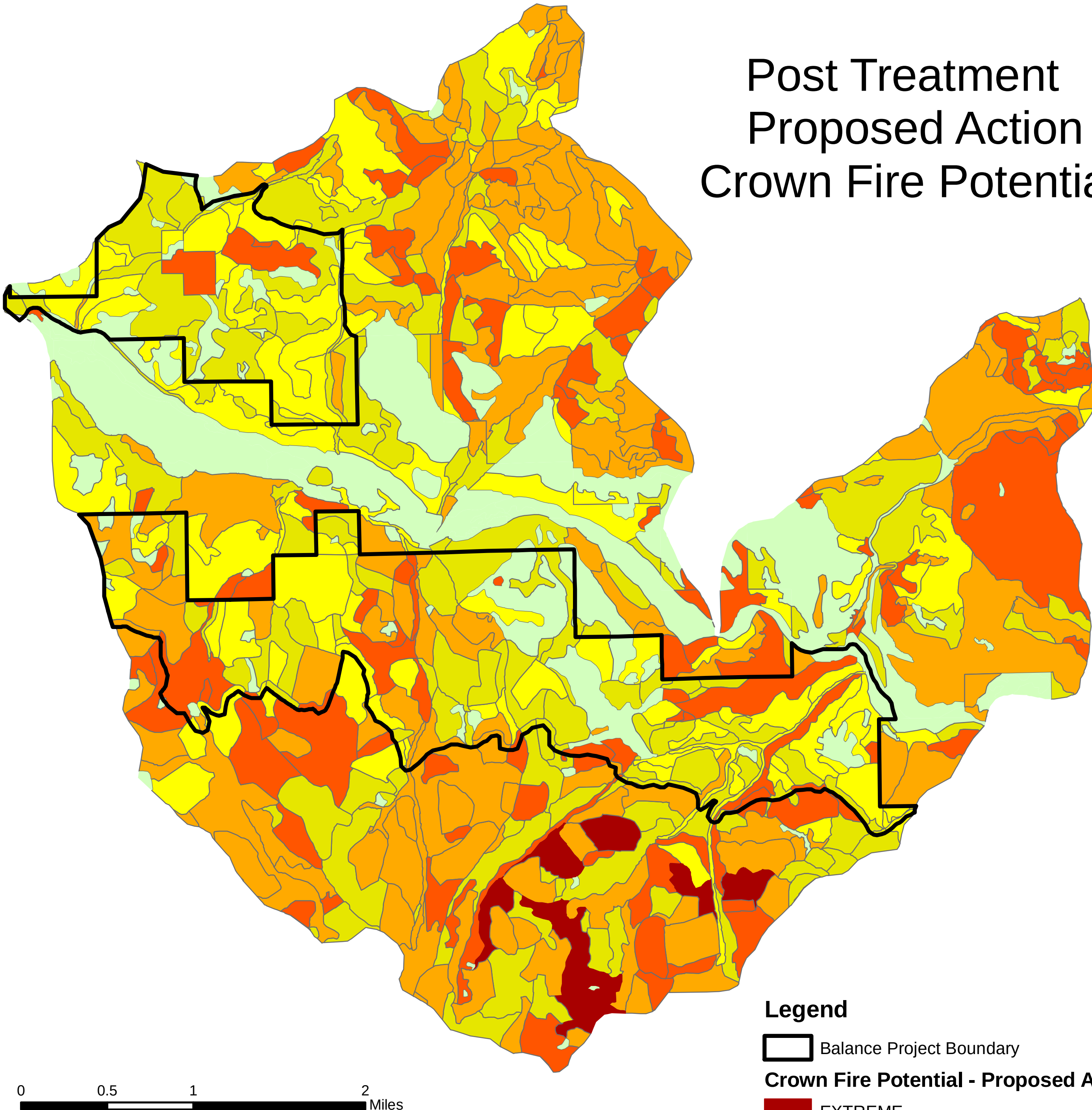
- Non-Forest
- SI-Stand Initiation
- OFMS-Old Forest Multi Strata
- OFSS-Old Forest Single Strata
- SECC-Stem Exclusion Closed Canopy
- SEOC-Stem Exclusion Open Canopy
- UR-Understory Reinitiation
- YFMS-Young Forest Multi-Strata

0 0.5 1 2 Miles

N

MAP 11

Post Treatment Proposed Action Crown Fire Potential



Legend

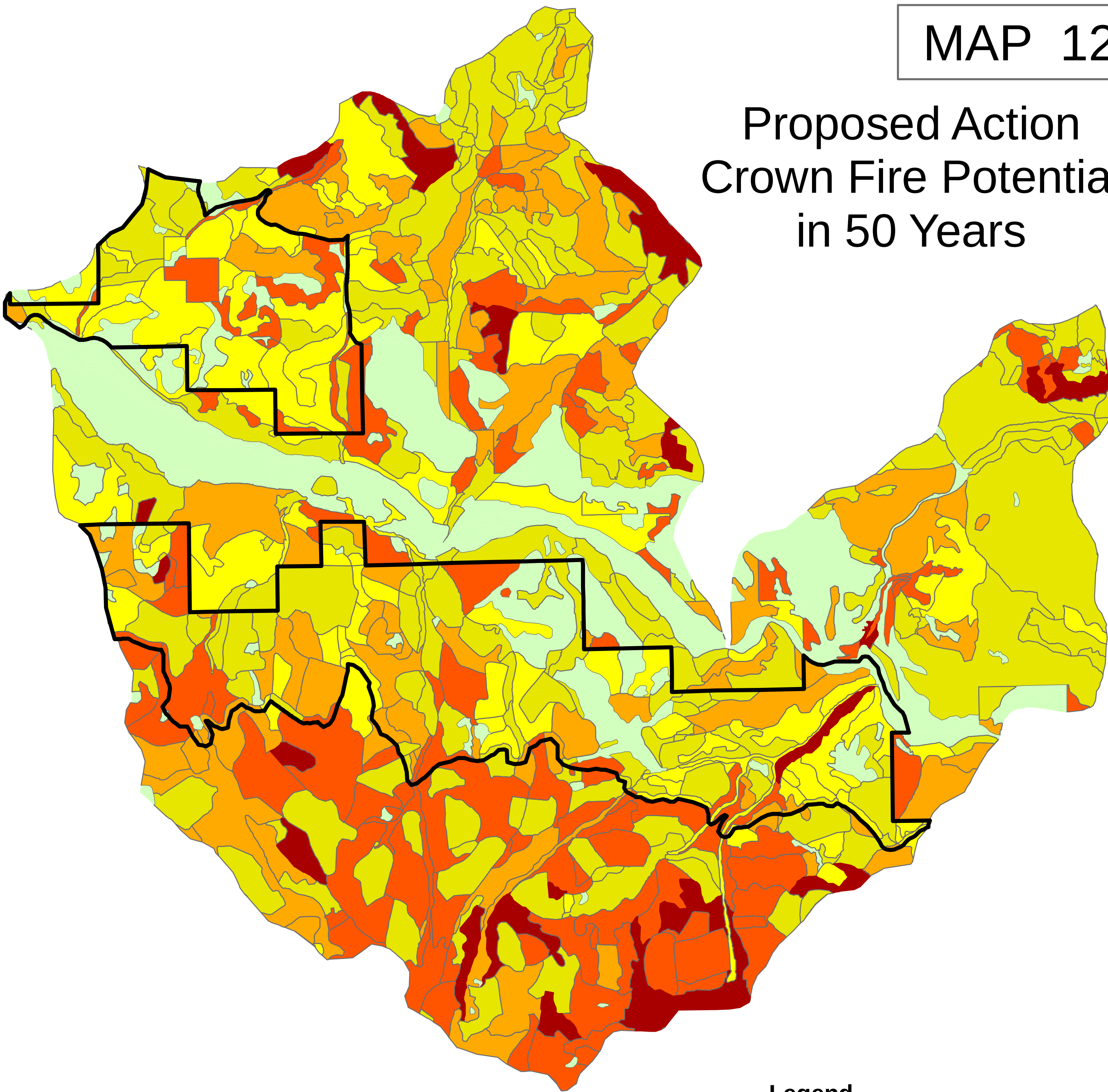
Balance Project Boundary

Crown Fire Potential - Proposed Action

EXTREME
VERY-HIGH
HIGH
MEDIUM
LOW
NON-FOREST; NON-VEG

MAP 12

Proposed Action Crown Fire Potential in 50 Years



0 0.5 1 2 Miles

N

Legend

Balance Project Boundary

Crown Fire Potential - 50 years

- EXTREME
- VERY-HIGH
- HIGH
- MEDIUM
- LOW
- NON-FOREST; NON-VEG

Appendix E – National Fire Plan Project ESA Compliance Statement

Project Compliance with the Endangered Species Act Consultation Requirements, Using the Counterpart Consultation Regulations

USDA Forest Service

Project Name: Balance Thinning and Fuels Reduction Project

State: Oregon

Forest Service Region: Pacific Northwest Region

National Forest: Malheur N. F.

Ranger District: Blue Mountain R. D.

Date of Completed BE or BA: Fisheries and Wildlife BE/BAs – Signed

Name of Journey-Level Biologists who Ensured the Adequacy of the BE or BA:
Scott Cotter (Fisheries) and Suzanne Grayson (Wildlife)

As proposed this project is within the scope of, and will support, the National Fire Plan because:

The Balance Thinning and Fuels Reduction Project will take action on reducing hazardous fuels within a portion of the Grant County WUI as defined in the Grant County Community Fire Protection Plan (GCCFPP). The project area is a forested area that is adjacent to County Road 20 which has been identified as a Safety Corridor in the GCCFPP. The Malheur National Forest annually experiences severe thunderstorms with numerous fires ignited during a single storm. Recent wildfires have threatened private and public lands and property.

The Balance Thinning and Fuels Reduction Project is an authorized hazardous fuels project under HFRA because it would use appropriate methods to reduce hazardous fuels on qualifying Federal Lands that are within the designated WUI.

The effects analysis completed and documented in the BE or BA resulted in a call of Not Likely to Adversely Effect (NLAA) or No Effect (NE). This was done under the Section 7 Counterpart Regulations of the Endangered Species Act (Federal Register, December 8, 2003) and is in compliance with those regulations and the March 3, 2004, Alternative Consultation Agreement between the Forest Service, Fish and Wildlife Service, and National Marine Fisheries Service.

Signature of Line Officer:___________________________________

Name of Line Officer: DOUG GOCHNOUR

Title of Line Officer: Forest Supervisor

Date:

Appendix F – Aquatic Biological Evaluation

for

Threatened, Endangered, and Sensitive (TES) Aquatic Species

Blue Mountain Ranger District

Malheur National Forest

Balance Fuels Reduction Project

Project Location

A. HUC 4: **Middle Fork John Day** (17070203)

B. HUC 5: **Camp Creek** (1707020302)

C. HUC 6: **Coyote Creek/Balance Creek** (170702030205)

Prepared and Reviewed By:

_*/S/ Scott Cotter*________________________________ Date_6-4-2008___

Scott Cotter, District Fisheries Biologist

I. Summary

Table 1 - Threatened, endangered and sensitive (TES) species considered in this analysis of the Balance Fuels Reduction Project and the effects determination for the No Action and Action alternatives.

Species	Status	Occurrence	Alt. 1 No Action	Alt. 2 Proposed Action
Aquatic Species				
Columbia River Bull Trout *Salvelinus confluentus*	T, MIS	HD, S	NE	NE
Mid-Columbia River Steelhead *Oncorhynchus mykiss*	T, MIS	HD, D	LAA	NLAA
Mid-Columbia Steelhead Designated Critical Habitat	D	HD	NLAA	NLAA
Chinook Salmon EFH[1]	MS	HD	NAE	NAE
Interior Redband Trout *Oncorhynchus mykiss*	S, MIS	HD, D	MIIH	MIIH
Westslope Cutthroat Trout *Oncorhynchus clarki lewisi*	S, MIS	HN, N	NI	NI
Mid-Columbia River Spring Chinook *Oncorhynchus tshawytscha*	S	HD, D	MIIH	NI
Columbia Spotted Frog *Rana luteiventris*	S, C	HD, S	MIIH	MIIH
Malheur Mottled Sculpin *Cottus bairdi ssp.*	S	HN, N	NI	NI

[1]Chinook salmon waters are designated Essential Fish Habitat by the Magnuson-Stevens Act.

Status

E	Federally Endangered
T	Federally Threatened
S	Sensitive species from Regional Forester's list
C	Candidate species under Endangered Species Act
MIS	Management Indicator Species
P	Proposed Critical Habitat
D	Designated Critical Habitat
MS	Magnuson-Stevens Act designated Essential Fish Habitat

Occurrence

HD	Habitat Documented or suspected within the project area or near enough to be impacted by project activities
HN	Habitat Not within the project area or affected by its activities
H	Historical Occurrence
D	Species Documented in general vicinity of project activities
S	Species Suspected in general vicinity of project activities
N	Species Not documented and not suspected in general vicinity of project activities

Effects Determinations

Threatened and Endangered Species

NE	No Effect
NLAA	May Effect, Not Likely to Adversely Affect
LAA	May Effect, Likely to Adversely Affect
BE	Beneficial Effect

Sensitive Species

NI	No Impact
MIIH	May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species
WIFV	Will Impact Individuals or Habitat with a Consequence that the Action May Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species
BI	Beneficial Impact

Designated Critical Habitat

NE	No Effect
LAA	May Effect, Likely to Adversely Affect
NLAA	May Effect, Not Likely to Adversely Affect

Chinook Salmon Essential Fish Habitat

NAE	No Adverse Effect
AE	Adverse Effect

II. Introduction

This Biological Evaluation (BE) satisfies requirements of Forest Service Manual 2672.4 requiring the Forest Service to review all its planned, funded, executed or permitted programs and activities for possible effects on proposed, endangered, threatened or sensitive species. The BE process is intended to review the Balance Fuels Reduction Project in sufficient detail to determine effects of alternatives on species in this evaluation and ensure proposed management actions would not:

- Likely jeopardize the continued existence, or cause adverse modification of habitat, for a species that is proposed (P) or listed as endangered (E) or threatened (T) by the USDI Fish and Wildlife Service or NOAA National Marine Fisheries Service; or
- Contribute to the loss of viability for species listed as sensitive (S) by USDA Forest Service, Region 6, or any native or desired, non-native species; nor cause any species to move toward federal listing (FSM 2672.4).

The following sources were used during the prefield review phase to determine the presence or absence of aquatic TES species in the Balance Project area:

1. Malheur N.F. GIS database
2. Regional Forester's (R6) sensitive animal list (2004, updated 07/2004)
3. ODFW stream survey and fish survey reports
4. Forest Service stream survey reports, Blue Mountain Ranger District, John Day, OR
5. Oregon Natural Heritage Program (ORNHP) database

6. Natural Heritage Conservation database (Biosource)
7. Bull Trout (*Salvelinus confluentus*) Draft Recovery Plan: John Day Recovery Unit
8. Oregon Native Fish Report (2005 Public Review Draft)

III. Project Description

See Chapter 1 of the Balance Fuels Reduction Project Environmental Assessment (EA) for a complete description of the project area and Chapter 2 for a description of the proposed action, design criteria and mitigation. See Appendix C of the EA for a list of past, ongoing and reasonably foreseeable future projects; all activities on this list have been considered in the cumulative effects analysis for each species in this BE.

IV. Existing Condition of Aquatic Habitat

Information used to summarize the current watershed conditions included stream surveys, visits to the project area, and information from the Galena Watershed Analysis (1999) and Galena Watershed Analysis – supplement (2002). There are three Category 1 streams in the Fisheries Analysis Area: the MFJD River, Balance Creek, and Sunshine Creek. Stream surveys have been conducted on all three of these streams in the past (Table 2). Coyote Creek, although fish bearing and within the Coyote Creek-Balance Creek Subwatershed was not included in the fisheries analysis area because there are no activities planned within this drainage.

Table 2. Stream Habitat Surveys Conducted in the Balance Fisheries Analysis Area

Stream	Survey Year	Agency	RHCA Category	Reach No.'s In the Analysis Area	Surveyed Length (mi.)
Balance Creek	1993	USFS	1	1	1.78
Dunstan Creek	1993	USFS	2	2	1.47
Sunshine Creek	1993	USFS	1	2	3.1
Middle Fork Sunshine Creek	1993	USFS	2	1	1.6
Coyote Creek	1992	USFS	1	3	3.2
Middle Fork John Day River	1989	ODFW	1	2	~5.0
Middle Fork John Day River	2005	ODFW	1	0[1]	12.1

Notes: USFS=U.S. Forest Service, ODFW=Oregon Department of Fish and Wildlife
1) Survey began at boundary between Confederated Tribes of Warm Springs and TNC property and continued upstream to the bridge crossing near Bridge Creek confluence.

PACFISH RMOs and Forest Plan Amendment 29 DFCs

Important aquatic habitat elements as defined by PACFISH and/or Forest Plan Amendment 29 include: 1) pool frequency, 2) water temperature/stream shading, 3) large woody debris, 4) bank stability, 5) width to depth ratio, and 6) embeddedness. These habitat elements are important in maintaining aquatic habitat function and health. Stream survey information was analyzed to compare existing habitat conditions to Forest Plan RMOs/DFCs for aquatic habitat (Table 3).

Table 3. R6 Level II Fish habitat summary data for Category 1 streams in the Balance Fisheries Analysis Area.

Stream Name	Pools/ Mile	Pieces LWD/Mile[6]	Wetted W/D Ratio	% Stable Banks[5]
Balance Creek	37[1]	31[3]	6.3	95
Dunstan Creek	28[1]	34[3]	4.4	90
Sunshine Creek	46[1]	20[3]	6.5	88
East Fork Sunshine Creek[7]	-	-	-	98
Middle Fork Sunshine Creek	69[1]	116[3]	4.7	93
Coyote Creek[8]	166[1]	98[4]	-	100
PACFISH RMO	96[1] 56[2]	20	<10	>80
Amend 29 DFC	75-132[1] 38-66[2]	80-120[3] 20-70[4]	<10	>90

Notes: 1) channels of <10 feet in width, 2) channels of >10 to 20 feet in width, 3) mixed conifer ecosystem, 4) ponderosa pine ecosystem, 5) – Extrapolated from Riparian Area Inventory – Pace Transect, 6) Stream survey protocol in 1992 and 1993 included not only large woody material within the bankfull channel, but also live leaning trees that lean over the area defined by the bankfull channel width, 7) Only Riparian Area Inventory completed, 8) 1992 W/D ratios were measured at pool tail crest therefore data was not used.

Pool Frequency

Pool frequency is a gauge of aquatic habitat diversity, and is an indicator of the degree to which streams are capable of supporting a varied and complex community of fish species. Pools are important for providing rearing habitat for juvenile fish and cool-water refuge areas for adult fish during periods of low flow and elevated temperatures. Pool spacing varies by channel morphology (Rosgen 1996). Deep pools also provide important habitat for adult Chinook salmon and steelhead trout.

Pool habitat can be reduced where management activities result in reductions of pool forming elements (e.g. LWD), changes in bedload (e.g. large increases in fine sediment), or changes in channel morphology (e.g. widening or straightening).

Stream surveys indicate that the Forest Plan DFC/PACFISH RMO for pool frequency is not being met in Balance Creek, Dunstan Creek, Sunshine Creek or Middle Fork Sunshine Creek

(Table 8). However, pool frequency is being met in Coyote Creek and is approaching Forest Plan DFC in Middle Fork Sunshine Creek.

Water Temperature/Stream Shading

Water temperature influences the metabolism, behavior, and health of fish and other aquatic organisms. Fish can survive at temperatures near extremes of suitable temperature ranges. However, growth is reduced at low temperatures because all metabolic processes are slowed. At the opposite extreme, growth is reduced at high temperatures because most or all energy from food must be used for maintenance needs. Fish are also more susceptible to diseases near the extremes of a species suitable temperature ranges.

The Forest Plan water temperature standard is for no measurable increase in maximum water temperature, and maximum water temperatures below 64°F within migration and rearing habitat and below 60°F within spawning habitats (PACFISH RMO). In general, juvenile and Chinook salmon, redband trout, and juvenile steelhead will occupy water that is from 55 to 64°F. Upper lethal temperatures range from about 75°F for steelhead to about 80°F for Chinook salmon. Water temperatures were measured up to 84 degrees in the MFJD River when the die-off of Chinook salmon occurred in July 2007. Mean maximum water temperatures are above the suitable range for salmonid species present during summer months in Dunstan Creek and Balance Creek within the analysis area (Table 4).

Table 4. Average maximum stream temperatures in the Balance Fisheries Analysis area.

Stream	Location	Years Analyzed	Mean 7 Day Mean Max Temp (°F)
Dunstan Creek	Above USFS Bdy.	2007	83.1
Balance Creek	Above USFS Bdy.	2007	65.5

Riparian stream shading is critical in regulating water temperature extremes and providing instream cover against predation. Stream temperatures increase following disturbance to riparian vegetation (i.e., harvest, grazing, or fire) (Beschta and Taylor 1988). Given the high temperatures found within the Coyote/Balance Creek Subwatershed and the importance of riparian vegetation in regulating extreme temperatures, it is important to identify stream reaches that are limited in shade and ultimately may be limited in providing quality instream habitat to fish species. In addition, it is known that shade from conifers and deciduous trees and shrubs functions differently. In winter, cold temperatures can be moderated by conifer shade acting as thermal cover.

Large Woody Debris

LWD plays an important role in forested stream reaches. LWD aids in dissipating stream energy, trapping sediment, and the formation of pools and associated aquatic habitat.

Quantity of LWD in streams can be altered by removal of streamside trees for timber production or salvage of instream pieces. Timber has been harvested from areas adjacent to streams in the analysis area. In extreme cases, large increases in peak flows and/or large increases in channel width can result in destabilization of instream pieces and subsequent transport downstream thus resulting in a decrease in LWD.

Riparian forests, especially individual trees that are within ½ to ¾ tree length of the stream channel, produce LWD that is recruited into a stream where it creates critical habitat features for aquatic species. The Malheur National Forest recognizes the role of LWD. Forest Plan Amendment 29 specifies a range in the number of pieces of LWD to be maintained for each mile of stream in certain ecotypes.

Level II Stream surveys indicate that the Forest Plan DFC for LWD quantity is not being met in Balance Creek, Dunstan Creek, or Sunshine Creek, while Coyote Creek and Middle Fork Sunshine Creek are exceeding Forest Plan Amendment 29 standards. All streams where Level II stream surveys have been completed meet or exceed PACFISH RMOs for LWD quantity. Sunshine Creek just meets the standard with 20 pieces of LWD per mile (Table 3).

Embeddedness/Fine Sediment

Composition of the stream substrate is an important feature of aquatic habitat. Cobble and gravel substrates provide habitat for a diverse assemblage of benthic macroinvertebrates as well as eggs and early life stages of numerous fish species. Macroinvertebrates represent a substantial portion of the diet available to various fish species.

Filling of interstitial spaces (i.e. the gaps between rocks on the stream bottom) with fine sediment (particles < 2 mm in size) eliminates habitat for many macroinvertebrates. Fish eggs and early life stages can also be buried and smothered when interstitial spaces are embedded with fine sediment. Winter habitat for juvenile salmonids is also lost as interstitial spaces are embedded with fine sediment.

Fine sediment in streams is a normal component of salmonid habitat; however, major disruption of the system occurs when sediment levels substantially exceed natural levels. Deposition of fine sediment can eliminate habitat for aquatic insects; reduce density, biomass, and diversity of aquatic insects; reduce permeability of spawning gravels; and reduce emergence of fry from redds (Nelson et al. 1991). Studies have shown that an increase in 1-3mm size sand from 20% to 30% can decrease emergent survival of salmonid species from 65% down to 40% (Phillips et al. 1975). Fine sediments are known to impact fry emergence and survival, and fine sediment (<6.5mm in size) levels above 40% can effectively eliminate salmonid populations and many macroinvertebrate species (Everest and Harr 1982).

Increases in fine sediment can occur from both increases in transport of fine sediment from upland areas and from destabilized stream banks. Increases can result from both episodic sources such as wildfires or from chronic sources such a native surface roads. Episodic sources normally result in short-term increases that return to pre-disturbance levels through recovery processes. Chronic sources can result in long-term changes of stream channels and aquatic habitat.

Embeddedness was rated as either yes or no at the time Level II stream surveys were completed on streams within the fisheries analysis area. In order for embeddedness to have been rated as yes for that reach, the substrate must have been embedded to a degree greater than 35 % for the majority of the reach.

These early stream surveys simply recorded whether measured units were embedded to a degree greater than 35 percent, not greater than 20 percent, and they did not conduct pebble counts, therefore without conducting new stream surveys it is not possible to determine whether these streams meet or do not meet Forest Plan DFC.

Embeddedness data is no longer collected during Region 6 stream surveys. Instead, stream substrate data is collected using pebble count procedures. Either methodology can be used to estimate the amount of fine sediment in streams. Adverse impacts to macroinvertebrates and fish can occur where fine sediment exceeds 20% of the surface area of the streambed or embeddedness exceeds 20%.

Width-to-Depth Ratio

The Forest Plan DFC/RMO for width-to-depth ratio is based on wetted width and depth. A large wetted width-to-depth ratio indicates a wide shallow stream channel morphology. Wide shallow streams are prone to increases in stream temperatures due to their high surface area to volume ratio. Shallow streams also provide little habitat for fish, due to the lack of water depth.

Width to depth ratios can be increased by increases in peak flows, direct bank alteration, increases in sediment or a combination of these factors. Conversely, reductions in these factors can lead to reductions in width to depth ratios.

Balance Creek, Dunstan Creek, Sunshine Creek, and Middle Fork Sunshine Creek were all within the Forest Plan DFC/PACFISH RMO for width-to-depth ratio in 1993 (Table 2). Data was not gathered on East Fork Sunshine Creek and data is not valid for Coyote Creek, therefore W/D Ratios were not entered for these two streams in Table 3.

Bank Stability

The Forest Plan DFC for stream bank stability is for 90% of the banks to be stable. Channel types differ in their sensitivity to management activities due to differences in bank erosion potential and the influence of streamside vegetation on bank stability. Data available from the 1993 stream surveys was not adequate to type streams based on Rosgen stream classification, therefore channel typing was not done on Sunshine Creek, Balance Creek or Dunstan Creek. Riparian Area Pace Transect surveys were conducted in 1992 and determined that streambank stability in Coyote Creek was within Forest Plan DFC/PACFISH RMOs. Transect surveys completed in 1993 determined that Balance Creek, Dunstan Creek, Sunshine Creek, East and Middle Fork Sunshine Creek all were within Forest Plan DFC/PACFISH RMOs (Table 3).

Legacy Conditions and Upland Influence

For over one hundred years the Camp Creek Watershed has been subjected to a variety of land-use practices. Practices have included placer mining, railroad logging, fire suppression, road construction, and grazing activities on public and private land. These activities have reduced aquatic TES species habitat quality and complexity of streams within the analysis area.

Historically, wildfires within the watershed would have had a higher frequency of occurrence, but fires would generally have been of lower intensity than under a fire-suppression strategy. Sediment inputs would probably have been more frequent due to this fire pattern but would have been short-lived as vegetation returned quickly to the burned areas. Recent fires that have occurred in the analysis area have burned approximately 42,497 acres since 1980. Areas of high mortality have been planted with native conifers. Wildfire suppression may have altered natural disturbance regimes that contribute to watershed structure and function. Fire exclusion has caused the build-up of fuels, overstocking of trees, and has created a situation where the possibility exists for a high intensity, stand replacement wildfire. With a probable historic fire-return interval of five to 15 years, as many as 10 fire cycles have been eliminated from this ecosystem. Evidence suggests that fires and disturbance in general can pose greater threats to fishes when their habitats become fragmented and otherwise altered by human activities (Dunham et al. 2003). Other human influences can interact with fire and when taken cumulatively can negatively affect aquatic TES species (e.g. habitat loss, degradation, fragmentation, nonnative species invasions) (Dunham et al. 2003).

Data on earlier harvests is not available; however logging of forest lands has been occurring in the watershed since about 1916 when the Oregon Lumber Company constructed narrow gauge railway from the town of Bates down the MFJD River toward the mining towns of Susanville and Galena (Galena Watershed Analysis – Supplement 2002). Since 1910 timber harvest has occurred on approximately 4,271 acres of Forest Service lands within the analysis area. Past logging within RHCAs reduced canopy cover within these areas, resulting in less shade over streams. These harvest activities likely reduced the amount of LWD in perennial streams within the analysis area. The amount of LWD and coarse wood available for delivery from intermittent drainages during storm events was also likely reduced. Pre-commercial thinning has occurred on approximately 3,900 acres since 1960.

Hydraulic mining was a major focus in the MFJD Subbasin up until about 1886 when hard rock mining began to take hold in the area. Downstream of the analysis area near Galena, the *Timms Dredge* worked the MFJD River, where it stayed until 1939. Within portions of the MFJD Subbasin, and possibly within the analysis area, historic mining activity has resulted in straightened channels and has reduced the presence of large log complexes. Historic mining activity has reduced available water for late season flows, reducing water table recharge, and has caused a reduction in riparian shade (Galena Watershed Analysis – Supplement 2002). Mining and exploring for locatable mineral resources continues within the sub-basin and recreational mining continues through the present day.

Roads can account for most of the sediment problems in a watershed because they are a link between sediment source areas (skid trails, landings, and cut slopes, etc.) and stream channels. They directly affect the channel morphology of streams by accelerating erosion and sediment delivery and by increasing the magnitude of peak flow (Furniss et al. 1991). Wemple (1994) focused on the interaction of forested roads with stream networks in Western Oregon and found that nearly 60% of the road network drained into streams and gullies, and are therefore, hydrologically integrated with the stream network. From a qualitative standpoint, the following assumptions can be used as general indicators of sediment delivery risk associated with roads: 1) the higher the road density the higher the potential for sediment yield increases due to the larger acreage of exposed surfaces, 2) the more drainage ways that are crossed the higher probability that direct sediment introduction would occur, and 3) the greater the distance, or higher on the slope, that the road is from the drainage network, the less probability for delivered sediment to occur (erosion may occur but is less likely to be routed to the stream). Drainage structure, function, and spacing are keys to minimizing the amount of surface flow, which directly affects surface erosion. The spacing of drain or ditch relief structures depends on the road gradient, road surface and ditch soil types, runoff characteristics, and the effects of concentrated runoff on slopes below the road. Forest Service Handbook and other manuals provide guidelines for drainage structure spacing. Drainage structures should be close together on silt-sand soils with little to no binder on steep slopes and further apart on gravel road surfaces with moderate binder and little to no fines on flat or minimum grades.

Surface erosion is highly dependant on soils, road surfacing and condition, road grade, traffic volumes, and the effectiveness and spacing of drainage structures. The greatest surface erosion problems occur in highly erodible terrain, particularly landscapes underlain by granitic soils, soils of the Clarno formation, and certain highly fractured or weathered rock types. Studies have found that sediment delivery to stream systems is highest in the initial years after road construction, although raw ditch-lines and road surfaces with little binder can remain chronic sources of sediment. Native surface roads (mostly Maintenance Level 1 and 2 roads) are generally greater chronic sediment sources than surfaced, higher standard roads. Approximately 41% of RHCA roads in the Coyote Creek/Balance Creek Subwatershed and approximately 61% of RHCA roads in the Balance project area are native surface roads. Native surface roads are more likely to contribute fine sediment to streams that can adversely affect aquatic habitat compared to roads with other surface types. Most native surface roads, if used other than during dry or frozen conditions cannot tolerate much traffic without rutting causing other resource problems. Adverse affects to aquatic TES species are more likely to occur where native surface roads are located adjacent to Category 1 streams (Table 6).

Stronghold populations of salmonids are associated with higher-elevation forested lands and the proportion declines with increasing road densities (Quigley et al. 1996). The higher the road density, the lower the proportion of subwatersheds that support strong populations of key salmonids. Specifically, Quigley et al. (1996) shows a strong correlation with road densities of 2 miles/mile^2 or higher and reduction of strong populations of salmonids. Further reductions of strong salmonid populations were identified at densities of 3 miles/mile^2 and 4 miles/mile^2 or greater. Roads in the project area that occur within 100 feet of streams or cross streams commonly impact fish and fish habitat more than roads located in uplands (Table 6).

Table 6: Road/Stream Interaction Information

	[1]Entire Subwatershed (Public & Private)				
Subwatershed	**Total Road Miles**	**Road Miles within 100 ft. of Cat. 1-4 Channels**	**Stream Crossings on Roads (Cat. 1 or 2)**	**Stream Crossings on Roads (Cat. 4)**	**Total Road Density Mi/ Mi^2**
Coyote Creek/Balance Creek	81.2	6.8	43	24	3.77
	[1]**Project Area (Public & Private)**				
	Total Road Miles	**Road Miles within 100 ft. of Cat. 1-4 Channels**	**Stream Crossings on Roads (Cat. 1 or 2)**	**Stream Crossings on Roads (Cat. 4)**	**Total Road Density Mi/ Mi^2**
Balance Project Area	27.3	2.1	12	2	5.2

[1] Note: Rounding road miles during calculations may result in minor (0.1) mile discrepancies. This information was derived from the Malheur National Forest GIS.

Road densities would remain above 3 miles/mile^2 in the Coyote Creek/Balance Creek Subwatershed and miles within 100 feet of Category 1-4 channels would remain fairly high (Table 6). There are slightly over 6.8 miles of roads that likely impact streams due to proximity (100 feet or less). This alternative would not change road densities or location in the project area. Road densities and roads in close proximity to streams would remain at moderately detrimental levels in the Coyote Creek/Balance Creek Subwatershed.

Within the analysis area closed and decommissioned roads and other tracks currently classified as unauthorized roads ("ghost roads") are present. They often dam and redirect subsurface flow on old landslide debris which sometimes results in concentrations that initiate rilling. Ditch relief culverts and culverts which concentrate flow from seeps above the roads also discharge concentrated flows which have initiated rilling. Near stream areas in the vicinity of culvert crossings, were attractive for past management activities, such as log landings and grazing. Today some of these same locations are occasionally used as pump chances and/or continue to be grazed, however salting no longer occurs at these type of locations.

Approximately 150 miles of road have been constructed in the analysis area for fire suppression, timber harvest, and public access. Approximately 52 miles are still open for use at this time within the subwatershed and 20 miles are still open for use within the project area. Some 45 miles of road have been closed and 53 miles of road have been decommissioned within the subwatershed. Most decommissioned roads are moving towards less disturbed conditions at natural rates, however mineral soil remains exposed near streams in some RHCAs creating localized areas of increased erosion potential. These conditions are found along segments of Sunshine and Balance creeks and their tributaries and along unnamed streams on the north side of the MFJD River. These conditions continue to reduce availability of riparian storage and other riparian and stream functions. Several of the roads that were previously decommissioned are currently being driven, as barricades have been breached. Consequently past activities are contributing to current cumulative effects.

Beaver

Beaver sign has been recently found along portions of the MFJD River on private lands within the analysis area (Kranich pers. com.) and it is possible that beaver utilize the lower portions of other streams within the analysis area where conditions are suitable. Beaver play a crucial role in the maintenance of stream channels and associated RHCAs. Beaver dams trap sediment, reduce water velocity, and can redistribute water as hyporheic flow. The net effect of beaver dams may be to lower water temperatures by increasing bank storage, which leads to increased base flow levels.

Restoration on Adjacent Lands

The Nature Conservancy (TNC) has proposed and implemented several aquatic and floodplain restoration projects on their 1,200 acre Dunstan Homestead Preserve (DHP). ODFW conducted surveys on the DHP, during the summers of 2005 and 2006 to validate fish response to instream restoration work. More recently, instream restoration work on the MFJD River was completed by TNC during the summer of 2007 (ODFWb 2007). This work was designed to alter fish habitat. Post-treatment monitoring recorded a greater quantity of large woody debris associated with pools. Post-treatment monitoring also showed that pool depth and volume were greater than the control reach. No fish counts were conducted during this post-treatment monitoring, however large numbers of small fish, several mountain whitefish, and four live adult spring Chinook salmon were observed holding in one of the newly treated pools (ODFWb 2007).

The Confederated Tribes of Warm Springs Reservation of Oregon (Tribes) continue habitat enhancing activities on their 1,022-acre Oxbow Conservation Area property on the MFJD River. Annual habitat maintenance includes management of riparian fences, weed control activities and care for the trees and shrubs planted in 2006. Plans are underway to enhance instream habitat and floodplain connectivity on the reach of the river between Beaver Creek and Ragged Creek. Removal of all non-native rock barbs, installed in the 1970s, is part of the effort to assist the River in naturally adjusting. The project also includes addition of large woody debris jams to maintain large pools for holding adult Chinook and instream habitat for rearing juvenile salmonids. This project is planned to be implemented in 2008 or 2009. The Tribes will also be addressing similar habitat enhancement activities for the rest of their property in various phases from 2010 to 2015, including channel construction efforts in the dredged reaches of the property.

The Tribes also plan to coordinate with the Malheur National Forest to perform a 90-acre prescribed burn in tandem with the Balance Fuels Reduction Project. This burn would occur on the western edge of the property in the Ragged Creek watershed, adjacent to National Forest Land.

The Tribes also are actively engaged in project monitoring, as well as status and trend monitoring of habitat conditions on the Oxbow Conservation Area, with most attention given to aquatic ecosystems. Weather, stream temperature, riparian vegetation survival, photo point, snorkeling, steelhead spawning, and adult Chinook salmon holding counts are some of the monitoring efforts performed. An ODFW aquatic habitat survey was conducted in 2005 on private land just upstream from the Balance fisheries analysis area, at TNC and the old Oxbow Ranch parcel's property boundary (Table 2). The channel was unconstrained within a broad valley floor. The average valley width index was 5.5 (range: 4.0-7.0). Land uses for the reach were large timber and light grazing. The average unit gradient was 0.7 percent. Riffles (79%) were the dominate stream habitat. Cobble (34%) and gravel (42%) were the primary stream substrates. Erosion was low (3% of the entire reach length had evidence of eroding banks). Wood volume was very low at $0.4m^3/100m$. The tree species found most frequently in the riparian zone were hardwoods 3-15cm (based on two riparian transects), however the riparian consisted primarily of grasses and shrubs.

Additionally, private landowners in the area are working towards restoration of aquatic habitat through active stream restoration and working with the Oregon Water Trust during the irrigation season to keep water in the MFJD River for spring Chinook, summer steelhead, redband trout and bull trout (Wright 2006). The Big Boulder Creek Project is planned for construction in summer 2008 and will consist of moving the stream into a historic alignment for approximately 2,400 feet on the Boulder Creek Ranch (BCR) property and installing small rootwad structures in the new channel and the remainder of the stream on BCR and TNC property. The existing channel to be re-routed is incised and held against the toe of the slope with very little chance to enhance riparian conditions. The goal of moving the channel is to have more flood plain interaction, greater diversity, improved water table elevation, and better environment for riparian vegetation growth. The rootwad structures will enhance pools, trap spawning gravels, and provide overhead cover (M. Croghan pers. com.).

V. Environmental Baseline of Species Considered in this Evaluation: Effects Calls and Rationale by Species and Alternative

On January 31, 2008, Regional Forester Linda Goodman released an updated Sensitive Species List which includes federally listed, federally proposed and sensitive species lists. In the cover letter for the updated species list the Regional Forester states that projects initiated prior to January 31, 2008 may use the updated sensitive species list or the list that was in effect when the project was initiated. The Responsible Official for the project has the authority to decide which list to use. "Initiated"means that a signed and dated document such as a project initiation letter (PIL), scoping letter, or Federal Register Notice for the project exists. The PIL was signed on February 9, 2007. Consequently, the 2004 Regional Forester Sensitive Species list in effect at that time was used for field reconnaissance and the Biological Evaluation.

Management Indicator Species, Threatened, Endangered and Sensitive Species

Management Indicator Species (MIS) are species of vertebrates and invertebrates whose population changes are believed to best indicate the effects of land management activities. Through the MIS concept, the total number of species found within a project area is reduced to a subset of species that collectively represent habitats, species, and associated management concerns. The MIS are used to assess the maintenance of populations (the ability of a population to sustain itself naturally) and biological diversity (which includes genetic diversity, species diversity, and habitat diversity), and to assess effects on species in public demand. Forest Plan

Standard 61 (p. IV-32) lists species and gives direction to provide for habitat requirements of MIS species. Aquatic MIS in the project area include: rainbow/redband trout, bull trout and steelhead trout.

Threatened and endangered species are listed under the ESA; whereas, sensitive species are identified by the Forest Service Regional Forester. An endangered species is an animal or plant species that is in danger of extinction throughout all or a significant portion of its range. A threatened species is an animal or plant species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. A sensitive species is an animal or plant species for which species viability is a concern either a) because of current or predicted downward trend in population numbers or density, or b) because of current or predicted downward trends in habitat capability that would reduce a species' existing distribution. Forest Plan Standard 62 (p. IV-32) gives direction to meet all legal and biological requirements for the conservation of threatened and endangered plants and animals. Standard 62 states, "Assess all proposed projects that involve habitat changes or disturbance and have the potential to alter the habitat of threatened, endangered or sensitive plant and animal species." When threatened or endangered species or habitats are present, follow the required biological assessment process, according to the requirements of the ESA (Public Law 93-205). Forest Plan Standard 64 further states, "Meet all consultation requirements with the USFWS and state agencies." Effects to aquatic threatened, endangered, and sensitive species are analyzed in this Aquatic BE.

Four threatened, endangered and/or sensitive (TES) salmonid species and one sensitive amphibian species are found in the project area.

- Summer-run steelhead of the MCR Distinct Population Segment (DPS) are listed as threatened under the ESA and their critical habitat was designated on September 2, 2005 including the MFJD River, Balance Creek, and Sunshine Creek within the fisheries analysis area. They are also on the State of Oregon sensitive species list.

- Spring-run Chinook salmon of the MCR Evolutionarily Significant Unit (ESU) are listed on the Region 6 sensitive species list; they are also covered under Essential Fish Habitat (EFH) for consultation with the National Marine Fisheries Service (NMFS) under the Magnuson-Stevens Fishery Conservation and Management Act (MSA).
- Bull trout of the Columbia River Basin DPS are listed as threatened under the ESA. They are seasonally present in the MFJD River. They are also on the State of Oregon sensitive species list.
- Inland Columbia River Basin Redband trout are considered the native, resident form of rainbow trout and they are on the State of Oregon and Region 6 sensitive species list.
- Columbia spotted frogs are also on the State of Oregon and Region 6 Sensitive Species List and are a Candidate for Federal listing under the ESA.

Westslope cutthroat trout (*Oncorhynchus clarki lewisi*) and Malheur mottled sculpin (*Cottus bendirei)*, both Region 6 sensitive species are not present in the Middle Fork Subbasin. Therefore, the Balance Fuels Reduction Project will have no impact on either westslope cutthroat trout or Malheur mottled sculpin, therefore neither will be considered further in this BE.

There are no aquatic species in the project area that are listed by the state of Oregon as threatened or endangered.

On January 31, 2008, Regional Forester Linda Goodman released an updated Sensitive Species List which includes federally listed, federally proposed and sensitive species lists. In the cover letter for the updated species list the Regional Forester states that projects initiated prior to January 31, 2008 may use the updated sensitive species list or the list that was in effect when the project was initiated. The Responsible Official for the project has the authority to decide which list to use. “Initiated”means that a signed and dated document such as a project initiation letter (PIL), scoping letter, or Federal Register Notice for the project exists. The PIL was signed on February 9, 2007. Consequently, the 2004 Regional Forester Sensitive Species list in effect at that time was used for field reconnaissance and this BE.

Affected Environment Steelhead

Steelhead (Mid-Columbia ESU, MCR steelhead) was listed by NMFS as threatened under the federal ESA on March 25, 1999 (64 FR 15417). MCR steelhead are also a Malheur National Forest MIS. Critical habitat for MCR steelhead was designated on September 2, 2005 (70 FR 52630). Critical habitat is present in the fisheries analysis area.

Steelhead trout are the anadromous form of *O. mykiss*. Adult summer steelhead return to freshwater from June through September. Adults overwinter in large rivers while sexually maturing. Adults resume migration to spawning streams in early spring. Spawning takes place from March through May. Eggs incubate during the spring and emergence occurs from April through July depending on water temperatures. Juveniles typically spend 2 to 3 years in freshwater. Juvenile steelhead generally utilizes habitats with higher water velocities than juvenile Chinook salmon. In winter, juveniles utilize deep pools with abundant cover. Juveniles may reside in their natal stream for their entire freshwater rearing phase or may migrate to other streams within a watershed. Smoltification occurs during late winter and emigration to the ocean occurs during spring. Summer steelhead adults normally rear for 1 to 2 years in the ocean.

Population Status, Distribution and Habitat

Middle Fork John Day Subbasin:

MCR steelhead runs in the John Day River Basin are composed entirely of native stocks. However, hatchery fish do stray into the John Day Basin from the Columbia River (NWPCC 2005). The MFJD River Subbasin contributes approximately 22% of the total run for the basin. Redd counts have displayed wide variability since 1964. Redds per mile have been below ODFW management objectives (5.8 redds per mile) since 2003 (Figure 1). MCR steelhead are widely distributed in the MFJD River Subbasin. Spawning and rearing takes place in all major tributaries of the MFJD River.

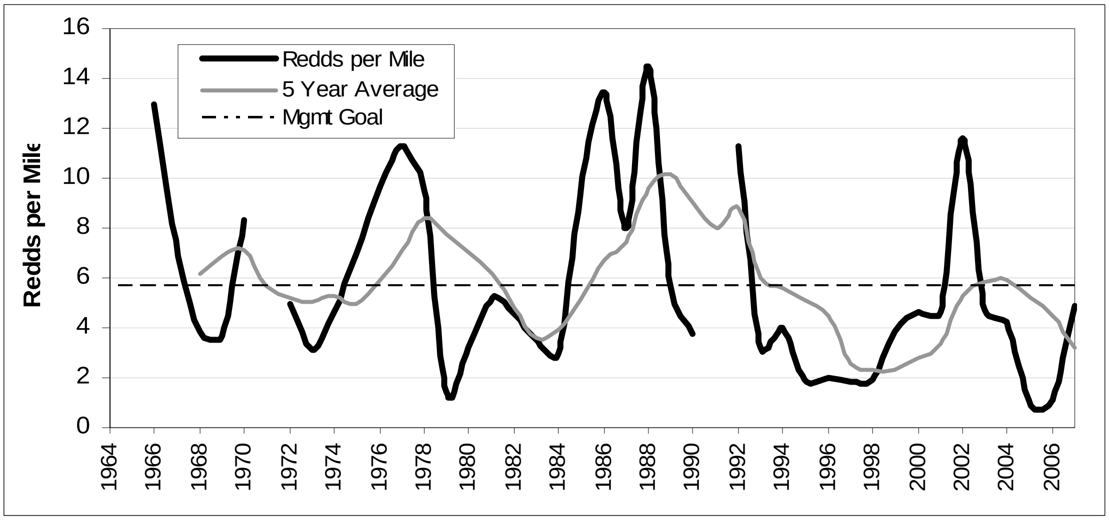


Figure 1. Number of redds per mile for MCR steelhead in the Middle Fork John Day River Subbasin, 1964 to 2007.

Balance Fisheries Analysis Area:

Some spawning may occur in Sunshine Creek during years when water conditions are favorable, however spawning in Balance Creek is unlikely because the stream is captured by an irrigation ditch on private land and does not have a direct connection with the MFJD River in most years. Spawning is unlikely in Dunstan Creek given the gradient at the mouth and small watershed size.

There are about 10.4 miles of steelhead habitat in the fisheries analysis area (Table 7, Figure 2). MCR steelhead utilize the MFJD River for migration, spawning and juvenile rearing habitat (7.3 mi). Spawning and rearing habitat is present in Sunshine Creek (1.8 mi) and potentially Balance Creek (1.3 mi). Juvenile rearing habitat is present on Dunstan Creek (0.2 mi).

Table 7— MCR steelhead (threatened) bearing streams in the fisheries analysis area (taken from GIS)

Stream	Miles (USFS or Private Outside Project area)	Miles (USFS-Project area only)	Habitat Type
MFJD River	7.24	0.79	Rearing, Spawning, Migratory
Balance Creek	1.03	0.25	Rearing, Spawning
Dunstan Creek	*0.2	0	Rearing
Sunshine Creek	0.12	1.68	Rearing, Spawning

*Note: Taken from 1993 Level II stream survey.

Critical Habitat

Critical habitat was designated for the MCR steelhead on February 16, 2000 (65 FR 7764). Critical habitat for MCR steelhead under the 2000 rule encompassed the major Columbia River tributaries known to support the DPS, including the Deschutes, John Day, Klickitat, Umatilla, Walla Walla, and Yakima Rivers, as well as the Columbia River and estuary. Critical habitat consisted of all waterways below long-standing (100 years or more), naturally impassable barriers, including the MFJD River. The adjacent riparian zone was also considered critical habitat. This zone was defined as the area that provides the following functions: Shade, sediment, nutrient/chemical regulation, streambank stability, and input of LWD/organic matter. Protective regulations for MCR steelhead were issued under section 4(d) of the ESA on July 10, 2000 (65 FR 42423).

In late 2000, a lawsuit was filed challenging the NOAA Fisheries Service's February 2000 final designation of critical habitat for ESUs of Pacific salmon and steelhead listed under the ESA. A federal court ruled that the agency did not adequately consider the economic impacts of the critical habitat designations. In April 2002, NOAA Fisheries Service withdrew its 2000 critical habitat designations.

Critical habitat for MCR steelhead was redesignated on September 2, 2005 (70 FR 52630). Under the 2005 rule, Balance Creek (0.4 mi.), Sunshine Creek (2.8 mi.) and the MFJD River (7.4 mi.) have been designated as critical habitat for MCR steelhead. Designated Critical Habitat includes the stream channels within the designated stream reaches, and includes a lateral extent as defined by the ordinary high-water line (33 CFR 319.11). In areas where ordinary high-water line has not been defined, the lateral extent will be defined by the bankfull elevation. Bankfull elevation is the level at which water begins to leave the channel and move into the floodplain and is reached at a discharge which generally has a recurrence interval of 1 to 2 years on the annual flood series.

The primary constituent elements (PCEs) that are essential for the conservation of listed MCR steelhead DPS on the Malheur National Forest are those sites and habitat components that support one or more life stages, including:

(1) Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development;

(2) Freshwater rearing sites with:

- (i) Water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility;
- (ii) Water quality and forage supporting juvenile development; and
- (iii) Natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.

(3) Freshwater migration corridors free of obstruction and excessive predation with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival.

Redband Trout – Affected Environment

Redband trout are a Region 6 sensitive species and a Malheur National Forest management indicator species. Redband trout are the resident form of *O. mykiss*. Redband trout may or may not be reproductively isolated from steelhead. Redband and steelhead trout from the same geographic area may share a common gene pool.

Redband trout are sensitive to changes in water quality and habitat. Adult redband trout are generally associated with pool habitats, although various life stages require a wide array of habitats for rearing, hiding, feeding, and resting. Pool habitat functions as important refugia during low water periods. An increase in sediment lowers spawning success and reduces the quantity and quality of pool and interstitial habitat. Other important habitat features include healthy riparian vegetation, undercut banks and LWD.

Redband trout may reside in their natal stream or may migrate to other streams within a watershed to rear. Habitat requirements are similar for redband trout and juvenile steelhead.

Spawning occurs during the spring, generally from March to June. Redds tend to be located where velocity, depth and bottom configuration induce water flow through the stream substrate, generally in gravels at the tailout area of pools. Water temperatures influence emergence of fry, which is typically from June through July.

Population Status, Distribution and Habitat

Middle Fork John Day Subbasin:

Neither ODFW nor the Forest Service routinely monitors abundance and distribution of redband trout in the John Day Basin. Juvenile *O. mykiss* with resident (redband trout) and anadromous (steelhead) life history types are difficult to differentiate where the two populations coexist, making independent monitoring difficult. At this time, abundance of John Day trout redband populations is unknown. Currently in the John Day Basin, redband trout are present in the North Fork, Middle Fork, Main stem, and South Fork John Day Rivers and their tributaries. Redband trout are present in all fish-bearing streams in the MFJD Subbasin. Summer distribution of redband trout is generally limited to headwater areas.

Balance Fisheries Analysis Area:

There are about 11.0 miles of redband trout habitat in the fisheries analysis area (Table 8, Figure 2). Redband trout utilize the MFJD River for spawning and juvenile rearing habitat (7.3 mi). Spawning and juvenile rearing habitat are present in Balance Creek (1.9 mi), Dunstan Creek (0.2 mi), and Sunshine Creek (1.8 mi). A Region 6 Level II stream survey was completed in 1993 and noted rainbow trout (probably resident redband trout) found upstream from Balance Lake. The redband trout were confined to only 0.2 miles of stream above Balance Lake, and were reported in jeopardy of being lost in 1993. A field scout on October 11, 2007 failed to locate any fish in this 0.2 mile reach of Balance Creek upstream from Balance Lake. It is unknown whether fish exist in Balance Lake or whether that population of rainbow trout observed in 1993 was a result of unauthorized stocking.

Table 8— Redband trout (sensitive) bearing streams in the fisheries analysis area (taken from GIS)

Stream	Miles (USFS or Private Outside Project area)	Miles (USFS-Project area only)	Habitat Type
MFJD River	7.24	0.79	Rearing, Spawning
Balance Creek	1.03	0.86	Rearing, Spawning
Dunstan Creek	*0.2	0	Rearing, Spawning
Sunshine Creek	0.12	1.68	Rearing, Spawning

*Note: Taken from 1993 Level II stream survey.

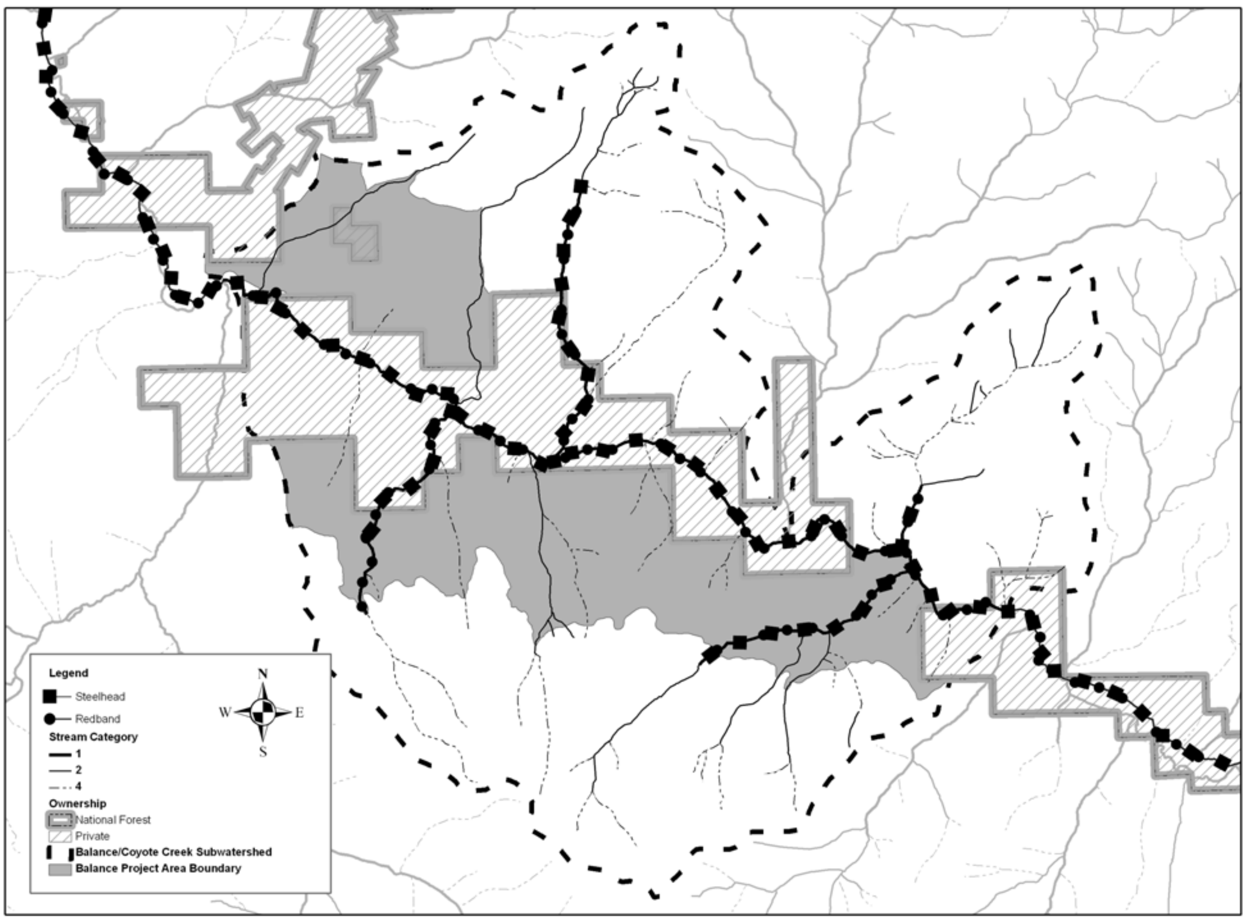


Figure 2. Distribution of steelhead and redband trout in the Balance Fisheries Analysis Area.

Spring Chinook Salmon – Affected Environment

Spring Chinook salmon are a Region 6 sensitive species. Essential Fish Habitat (EFH) for spring Chinook salmon has been designated by NMFS in the fisheries analysis area. Salmon are sensitive to changes in water quality and habitat. Juvenile Chinook salmon are generally associated with pool habitats. An increase in sediment lowers spawning success and reduces the quantity and quality of pool and interstitial habitat. Other important habitat features include healthy riparian vegetation, undercut banks and LWD.

Adult spring Chinook salmon return to the MFJD River during the spring. Adults hold in deep pools during the summer while sexually maturing. Spawning occurs during fall, generally from August through September. Embryos incubate over the winter and emergence occurs the following spring. Juveniles generally rear for one year in freshwater. Juveniles use habitats with slower water velocities (pools, glides, and side channels). Juveniles overwinter in deep pools with abundant cover. Smoltification and emigration to the ocean occurs in the spring of their second year. The ocean rearing phase lasts from 1 to 3 years.

Population Status, Distribution and Habitat

Middle Fork John Day Subbasin:

Spring Chinook salmon runs in the John Day River Basin are composed entirely of native stocks. Spring Chinook salmon are known to be present in seven streams in the Camp Creek Watershed. The MFJD River Subbasin has historically contributed approximately 12% of the total run for the basin. The population has been generally increasing since 1959 but has been declining since 2002 (Figure 3). However, due to the low population size (<500) and current habitat conditions, the MFJD River population would be at risk during any future periods of adverse environmental conditions (NWPPC 2005). Spawning habitat for the MCR spring Chinook is present in the Big Creek, Camp Creek, and Upper Middle Fork John Day River Watersheds. Main spawning areas are located along the MFJD River with minor amounts of spawning occurring in Clear Creek. Juvenile rearing primarily occurs in Squaw Creek, Clear Creek, Granite Boulder Creek, Camp Creek, and the MFJD River downstream to the confluence with the North Fork John Day River.

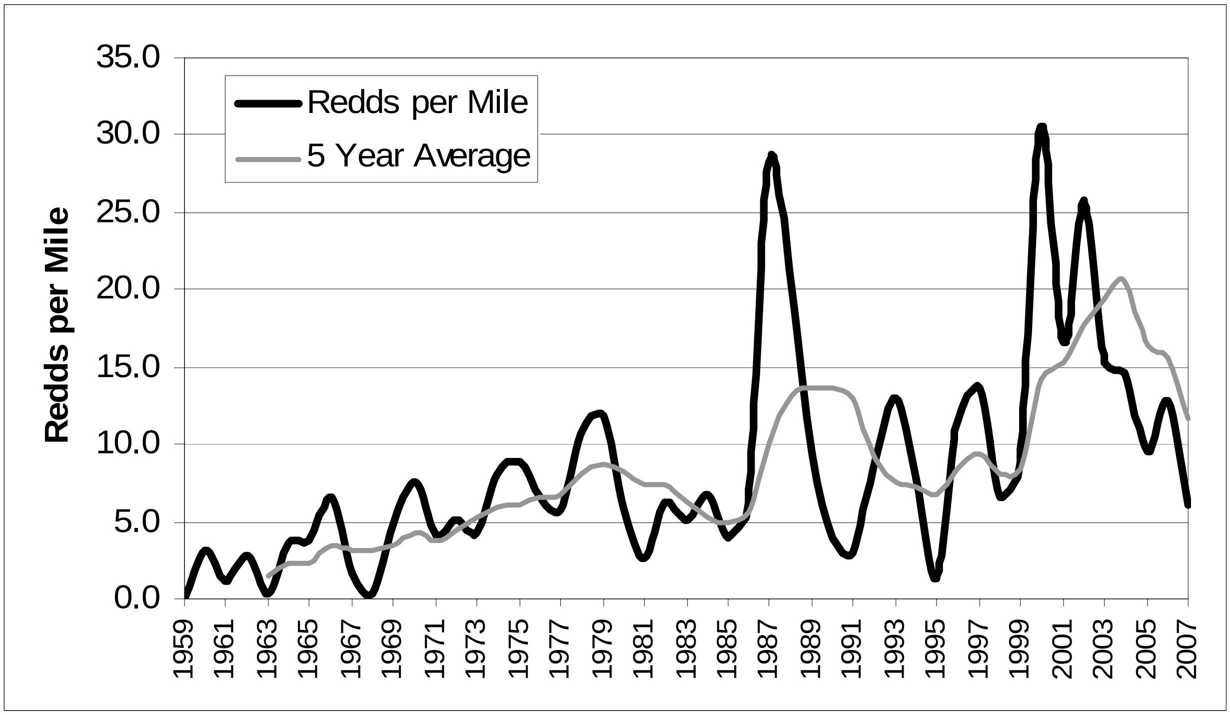


Figure 3. Number of Spring Chinook Salmon Redds per mile in the Middle Fork John Day Subbasin, 1959 to 2007.

Balance Fisheries Analysis Area:

There are about 7.3 miles of spring Chinook spawning and rearing habitat within the MFJD River (Table 9, Figure 4).

Table 9— MCR (ESU) Chinook salmon (sensitive) bearing streams in fisheries analysis area (taken from GIS)

Stream	**Miles(USFS and/or Private)**	**Miles (USFS only)**	**Habitat Type**
MFJD River	7.24	0.79	Rearing, Spawning

A die-off during July 2007 resulted from the combination of high water temperatures (measured up to 84 degrees) and low stream flows (one-third the average during this period) in the MFJD River. Approximately 118 wild adult spring Chinook salmon were found dead near the mouth of Big Boulder Creek and the mouth of Vinegar Creek (ODFWa 2007). Numerous resident rainbow trout and mountain whitefish mortalities were also observed.

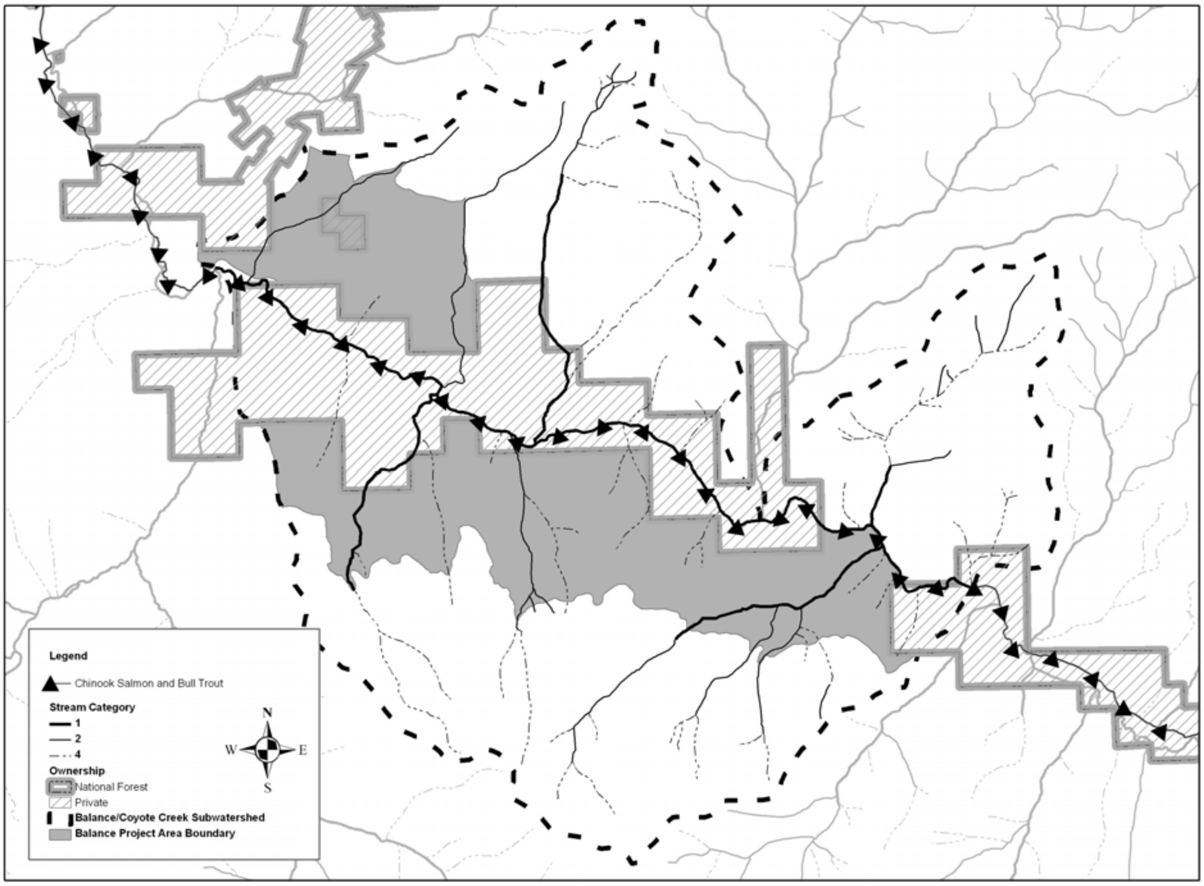


Figure 4. Distribution of spring Chinook salmon and bull trout in the Balance Fisheries Analysis Area

Essential Fish Habitat (EFH)

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104 – 267), requires the inclusion of EFH descriptions in Federal fishery management plans. In addition, the MSA requires Federal agencies to consult with NMFS on activities that may adversely affect EFH. EFH determinations and rationale are included in this section by alternative.

Congress defined EFH as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” The EFH guidelines further interpret the EFH definition as:

1. Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate,
2. substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities,

3. necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem, and
4. “spawning, breeding, feeding, or growth to maturity” covers a species' full life cycle.

Chinook salmon Essential Fish Habitat (EFH) analysis is also included. Public Law 104-267, the Sustainable Fisheries Act of 1996, amended the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) to establish new requirements for “EFH descriptions in Federal fishery management plans and to require federal agencies to consult with the NMFS on activities that may adversely affect EFH. “Essential Fish Habitat means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity” (Magnuson-Stevens Act).

Bull Trout – Affected Environment
Bull trout were listed by the USFWS as threatened under the federal ESA on June 10, 1998 (63 FR 31647). Critical habitat for bull trout was not designated in the analysis area by the USFWS (70 FR 56212). Bull trout are also a Malheur National Forest MIS. The analysis area is located in the John Day bull trout subpopulation area.

Population Status, Distribution and Habitat

Middle Fork John Day Subbasin:

Bull trout in the MFJD Subbasin persist at low abundance levels. In 1999, population surveys were conducted by ODFW, the Malheur National Forest and others in Clear Creek, Big Creek, Deadwood Creek, and Granite Boulder Creek to estimate abundance. Total numbers of bull trout consisting of primarily juvenile and sub-adult fish, were estimated to be 1,950 individuals in Big Creek, 640 individuals in Clear Creek, and 368 individuals in Granite Boulder Creek (Hemmingsen 1999). Four local populations currently exist within the MFJD Subbasin. Local populations include Clear Creek, Granite Boulder Creek, Deadwood and Big Creek (Buchanan et al. 1997). The Malheur National Forest identifies upper Big Boulder Creek, Badger Creek, Indian Creek, and Vinegar Creek as potential habitat for bull trout local populations (potential local populations).

Current distribution in the MFJD Subbasin is based on isolated sightings with the primary distribution restricted to tributaries and limited to 22% of stream miles previously known to support bull trout (Claire and Gray 1993, Buchanan et al. 1997). Summer distribution of bull trout, based on the 1990 and 1992 ODFW Aquatic Inventory Project, indicated bull trout occupy approximately 16 miles of stream in the MFJD Subbasin, including: 5.5 miles in Big Creek, 2.5 miles in Deadwood Creek (a tributary to Big Creek), 4 miles in Granite Boulder Creek; and 4 miles in Clear Creek. Bull trout migration from these tributary streams during the summer is highly unlikely due to high water temperatures and habitat modifications in the MFJD River. Aquatic inventory surveys conducted by the ODFW in 1990 and 1991 detected 60 bull trout in the MFJD River Subbasin; two fish were measured at 260 millimeters (10 inches) and 360 millimeters (14 inches), all others were less than 210 millimeters (8 inches) in length (Buchanan et al. 1997). In the 1999 and 2000 surveys of Clear Creek, eight redds were observed each year (Prairie City Ranger District redd survey data).

Balance Fisheries Analysis Area:

Bull trout are seasonally present in the MFJD River (7.3 mi.). Bull trout use the River as a migration corridor and for winter rearing habitat (Table 10). Bull trout are not present in Balance Creek, Dunstan Creek or Sunshine Creek where habitat is unsuitable. Spawning and summer rearing habitat for bull trout is not present in the analysis area.

Table 10 — Columbia River Basin (DPS) bull trout (threatened) bearing streams in fisheries analysis area (taken from GIS)

Stream	Miles (USFS & Private)	Miles (USFS only)	Habitat Type
MFJD River	7.24	0.79	Winter Rearing, Migratory

Columbia Spotted Frog – Affected Environment

Spotted frogs are highly aquatic and are rarely found far from permanent water. They are usually found along the grassy margins of low gradient streams, lakes, ponds, springs, and marshes.

During winter, spotted frogs burrow into banks adjacent to streams, ponds, and springs. Breeding occurs in the spring varying with elevation. In the Columbia basin of Washington, breeding occurs from March to April in lower elevations, and from May to June in the higher elevations. Breeding habitat is usually found in shallow water in ponds or other quiet waters along streams. Breeding may also occur in flooded areas adjacent to streams and ponds. Adults may disperse overland in the spring and summer after breeding.

Population Status

Condition and Trend of Population:

This species occurs in extreme southeastern Alaska, southwestern Yukon, northern British Columbia, and western Alberta south through Washington east of the Cascades, eastern Oregon, Idaho, and western Montana to Nevada (disjunct, Mary's, Reese, and Owyhee river systems), southwestern Idaho (disjunct), Utah (disjunct, Wasatch Mountains and west desert), and western and north-central (disjunct) Wyoming. Disjunct populations occur on isolated mountains and in arid-land springs. In Oregon, Columbia spotted frogs are widely distributed east of the Cascade Mountains.

USFWS lists livestock grazing and introduction of nonnative fish (salmonids and bass) as threats to the Great Basin population of Columbia spotted frogs (66 FR 1295).

The Columbia spotted frog (*Rana luteiventris*) is on the Regional Forester's Sensitive Species List and is a candidate for Federal listing under the ESA. The spotted frog is considered present in all sub-basins on the Malheur National Forest. It is assumed this species is widely distributed in the MFJD Subbasin. Limited habitat surveys have been conducted specifically for spotted frogs; however, habitat probably exists along low gradient perennial streams. Fish surveys record incidental sightings of frogs but most do not differentiate species. During 1996 fish surveys, spotted frogs were reported in the Vinegar Creek Subwatershed; along Davis and Placer

Creeks. Spotted frogs have also been documented in the MFJD River. In 2003 and 2004, Forest Service personnel conducted spotted frog surveys and spotted frogs were found near the mouth of Camp Creek and in the MFJD River near Camp Creek, and Crawford Creek. Egg masses of spotted frogs were also found in a pond adjacent to Bridge Creek and Highway 26 near Austin Junction.

Habitat in the Analysis Area:

Spotted frogs have been documented in the MFJD River and Camp Creek in the analysis area. Balance Lake and associated wetland appear to be excellent spotted frog breeding and/or overwintering habitat.

VI. Direct, Indirect and Cumulative Effects

Alternative 1 - No Action

Direct and Indirect Effects

Temperature: With no vegetative treatments, haul activities or prescribed burning in riparian areas, there would be no short term effect on water temperature. Riparian areas within this project area are not large enough to act as fire breaks for higher intensity wildfires. Because fuels would remain untreated under this alternative, all streams in the analysis area, except for the MFJD River, with existing conifer or hardwood shading would be at risk for losing shade and incurring increasing summer water temperatures in the future due to an increasing risk, over time, of a high intensity, stand replacement wildfire. Increased width-to-depth ratios from sediment pulses following such a wildfire could raise stream temperatures by increasing the surface area exposed to solar radiation. Additionally, the immediate water temperature increase resulting from a high intensity fire as it burns through a riparian area (over the stream) can lead to direct mortality of fish and spotted frogs. Mean maximum water temperatures are already above the suitable range for salmonids in Dunstan Creek and Balance Creek (Table 4).

Ongoing road maintenance activities located within RHCAs would not reduce existing stream canopy cover so as to adversely affect streamside shading or water temperature. Considering the risk of a high intensity wildfire under the no action alternative, there is the slight potential for adverse direct and indirect water temperature affects to aquatic TES species over the long term.

Sediment: The activities with the highest potential for affecting sediment input to streams are related to road maintenance, or a lack thereof. Road related impacts most likely to contribute high sediment inputs would be plugged culverts leading to washed out road fills, undersized culverts at stream crossings leading to high water velocities and subsequent erosion at culvert outlets, or sediment channeled on road surfaces and routed through road-side ditches and cross-drain culverts to streams. Under this alternative, there would be no road management activities other than routine road maintenance. This can be considered a no effect, or no change from the existing condition, in the short term, however, at existing funding levels road maintenance is not expected to keep up with all needs. This alternative would not do anything to reduce impacts of the existing road system. Therefore it would be expected that sedimentation from existing open and closed roads and some previously decommissioned roads would increase over time, unless other projects are implemented to address these impacts (Recent communication from the Regional Office indicates that funding may be available in the near future to address road conditions and decisions).

The quality of fish habitat could be reduced because fuels would remain untreated under this alternative. A high intensity, stand replacement wildfire could result in a scale and severity of effects that is uncharacteristic of this habitat type. Such a wildfire may transport fine ash, remove soil cover, kill bank-stabilizing plant roots, and potentially increase water run-off rates. The quality of fish habitat would decline until vegetation along burned portions of streams recovered (an estimated 5-10 years). Indirectly, given the risk of a high intensity, stand replacement wildfire under the no action alternative, a higher erosion potential exists for a certain period following such an event. Intense storm events (greater than a six year event) immediately following a wildfire that burned in steep terrain and had large areas of high severity burn may result in concentrated run-off, resulting in more sediment transport directly into fish bearing streams and potentially resulting in increased width-to-depth ratios. This could result in short term adverse affects and a recovery of the stream ecosystem from the effects of fire that is slower, more sporadic, and potentially incomplete, in cases where natural stream processes are already impaired (see below).

As noted by Dunham et al. (2003), the effects of wildfires depend on a variety of factors including their timing, location, area, extent, and intensity. Other factors include the characteristics of the ecosystems and the species affected along with other indirect physical and ecological linkages. While such events can cause short term negative effects, such as those listed below, over long time periods the resulting habitat conditions may be more productive then in areas where natural disturbance has been suppressed (Dunham et al. 2003). Wildfires can have a number of detrimental effects to stream channels such as decreasing stream channel stability, increasing discharge and affecting discharge variability, altering coarse woody debris delivery and storage, increasing nutrient availability, increasing sediment delivery and transport, increasing solar radiation and altering water temperature regimes (Dunham et al. 2003). In cases where natural stream processes are already impaired such as Balance Creek, Dunstan Creek and Sunshine Creek, the recovery of the stream ecosystem from the effects of severe wildfire is likely to be slower, more sporadic, and potentially incomplete (Minshall 2003).

In summary, reductions in shade and increases in sediment load due to past public land management activities is currently recovering and would continue to recover under either alternative, in the absence of a high intensity, stand replacement wildfire. Future impacts from a high intensity, stand replacement wildfire could reach a magnitude of "Likely to Adversely Affect" for MCR steelhead. The short term water temperature increase due to a high intensity fire burning through the riparian area could lead to direct mortality of fish or spotted frogs in the stream(s) at that time. These impacts would not cover a large enough area to result in a WIFV determination for redband trout, Chinook salmon, or Columbia spotted frog (see Table 10 definitions). Due to the fact that none of the Critical Habitat indicators are likely to be degraded under this alternative, but there may be minor affects that are considered insignificant, the Malheur National Forest has made the determination that this alternative is “May Affect, but is Not Likely to Adversely Affect” Mid-Columbia steelhead Critical Habitat and No Adverse Effect to Chinook salmon Essential Fish Habitat (Table 10). Because the MFJD River is migratory habitat for bull trout and they are not likely to be found within this portion of the River during summer months, there will be no direct or indirect effects to bull trout.

Alternative 2 – Proposed Action

Direct and Indirect Effects

Temperature: Timber harvest units, landings, and all temporary roads would be located outside of RHCAs under Alternative 2. Restricting these activities to areas outside of RHCAs would prevent adverse impacts to existing stream shading. RHCA widths are sufficient for Category 1 and 2 streams to prevent removal of trees that provide stream shading. Hand thinning and pile burning is planned for Unit 50, along perennial non-fish bearing reach of Cress Creek. Control lines will be constructed within the RHCA along the private/USFS boundary. However, they will tie into an existing road located just inside the RHCA boundary, the road being located between the treated area and Cress Creek, which is not fish-bearing. Hand thinning, prescribed burning, and limited pile burning is planned for Unit 68, along fish-bearing reach of Sunshine Creek. No thinning would occur within 25 feet of these streams or within bankful channel or lower benches, and trees would not be directionally felled into the no cut zone. Additionally, hand piles in RHCAs will be located at least 50 feet away from live and intermittent stream channels and not in riparian vegetation. Ignition of closely spaced piles (less than 75 ft. apart) in RHCAs will be distributed over a minimum of two years; an alternative schedule of ignition may be implemented after consulting with soil scientist, hydrologist, or fish biologist.
Enhancement of two aspen stands along Sunshine Creek would include felling conifers to reduce shading of and competition with young aspen and protecting regeneration from big game and cattle browsing by installing fencing or placement of the fallen material. Generally conifers would be felled where they interfere with the growth of existing aspen or where they block light from reaching aspen sprouts. Conifers may be preferentially felled across streams under the guidance of a hydrologist or other designated specialist. Felled trees may be used for fencing. Residual slash (limbs and tops) from felled trees would be scattered or piled and burned. Existing large wood debris would be left in place and protected from burning by piling slash away from the debris or by designating ignition locations during prescribed burning. Aspen stands would be fenced to protect regeneration. Felling of conifers along two aspen stands would not result in increases in stream temperature to Sunshine Creek because the two stands total only 0.8 acres and only a few conifers would be felled in each of the two units which could act to shade the stream.

Prescribed fire activities would occur in RHCAs. Burning activities would mimic low intensity fires that are characteristic of natural burning patterns that tend to occur in riparian areas. This technique would result in a patchy distribution of burned and unburned areas in RHCAs based on the Malheur National Forest’s experience with past prescribed burning activities in RHCAs using the same technique. Ignition of prescribed fire is planned within RHCAs on approximately 210 acres and would occur under strict burn prescriptions. In other burn blocks, fire from upslope burning units which is within prescription, would be allowed to back into RHCAs. Design elements include retention of at least 95% of stream shade and a goal of less than 5% actual exposed mineral soil within RHCAs. The prescribed burning would occur when moisture and climate conditions would minimize the potential for a high intensity burn. Although some mortality of overstory trees may occur, loss of shade which could affect stream temperature is not expected to occur. Burning in the ponderosa pine communities along Sunshine Creek is expected to be low intensity and rarely kill trees in this fire adapted community. Longer term beneficial effects could result from increased riparian vegetative vigor, as a result of these low intensity, mosaic burns in riparian areas. In a recent study, Beche et al. (2005) found that a fall prescribed fire within the riparian zone of a mixed-conifer forest in El Dorado County, California was patchy in terms of intensity, consumption, and severity. Additionally they found that although 49.4% of all tagged trees (>11.5 cm/4.5 in.) and snags were scorched by the prescribed fire, only 4.4% of all tagged trees were dead one year after the prescribed fire. In general the trees killed by the prescribed fire were small and located near areas of high litter accumulation (Beche et al. 2005).

Water for application would come from the following designated water sources: Sunshine Creek and Ragged Creek at the FSR 2045 crossing, and Cress Creek at FSR 2000-045 crossing in Section 17. Water withdrawals would be in accordance with the 2005 Malheur National Forest Road Maintenance Biological Assessment (BA) and NMFS guidance (with the exception that drafting would be permitted before sunrise and after sunset). Use of these procedures would ensure that water withdrawals do not result in a measurable increase in water temperatures.

Sediment: Commercial harvest units, landings, and temporary roads would not be located in RHCAs under Alternative 2. Restricting these activities to areas outside of RHCAs would minimize the potential for sediment delivery to fish bearing streams. There would be soil disturbance associated with commercial thinning and other proposed activities, primarily as a result of tractor skidding, and subsoiling of skid trails and landings. The risk of sediment from these activities reaching streams providing fish habitat is negligible, due to the likelihood that sediment will remain within unit boundaries as described in the Soils section of the EA. In most cases sediment generated from these activities, which has the potential to move off-site during rare large storm events, would be captured in the RHCA buffer.

There is also the potential for generating sediment from non-commercial thinning operations and burning hand piles. The risk of sediment from these activities reaching fish habitat is negligible because they do not involve heavy equipment and design elements have been developed to reduce the risk of sediment delivery to streams.

While high intensity prescribed fire has the potential to result in exposed soil, which in turn poses a potential for sediment transport off-site, the design elements for the proposed prescribed burning in this project would minimize that risk. Burn plan prescriptions would include parameters for weather and fuel moisture conditions, percent duff removal, percent mineral soils exposed, and others, which will set the sideboards to keep fire intensity to a level that would not result in soil loss. The ignition and limited use of fire within RHCAs described above would result in a low risk of generating sediment along perennial streams. Fire lines would not be permitted within RHCAs, except for one location along Cress Creek (not fish-bearing) where control lines would tie into an existing road located between Cress Creek and the treatment area; thus reducing the risk of sediment being channeled to intermittent or perennial stream channels. Beche et al. (2005) conducted intense post-prescribed fire monitoring (e.g. pebble counts, longitudinal profiles, cross-sections) and observed little to no change in stream sediment composition 1 year post-fire. Similarly, they observed little to no change in stream channel morphology and no substantial change in erosion or deposition in the surveyed reaches (Beche et al. 2005). The prescribed burning would be expected to burn across Category 4 RHCAs, since these would be dry during the burning operations. However, as mentioned in the Soils section of the EA, because burning would take place so as to avoid decreasing ground cover below Forest Plan standards; the potential for erosion from these areas would not be significant. The potential for some sediment movement in some of these intermittent channels which could reach fish habitat is low, except under rare, intense storm events.

Temporary Road Construction: Approximately 2.5 miles of temporary road are proposed to be constructed on previously decommissioned road beds. These road beds were previously considered authorized roads and have been decommissioned under previous NEPA. None of these previously decommissioned road beds shows signs of sediment transport or unauthorized use and all are currently grassed in to some degree. Temporary roads are not part of the Forest road system, and they would be returned to their existing state after use. Personal observations by the soil scientist indicate that sediment generated from temporary road construction and use would be deposited within 50 feet of the road edge (R. McNeil pers. com). All temporary roads are located entirely outside of RHCAs. Because of the location and design elements for these roads, it is not expected that any sediment generated from the construction, use, or "decommissioning" of these roads, would reach fish bearing streams.

Haul Road Use: There will be an opportunity to perform road maintenance on up to 29.2 miles of Forest roads commensurate with commercial uses associated with project activities. The type of road maintenance activities which may occur on roads used for commercial haul could include:

- Blading and shaping of road surface and ditches
- Construction or reshaping of drain dips or grade sags
- Construction of waterbars/cross ditches
- Spot rocking of road surface
- Brush removal from roadway
- Felling and or removal of hazard trees
- Minor realigning of road junctions
- Cleaning culverts
- Seeding
- Removing excess materials from roadway

Because the maintenance work accomplishments will be commensurate with use, the amount actually accomplished will vary depending on existing road conditions, season of use and other factors. When road maintenance work is accomplished, commensurate with use, it would help to ensure that haul roads are kept in an appropriate condition so as to avoid deterioration of conditions and reduce erosion and sediment output from haul roads.

Approximately 6.1 miles of commercial haul routes are located within RHCAs. Of these 6.1 miles within RHCAs, approximately 2.1 miles are over native surface roads. The Malheur National Forest has a policy (with direction from PACFISH RF-2) to regulate traffic during wet periods to minimize erosion and sediment delivery. This includes log haul, as well as, any other vehicle traffic. Mitigation measures such as dust abatement (mainly for safety reasons), hauling on dry or frozen ground, and ceasing haul activities during muddy conditions are highly effective at minimizing sediment input to streams. Because haul roads would receive pre/during and post haul maintenance, commensurate with use, and the majority of these roads are upstream from fish habitat; the magnitude of haul road use on sedimentation is insignificant, and therefore would result in a neutral effect.

Reopening of Closed Roads: Approximately 5.9 miles of currently closed roads would be opened for timber harvest and then effectively re-closed after project activities are concluded. Of these 5.9 miles to be opened, approximately .5 miles are located within RHCAs. These closed roads were previously analyzed to derive subwatershed road densities under baseline condition. The baseline condition of these roads was considered to be similar to open roads, with respect to the level of vegetation recovery, even though two of these roads have grown-in to varying degrees with grass (2000983) and reprod (2000083).

Reopening these closed roads would not change road densities already analyzed under the baseline. Road densities and roads in close proximity to streams would remain at detrimental levels within the subwatershed.

As mentioned in the Watershed section of the EA, Best Management Practices associated with the proposed activities are expected to control most run-off and sediment transport under common run-off events. However, because the proposed activities would be implemented in sub-drainages which have been previously disturbed by management activities, including roading at densities in excess of five miles/square mile within the Project Area (Table 6), a slight probability exists that previous disturbance would become connected to ground disturbance associated with the proposed actions.

The magnitude of reopening closed roads on sedimentation is insignificant, and therefore would result in a neutral effect for the following reasons: 1) reopened roads would receive pre/during and post haul maintenance, commensurate with use, and would be effectively reclosed after use, and 2) the majority of these reopened roads (5.4 miles) are not located in RHCAs and only one section (<0.1 miles) of reopened road is located within the RHCA of Sunshine Creek.

Road Maintenance: Roads used within the sale area would receive road maintenance at a level commensurate with use. Road maintenance includes several activities that potentially result in sedimentation from the road prism to the ditch line, or the adjacent slope. Typical road maintenance activities could include: blade and shape road including existing drainage dips, grade sags, and waterbars, repair damaged culverts, place rock in some existing drainage dips and grade sags, place rock in wet areas of road, brushing, remove hazard trees, and dust abatement.

Project design elements and protective measures from the 2005 Malheur National Forest Road Maintenance BA would be followed for the replacement, removal, or installation of ditch-relief culverts.

The longer term effects of road maintenance, commensurate with use, are to maintain or improve existing road conditions. Road maintenance, commensurate with use, may decrease chronic sedimentation in some locations. Improving drainage, removing ruts and rills from the driving surface, and adding less erosive surfacing material would reduce detachment and transport of sediment. This is especially important for roads within RHCAs. Because road maintenance activities would be commensurate with use, it is possible that if winter logging occurs, little to no road maintenance may be necessary and therefore would not occur. Alternatively, if operations occur in the summer, road maintenance, commensurate with use, may occur on all or nearly all of the roads.

The overall effect of the proposed action to the baseline conditions of sediment is that the negligible effects over the short or long term would be insignificant to measurably increase the baseline levels of sediment in spawning habitat of MCR steelhead, Chinook salmon and redband trout.

Chemical Contaminations/Nutrients: The Forest Service would require the purchaser to adhere to all requirements within the timber sale contract related to oil spills and hazardous substances. Refueling and fuel storage sites would be located at least 150 feet away from live streams. Other chemicals used may include saw gas and oil, and fuels used to ignite fires. All have the potential to adversely affect aquatic TES species, if they were to enter nearby stream systems. Handling procedures and spill plans would minimize the risk of potential effects. In the event of the need for fire suppression actions, no chemicals or retardant would be used within 300 feet of water or wetlands. There is minimal risk of an accidental spill from logging equipment, vehicles used to transport crews, equipment, ignition materials, or fire suppression activities in the event of an escaped prescribed burn.

Beche et al. (2005) found that ash deposition from the prescribed fire appeared to have a minimal impact on stream water chemistry with increases in some water chemistry parameters (SO4-, total P, CA2+, and Mg2+). It should be noted that their study area had low to moderate hillslopes and so accelerated erosion and ash delivery would not be expected. It might be expected that these same water chemistry parameters would also increase with the proposed prescribed burning in this alternative, at least temporarily.

Dust abatement procedures would adhere to the Road Maintenance Specification in the Dust Abatement plan. Only water would be used for dust abatement, as needed, during periods of heavier vehicle use associated with commercial timber harvest activities and/or rock haul activities. Water for application would come from the following designated water sources: Sunshine Creek and Ragged Creek at the FSR 2045 crossing, and Cress Creek at FSR 2000-045 crossing in Section 17. Because handling procedures, refueling restrictions and spill plans would be in place and there is a low probability of a fuel spill when lighting in RHCAs, there is a neutral effect of the project to streams from chemical or nutrient contamination. No change to baseline levels of nutrients or chemical contaminants are expected.

Large Woody Debris (LWD): Approximately 6.1 miles of commercial haul routes are located within RHCAs. Felling of danger trees for human safety along haul routes in RHCAs has the potential to reduce the supply of LWD to stream channels and therefore pool habitat. Under PACFISH, trees may be felled in RHCAs when they pose a safety risk (PACFISH Standard RA-2). All trees felled in RHCAs for safety reasons would be kept on site in accordance with PACFISH Standard RA-2 to meet woody debris objectives. Proposed road maintenance, road reconstruction and/or haul activities would not likely result in a reduction of LWD to Category 1, 2 or 4 stream channels because in most cases, trees that can only safely be felled across the road, often have a lean away from the stream channel and would be less likely to fall into stream channels where they could function in the formation of pools and/or contribute coarse particulate organic matter directly to the stream.

Prescribed fire activities would occur in RHCAs. Burning activities would mimic low intensity fires that are characteristic of natural burning patterns in riparian areas. This technique would result in a patchy distribution of burned and unburned areas in RHCAs. Using these techniques, mortality of understory trees may occur in burned patches but few overstory trees would be killed. Fire intensities would not be high enough to consume trees or downed wood large enough to function as LWD (> 20” dbh) in stream channels therefore burning activities would not result in a reduction of pool habitat. Consumption of coarse wood near stream channels greater than 4”dbh would be minimized. Beche et al. (2005) found that prescribed fire did not change the amount or movement of LWD in their study reach relative to unburned streams. They did note, however, that in other less intensely studied reaches snags fell into the stream channel.

There is a neutral or slightly positive effect to LWD and its recruitment from the project because instream wood will not be physically removed from RHCAs where it has the potential to fall into live streams, snags may fall into streams as a result of prescribed fire activities, and as a result of aspen treatments along Sunshine Creek LWD may be felled into the stream. Some roadside danger trees may be felled into stream channels, ephemeral draws or floodplains, and the reduction in stocking densities following burning activities may increase the vigor of larger trees in the overstory.

Summary

In summary, the risk of sediment from proposed activities reaching streams providing fish habitat is negligible, due to the likelihood that sediment will remain within unit boundaries as described in the Soils section of the EA, the fact that all temporary roads would be located outside of RHCAs, and the likelihood that sediment generated from temporary road construction and use would be deposited within 50 feet of the road edge. In most cases sediment generated from proposed activities, which has the potential to move off-site during rare large storm events, would be captured in the RHCA buffer.

The effects determination for Alternative 2 is “May Affect, but is Not Likely to Adversely Affect” Mid-Columbia steelhead and steelhead Critical Habitat, “No Effect” to bull trout, “No Adverse Effect” to Chinook salmon Essential Fish Habitat, the effects determination to Chinook salmon is No Impact, and the effects determination to redband trout and spotted frog is “May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species” (see Table 1).

Cumulative Effects

Higher level effects are mostly due to roads, including former logging roads (some of which are currently decommissioned, however are producing sediment), past grazing, and past riparian harvest. Lesser effects (sediment) may be due to the recent culvert replacement on County Road 20, from channel restoration activities on private land immediately upstream of the fisheries analysis area, and private land grazing adjacent to the project area.

The aquatic habitat and water quality effects of future activities described in Appendix C of the EA are negligible, except for the short-term effects from the actions mentioned in the preceding sentence. The effects of use and maintenance of roads which are not decommissioned would remain about the same as at present. The effects of County Road 20 culvert replacement and channel restoration in the MFJD River would start to decrease in 2008, and would be negligible by 2010.

Either alternative would permit natural slow, partial recovery from effects of past grazing, past riparian road construction, and past riparian harvest. This recovery would occur as riparian trees grow larger, as large wood falls into the streams, as channel types change to more stable, narrow configurations, as sediment from past actions is washed out, and as riparian shrubs and herbs recover and contribute to more stable stream banks. Recovery would be only partial because ongoing impacts from some existing roads would not permit full recovery. Intermittent flow in Balance Creek and very low flow in the perennial reaches of Dunstan Creek and upper reaches of Sunshine Creek are limiting factors for fish habitat.

The current grazing standards are designed to eliminate any effects on aquatic habitats that could carry over to the following year. There is no cumulative effects from current grazing practices within the USFS portion of adjacent allotments.

If a severe crown fire occurs, shade would be reduced, and water temperatures would increase. Sediment would increase from channel and upland sources, and a pulse of woody debris would fall into the analysis area streams. Both low flows and peak flows would increase for perhaps 10 years, until evapotranspiration recovers.

Alternative 1 – No Action

Under the No Action Alternative, there would be no management activities associated with the fuels treatments, commercial and precommercial thinning in the project area; therefore, there would be no direct effects to aquatic species. This would eliminate the need for construction of landings, temporary roads and felling of danger trees. It would also eliminate the need for haul activities including water withdrawals for dust abatement. Road maintenance activities if performed on a regular basis would help to ensure that culverts are cleaned out and maintained, waterbars and other drainage features are properly constructed and maintained, and would result in reduced levels of fine sediment entering streams within the analysis area. It would be expected that sedimentation from existing roads would increase over time, unless other projects are implemented to address these impacts. No funding has been available to improve the conditions of these roads for the last several years and while funding was projected to decrease, recent communication from the Regional Office indicates that funding may be available in the near future to address road conditions and decisions.

The hazard of a severe crown fire is higher, as described in the EA (Fire and Fuels section of Chapter 3). Most of the forested stands in the project area are identified as moderate to high risk for stocking induced mortality and related infestation of pests or disease. Without silvicultural treatment and/or the controlled re-introduction of fire into the project area, current stand conditions would worsen and increase the chance of a stand replacement fire. A stand replacement wildfire would result in the loss of shading along stream channels, loss of instream wood structures, and relatively short-term (5 to 10 years) loss of streamside vegetation. This could adversely affect fish habitat in Balance Creek and Sunshine Creek. In addition, localized extirpation of these fish could occur as the result of severe wildfires (Rinne 1996).

Alternative 2 – Proposed Action

Under Alternative 2 the hazard of a severe crown fire is lower than under Alternative 1, as described in the Fire and Fuels section of Chapter 3.

Under the proposed action, commercial/pre-commercial thinning, log and rock haul, prescribed burning, and road maintenance may result in negligible increases in fine sediment, however it is unlikely that these increases would result in cumulative adverse effects when combined with other past, ongoing, or future actions.

Short-term increases in fine sediment from prescribed burning is unlikely to result in measurable increases in fine sediment in stream channels. Timber harvest units, landings, and all temporary roads would be located outside of RHCAs under Alternative 2. Restricting these activities to areas outside of RHCAs would prevent adverse impacts to existing stream shading and reduce the chance of sediment input to streams.

Of the activities proposed under this alternative, only prescribed burning, pile burning, limited pre-commercial thinning, and certain road maintenance and haul activities could affect sediment input to fish bearing streams. All other activities would occur outside of RHCAs, and associated buffering should be sufficient to trap any mobilized soil resulting from external ground disturbance. Prescribed burning, as described in the direct and indirect effects section, could creep down to streams and remove soil cover and although ground cover would decrease, especially during fall burns, effects from prescribed burning would be minor. Burning would take place so as to avoid decreasing ground cover below Forest Plan standards, so erosion would not be significant (see Soils section of the EA). As a result, the cumulative increase in sediment would likely be brief and not measurable. Consequently no cumulative effects on Balance Creek, Dunstan Creek, Sunshine Creek or the MFJD River are expected to develop from the proposed activities following common run-off events.

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APPENDIX A – General Water Drafting Guidance for Road Maintenance and Non-emergency Fire Use for Watersheds with Anadromous Fish in the Blue Mountain Tri-Forest Area (H3)

Within the Blue Mountain Tri-Forest area (Malheur National Forest, Umatilla National Forest, and Wallowa Whitman National Forest), water drafting regularly occurs to accomplish road maintenance activities as well as control fires. Because of the wide distribution of Endangered Species Act (ESA) listed anadromous salmonids within the Tri-Forest area, and frequency of drafting water for Federal activities, there is potential for water drafting activities interfering with ESA listed anadromous salmonids. This is particularly true in northeast Oregon where streams used for water are small and support ESA-listed anadromous salmonids.

Water drafting for road maintenance activities can happen at any time of the year, though the largest water withdrawals typically occur in spring. Water is used to soften soil for road shaping, grading, and rocking. These activities usually involve tanker trucks ranging from 500 gallons to 3500 gallons which fill their tanks from local surface water sources and distribute water on roads as they drive. Most tankers used for this application are equipped with power take off (PTO) pumps which are powered by the vehicles engine. PTO pumps for these types of tankers typically range from about 150 gallons per minute (gpm) (approximately 0.3 cubic feet per second (cfs)) to about 550 gpm (approximately 1.2 cfs) and are often not capable of varying pump rates. Because these types of pumps are capable of removing large volumes of water at high rates, and streams available for water drafting are often small, it is important to avoid or minimize the potential to harm or harass ESA listed anadromous salmonids.

Water drafting for prescribed fire use can vary from use of small pumps (less than 40 gpm/ 0.1 cfs) for direct use with hoses to larger pumps as described above for filling tanks or water tenders.

Regardless of pump rate, physical damage to redds, spawning adults, or juveniles can occur from incorrect placement of water drafting equipment. Proper equipment handling and placement in sensitive areas is important to reduce the likelihood of direct harm of ESA listed anadromous salmonids.

This document provides guidance for water drafting activities mainly associated with road maintenance and non-emergency fire suppression activities in the Blue Mountain Tri-Forest area (Umatilla, Malheur, and Wallowa Whitman National Forests). The goal is to create an understandable and workable protocol that will allow water drafting to occur while avoiding or minimizing risks to Endangered Species Act (ESA) listed fish.

The following guidance is intended to minimize or avoid adverse effects to listed fish in the Blue Mountain Tri-Forest area when engaging in water drafting activities. As with any activity, site specific or project specific information may require more stringent or relaxed criteria to avoid adverse effects. In addition, compliance with these criteria may not minimize adverse effects to avoid take of listed fish in all cases, and therefore does not preclude the need for consultation. Projects will be reviewed on a case by case basis to ensure that guidance is reasonable, prudent, and adequately avoids or minimizes adverse effects to listed species.

1. Any intake used for drafting water will be screened according to NOAA Fisheries Juvenile Fish Screen Criteria For Pump Intakes for salmonid fry (see Appendix B).

2. Non-stream water (i.e. ponds) sources will be used prior to the use of stream sources whenever feasible.

3. When non-stream sources are unavailable, streams with the greatest flow will be used whenever feasible.

4. Water withdrawal will not reduce stream flow by more than 1/10th. In order to accomplish the lowest reduction of flow from marginal water sources (sources in which water drafting will reduce flows by more than 5%), the lowest drafting rate on pumps that have adjustable draft rates, and the smallest volume tender appropriate for the project will be used. Whenever feasible, marginal water sources will be avoided.

5. During drafting, streams will be monitored for reduced flows. If a flow concern is identified, operators will reduce pumping rates to ensure that flow reduction is not more than 1/10th of the existing stream flow is being removed or discontinue drafting.

6. If marginal water sources are used, withdrawal from single marginal sites will be limited to 18,000 gallons per day.

7. No more than one high-volume pump per site will be used, except sites in which the use of multiple pumps will not measurably decrease stream flows.

8. To avoid disturbing fish that may be spawning, No drafting will occur from any pools which contain adult salmonids.

9. Operators will avoid direct effects to redds or pre-emergence alevins by placing the intake hose in the deepest part of a drafting pool (where redds are unlikely to be present) and will avoid placing equipment on areas that redds are known or suspected to be. Operators will also ensure that tailout areas of pools that are known or suspected to have redds will not be dewatered.

10. Blading, shaping, aggregate placement, and dust control should be performed in spring and early summer when flows are high, to take advantage of available road soil moisture content to minimize the need for water drafting. Exceptions during the low-flow period will be limited to roads receiving heavy summer through fall traffic creating hazardous road surface conditions that require maintenance for human safety reasons. Essential maintenance during low-flow conditions will be deferred, when possible, until fall precipitation reduces the need for water drafting. Spring and fall blading and shaping will minimize demands for water usage, will minimize dust production, and will reduce sediment generated from surface erosion.

11. NOAA Fisheries may periodically review drafting activities to ensure that these measures are adequate for the protection of listed fish.

APPENDIX B – NMFS Juvenile Fish Screen Criteria for Pump Intakes

Developed by:
National Marine Fisheries Service
Environmental & Technical Services Division
Portland, Oregon
May 9, 1996

The following criteria serve as an addendum to current National Marine Fisheries Service gravity intake juvenile fish screen criteria. These criteria apply to new pump intake screens and existing inadequate pump intake screens, as determined by fisheries agencies with project jurisdiction.

Definitions used in pump intake screen criteria

Pump intake screens are defined as screening devices attached directly to a pressurized diversion intake pipe. Effective screen area is calculated by subtracting screen area occluded by structural members from the total screen area. Screen mesh opening is the narrowest opening in screen mesh. Approach velocity is the calculated velocity component perpendicular to the screen face. Sweeping velocity is the flow velocity component parallel to the screen face with the pump turned off.

Active pump intake screens are equipped with a cleaning system with proven cleaning capability, and are cleaned as frequently as necessary to keep the screens clean. Passive pump intake screens have no cleaning system and should only be used when the debris load is expected to be low, and

1. if a small screen (less than 1 CFS pump) is over-sized to eliminate debris impingement, and
2. where sufficient sweeping velocity exists to eliminate debris build-up on the screen surface, and
3. if the maximum diverted flow is less than .01% of the total minimum streamflow, or
4. the intake is deep in a reservoir, away from the shoreline.

Pump Intake Screen Flow Criteria

The minimum effective screen area in square feet for an active pump intake screen is calculated by dividing the maximum flow rate in cubic feet per second (CFS) by an approach velocity of 0.4 feet per second (FPS). The minimum effective screen area in square feet for a passive pump intake screen is calculated by dividing the maximum flow rate in CFS by an approach velocity of 0.2 FPS. Certain site conditions may allow for a waiver of the 0.2 FPS approach velocity criteria and allow a passive screen to be installed using 0.4 FPS as design criteria. These cases will be considered on a site-by-site basis by the fisheries agencies.

If fry-sized salmonids (i.e. less than 60 millimeter fork length) are not ever present at the site and larger juvenile salmonids are present (as determined by agency biologists), approach velocity shall not exceed 0.8 FPS for active pump intake screens, or 0.4 FPS for passive pump intake screens. The allowable flow should be distributed to achieve uniform approach velocity (plus or minus 10%) over the entire screen area. Additional screen area or flow baffling may be required to account for designs with non-uniform approach velocity.

Pump Intake Screen Mesh Material

Screen mesh openings shall not exceed 3/32 inch (2.38 mm) for woven wire or perforated plate screens, or 0.0689 inch (1.75 mm) for profile wire screens, with a minimum 27% open area. If fry-sized salmonids are never present at the site (by determination of agency biologists) screen mesh openings shall not exceed 1/4 inch (6.35 mm) for woven wire, perforated plate screens, or profile wire screens, with a minimum of 40% open area.

Screen mesh material and support structure shall work in tandem to be sufficiently durable to withstand the rigors of the installation site. No gaps greater than 3/32 inch shall exist in any type screen mesh or at points of mesh attachment. Special mesh materials that inhibit aquatic growth may be required at some sites.

Pump Intake Screen Location

When possible, pump intake screens shall be placed in locations with sufficient sweeping velocity to sweep away debris removed from the screen face. Pump intake screens shall be submerged to a depth of at least one screen radius below the minimum water surface, with a minimum of one screen radius clearance between screen surfaces and adjacent natural or constructed features. A clear escape route should exist for fish that approach the intake volitionally or otherwise. For example, if a pump intake is located off of the river (such as in an intake lagoon), a conventional open channel screen should be considered, placed in the channel or at the edge of the river. Intakes in reservoirs should be as deep as practical, to reduce the numbers of juvenile salmonids that approach the intake. Adverse alterations to riverine habitat shall be minimized.

Pump Intake Screen Protection

Pump intake screens shall be protected from heavy debris, icing and other conditions that may compromise screen integrity. Protection can be provided by using log booms, trash racks or mechanisms for removing the intake from the river during adverse conditions. An inspection and maintenance plan for the pump intake screen is required, to ensure that the screen is operating as designed per these criteria.

Balance Thinning and Fuels Reduction Project

Wildlife Biological Evaluation (BE) for Threatened, Endangered, and Sensitive (TES) Species

Malheur National Forest
Blue Mountain Ranger District
Grant County, Oregon

Prepared by: __________________ Date:________________

Suzanne Grayson
Blue Mountain District Wildlife Biologist

INTRODUCTION

PROJECT NAME: Balance Thinning and Fuels Reduction Project

FOREST/DISTRICT: Malheur National Forest/Blue Mountain Ranger District

SUB-BASIN/WATERSHED: Middle Fork John Day/Camp Creek

SUBWATERSHED: Coyote Creek/Balance Creek

LEGAL DESCRIPTION: T.11S. R.35E.Sections 10, 15 and 16.

MANAGEMENT AREA: MA_1 General Forest, MA-2 Rangeland, MA-3b Anadromous Riparian Area, MA-4a Big Game Winter Range, MA-13 Old-growth, MA-14 Visual Corridor,

PROJECT DESCRIPTION:

The Balance Thinning and Fuels Reduction project area comprises approximately 3,530 acres. The project proposes to treat (thin and burn) approximately 1290 acres. The Proposed Action is designed to reduce the fire hazard and improve forest health in the Project Area by reducing fuels and modifying the spatial distribution of the fuels in the three fuel layers. A variety of mechanical vegetation treatments are prescribed to reduce the fire hazard and to promote forest health;

- Commercial/Precommercial Thinning - 734 acres
- Precommercial Thinning to 9" DBH – 355 acres
- Precommercial Thinning to 7" DBH – 99 acres
- Thinning around Large Trees – 90 acres

All proposed thinning—both noncommercial and commercial—would be conducted using thinning from below methods, which remove mainly lower- or mid-level trees to reduce ladder fuels, increase the crown base height while also favoring and redistributing growth potential to upper-level large trees. Trees to be removed would be those currently contributing to crown-fire potential, up to a size limit of 21 inches in diameter at breast height (DBH). The thinning would retain an increased proportion of fire-resilient species such as ponderosa pine, while still maintaining a variety of native tree species currently present. Thinning around Large Trees is designed to enhance individual old-growth trees by removing understory trees that are ladder fuels into the crowns of the large trees. This will also improve the health and vigor of the large trees by reducing the competition for water and nutrients. A limited number of trees larger than 21 inches DBH may be removed if necessary for temporary road development, hazard tree removal, or log landings, as provided by current policy.

Approximately 142 acres of precommercial thinning within Riparian Habitat Conservation Areas (RHCAs) would occur in portions of units 50, 60, 64, 68, 72, and 74. The RHCAs are being thinned with the objectives of reducing the fire hazard and improving the health and resiliency of riparian stands. All thinning and fuel treatment would be by hand, with no ground disturbing machinery permitted in the RHCAs.

Prescribed burning would occur on approximately 1,934 acres. Prescribed underburning unit boundaries were developed incorporating concerns of resource specialists and collaborators. This included excluding fire from Dedicated Old Growth, specific RHCAs, and areas identified as important for big game security. There are two objectives of prescribed burning with this project as described below which address all or some of the following burning objectives; reduce surface fuels, reduce litter and duff depth, and increase canopy base height. Approximately 650 acres will have mechanical treatments before under burning. Burning would be accomplished in the spring and fall seasons when weather and moisture conditions are appropriate. Ignition would be by hand or by ATVs. Multiple prescribed burning entries may be needed to reduce the ladder and surface fuels to reach the desired fuel composition and conditions for maintenance burning. These prescribed burn entries will be accomplished over the next 10 years.

Control lines may include the use of roads, the use of natural features, fire line construction by hand or ATV, black line construction, (creating a wide black line by burning along the boundary when there is higher moisture content), wet-line construction, or use of weedeaters to create mow lines. Approximately 11 miles of constructed fire line would be needed to implement the prescribed burning.

The objectives of utilizing prescribed fire are to reduce surface fuels, reduce litter depth, and increase canopy base height. Prescribed fire is not being utilized to change the structural stage of any the stands. Some tree mortality is expected and acceptable in forested stands. Acceptable mortality ranges are as follows:

- Trees 0–5 inch dbh, tree mortality is acceptable from a range of 5 to 35% but expected to be 5-15%.
- Trees 5–10 inch dbh, tree mortality is expected to range from 5 to 10%.
- Trees 10–20+ inches and larger dbh, tree mortality is acceptable from a range from 1 to 5%, but expected to be 1-2%.

These mortality levels are based on averages over the whole burning area and recognize the fact that fire is a relatively inexact tool and that there would be some localized areas where mortality reaches 100% in trees less then 10 inches. Mortality patches should be kept to less than 2 acres wherever possible and preferably to the ¼ to ½ acre size, in stands that have not had previous mechanical treatments that were thought to exist under historic conditions (Agee, 1993).

Ten aspen stands are proposed for treatment for a total of approximately 8.5 acres. Treatments would enhance aspen by falling conifers to reduce shading and fencing the stands to protect regeneration from big game and cattle browsing.

BIOLOGICAL EVALUATION (BE)

This Biological Evaluation (BE) analyzes the potential effects of the proposed action for the Balance Thinning and Fuels Reduction project on the Malheur National Forest.

This BE satisfies the requirements of Forest Service Manual 2672.4 that requires the Forest Service to review all planned, funded, executed or permitted programs and activities for possible effects on proposed, endangered threatened or sensitive species.

The following sources of information have been reviewed to determine which TES species, or their habitats, occur in the project area:

- Regional Forester's Sensitive Species List
- Forest or District sensitive species databases(s) and the GIS mapping layer(s)
- Oregon Natural Heritage Program, Rare, Threatened, and Endangered Plants and Animals of Oregon

- Project area maps and aerial photos.

PRE-FIELD REVIEW: The following table displays the threatened, endangered and sensitive (TES) species considered in the analysis of the Balance Thinning and Fuels Reduction Project.

Species	Scientific Name	Status	Occurrence	Effects Determination
Terrestrial Species				
Gray Wolf -De-listed	*Canis lupus*	S	HD/N	NI
Northern Bald Eagle De-listed	*Hailaeetus leucocephalus*	S	HN/S	NI
North American Lynx	*Lynx canadensis*	T	HN/N	NE
American Peregrine Falcon	*Falco perigrinus anatum*	S	HN/N	NI
California Wolverine	*Gulo gulo luteus*	S	HN/N	NI
Pygmy Rabbit	*Brachylagus idahoensis*	S	HN/N	NI
Pacific Fisher	*Martes pennanti*	S	HN/N	NI
Gray Flycatcher	*Empidonax wrightii*	S	HN/N	NI
Bobolink	*Dolichonyx oryzivorus*	S	HN/N	NI
Upland Sandpiper	*Bartramia longicauda*	S	HN/N	NI
Tricolored Blackbird	*Agelaius tricolor*	S	HN/N	NI
Bufflehead	*Bucephala albeola*	S	HN/N	NI
Columbia Spotted Frog	*Rana lueteiventris*	S/C	HD/S	NI*
*Effects discussion for Columbia Spotted Frog is in the Aquatics BE				

Status

E	Federally Endangered
T	Federally Threatened
S	Sensitive species from Regional Forester's list
C	Candidate species under Endangered Species Act

Occurrence

HD	**Habitat Documented** or suspected within the project area or near enough to be impacted by project activities
HN	**Habitat Not** within the project area or affected by its activities
D	Species **Documented** in general vicinity of project activities
S	Species **Suspected** in general vicinity of project activities
N	Species **Not documented** and not suspected in general vicinity of project activities

Effects Determinations - Threatened and Endangered Species

NE	No Effect
NLAA	May Effect, Not Likely to Adversely Affect
LAA	May Effect, Likely to Adversely Affect
BE	Beneficial Effect

Effects Determinations - Sensitive Species

NI	No Impact
MIIH	May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species
WIFV	Will Impact Individuals or Habitat with a Consequence that the Action May Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species
BI	Beneficial Impact

Designated or proposed critical habitat for Threatened or Endangered species in affected subwatersheds: yes___ no_X__

Project is compliant with any applicable species recovery plans, management plans, etc.: yes___no___n/a_X__

Field reconnaissance required: yes_X_ no___

FIELD RECONNAISSANCE: In late Summer of 2007, I conducted three field visits to look at wildlife use in riparian and old growth habitats and second growth stands in the project area. Forest Service databases (wildlife observations, and surveys, etc.) and GIS layers were used to make these determinations**.** Models used for analysis: HEI and INFORMS

PROTECTION MEASURES:

In addition to the three relevant laws pertaining to wildlife management (the National Forest Management Act of 1976 (NFMA), the Endangered Species Act of 1973 (ESA), and the Migratory Bird Treaty Act (MBTA) of 1918 the 1995 Regional Forester's Eastside Forest Plans Amendment 2 is included. This amendment establishes interim wildlife standards for old growth, old growth connectivity, snags, large downed logs, and northern goshawks.

TES SPECIES/HABITAT PRESENCE:

The proposed project area was evaluated to determine which TES species might occur based on the presence of probable habitat types, known sightings and the biological requirements of each species involved.

Bald eagles (de-listed, 8 August, 2007 but still protected under the MBTA and The Bald and Golden Eagle Protection Act) have been sighted along the Middle Fork of the John Day River and probably forage there during the winter as long as carrion is present and available. Temporary winter roosts are possible within the surrounding area, but none have been documented. In 2001, wildlife biologists identified the first suspected bald eagle nest to be located on the Blue Mountain Ranger District. The nest site is located about five miles west of the project area; it is believed the nest failed to fledge young in 2001 and has not been used by bald eagles since. However, golden eagles used the nest in 2003 and have not been used by either the bald or golden eagle since. The nest site is monitored annually.

The project area is located approximately 2 miles south of the Indian Rock Lynx Analysis Unit (LAU). Although the project area is not in the LAU, the project area could provide potential dispersal/travel and foraging habitat for large, wide-ranging carnivores including the Canada lynx, gray wolf and California wolverine. Canada lynx and gray wolf would be considered rare visitors to the area; wolverine may use the area for dispersal/travel or foraging habitat between unroaded areas, but no sightings have occurred in the project area or surrounding analysis area. However, there have been no formal surveys conducted.

B. Terrestrial Species

The proposed project area was evaluated to determine which TES species might occur based on the presence of probable habitat types, known sightings and the biological requirements of each species involved.

B.1 Listed Species

Bald Eagle (*Haliaeetus leucocephalus)*

Status-delisted, changed to Sensitive status, but still protected.
8 August, 2007

Environmental Baseline:

Bald eagles prey largely on fish and, to a lesser extent, waterfowl and are usually associated with rivers or lakes. Habitat includes clean water with abundant fish and/or waterfowl populations, and large, wolfy perch trees and roost sites nearby. In the Pacific Northwest, bald eagle nests are usually in multistoried, predominantly coniferous stands with old growth components near water bodies which support adequate food supply (U.S. Dept. Interior 1986). They usually nest in the same territories each year and often use the same nest repeatedly which can result in very large nest structures, 2-3' deep and up to 5' in diameter. They will use alternate nests. Nest trees have stout upper branches to support the nest structure and usually provide an unobstructed view of an associated water body. Most nests in Oregon have been within 1/2 mile of water.

In 2001, wildlife biologists identified the first suspected bald eagle nest to be located on the Blue Mountain Ranger District. The nest was identified along the Middle Fork of the John Day River, approximately five miles from the project area. The site was monitored early in the nesting phase, prior to expected incubation, so nestling success is unknown. No bald eagle activity was observed in 2002. There are no additional reports of bald eagles nesting on the Blue Mountain Ranger District. The nearest known nest site is approximately 13 miles south on the Emigrant Ranger District. This site has been monitored since 1991; young were produced in 8 of 11 years.

On the Malheur National Forest, bald eagles congregate at winter roost sites during the late fall, winter, and early spring. The eagles roost and feed in Bear Valley, and along the South Fork John Day River, Middle Fork John Day River, and the main John Day River. They scavenge in agricultural valleys and wetlands, feeding primarily on carrion normally found in areas of cattle concentration and birthing, or where ranchers dispose of dead animals. They roost at night in mature forest stands, which provide a microclimate that helps protect them from cold weather and wind. Bald eagles have been sighted in every month except September, and peak use is November to March. Two winter roosts are on the District in forested stands near Bear Valley, and a third roost is on private land in Bear Valley approximately 40 miles south of the Balance project.
Since there is no habitat including clean water with abundant fish and/or waterfowl populations, and large, wolfy perch trees and roost sites nearby, there would be NI (No Impact) to bald eagles.

Effects and Determination

Direct, Indirect and Cumulative Effects:

Under the No Action Alternative, there will be no new management activities; therefore, there would be no direct, indirect or cumulative effects to bald eagles or their habitat.

Proposed Action and Cumulative Impacts:

The Proposed Action alternative would not remove potential nest trees. There are no activities proposed in any potential nesting habitat along the Middle Fork of the John Day River. There would be no cutting of potential nest trees and snag removal would be restricted to incidental hazard trees along log haul routes and landings. There would be no impacts to fisheries habitat from the action alternative; therefore no affects would impact bald eagles or their habitat. There would be no cumulative impacts to bald eagles or their habitat.

There would be **No Impact (NI)** to bald eagles or their habitat by implementing the proposed Balance Project.

Gray wolf (*Canis lupus*) (De-listed 3/2008) Changed to sensitive status, but still protected.

Status

Federal Status: Endangered (list 1-7-00-SP-588). The northern Rocky Mountain gray wolf was listed as endangered on June 4, 1973, and a recovery plan was released in 1987.
USDA-Forest Service (Region 6) Status: Endangered (USFS 2000)
State Status: Endangered (last revised 12/1998) (ODFW 2000)
Oregon Natural Heritage Program Status: List 2-extirpated (ONHP 2001)

The United States Fish and Wildlife Service (the Service) proposed to establish a distinct population segment (DPS) of the gray wolf (*Canis* lupus) in the Northern Rocky Mountains NRM) of the United States. The proposed NRM DPS of the gray wolf encompasses the eastern one-third of Washington and Oregon a small part of north-central Utah, and all of Montana, Idaho and Wyoming. The Service is also proposing to remove the gray wolf in the NRM DPS from the list of Endangered and Threatened wildlife under the Act. (Federal Register Notice (Volume 72, No. 26 2/8/07).

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Effective **March 28, 2008,** the Northern Rocky Mountain population of the Gray Wolf (as a Distinct Population Segment) was removed from the federal list of Endangered and Threatened Species under the Endangered Species Act (ESA). The boundary of the Northern Rocky Mountain (NRM) Distinct Population Segment (DPS), as established in the Federal Register Notice (Enclosure 1), includes lands within eastern Oregon and Washington (see map on Page 10517, Enclosure 1) that encompass all of the Colville National Forest, and bisects the Wallowa-Whitman, Umatilla, Malheur, and Okanogan-Wenatchee National Forests. In all areas of Oregon and Washington outside of this DPS, the gray wolf remains listed as an endangered species under the ESA.

Biology and Ecology:

Wolves are limited by prey availability and are threatened by negative interactions with humans. Generally, land management activities are compatible with wolf protection and recovery, especially actions that maintain ungulate populations. Despite good populations of ungulates on the Malheur National Forest, no *known* wolf populations currently exist and no denning habitat has been located. However, in the past 6 years large canid tracks have been seen and scat collected for analysis on the Malheur National Forest. It is postulated that while no denning habitat or packs of wolves have been located to present, individual wolves may be traveling through the Blue Mountains. Wolves are considered to be absent from Oregon although one female radio-collared wolf from the experimental population in Idaho traveled to the Malheur National Forest and was trapped and returned to Idaho in 1999. This wolf was in the vicinity of the Upper Middle Fork Watershed. During the fall of 2000, a male wolf was killed on Interstate 84 near Baker City, Oregon. This indicates that wolves can and will travel to Oregon and the Malheur National Forest. It is possible that dispersing wolves may eventually establish breeding territories in Oregon and possibly on the Malheur National Forest.

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A recent flight occurred over northeastern Oregon searching for 15 radio-tagged wolves missing out of Idaho. The flight included the Blue Mountains as far south as the Middle Fork of the John Day River.

Gray wolves (*Canis lupus*) are the largest wild members of the Canidae, or dog family, with adults ranging from 18 to 80 kilograms (kg) (40 to 175 pounds [lb]) depending upon sex and subspecies (Mech 1974 as cited in Federal Register: July 13, 2000). Wolves resemble coyotes (*Canis latrans*) or domestic German shepherd or husky dogs (*C. domesticus*), but can be distinguished from them by their longer legs, larger feet, wider head and snout, and straight tail (Federal Register: July 13, 2000).

Wolves are social animals, normally living in packs of two to ten members. They need a large, remote area relatively free from human disturbance (Snyder, S. A. 1991 [16]). Packs occupy, and defend from other packs and individual wolves, a territory of 50 to 550 km^2 (20 to 214 mi^2)). In the northern U.S. Rocky Mountains territories tend to be larger, typically from 520 to 1040 km^2 (200 to 400 mi^2) (Federal Register: July 13, 2000).

The gray wolf historically occurred across most of North America, Europe, and Asia. In North America, gray wolves formerly occurred from the northern reaches of Alaska, Canada, and Greenland to the central mountains and the high interior plateau of southern Mexico. The only areas of the contiguous United States that apparently lacked gray wolves since the last glacial events are much of California and the Gulf and Atlantic coastal plain south of Virginia. Wolves were generally absent from the extremely arid deserts and the mountaintops of the western United States (Goldman 1944, Hall 1959, Mech 1974 [all as cited in Federal Register: July 13, 2000]).

Normally, only the top-ranking male and female in each pack breed and produce pups. Litters, usually four to six pups, are born from early April into May (Michigan Department of Natural Resources (MI DNR) 1997, U.S. Fish and Wildlife Service 1992a, both as cited in Federal Register: July 13, 2000). Wolves excavate natal dens in well-drained soils in meadows near water, but occasionally they will den in hollow logs, under tree roots, rock outcrops, or even in beaver lodges (Snyder, S. A. 1991 [11, 16]). After 1 to 2 months, natal dens are abandoned for an open area called a rendezvous site. Here a few adult pack members guard the pups, while the rest of the pack hunts (Snyder, S. A. 1991 [1]).

Yearling wolves frequently disperse from their natal packs, although some remain with their pack (Michigan Department of Natural Resources (MI DNR) 1997, U.S. Fish and Wildlife Service 1992a, both as cited in Federal Register: July 13, 2000).

Forests, open meadows, rocky ridges, and lakes or rivers all comprise a pack's territory (Snyder, S. A. 1991 [16]). In the west, wolves have been known to follow the seasonal elevational movements of ungulate herds. Wolves prey mainly on large ungulates, such as moose (*Alces alces*), deer (*Odocoileus* spp.), elk (*Cervus elaphus*), and caribou (*Rangifer tarandus*). Beaver (*Castor canadensis*) are a major supplement to wolves' diets (Snyder, S. A. 1991 [23]). Voigt and others (Snyder, S. A. 1991 [33]) reported that wolves' diets vary, depending on relative prey abundance. Other prey species include mountain goats (*Oreamnos americanus*), bison (*Bison [Bos] bison*), pronghorn (*Antilocapra americana*), various rodents, upland game birds and waterfowl, snowshoe hare (*Lepus americanus*), and black bear (*Ursus americana*) (Snyder, S. A. 1991 [6,10,21,23,25,33]). Occasionally wolves prey on domestic livestock.

Humans are the only significant predator of the wolf and have eradicated it from almost all of its former range worldwide (Snyder, S. A. 1991 [27,34]). Pimlott and others (Snyder, S. A. 1991 [26]) noted black bear preying on wolf cubs and adults.

Source habitats span a broad elevational range and include all terrestrial community groups except exotic herblands and agriculture (Wisdom et al. 2000).
Source habitats for the gray wolf likely occurred throughout the basin historically. The current extent of habitat, albeit largely unoccupied, is similar to the historic distribution except for the Columbia Plateau, Lower Clark Fork, and Upper Clark Forks ERUs (Ecological Resource Unit), where habitat is more patchily distributed than it was historically. The overall trend in source habitats across the basin was neutral.

Roads negatively affect this species by increasing human presence in wolf habitat and increasing the likelihood of negative contacts. A disproportionate number of human-caused mortalities occur near roads. Vehicle collisions account for additional mortalities on highways. Vehicle traffic on roads and off road use by all-terrain vehicles (ATV's) displace big game onto private lands and would affect distribution of wolves during hunting seasons when most recreational activities are present. Roads, when heavily used by vehicles, displace big game populations, which are primary food source for wolves. Thurber and others (1994) cite three studies (Jensen and others 1986, Mech 1988, Thiel 1985) indicating wolf packs would not persist where road densities exceeded about 1.0 mi/mi^2 (Wisdom et al. 2000).

Wolves feed on big-game animals and occasionally on other species. Therefore, actions that affect big-game populations could affect wolf survival or productivity. The wildlife effects report regarding the thinning and burning planned for the Balance Project states that big-game animals might move, but populations probably won't be affected by either alternative. Big game populations for elk have been stable for the past 10 years and this project is not expected to cause declines in big game numbers for this area.
Historically, wolves (*Canis lupus*) occupied all habitats on this Forest, but are currently considered extirpated. The Blue Mountains provide suitable habitats for wolves based on evidence of a wolf captured in 1999 on the Malheur Forest and returned to Idaho. Past flights to

locate radio-collared wolves have not confirmed any evidence of wolves in Oregon. Flights occurred over the Malheur National Forest in April 2006 (Miller, personal communication 06)

However, in the past 6 years large canid tracks have been seen and scat collected for analysis on the Malheur NF. It is postulated that while no denning habitat or packs of wolves have been located to present, individual wolves may be traveling through the Blue Mountains.

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Effects and Determination

Common to All Alternatives

Direct, Indirect and Cumulative Effects

The No Action and the Proposed Action would not have any direct or indirect effects on gray wolves or their habitat. No cumulative effects from these two alternatives or other projects are expected. Currently there are no *known* wolf populations in Oregon.

Wolves are limited by prey availability and are threatened by negative interactions with humans. Generally, land management activities are compatible with wolf protection and recovery, especially actions that manage ungulate populations. Habitat and disturbance effects are of concern in denning and rendezvous areas.
No such *known* habitat is currently occupied in Oregon.

At this time, the determination for almost all project activities on the Malheur National Forest is **No Impact (NI)** for the following reasons:

- No known populations currently occupy the Malheur National Forest.
- No denning or rendezvous sites have been identified on the Malheur National Forest.
- There is an abundance of prey on the forest; therefore prey availability is not a limiting factor.

Canada Lynx *(Lynx canadensis)*

Status: Federal – Threatened
State – None
Region 6 - Threatened

Biology and Ecology:

The lynx is found in the taiga zone of North America, from British Columbia east to Atlantic Coast of Canada. It ranges from Alaska south, except for the coastal areas, to isolated parts of Washington, Idaho, and Montana. The lynx is also found in central Utah and in a fraction of Colorado. Small populations might still exist in northern Minnesota, Wisconsin, and New Hampshire (U. S. Dept. Interior Fish and Wildlife Service 1994). Its distribution probably has changed little from the historical except at the southern extent of its range (Koehler and Aubry in Ruggiero et. al. 1994).

The lynx has always been rare in Oregon (Koehler and Aubry 1994). The few specimen records that exist are from the higher elevations of the Cascade Mountains and the Wallowa Mountains in northeastern Oregon. A lynx shot in Oregon in 1964 was the first record since 1935. One lynx was trapped near Drewsey, Oregon, in 1994. Pat Sweeney, wildlife biologist (retired) observed a lynx in 1994 near the Summit Meadows on USFS 1940 road which is approximately 15 miles SE of the Balance project area.

The Lynx Conservation Agreement (CA) between the U.S. Fish and Wildlife Service and the U.S. Forest Service was revised and amended in 2005 and 2006; the FWS Recovery Outline was issued in September 2006. The 2006 amendment to the CA identified the Malheur NF as not occupied based on the results of the surveys conducted in 1999, 2000, and 2001 as part of the National Lynx Survey. The project area was not surveyed due to the fact that the habitat was not considered suitable. The revision to the CA concluded that the Lynx Conservation Strategy (LCAS) (under which Lynx Analysis Units (LAU) were delineated) did not apply to habitat that was unoccupied by Lynx. However, the CA amendment also states that the LCAS may provide useful information for FS managers to consider when making decisions regarding unoccupied, mapped lynx habitat.

The Forest is included in “Peripheral Habitat” in the FWS Recovery Outline: “In ‘peripheral areas’ the majority of historical lynx records is sporadic and generally corresponds to periods following cyclic lynx populations high in Canada. There is no evidence of long-term presence or reproduction that might indicate colonization or sustained use of these areas by lynx. However, some of these peripheral areas may provide habitat enabling the successful dispersal of lynx between populations or subpopulations…”

Lynx occur in both dense climax forests and second-growth stands. In Alaska and Canada, they prefer boreal forests, and in the Intermountain West, they prefer spruce (*Picea* spp.)-subalpine fir (*Abies lasiocarpa*) and lodgepole pine (*Pinus contorta*) forests. In Washington, Idaho, and Montana, lynx occur above 4,000 feet (1,200 m) elevation; in Wyoming, above 6,500 feet (1,900 m); and in Colorado and Utah, above 8,000 feet (2,400 m) (Koehler and Brittell 1990).

Lynx require a mix of early and late seral habitats to meet their food and cover needs. Early seral habitats provide the lynx with a prey base, while mature forests provide denning space and hiding cover (Koehler 1990). Lynx den sites are in forests with a high density of downfall logs in patches scattered over 5-10 acres (>40 logs per 40 yards [46 m] lying 1 to 4 feet [0.3-1.3 m] above the ground) (Koehler 1990). Pockets of dense forest must be interspersed with prey habitat (Grange 1965 in Ruggeiro, et al. 1994). Lynx den in rotten logs, beneath tree roots, and in rock crevices. Pockets of late and old forest, at least 5-10 acres (2-4 ha), should be left for denning sites. These pockets should border prey habitat. Management units should be designed to provide travel corridors, especially along ridges and saddles, as lynx are more likely to use these areas.

Travel corridors provide security during movement from denning areas to foraging areas and during dispersal. Cover that is generally greater than 8 feet tall with stem densities in excess of 180 trees per acre allows for movement of lynx within their home ranges (Koehler 1990). Riparian corridors, forested ridges, and saddles appear to be favored travel ways. Lynx avoid large openings (> 300 feet from cover) that have the potential to disrupt movement between isolated populations (Ruggiero 1994).

Lynx prey primarily on snowshoe hare (*Lepus americanus*). Their diet also includes ducks (*Anas* spp.), upland game birds, especially grouse (*Dendragapus* spp.), and various forest rodents, including squirrels (*Scuirids, Spermophilids*). Lynx also feed on deer, moose, and caribou carcasses. Their populations usually fluctuate in a cycle with snowshoe hare populations, peaking about every 9 to 10 years (Fox 1978, Mech 1980, U.S.D.I. Fish and Wildlife Service 1994). Because of these volatile swings, their populations become very low about every 10 years. Therefore, they can be rare in any one given area at these times.

Lynx can be managed by managing for their prey. Snowshoe hare populations increase dramatically following disturbance, particularly fire. However, snowshoe hare recolonization may not occur until 6 to 7 years following logging, and that snowshoe hare densities may not reach their maximum for another 20 to 25 years (Koehler and Brittell 1990). This depends on site conditions and type of treatment. As stands become older (about 20 to 30 years old), their benefits to snowshoe hare decrease. Snowshoe hares are closely tied to lodgepole pine stands with ample understory vegetation. There are no lodgepole pine stands in the project area.

Because lynx populations oscillate with snowshoe hare populations, events that create snowshoe hare cover and food generally benefit lynx (Koehler and Brittell 1990). These events might have negative short-term effects by eliminating cover for snowshoe hare and lynx. However, as succession progresses and snowshoe hares become abundant, lynx will benefit. Lynx usually do not cross openings greater than 300 feet (90 m) and use travel corridors with tree densities of 180 stems per acre (450/ha). Therefore, events that create large openings without leaving travel corridors between pockets of dense forest may be detrimental to lynx (DeVos and Matel 1952, Grange 1965).

Lynx breed when they are one year old. The breeding season is January or February, sometimes into April (Brainerd 1985, Nellis et al. 1972). The gestation period is 60 days and birthing occurs in March or April, sometimes May or June. The maximum life span is 15 to 18 years in captivity.

Oregon is considered to be at the southern fringe of the lynx's range, and animal density and habitat use are expected to differ from further north where habitat is considered more suitable. There are 11 historical museum specimens taken from Oregon, three of which are from Granite in Grant County. Surveys using a hair sampling protocol that targets lynx were conducted on the Malheur National Forest in September 1999, 2000, and 2001. Samples were sent for analysis and none were lynx. Surveys to detect other forest carnivores have been conducted in the past, and while no lynx were detected, snowshoe hare tracks were reported along several routes.

Based on the limited available information, the Fish and Wildlife Service cannot substantiate the historic or current presence of a resident lynx population in Oregon (Ruediger, et. al. 2000). Verts and Carraway (1998) conclude that there is no evidence of self-maintaining populations in Oregon and USDI (1997) considered lynx "extirpated" from Oregon. Additional surveys and research are warranted before lynx are considered as having self-maintaining populations in Oregon.

Source Habitat Trend:

Basin-wide, source habitat was projected to have increased moderately or strongly in 47 percent of the watersheds. The Blue Mountains ERU has undergone a positive absolute (+26.93%) and relative (>100.00%) change in source habitat availability (moderate or strong increases in more than 50 percent of the watersheds). An increase in Blue Mountains source (denning) habitat was most influenced by an increase in mid- and late-seral montane forest and mid-seral subalpine forests (Wisdom et al. 2000).

Habitat on the Malheur National Forest is defined as stands above 5,000 feet that are subalpine fir, lodgepole pine, Engelmann spruce, or moist grand fir types. Until survey results supply better information, analysis for this proposed project will assess the effects due to management actions assuming that the project area currently does not have lynx habitat. The plant associations found in the Balance project area are drier plant association groups which are not conducive for suitable snowshoe hare habitat, consequently would not be suitable for lynx. There is no primary habitat, sub-alpine fir plant associations or lodgepole/grouse huckleberry plant association, within the Balance project area. Due to decades of fire suppression efforts, the connectivity habitat in Balance has been artificially induced, which provides more security for carnivores compared to historic conditions. Frequent wildfires would have maintained more open conditions within the warm dry plant association groups.

Standards and guidelines related to project-level analysis provided within the Recommendations for Analysis and Conservation section of the Lynx Conservation Assessment and Strategy (LCAS) (Ruediger et al. 2000) and the Lynx Consultation Worksheet, Blue Mountain Provincial Expedited Process Project Design Criteria (PDC) were used to assess effects to potential lynx habitat.

It is unlikely that connectivity habitat in Balance is used by lynx. However, connectivity for lynx and other forest carnivores would be maintained throughout the Balance planning area from the corridors required with Regional Foresters Amendment 2. The corridors between the LOS and allocated old growth stands may provide enough closed canopy environment that would allow movement by lynx.

Direct and Indirect Effects:

No Action – Alternative 1

Under the No Action Alternative, there will be no new management activities; therefore, there would be no direct, indirect or cumulative effects.

Proposed Action – Alternative 2

Direct and Indirect Effects:

Treatments are proposed in areas not capable of producing lynx habitat. (Hot-Dry+Warm-Dry=~80%) Within the connectivity habitat thinning, harvest, and burn prescriptions are designed to move conditions towards the Historic Range of Variability. Burning would occur on approximately 1934 acres, predominantly in the low elevation warm-dry to hot-dry sites. These sites tend towards an open forest condition with an herbaceous understory.

To ensure that lynx have ***any potential*** habitat for movement and dispersal, a network of corridors that are at least 400-feet wide that interconnect late and old structural stage stands will be maintained. The goal is to provide movement and dispersal habitat while managing the forest within HRV. The Forest Plan requires that within corridors, canopy closure be maintained in the upper 1/3 of site capability. This standard does not necessarily meet lynx needs because it applies to overhead cover, measured above about 5 feet, rather than horizontal cover near the ground that is more important to lynx that is about 2 feet tall. Corridors tend to have more trees and provide better lynx hiding cover than surrounding stands, even in the warm-dry and hot-dry biophysical environments. Corridors, when located in riparian or ridge lines, offer the best options for lynx dispersal and movement. By maintaining corridors, the forest can be managed within HRV while maintaining options for lynx (Ruediger et. al, 2000, p. 78).

Proposed treatment (underburning) within big game travel corridors has the potential to remove hiding cover, but retention of submerchantable (small diameter) trees in the understory is expected to facilitate lynx forage and travel associated. Connectivity habitat would be maintained throughout the planning area.

Cumulative Effects: Since there is no primary habitat within the project area, there will be no cumulative effects to Canada lynx.

Determination of Effects:

Since there is no primary habitat within the project area, there will be **NE** (No Effect) to lynx or their habitat.

California wolverine (*Gulo gulo*)

Status

Federal Status: Species of Concern (list 1-7-00-SP-588)
USDA-Forest Service (Region 6) Status: Sensitive
State Status: Threatened (ODFW 2000)
Oregon Status: Imperiled
Oregon Natural Heritage Program Status: List 2 (ONHP 2001)

Major Threats

Status is not well known in many portions of the range and extirpated from most of its historic range in the contiguous 48 states. Wolverines are showing promising signs of semi-recovery in selected western states (TNC 1999).

Wolverine populations are suspected to be small, especially sensitive to disturbance, and vulnerable to local extinction (Ruggerio et al. 1994). Past decline in population may have been due primarily from fur trapping, but habitat alteration (e.g. agriculture, oil exploration, cattle grazing, rural settlement, timber harvest, road construction, and ski area development) and general human disturbance are contributing factors (TNC 1999, Witmer et al. 1998).

Population Status and Trend

“Hash (1987) describes a contraction in the North American range of the wolverine beginning around 1840 with the onset of extensive exploration, fur trade, and settlement. State records suggest very low wolverine numbers in Montana, Idaho, Oregon, and Washington from the 1920s through 1950s, with increases in wolverine sightings since the 1960s (Banci 1994)” (Wisdom et al. 2000).

Source Habitat Trend

Basin-wide, source habitat was projected to have increased moderately or strongly in 56 percent of the watersheds. The Blue Mountains ERU has undergone a positive absolute (+27.46%) and relative (>100.00%) change in source habitat availability (moderate or strong increases in more than 50 percent of the watersheds). An increase in Blue Mountains source habitat was most influenced by an increase in mid- and late-seral montane community types (Wisdom et al. 2000).

Habitat

The wolverine occurs in a broad range of wilderness habitats (Verts and Carraway 1998). Source habitats for wolverines include alpine tundra and all subalpine and montane forests. Within the forest type, all structural stages except the closed stem exclusion stage provide source habitat (Wisdom et al. 2000). The impression that wolverines require high elevation habitat may be a result of remaining wolverine populations retreating to inaccessible, undeveloped areas, which are often at high elevations (Witmer et al. 1998).

Wolverines are solitary predators that range over vast and remote territories; consequently, they are difficult to study and to survey (Rausch and Pearson 1972). Most available research indicated that wolverines were strictly associated with secluded wilderness areas and that distribution is probably limited to upper montane and sub-alpine forest types. Some recent work suggests that although wolverines may frequent upper montane and sub-alpine habitat during most of the year, they may follow migrating big game herds and scavenge on winterkills, which is considered a primary winter food source (Wisdom et al. 2000, Ruggiero 1994), to lower elevation winter range.

In summer, wolverines use a variety of foods including small mammals, birds, carrion, and berries (Wisdom et al. 2000). Copeland (1996) found that carrion related food supplied 46 percent of wolverine diets in Idaho during both summer and winter. Banci (in the Scientific Basis for Conserving Forest Carnivores: American Marten, Fisher, Lynx, and Wolverine in the Western United States 1994) suggests that diversity of habitats and foods is important to wolverines.

Several special habitat features have been identified for wolverines. Natal dens in the western United States is generally located in subalpine basins in isolated talus fields surrounded by trees (Copeland 1996). There is also evidence that wolverine use down logs and hollow trees for denning and cavities in live trees may be used (Wisdom et al. 2000). Both talus and areas associated with large, fallen trees were used as maternal dens sites in Idaho (Copeland 1996).

Regardless of habitat type used, the critical component to suitable source habitat seems to be the absence of human activity or development (Hash 1987). High elevation wilderness and undisturbed backcountry refugia are still considered critical to the current welfare and viability of existing wolverine populations (Hornocker and Hash 1981).

Denning Habitat

A denning habitat model developed primarily by Jeff Copeland, Idaho Department of Fish and Game, was used to identify potential wolverine denning habitat on the Malheur National Forest. Utilizing PMR (Pacific Meridian Resources Company) data and ArcInfo base coverage, key habitat components were queried to produce a forest level coverage of potential denning habitat. Key elements included topographic relief with flat to concave curvature, slopes with north to northeast aspects, areas above 5,000-foot elevation, and rock or snow cover types.

Results: Large areas of potential denning habitat were identified in the Strawberry Wilderness, Monument Rock Wilderness, and in some northern portions of the Malheur National Forest.

Distribution

Wolverines once occupied the boreal zone across the northern part of the continent and southward into the mountains of Colorado and California. Bailey (1936) states that wolverine were thought to be rare in the United States, but probably were not yet extinct in the Cascades and Sierra Nevada’s.

Since Bailey's report, numerous animals have been collected or sighted around the northwest. A query of the Oregon Natural Heritage database reveals that there are about 150 observations of wolverines in Oregon, with most occurring in the mountainous northeast (Baker, Grant, Umatilla, Union and Wallowa Counties) region (Edelmann and Copeland 1997).

Confirmed observations on Malheur National Forest and adjacent areas include:

- A partial skeleton and tufts of fur suspected to be wolverine found near Canyon Mountain, Grant County (1992)
- Tracks and a probable denning site found in the Strawberry Wilderness (1997)
- Tracks in Monument Rock Wilderness (1997)
- Collection of an animal from Steens Mountain, Harney County, (1973)
- Hair and track collection on Snow Mountain Ranger District, Ochoco National Forest (1992)

Local Surveys

No surveys have been conducted for wolverine within the Balance project area or surrounding analysis area. On 02/24/1997 Oregon Department of Fish and Wildlife personnel conducted an aerial survey of potential wolverine habitat on the Malheur National Forest. No animals or tracks were observed.

Existing Condition

Wolverines were always rare in Oregon, although recent sightings, tracks, and collected remains document their continued presence at low densities in the state (Csuti et al. 1997). Current distribution appears to be restricted to isolated wilderness areas. Verts and Carraway (1998) believe that while there is a possibility of self-maintaining population of wolverine in the state, most animals seen or collected are likely dispersers from Washington and Idaho populations. There are no source habitats for wolverine in the planning area. There are no subalpine forest types with or without talus surrounded by trees in or adjacent to this area. The nearest area that approximates this habitat type is located in the Dixie (2-3 miles southeast) and Indian

Rock/Vincent, Vinegar areas (2-3 miles to the north and northeast).

It is extremely unlikely that the forest types that are present within the project area provide primary habitat for wolverines. The majority (~80%) of the Balance project area consists of hot-dry, warm-dry biophysical environments. High levels of human disturbance (recreational use, firewood cutting, and management activities) and development make most of this area unsuitable for wolverine.
The likelihood of wolverine using or frequenting the Balance Project area is expected to be extremely low. However, there may be a chance during the winter months that they may forage /travel over from the Indian rock area to Dixie Mountain.

Alternative 1-No Action: Under this Alternative, there would be no management activities; therefore, there should be no direct, indirect or cumulative effects to wolverine or their habitat.

Alternative 2-Proposed Action: There are no confirmed records of this species occurring in the project area, or surrounding areas; therefore, there would be no direct effect to this species. There is probably no reproductive habitat identified within the Balance Creek/Coyote Creek subwatershed, given the types of bio-physical environments present.

Indirect effects to wolverine, would be minimal. Timber harvest to reduce stand densities in stands currently providing dense conditions may affect individual wolverine travel corridors. However, research by Hornocker and Hash (1981) found wolverines showed preference for scattered timber with pockets, compared to young dense stands. Wolverines typically use ridges, saddles, and riparian areas for travel. Travel corridors maintained as described for lynx are expected to prevent impediments to wolverine travel and dispersal through the project area. Established elk and deer use may be altered but there would be no effect to their populations.

Underburning may reduce habitat for some species of rodents such as voles, but low intensity fire will improve habitat for some species of rodents such as deer mice (*Peromyscus*). Applying mitigation measures to protect downed logs and snags will reduce impacts to substrate for wolverine prey.

Cumulative Effects:

This alternative would not contribute any adverse cumulative effects to wolverine prey or their habitats. Activities that increase human disturbance in to remote areas can adversely affect wolverine. None of these proposed projects would increase human disturbance into remote areas. Since there are no direct and indirect effects to wolverine, there are no cumulative effects. There is no anticipation of an increase in recreation activities from any of the proposed projects, therefore human disturbance other than project implementation would not displace any transient wolverine from the area.

Effects and Determination

Based on current information, implementation will not impact individuals or habitat, and will not contribute to a trend toward federal listing or loss of viability to the population or species. The thinning and burning prescriptions under this alternative would not impede wolverine movement throughout the Balance area. Therefore a **No Impact** (**NI)** determination is given.

DETERMINATION OF EFFECTS:

The Balance project is consistent with the 1990 Malheur National Forest Plan, and Regional Forester's Eastside Forest Plans Amendment 2. The determination of effects for endangered and threatened species and their habitats is **No Effect (NE).** The determination of effects for sensitive species is **No Impact (NI).**

Biological Evaluation

for

Proposed, Threatened, Endangered, and Sensitive Plants

Balance Thinning and Fuels Reduction Project

Prepared by _______________________ Date:__________
Cynthia L. Kranich
Acting Botanist, Blue Mountain Ranger District

Executive Summary

Purpose and Project Area

This biological evaluation describes and displays effects to proposed, endangered, threatened, and sensitive floral species associated with the Balance Thinning and Fuels Reduction Project within the Blue Mountain District of the Malheur National Forest. The analysis and project area for this biological evaluation is the portion of the project area where treatments are planned. A map of the project area is included in the beginning of the environmental assessment (EA).

Surveys and Analysis

Potential sensitive species habitat was surveyed during the 2005 field season. Potential habitat was noted for eleven species, two of which were documented within the project area (Table 1- Effect Determinations).

Effects to habitat or individuals or populations are addressed under the Proposed Action assessment.

Proposed Action

The Proposed Action activities include thinning commercial and non-commercial size trees within proposed harvest units, prescribed burning, and aspen restoration. Connected actions include using and improving the existing transportation system, constructing temporary roads, and treating fuels associated with commercial and non-commercial thinning.

Status of Species, Habitat, and Effects Summary

Table 1 – Effect Determinations displays the status of species and habitat within the project area, and effect findings for species suspected or documented on the Blue Mountain Ranger District and are contingent upon implementation of mitigation measures, identified below.

Mitigation

- To protect *Eleocharis bolanderi* species habitat, vehicles and off-road equipment should avoid scabland areas and vernally moist meadows. Known sites in the Sunshine Flat area are to be mapped and flagged prior to implementation. Sites are to be avoided during operations, including direct lighting and ATV travel during prescribed burning.

- To protect *Botrychium* species habitat and *Carex interior* habitat, vehicles and off-road equipment should avoid seeps, springs, and riparian areas. Needs for temporary culverts were identified post-2005 field surveys. Monitoring of these specific sites will be conducted during spring 2008 prior to road reconstruction across stream crossings.

- To protect *Phacelia minutissima* habitat, areas supporting false hellebore (*Veratrum californicum*) and vernally moist meadows should be avoided by vehicles and heavy equipment, even if these areas dry out late in the season.

- To protect *Carex idahoa* habitat, prescribed burning should produce only low to moderate fire severity so rhizomes of any existing plants will survive and sprout after the burn.

- To avoid additional introduction of non-native species within the project area, local native seed mixes or non-persistent weed-free certified seed will be used for areas requiring erosion control or rehabilitation measures. (Further measures to prevent the introduction, establishment, or spread of invasive weed species are discussed in Chapter 2 of the EA: Noxious Weeds - Design Elements).

Table 1 - Effect Determinations

Sensitive Species	Occurrence in Project Area	Habitat Status Within Project Area	Alt 1 (No Action)	Alt 2 (Proposed Action)
Achnatherum hendersonii Henderson's ricegrass	Not Found	Not Present	NI	NI
Achnatherum wallowensis Wallowa ricegrass	Not Found	Not Present	NI	NI
Astragalus diaphanus var. diurnus South Fork John Day milkvetch	Not Found	Not Present	NI	NI
Astragalus tegetarioides Deschutes milkvetch	Not Found	Not Present	NI	NI
Botrychium ascendens upswept moonwort	**Not Found**	**Present**	**MIIH**[1]	**MIIH**
Botrychium crenulatum crenulate moonwort	**Not Found**	**Present**	**MIIH**	**MIIH**
Botrychium lanceolatum lance-leaf moonwort	**Not Found**	**Present**	**MIIH**	**MIIH**
Botrychium minganense Mingan moonwort	**Not Found**	**Present**	**MIIH**	**MIIH**
Botrychium montanum mountain moonwort	**Not Found**	**Present**	**MIIH**	**MIIH**
Botrychium pinnatum pinnate moonwort	**Not Found**	**Present**	**MIIH**	**MIIH**
Calochortus longebarbatus var. peckii long-bearded sego lily	Not Found	Not Present	NI	NI
Camissonia pygmaea dwarf evening primrose	Not Found	Not Present	NI	NI
Carex backii	**Not Found**	**Present**	**NI**	**MIIH**
Carex idahoa Idaho sedge (formerly C. parryana)	**Not Found**	**Present**	**NI**[2]	**MIIH**

[1] MIIH – May impact individuals or habitat but not expected to affect viability.
NI – No impact
[2] MIIH – May impact individuals or habitat but not expected to affect viability.
NI – No impact

Sensitive Species	**Occurrence in Project Area**	**Habitat Status Within Project Area**	**Alt 1 (No Action)**	**Alt 2 (Proposed Action)**
Carex interior **inland sedge**	**Found**	**Present**	**NI**	**MIIH**
Cypripedium fasciculatum clustered lady slipper	Not Found	Not Present	NI	NI
Dermatocarpon luridum silverskin lichen	Not Found	Not Present	NI	NI
Eleocharis bolanderi[3] Bolander's spikerush	**Found**	**Present**	**NI**	**MIIH**
Leptogium burnetiae var. hirsutum hairy skin lichen	Not Found	Not Present	NI	NI
Listera borealis northern twayblade	Not Found	Not Present	NI	NI
Lomatium erythrocarpum redfruit desert parsley	Not Found	Not Present	NI	NI
Lomatium ravenii Raven's lomatium	Not Found	Not Present	NI	NI
Luina serpentina colonial luina	Not Found	Not Present	NI	NI
Mimulus evanescens vanishing monkeyflower	Not Found	Not Present	NI	NI
Pellaea bridgesii Bridge's cliff-brake	Not Found	Not Present	NI	NI
Phacelia minutissima least phacelia	**Not Found**	**Suspected**	**NI**	**MIIH**
Pleuropogon oreganus Oregon semaphore grass	Not Found	Not Present	NI	NI
Thelypodium eucosmum arrow-leaved thelypody	Not Found	Not Present	NI	NI

[3] *Eleocharis bolanderi* was documented within the project area and included in the analysis. It is listed a sensitive species on the current R6 sensitive species list (USDA, 2008).

Introduction

This Biological Evaluation analyzes the potential effects for the Balance Thinning and Fuels Reduction Project. This document satisfies the requirements of Forest Service Manual 2672.4 that requires the Forest Service to review all planned, funded, executed or permitted programs and activities for possible effects on proposed, endangered, threatened or sensitive species.

The objective of this evaluation is to understand how actions or lack of action will impact habitat and viability of these plant populations and how to reduce or avoid adverse impacts. The type of actions, scope of present, future, and past activities, and duration of activities, influence the size of impacts to these uncommon plants.

Location

The proposed project is located in Grant County, Oregon, and encompasses approximately 3,500 acres along the Middle Fork of the John Day River on the Blue Mountain Ranger District of the Malheur National Forest. The legal description is:

T.10S. R.33E. Sections 17, 18, 20, 27-36

The Dunstan Preserve (The Nature Conservancy), and several residences as well as privately owned lands and lands owned by the Confederated Tribes of Warm Springs are within and adjacent to the project area.

Project Area Baseline Conditions

Elevations within the project area range from 3,600 feet near the Middlefork John Day River, to approximately 4,500 feet at Windy Point or along higher sections of FS road 2045 that defines the southern boundary of the project area.

Habitat is predominantly ponderosa pine/grass communities to the extreme west and eastern sections of the project, with grand fir, Douglas fir mixed conifer forest occurring in the wetter drainages of Dunstan and Balance Creeks. Two western white pine and one Pacific yew were encountered during surveys.

Potential habitat for sensitive plant species occurs especially in the Balance and Dunstan Creek areas. These cooler mixed-conifer riparian corridors are full of seeps and tributary streams, and in the vicinity of Balance Creek some bog-like expanses of wet habitat are present. Nine species of orchids were observed in the Dunstan Creek drainage within the Dedicated Old Growth area. Rocky habitat occurs along the north edge of the project, as well as smaller meadows. The Sunshine Meadow (Sunshine Flat) area contains numerous *Eleocharis bolanderi* plants.

Scope of Actions and Duration

Proposed activities include timber harvest, precommercial thinning, fuel treatment, prescribed burning, temporary road construction, road maintenance, aspen restoration, and monitoring. Activities are expected to occur over the next 5 years, from 2008 through 2013.

Alternative 1 (No Action) would not implement any activities associated with this project, but would allow other projects within the planning area to continue.

Proposed Action

The proposed action is designed to reduce the fire hazard and improve forest health in the Balance Thinning and Fuels Reduction Project project area by reducing fuels and modifying the spatial distribution of the fuels in three fuel layers:

- Crown or canopy fuels would be reduced by commercial and non-commercial thinning. The trees cut would vary in size from medium to smaller diameters. Some of the smaller sized material may be difficult to economically utilize for products; utilization will be pursued if the opportunity exists.

- Ladder fuels would be reduced by commercial and non-commercial thinning treatments. The trees cut would vary in size from medium to smaller diameters, removing fuels that allow fire to move into the tree crowns.

- Surface fuels would be reduced by one or more of the following methods: yarding tops to landings for utilization or disposal by burning, hand piling or mechanical treatment of natural and project generated fuels, burning any created piles, or underburning with hand fireline construction as needed.

Specific actions in this proposal include:

- 734 acres of commercial/precommercial thinning to decrease stand density, reduce ladder fuels, and increase crown spacing;
- 355 acres of precommercial thinning to decrease stand density, reduce ladder fuels, and increase crown spacing;
- 99 acres of precommercial (plantation) thinning up to 7 inches dbh;
- 90 acres of thinning around late and old structure trees to reduce ladder fuels and competition;
- 1,290 acres of treatment of natural and project generated slash within treatment units;
- 1,934 acres of post treatment prescribed burning,
- 2.5 miles of temporary road construction;
- 11 miles of prescribed fire control lines;
- 10 aspen stands treated by activities that may include conifer removal or girdling, piling slash, burning piles, and fencing;
- Removal of hazard trees along the 2045 Road

Potential Plant Habitats

The potential for occurrence of any given plant species is based on combinations of habitat, elevation, aspect, and micro sites known to occur within or adjacent to the analysis area. The following table presents the Regional Forester's listing of plants designated as sensitive (USDA, July 2004) that are considered as potentially having habitat on the Blue Mountain Ranger District.

Table 2. *Sensitive Plant Species List for the Blue Mountain Ranger District

Scientific Name	Common Name
Achnatherum hendersonii	Henderson's ricegrass
Achnatherum wallowaensis	Wallowa ricegrass
Astragalus diaphanus var. diurnus	South Fork John Day milkvetch
Astragalus tegetarioides	Deschutes milkvetch
Botrychium ascendens	upswept moonwort
Botrychium crenulatum	dainty moonwort
Botrychium lanceolatum	triangle moonwort
Botrychium minganense	mingan moonwort
Botrychium montanum	mountain moonwort
Botrychium pinnatum	northwestern moonwort
Calochortus longebarbatus var. peckii	long-bearded sego lily
Camissonia pygmaea	dwarf evening-primrose
Carex backii	Cordilleran sedge
Carex idahoa	Idaho sedge
Carex interior	inland Sedge
Cypripedium fasciculatum	clustered lady slipper
Dermatocarpon luridum	silverskin lichen
Leptogium burnetiae var. hirsutum	hairy skin lichen
Listera borealis	northern twayblade
Lomatium erythrocarpum	red-fruited lomatium
Lomatium ravenii	Raven's lomatium
Luina serpentina	colonial luina
Mimulus evanescens	fleeting monkeyflower
Pellaea bridgesii	Bridge's cliff-brake
Phacelia minutissima	least phacelia
Pleuropogon oregonus	Oregon semaphore grass
Thelypodium eucosmum	arrow-leaved thelypody

***Regional Forester's Sensitive Species List (Update):** On January 31, 2008, Regional Forester Linda Goodman released an updated Sensitive Species List which includes federally listed, federally proposed and sensitive species lists.

In the cover letter for the updated species list the Regional Forester states that projects initiated prior to January 31, 2008 may use the updated sensitive species list or the list that was in effect when the project was initiated. The Responsible Official for the project has authority to decide which list to use. "Initiated" means that a signed and dated document such as a project initiation letter, scoping letter, or Federal Register Notice for the project exists.

The Balance Thinning and Fuels Reduction Project field surveys were conducted in 2005 and the official project initiation letter written in 2006. Consequently, the 2004 Regional Forester Sensitive Species list in effect at that time was used for field reconnaissance and this Biological Evaluation (BE).

Because populations of *Eleocharis bolandari* were documented within the project area, this BE also addresses this particular spike rush. This plant was added to the Regional Forester's 2008 Sensitive Species list (USDA, 2008).

Pre-Field Review

A pre-field review is used to determine the likelihood that TEPS species, or their respective habitats, are located within or adjacent to the project area. Information from the pre-field review, in conjunction with the project description, is used to determine the need and intensity of field surveys and, in part, fulfills the standards and procedures for conducting a BE (Forest Service Manual 2672.42).

The following sources of information were used to determine which TEPS species, and their respective habitats, occur or may occur within or near the project area:

1) The Regional Forester's Sensitive Species List (USDA Forest Service, 2004).
2) Malheur National Forest sensitive plant species database and Geographic Information System (GIS) layer, and other pertinent GIS mapping layers.
3) *Sensitive Plants of the Umatilla and Malheur National Forests* (USDA Forest Service, 2004).
4) *Flora of the Pacific Northwest* (Hitchcock and Cronquist, 1973).
5) *Field Guide to Intermountain Sedges* (Hurd et al., 1998).
6) Available literature, reports, conservation plans, and species descriptions on file at the Malheur National Forest Supervisor's Office.
7) Project maps and aerial photographs provided by the Project Leader and/or Project Interdisciplinary Team Leader.

Results of this pre-field review:

- Documented occurrences of TEPS plant species within the project area: **Yes.** *Carex interior* was documented during a survey of proposed water developments on a tributary to Dunstan Creek, August 2002. Additional populations of *Carex interior* were located along Dunstan Creek and tributaries in June and July of 2005. Several patches of *Eleocharis bolandari* were documented in the Sunshine Flat area of the project in 2005.

- Project proximity to known TEPS plant populations: *Carex interior* sites are found one to three miles west of the project area in Upper Gibbs, Jungle, and Bear Creek Drainages. *Botrychium crenulatum* is documented four miles west of the project area at 4700' in the Hawkins Creek drainage. Additonal *Botrychium spp*. have been documented during surveys conducted along Big Creek, northwest, and Vinegar Creek, northeast, of the project area.

Field Surveys

Field surveys were completed during June and July, 2005, by Julie Gibson, Biological Technician, and Nancy Hafer, District Botanist, Blue Mountain Ranger District. Surveys were performed within areas considered to have potential habitat.

Eleven sensitive plant species have potential habitat within the analysis area: *Botrychium ascendens, Botrychium crenulatum, Botrychium lanceolatum, Botrychium minganense, Botrychium montanum, Botrychium pinnatum, Carex backii; Carex idahoa; Carex interior, Phacelia minutissima, and Eleocharis bolandari.*

Description of Affected Species and Effects Analysis

In this section, the effects determination is given for the Proposed Action or the No Action alternative for species with similar habitats. Individual species descriptions and effects discussions follow.

Plant Species Associated with Dry Habitat

These species are found in rock outcrops, talus slopes, rocky scabs in ponderosa pine stands, or grass steppe habitats.

Carex backii (Back's sedge)
Status Federal: none
State: Candidate
Region 6:Sensitive

Effects Determination for Plant Species Associated with Dry Habitats

Proposed Action

Project impact to this habitat group is low or limited since these plants inhabit non-forested or sparsely forested habitat. The Proposed Action may impact individuals or habitat, but should not contribute to a trend towards federal listing or cause a loss of viability to the species.

Carex backii (Back's sedge)

Environmental Baseline

There is scant information on this species on the Malheur National Forest. On the Emigrant Ranger District (Malheur National Forest) this species has been found on a terrace above a stream in association with ponderosa pine (*Pinus ponderosa*), common snowberry (*Symphoricarpos albus*), and scattered Douglas-fir (*Pseudotsuga menziesii*), but generally in less shrubby areas of this plant association. At higher latitudes the preferred habitat of this sedge species is lowland to mid-montane sites that show substrate movement on steep slopes or are closely associated with rock outcrops. On the Wallow-Whitman National Forest it has been found in dappled to deep shade and includes a shrub component or are within ponderosa pine forests on rocky ridge tops, or growing in proximity to basaltic rock outcrops. Associated species include red alder (*Alnus rubra*), red osier dogwood (*Coses sericea s. sericea*), mountain alder (*Alnus incana*), other dry land sedges, and old man's whiskers (*Geum triflorum*).[4]

The flowering period is July to August.

[4] Jean Wood, former District Botanist, personal communications with Elizabeth Crowe, April 1999.

Direct Effects and Indirect Effects

No populations of the Back's sedge have been found within the analysis area, but potential habitat may exist.

Ground disturbing activities, such as use of logging equipment or fireline construction, would be detrimental to the species and habitat, however, such activities are not likely to occur within close proximity to riparian habitat or rocky outcrops.

Cumulative Effects

Past road building, yarding and log landing use may have reduced habitat by changing water availability. Invasive species such as red top (*Agrostis stolonifera*) and Kentucky blue grass (*Poa praetensis*) have invaded from riparian areas and may be the most serious threat this species.

Plant Species Associated with Seasonally Moist Habitat

These species are found in isolated areas where localized moisture is only available in the spring and are found within forested stands, veratrum meadows, or grass-steppe habitats.

Carex idahoa (Idaho sedge)
(formerly *Carex parryana*)
Status Federal: none
State: none
Region 6: Sensitive

Eleocharis bolanderi (Bolanders Spike Rush)
Status Federal: none
State: Sensitive
Region 6: Sensitive (2008 list)

Phacelia minutissima (least phacelia)
Status Federal: Species of Concern
State: Candidate
Region 6: Sensitive

Effects Determination for Plant Species Associated with Seasonally Moist Habitat

Proposed Action
The proposed activities could impact individuals or habitat. Activities would not contribute to a trend towards federal listing or cause a loss of viability to either species.

Carex idahoa (Idaho sedge)

Environmental Baseline:

No populations of *Carex idahoa* have been found within the analysis area, although there are areas of potential habitat.

This sedge is a loosely tufted perennial that grows from lowlands to moderate elevation. Its range is chiefly east of the continental divide but it extends onto the Pacific slope in central and east Idaho and northern Utah; it is also known from northeast Oregon and central Nevada.

Carex idahoa grows in the driest communities of moist meadows, swales, and moist, low ground around streams and lakes, and on prairies and high plains as well. Associated plants found on a wetland classification plot on the Emigrant Creek Ranger District were *Poa pratensis, Agrostis stolonifera, Juncus balticus*, and *Carex praegracilis.* *Carex idahoa* can reproduce via creeping rhizomes, and by seed production. Because it is wind-pollinated, it requires no pollinator insects.

Direct, Indirect, and Cumulative Effects

Because of its habitat, *Carex idahoa* is not likely to be affected by logging or thinning activities, as long as vehicles and machinery avoid meadows and moist ground around streams.

There is no information about the effects of fire on *Carex idahoa*. Because it grows in the driest associations of moist meadows, its habitat could be affected. If a fire is low to moderate in severity, the creeping rhizomes will probably survive and sprout after the burn. This sedge's overall habitat would probably not be negatively affected by low intensity prescribed burning, especially fall prescriptions.

Noxious weeds, knapweeds in particular, can spread rapidly in this species' preferred habitat. Knapweed sites are documented along roads within and adjacent to the project area. Dalmation toadflax, white top, St. Johns wort, and Canada thistle are also documented.

Cumulative Effects

Historic heavy grazing, including late season use that removed the seed crop may have reduced occurrences of this sedge in NE Oregon.

Lowered water tables associated with stream channel degradation, and the loss of beaver created wetlands may have reduced potential habitat.

Phacelia minutissima (least phacelia)

Environmental Baseline

No populations of *Phacelia minutissima* have been found within the analysis area, although potential habitat is present. Elevation of the project area may be slightly lower than optimum for this plant.

Phacelia minutissima is a regional endemic of the Pacific Northwest, found in Oregon, Washington, Idaho, and Nevada. It grows at moderate elevations (generally 5000 to 7000 feet) in the mountains, in micro-habitats that are at least vernally moist. It is known from the Wallowas, from the Aldrich Mountains, and from one upland site, near upper Camp Creek, a tributary to the Middle Fork John Day River and southwest of the project area.

According to Atwood (1996), least phacelia grows along streambanks in sagebrush communities and in aspen stands. In the Blue Mountains it often occurs in association with *Veratrum californicum* (false hellebore) and *Wyethia helianthoides* (white mules ears) in vernally moist meadows and small scablands that are common throughout the forest. In currently known sites, it exists in relatively disturbed habitat where its greatest threat may be invasion by exotic plant species such as *Lotus corniculatus* (birdsfoot trefoil).

Populations of least phacelia are most abundant in wet years, though its diminutive size, along with its annual life cycle, makes this plant difficult to locate. For this reason it is possible that it is more widespread than current records indicate. The first population to be found in the Middle Fork John Day watershed was documented in summer, 2001.

Direct and Indirect Effects

Timber harvest activities have little effect on least phacelia as long as they avoid wet meadows and riparian habitat. Meadows supporting *Veratrum californicum* (California false hellebore) should be avoided with vehicles and heavy equipment, even if they dry out late in the season.

Prescribed fire allowed to creep is not likely to adversely impact favored habitat if conducted in the fall. Wet meadows and scabs supporting least phacelia should be avoided by heavy foot or ATV traffic in spring. Burning through these areas early spring would likely not be possible because of moisture and lack of flammable vegetation. Because the population documented in the upper Camp Creek area has continued to produce new plants after various disturbances, proposed activities would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species .

Cumulative Effects

Historic heavy grazing and overuse of riparian zones and meadows, as well as invasion by weeds, may have reduced the extent and abundance of least phacelia throughout its range, and may have degraded potential habitat as well. While it can exist in areas of moderate disturbance, its survival on severely impacted soils is in question.

Eleocharis bolanderi (Bolander's spikerush)

Environmental Baseline:

Several sites containing *Eleocharis bolanderi* have been found within the eastern half analysis area, along vernal channels in an area called Sunshine Meadow (Gibson 2005). FS road 2045 is the northern boundary to this meadow.

Little information is available about *Eleocharis bolanderi,* which was known only from historic records (1940's) until it was located in Grant and Malheur counties in 2002 (J.Wood, 2007). This spikerush is a densely tufted, grass-like perennial that grows in seasonally wet meadows and channel edges in grass steppe-scablands, from foothills to moderate elevations in the mountains. Its range occurs within Oregon, Idaho, California, Nevada, Utah, and Colorado.

Flowering period is June through July.

Direct, Indirect, and Cumulative Effects

Because of its habitat, *Eleocharis bolandari* is not likely to be affected by logging or thinning activities, as long as vehicles and machinery avoid meadows and moist ground around streams. Temporary road construction across meadows or scabs is to be avoided.

There is no information about the effects of fire on *Eleocharis bolanderi* . Previous year's leaves and culms often persist, possibly providing some fuel to carry a ground fire late season. If a fire is low in severity, the plant will probably survive and sprout from rhizomes after the burn. This spikerush's overall habitat would probably not be negatively affected by low intensity prescribed burning, especially fall prescriptions.

Cumulative Effects

Historic heavy grazing or trampling may have reduced occurrences of this spike rush in NE Oregon.

Lowered water tables associated with stream channel degradation may have reduced potential habitat

Plant Species Associated with Riparian Habitat

These seven species are found in perennially moist ground at the edges of riparian areas, including bogs and wet meadows, seeps, springs, or streams.

Botrychium ascendens
(ascending moonwort)
Federal: Species of Concern
State: Candidate
Region 6: Sensitive

Botrychium crenulatum
(crenulate moonwort)
Federal: Species of Concern
State: Candidate
Region 6: Sensitive

Botrychium lanceolatum
(lance-leaf moonwort)
Federal: None
State: None
Region 6: Sensitive

Botrychium minganense
(Mingan moonwort)
Federal: None
State: None
Region 6: Sensitive

Botrychium montanum
(mountain moonwort)
Federal: None
State: None
Region 6: Sensitive

Botrychium pinnatum
(pinnate moonwort)
Federal: None
State: None
Region 6: Sensitive

Carex interior
(inland sedge)
Federal: None
State: None
Region 6: Sensitive

Effects Determination for Plant Species Associated with Riparian Habitat

No action
Because the no action alternative may increase vegetation susceptibility to high intensity fire, it may adversely impact Botrychium species by affecting habitat: by removing shade, damaging rhizomes, or reducing or temporarily eliminating necessary mycorrhizal associations. However, no action will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Proposed Alternative
Riparian areas, seeps, and springs should be avoided by vehicles and all off-road equipment and logging activity. While Botrychium plants were not located during the survey period, habitat exists in several drainages and seeps, particularly in the Balance and Dunstan drainages within the project area. Prescribed fire allowed to back into riparian areas may impact individual plants, but as long as fire intensity is low, impact to surrounding habitat and overstory trees and shade should be minimal.
Proposed activities should have minimal impact on individuals and will not likely contribute to a trend towards federal listing or cause a loss of viability to the species.

Botrychium Species
None of the six Botrychium species have been documented within the project area, however several species are documented in similar habitat in adjacent drainages west, northwest, and northeast of the project area. In this evaluation, all Botrychium species with occurrence potential on the district are treated under a single analysis because they have common habitat requirements and are frequently found growing together.

Environmental Baseline:

Botrychiums, also known as moonworts, are small primitive plants closely related to ferns. They reproduce by spores, and are known to be mycorrhizal, though many details of their life history and growth requirements are still unknown. Although green and apparently photosynthetic, the species considered here are all capable of surviving for years with only sporadic above-ground growth, apparently drawing reserves from the host plants with which they have mycorrhizal connections. As a result, populations of these moonworts appear to fluctuate from year to year, depending on how many plants produce visible leaves and/or fruiting bodies. The factors determining yearly growth are not yet understood.

These six Botrychium species are found sporadically throughout the mountains of the Pacific Northwest and the Rockies, and *B. minganense* is known across Canada to the eastern part of the continent. In the Blue Mountains they have primarily been found between 5000 and 7500 feet elevation.

Preferred habitat of these species is perennially moist ground at the edges of small streams, wet meadows, springs, and small seeps within forest openings. It should be emphasized that even the smallest spring or seep provides good potential habitat, especially above 4500 feet elevation.

Plants often favor shade from an overstory of conifers or riparian shrubs such as alder and red-osier dogwood, but also occur in openings or meadows with only grasses and forbs providing shade. Wet meadow edges with encroaching lodgepole pine are prime habitat sites, as are the mossy openings around springs in mixed conifer forest that includes sub-alpine fir and Engelmann spruce. On the Umatilla National Forest several botrychium species are found under young spruce in moist tree plantations that are 20 to 40 years old. Plants frequently associated with botrychiums in the Blue Mountains include strawberries and violets, *Pinus contorta, Picea engelmannii, Alnus incana, Vaccinium scoparium, Carex aurea, Geum macrophyllum, Hypericum anagalloides, Mimulus moschatus, Orthilia secunda, Platanthera dilatata, Ranunculus uncinatus*, and other botrychium species.

In many instances, moonworts appear to be "seral" species favored by one-time ground disturbance, tending to appear 10 years or more after such disturbance occurs. It is possible that they die out eventually, as forest succession shades out understory plants. A mosaic of forest habitats that shift over time, providing new openings as old ones fill in, may best ensure the long-term survival of botrychiums. However, until this is definitively known and the needs of these moonworts are better understood, it is important to preserve existing populations. Since most of the plants are quite small and are difficult to find, they may be easily overlooked except in intensive surveys. Their habitat, on the other hand, is readily identified and protected or avoided during management activities.

Reproduction of these plants is accomplished by the dispersal of spores by wind and water, and pollinators are not required.

Direct and Indirect Effects

Ground disturbance, such as soil disruption by logging and yarding activities, would reduce the quality of habitat, and could disrupt needed mycorrhizal connections, and cause direct mechanical damage to above-ground plants during the growing season. Loss of individual above-ground stems, by herbivores, unseasonable frost, or mechanical damage, may not harm plants in the long run, considering that they do not appear above ground every year, and probably rely on nutrients obtained from the mycorrhizal connections to persist.

Along with ground disturbance, changes in moisture availability such as loss of ground water sources or hydrological changes, are probably the most potentially damaging to moonwort populations. While existing plants may have the capacity to survive droughty periods through their mycorrhizal connections, germination and establishment of new plants require ample moisture.

The effects of fire are not known. Because moonworts are limited to very wet microhabitats in the Blue Mountains, they are unlikely to be directly affected by fire, unless it is severe. However, the death of overstory trees due to burning may remove a necessary mycorrhizal host and impact an entire population, as in those that grow at the edges of meadows around small lodgepole pine. Loss of the shade that many populations favor could also affect long term survival of these species. It is not known what consequences such fire effects might have, or whether an existing population could persist under these circumstances.

Because sites capable of supporting botrychiums are usually classified as riparian, they should not be affected by harvest activities. For the same reason, low intensity prescribed fire is unlikely to damage potential habitat or any plants that may be present. Because the six sensitive species considered here have a broad distribution on the continent, possible impacts to individuals from this project would not jeopardize the survival of the species as a whole.

Cumulative Effects

Loss of undisturbed wet sites capable of supporting botrychiums, whether due to water "developments" for livestock, water uses, or to upstream, upslope hydrologic disturbance can most effectively eliminate potential habitat. The Forest Plan, as amended by PACFISH, should adequately protect potential habitat.

Carex interior (interior sedge)

Environmental Baseline:

Interior sedge has been documented within the project area, in 2002, and new populations were located in 2005. All sites are located associated with seeps and tributaries found in the Dunstan Creek drainage.

Carex interior is a densely tufted sedge that grows in lowland to mid-montane elevations. It is a widespread North American species found throughout the range of the Pacific Northwest, as defined by Hitchcock and Cronquist; however, it is apparently uncommon in Oregon. It is known to inhabit saturated riparian areas with year-round surface water. It thrives in full sun, but can survive with small amounts of shade. Associated species include *Alnus incana, Carex cusickii, Carex utriculata, Cicuta douglasii, Deschampsia cespitosa, Juncus* spp., and *Menyanthes trifoliata*.

Carex interior is not rhizomatous and reproduces only by seed.

Direct and Indirect Effects

Inland sedge grows in very wet habitats that are unlikely to be affected by prescribed fire. If fire did creep into an area where this sedge grows, it would likely only affect the above ground portions of the plant. The rhizomes embedded in wet mud can probably survive all but the most severe fires, allowing the plants to resprout rapidly after a burn.

The use of heavy equipment associated with logging and road construction can harm fragile, wet soils on which *Carex interior* grows. Because of its location in wet areas, its habitat is protected from mechanical disturbance by Forest Plan standards.

Cumulative Effects

Heavy domestic livestock grazing and wild ungulate use may have decreased the abundance of this sedge across the landscape. Like other sedges, *Carex interior* remains palatable fairly late in the summer and may become preferred forage when other plants are drying and late season grazing can remove the seed crop, negatively impacting this species' reproduction. Excessive use by ungulates can also harm the fragile, wet soils this sedge inhabits.

Water developments such as cattle troughs and ditches for irrigation have decreased wet meadow habitat. Lowered water tables associated with stream channel degradation and loss of beaver wetlands has also reduced wetland habitat that has the potential to support Carex interior

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