United States Department of Agriculture

# Ten Cent Community Wildfire Protection Project

## Draft Environmental Impact Statement

umatilla and wallowa-whitman
NATIONAL FORESTS

North Fork John Day Ranger District
and Whitman Ranger District

Publication No.
FS-F14-NF-01a-17

October
2016

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# Ten Cent Community Wildfire Protection Project
# Draft Environmental Impact Statement
# Grant County, Oregon


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**Abstract:** The USDA Forest Service is preparing this Draft Environmental Impact Statement for the Ten Cent Community Wildfire Protection Project (Ten Cent). This Project proposes surface and canopy hazardous fuels reduction activities to modify potential wildfire behavior within portions of the Ten Cent project planning area on Umatilla and Wallowa-Whitman National Forests. Four Alternatives are analyzed, including the No Action Alternative (Alternative 1). The Proposed Action (Alternative 2), and two additional action alternatives (Alternative 3 and 4). Alternative 3 includes forest thinning activities across 13,445 acres. Alternative 4 includes forest thinning activities across approximately 12,000 acres. Action Alternatives include commercial thinning up to 21 inches in diameter at breast height, small diameter thinning, prescribed fire, mechanical fuels treatment, and roadside hazard treatments. Private and commercial firewood opportunities are also proposed to meet the purpose and need of this project.

It is important that reviewers provide their comments at such times and in such a way that they are useful to the Agency's preparation of the EIS. Therefore, comments should be provided prior to the close of the comment period and should clearly articulate the reviewer's concerns and contentions. The submission of timely and specific comments can affect a reviewer's ability to participate in subsequent administrative review or judicial review. Comments received in response to this solicitation, including names and addresses of those who comment, will be part of the public record for this proposed action. Comments submitted anonymously will be accepted and considered; however, anonymous comments will not provide the respondent with standing to participate in subsequent administrative or judicial reviews.



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OR submit electronic comments on the Ten Cent project webpage: http://www.fs.fed.us/nepa/fs-usda-pop.php/?project=45203 by selecting the "Comment on Project" link in the "Get Connected" group at the right hand side of the project webpage.


**Comments Received by:** The end of the **45 days following publication of the notice of availability** (NOA) in the Federal Register. The publication date of the NOA in is the exclusive means for calculating the comment period.

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## Summary

The Umatilla and Wallowa-Whitman National Forests proposes multiple types of fuel reduction treatments designed to increase crown spacing and reduce surface fuels along the private land boundaries and extending up to 1.5 miles away from those boundaries. The Ten Cent Community Wildfire Protection Project planning area is approximately 37,800 acres in size: 23,990 acres within the Umatilla National Forest (Umatilla) (63 percent), and 13, 810 acres within the Wallowa-Whitman National Forest (Wallowa-Whitman) (37 percent). It is located in Grant County, Oregon within the Granite Creek Watershed. The planning area also includes approximately 9,500 acres of the North Fork John Day Wilderness.

Treatments for this project include roadside treatments, small diameter thinning, commercial thinning, mechanical fuels reduction, riparian habitat conservation area treatment, prescribed burning, and prescribed fire in wilderness. These are described in Chapter 2 of this document as part of prescriptions for treatment developed by the interdisciplinary team (IDT). Fuels projects are designed to create contiguous defensible fuel profile zones along all private land borders within the project area, along strategically identified roads, and within overlapping forest stands. Treatment width will be dependent on current stand conditions as well as other resource management needs. Proposed defensible fuel profile zones are designed to help facilitate safe evacuation of the public in the event of a wildfire, slow the progress of a wildfire coming out of the Wilderness, and provide suppression forces a higher probability of successfully managing a wildfire using indirect or more direct suppression tactics.

Defensible fuel profile zones are defined as linear paths through a forested area in which surface and canopy fuels have been altered but where significant overstory is retained to shade the surface fuels. Fires that exhibit flame lengths of less than four feet can generally be attacked at the head or flanks by firefighters using hand tools. Handline should be able to hold the fire within the line. With ladder fuels removed the chance of the fire getting into the tree crowns is greatly reduced as well.

The area affected by the proposal includes 8,137 acres of stands identified that currently support flame lengths greater than or equal to four feet and have a high potential for crown fire initiation. A total of 6,035 acres would be treated along egress routes within the project area. About 38,000 acres of prescribed fire is proposed across the watershed including a maximum of about 9,500 acres located in the North Fork John Day Wilderness.

The purpose of this project is to provide a safer working environment for firefighters while improving probability of success in protecting life and property associated with the adjacent private lands in the event of a wildfire within or threatening the values at risk in the Granite Zone as defined by the Grant County Community Wildfire Protection Plan. There is a need; (1) to create a series of strategically placed defensible fuel profile zones (defensible zone) in order to modify the existing fuels to reduce potential fire behavior to low intensity and reduce the probability of crown fire and spotting; (2) to enhance landscape resilience to future wildfires within the Granite Creek watershed; (3) to maintain and enhance local communities and economies by providing a diversity of resource management activities, recreational opportunities, commodity outputs, and ecosystem services from public lands. The overall need for the Ten Cent Community Wildfire Protection Project is to modify the predicted fire behavior in the project area while supporting local communities by providing goods and services.

The proposed actions, with the exception of some prescribed burning, are within 1.5 miles of identified values at risk (cities of Granite and Greenhorn, private inholdings/structures, ingress and egress routes) with most of the treatments occurring within 0.25 miles of the values at risk. The proposed action (Alternative 2) was originally listed as a proposal on the Umatilla National Forest Schedule of Proposed Actions in October 2014 and updated periodically during the analysis.

Government-to-government letters were sent to the Nez Perce Tribe, the Confederated Tribes Warm Springs Reservation of Oregon (Wasco, Warm Springs, Paiute); and the Confederated Tribes of Umatilla

Indian Reservation (Walla Walla, Cayuse, Umatilla Tribes. These Tribes have Ceded lands and/or Usual and Accustomed Lands within the project area.

Public scoping was conducted concurrently with the provision of a Legal Notice of Proposed Action and Solicitation for Public Comment. Letters were sent to interested participants with the project description. Scoping information and the notice and opportunity to comment were mailed to 162 individuals and/or organizations that had previously expressed interest in fuels reduction and wildfire protection projects on the North Fork John Day and Whitman Ranger Districts. A legal notice requesting participation in the project development and providing opportunity to comment was published in the *Baker City Herald* August 2015 and in the *East Oregonian* September 2015. A public meeting with responsible officials was held in November 2015.

The scoping letter and supporting documents are posted to the Umatilla National Forest website for public review. As a result of scoping, the Forest Service received 12 letters from interested and affected parties and agencies. Comment documents were tracked upon receipt to assure all relevant comments were captured. Comments, questions, and issues raised by the public were reviewed. Issues defined as concerns about effects that may be directly or indirectly caused by implementing the proposed action were resolved through alternative or project design criteria development. These issues identified by the team included:

**Issue 1:** Large scale landscape prescribed burning may have negative impact to air quality.

**Issue 2:** Prescribed fire treatment may be proposed inappropriate for Potential Vegetation Groups (PVGs) and associated biophysical environments.

**Issue 3:** Prescribed fire treatments in the Wilderness may have a negative impact on Wilderness characteristics.

**Issue 4:** Mechanical and hand treatments, such as, hand thinning and pilling, mastication, and grapple piling would not maximize economic benefits.

**Issue 5:** Some proposed prescribed fire treatments may be a threat to forest investments such as white pine plantations and Subalpine fir stands.

**Issue 6:** Proposed Action would impact connectivity habitat affecting the ability of wildlife to move freely between late and old structure and designated old growth stands and would not meet Forest Plan standards following implementation.

These issues led the agency to develop alternatives to the proposed action including:

Alternative 1: Under the no action alternative, current management plans would continue to guide management of the project area. No project activities would be implemented to accomplish project goals. This no action alternative serves as a baseline by which to compare the effects of the action alternatives.

Alternative 2: The proposed action as scoped was developed to meet the purpose and need of the Ten Cent Community Protection Project. In order to compare the effects of the proposed action to effects of other alternatives developed as a result of scoping, minor modifications were made to this alternative and are described in Chapter 2.

Alternative 3: Addresses the air quality, prescribed fire in cold/moist PVG and wilderness, Economics, Forest Investment protection (White Pine) issues identified in scoping. Project would be designed to limit the amount of prescribed fire applied to the landscape and maximize the mechanical treatment across the project area. Mechanical treatment units would be thinned heavier under this alternative.

Alternative 4: Addresses prescribed fire in wilderness, wildlife connectivity, and reducing the amount of mechanical treatment by thinning less. This alternative would also focus on leaving larger wildlife islands within units, not thinning the wildlife corridors, and feathering treatments away from islands, corridors and private land boundaries. Heavy to light feathering would occur adjacent to the private land and light to heavy feathering would occur adjacent to the wildlife corridors.

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# Chapter 1. Purpose of and Need for Action

## 1.1 Introduction

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

- **Purpose of and Need for Action (Chapter 1):** This chapter briefly describes the proposed action, the need for that action, and other purposes to be achieved by the proposal. This section also details how the Forest Service informed the public of the proposed action and how the public responded.
- **Alternatives, Including the Proposed Action (Chapter 2):** This chapter provides a detailed description of the agency's proposed action as well as alternative actions that were developed in response to comments raised by the public during scoping. It describes the key management direction used in developing the project which comes from the Forest Plan of the Umatilla and Wallowa-Whitman National Forests. The end of the chapter includes summary tables comparing the proposed action and alternatives with respect to the activities proposed for each alternative, how each addresses the purpose and need of the project, how each addresses relevant issues, and their environmental impacts.
- **Affected Environment and Environmental Consequences (Chapter 3):** This chapter describes the affected environment and environmental impacts of the proposed action and alternatives on Forest resources and the overall response from the Forests to responsible opposing views.
- **Consultation and Coordination (Chapter 4):** This chapter provides a list of preparers and agencies consulted during the development of the EIS.
- **Appendices:** The appendices provide more detailed information to support the analyses presented in the EIS.

Additional documentation, including maps and more detailed analyses of project area resources, may be viewed by appointment at the North Fork John Day Ranger District at 401 Main St, Ukiah, Oregon 97880 or on the project website: http://www.fs.usda.gov/project/?project=45203.

## 1.1 Proposed Project Location

This project is located within the Granite Creek Watershed on the Umatilla and Wallowa-Whitman National forests (Map A-1). As the analysis area is based on the Granite Creek Watershed, there is a small portion consisting of approximately 160 acres on the Malheur National Forest. There are no planned treatments or actions for this portion of the analysis area; hence, it is excluded from further analysis. The planning area also includes approximately 9,500 acres of the North Fork John Day Wilderness. The project area is located in Grant County, Oregon, in the following locations:

- Southeast corner of Township 8 South, Range 34 East
- South half of Township 8 South, Range 35 East
- South half of Township 8 South, Range 35 V2 East
- Southwest corner of Township 8 South, Range 36 East

- East half of Township 9 South, Range 34 East
- All of Township 9 South, Range 35 East
- All but Southeast corner of Township 9 South, Range 35 V2 East
- The western half of Township 9 South, Range 36 East, Willamette Meridian surveyed

Numerous residences and the communities of Granite and Greenhorn exist on private lands adjacent to the Umatilla and Wallowa-Whitman National Forests within the proposed project area. This area is identified in the Grant County Community Wildfire Protection Plan as a high risk area in the Communities at Risk Assessment.

The Ten Cent project planning area is approximately 37,800 acres in size: 23,990 acres within the Umatilla National Forest (Umatilla; 63 percent), and 13,810 acres within the Wallowa-Whitman National Forest (Wallowa-Whitman; 37 percent). (**Error! Reference source not found.**, Appendix A).

## 1.2 Background

The Forest Service has prepared this draft Environmental Impact Statement (draft EIS) for the Ten Cent Community Wildfire Protection Project. Within the project area very few large fires have occurred within the last 100 years. Until recently most fire starts received active suppression efforts. Approximately 5,326 acres from 14 different fires have burned within the 94,513 acre planning area (see figure 12). That equates to approximately 6% of the landscape within the planning area has burned within the last 115 years. The Vinegar Fire of 2013 has been the largest recorded fire to burn within the 94,513 acre planning area. Records show approximately 429 fire starts in the planning area between 1970 and 2015. Lightning fires caused 87% of these fires and the remaining 13% were human caused. The number of ignitions prior to 1970 were not recorded.

Most large fires on this part of the Umatilla and Wallowa-Whitman National Forests typically occur in mid to late summer and grow largest when there is a combination of dry fuels and high winds. The extent, likelihood, and severity of future wildfires in the area are unknown. However, the large number of both human and natural fire starts, the current fuel loading and the recent history of large fires near the analysis area provide evidence that a large fire within the area is likely.

The 2015 fire season in the Pacific Northwest was the most severe in modern history and an example of potential outcomes based on current forest condition. During the 2015 fire season Oregon and Washington experienced more than 3,800 wildfires (almost 2,300 in Oregon and more than 1,500 in Washington) that burned more than 1,600,000 acres (more than 630,000 acres in Oregon and more than 1,000,000 acres in Washington)—including 1,325 fires representing 507,000 acres on Forest Service lands. In 2015, wildfires originating on National Forests in Grant County became the Canyon Creek Complex and destroyed 43 primary residences, numerous other structures, and caused millions of dollars in economic loss while creating multiple other social hardships.

The Ten Cent project recognized the need to reduce extreme fire hazard and provide protection to private property and identified values at risk. These current conditions and objectives were identified in the Grant County Wildfire Protection Plan. In this plan, nine zones across Grant County were identified to receive a Wildfire Risk Assessment. The Granite zone includes the entire Ten Cent Community Wildfire Protection Project area. Each of the zones received a rating of low, moderate, high or extreme rating for overall risk of wildfire affecting the zone. Five

factors were considered in determining the risk rating; ignition risk, hazard, values at risk, protection capability and structural vulnerability. The ratings were based on only four of the factors as structural vulnerability was not evaluated at the time of plan completion. The Granite zone rated high for risk from wildfire. The plan has described this zone as being extremely vulnerable to wildfire due to location, vegetation type, topography, communication structure and the limited structural fire protection available. The purpose and need was developed considering the current condition of the project area as well as the following goals identified in the Grant County Protection Plan:

*Protect against potential loss to life, property and natural resources from forest fire by;*

- Establishing and maintaining escape routes and adjacent corridors
- Identifying areas at risk and hazards
- Reducing wildfire risk to identified areas

*Identify incentives for fire protection and community participation by;*

- Assessing and utilizing federal and other grant dollars

*Monitor the changing conditions of forest fire risk and citizen action over time;*

- Establishing a monitoring and evaluation process

*Improve community safety through continued wildland fire education and awareness by*

- Setting realistic expectations for reducing forest fire risk
- Promoting visible projects and program success
- Developing strategies for increasing citizen awareness and action for fire and outreach prevention

*Preserve and promote the custom, culture and economic health of Grant County by*

- Identifying economic development and networking opportunities regarding fuel reduction and biomass utilization enterprises

Both the 2015 Canyon Creek wildfire complex and the 2013 Grant County Protection Plan show there is an imminent need to take action in the Ten Cent Project area to improve the probability of success in protecting the communities of Granite and Greenhorn.

## 1.3 Purpose and Need for Action

An interdisciplinary team composed of specialists from a wide array of disciplines developed a proposal consistent with Umatilla and Wallowa-Whitman Forest Plans, by comparing the existing conditions in the project area with the desired conditions from the relevant Forest Plans and Granite Community Wildfire Protection Plan. The need for action in the Ten Cent area is based upon these differences with respect to fuel levels, associated potential wildfire behavior, and related risks to values. These values at risk (Map A-2, Appendix A) include the cities of Granite and Greenhorn, scattered inholdings (intermix), and the ingress/egress routes from private lands. Over 65% of the project area has extreme fire hazard under 97$^{th}$ percentile weather and fuel conditions (see Fuels and Fire Chapter 3 section). Extreme fire hazard equates to high flame lengths and varying degrees of crown fire where suppression efforts become ineffective. Flame lengths were modeled under the 97$^{th}$ percentile and are currently around 4.6 feet, with some stands showing modeled flame lengths as high as 20 feet. Many of the stands within the analysis area are predicted to exhibit active crown fires as well. Given assumptions made from best available science, extreme, and even moderate and high fire hazard would be damaging to valued stand characteristics and other values at risk.

The overall purpose of the Ten Cent Community Wildfire Protection Project is to provide a safer working environment for firefighters while improving probability of success in protecting life and property associated with the adjacent private lands in the event of a wildfire within or threatening the values at risk in the Granite Zone, as defined by the Grant County Community Wildfire Protection Plan. The need for this project is:

- To create a series of strategically placed defensible fuel profile zones (defensible zones) in order to modify the existing fuels to reduce potential fire behavior to low intensity;
- To reduce the probability of crown fire and spotting;
- To enhance landscape resilience to future wildfires within the project area; and
- To maintain and enhance local communities and economies by protecting and enhancing the public lands that provide recreational opportunities, commodity outputs and ecosystem services.

## Grant County Community Wildfire Protection Plan

Grant County's original Community Wildfire Protection Plan was prepared in 2004 and signed in 2005. It was adopted by the Grant County Court in July of 2005. In 2012 the county identified a need to update the 2005 plan. The updated plan was adopted by the county court in August of 2013. The purpose of the update was in response to input from county, state and federal officials; input from the Grant County Communications Task Force; and input gathered from community meetings and absentee landowner outreach. Out of the above outreach a new mission statement was developed. The new mission strives to "reduce the risk from wildfire to life, property and natural resources and assist with resource management of lands within Grant County in a manner that benefits the local economy and maintains and enhances natural resources. " The goals of the revised plan were used to develop the purpose and need of the Ten Cent (see Purpose and Need section above).

The Protection Plan also identified nine zones. The Granite Zone which includes the communities of Granite and Greenhorn is identified in this Protection Plan. This area is identified in the Protection Plan as a high risk area in the Communities at Risk Assessment. All of the proposed activities for the Ten Cent Community Wildfire Protection Project would occur on national forest system lands within the Granite Zone.

## Umatilla National Forest Land and Resource Management Plan

The Umatilla Forest Land and Resource Management Plan (Umatilla Forest Plan) guides all natural resource management activities and establishes management standards and guidelines for the Umatilla National Forest. It describes resource management practices, levels of resource production and management, and the availability and suitability of lands for resource management. This Draft Environmental Impact Statement is tiered to the Final Environmental Impact Statement (FEIS) for the Umatilla National Forest Land and Resource Management Plan, as amended Final Environmental Impact Statement (FEIS) and Record of Decision (ROD). The Umatilla National Forest Plan was prepared and is maintained at the Umatilla National Forest Headquarters in Pendleton, Oregon.

The Umatilla Forest-wide goals most applicable to this project include (USDA Forest Service 1990a, pages 4-1 to 4-3):

- To provide land and resource management that achieves a more healthy and productive forest and assists in supplying lands, resources, uses, and values which meet local, regional, and national social and economic needs.

- To provide and execute a fire protection and fire use program that is cost-efficient and responsive to land and resource management goals and objectives.
- Provide for production and sustained yield of wood fiber and insofar as possible meet projected production levels consistent with various resource objectives, standards and guidelines, and cost efficiency.
- Promote human resources, civil rights, and community development within the zone of influence of the Forest. Promote cooperation and coordination with individuals, groups, landowners, Forest users, Native American tribes, and state and Federal agencies in forest management, and community and economic development.

## Management Direction

As previously noted, about 23,990 acres (or 63 percent) of the project area is within the Umatilla National Forest. The Umatilla Forest Plan (USDA Forest Service 1990a) provides management direction for these areas. The Umatilla Forest Plan made land allocations using management areas (MA), each of which emphasizes a particular desired future condition. Umatilla Forest Plan standards and guidelines provide direction for achieving Desired Future Conditions.

Additional management direction is provided by Umatilla Forest Plan Amendments approved since 1990:

- “Interim Management Direction Establishing Riparian, Ecosystem, and Wildlife Standards for Timber Sales” (USDA Forest Service 1995; also known as Eastside Screens)
- The Eastside Screens (Forest Plan amendment #11; approved 6/12/1995) focuses on potential impacts of timber sales on riparian habitat, historical vegetation patterns, and wildlife fragmentation and connectivity (USDA Forest Service 1995).
- “Interim Strategies for Managing Anadromous Fish-Producing Watersheds on Federal Lands in Eastern Oregon and Washington, Idaho and Portions of California” (USDA Forest Service and USDI Bureau of Land Management 1994; also known as PACFISH).
- PACFISH (Forest Plan amendment #10; approved 2/24/1995) establishes management direction designed to arrest and reverse declines in anadromous fish habitat (USDA Forest Service and USDI Bureau of Land Management 1994).
- The Pacific Northwest Region Final Environmental Impact Statement for the Invasive Plant Program, 2005, hereby referred to as the R6 2005 FEIS. The R6 2005 FEIS culminated in a Record of Decision (R6 2005 ROD) that amended the Umatilla National Forest Plan.
- The R6 2005 FEIS (approved 10/11/2005) amended the Forest Plan by adding management direction relative to invasive plants.

The Forest Plan allocates management areas as the way to characterize the landscape for the type and intensity of management activities that may occur on Umatilla National Forest. Management areas within the project planning area are shown in Table 1-1 (see Map A-3: Land Management Areas, Appendix A).

**Table 1-1: Umatilla Forest Plan Management Areas within Ten Cent planning area**

| Forest Plan Management Areas | Management Area Acres within Planning Area | Acres proposed for treatment by Management Area | Percentage of affected Management Areas proposed for treatment |
|---|---|---|---|
| A3- Viewshed 1 | 2,619 | 1,543 | 59% |
| A4- Viewshed 2 | 40 | 34 | 84% |
| A8- Scenic Area | 3,044 | 23 | 1% |
| A9- Special Interest Area | 1,084 | 354 | 33% |
| B1- Wilderness | 25,008 | 9,500 | 38% |

| Forest Plan Management Areas | Management Area Acres within Planning Area | Acres proposed for treatment by Management Area | Percentage of affected Management Areas proposed for treatment |
|---|---|---|---|
| B2- RNA In Wilderness | 145 | 0 | 0% |
| B7- Wild and Scenic River in Wilderness | 51 | 51 | 100% |
| C1-Dedicated Old Growth | 1,247 | 546 | 44% |
| C7-Special Fish Management Areas | 16,259 | 11,557 | 71% |
| D2-Research Natural Areas | 34 | 0 | 0% |
| P- Private Property | 4,145 | 0 | 0% |
| **Totals** | **53,676** | **23,607** | **44%** |

The following goals are associated with each Forest Plan management area allocation located within the Ten Cent project planning area. Detailed descriptions for each area can be found in the Umatilla Forest Plan.

**A3** **Viewshed 1—Goal:** Manage the area seen from a travel route, use area, or water body, where forest visitors have a major concern for the scenic qualities (sensitivity level 1) as a natural appearing landscape.

**A4** **Viewshed 2—Goal:** Manage the area seen from a travel route, use area, or water body, where forest visitors have a major concern for the scenic qualities as a natural appearing to slightly altered landscape.

**A8** **Scenic Area—Goal:** Protect or enhance the unique natural characteristics of landscapes noted for their scenic beauty.

**A9** **Special Interest Area—Goal:** Manage, preserve, and interpret areas of significant cultural, historical, geological, botanical, or other special characteristics for educational, scientific, and public enjoyment purposes. Viewpoints (Bald Mountain overlooking Looking Glass Canyon) - sites affording opportunities for viewing forest activities and landscape settings.

**B1** **Wilderness—Goal:** Manage to preserve, protect, and improve the resources and values of the forest wilderness, as directed by the Wilderness Act of 1964.

**B2** **Research Natural Area in Wilderness:** GIS exercise identifying where Research Natural (D2) areas overlap Wilderness (B1) areas. **Goal for D2:** preserve naturally occurring physical and biological units where natural conditions and processes are maintained, insofar as possible, for the purposes of: 1) comparison with those lands influenced by man; 2) provision of educational and research areas for ecological and environmental studies; and 3) preservation of gene pools for typical and rare and endangered plants and animals.

**B7** **Wild and Scenic River in Wilderness—** GIS exercise identifying where Wild and Scenic River (A7) overlap Wilderness (B1) areas. **Goal for A7:** manage classified wild and scenic river segments to appropriate standards as wild, scenic, or recreational river areas, as defined by the Wild and Scenic Rivers Act, Public Law 90-542, October 2, 1968 (US Laws, Statutes, etc. 1968), and

expanded by the Omnibus Oregon Wild and Scenic Rivers act of 1988 (Public Laws 100-557).

**C1** **Dedicated Old Growth – Goal:** Provide and protect sufficient suitable habitat for wildlife species dependent upon mature and/or over mature forest stands, and promote a diversity of vegetative conditions for such species.

**C7** **Special Fish Management Area—Goal:** Maintain and enhance water quality and produce high levels of anadromous fish habitat on an area-wide basis.

**D2** **Research Natural Area—Goal:** Preserve naturally occurring physical and biological units where natural conditions and processes are maintained, insofar as possible, for the purposes of: 1) comparison with those lands influenced by man; 2) provision of educational and research areas for ecological and environmental studies; and 3) preservation of gene pools for typical and rare and endangered plants and animals.

**P** **Private Property**

## Wallowa-Whitman National Forest Land and Resource Management Plan

The Wallowa-Whitman Forest Land and Resource Management Plan guides all natural resource management activities on the project area that overlaps the Wallowa-Whitman National Forest (Wallow-Whitman). The Forest Plan, as amended, includes management goals and objectives and standards and guidelines, both forest-wide and specific to land allocations. All proposed activities in this project are consistent with the management guidance and direction provided in the Forest Plan. This Draft Environmental Impact Statement is tiered to the Final Environmental Impact Statement (FEIS) for the Wallowa-Whitman National Forest Land and Resource Management Plan, as amended Final Environmental Impact Statement (FEIS) and Record of Decision (ROD); The 1990 North Fork John Day Motorized Access and Travel Management Program (NFJD TMP) Environmental Assessment (EA) and Decision Notice/Finding of no Significant Issues (DN/FONSI); the 2001 Roadless Area Conservation Rule; the 2005 Pacific Northwest Region Invasive Plant Program FEIS and ROD; the 2010 WWNF Invasive Plants Treatment Project FEIS and ROD.

The Wallowa-Whitman Forest-wide goals which are most applicable to the proposed Ten Cent Project include (USDA Forest Service 1990b, pages 4-1 to 4-3):

- To provide well-planned and executed fire protection and fire use programs that are cost efficient and responsive to land and resource management goals and objectives.
- To provide for production of wood fiber to satisfy National needs and benefit local economies consistent with multiple resource objectives, environmental constraints, and economic efficiency.
- To provide fuelwood for personal and commercial uses.

### Management Direction

As noted above 13, 810 acres (or 37 percent) of the project area is allocated under the Wallowa-Whitman National Forest Plan Forest and its Environmental Impact Statements (as amended) to the following management areas. All applicable management direction specific to the following management areas apply to this project area.

The Forest Plan allocates management areas as the way to characterize the landscape for the type and intensity of management activities that may occur on the Wallowa-Whitman. Management areas within the project planning area are shown in Table 1-2. (see Map A-3: Land Management Areas, Appendix A)

**Table 1-2: Wallowa-Whitman Forest Plan Management Areas within Ten Cent planning area**

| Forest Plan Management Areas | Management Area Acres within Planning Area | Acres proposed for treatment by Management Area | Percentage of affected Management Areas proposed for treatment |
|---|---|---|---|
| MA 1- Timber Production Emphasis | 7 | 0 | 0% |
| MA 6-Backcountry | 984 | 0 | 0% |
| MA 15- Old Growth Preserve | 1763 | 637 | 36% |
| MA 18- Anadromous Fish Emphasis | 37883 | 13631 | 36% |
| **Totals** | **40636** | **14267** | **35%** |

The following goals are associated with each Forest Plan management area allocation located within the Ten Cent project planning area. Detailed descriptions for each area can be found in the Wallowa-Whitman Forest Plan.

**MA 1** **Timber Production Emphasis—Goal:** Management emphasizes wood fiber production on suitable timber lands while providing relatively high levels of forage and recreational opportunities. Temporary forage increases result from silvicultural activities. Timber is managed according to Forest-wide standards and guidelines

**MA 6** **Backcountry—Goal:** These areas are to remain relatively natural and undeveloped. A road density level similar to 1985 levels will be maintained. Although recreational site development is not precluded within this management area the intent is to emphasize semi primitive recreation opportunities. These areas will be accessed largely by trail with some trails open to motorized use.

**MA 15** **Old Growth Preserve—Goal:** maintain habitat diversity, preserve aesthetic values, and to provide old-growth habitat for wildlife. Old-growth stands contain mature and overmature trees in the overstory and are well into the mature growth stage and usually contain a multi-layered canopy and trees of several age classes. Standing dead trees and downed material are present. Evidence of human activities may be present but do not significantly alter the other characteristics and would be a subordinate factor in a description of such a stand

**MA 18** **Anadromous Fish Emphasis—Goal:** This area is intended to achieve and maintain optimum conditions for anadromous fish and provide near-optimum conditions for big game Emphasis is placed on providing anadromous fish habitat at, or near, the maximum potential of the watershed where this area is applied In most instances, it is expected that near-optimum habitat for big game can be provided simultaneously with anadromous fish habitat. Providing quality fish habitat takes priority over big-game habitat where conflicts occur.

## 1.4 Proposed Action

The proposed actions are described in detail as Alternative 2 in Chapter 2 of this document. Overall the Ten Cent Project proposes multiple types of fuel reduction treatments designed to increase crown spacing and reduce surface fuels. These treatments would extend up to 1.5 miles along the private land boundaries. Predicted fire behavior was used to focus on areas with high risk to identified values at risk. The goal would be to create a contiguous defensible fuel profile zones (defensible zones) along all private land borders within the project area. Defensible zones would also be placed along roads identified as strategic to fire suppression activities and ingress/egress routes. Forest stands within these defensible zones would be treated a maximum of 500 feet from both sides of the road. The width of treatment would be dictated by current stand conditions as well as other resource management needs. Commercial and small-diameter thinning, prescribed fire within and outside of wilderness, mechanical fuels treatments, and roadside hazard treatments would create these defensible zones. These defensible zones would help facilitate safe public evacuation in the event of a wildfire, slow the progress of a wildfire coming out of the Wilderness, and provide suppression forces a higher probability of successfully managing a wildfire.

With the exception of some prescribed burning, actions proposed are within 1.5 miles of identified values at risk (cities of Granite and Greenhorn, private inholdings/structures, ingress and egress routes). Most of the treatments occur within 0.25 miles of the values at risk. The area treated would include 8,137 acres of stands identified that currently support flame lengths greater than or equal to four feet and have a high potential for crown fire initiation. A total of 6,035 acres would be treated along egress routes within the project area. About 38,000 acres of prescribed fire is proposed across the watershed including a maximum of about 9,500 acres located in the North Fork John Day Wilderness. See Map A-4: Alternative 2 (Proposed Action) Units and Temporary Roads, Appendix A.

## 1.5 Decision Framework

Based upon the effects of the alternatives, the responsible official will decide to (1) select the proposed action; (2) select one of the alternatives; (3) select one of the alternatives after modifying the alternative with additional mitigation measures or a combination of activities from other alternatives; or, (4) select the no action alternative, choosing not to authorize the Ten Cen Community Wildfire Protection Project. Given the purpose and need, the deciding official reviews the proposed action, the other alternatives, and the environmental consequences in order to make the following decisions:

- How well does the selected alternative meet the purpose and need described in this EIS?
- How well does the selected alternative move the project area toward the desired conditions established in the Umatilla and Wallowa-Whitman Forest Plans?
- Does the selected alternative mitigate potential adverse effects?

## 1.6 Tribal Relations

There are numerous federal statutes that require federal agencies to consult or coordinate with Native American Tribes—the United States acknowledges federally recognized tribes as sovereign nations; hence, interaction takes place on a “government-to-government” basis. There is a federal trust responsibility, largely rooted in treaties through which Indian tribes ceded large portions of their aboriginal lands to the United States in return for the protection of tribal rights as self-governing nations within the reserved lands (i.e., reservations) and certain reserved rights

(e.g., aboriginal hunting, fishing, and gathering rights) to resources outside of those lands. Furthermore, under the canons of construction, the Federal Government recognizes that: (1) treaties should be liberally construed in favor of tribes, interpreted as tribes would have interpreted the treaties at the time of signing them; (2) ambiguities in treaties should be recognized in favor of tribes; and (3) tribes have reserved rights established in treaties and case law.

The Umatilla NF contains Ceded lands and/or Usual and Accustomed lands for three different groups: the Nez Perce Tribe, the Confederated Tribes Warm Springs Reservation of Oregon (Wasco, Warm Springs, Paiute); and the Confederated Tribes of Umatilla Indian Reservation (Walla Walla, Cayuse, Umatilla Tribes). The Wallowa-Whitman NF contains Ceded lands and Usual and Accustomed lands for the Nez Perce Tribe and the Confederated Tribes of the Umatilla Indian Reservation. Government-to-government letters were sent to these Tribes before public scoping was initiated. No comments were received on the initial proposed action prior to drafting this EIS.

The Ten Cent Community Wildfire Protection Project was also presented at the following meetings. USFS signifies that representatives from the Umatilla, Wallowa-Whitman, and Malheur National Forests were all present.

| | |
|---|---|
| **August 23, 2016** | USFS & CTUIR Natural Resource Committee/Program of Work Staff Meeting |
| **May 25, 2016** | USFS & CTUIR Natural Resource Committee/Program of Work Staff Meeting |
| **October 13, 2015** | USFS & CTUIR Wildlife and Cultural Committees/Program of Work Staff Meeting |
| **July 10, 2015** | USFS & CTUIR Natural Resource Committee/Program of Work Staff Meeting |
| **May 5, 2015** | USFS & CTUIR Natural Resource Committee/Program of Work Staff Meeting |
| **September 19, 2014** | USFS & CTUIR Board of Trustees/Program of Work Government-to-Government Meeting |
| **July 15, 2014** | USFS & CTUIR Wildlife and Cultural Committees/Program of Work Staff Meeting |
| **June 4, 2014** | USFS & CTUIR Natural Resource Committee /Program of Work Staff Meeting |

During and after meetings no comments or concerns regarding the Ten Cent project were expressed. As this project moves forward the Umatilla and Wallowa-Whitman will continue to uphold their Federal Trust Responsibility to engage in ongoing government-to-government and staff-to-staff consultation with the Nez Perce, Confederated Tribes Warm Springs Reservation of Oregon, and the Confederated Tribes of Umatilla Indian Reservation.

## 1.7 Public Involvement

The Notice of Intent (NOI) was published in the Federal Register on March 8, 2016. The NOI announced a projected timeline for the draft environmental impact statement. In addition, as part of the public involvement process, the agency originally listed the proposed action as a proposal

on the Umatilla National Forest Schedule of Proposed Actions in October 2014 and the Wallowa-Whitman National Forest Schedule of Proposed Actions in July 2016, and updated periodically during the analysis.

This project was initiated August 2014 with a letter to interested parties. Several responses were received after initial public scoping and were used in the refinement of the proposed action. A second scoping letter was sent out July 2015. A legal notice requesting participation in the project development and providing opportunity to comment was published in the *Baker City Herald* on August 12, 2015 and in the *East Oregonian* on September 5, 2015. Comments were requested within 30 days from publication of the legal notice in the *East Oregonian* on September 5, 2015. A public meeting with responsible officials was held in November 2015. Notes were taken to capture any comments from the nine participants. The notes and list of attendees is included in the project record.

Scoping was conducted concurrently with the provision of a Legal Notice of Proposed Action and Solicitation for Public Comment. Letters were sent to interested participants with the project description. Scoping information and the notice and opportunity to comment were mailed to 162 individuals and/or organizations that had previously expressed interest in fuels reduction and wildfire protection projects on the North Fork John Day Ranger District and the Whitman Ranger District.

The scoping letter and supporting documents were posted to the Umatilla National Forest website for public review. As a result of scoping, the Forest Service received 12 comments from interested and affected parties and agencies. Comment documents were tracked upon receipt to assure all relevant comments were captured. Comments, questions, and issues raised by the public were reviewed. Using the comments from the public, other agencies, and tribes affected by this project (see *Issues* section), the interdisciplinary team developed a list of issues to address.

## 1.8 Issues

The Forest Service separated the issues into two groups: issues and concerns. Issues were defined as those directly or indirectly caused by implementing the proposed action. Concerns were identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations explain this delineation in Sec. 1501.7, "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)…". Issues defined as concerns about effects that may be directly or indirectly caused by implementing the proposed action were resolved through alternative or project design criteria development. The Forest Service identified the following issues during scoping:

**Issue 1:** Large scale landscape prescribed burning may have negative impact to air quality.

Alternatives 3 was developed in response to this Issue identified during scoping. Alternative 3 limits the amount of prescribed fire applied to the landscape by using more mechanical treatment. Differences in alternatives are measured by:

- Acres of prescribed fire proposed
- Particulate matter produced

**Issue 2:** Prescribed fire treatment proposed may be inappropriate for Potential Vegetation Groups (PVGs) and associated biophysical environments.

Alternatives 3 and 4 were developed in response to this Issue identified during scoping. Alternative 3 reduces the amount of prescribed fire proposed by using more mechanical treatments to reach the desired condition and purpose and need of the project. Alternative 4 responds to this issue by not prescribing fire in the Wilderness. Differences in alternatives are measured by:

- Acres of prescribed fire proposed
- Change in structural classes (forest structure)
- Amount of tree vegetation on a unit of land (forest density)
- Change in cover type or potential vegetation (species composition)

**Issue 3:** Prescribed fire treatments in the Wilderness may have a negative impact on Wilderness characteristics.

Alternatives 4 was developed in response to this Issue identified during scoping. Alternative 4 responds to this issue by not prescribing fire in the Wilderness. Differences in alternatives are measured by:

- Acres of prescribed fire proposed in wilderness areas.
- Potential change to wilderness characteristics

**Issue 4:** Mechanical and hand treatments, such as, hand thinning and piling, mastication, and grapple piling would not maximize economic benefits.

Alternatives 3 was developed in response to this Issue identified during scoping. Alternative 3 increases the amount of mechanical treatments used to reach desired condition. Differences in alternatives are measured by:

- Acres of mechanical treatment proposed.
- Sawlog or biomass/fiber volume is measured by 100 cubic feet of solid wood (CCF).
- Revenue and cost of harvest.
- Firewood measured by the amount of cords available.

**Issue 5:** Some proposed prescribed fire treatments may be a threat to forest investments such as white pine plantations and subalpine fir stands.

Alternatives 3 and 4 were developed in response to this Issue identified during scoping. Alternative 3 reduces the amount of prescribed fire proposed by using more mechanical treatments to reach the desired condition and purpose and need of the project. Alternative 4 responds to this issue by not prescribing fire in the Wilderness. Differences in alternatives are measured by:

- Acres of prescribed burning within areas of concern
- Acres of treatments within white pine plantations and subalpine fir stands

**Issue 6:** Proposed Action would impact connectivity habitat affecting the ability of wildlife to move freely between late and old structure and designated old growth stands and would not meet Forest Plan standards following implementation.

Alternatives 4 was developed in response to this Issue identified during scoping. Alternative 4 responds to this issue by not thinning areas identified as Connective Corridors. Differences in alternatives are measured by:

- Acres proposed for commercial and prescribed burning within identified connectivity corridors.
- Distribution and quality of habitat connecting late old structure and old growth.

# Chapter 2. Alternatives, Including the Proposed Action

## 2.1 Introduction

This chapter describes and compares the alternatives considered for the Ten Cent Community Wildfire Protection Project. It includes a description and map of each alternative considered. This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. Some of the information used to compare the alternatives is based upon the design of the alternative and some of the information is based upon the environmental, social and economic effects of implementing each alternative. Best available science has shown a combination of forest thinning and prescribed burning can reduce flame length and spotting of embers generated from wildfires (Kailes and Kent 2016). Proposed actions were developed depending on forest stand conditions and crown fire potential (Powell, 2010).

## 2.2 Alternatives Considered in Detail

The Forest Service developed four alternatives, including the No Action and Proposed Action alternatives, in response to issues raised by the public. Maps of treatment units, prescribed fire units, and connective corridors are provided in Appendix A of this document.

### Alternative 1 (No Action)

Under the no action alternative, current management plans would continue to guide management of the project area. No project activities would be implemented to accomplish project goals. This no action alternative serves as a baseline by which to compare the effects of the action alternatives.

### Alternative 2 (Proposed Action)

Alternative 2 is the proposed action that was scoped in July 2015 and was developed to meet the purpose and need of the Ten Cent Project. Overall a majority of the prescriptions or treatments in this alternative remain the same in order to compare the effects of project activities with additional action alternatives developed during scoping. Listed below are minor changes made to the proposed action based on comments received from the public and internal interdisciplinary team review:

- Acre adjustments were made based on GIS and descriptions were modified for readability and to clarify proposed actions.
- Non-commercial[1] thinning will now be referred to as small diameter thinning since it may have commercial value determined by commercial interest as biomass, biochar, post/pole, or firewood. This includes all trees less than seven inches in diameter at breast height for removal. In the initial scoping this included only trees less than nine inches in diameter at breast height.

[1] The lines between what is "commercial" and "non-commercial" material in forest thinning treatments have blurred in the recent past, as markets and machinery have evolved. In an attempt to indicate that the material created from thinning may have commercial value and be sold or it may have no commercial value (and would then be left on site), the stands may include both commercial and small diameter thinning. Either both or one or the other could occur in Prescriptions A-D, depending on the market value.

The Forest Service proposes roadside treatments, small diameter thinning and commercial thinning (up to 21 inches in diameter at breast height), mechanical fuels reduction, riparian habitat conservation area (RHCA) treatment, prescribed burning, and prescribed fire in wilderness to address the purpose and need of the project. These treatments, with the exception of some prescribed burning, are within 1.5 miles of identified values at risk (cities of Granite and Greenhorn, private inholdings/structures, ingress and egress routes) with most of the treatments occurring within 0.25 miles of the values at risk. The area treated would include 8,137 acres within stands identified as currently supporting flame lengths greater than or equal to four feet and have a high potential for crown fire initiation. A total of 6,035 acres would be treated along egress routes within the project area. About 38,000 acres of prescribed fire is proposed across the watershed including a maximum of about 9,500 acres located in the North Fork John Day Wilderness.

A combination of treatments listed above would occur along the private land boundaries and extend up to 1.5 miles away from those boundaries, where indicated by predicted fire behavior. The overall goal of treatments is to create contiguous defensible fuel profile zones (defensible zones) along all private land borders within the project area. Defensible fuel profile zones (defensible zones) are shaded fuel breaks along ridgetops and roads where surface and ladder fuels and tree densities have been reduced in an effort to modify fire behavior and provide a safe place for firefighters to initiate direct fire suppression activities. Fires that exhibit flame lengths of less than four feet can generally be directly attacked at the head or flanks by firefighters using hand tools. Handline should be able to hold the fire within the line. With ladder fuels removed the chance of the fire getting into the tree crowns is greatly reduced as well.

Strategic defensible zones would also be placed along roads and forest stands within these zones, reducing stand densities and surface and ladder fuels. Defensible zone width would be dependent on current stand conditions as well as other resource management needs (with a maximum width of 500 feet from both sides of the road). Proposed defensible zones are designed to help facilitate safe public evacuation in the event of a wildfire, slow the progress of a wildfire coming out of the Wilderness, and provide suppression forces a higher probability of successfully managing a wildfire. Defensible zones would be created with a combination of the following proposed prescriptions.

## Prescription A (Roadside Treatment) 3,209 acres

This treatment was developed to provide a safer working environment for firefighters and improve the probability of success in protecting identified values at risk. Roadside treatments as were identified as places to establish or maintain existing escape routes and treatments will be treated to meet tree spacing levels that are low susceptibility to crown fire (Powell, 2010). The following table was used to develop the desired tree spacing to reach “low” fire susceptibility rating.

**Table 2-1: Estimated equilateral tree spacing in feet for three crown fire susceptibility ratings**

| Cover Type Group[1] | Diameter Class Category[2] | Equilateral tree spacing in feet for each crown fire susceptibility rating[3] | | |
|---|---|---|---|---|
| | | Low | Moderate | High |
| Ponderosa pine | Seed-Sap (< 5” QMD) | >6.4 | 6.4–4.2 | < 4.2 |
| | Poles (5–9” QMD) | > 13.8 | 13.8–8.7 | < 8.7 |
| | Small+ (> 9” QMD) | > 22.2 | 22.2–13.9 | < 13.9 |
| Interior Douglas-fir | Seed-Sap (< 5” QMD) | >9.4 | 9.4-6.1 | <6.1 |
| | Poles (5–9” QMD) | >17.8 | 17.8-11.4 | <11.4 |

| Cover Type Group[1] | Diameter Class Category[2] | Equilateral tree spacing in feet for each crown fire susceptibility rating[3] | | |
|---|---|---|---|---|
| | | Low | Moderate | High |
| | Small+ (> 9” QMD) | >26.8 | 26.8-17.1 | <17.1 |
| Grand Fir | Seed-Sap (< 5” QMD) | >9.1 | 9.1-5.6 | <5.6 |
| | Poles (5–9” QMD) | >19.1 | 19.1-11.4 | <11.4 |
| | Small+ (> 9” QMD) | >30.5 | 30.5-18.2 | <18.2 |

[1]Cover type groups are described in footnote 1 to Table 2-2 [2]Average diameter class categories are described in footnote 2 of Table 2-2; [3]Crown fire susceptibility ratings are defined in footnote 3 of Table 2-2

Equilateral spacing would be applied to roadside treatment areas. Spacing is determined by vegetation and forest type. In mixed conifer stands, trees will be thinned to an equilateral spacing between 18 to 30 feet. Variability would occur in the mixed conifer stands based on species composition and skips and gaps. Lodgepole pine stands within the roadside stands would be thinned to a spacing of greater than 30 feet. Western larch is a desired species in these stand types and would be identified as leave trees and spacing would be based off of those individual trees. In dry ponderosa pine sites, an equilateral spacing of greater than 22 feet on trees greater than seven inches diameter would be used. For all stands identified for this prescription all trees over 21 inch diameter would be retained and the equilateral spacing would incorporate them when present within the stand.

Skips and gaps would range between half an acre to two acres in size and placed strategically across the units. Placement of skips and gaps would meet the desired outcome by reducing potential fire behavior to low intensity and reducing the probability of crown fire and spotting. Skips would be pruned or small diameter thinned where needed to reduce ladder fuels so project objectives are still being met. Prescription A would be applied to all roadside treatment areas which include all or portions of the following roads within the project area: Forest Service Road 1000, 1035, 1038, 1305, 1310, 1900, 7350, 7355, 7366, 7375 and Grant County Road 2.

### Prescription B (Basal Area) 4,650 acres

Project area stands were modeled for potential fire type that is predicted across the stand. Stands identified as having the potential for passive, active, or conditional crown fires would receive priority treatment and are listed by potential fire type below. Based on the fire type modeled a basal area prescription would be used to reduce surface and ladder fuels (as described in the prescribed fire section below). The overall basal area for these stands would range between 40 to 90 square feet per acre. Basal area ranges adjust based on the fire type and were based on the following table (Powell, 2010):

**Table 2-2: Estimated basal area per acre in ft$^2$ (basal area per hectare in m$^2$) for three crown fire susceptibility ratings.**

| Cover Type Group[1] | Diameter Class Category[2] | Basal area per acre for each crown fire susceptibility rating[3] | | |
|---|---|---|---|---|
| | | Low | Moderate | High |
| Ponderosa Pine | Seed-sap (< 5” QMD) | < 59 | 59-149 | > 149 |
| | Poles (5-9” QMD) | < 71 | 71-181 | > 181 |
| | Small+ (> 9” QMD) | < 80 | 80-206 | > 206 |
| Interior Douglas-fir | Seed-sap (< 5” QMD) | < 29 | 29-68 | > 68 |
| | Poles (5-9” QMD) | < 43 | 43-104 | > 104 |
| | Small+ (> 9” QMD) | < 55 | 55-135 | > 135 |
| Grand fir | Seed-sap (< 5” QMD) | < 30 | 30-82 | > 82 |

| Cover Type Group[1] | Diameter Class Category[2] | Basal area per acre for each crown fire susceptibility rating[3] | | |
|---|---|---|---|---|
| | | Low | Moderate | High |
| | Poles (5-9” QMD) | < 38 | 38-103 | > 103 |
| | Small+ (> 9” QMD) | < 43 | 43-120 | > 120 |

[1]Cover type are grouped as follows: **Ponderosa pine:** western larch, whitebark pine, lodgepole pine, ponderosa pine; **Interior Douglas-fir:** Douglas-fir and other species not included in the ponderosa pine or grand fir groups; **Grand fir: grand fir,** subalpine fir, and Engelmann spruce.

[2]Average diameter class pertains to an entire forest polygon; QMD is quadratic mean diameter, the diameter associated with a tree of average basal area (Helms 1998). Diameter class is assumed to reflect an average or representative QMD condition for an entire polygon; “seed-sap” refers to the seedling-sapling diameter classes.

[3]Crown fire susceptibility ratings are based on canopy bulk density: **Low**: CBD ≤ 0.05 kg/m3 (≤ 0.003 lbs/ft3); **Moderate**: CBD 0.06−0.09 kg/m3 (0.004–0.005 lbs/ft3); **High**: CBD ≥ 0.10 kg/m3 (≥ 0.006 lbs/ft3)

All stands under this prescription, strategically placed skips and gaps ranging between 0.5 to 2 acres would be used to increase variability. Placement of skips and gaps on the landscape would consider the overall goal of this project of breaking up continuous surface and ladder fuels.

All trees over 21 inches in diameter at breast height (diameter) would be retained. For trees under 21 inches in diameter and within mixed conifer stands desired species including larch, ponderosa pine, and Douglas-fir would be preferred for species retention within the stand. In dry forest pine dominated stands ponderosa pine would be the preferred species for retention within these stands. The largest or dominant trees within a stand would be left to maintain a large-tree component on the landscape and provide valuable wildlife habitat, fire resistance, and structural diversity. These trees provide valuable wildlife habitat, are fire resilient, and may become large persistent snags after death. All snags which do not pose a safety hazard would be retained and all others would be felled and may be left on site to provide coarse woody debris.

### *Active Crown Fire Stands[2] (not dominated by ponderosa pine), 1,629acres*

In an active crown fire we predict that stand conditions can support a running crown fire across the stand. Stands that have been predicted to support active crown would be would be thinned to a lower basal area of 40 to 50 square feet per acre.

### *Passive Crown Fire Stand[3] (not dominated by ponderosa pine), 2,246 acres*

In a passive fire the crown involvement is limited to torching trees across the stand. Stands predicted to support the passive crown fire would be thinned to a basal area range of 50 to70 square feet per acre.

### *Conditional Crown Fire Stands, (not dominated by ponderosa pine), 115 acres*

In a conditional crown fire it is predicted that stand conditions cannot initiate a crown fire; however a crown fire would be sustained if it were to run into these stands. These stands would vary in recommended basal area range based on proximity to predicted active crown fire stands and forest type. The stands predicted to support the conditional crown fire type would be thinned at a higher basal area range, unless they are directly adjacent to a stand predicted to support an

[2] Stands predicted as active crown fire type include; 112, 134, 138, 139, 153, 162, 164, 174, 175, 178, 191, 192, 193, 194, 195, 212, 213, 215, 216, 217, 218, 225, 230, 241, 242, 243, 244, 246, 247, 248, 254, 260, 261, 268, 272, 285, 286, 287, 288, 289, 290, 291, and 292.

[3] Predicted stands in this fire type include; 118, 119, 120, 121, 122, 128, 129, 130, 156, 172, 173, 179, 180, 181, 182, 205, 206, 207, 208, 209, 210, 211, 226, 229, 236, 237, 238, 239, 240, 249, 267, 270, 271, 274, 276, 278, 279, and 282.

active crown fire. Stands within dry forest mixed conifers would be thinned to the low or middle range basal area. Breaking up the canopy continuity would be the main goal throughout these stands. Overall the basal area range in these stands would be between 70 to 90 square feet per acre. Stands include; 107, 136, 137, 168, 169, 170, and 275.

*Active, Passive, Conditional Crown Fire (dominated by ponderosa pine), 773 acres*

In the Dry Upland Forest Potential Vegetation Group where ponderosa pine is the dominant species, the area would be thinned to a basal area of less than 80 square feet per acre. Units include; 131, 144, 214, 220, 221, 222, 223, 224, 226, 245, 251, 252, 255, 256, 257, 258, 259, 262, 263, 264, 270, and 273

### Prescription C (Small Diameter Thinning) 1,227 acres[4]

Treatment would include thinning to reduce fuels in stands identified as hazardous to the potential loss to property and natural resources from fire in trees less than seven inches diameter at breast height. Variable spacing between trees of 6 to 19 feet from crown to crown would be applied across the stands and skips would be left within the stands at a rate of one acre for every 50 acres treated.

Fuels treatment would concentrate on surface fuels and removal of standing trees considered ladder fuels or trees that may carry fire into the crowns of the overstory trees. Fuels treatments would alter fire behavior reducing the risk of stand-replacing wildfires.

Treatment methods would include hand thinning, hand piling, machine thinning (mastication), machine piling, and hand or machine removal. Depending on the market value, some or all of the material could be sold as well. Biomass[5] removal or firewood opportunities may exist in these units. Species preference would vary by stand.

### Prescription D (Mechanical Fuels) 153 acres

Treatment would include thinning to reduce fuels in stands identified as hazardous to the potential loss to property and natural resources from fire in trees less than seven inches in diameter at breast height. Biomass removal may occur when removing these smaller diameter trees. Fuels treatment would concentrate on downed fuels and thinning ladder fuels that may carry fire into the crowns of the overstory trees. A combination of hand work, mastication, and grapple piling may be used within these units. Variable spacing between trees of 6 to 19 feet from crown to crown would be applied across the stands and skips would be left within the stands at a rate of one acre for every 50 acres treated. Units affected by this treatment include: 108, 133, 135, and 127.

### Connective Corridors

Connectivity corridors between late and old structure stands and Forest-Plan designated old growth management areas (Cl and C2 on the Umatilla National Forest and MA 15 on the Wallowa-Whitman National Forest) have been identified for the planning area. The goal within these corridors would be to provide stands with higher density and more structural complexity.

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[4] Stands considered for this prescription include: 114, 115, 116, 117, 126, 141, 142, 145, 146, 147, 148, 149, 150, 151, 152, 154, 155, 157, 158, 159, 160, 161, 163, 171, 176, 177, 183, 184, 188, 190, 197, 198, 199, 200, 201, 202, 203, 204, 227, 228, 234, 235, 253, 269, 277, 280, 281, 283, and 284.

[5] Biomass is defined as pieces that are not large enough to have any commercial value as saw logs but may meet the purchaser's minimum requirements. The biomass may be used for other utilitarian purposes such as biochar production, co-generation of electricity, commercial fuel pellets, post and pole material, firewood, and other non-traditional uses.

These areas provide for the free movement of late and old structure associated wildlife and other wildlife between habitat patches at the small scale to larger landscape level.

Width of these corridors would vary based on connectivity needs at the stand level. The minimum width of these corridors would be 400 feet. Where proximity to values at risk or other fuels management concerns conflict with corridors wider than 400 feet, the minimum width may be applied. In order to meet the intent of the Eastside Screens Wildlife Standard and the Forest Plan, basal area may be maintained in the upper limits of the basal area range (70 to 90 square feet per acre) where treatment occurs in corridors.

Overstory as well as understory vegetation would be treated in order to break up the fuel profile in these stands. Treatment could be applied in such a way as to enhance heterogeneity. Untreated skips may also be provided within corridors; approximately 10 to 15 percent of connectivity stands would be untreated skips. Please see Connective Corridors Map in Appendix A, Map A-5.

### Riparian Habitat Conservation Areas (3,557 acres)

About 3,541 acres (units 1R to 245R) of riparian habitat conservation areas (RHCAs) across the project area are also in need of treatment. Only manual activities (by hand, no mechanical equipment) would occur within the RHCAs. These treatments may include small diameter thinning, pruning, and ladder fuel removal. Hand thinned material would be hand piled and burned within the Limited Activity Buffers according to the Blue Mountain PDCs.

### Prescribed Burning (37,802 acres)

Approximately 13,492 acres of jackpot (mechanically-placed tree limbs and tops) and pile burning would take place in the areas that were mechanically and hand treated. These prescribed fires would be implemented under conditions in which fire growth would be greatly reduced by environmental factors such as rain or snow.

Landscape prescribed fire is also proposed throughout the project area on approximately 29,220 acres in areas that would not be mechanically treated under this project. These prescribed fires would be designed to mimic low to moderate intensity wildfires across the landscape. On the drier sites, a low intensity burn would be preferred and in mixed moist/cold/dry sites a low to moderate prescription would be preferred. Under this scenario there may be small areas across the landscape where stand replacement may occur. Burn plans will be signed and approved by line officer in accordance with Interagency Prescribed fire Planning and Implementation Procedures Guide (2013). The objectives of this prescription include reducing the surface fuels, reducing litter depth, creating small openings in order to break up contiguous fuels, and increasing the canopy base heights. The prescribed fire prescription would depend on weather and fuel moisture conditions to enable prescriptions to meet desired fire effects and the purpose and need of each site.

#### *Wilderness Prescribed Burning (9,557 acres)*

Approximately 9,557 acres of Wilderness prescribed fire falls under the landscape prescribed fire prescription described above. This project proposes to implement prescribed fire operations in the North Fork John Day Wilderness in order to increase firefighter success in future suppression efforts. Implementing prescribed fire would help protect values at risk outside the wilderness by reducing intensity and severity and changing burn patterns of future fires. Landscape level prescribed burning within the wilderness increases the ability of forest managers to manage risk and use monitoring or confine and contain strategies when faced with future fires within the Wilderness boundary. No motorized equipment, tree cutting, or fire line construction would

occur in the North Fork John Day Wilderness and any fire lit in the Wilderness would be a backing fire lit by drip torch or other non-motorized means.

### Firewood (517 acres)

In addition to the current Forest firewood cutting permit, people cutting personal firewood (and post and pole removal) would be allowed within the project area. This is a similar treatment to small dimeter thinning, but instead of logging equipment removing trees, firewood cutters would accomplish this treatment. Snags retained for wildlife habitat would be marked as not available to woodcutters.

**Table 2-3: Ten Cent Community Wildfire Protection Project Treatment Table**

| Treatment Type | Acres or Miles |
|---|---|
| Commercial Thinning Acres | 7,859 acres |
| Firewood | 517 acres |
| Mechanical Fuels (Mastication) | 153 acres |
| Small diameter Thinning | 1,227 acres |
| RHCA Small diameter Thinning | 3,557 acres |
| Landscape Burning (Non-Wilderness) | 19,663 acres |
| Landscape Burning (Wilderness) | 9,557 acres |
| Jackpot Burning (Slash and Pile Burning) | 13,492 acres |
| Temporary Road Construction | 5 miles |

### Roadside Hazard Trees

Danger trees would be cut alongside haul roads. Danger trees are defined as 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 would allow that tree to reach the roadway if it fell. If danger trees are identified within Riparian Habitat Conservation Area buffers they would be cut with chainsaws and left on site. If they are outside of Riparian Habitat Conservation Area buffers; not required to be retained for other resource needs; and are of commercial value, they could be removed with the timber sale depending on existing large wood levels in the area.

### Removal System Summary

Proposed harvest treatments are estimated to result in the removal of commercial and small diameter material using the following logging systems:

- Skyline based yarding system- 1,114 acres;
- Ground based yarding system- 3,523 acres; and
- Units with combination ground based and skyline yarding systems-3,381 acres

The Transportation Action Plan located in the project record and table listing roads considered is provided as Appendix D. No new permanent road construction is being proposed within this project. Approximately 93 miles of closed roads would be re-opened to facilitate harvesting and hauling. Re-opened closed roads will be closed following implementation. Other roads that will be used to facilitate harvest and hauling include 16 miles of seasonally opened roads, 97 miles of open roads, and approximately 15 miles of county roads. Regular road maintenance would occur on these roads to facilitate harvest activities. Road maintenance work to fix or prevent sedimentation issues would also occur as needed.

#### *Temporary Road Construction*

Approximately 5 miles of temporary road construction are proposed (Appendix D). Existing forest system roads and closed forest roads would be used for access to conduct treatments. Currently designated closed roads, and temporary roads used in the area would be re-closed or reclaimed. Temporary road construction would not occur within Riparian Habitat Conservation Areas or in areas with potential for landslides/mass failure as depicted on the soil type map.

## Alternative 3

Alternative 3 addresses Issues 1 through 5 listed in the *Issues* section in Chapter 1. These issues included air quality concerns, inappropriate use of prescribed fire in moist and cold upland forests, maximizing economic values by using mechanical treatments, and inability to protect forest investments such as white pine plantations and subalpine fir stands. Majority of the changes proposed as part of this this alternative would address the issues the public identified during scoping. Alternative 3 limits the amount of prescribed fire applied to the landscape by using more mechanical treatment. In order to meet purpose and need of the project, mechanical treatments would be used in some areas rather than prescribed fire to protect values at risk. For this alternative, stands identified in the description of Alternative 2 would be thinned to a heavier degree decreasing the basal area ranges as described below.

### Prescription A (Roadside Treatment) 3,209 acres

This prescription would be applied as described in Alternative 2; however thinning prescription would be heaver. Prescription A would be applied to all roadside treatment areas which include all or portions of the roads listed in Alternative 2.

### Prescription B (Basal Area) 4,650 acres

This prescription would be applied as described in Alternative 2 with the exception that the overall basal area ranges would increase. The range would be between 40 to 60 square feet per acre. Basal area ranges adjust based on the predicted fire type:

- *Active Crown Fire Stands (not dominated by ponderosa pine), 1,629 acres*—the desired basal area range for these stands are from 40 to 50 square feet per acre. Stands predicted as active crown fire type are listed in the description for Alternative 2.
- *Passive Crown Fire Stand Treatments (not dominated by ponderosa pine), 2,246 acres*—the passive crown fire treatment stands would be thinned to a basal area range of 50 to 60 square feet per acre. Predicted stands in this fire type are listed in the description for Alternative 2.
- *Conditional Crown Fire Stands, (not dominated by ponderosa pine), 115 acres*—overall the basal area range in these stands would be between 60 to 70 square feet per acre. Stands are listed in the description for Alternative 2.
- *Active, Passive, and Conditional Crown Fire Stands (dominated by ponderosa pine), 773 acres*—these area would be thinned to a basal area between 40 to 50 square feet. Units are listed in the description for Alternative 2.

### Prescription C (Small Diameter Thinning) 1,227 acres

This prescription would be the same as described in Alternative 2. Stands considered for this prescription are listed in the description for Alternative 2.

### Prescription D (Mechanical Fuels) 153 acres

This prescription would be the same as described in Alternative 2. A combination of hand work, mastication, and grapple piling may be used within these units. Stands considered for this prescription are listed in Alternative 2.

### Connective Corridors

Same as described in Alternative 2.

### Riparian Habitat Conservation Areas (3,557 acres)

Same as described in Alternative 2.

### Prescribed Burning (16,967 acres)

Prescribed burning acres as described in Alternative 2 would be reduced to respond to issues identified during the public scoping comment period. These issues are described in the *Issues* section of Chapter 1. The following acres would be proposed as part of Alternative 3:

- Jackpot (mechanically-placed tree limbs and tops) and pile burning on approximately 13,492 acres of would take place in the areas that overlap mechanically and hand treated stands.
- Landscape prescribed fire on approximately 3,512 acres in areas that would not be mechanically treated under this alternative. No landscape prescribed fire is proposed within the North Fork John Day Wilderness in this alternative.

### Firewood (517 acres)

Same as described in Alternative 2.

### Fireline Construction

Fireline would be constructed by hand or by mechanical treatments creating up to 24 inch scrape down to bare mineral soil. Approximately 13 miles of fireline is proposed for construction in Alternative 3 only. Location of the fireline is proposed to protect values at risk and can be seen in the map for Alternative 3 (Map A-7). No fireline construction is proposed in RHCAs.

**Table 2-4: Ten Cent Community Wildfire Protection Project Treatment Table**

| Treatment Type | Acres or Miles |
|---|---|
| Commercial Thinning Acres | 7,859 acres |
| Firewood | 517 acres |
| Mechanical Fuels (Mastication) | 153 acres |
| Small diameter Thinning | 1,227 acres |
| RHCA Small diameter Thinning | 3,557 acres |
| Landscape Burning<br>(Non-Wilderness, Dry Forest Stands) | 3,512 acres |
| Landscape Burning (Wilderness) | 0 acres |
| Jackpot Burning (Slash and Pile Burning) | 13,492acres |
| Temporary Road Construction | 5 miles |
| Fireline Construction | ~13 miles |

### Roadside Hazard Trees

In addition to the current Forest firewood cutting permit, people cutting personal firewood (and post and pole removal) would be allowed within the project area as described in Alternative 2.

### Removal System Summary

Temporary Road Construction and acres for each yarding system would be used for implementation as described in Alternative 2.

## Alternative 4

Alternative 4 was developed to address issues identified following public scoping. This alternative addresses issues 2, 3, and 6 described in *Issues* section described in Chapter 1. These issues were developed based on comments received regarding prescribed fire in wilderness, wildlife connectivity, and reducing the amount of mechanical treatment by using a lighter thinning approach. Alternative 4 address this issues by including leaving larger skips or wildlife islands.

Feathering treatments (gradually increasing or decreasing the space between thinned trees) would be used along the edges and away from islands to meet desired fuels condition and protect them from future wildfire. Feathering would accomplish three things:

1. Slightly increase hiding cover closer to the islands;
2. Soften the edges of the islands to avoid the stark line between the thinned area and the un-touched island/corridor; and
3. Ensure wider spacing of trees along private land boundaries and roads.

In the range of feathering from lightest to heaviest, the openings or spacing between trees called for by the silvicultural prescription would be the lightest and most open stand; as feathering grows heavier, the openings or spacing would gradually become smaller and the stand relatively more closed in. Thinning in stands adjacent to private land or roads would move (feather) from the lightest, open stands to less open nearer to an island or corridor. Feathering would include thinning ladder fuels (small saplings/poles, intermediate trees) would still be removed throughout the feathering technique, but boles of the larger trees would be closer together in the heavier portions of the treatment. The sizes and arrangement of trees within a stand, as well as topography will dictate the actual application of the feathering treatment which will be site specific and designed foremost to meet desired fuels conditions over the stand.

Feathering treatments would be focused along wildlife corridors and private land boundaries. Wildlife corridors will not be thinned as described in Alternative 2 and no prescribed fire is proposed in the Wilderness in this alternative.

**Figure 2-1: Example of potential outcome for a feathering treatment, depicting lighter (more open) spacing in the foreground and feathering to heavier (less widely spaced) towards the background and an uncut stand.**

### Prescription A (Roadside Treatment) *3,208 acres*

This prescription would be applied as described in Alternative 2. Prescription A would be applied to all roadside treatment areas as listed in the description of Alternative 2.

### Prescription B (Crown Fire Potential Reduction) *3,518 acres*

This prescription would be applied as described in Alternative 2 with the exception that the overall basal area ranges would increase. The range would be between 50 to 90 square feet per acre. Basal area ranges adjust based on the fire type:

- *Active Crown Fire Stands (not dominated by ponderosa pine), 917 acres*—the desired basal area range for these stands are from 50 to 60 square feet per acre. Stands predicted as active crown fire type are listed in the description for Alternative 2.
- *Passive Crown Fire Stand Treatments (not dominated by ponderosa pine), 1,767 acres*—the passive crown fire treatment stands would be thinned to a basal area range of 60 to 70 square feet per acre. Predicted stands in this fire type are listed in the description for Alternative 2.
- *Conditional Crown Fire Stands, (not dominated by ponderosa pine), 37 acres*—overall the basal area range in these stands would be between 80 to 90 square feet per acre. Stands are listed in the description for Alternative 2.

- *Active, Passive, and Conditional Crown Fire Stands (dominated by ponderosa pine), 732 acres*—these area would be thinned to a basal area would be between 60 to 80 square feet. Units are listed in the description for Alternative 2.

### Prescription C (Small Diameter Thinning) 1,227 acres

This prescription will be the same as described in Alternative 2. Stands considered for this are listed in the description of Alternative 2.

### Prescription D (Mechanical Fuels) 153 acres

A combination of hand work, mastication, and grapple piling may be used within these units. Stands considered for this are listed in the description of Alternative 2.

### Connective Corridors

Connectivity corridors as defined in Alternative 2 would not be thinned in this alternative. Feathering treatments adjacent to these areas may be applied to meet fuels objectives. Please see Map A-5 (Appendix A) for units that may be affected by connectivity.

### Riparian Habitat Conservation Areas (3,554 acres)

Same as described under Alternative 2.

### Prescribed Burning (28,246 acres)

Prescribed burning acres as described in Alternative 2 will be reduced to respond to issues identified during the public scoping comment period. These issues are described in the *Issues* section of Chapter 1. The following acres will be proposed as part of Alternative 4:

- Jackpot (mechanically-placed tree limbs and tops) and pile burning on approximately 12,042 acres of would take place in the areas that were mechanically and hand treated.
- Landscape prescribed fire is proposed on approximately 19,663 acres outside of the wilderness, following mechanical treatments. No landscape prescribed fire overlapping the North Fork John Day Wilderness is proposed for Alternative 4.

### Firewood (382 acres)

In addition to the current Forest firewood cutting permit, people cutting personal firewood (and post and pole removal) will be allowed within project area as described in Alternative 2.

**Table 2-5: Ten Cent Community Wildfire Protection Project Treatment Table**

| Treatment Type | Acres or Miles |
|---|---|
| Commercial Thinning Acres | 6,727 acres |
| Firewood | 382 acres |
| Mechanical Fuels (Mastication) | 153 acres |
| Small diameter Thinning | 1,227 acres |
| RHCA Small diameter Thinning | 3,554 acres |
| Landscape Burning (Non-Wilderness) | 19,663 acres |
| Landscape Burning (Wilderness) | 0 acres |
| Jackpot Burning (Slash and Pile Burning) | 12,042 acres |
| Temporary Road Construction | 4 miles |
| Fireline Construction | 0 miles |

### Roadside Hazard Trees

Same as described under Alternative 2.

### Removal System Summary

Acres for each yarding system were adjusted to account for changes in the prescriptions listed above. Proposed harvest treatments will remove material using the following logging systems:

- Skyline based yarding system- 1,062 acres;
- Ground based yarding system- 2,441 acres; and
- Units with combination ground based and skyline yarding systems-3,224 acres

#### *Temporary Road Construction*

One mile of temporary road construction was removed from this alternative, leaving approximately four miles of temporary road construction proposed for Alternative 4. Existing forest system roads and closed forest roads would be used for access to conduct treatments. Currently designated closed roads, and temporary roads used in the area would be re-closed or reclaimed. Temporary road construction would not occur within Riparian Habitat Conservation Areas or in areas with potential for landslides/mass failure as depicted on the soil type map.

## 2.3 Project Design Criteria

The Forest Service developed the following project design criteria developed to address overall project objectives, to minimize resource impacts, and ensure Forest Plan and/or legal compliance. Table 2-6 below displays the project design criteria developed for this project applicable units and/or alternatives if they are only applicable to specific units or alternatives. Table 2-7are the Blue Mountain Project Design Criteria RHCA default limited activity buffers used for this project (see WQ-7).

**Table 2-6: Project design features**

| Design Feature | Description | Applicable Unit/Alternative |
|---|---|---|
| ARCH-1 | Mark heritage resource sites and avoid all marked sites during all ground-disturbing project activities. The heritage resources within or immediately adjacent to treatment units would be flagged (10 meter buffer applied). | Project wide |
| ARCH-2 | Prescribed burns are not to take place over an eligible or unevaluated historic site; fire control methods (control lines, wetlines, hoselays, engines or handcrews, foam etc.) must be enacted outside the buffered site boundaries to protect the site. A few lithic cultural sites may be burned over with fast moving low intensity prescribed fire. Prescribed fire treatments are addressed for both the UNF and WWNF in the 2004 PA, specifically A-26 (landscape-scale low-intensity under-burning) and B-17 (Prescribed burns with protective measures), and also in the 1984 PMOA for lithic scatters. | Project wide |
| ARCH-3 | Allow thinning within heritage site boundaries, provided: cutting is accomplished using hand tools only (no mastication, pile burning or ground disturbance within heritage site boundaries); no mechanized equipment or staging of equipment within site boundaries; large diameter trees are felled away from all features; and thinned material is hand carried outside the site boundary. Existing roads can be used for hauling or skidding within the site boundaries; however, no expansion of roads within the sites is to occur. | Project wide |

| Design Feature | Description | Applicable Unit/Alternative |
|---|---|---|
| ARCH-4 | Based on the 1985 PMOA for Historic Water Transportation Ditches specific to the Wallowa-Whitman National Forest, linear features (i.e., ditches) will be avoided or treated in such a way as to avoid adverse effects. Measures to avoid adverse impacts include:<br>1. Ditch corridor is generally 50ft from center of ditch in both directions, where special protection is necessary.<br>2. No heavy machinery within 10m from the edge of the ditches in either direction.<br>3. Trees can be marked for harvest on ditches; this includes dead or green trees. These trees will be directionally felled away from ditches. The trees will then be lifted off ditches and not dragged.<br>4. Road crossings and any skidding should be located at existing road crossings and previously disrupted segments. No new crossings will be created on any ditch without an Archaeologist review or agreement. The use of geotextile with cover material to adequately protect a ditch is just one form of many mitigation techniques that can be utilized to cross a ditch. However, no new crossings are planned for this project.<br>5. Trees adjacent to a ditch will be directionally felled away from the ditch.<br>6. Hand bucking and piling of slash may be used within the ditch corridor. Slash may be hand piled immediately adjacent to, but not on any ditch.<br>7. Prescribed burning will only be used if no wooden features are present. No fire line other than light hand line should be constructed within the ditch corridor. No fire line will be constructed on ditch grades at all.<br>If accidental damage occurs to a ditch, it must be repaired to its pre-project configuration of banks and contour. | Wallowa-Whitman NF |
| ARCH-5 | All new temporary roads will be routed away from buffered site boundaries. To minimize the potential effect of actions related to road maintenance, use, reopening, and closure during the project, the following protection measures must be followed. All ground disturbing activities such as vegetation removal, scarification, grading, and berming would be carried out within the existing road footprint. | Project wide |
| ARCH-6 | If any staging or storage areas must be established outside the existing roadbed, these areas would be situated within existing heritage inventory areas and the action must be determined through consultation with the Forest, District, or Zone Archaeologist to have no effect on known historic properties. Depending on the context of these locations and the scale of the proposed work, an on-site archaeologist may also be required to monitor the work. | Project wide |
| ARCH-7 | If any previously unidentified cultural resources are located during project implementation, ground-disturbing work will be halted in the vicinity until the resources are evaluated by the District or Zone archaeologist. If the cultural resources are determined to be potentially eligible for listing on the National Register of Historic Places work will either be permanently halted or a mitigation plan will be developed in consultation with the Oregon SHPO before work continues. | Project wide |
| BOT-1 | Populations of Forest Service designated sensitive plant species and plant species of local conservation concern that are in, or near, areas with proposed ground disturbing activities shall be designated as “Areas To Protect” (ATPs). These sites shall be buffered and protected from all ground disturbances. Vehicle and equipment parking, log decking, yarding, slash piling and burning, and construction of fire lines shall be prohibited within these areas. ATPs shall be clearly marked on sale maps, and on implementation planning maps. ATPs may be flagged on the ground prior to treatment. A botanist may assist with unit layout in areas where the ATPs occur.<br>Aerial, hand, or vehicle-based fire ignition in areas with populations of plants of conservation may be done in consultation with a botanist. This would depend upon the particular species expected response to fire.<br>Any additional populations of plant species of conservation concern discovered during field surveys shall be evaluated for the need to be designated as ATPs.<br>Timber sale administrator and/or implementing staff shall notify botany staff when activities are scheduled to begin in areas where ATPs are designated. | All known populations of plants of conservation concern in, or near, project activity areas.<br>Vegetation management units 38, 42R 59, 60, 170R 192, and 195.<br>And RX fire units 517, 533, 578, and 581 |

| Design Feature | Description | Applicable Unit/Alternative |
|---|---|---|
| BOT-2 | Pre-implementation monitoring of selected high probability habitats for sensitive plants shall be conducted in specific areas of proposed activities. | High probability habitats within areas of proposed activities. Priority will be given to sites where ground disturbing activities are proposed. |
| FIRE-1 | Pile burning would take place outside the edge of limited activity riparian buffer according to the Blue Mountain PDCs in areas that were hand treated. These prescribed fires would be implemented under conditions in which fire growth would be greatly reduced by environmental factors such as rain or snow. Prescribed burning outside of RHCAs would be allowed to back into the RHCA to the water's edge. Fire would not be ignited within RHCAs, including wet meadows. | Units Include: 1R-245R |
| FUELS-1 | Landscape burning shall be conducted during the fall burn window. In areas dominated by subalpine fir, where feasible, prescribed burn blocks will be reduced in size to allow for creation of a smaller scale mosaic pattern that serves as a mitigating measure for the loss of subalpine fir. | Portions of the planning area that harbor significant populations of subalpine fir – *Abies lasiocarpa* that are slated for prescribed burn treatment. |
| FUELS-2 | When slash piles are planned for burning each of these piling locations will be documented with a GPS waypoint. Those waypoints will in turn be communicated to both the botany program and to the district weed coordinator(s) for subsequent monitoring and potential treatment should infestations occur at these susceptible sites. | All jackpot slash burn pile sites |
| FUELS-3 | Burn prescriptions are designed to imitate low intensity wildfire effects on soil and dominant tree mortality. | |
| FUELS-4 | There is no lighting immediately adjacent to dead standing trees. | |
| FUELS-5 | Where possible, accumulations of slash/debris will be pulled away from larger diameter dead standing snags and older, large live trees (>20 dbh) if these accumulations increase the risk of these structures being consumed during prescribed burning practices. | |
| FUELS-6 | Conduct prescribed fire treatments, including pile burning, for slash disposal in a manner that encourages efficient burning to minimize soil impacts while achieving treatment objectives. | |
| FUELS-7 | Where possible, locate slash piles in areas previously disturbed so they do not interfere with natural drainage patterns and limit the damage to residual trees. | |
| NW-1 | 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. This standard does not apply to initial attack of wildland fires, and other emergency situations where cleaning would delay response time. | |
| NW-2 | Use only gravel, fill, sand, and rock that is judged to be weed free by District or Forest weed specialists. | |
| NW-3 | Use weed-free straw and mulch for all projects conducted or authorized by the Forest Service on National Forest System Lands. If State certified straw and/or mulch is not available, individual forests should require sources certified to be weed free using the North American Weed Free Forage Program standards, or a similar certification process. | |
| NW-4 | Inspect gravel, fill, sand stockpiles, quarry sites, and borrow material for invasive plants before use and transport. | |

| Design Feature | Description | Applicable Unit/Alternative |
|---|---|---|
| NW-5 | Conduct road blading, brushing and ditch cleaning in areas with high NW-concentrations of invasive plants in consultation with District or Forest-level invasive plant specialists; incorporate invasive plant prevention practices as appropriate. | |
| NW-6 | Native plant materials are the first choice in revegetation for restoration and rehabilitation where timely regeneration of the native plant community is not likely to occur. | |
| NW-7 | Project or contract maps will show currently inventoried high priority noxious weed infestations as a means of aiding in avoidance areas and/or monitoring. | |
| NW-8 | Landings and parking areas shall not be located in known areas of invasive plant infestations. | |
| NW-9 | Upon completion of activities, skid trails, landings, or exposed mineral soil will be treated as necessary and appropriate to the site to reduce soil erosion, soil compaction, or establishment of noxious weeds. This may include seeding, water barring, subsoiling of landings, etc. Displaced soil in berms or ruts may be returned to its prior location. | |
| NW-10 | Prevention of invasive plant introduction, establishment and spread will be addressed in watershed analysis, roads analysis, fire and fuel management plans, recreation management plans, vegetation management plans, and other land management assessments. | |
| RANGE-1 | All existing structural range improvements (fences, gates, waterholes, etc.) will be contractually protected. | |
| RANGE-2 | Fences which are cut in order to facilitate logging operations must be repaired to Forest Service standards by the purchaser. | |
| RANGE-3 | If livestock are present on either side of a fence, means will be taken to prevent the movement of livestock to the other pasture. If no livestock are present, gates and fences shall be operable prior to logging activities proceeding to the next subdivision. | |
| RANGE-4 | Fence right of ways and stock driveways and trails will be cleared of slash produced by logging or post sale activities. | |
| REC-1 | Skid trails and landings will not be placed within developed campgrounds, visual overlooks, or trailhead parking areas. | |
| REC-2 | Fuels treatments along FSR 73 will avoid the water source for Gold Center Spring. | |
| REC-3 | The District Recreation specialist, Fuels specialist, and Archa eologist will lay out treatment units adjacent to the Ah Hee Diggings interpretive site on FSR 73. | |
| REC-4 | Treatment of units 57, 58, 59, 60, 191, 192, 193, 194, 195, 205, 206, 207, 208, 209, 210, 211 should be timed from mid-November until the end of July to avoid heavy equipment traffic on FSR 10 during the busiest recreation season (hunting). Operations associated with these units should also avoid Memorial Day and July 4 weekends for the same reason. | Units 57, 58, 59, 60, 191, 192, 193, 194, 195, 205, 206, 207, 208, 209, 210, 211 |
| REC-5 | Where possible, avoid placement of landings on dispersed campsites outside of A3 and A4 corridors (see Visual Quality mitigation for dispersed campsites within A3 and A4 corridors). These sites are to be managed to at least a Partial Retention visual quality objective. Where a landing occurs on a dispersed campsite, remove logging debris (burning or other), level any ruts, and plant native seed after harvest is complete to return the site to recreational use. | |
| REC-6 | Skid trails will not overlap system trails and trail crossings will be minimized to the extent possible to protect trail tread. Where crossings do occur, any rutting of the trail tread would be smoothed out and water bars would be installed on the uphill side of the skid trail as needed to keep runoff from damaging the trail tread after treatments are complete. Debris and/or felling of trees will also be used to block skid trail crossings once activities are complete to discourage trail users from diverting off the trail. | |
| REC-7 | Treatment debris will not be placed within the tread of designated trails. | |
| REC-8 | Trails will be signed 300 feet in advance of an active harvest unit to warn visitors of potential hazards due to logging activities. | |
| SCEN-1 | Thinning in A3, A4, A8, and A9 management areas will leave irregularly spaced trees. | |

| Design Feature | Description | Applicable Unit/Alternative |
|---|---|---|
| SCEN-2 | Landings, skid trails, and slash piles will be placed to minimize effects to visual quality within the A3, A4, A8, and A9 viewsheds. Mitigate against soil disturbance to the greatest extent possible within the foregrounds (operate over slash, log when the ground is frozen, locate skid trails so they are visually screened, etc.). The fuels specialist and/or sales administrator will designate these areas on the ground. | |
| SCEN-3 | Where possible, thinning will only be conducted on the side of FS Road 10 where it is not within management area A-9. For the estimated 3.5 miles of FSR 10 that is straddled by this management area, stumps that could be visible from the road will be flush cut and disguised with dirt so as not to be noticeable. Slash will be treated with a masticator or chipper where slope is not too steep and lopped/scattered in steeper areas in order to disperse debris and avoid piles and resultant burned patches. Where conditions on the ground will not allow management activities to appear natural, such areas will be left untreated. (The intention of the fuel break will still be intact in that these short stretches of road could be quickly prepped as needed during fire suppression activities.) The archeologist, fuels specialist, and recreation specialist will lay out boundaries within the A9 portion to ensure protection of this Special Interest Area's values. | |
| SCEN-4 | No grapple piling within 300 feet of an open road within A3, A4, A8, and A9 viewshed corridors. Preferred slash treatments are hand piling and burning, chipping, hauling slash away, and similar low disturbance methods designed to meet a visual quality objective of Retention within the immediate foreground. When hand piling/burning is used, pile slash away from larger diameter live trees (>12" DBH) to prevent mortality. | |
| SCEN-5 | Where areas of soil disturbance occur within A3, A4, A8, and A9 corridors, restore ground cover as quickly as possible (native seeding, cultivation practices, placement of slash, etc). | |
| SCEN-6 | Modified logging practices for visual quality (such as low cutting stumps) will be used within 300 feet of County Road 24 and FS Roads 10 and 73 unless topography limits sight distance. | Within 300 feet of County Road 24 and FS Roads 10 and 73 |
| SCEN-7 | Within ¼ mile of County Road 24 and FS Roads 10 and 73, use dispersed campsites for landings where practical to minimize creation of new areas of disturbance within the viewshed foreground. Where a landing occurs on a dispersed campsite, remove logging debris (burning or other), level any ruts, and seed with native seed as soon as harvest of the unit is complete to return the site to recreational use. | Within ¼ mile of County Road 24 and FS Roads 10 and 73 |
| SILV-1 | Where grand fir will be retained and managed into the future, tree removal contracts should include treatment (at time of cutting) of grand fir stumps >14" in diameter with an approved borax product. | Units recommended for treatment will be identified in a timely manner for inclusion in contract clauses/specs |
| SOILS-1 | "Within commercial harvest units, no harvest or heavy equipment will leave designated roads or trails, to limit the potential of detrimental soil disturbance.<br>The exception to equipment leaving designated trails will be specific to harvester/forwarder operations. In the event that harvester/forwarder will make more than one pass on a trail, equipment will be required to have no less than 1 foot of slash (depth) under both equipment tracks. This slash load should buffer the weight of equipment when operating on other than designated trails. | |
| SOILS-2 | If Grapple piling is used for fuels reduction, in moist or wet soil conditions (regardless of equipment PSI). Then equipment will be required to travel over >1 foot of slash, and utilize designated trails to limit elevated detrimental soil conditions. Once the equipment reaches a starting point it will back out of the unit riding on material being piled. | |
| SOILS-3 | All temporary roads (existing or new) used for this project would be rehabilitated (Transportation Goal LRMP 4-86). These roads will be either scarified or subsoiled where possible depending upon the soil depth and slash will be placed over the surface. | |

| Design Feature | Description | Applicable Unit/Alternative |
|---|---|---|
| SOILS-4 | Use of ground based harvest equipment will not be permitted when soils reach field capacity (heightened moisture content), to limit the potential of long-term detrimental soil conditions, as described in the Forest Plan, or if ruts greater than 2-4 inches occur. Log haul will only be permitted on dry or frozen roads. | |
| WL-01 | There will be no cutting of snags ≥20 inches dbh unless they are a safety hazard to operations. Snags < 20 inch dbh would generally not be cut unless they need to be removed to meet purpose and need or if they are a safety hazard to operations. Snag standards and desired levels would be met following treatment activities. Refer to Forest Plan standards for snag densities. | |
| WL-02 | Danger tree abatement would occur along open and closed system roads and temporary roads used during implementation. All danger trees would be determined by a Qualified Person using the 2008 Field Guide for Danger Tree Identification and Response. Trees determined to be an **imminent or likely** danger would be felled along **open system roads**. Trees determined to be an imminent would be felled along **closed system roads and temporary roads**. | |
| WL-03 | Danger trees (live trees with visible defect) ≥20 inches dbh will be left to provide large-diameter dead wood habitat or available for removal for aquatic restoration activities if downed wood standards and desired ranges are being met. Felled danger trees less than 20 inches dbh may be commercially removed or utilized for aquatic restoration activities if Forest Plan standards and desired ranges of downed wood are being met. Wildlife biologist input would be sought in making these determinations. | |
| WL-04 | Where possible, avoid identifying or marking removal trees within or adjacent to patches of snags and other high value snag habitat (large diameter legacy snags with multiple existing cavities, etc.) especially in areas distant from open roads to minimize impacts to these high value structural features. Consider these areas for potential "skips" where they would not conflict with the overall purpose and need for the project (see WL-13). | |
| WL-05 | If a goshawk nest site is located during goshawk surveys or sale preparation, protect the site by eliminating harvest on at least 30 acres of the most suitable nesting habitat around the site (active and historic nests). A 400 acre post fledging area would be designated around this core nest area for all active nests. Treatment could occur in this post fledging area if treatments retain late and old structure or move young stands toward a late old structure condition; consult with the district wildlife biologist and silviculturist to ensure that the standards provided in the Eastside Screens would be met. | |
| WL-06 | If a goshawk nest is discovered, seasonal restrictions on treatment activities and haul would be applied, where needed, to reduce disturbance in the immediate vicinity of the nest. | |
| WL-07 | If raptor nest sites are encountered during layout or implementation, they will be protected. The level of protection will vary by species, and will be determined by the District Wildlife Biologist. It is the responsibility of the layout and marking crew to ensure that the District Wildlife Biologist is consulted prior to marking in these areas. | |
| WL-08 | Recognize structural features important to late and old structure-associated wildlife when identifying trees to be retained, regardless of tree size and habitat type. These features include flat tops, bole damage, broken or dead tops, multiple tops, large limbs, green trees with existing cavities or bole rot (including Indian paint fungus), etc. | |
| WL-09 | Consider retention of mistletoe infected Douglas-fir and ponderosa pine where appropriate while still meeting the purpose and need and project goals. | |
| WL-10 | Place skips in high wildlife use areas such as higher density patches, higher canopy closure, interior cover patches, areas with high-density snags, downed wood, or snags larger than the stand average, patches of old trees, fir thickets/regeneration patches (see WL-13), and areas associated with springs, wallows, meadows, or other wet areas. Skip size depends on the nature of specific feature(s) but will typically be no smaller than ¼ acres and generally less than 2 acres in dry forests but can be greater than 2 acres in moist forests or where other unique or underrepresented habitats are present. Skips should be irregular in shape. | |
| WL-11 | Leave wildlife habitat clumps (skips) of uncut regeneration (small diameter) conifers ranging in size from ¼ acre up to 1 acre in size in small diameter thin units. Clumps of uncut small diameter conifers would total approximately 2 acres for every 30 acres of treatment. | |

| Design Feature | Description | Applicable Unit/Alternative |
|---|---|---|
| WL-12 | Where appropriate, given vegetative potential and the current composition and structure in larger proposed treatment units, incorporate larger skips (ranging in size from several acres up to 10 acres, or larger, where appropriate) into units under Alternative 4. Larger skips would generally be more appropriate in cold and moist stands. Consider incorporating larger skips into known spring areas or other areas with a high probability of wildlife use. Ensure that this activity is consistent with the overall purpose and need and meets project goals. | |
| WL-13 | Protect unique habitats ((lithosols (scablands), seeps, springs, wallows, wetland areas including wet meadows) from harvest activities. Buffer these areas a minimum of 100 feet from vegetative treatment activities. Log decking, piling, and burning of slash piles shall not occur in these areas. Man-made ponds without spring influence would be buffered 50 feet from harvest activities. Wetlands and ponds greater than 1 acre would be buffered 150 foot from the edge of the wetland. If caves, cliff faces, or other unique habitats not listed above are encountered during recon or layout, their value to wildlife and botany would be evaluated, and appropriate protection, as determined by the District Wildlife Biologist, would be provided. These unique habitat features are often good areas to place a skip (see WL-10) | Lithosols include areas immediately adjacent to project units 193, 194, and 195. |
| WL-14 | In areas adjacent to roads, private land, or other values at risk, treat (commercial thin, small diameter thin, etc.) stands more heavily; further from these features implement a lighter thin to reduce sight distances, especially where adjacent to open roads. Feather treatments for a smooth transition from heavy to light thin. Where appropriate, consider retention of patches of regeneration to reduce sight distances, especially where conventional small diameter thinning prescriptions, topography, and other factors would cumulatively create large, open stands. Ensure that this activity is consistent with the overall purpose and need of the project and meets project goals. | |
| WL-15 | Prescribed fire would preferably occur during the late summer and fall. To the greatest extent possible, provide for a mixed fire severity result, with some acres burned at low and moderate severity, with some patches of unburned and high severity impacts, creating a mosaic of fire effects. | |
| WL-16 | During burning operations, attempt to maintain unburned blocks of habitat adjacent to burned habitats to ensure that low-level structure (grasses, forbs, shrubs, and small diameter trees) for migratory birds is present at some level across the landscape. | |
| WL-17 | Where hand or machine piling of harvest or thinning-created slash, retain at least one unburned slash pile per acre in mechanical treatment units and riparian hand-thinning units for wildlife. Retained piles will not contain plastic sheeting. | |
| WL-18 | Pre-identified connectivity units would be marked and harvested such that the upper management limit (basal area) would be retained in these areas. Where feasible, maintain a mosaic of stand layers, structure, and complexity by breaking up the continuity of surface, understory, and overstory fuels in an uneven pattern across the landscape within connectivity stands. Incorporate untreated patches as well where they do not conflict with the overall purpose and need (e.g. not immediately adjacent to private land, structures, VARs). Connectivity stands would be identified on unit specific data sheets provided to layout and marking crews in order to ensure implementation of this design criterion. Consider providing a greater proportion of skips in connectivity stands. | |
| WL-19 | Where appropriate, feather treatment in the vicinity of connectivity corridors lying within units identified as “Roadside” treatment units under Alternative 4. Thin lighter adjacent to the connectivity corridor; implement a heavier thin (moving toward or meeting unit-specific basal area or spacing targets) further out in order to smooth the transition between corridors and the surrounding matrix. Ensure that this activity is consistent with the overall purpose and need of the project and meets project goals. | |
| WL-20 | Effectively close, to the degree possible with available vegetation or other barriers (i.e. boulders, gates, etc.), closed system roads and existing temporary roads used to access treatment and burning units following implementation to reduce the likelihood of illegal motorized use. Obliterate temporary roads used during implementation. Methods for accomplishing this are described in the timber sale contract. | |
| WL-21 | Where new temporary roads or existing temporary and closed roads used for implementation intersect open system roads, provide for effective closure at these locations by applying a lighter thin in the area immediately adjacent to the road junction. This activity would make it more difficult for motorized vehicles, especially ATVs, to bypass closures following implementation. Ensure that this activity is consistent with the overall purpose and need of the project and meets project goals. | |

| Design Feature | Description | Applicable Unit/Alternative |
|---|---|---|
| WL-22 | If piling of harvest-created slash occurs, pile slash away from snags (≥10 inches dbh), downed wood (≥12 inches), and large legacy trees (where snag creation is not a desired activity), where feasible. | |
| WL-23 | In general ,overstory vegetation (larger than 9 inches dbh) and dead wood habitat (snags and downed wood) would not be cut or removed in small diameter thinning units except where necessary to meet the purpose and need of the project | |
| WL-24 | Within commercially harvested stands, protect large diameter snags and green trees (≥20 inches dbh), where needed, from adverse impacts (consumption, mortality, felling as hazards to operations) associated with activity fuels and landscape burning. This may include scratch lining or pulling harvest-created slash away from these structural features. | |
| WL-25 | Downed wood (≥12 inches at the large end) would generally not be removed from proposed mechanical treatment units (CT, NCT, FW, Roadside, Mech Fuels). Downed wood ≥20 inches would not be removed in mechanical treatment units. Smaller downed wood may be removed to meet the purpose and need. Forest Plan standards and desired ranges (based on the best science available) for downed wood would be met after treatment. In the event there are no logs ≥12 inches dbh available, the largest available would be retained to meet Forest Plan standards for down wood as amended (USDA 1995). | |
| WL-26 | Green tree replacement standards would be met in all proposed treatment units following implementation. | |
| WL-27 | Pumps used at all water sites (ponds and streams) would be screened to eliminate potential impacts (impingement and mortality) to larval amphibians and fish. Screen mesh size would be no larger than 3/32” for all species. | |
| WQ-1 | There will be no mechanized entry for vegetation management in RHCAs. Handwork only would occur within the outer halves of the buffer widths in RHCAs. These treatments may include small diameter thinning, pruning, and ladder fuel removal. | Units Include: 1R-245R |
| WQ-2 | Danger trees, which are defined as 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 would allow that tree to reach the roadway if it fell would be cut along haul roads. If the trees are within RHCA buffers they would be cut and left on site. | |
| WQ-3 | Temporary road construction would not be constructed inside of RHCAs and roads will be located to minimize or mitigate adverse effects to soil, water quality and riparian resources.<br>Maintain the natural drainage pattern of the area wherever practical; apply soil protective cover on disturbed areas. Native seed will be provided by the FS as funds allow.<br>Temporary roads will be inspected to verify that erosion and stormwater controls are implemented and functioning and are appropriately maintained.<br>Also, existing forest system roads and closed forest roads would be used for access to conduct treatments. Currently designated closed roads, and temporary roads used in the area would be re-closed or reclaimed.<br>Utilize yarding mechanisms or mechanical treatments that avoid or minimize disturbance to the ground and vegetation consistent with project objectives.<br>Design roads and trail approaches to minimize overland flow entering the landing.<br>Existing landings will be used where possible. Use suitable measures as needed and/or restore and stabilize the landing after use.<br>Ensure culverts do not become plugged from logging activities and thereby do not affect the functionality of the roads<br>Implement measures to promote infiltration of runoff and intercepted flow and/or desired vegetation growth on the road prism and other compacted areas. | |

| Design Feature | Description | Applicable Unit/Alternative |
|---|---|---|
| WQ-4 | - Activities would be mitigated by operating equipment in dry or frozen conditions.<br>- Conduct winter logging operations when the ground is frozen or snow cover and depth is adequate to avoid or minimize unacceptable rutting or displacement of soil.<br>- Suspend winter operations if ground and snow conditions change such that unacceptable soil displacement, disturbance, or erosion becomes likely.<br>- Compact the snow on skid trails when adequate depth exists before felling or skidding trees.<br>- Avoid locating skid trails on steep areas where frozen skid trails may be subject to soil erosion the next spring.<br>- Mark boundaries and stream courses before the first snow so that they will be visible in heavy snows.<br>- Install and maintain suitable erosion control on skid trails before the first runoff, during the dry season if needed. | |
| WQ-5 | Timber sale planning process, harvest unit design, erosion potential assessment and use of sale area maps for designating water quality protection needs. BMP's for Class IV stream areas will be concerned primarily with preventing soil and debris movement, including slumps, earth slides, etc., from migrating downstream into higher class streams during periods of runoff.<br>- Objectives are to introduce water quality and hydrologic considerations into the timber sale and planning process.<br>- Harvest unit design should ensure favorable conditions of water flow, water quality and fish habitat.<br>- To prevent downstream water quality degradation by the timely identification of areas with high erosion potential and adjustment of harvest unit design.<br>- Delineate the location of protection areas and available water sources as a guide for both the purchaser and the sale administrator, and to ensure their recognition and proper consideration and protection on the ground.<br>- There will be an initial pre-contract meeting to ensure that BMPs and additional project design criteria are incorporated into the timber sale contract. | |

| Design Feature | Description | Applicable Unit/Alternative |
|---|---|---|
| WQ-6 | **Erosion Prevention and Control (FSM 2070 and FSM 2080)**<br>- Equipment staging, parking and refueling will be outside of RHCAs and in designated areas that have previous soil disturbance.<br>- FS will work with the contractor to locate landings, skid trails, and slash piles in suitable sites to avoid, minimize or mitigate potential for erosion and sediment delivery to nearby waterbodies. Most of this is decided as an interdisciplinary team during the project planning stage.<br>- Erosion control and sediment plans will cover all disturbed areas including skid trails and roads, landings, cable corridors, temporary road fills, water source sites, borrow sites or other areas disturbed during mechanical vegetation treatments.<br>- Use suitable species and establishment techniques to cover or revegetate disturbed areas in compliance with local direction and requirements for vegetation ecology and prevention and control of invasive species. Prevention and control of invasive plants within the project area will be consistent with the Region 6 Invasive Plant Program Record of Decision, 2005 and treatment will be consistent with the 2010 Umatilla National Forest's Invasive Plants Treatment Project Record of Decision.<br>- Install sediment and stormwater controls prior to initiating surface disturbing activities to the extent practical.<br>- Operate equipment when soil compaction, displacement, erosion and sediment runoff would be minimized.<br>- Avoid ground equipment operations (including ATV and truck driving and parking) on unstable, wet or easily compacted soils and steep slopes as described per Umatilla Forest Plan (USDA, 1990).<br>- Implement mechanical treatments on the contour on sloping ground to avoid or minimize water concentration and subsequent accelerated erosion.<br>- Road blading will only be done when necessary. Ditches would not be routinely bladed, and exposed soil areas on road prisms, ditches, cuts, and fills would be seeded with non-palatable plants if funds are available.<br>- Equipment crossing ephemeral draws that do not classify as Class IV will be confined to designated crossings. There will be a minimum 100 foot spacing between designated stream crossings. Skidding up and down ephemeral draws will be prohibited. Equipment crossing swales that do not classify as Class IV channels will be confined to crossings approved by the FS, and may not otherwise operate within the swale, in order to minimize soil disturbance and sedimentation. Debris may be placed into the crossings to reduce soil disturbance, compaction, and erosion. However, the debris must be removed before the unit is closed out . Trees within these swales may be cut and dragged or lifted out. Skidding up and down the swales will be prohibited. If crossing swales during runoff is anticipated, culverts, bridges, and/or rock/earth work will be used to stabilize and armor channel banks and bottoms and prevent erosion .<br>- Directionally fell trees to facilitate efficient removal along pre-designated yarding patterns with the least number of passes and least amount of disturbed area. | |
| WQ-7 | Buffer widths for activities in RHCAs will follow the Blue Mountain project design criteria (see Table 2-7). Wetland areas less than an acre will have a 100 ft buffer. | |

| Design Feature | Description | Applicable Unit/Alternative |
|---|---|---|
| WQ-8 | **Riparian Habitat Conservation Areas**<br>Specify RHCA layout, maintenance, and operating requirements in contracts, design plans and other necessary project documentation.<br>Use handwork vegetation treatments in the RHCAs only when suitable to achieve long-term desired conditions and management objectives.<br>Modify vegetation treatment prescription and operations in the RHCAs as needed to maintain ecosystem structure, function and process.<br>Locate transportation facilities for mechanical vegetation treatments, including roads, landings and main skid trails, outside of the RHCA to the extent practicable.<br>Do not use drainage bottoms as turn-around areas for equipment during mechanical vegetation treatments.<br>Use suitable measures to disperse concentrated flows of water from road surface drainage features to avoid or minimize erosion, gully formation and mass failure in the RHCA and sediment transport to the waterbody.<br>The source location, quantity, and timing of water use for dust abatement will be approved by the FS before sale, in order to protect water resources during low flows. Pond sources may be available and the pump must be screened.<br>Monitor the RHCA during whenever possible during mechanical operations to evaluate compliance with prescription and mitigation requirements. | Units Include: 1R-245R |
| WQ-9 | - Use cable or aerial yarding systems on steep slopes where ground-based equipment cannot operation without causing unacceptable ground disturbance.<br>- Locate cable corridors to efficiently yard materials with the least soil damage.<br>- Fully suspend logs when yarding over RHCAs.<br>- Postpone yarding operations when soil moisture levels are high if the type of yarding system results in unacceptable soil disturbance and erosion within cable corridors. | |
| LANDS-1 | The Minerals Administrator and Responsible Official will be made aware of any conflicts or potential conflicts with miners in the field. | |
| LANDS-2 | Prior to the conduction of proposed activities each year, the lead will need to review proposed work with the Minerals Administrator who will review the proposed activities against the known local operators and claimants The minerals administrator will contact (by letter, phone, or email) those claimants actively working in the area and inform them of any delays or overlaps with their mining operation. | |
| LANDS-3 | Should previously unidentified abandoned mine sites be located during the project implementation, work should stop until the minerals administrator or other appropriate Forest Service representatives have reviewed and evaluated the area for potential safety hazards or risks. | |
| LANDS-4 | The abandoned mine map is considered sensitive information and should not be given out to the public. | |
| LANDS-5 | Should any vertebrate fossils be located during the earth moving operations, work will stop in that area until the find can be assessed and mitigation measures incorporated. | |

**Table 2-7: Blue Mountain Project Design Criteria applicable for WQ-7**

| Activity | PACFISH/ INFISH Category | | | RHCA Restrictions* (Activities allowed outside the limited activity stream buffer**) |
|---|---|---|---|---|
| | Fish Bearing and Designated Critical Habitat Streams<br>Default Limited Activity Buffers | Permanently Flowing non- fish Bearing and Ponds, Lakes and wetlands > 1 acres<br>Default Limited Activity Buffers | Seasonally Flowing or Intermittent Streams, wetlands < 1 acres, landslides and landslide-prone areas<br>Default Limited Activity Buffers | |
| Thinning in RHCAs | 100’ | 75’ on slopes < 30% | 50’ on slopes < 30% | - treatment by hand only (no ground based equipment)<br>- prior to treatment 500 – 2,500 stems per acre; post treatment fully stocked (generally 175 – 220 trees per acre)<br>- variable spacing<br>- all shade providing trees and long term wood recruitment trees retained<br>- only trees < 9” dbh |
| Prescribed Fire in RHCAs | 100’ | 75’ on slopes < 30% | 50’ on slopes < 30% | - treatment by hand only<br>- all shade providing, instream and long term wood recruitment trees retained<br>- fully stocked canopy retained<br>- hand applied ignition (such as drip torch or fusees) within the limited activity buffer, |
| Slash Pile Burning | 100’ | 75’ | 50’ | - piles located outside the limited activity RHCA buffer width and in locations that avoid damage to remaining overstory canopy<br>- hand piling only (no mechanical treatments)<br>- maximum size four feet in height and six feet in diameter<br>- piles burned when there is a high soil moisture content |

* There may be situations where the width of a limited activity buffer may need to be increased or decreased based on local sixth field watershed conditions. For a project to propose activities with a different limited activity buffer, an analysis at a sixth field watershed scale must occur and be attached to the Compliance Form found in Appendix E. The analysis should focus on indicators which could affect ESA listed species and their DCH from project activities. This includes a change in any of the following: temperature, sediment, large wood, or overall vegetation condition of RHCAs. After the project is completed results will be summarized in a completion report (see Appendix E).

** RHCA restrictions are for the areas between the limited activity buffer and boundary of the full PACFISH buffer.

## 2.4 Alternative Considered but Eliminated from Detailed Study

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

### Alternative A: No Commercial Thinning

Public comments received in response to the Proposed Action provided suggestions for alternative methods for achieving the purpose and need. During the scoping comment period the project received comments requiring the project to have no commercial or limit the commercial component to the Ten Cent Project. This alternative was outside the scope of the need to maintain and enhance local communities and economies by providing a diversity of resource management activities, recreational opportunities, commodity outputs, and ecosystem services from public lands.

## 2.5 Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. Information in the table is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives.

**Table 2-8: Comparison of all alternatives within the entire project area**

| Treatment Type | Alternative 1 Acres or Miles | Alternative 2 Acres or Miles | Alternative 3 Acres or Miles | Alternative 4 Acres or Miles |
|---|---|---|---|---|
| Commercial Thinning Acres | 0 | 7,859 acres | 7,859 acres | 6,727 acres |
| Firewood | 0 | 517 acres | 517 acres | 382 acres |
| Mechanical Fuels (Mastication) | 0 | 153 acres | 153 acres | 153 acres |
| Small diameter Thinning | 0 | 1,227 acres | 1,227 acres | 1,203 acres |
| RHCA Small diameter Thinning | 0 | 3,554 acres | 3,554 acres | 3,535 acres |
| Landscape Burning (Non-Wilderness) | 0 | 19,663 acres | 3,512 acres | 19,663 acres |
| Landscape Burning (Wilderness) | 0 | 9,557 acres | 0 acres | 0 acres |
| Jackpot Burning (Slash and Pile Burning) | 0 | 13,492 acres | 13,492 acres | 12,042 acres |
| Temporary Road Construction | 0 | 5 miles | 5 miles | 4 miles |
| Fireline Construction | 0 | 0 miles | ~13 miles | 0 miles |
| Estimated Volume (includes saw timber and non-saw such as biomass and firewood) | 0 | 59,443 CCF/ 30,927 MBF | 59,443 CCF/ 30,927 MBF | 49,780 CCF/ 25,899 MBF |

**Table 2-9: Comparison of all alternatives that are on the Wallowa-Whitman National Forest.**

| Treatment Type | Alternative 1 Acres or Miles | Alternative 2 Acres or Miles | Alternative 3 Acres or Miles | Alternative 4 Acres or Miles |
|---|---|---|---|---|
| Commercial Thinning Acres | 0 | 3,359 acres | 3,359 acres | 2,873 acres |
| Firewood | 0 | 331 acres | 331 acres | 196 acres |
| Mechanical Fuels (Mastication) | 0 | 153 acres | 153 acres | 153 acres |
| Small diameter Thinning | 0 | 691 acres | 691 acres | 691 acres |
| RHCA Small diameter Thinning | 0 | 1,889 acres | 1,889 acres | 1,889 acres |
| Landscape Burning (Non-Wilderness) | 0 | 9,368 acres | 2,472 acres | 9,368 acres |
| Landscape Burning (Wilderness) | 0 | 0 acres | 0 acres | 0 acres |
| Jackpot Burning (Slash and Pile Burning) | 0 | 6,421 acres | 6,421 acres | 5,800 acres |
| Temporary Road Construction | 0 | 1.5 miles | 1.5 miles | 1.3 miles |
| Fireline Construction | 0 | 0 miles | ~8 miles | 0 miles |

**Table 2-10: Comparison of all alternatives that are on the Umatilla National Forest.**

| Treatment Type | Alternative 1 Acres or Miles | Alternative 2 Acres or Miles | Alternative 3 Acres or Miles | Alternative 4 Acres or Miles |
|---|---|---|---|---|
| Commercial Thinning Acres | 0 | 4,680 acres | 4,680acres | 3,855 acres |
| Firewood | 0 | 186 acres | 186 acres | 186 acres |
| Mechanical Fuels (Mastication) | 0 | 0 acres | 0 acres | 0 acres |
| Small diameter Thinning | 0 | 536 acres | 536 acres | 536 acres |
| RHCA Small diameter Thinning | 0 | 1,669 acres | 1,669 acres | 1,667 acres |
| Landscape Burning (Non-Wilderness) | 0 | 10,296 acres | 1,040 acres | 10,296 acres |
| Landscape Burning (Wilderness) | 0 | 9,557 acres | 0 acres | 0 acres |
| Jackpot Burning (Slash and Pile Burning) | 0 | 7,071 acres | 7,071 acres | 6,243 acres |
| Temporary Road Construction | 0 | 3.5 miles | 3.5 miles | 3 miles |
| Fireline Construction | 0 | 0 miles | ~5 miles | 0 miles |

Total estimated volume per acre for the entire project is about 3.85 MBF per acre. This equates to 7.40 CCF per acre. Please see the table below for volume estimates by logging system and product by alternative. These are rough estimates based on limited pre-cruise data. Final numbers could vary by 20 percent or greater.

**Table 2-11: Volume estimates by forest and alternative**

| Logging System/Product | Alternative 2 Vol (ccf) | Alternative 3 Vol (ccf) | Alternative 4 Vol (ccf) |
|---|---|---|---|
| Ground based saw | 14,287 CCF | 14,287 CCF | 9,899 CCF |
| Ground based fiber | 12,171 CCF | 12,171 CCF | 8,433 CCF |
| Roadside Saw | 13,711 CCF | 13,711 CCF | 13,075 CCF |
| Roadside fiber | 11,680 CCF | 11,680 CCF | 11,138 CCF |
| Skyline Saw | 4,518 CCF | 4,518 CCF | 4,307 CCF |
| Skyline fiber | 3,848 CCF | 3,848 CCF | 3,669 CCF |
| **Totals** | **60,215 CCF** | **60,215 CCF** | **50,520 CCF** |

**Table 2-12. Summary of Environmental Effects by Resource Indicators for each Alternative**

| Resource Indicator | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| **Fire and Fuels**: Wildfire Hazard | With no management activities occurring, more acres would transition from low and moderate fire hazard towards high and extreme fire hazard. Currently an estimated 25,385 acres (27%) exhibiting low wildfire hazard would naturally transition over the next 20 years, due to tree and vegetation growth to either a moderate or high fire hazard category. The remaining 73% of acres within Ten Cent CWPP planning area are predicted to exhibit moderate to extreme fire hazard. Moderate flame lengths (4-8 feet). | Treatments proposed in Alternative 2 would result in 23,698 acres being moved from an existing condition hazard rating of 'Extreme' to a lower hazard rating. A majority of those acres with Alternative 2 treatments are moved to a hazard rating of 'Low. | Treatments proposed in Alternative 3 would result in 10,222 acres being moved from an existing condition hazard rating of 'Extreme' to a lower hazard rating. A majority of those acres with Alternative 3 treatments are moved to a hazard rating of 'Low.' | Treatments proposed in Alternative 4 would result in 17,699 acres being moved from an existing condition hazard rating of 'Extreme' to a lower hazard rating. A majority of those acres with Alternative 4 treatments are moved to a hazard rating of 'Low.' |
| **Fire and Fuels**: 0-3" Size class fuels | No reduction in surface fuels | Surface fuel loading would be reduced across approximately 37,759 acres of the planning area. 100% reduction in 0-3" size class surface fuels on treated acres. | Surface fuel loading would be reduced across approximately 16,934 acres of the planning area. Close to 18 percent of the area would be affected. 100% reduction in 0-3" size class surface fuels on treated acres. | Surface fuel loading would be reduced across approximately 28,208 acres of the planning area. Close to 30 percent of the area would be affected. 100% reduction in 0-3" size class surface fuels on treated acres. |
| **Air Quality:** Particulate Matter (PM) | 0 PM occurs or 21,111(over 33,429 acre wildfire, usually occurring in 2-6 weeks) tons if a large wildfire were to occur | 23,955 tons of PM10 and PM2.5 released over time (prescribed burning approximately 42,709 acres over a much longer period of time, and the jackpot, pile and slash burning would be burned two times under this scenario). | 15,412 tons of PM10 and PM2.5 released over time (prescribed burning approximately 16,747 acres over a much longer period of time, and the jackpot, pile and slash burning would be burned two times under this scenario). | 19,126 tons of PM10 and PM2.5 released over time (prescribed burning approximately 31,705 acres over a much longer period of time, and the jackpot, pile and slash burning would be burned two times under this scenario). |

| Resource Indicator | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| **Forest Vegetation**: Stand Structure | Management would not alter stand structures, and the over-abundant understory re-initiation stage would continue to increase, perpetuating ladder fuel and closed canopy conditions. | Reducing ladder fuels and thinning will alter stand structures within treatment units. The relatively small area of treatment within the large project area would not have a great effect on stand structure for the project area. There will be a small increase in OFSS in the Dry UF, but it will remain below its range of variation. Landscape prescribed burning has the potential to alter structure on a larger scale, an estimated 5% to 20% of the upland forest vegetation stands could experience more than 50% mortality. | Stand treatments of thinning and their effects in this alternative would be the same as Alternative 2. The amount of landscape burning would be much less (82% less), and while the effects within the burned area may be the same, the burned area would be much smaller, and the effect on stand structure across the project would be greatly reduced. | Stand treatments of thinning, utilizing some feathering and untreated islands, are proposed on fewer acres (11% fewer than Alternative 2), but overall effects on structure would be the same as Alternative 2. Proposed landscape burning effects would also be the same as Alternative 2. |
| **Forest Vegetation**: Forest Density | Currently dense forest stands would not be altered by management (fire suppression would remain), increasing susceptibility to disturbances such as insects, disease and wildfire. | Thinning would reduce stand density within the treatment units, although the relatively small acreage of thinning compared to the large project acreage means there would not be a large-scale effect within the project. All upland forests will continue to have high densities above their range of variation, though there would be a shift of some high density stands to low density, lifting low density into range of variation for Cold and Moist forests. Prescribed landscape fire would reduce stand densities by killing some trees immediately or within 2 years and leaving others vulnerable to insects or disease. Natural regeneration response could result in a dense stand in the future. | Stand treatments of thinning and their effects in this alternative would be the same as Alternative 2. The amount of landscape burning would be much less (82% less), and while the effects within the burned area may be the same, the burned area would be much smaller, and the effect on stand densities across the project would be greatly reduced. | Stand treatments of thinning, utilizing some feathering and untreated islands, are proposed on fewer acres (11% fewer), but overall effects on forest density would be the same as Alternative 2. Proposed landscape burning effects would also be the same as Alternative 2. |

| Resource Indicator | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| **Forest Vegetation**: Species Composition | Species compositions that are out of sync with their range of variation would likely remain so; stands would progress through natural successional patterns with no manipulation except fire suppression. | Reducing ladder fuels and thinning will favor ponderosa pine, western larch and Douglas-fir where present, or the most-fire resistant species that is present on the site. Overall, the effect on composition will be low when the small acreage of stand treatment is weighed against the large project area. Prescribed fire could alter composition by directly causing mortality (loss of individual trees), or by creating conditions favorable for natural regeneration. Lodgepole pine is most likely to be the first species to naturally regenerate within most of the burn areas. | Stand treatments of thinning and their effects in this alternative would be the same as Alternative 2. The amount of landscape burning would be much less (82% less), and while the effects within the burned area may be the same, the burned area would be much smaller, and the effect on species compositions across the project would be greatly reduced. | Stand treatments of thinning, utilizing some feathering and untreated islands, are proposed on fewer acres (11% fewer), but overall effects on species composition would be the same as Alternative 2. Proposed landscape burning effects would also be the same as Alternative 2. |
| **Wildlife:** Old Growth Habitat | The quality and distribution of old growth habitat would likely remain in its current state in the short term. In the mid to long term old growth habitat would likely increasee for a number of moist and cold upland forest-associated species. | Approximately 540 acres of C1 old growth and 560 acres of MA15 old growth would be landscape burned. Fire-caused mortality would increasee snag and downed wood habitat in the short and mid-term. | Fewer acres of landscape burning in Forest Plan old growth stands. Approximately 8 acres of C1 old growth and 38 acres of MA15 old growth would be landscape burned under Alternative 3. | Same as Alternative 3. |
| **Wildlife:** Late Old Structure | In the short term, late and old structure habitat would maintain its current quality and extent in the analysis area. These stands would become increasingly susceptible to insect and disease outbreaks and high-severity wildfire. | This alternative would prescribe burn the most acres (3,745 acres) of late and old structure habitat when compared to the other two action alternatives. As a result, it would have the greatest immediate and short term impacts to the quality and distribution of late and old structure habitat across the analysis area. | This alternative would prescribe burn the fewest acres of late and old structure stands (1,712 acres) when compared to the other action alternatives. As a result, it would have the least immediate and short term impacts to the quality and distribution of late and old structure habitat. | This alternative would burn an intermediate level of late and old structure stands. Approximately 2,862 acres of LOS would be burned under this alternative. Fewer acres would be moved toward a single-stratum late and old structure condition in the dry upland forest PVG under this alternative (20 fewer acres and 30 fewer acres, respectively). |

| Resource Indicator | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| **Wildlife :** Connectivity | In the short term, late and old structure stands and old growth stands would remain connected across the landscape and within the project area with stands that generally meet Forest Plan standards. It is expected that sometime in the future, a large, high severity wildfire would impact the landscape due to vegetation and fuels conditions in the analysis area. The connectivity of late and old structure and old growth stands would be reduced over a large area. | This alternative would burn the most acres of connectivity habitat when compared to the two other action alternatives. It is expected that impacts to connectivity habitat and species that require these stands to move across the landscape would be the greatest under this alternative in the short and mid-term. | Under Alternative 3, there would be less burning in moist and cold upland forest stands. As a result, there would be less impact to the structure and composition of connectivity habitat. | Under Alternative 4 there would be less burning in moist and cold upland forest stands than Alternative 2 and more acres of burning with the potential to affect connectivity habitat than Alternative 3. |
| **Wildlife:** Snag Replacement Trees | Within the next five years, snag replacement trees (live/green) would continue to occupy the project area at or near current densities and size classes. | Proposed harvest activities (commercial thinning, mechanical fuels, small diameter thinning, and roadside treatments) would directly and indirectly affect green trees in the project area. These treatments would reduce the density of green trees in units; however, all treated stands would meet or exceed objectives for green tree replacements (USDA 1996) following treatment. | Same as Alt 2 | Same as Alt 2 |
| **Wildlife:** Down Wood Habitat | Over the next five years, dead downed wood would continue to occupy the analysis area at or near the current density in all WHTs. Over the next five to fifteen years, falling snags would be the primary factor contributing to the recruitment of downed wood habitat, potentially increasing downed wood densities across the analysis area. | This alternative would burn the most acres when compared to the other action alternatives. As a result, it would have the greatest impact to down wood in the short and mid-term. | The short and mid- term impacts of landscape burning on existing downed wood (particularly in the wilderness and moist and cold upland forest stands) would be least under this alternative | Under this Alternative impacts to down wood are greater than those of Alternative 3 and less than those of Alternative 2 |
| **Wildlife:** Elk Cover/HEI | The amount of satisfactory and total cover and the HEI value in the C7 (54) and MA18 (51) management areas would remain the same in the short term. | HEI would increase further above standards in the C7 (58) management area and would move toward desired future conditions in the MA18 (53) management area. | Same as Alt 2 | Same as Alt 2 |

| Resource Indicator | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| **Forest Vegetation**: Snag Habitat (Primary Cavity Excavators & Bats) | In the mid and long term (5 to 15+ years), existing snags would decay and fall to the ground, increasing downed wood in the analysis area. In the mid and long term, snag densities have the potential to increase in the analysis area through naturally occurring (background) mortality and mortality caused by insect and disease outbreaks and wildfire. | This alternative would have the greatest impact on snags and those species that depend on this habitat feature due to the fact that it would commercially and small diameter thin and landscape burn the most acres when compared to the other action alternatives. | Because it would burn the fewest acres, this alternative would have the least short and long term impact on the snag density distribution in the analysis area. | Acres burned under this Atlternative are greater than Alternative 3 but less than Alternative 2 with a corresponding intermediate impact to snag density distribution. |
| **Wildlife:** Pileated Woodpecker Source Habitat | Stand densities would increase, and locally high concentrations of insects and disease would provide foraging and nesting habitat by creating snags. The analysis area would become more susceptible to a large high severity wildfire that could change the composition and structure of pileated woodpecker source habitat to an early successional stage with little or no tree cover and cause fragmentation of existing habitat. | This alternative would landscape burn approximately 11,000 acres of pileated woodpecker source habitat, the most of all of the action alternatives. As a result, this alternative is expected to have the greatest impact on pileated woodpecker and their habitat in the short, mid, and long term | This alternative would landscape burn approximately 2,200 acres of pileated woodpecker source habitat and be the least impactful of the action alternatives. | This alternative would landscape burn approximately 6,400 acres of pileated woodpecker source habitat. As a result, this alternative is expected to have a greater impact than Alternative 3, but less impact than Alternative 2 |
| **Wildlife:** American Marten Source Habitat | In the short term (0 to 5 years), there would be no change in the quality or distribution of marten source habitat in the analysis area. In the mid (5 to 15 years) and long term (15+ years), the quality and distribution of marten habitat would likely change due to increased stand density and risk of high severity wildfire which could reduce suitable marten source habitat. | Mechanical vegetative treatment would impact the suitability of approximately 3,400 acres of source habitat on the Umatilla National Forest and 1,700 acres of source habitat on the Wallowa- Whitman National Forest. This alternative would landscape burn almost 18,000 acres of marten source habitat, the most of all of the action alternatives. As a result, this alternative is expected to have the greatest impact on marten and their habitat in the short, mid, and long term. | This alternative would landscape burn approximately 3,200 acres of marten source habitat, the least of all of the action alternatives. As a result, this alternative is expected to have the least impact on marten and their habitat in the short, mid, and long term | This alternative would mechanically treat the fewest acres of marten source habitat when compared to the other action alternatives. Vegetative treatment would impact the suitability of approximately 2,600 acres of source habitat on the Umatilla National Forest and 1,400 acres of source habitat on the Wallowa-Whitman National Forest. This alternative would landscape burn approximately 10,300 acres of marten source habitat. As a result, this alternative is expected to have a greater impact that Alternative 3, but less impact than Alternative 2, |

| Resource Indicator | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| **Wildlife:** American Three Toed Woodpecker Source Habitat | In the mid (5 to 15 years) and long term (15+ years), the quality and distribution of habitat would likely change. Mortality resulting from insects and disease would improve the condition of foraging and nesting habitat for the three-toed woodpecker. High fuel loading would increase the risk of high severity wildfire which would improve distribution of source habitat for this fire-dependent species. | This alternative would mechanically treat the same number of acres of three-toed source habitat as Alternative 3<br>This alternative would landscape burn almost 14,000 acres of three-toed woodpecker source habitat, the most of all of the action alternatives. The resulting burned forest stands (immediate and delayed mortality) would provide excellent habitat for this species for five to ten years post-harvest. | This alternative would landscape burn approximately 2,300 acres of source habitat, the least of all of the action alternatives. Also mechanical treatment would result in lower retained basal area than under Alternative 2. As a result, this alternative is expected to have the greatest negative impact on green source habitat availability, and the least increase in the availability of mixed and high severity burned patches that this species depends on. | This alternative would commercially thin the fewest acres of source habitat (2,363 acres), and would landscape burn approximately 6,500 acres of source habitat. Impacts would include a net increase in suitable habitat that is greater than Alternative 3 but less than Alternative 2. |
| **Wildlife:** Northern Goshawk Source Habitat | The availability of source habitat would increase slightly in the long term due to a greater abundance of large trees and dense multi-layered habitat. Also in the long term, dense, multi-layered stand conditions would increase the susceptibility of stands to insects, wildfire, and disease outbreaks. It is expected that a high severity fire would convert suitable source habitat to an unsuitable condition over a large portion of the analysis area | This alternative would commercially treat vegetation and landscape burn approximately 1,200 and 2,200 acres of goshawk source habitat, respectively. Commercially treated source habitat would be converted to an unsuitable condition. As a result, this alternative is expected to have the greatest impact on the northern goshawk and source habitat in the short, mid, and long term. | This alternative would commercially harvest the same number of acres of source habitat as Alternative 2, therefore vegetative treatment would result in the same reduction in source habitat as would occur under Alternative 2. This alternative would landscape burn approximately 1,100 acres of goshawk source habitat, the least of all of the action alternatives. As a result, this alternative is expected to have the least impact on the northern goshawk and source habitat in the short, mid, and long term. | This alternative would commercially harvest approximately 800 acres of source habitat, the fewest when compared to the other action alternatives This alternative would also landscape burn approximately 2,200 acres of goshawk source habitat, which is the same amount that would be affected by Alternative 2. As a result, impacts on goshawk would lie between those described for Alternatives 2 and 3. |
| **Wildlife:** Peregrine Falcon Habitat | Under this alternative there would be no impacts to potential habitat in the analysis area. | Under all of the action alternatives, there would be no direct impacts on this species. There would also be no impact on potential nesting cliffs lying in the southwestern portion of the analysis area. | Same as Alt 2 | Same as Alt 2 |

| Resource Indicator | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| **Wildlife:** Bat Habitat | There would be no change in available bat habitat (abandoned buildings, mines, snags in forested landscapes) in the short term. | The proposed activities would not impact potential roosting habitat associated with abandoned mines (shafts/adits), rock outcroppings, or abandoned buildings that may be used by the Townsend's big-eared , spotted bat and the fringed myotis. For impacts to snag roosts see comparison of alternatives for snag habitat/PCE/bats above. | See snag habitat section above. | See snag habitat section above. |
| **Wildlife:** Western Bumblebee Habitat | There would be no change in western bumblebee habitat in the short term. In the mid and long term, open forested habitats would continue to fill in with conifer regeneration (in the absence of wildfire) and meadows edges would encroached by conifers. These events would reduce the quality of habitat for this species. | This alternative would mechanically thin and burn the most acres when compared to the other action alternatives. This alternative would have the most short term impact on individuals and existing colonies. In the mid and long term, this alternative would improve habitat quality on more acres than the other alternatives. | This alternative would do the least toward reversing past losses in habitat and reductions in habitat quality when compared to Alternatives 2 and 4, largely due to the fact that burning in moist and cold upland forest PVG stands would largely be dropped from this alternative | This alternative would commercially thin slightly fewer acres than Alternatives 2 and 3 and landscape burn an intermediate number of acres when compared to the other action alternatives. Improvement to habitat quality would be less than under Alternative 2 but greater than Alternative 3. |
| **Wildlife:** North American Wolverine | There would be no change in potential wolverine habitat in the analysis area in the short term. In the mid and long term, potential wolverine foraging habitat would continue to develop multi-strata habitat features including dense canopy layers, understory regeneration and shrub cover, and high stand densities. Increased fuel loads resulting from fire suppression and insect and disease outbreaks would increase the risk of high severity wildfire. A fire of this type would alter stand structure and composition and fragment existing habitat. | This species is currently not known or suspected to occur in the analysis area. Potential denning habitat would not be affected under any of the action alternatives because there would be no vegetative treatment or landscape burning in these areas. This alternative would affect the quality of foraging habitat and landscape burn the most acres when compared to the other alternatives. As a result, the cumulative effects under Alternative 2 would be greater than Alternative 3. | Although potential foraging habitat impacts (through vegetative treatment) would be greater under this alternative, it would burn the fewest acres (mostly in dry and closely-associated moist stands) when compared to the other action alternatives. As there would be less area experiencing high severity impacts to vegetation, the cumulative impacts would be less under this alternative. | This alternative would commercially thin the fewest acres of potential habitat when compared to Alternatives 2 and 3. This alternative would also landscape burn an intermediate level of potential foraging habitat. As a result, it is expected to have an intermediate level of impact on potential habitat for this species. |
| **Wildlife:** Yuma Skipper | Current information indicates that this species is not present in the analysis area. For this reason, there would be no direct or indirect impacts on this species. | Same as ALT 1 | Same as ALT 1 | Same as ALT 1 |

| Resource Indicator | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| **Wildlife:** Fir Pinwheel | Current information indicates that this species is not present in the analysis area. The specific habitat requirements of this species are not believed to be present in the analysis area. Because this is the case, it is expected that there would be no direct or indirect effects on this species and its habitat | Same as ALT 1 | Same as ALT 1 | Same as ALT 1 |
| **Wildlife:** Columbia Spotted and Rocky Mountain Tailed Frogs | In the short term, the quality and extent of Columbia spotted and Rocky Mountain tailed frog habitat would not change. In the mid and long term, continued recovery of riparian habitat would improve habitat quality for these species. High severity fire impacts could occur in dense riparian habitat along perennial streams. | Alternative 2 proposes to landscape burn the most acres when compared to the other action alternatives. As a result, it would potentially have the greatest impact on individual Columbia spotted and Rocky Mountain tailed frogs and their habitat in the analysis area. | Alternative 3 proposes to landscape burn the fewest acres when compared to the other action alternatives. As a result, it would have the least impact on individual Columbia spotted and Rocky Mountain tailed frogs and their habitat in the analysis area. | Alternative 4 proposes to landscape burn an intermediate number of acres when compared to the other action alternatives. The resulting impact would be less than Alternative 2 but greater than Alternative 3. |
| **Wildlife:** White-headed and Lewis' Woodpeckers | In the short term, there would be no change in existing habitat for this species. In the mid and long term, shade tolerant tree species would continue to encroach into historically open ponderosa pine stands and ultimately, large diameter ponderosa pine trees and snags would be less common, reducing habitat quality for the white-headed and Lewis' woodpeckers. | Under this alternative, basal area retention would be greater than would occur under Alternative 3. As a result, there would be a greater potential for snag creation under this alternative in the long term. This alternative would burn the most acres of moist and cold upland forest. Burning in these areas would create or enhance the most acres of post-fire (mixed severity) habitat for these species. | This alternative would burn the fewest acres when compared to the other alternatives. As a result, these acres would be more susceptible to a large high severity wildfire. | This alternative would commercially thin the fewest acres. Higher basal area retention and larger untreated skips would provide for higher density dependent mortality (snag creation) in the mid and long term. This alternative would also burn an intermediate number of acres creating more suitable woodpecker habitat than Alternative 3 but less than Alternative 2. |
| **Wildlife:** Gray Wolf | The quality of potential gray wolf habitat is not expected to change in the short term. Big game populations (prey) are also expected to be relatively stable in the mid and long term (meeting or near state management objectives), barring large scale disturbance. | Vegetative treatments and burning would not directly affect the gray wolf because this species is a habitat generalist, and is not known to occur in the analysis area. Dens and rendezvous sites would also not be affected by the proposed activities because none are known to occur in the analysis area. | Same as Alt 2 | Same as Alt 2 |

| Resource Indicator | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| **Wildlife:** Intermountain Sulphur | The quality of potential Intermountain Sulphur habitat is not expected to change in the short term. Habitat adjacent to roads and along tailings would continue to recover from past mining and vegetative treatment. | Under all of the action alternatives, there would be mechanical treatment and burning that may directly impact nectaring plants, larval host plants (Lathyrus species), and individuals in the short term. Following initial impacts to habitat and individuals, these activities would also promote the growth of larval and nectaring plants in the mid and long term. | Same as Alt 2 | Same as Alt 2 |
| **Wildlife:** Johnsons Hairstreak | The quality of potential Johnson's hairstreak habitat is not expected to change in the short term. In the long term, high severity fire in the cold, moist, and dry upland forest PVGs would cause high over story mortality, resulting is a reduction in the availability and distribution of mistletoe at a large scale. | This alternative would landscape burn the most acres when compared to the other action alternatives; as a result, this alternative would have the most short and mid-term impact on the distribution and abundance of dwarf mistletoe-infected trees. | This alternative would mechanically treat the same number of acres as Alternative 2 and landscape burn the fewest acres (primarily dry forest stands) when compared to the other action alternatives. As a result, it would have the least short and mid-term impact on the abundance and distribution of dwarf mistletoe. | This alternative would mechanically treat the fewest acres when compared to the other action alternatives. This alternative would also burn an intermediate number of acres compared to Alternatives 2 and 3. Overall impacts to this species and its habitat are expected to be intermediate between Alternatives 2 and 3. |
| **Wildlife:** Neo-tropical Migratory Birds | The current condition of habitat for land birds in the analysis area would not change in the short term or early mid-term. In the long term, dry forest habitats would continue to be invaded by shade tolerant tree species. High severity fire would create edges and perches that would benefit some species while other species requiring high canopy closure and multiple canopy layers would be negatively impacted. | Impacts to potential nesting and foraging habitat would be the greatest in the short term under this alternative due to the combined acres of mechanical treatment and prescribed burning. These treatments would have long term benefits on dry upland forest stands and habitat conditions for the white-headed woodpecker, Lewis' woodpecker, chipping sparrow, and flammulated owl. | Under Alternative 3, the combined short term impacts of mechanical treatment and prescribed burning would be less than Alternative 2 and greater than Alternative 3. However, long term habitat quality is expected to increase less under Alternative 3 than under Alternative 2. | Disturbance to potential nesting habitat, potential nest loss, and snag reductions (through hazard/danger tree felling, felling as part of stand prescriptions) would be the least under this alternative due to the fact that it would mechanically treat the fewest acres. |

| Resource Indicator | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| **Soil Stability**: Soil Mass Wasting | Two mass failure sites were identified in the project area (50.8 acres). these unstable lands are likely to continue to move under this and all other alternatives; affecting Forest Service Road 7300, north of the town of Granite, as rock fall and ditch cleanout are chronic problems in this stretch of road due to this hillside feature. The second Mass Failure site, though unlikely to create noticeable effects on gentle slopes, may slump further under certain precipitation events onto a proposed haul route. | Mass failure sites were removed from proposed project units. Since there are no unstable slopes within proposed units this Resource Indicator and Measure will not be analyzed further. | Same as Alternative 2. | Same as Alternative 2. |
| **Soil Productivity**: Erosion | If the project area were to continue unchanged by further disturbance from project activities or natural events; it would remain on its current soil developmental trajectory with no direct change to the resource indicator of erosion. | No activity unit acres modeled $\geq$0.03 tons per acre. There is little risk of accelerated erosion within the units. If the proposal utilizes adequate EGC the risk can be reduced to unmeasurable levels. | Same as Alternative 2. | Same as Alternative 2. |
| **Water quantity (Soils):** Sediment | If the project area were to continue unchanged by further disturbance from project activities or natural events; it would remain on its current soil developmental trajectory with no direct change to the resource indicator of sediment. | No activity units would produce $\geq$0.03 tons per acre. Sediment delivery is not expected to be elevated from the proposal, due to low erosion risk. | Same as Alternative 2. | Same as Alternative 2. |
| **Detrimental Soil Conditions (DSC):** Change or absence in vegetation growth | Existing roads and skid trails (75 miles) may continue to contribute to the change or absence in vegetation growth. Without project activities there are not many cases when the soil resource can be influenced. Thus the inhibition of the growth of tree and brush (per FSM 2551.5 exhibit 01) would be considered an expression of a detrimental change to the productivity of the soil resource. | An additional 222 miles combined of new temporary roads and skid trails would be constructed. The accumulated area of disturbance can reduce the future vegetative growth or desired species of plants or lead to undesired plants entering the unit. | Same as Alternative 2. | Amount of existing and new road and skid trails proposed is reduced by 7 miles but effects are the same as Alternative 2. |

| Resource Indicator | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| **Hydrology**: Temperature and Biological Criteria | 64,702 acres rated as high or extreme wildfire hazard (see Fuels report). These acres would be more likely to burn at a high intensity, which could remove a significant portion of shading vegetation. | Reduce the amount of land that is currently rated as high or extreme wildfire hazard by 24,897 acres, with the majority being rated as low hazard after the treatments (see Fuels report). This is a 38% reduction compared to the number of acres currently rated as high or extreme (64,702). These reductions would be beneficial to shade, which would benefit stream temperature and biological criteria, because of the reduced risk of high severity wildfire which could remove a significant portion of shading vegetation. | Reduce the amount of land that is currently rated as high or extreme wildfire hazard by 10,577 acres. These reductions would be beneficial to shade, which would benefit stream temperature and biological criteria, because of the reduced risk of high severity wildfire which could remove a significant portion of shading vegetation. | Reduce the amount of land that is currently rated as high or extreme wildfire hazard by 18,304 acres. These reductions would be beneficial to shade, which would benefit stream temperature and biological criteria, because of the reduced risk of high severity wildfire which could remove a significant portion of shading vegetation. |
| **Hydrology**: Sediment/Peak Flows | 144 miles of roads in riparian areas within the project area. Erosion from roads can contribute to stream sedimentation. The exiting equivalent clearcut area is below the 15% threshold for a detectable change in peak flows, which can affect channel morphology and sediment. | Would use approximately 72.3 miles of haul routes in RHCAs—any effects would be localized and of limited duration. Because of these Design Criteria, it is not expected that the activities in RHCAs would cause measurable increases in sedimentation above the background levels. Equivalent Clearcut Area (ECA) would be below the 15% threshold for a detectable change in peak flows, which can affect channel morphology and sediment. | Same as Alternative 2. | Would use 70.7 miles in RHCAs—any effects would be localized and of limited duration.<br>Because of these Design Criteria, it is not expected that the activities in RHCAs would cause measurable increases in sedimentation above the background levels. ECA same as Alternative 2. |
| **Fisheries:** Temperature | No changes from current management activities; there will continue to be risk of high intensity wildfire along fish-bearing streams, which could remove a significant portion of shading vegetation. | The inner halves of the RHCAs will receive no thinning, and other treatments such as prescribed fire are not expected to measurably affect riparian shade, thus it is unlikely to measurably affect stream temperatures. | Same as Alternative 2. | Same as Alternative 2. |
| **Fisheries:** Sediment | No changes from current management activities | BMPs and PDCs are expected to keep any sediment transported to stream channels from road use at an insignificant and not measureable level. | Same as Alternative 2. | Same as Alternative 2. |

| Resource Indicator | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| **Cultural Resources:** Damage to cultural sites | Under this no action alternative, there would be no direct or indirect impacts to heritage resources. The implementation of the No Action Alternative would not change or alter the significant characteristics or the integrity of heritage resources.<br>The risk for loss or degradation of heritage resources from high-intensity wildfire increases in areas with heavy fuel loads increases. | Alternative 2 would increase the protection of heritage resources by reducing the likelihood for high intensity wildfire in the project area. Resource protection measures ensure that project activities would be controlled through identification and protection of sites, either through avoidance or through the implementation of specific treatments recommended by the Forest Service archeologist.<br>Mechanical fuels treatments would have the potential to directly impact heritage/cultural resources. This is because they may result in moderate to high amounts of ground disturbance and mixing of soils. Indirect impacts may include erosion and changes to vegetation that result from off-site projects, which may change the characteristics and integrity of a site.<br>Hazardous fuels reduction may also be beneficial to heritage/cultural resources by providing defensible space for resources (e.g, wooden structures) that are especially vulnerable to the impacts related to wildfire. | Similar effects as Alternative 2, but this alternative reduces the ancillary risks associated with prescribed burning by the elimination of wilderness burning, it does increase the level of slash and pile but risk is reduced through application of design criteria. There will be an increase need for coordination between the road engineer and the archaeologist. | Overall, this alternative presents a reduction in commercial thinning and temporary road construction in comparison to Alternative 2 (preferred action). Based on the implementation of design criteria the effects and associated risks are also the same. |
| **Botanical:** Documented sensitive plant populations (Number of sensitive plant populations potentially impacted) | No sensitive plant populations would potentially be impacted | 8 populations in areas with no proposed activities<br>One population in logging Unit 60. It will be avoided by designation as an ATP<br>No populations in areas of proposed burning | 8 populations in areas with no proposed activities<br>One population in logging Unit 60. It will be avoided by designation as an ATP<br>One population may be subject to slash and pile burning (fire unit 581). | 8 populations in areas with no proposed activities<br>One population in logging Unit 60. It will be avoided by designation as an ATP<br>One population may be subject to slash and pile burning (fire unit 581).<br>Four populations may be subject to landscape scale burning (fire unit 517) |

| Resource Indicator | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| **Botanical:** Potential sensitive plant habitat (Number of acres of potential sensitive plant habitat that may potentially be impacted) | No sensitive plant habitat would potentially be impacted. | 9,907 acres of upland coniferous habitat may be impacted by ground disturbing activities.<br>3,538 acres of riparian habitat conservation areas subject to hand tree felling, hand pile burning, and landscape burning<br>8,582 acres subject to mechanically piled burning<br>29,220 acres may be subject to landscape burning | 9,907 acres of upland coniferous habitat may be impacted by ground disturbing activities<br>3,538 acres of riparian habitat conservation areas subject to hand tree felling, hand pile burning, and landscape burning<br>13,712 acres subject to mechanically piled burning<br>3,512 acres may be subject to landscape burning | 8,546 acres of upland coniferous habitat may be impacted by ground disturbing activities<br>3,535 acres of riparian habitat conservation areas subject to hand tree felling, hand pile burning, and landscape burning<br>8,582 acres may be subject to mechanically piled burning<br>19663 acres may be subject to landscape burning |
| **Invasive Plants:** acres at low, moderate or high risk of spread | The spread of invasive plants from currently existing populations and off-Forest seed sources is not expected to be extensive, as existing populations, both on and off-Forest, are relatively small and isolated.<br>It is likely that infestations will continue to be found along active roads within the analysis area.<br>There are currently 834 acres of known infestations of invasive plants. These infestations are considered high risk areas for potential spread within the analysis area. | Alternative 2 creates the most acreage at high vulnerability for weed infestation, due to the slightly larger amount of ground disturbing activities proposed.<br>This alternative would have 31,246 acres with low risk, 8,529 with moderate risk, and 2,553 acres of high risk of spread. | Similar effect to Alternative 2 except acres considered as low risk of spread decrease because less prescribed fire is proposed.<br>This alternative would have 5,538 acres with low risk, 8,529 with moderate risk, and 2,557 acres of high risk of spread. | The smaller area of ground disturbance in Alternative 4 results in fewer acres at high risk.<br>This alternative would have 21,659 acres with low risk, 8,288 with moderate risk, and 1,462 acres of high risk of spread. |
| Range | Within the planning area, there are 8,552 acres that overlap with vacant allotments. There are no reasonably foreseeable plans to authorize grazing with vacant allotments. No effect to range by this alternative. | The Ten Cent project would have no effects to range management. Less than one acre of treatments would occur within active allotments and would not affect the overall management of livestock grazing in the area. | Same as Alternative 2. | Same as Alternative 2. |
| Recreation Opportunity | Recreation conditions would only be affected by ongoing management and changes caused by natural events. The Recreation Opportunity Spectrum (ROS) identified for each management area would not be affected by this alternative. | Proposed activities within management areas A8 and A9 would temporarily change the Recreation Opportunity Spectrum from Semi-Primitive to a Roaded Natural by leaving debris, stumps and disturbed soil.<br>Deviation from the assigned ROS class for both management areas would be short-term lasting 2-3 years until vegetative growth hides the evidence of disturbance. | Same as Alternative 2. | Same as Alternative 2. |

| Resource Indicator | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| Visual Quality | There would be no change to visual quality within the analysis area. There would be no changes to scenic attractiveness or integrity in any of the above-mentioned management areas as a result of implementing this alternative. | Visual quality would be reduced for up to three years following treatments until freshly cut wood fades, soil disturbance is revegetated, and plant growth disguises stumps.<br>Scenic integrity would temporarily decrease for 1-3 years following treatments until ground vegetation covers soil disturbance and stumps.<br>Prescribed burning would temporarily reduce scenic attractiveness in all management areas—pile burning more so than landscape burning since pile burning would not leave a natural pattern on the ground. However, the effects of prescribed fire would become visually subordinate to the surrounding area within one to two years. | Same as Alternative 2. | Same as Alternative 2. |
| Developed Recreation | The vegetation surrounding these developed recreation sites would continue to display a full overstory and relatively dense understory. | Recreationists at Olive Lake and Fremont Powerhouse Complex would be temporarily affected by noise, traffic, dust and smoke from the adjacent proposed activities.<br>After all associated activities are completed, FSR 10 would serve as a fire break increasing the likelihood that the campground and Fremont Complex would survive a wildfire as well as providing a safe evacuation route for recreationists.<br>Vegetation along FSR 10 would be much more open in the foreground, allowing motorists to see and avoid wildlife collisions. Proposed treatments could help restore views of interpretive sites such as Ah Hee Diggings along FSR 73 where the view is becoming obscured by tree growth. | Same as Alternative 2. | Same as Alternative 2. |

| Resource Indicator | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| Trails | Vegetation adjacent to the five trailheads would increase in density. | Three developed trailheads (Lake Creek, Granite Creek, and Lost Creek/Saddle Camp) would experience increased traffic and dust while proposed activities are implemented. Blue Springs Summit Snowpark and Mt. Ireland Trailhead are outside any proposed treatment units and so should not be affected. There are 12 snowmobile trails, 12 OHV trails, and three hiking/horseback riding trails that cross proposed thinning units. Trails could be temporarily closed during treatment activity for safety reasons, however this would only affect one to two trails at a time. Effects to trails would be limited to one season or less and mitigation would ensure any damage to trail tread is repaired. Trails within prescribed fire units would need to be monitored for hazardous trees created by the burn and identified hazard trees within one tree-height of trails would be felled. | Same as Alternative 2. | Same as Alternative 2. |

| Resource Indicator | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| Dispersed Recreation | Campers using dispersed sites would not be disturbed by noise, smoke, or increased traffic. Dispersed campsite use patterns would change only due to natural events (fire, windthrow, etc). | There are 22 inventoried dispersed campsites within 300 feet of a proposed thinning units and 38 that lie on proposed haul routes. The listed mitigation (RC5) would protect the integrity of sites, although use of these sites could be temporarily interrupted (1-2 weeks) while thinning is implemented.<br>Eight sites are within viewshed corridors could be used as log landings in order to reduce impacts to visual quality throughout these viewsheds. This would make these campsites unusable for 1-3 years.<br>All dispersed campsites would be affected to some degree by smoke from prescribed burning.<br>Alternative 2 would affect the most dispersed campsites due to its large-scale prescribed burning, and Alternative 4 would affect the least due to fewer thinning units and the omission of burning in the wilderness. | Same as Alternative 2. | Same as Alternative 2. |
| Wilderness and | Natural fire cycles in the North Fork John Day Wilderness would continue to be interrupted by fire suppression and existing fuels would continue to accumulate. | Prescribed fire would be applied both outside the wilderness and allowed to back into the wilderness, and ignition would also occur along existing trails and ridgelines within the wilderness. Since the fire would only be controlled once it reaches the wilderness boundary, control features such as fire line trenches or tree stumps would not occur in the wilderness. Removal of fuels under prescribed fire conditions would protect other wilderness features of value such as big game and anadromous fish habitat, high water quality, and historic features. | No prescribed fire is proposed for this alternative, effects would be similar to Alternative 1. | Same as Alternative 3 |

| Resource Indicator | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| Inventoried Roadless Area | Greenhorn and Twin Mountain IRAs, and North Fork John Day Wild & Scenic River would continue to be interrupted by fire suppression and existing fuels would continue to accumulate. | The only activities proposed within the IRAs would be prescribed fire, which would have effects similar to those discussed for wilderness. Fire could creep down to the Wild & Scenic River corridor, but the effects of such would appear natural, meeting the "preservation" standard. Views of the fire would appear as a mosaic from the river corridor, again meeting standards specified in the Wild & Scenic River Management Plan | Same as Alternative 2. | Same as Alternative 2. |
| Lands with Wilderness Characteristics | All 55,354 acres of lands with wilderness characteristics would remain as described in the Affected Environment section.<br>There would be no changes to Late Old Structure wildlife habitat or pileated woodpecker source habitat. There would also be no changes to fisheries habitat and streams would remain unaffected by forest treatments within the polygon. Therefore, selecting this alternative would not affect any future wilderness decision associated with a forest plan revision. | Less than 1% of lands with wilderness characteristics would be affected by treatment. There would be 1% loss of lands with wilderness characteristics. 54,808 acres of lands with wilderness characteristics would remain.<br>Prescribed fire would have little effect on lands with wilderness characteristics in that the majority of the treated area would still appear natural, with some non-conforming fire control lines and periodic stumps related to removal of hazardous snags. | Same as Alternative 2. | Overall effects would be the same as Alternative 2, however there would be 54,849 acres of lands with wilderness characteristics would remain. |
| Other Undeveloped Lands | There would be no direct effects to other undeveloped lands because no activities would occur in these areas. | Effects to the intrinsic physical and biological resources of other undeveloped lands within the Ten Cent planning area (soils, water, wildlife, recreation, fisheries, etc.) are disclosed in the applicable resource sections of the EIS<br>Environmental effects to resources in other undeveloped lands due to the implementation of proposed project activities would be consistent with applicable laws, regulations, and Forest Plan management area standards and guidelines (see applicable sections of the EIS for Findings of Consistency for each resource). | Same as Alternative 2. | Same as Alternative 2. |

| Resource Indicator | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| **Economics** | Under the No Action Alternative, no commercial timber harvest, pre-commercial thinning, or fuel reduction activities associated with the Ten Cent project would occur.<br>Alternative 1 would incur no costs, produce no revenue, and would not change the conditions or level of economic activity in the surrounding counties. | The costs of harvesting and hauling small diameter merchantable timber exceeds the expected revenues for a total project cost of $3,777,826. | Same as Alternative 2 | The costs of harvesting and hauling the small diameter merchantable timber exceed the expected revenues by $3,560,210. Alternative 4 would treat 1291 acres less than Alternatives 2 and 3 but would also cost more per CCF due to longer skidding and yarding distances. |

# Chapter 3. Affected Environment and Environmental Consequences

## 3.1 Introduction

This chapter summarizes the physical, biological, and economic environments that may be affected by the proposed action and alternatives on the environment (affected environment) and the effects on that environment that will result from implementation of alternatives (environmental consequences). It also presents the scientific and analytical basis for the comparison of alternatives presented in Chapter 2. The proposed action (Alternative 2), Alternative 3, and Alternative 4 (hereafter grouped as action alternatives) include the project design criteria (Table 2-6) which were developed to minimize negative effects. Therefore, the effects of the action alternatives are analyzed based on design features being in place.

The environmental consequences section discusses the potential effects to the resource associated with the implementation of each alternative. Effects are defined as (1) direct effects that are caused by an action and occur at the same place and time as the action; (2) indirect effects that are caused by an action but are later in time, or removed in distance, from the action; and (3) cumulative effects that result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such actions.

This analysis is consistent with the CEQ memorandum (CEQ, 2005) which is incorporated by reference and states: "…agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions." Past actions are treated similarly in the recently published Forest Service direction for implementing NEPA (Forest Service Handbook (FSH) 1909.15, 15.1). For these reasons, the analysis of past actions in this final environmental impact statement is based on current environmental conditions (affected environment). The cumulative effects analysis in this final environmental impact statement is also consistent with Forest Service NEPA Regulations (36 CFR 220.4(f)) that state, in part:

CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions. Once the agency has identified those present effects of past actions that warrant consideration, the agency assesses the extent that the effects of the proposal for agency action or its alternatives will add to, modify, or mitigate those effects. The final analysis documents an agency assessment of the cumulative effects of the actions considered (including past, present, and reasonably foreseeable future actions) on the affected environment. With respect to past actions, during the scoping process and subsequent preparation of the analysis, the agency must determine what information regarding past actions is useful and relevant to the required analysis of cumulative effects.

Cataloging past actions and specific information about the direct and indirect effects of their design and implementation could in some contexts be useful to predict the cumulative effects of the proposal. The CEQ regulations, however, do not require agencies to catalogue or exhaustively list and analyze all individual past actions. Simply because information about past actions may be available or obtained with reasonable effort does not mean that it is relevant and necessary to inform decision-making (40 CFR 1508.7).

Analysis areas for determining environmental effects vary by resource, as do the other actions included in each cumulative effects analysis. Cumulative effects in an analysis area may include estimated effects from past, present, and reasonably foreseeable future private or public vegetation treatments, road construction, grazing, and wildfire suppression or lack of same. A list of such potential actions is included in Appendix C of this document.

Separate resource reports provide background for the analysis summarized in this final environmental impact statement. These reports use resource data housed in the geographic information system (GIS) and other relevant sources. The reports are summarized in this chapter and incorporated by reference; they are available on the project website or can be viewed at the North Fork John Day Ranger District Office in Ukiah, Oregon. .

# 3.2 Fire and Fuels

## Methodology

Project area site visits occurred during the spring, summer, and fall of 2013, 2014, and 2015. These visits were to verify existing stand exam data and visually collect surface fuel data as well as species composition. Stand attributes such as slope, aspect, or plant association group 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 using Forest Vegetation Simulator (FSVeg) and FlamMap. Fire Family plus was utilized to determine percentile weather for use in modeling.

Information for this analysis was gathered from field reconnaissance, the Umatilla National Forest's Geographic Information System (GIS), historical mapping and the Forest Vegetation Simulator vegetation database. Analysis was accomplished by varying methods, including: GIS/mapping, FlamMap3, BehavePlus5, Fire Regime Condition Class Software Application (FRCCsa), comparison with pertinent research, field observations, professional judgment based upon observation of past activities and experience within the general location. The vegetation information used for analyses throughout this document was developed using the most similar neighbor (MSN) imputation process (Moeur and Stage 1995, Crookston et al. 2002). For more information related to the models, assumptions made in analysis, and information sources used in this analysis see the Fuels Report in the project record.

### Analysis Indicators and Measures

Analysis indicators were developed to address purpose and need and key issues identified internally and by members of the public during scoping. Resource indicators and measures were developed based on principles of fire-safe forests (Agee 2000, 2002). Principles of fire-safe forests are described in Table 3-1. Resource indicators and measures for assessing effects can be found in Table 3-2 below.

**Table 3-1: Principles of fire-safe forests**

| Principle | Effect | Advantage | Concerns |
|---|---|---|---|
| Reduce surface fuels | Reduces potential flame length | Fire control is easier; less torching of individual trees | Surface disturbance: less with prescribed burning, more with other techniques |
| Increase height to live crown | Requires longer flame length to begin torching | Less torching of trees | Opens understory, possibly allowing surface winds to increase* |

| Principle | Effect | Advantage | Concerns |
|---|---|---|---|
| Decrease crown density | Makes tree-to-tree crown fire spread less likely | Reduces crown fire potential | Surface winds may increase and surface fuels may become drier* |
| Favor fire-tolerant species and larger trees | Reduces potential tree mortality, thicker bark and taller crowns | Improves vegetation tolerance (survivability) to low- and mixed-severity fire | If used too broadly, it could simplify composition at landscape scale, removal of smaller trees is less profitable |

*Sources*: Adapted from Agee et al. (2000) and Agee (2002).

* Where thinning is followed by sufficient treatment of surface fuels, the overall reduction in expected fire behavior and severity usually outweigh the changes in fire weather factors such as wind speed and fuel moisture (Weatherspoon, 1996).

**Table 3-2: Resource indicators and measures for assessing effects**

| Resource Element | Resource Indicator | Measure | Used to address: P/N, or key issue? | Source (LRMP S/G; law or policy, BMPs, etc.)? |
|---|---|---|---|---|
| Fire Behavior | Flame Length | < 4 feet | Yes | Research- Agee et al. (2000) & Agee (2002) |
| Fire Behavior | Crown Fire Activity | Active, Passive, Conditional, Surface Fire | Yes | Research- Agee et al. (2000) & Agee (2002) |
| Surface Fuel Loadings | Tons per acre | < 9 tons per acre in 0-3” size class | Yes | Umatilla NF LRMP, Wallowa-Whitman LRMP (1990) |

### Spatial and Temporal Bounding of Analysis Area

The spatial boundaries for analyzing the cumulative effects to fire and fuels are the entire Ten Cent CWPP planning area, which consists of the HUC 10 Granite Creek watershed. This area was chosen as it is large enough to display the effects of the Fire regime Condition Class across the landscape. It is also a large enough area to accurately display the potential effects of the larger wildfires that have been occurring across Northeast Oregon.

There is little scientific documentation on long term treatment effectiveness. Mechanical fuel treatments have been shown to be very effective at 7 years beyond treatment (Stephens, et al. 2012). Studies have shown that mechanical treatments followed by fire treatments have a longer effectiveness interval (15-20 yrs.) because of low post prescribed fire tree mortality and high initial surface fuel consumption (Stephens, et al 2012). There is evidence of prescribed fire alone reducing fire behavior intensity at a roughly 9 year interval (Stephens, et al., 2012).The treatment areas would be maintained through maintenance burning to reduce passive crown fire potential. This would take place more in line with the landscapes Fire Regimes. On the drier sites, maintenance burning could take place from 3-18 years from initial implementation. On the more moist and cold sites prescribed fire may take place at longer intervals. Small diameter thinning would be the preferred method, followed by jackpot burning or the burning of piles in the cold and moist sites.

## Affected Environment

The fire environment across the Ten Cent area includes all available fuels, existing topography and weather. These elements together define the potential fire behavior that can occur across the entire landscape. Of the three characteristics described above only the fuels (vegetation) can be altered by management actions.

Many elements of fuels work together to influence fire behavior including: vertical and horizontal distribution and continuity, moisture and chemical content, compaction, size and shape of fuels, and fuel loading. These elements of the fire environment can be modified to reduce potential fire behavior.

Northern and eastern aspects and higher elevations of the analysis area consist mostly of cold upland forest. Ridge tops, southern and western aspects transition into dry ponderosa pine, dry Douglas-fir, and dry Grand fir types.

Due to fire exclusion, shade tolerant species, such as grand fir, Douglas fir and lodgepole pine have expanded into areas that were once dominated by ponderosa pine or ponderosa pine/western larch mixtures. Regeneration and growth of these species, over time, has created the current condition of dense multiple canopy layered stands.

**Table 3-3: Resource indicators and measures for the existing condition**

| Resource Element | Resource Indicator | Measure | Existing Condition (Alternative 1) |
|---|---|---|---|
| Wildfire Hazard | Flame length and Crown fire susceptibility | Average < 4 ft. in treated stands, Basal Area range of 30-80 (depending on cover type) | 4.75 ft. (High of 21 ft. and low of 1.3 ft.), Average Basal Area- 118 |
| Surface Fuel Loading | Tons per acre | Average < 9 tons per acre | 11 tons per acre |

## Fire Behavior- Flame Length and Fuel Models

The fuel profile consists of the amount of fuel present (fuel load), fuel type/composition, structure, and arrangement (horizontal and vertical). Fuel models have been developed to characterize the mix of these components. A description of the fuel models and fire behavior used for this analysis can be found in Figure 3-1 and Table 3-4.

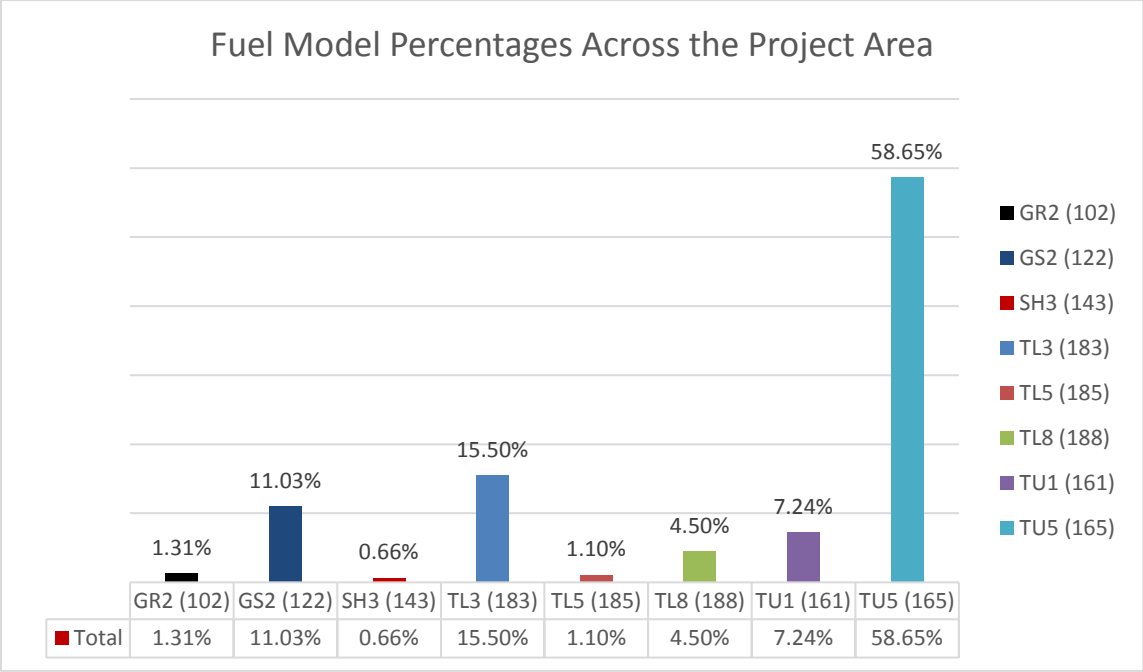


**Figure 3-1: Fuel models across the Granite Creek Watershed**

**Table 3-4 Fuel Model Descriptions**

| Fuel Model | Description |
|---|---|
| GR2 | The primary carrier of fire in the GR2 fuel models is grass. Fire behavior displays moderate spread rate and low flame length. |
| GS2 | The primary carrier of fire in GS2 is grass and shrubs combined. Shrubs are 1 to 3 feet high, grass load is moderate. Spread rate is high; flame length moderate. Moisture of extinction is low. |
| SH3 | The primary carrier of fire in SH3 is woody shrubs and shrub litter. Moderate shrub load, possibly with pine overstory or herbaceous fuel, fuel bed depth 2 to 3 feet. Spread rate is low; flame length low. |
| TU1 | The primary carrier of fire in TU1 is low load of grass and/or shrub with litter. Spread rate is low; flame length low. |
| TU5 | The primary carrier of fire in TU5 is heavy forest litter with a shrub or small tree understory. Spread rate is moderate; flame length moderate. |
| TL3 | The primary carrier of fire in TL3 is moderate load conifer litter, light load of coarse fuels. Spread rate is very low; flame length low. |
| TL5 | The primary carrier of fire in TL5 is high load conifer litter; light slash or mortality fuel. Spread rate is low; flame length low. |
| TL8 | The primary carrier of fire in TL8 is moderate load long-needle pine litter, may include small amount of herbaceous load. Spread rate is moderate; flame length low. |

Fire behavior predictions were made using the BehavePlus version 5 (Andrews, Bevins, & Seli, BehavePlus fire modeling system, Version 4.0: User's Guide, 2008). Behave plus uses a series of interactive fire behavior computer programs for estimating wildfire potential under various fuel, weather and topographic situations. The system provides point projections of fire behavior under a set of conditions that are assumed to be constant for the period of interest in one-dimensional space. Fuel models GR2, GS2, SH3, TU1, TU5, TL3, TL5, and TL8 from the Behave system were used for analysis because these models exist within the analysis area. FlamMap was also used for calculating the surface and crown fire behaviors and the flame lengths. FlamMap is designed to examine the spatial variability in fire behavior assuming that fuel moisture, wind speed and wind direction are held constant in time thereby allowing more direct comparison of fuel treatment effects. The program allows the user to characterize fuel hazard and potential fire behavior.

Fire predictions were run using identical weather inputs, slope values and 97th percentile fuel moistures. Flame length projections from the BehavePlus program for the Ten Cent project area are shown in Figure 13.

The flame length categories were broken out into the four Hauling chart categories that are directly related to flame length. The Hauling chart is an excellent tool for measuring the safety and potential effectiveness of various fireline resources given a visual assessment of active flame length. It was so named because it infers the relative intensity of the fire behavior to trigger points where “hauling” various resources to or away from an incident should be considered (Andrews & Rothermel), Charts for Interpreting Wildland Fire Behavior Characteristics, 1982). Table 3-5 describes the Hauling chart interpretations.

**Table 3-5: Hauling Chart Interpretations**

| Flame Length (Feet) | Fireline Intensity (BTU/Ft/Sec) | Interpretation |
|---|---|---|
| 0-4 | 0-100 | Persons using handtools can generally attack fires at the head or flanks. Handline should hold the fire. |
| 4-8 | 100-500 | Fires are too intense for direct attack on the head by persons using handtools. Handline cannot be relied on to hold fire. Equipment such as dozers, engines, and retardant aircraft can be effective. |
| 8-11 | 500-1,000 | Fires may present serious control problems such as torching, crowning, and spotting. Control efforts at the head of the fire will probably be ineffective. |
| 11+ | 1,000+ | Crowning, spotting, and major runs are common; control efforts at the head of the fire are ineffective. |

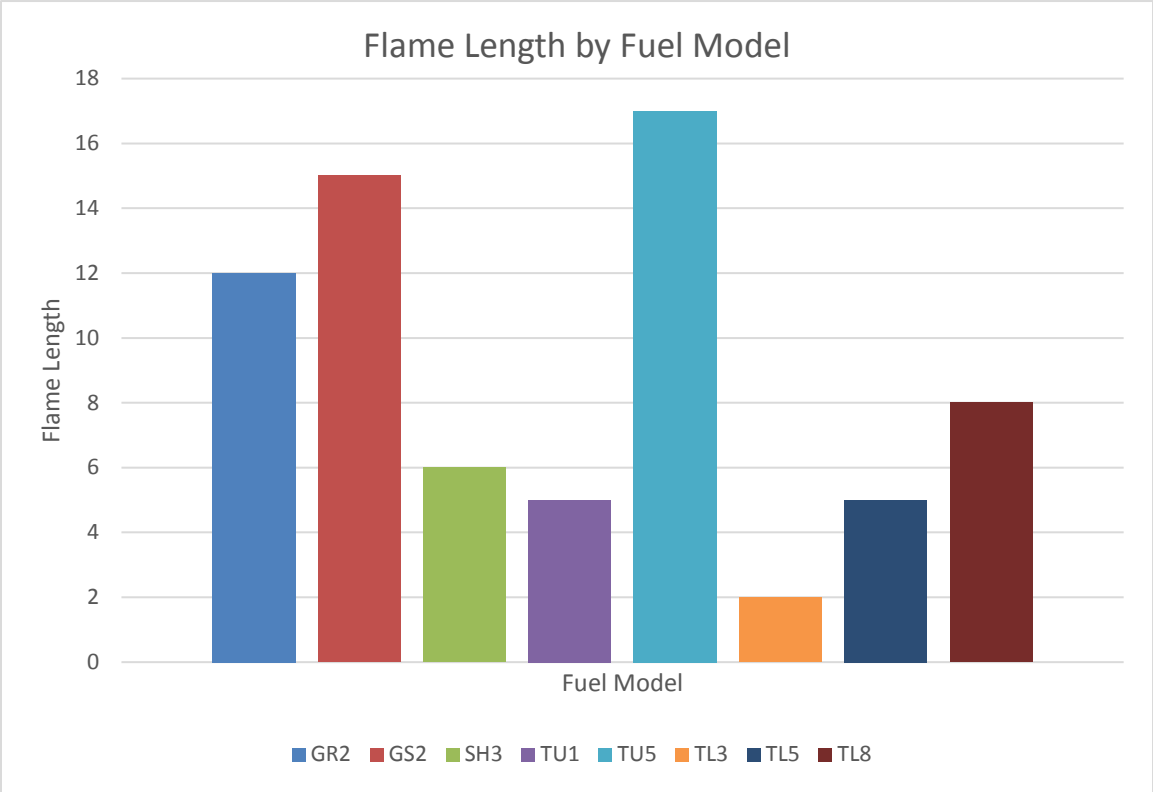


**Figure 3-2: Flame length comparison by fuel model**

## Fire Behavior

Crown fires are fires that burn in elevated canopy fuels (above ground) that consist of live and dead foliage, lichen, and the fine live and dead branch wood. (Graetz, Sessions, & Garman, 2007). A surface fire may make the transition to some form of crown fire depending on the surface intensity and crown characteristics (Van Wagner, Conditions for the start and spread of crown fire, 1977). FlamMap was used to model the crown fire potential for the Ten Cent CWPP area. The crown characteristics used to compute crown fire activity are; canopy base height, stand height, canopy bulk density and foliar moisture content. Low canopy base height (including ladder fuels) facilitates ignition of the crown fuels by the surface fire and then,

transition to some form of crown fire, which may spread much faster than a surface fire. Stand height is used as the upper level of crown space for determining crown fuel loading and the starting height for lofting embers. Please see figure 14 below for a visual understanding of the crown characteristics used in the calculation.

In order for FlamMap to determine the crown fire activity for each cell on the landscape, first the surface fireline intensity is compared with the intensity threshold that is critical to involving the overlying crown fuels using the canopy base height (CBH) from the landscape and the foliar moisture content. If this fireline intensity threshold is not met the cell is given a value of 1 (surface fire). If the fireline intensity threshold is met or exceeded, some form of crown fire (passive or active) has occurred. To determine what "type" of crown fire (Van Wagner, Conditions for the start and spread of crown fire, 1977), the equilibrium rate of crown fire spread is computed for the current spread direction (Rothermel R. C., 1991), modified by the "crown fraction burned" (Van Wagner, Prediction of crown fire behavior in two stands of Jack pine, 1993) and compared with the critical rate of spread (computed from the canopy bulk density, CBD) required for an active crown fire. If this critical rate of spread threshold is not met, the crown involvement is assumed limited to torching trees (a passive crown fire) and coded as 2. When the critical rate of spread threshold is met or exceeded the cell is given an attribute of 3 (active crown fire).

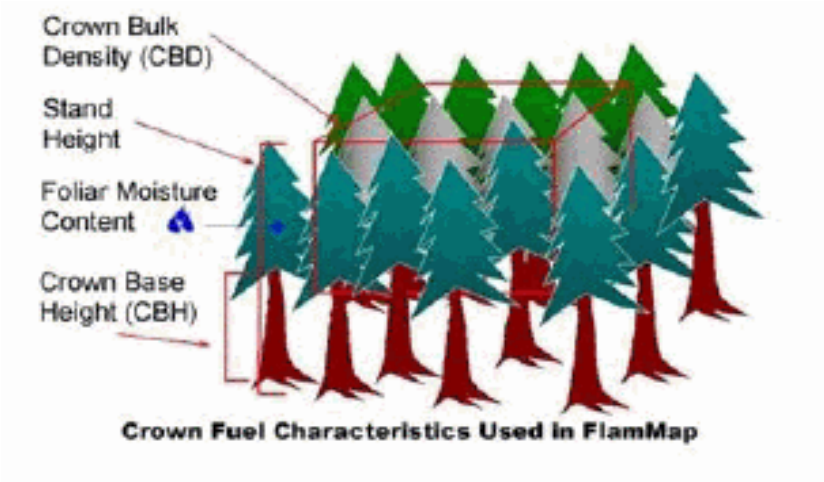


**Figure 3-3: Crown fuel Characteristics Used in FlamMap**

The effect of this logic is that for a cell to be assigned a value of 3 (active crown fire), the two conditions for the fireline intensity threshold (torching) and critical rate of spread threshold must both occur. A cell cannot have active crown fire without torching conditions also occurring. Likewise, a cell requires surface fire activity before either the torching of active crown fire conditions can be met (Finney, An Overview of FlamMap Fire Modeling Capabilities, 2006).

The spatial continuity and density of tree canopies in combination with wind and physical setting provide the conditions for crown fires (Graham 2004). Canopy base height, canopy bulk density, and canopy continuity are key characteristics of forest structure that affect the initiation and propagation of crown fire (Albini 1976, Rothermel 1991). Canopy base height is important because it affects crown fire initiation and canopy continuity influences the spread of fire (Graham 2004).

Ladder fuels, as they relate to canopy base height, provide avenues for fire to move from the ground to the tree crowns. Stands with low canopy base height are more susceptible to crown fires. Crown fires are high intensity wildfires that advance through a stand's canopy and can exhibit extreme fire behavior that is difficult and dangerous to suppress, and cause economic damage (Keyes and O'Hara, 2002). They occur when surface fires create enough energy to preheat and combust live fuels well above the ground or when ladder fuels, in the form of small seedlings, saplings and young trees with low hanging branches, carry fire into the upper canopy. There are two stages of crown fires: the initiation of crown fire activity, referred to as "torching" (also known as passive crown fire), and the process of active crown fire spread, where fire moves from tree crown to tree crown (Agee, 2005). Torching commences when the surface flame length exceeds a critical threshold, defined by Van Wagner (1977) as a function of the moisture content of overstory foliage and the vertical distance to live crown, known as canopy base height (CBH). Once in the crowns, fire must maintain a minimum rate of spread to become an active crown fire and is primarily determined by topography and weather conditions. The spread rate required to keep fire in the crowns hinges on the density of fuels in the canopy, called canopy bulk density (CBD) (Keyes and O'Hara, 2002). Torching and crowning also create firebrands that can spread fire well beyond their source, increasing fire spread to adjacent stands. Crowning significantly limits fire suppression options, requiring suppression personnel to rely on aerial resources or implement other indirect attack techniques.

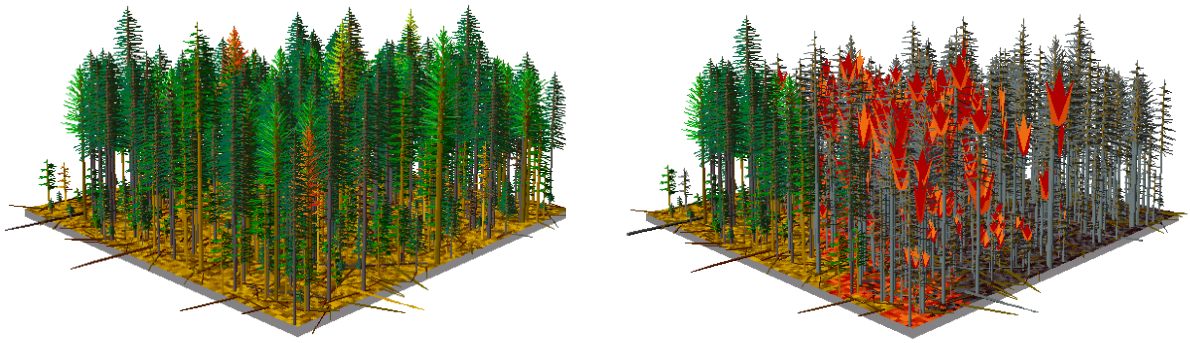

**Figure 3-4 Existing Condition and Existing Condition with Wildfire**

Potential fire behavior within the Ten Cent CWPP planning area is described, in part, by wildfire hazard. Hazard describes the resistance to control once a fire starts. Fire hazard has been qualified into the following hazard ratings of low, moderate, high and extreme. The hazard ratings are determined by the potential flame length and fire type at any given pixel (Table 3-6).

**Table 3-6 Wildfire Hazard Rating Matrix**

| | Flame length potential (ft) | | | |
|---|---|---|---|---|
| **Fire Type** | **0-4** | **4-8** | **8-11** | **11+** |
| Surface | Low | Moderate | High | Extreme |
| Passive Crown | Low | Moderate | High | Extreme |
| Active Crown | Moderate | High | Extreme | Extreme |

Potential fire behavior hazard ratings start with flame length potential. Flame length potential ratings of 0-4 feet, 4-8 feet, 8-11 feet, and 11 feet plus are determined based on Fire Behavior Characteristics Charts found in the Appendix B of the National Wildfire Coordinating Group (NWCG) Fireline Handbook (2006). Fire Behavior Characteristics Charts are used by

firefighters to determine a fire's resistance to control and spread rates. Built into the hazard ratings along with flame length potential is fire type. Fire type is related to the potential for a crown fire and a firefighter's ability to engage.

Potential fire hazard in the low category generally allows fire suppression resources to safely and efficiently attack the fire at the head with handtools. This is not a guide to personal safety. Fires can be dangerous at any level. Wilson (1977) has shown that most fatalities occur in light fuels on small fires or isolated sections of large fires. Low fire hazard also generally allows for multiple operational alternatives to be considered such as aggressive full perimeter control, point source protection or utilizing barriers either natural or constructed. Moderate fire behavior is fire behavior where fire suppression efforts may be limited, due to the availability of the type of equipment that may be necessary to be successful. At four to eight foot flame lengths you have exceeded the capabilities of hand crews, handline cannot be relied on to hold the fire, and equipment, such as bulldozers, engines and retardant aircraft, would be necessary. High hazard fire behavior presents serious control issues related to torching, crowning and spotting. Control efforts become ineffective. Extreme hazard fire behavior does not allow for safe working conditions for any type of fire suppression resources directly related to the fire.

Table 3-7 shows the predicted wildfire hazard for the existing condition in acres for the Ten Cent CWPP Planning area using the hazard matrix shown in Table 3-6. Figure 3-5 is a spatial map of the existing condition fire hazard.

Table 3-7 shows that 65% of the project area has extreme fire hazard under 97$^{th}$ percentile weather and fuel conditions. Extreme fire hazard equates to high flame lengths and varying degrees of crown fire where suppression efforts become ineffective. Given assumptions made from best available science, extreme, and even moderate and high fire hazard would be damaging to valued stand characteristics.

**Table 3-7: Existing Condition Hazard Rating and Acres**

| Hazard | Acres* | % of planning area |
|---|---|---|
| Low | 25,385 | 27% |
| Moderate | 4,344 | 5% |
| High | 2,919 | 3% |
| Extreme | 61,783 | 65% |

*There is approximately 82 acres missing from the total acres within the project area. This may be due to multiple factors, including areas coded as Fuel Model 99 (Bare Ground, water, etc.) or small slivers that get dropped during GIS analysis.

About 27% of the project area currently rates as low hazard fire potential. Low hazard potential is the desired condition that best allows safe, efficient firefighting, provides least cost (see Table 3-6 and hazard rating explanation on pg. 24) and achieves the best results with regards to fire effects (see General Assumptions, pg. 11-12). Areas of low hazard may still need treatment in order to maintain their low hazard quality.

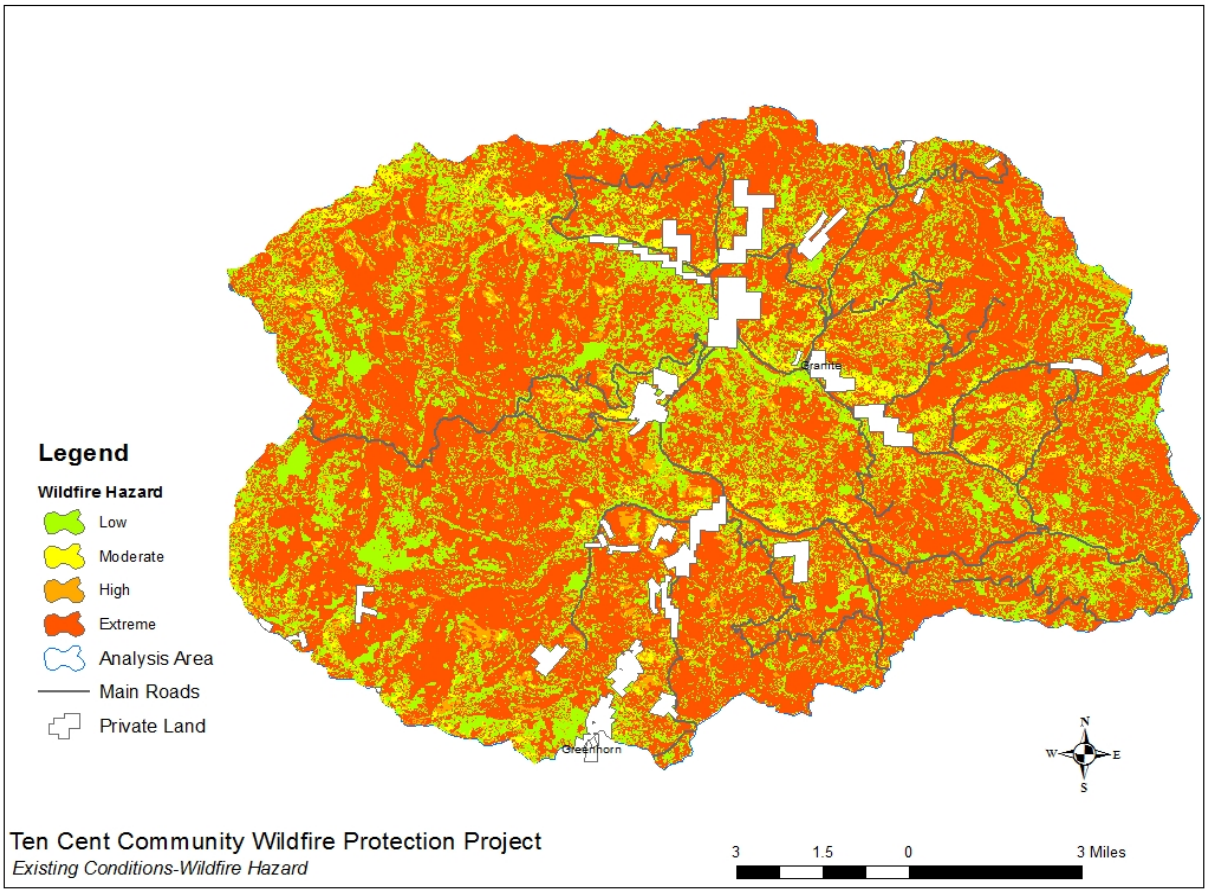


**Figure 3-5: Existing Condition Wildfire Hazard**

## Fuel Loading

Surface fuel loadings vary somewhat throughout the project area. Fuel models contained within the proposed areas are described by Scott and Burgan (2005). The difference in fire behavior among fuel models is related to the fuel load and its distribution among the fuel particle size classes (Anderson 1982). Fuel load and depth are significant properties for predicting ignition, rate of spread, and intensity (Anderson 1982). Fuel models do not indicate potential for uncharacteristic wildfire behavior and effects, fire regime condition class, or departure from historical conditions. However, the combination of an indicator of departure from historical conditions, along with fuel models, can be of considerable value in determining if wildfire behavior and effects have departed from natural conditions (Hahn and Strohm 2003). Intensity and duration of surface fires depend on the availability and condition of surface fuels (Graham 2004). In terms of fuels and fire potential, a majority of the closed stands proposed for treatment have fuel loads that are best represented as fuel model TU5. After treatment, these stands will be best represented by fuel models TL3 and TU1.

# Environmental Consequences

## Alternative 1 (No Action)

### *Direct and Indirect*

With no management activities occurring, more acres would transition from low and moderate fire hazard towards high and extreme fire hazard. Currently an estimated 25,385 acres (27%) exhibiting low wildfire hazard would naturally transition over the next 20 years, due to tree and vegetation growth to either a moderate or high fire hazard category. The remaining 73% of acres within Ten Cent CWPP planning area are predicted to exhibit moderate to extreme fire hazard. Moderate flame lengths (4-8 feet) may make direct attack of a wildfire under the stated conditions possible with a bulldozer, however the damage that bulldozers can induce while fighting a fire is not always desirable and costs are increased. A good portion of this type of suppression activity would most likely occur close to the wilderness boundary as well. Flame lengths of over 8 feet (high and extreme fire behavior) cannot be safely suppressed by direct attack by any type of ground resources. Other forms of suppression, like indirect attack, would have to be considered, which could also increase the amount of damage and cost. The resulting crown scorch from 4 foot and higher flame lengths would mean more mortality in those areas than in other areas where less than 4 foot flame lengths are predicted. These fuel conditions that would support moderate to extreme fire behavior would also continue to transition; fuel loadings would further increase and shrub heights would increase.

The only way that fuels reduction would occur is with a wildfire that under the no action alternative could be intense with extreme fire hazard over half the project area, making suppression difficult and leading to damage and mortality across the project area. The effect of Alternative 1, the no action alternative, would be a continued decrease in stand resiliency to wildfire and a reduced probability of success when trying to protect the values at risk across the entire project area over time.

## Alternative 2

### *Direct and Indirect*

#### Wildfire Hazard

The wildfire hazard for post-Alternative 2 treatment conditions was predicted using the modeling described in the Analysis Methods section of this report. The resulting predicted wildfire hazard for post-Alternative 2 conditions is shown and compared to the existing condition in Table 3-8.

**Table 3-8: Alternative 2 Hazard Rating**

| Hazard | Alternative 2 treated acres | Existing condition acres |
|---|---|---|
| Low | 10,569 | 25,385 |
| Moderate | 2,293 | 4,344 |
| High | 1,199 | 2,919 |
| Extreme | 23,698 | 61,783 |

Treatments proposed in Alternative 2 would result in 23,698 acres being moved from an existing condition hazard rating of ‘Extreme’ to a lower hazard rating. A majority of those acres with Alternative 2 treatments are moved to a hazard rating of ‘Low.’ This is a substantial change in fire behavior. This change would allow direct attack with hand crews of a wildfire under 97$^{th}$ percentile conditions on an estimated 43,019 acres of the Ten Cent CWPP planning area. Direct

attack on these low hazard acres allows unwanted fires to be contained at small fire sizes, thereby protecting forest values on those acres. Maintaining a hazard rating of low across the planning area would involve continued maintenance treatments such as further small diameter thinning and prescribed fire. With prescribed fire, minimal damage and minimal cost will occur.

Fire behavior simulation studies have shown that treatments have had consistent and significant effects in reducing forest vulnerability to crown fire (Fulé, et al. 2012). Crown fire potential would be reduced from passive and/or active to surface. Reducing passive crown fire potential to a surface fire would reduce the potential for long range spotting. There is little scientific documentation on long term treatment effectiveness. Mechanical fuel treatments have been shown to be very effective at 7 years beyond treatment (Stephens, et al. 2012). Studies have shown that mechanical treatments followed by fire treatments have a longer effectiveness interval (15-20 yrs.) because of low post prescribed fire tree mortality and high initial surface fuel consumption (Stephens, et al 2012). The treatment areas would be maintained through maintenance burning to reduce passive crown fire potential.

#### Surface Fuel Loading

Surface fuel loading would be reduced across approximately 37,759 acres of the planning area. Close to 40 percent of the area would be affected. Four different Society of American Foresters forest cover types were used to model the fuel consumption using the FOFEM 6.0 modeling program. These types included SAF 210, 211, 218 and 237. Models were run under the dry scenario, as that is most likely when a prescribed burn would take place. Surface fuels in the treatment units would be reduced to acceptable levels in regards to the Forest Plan Standards and Guidelines as well as the desired condition of surface fuel reduction across the treated areas within the planning area. Complete modeling results are available in the Fuels Resource Report.

### *Cumulative Effects*

#### Wildfire Hazard and Surface Fuel loading

A full list of activities considered for cumulative effects analysis is included in Appendix C of the EIS and in the Fuels Resource Report. Stand and fuel conditions from any past treatments or fires within the Ten Cent planning area were reflected in the Landfire satellite imagery, and so therefore the cumulative effects for wildfire hazard of these treatments/fires along with any proposed treatments in the Ten Cent project can be referenced in the Direct and Indirect Effects for Alternative 2.

## Alternative 3

### *Direct and Indirect Effects*

#### Wildfire Hazard

The wildfire hazard for post-Alternative 3 treatment conditions was predicted using the modeling described in the Analysis Methods section of this report. The resulting predicted wildfire hazard for post-Alternative 3 conditions is shown and compared to the existing condition in Table 3-9.

**Table 3-9: Alternative 3 Hazard Rating**

| Hazard | Alternative 3 Treated Acres* | Existing Condition Acres* |
|---|---|---|
| Low | 4,850 | 25,385 |
| Moderate | 1,507 | 4,344 |
| High | 355 | 2,919 |
| Extreme | 10,222 | 61,783 |

Treatments proposed in Alternative 3 would result in 10,222 acres being moved from an existing condition hazard rating of 'Extreme' to a lower hazard rating. A majority of those acres with Alternative 3 treatments are moved to a hazard rating of 'Low.' This is a substantial change in fire behavior. This change would allow direct attack with hand crews of a wildfire under 97$^{th}$ percentile conditions on an estimated 37,469 acres of the Ten Cent CWPP planning area. Direct attack on these low hazard acres allows unwanted fires to be contained at small fire sizes, thereby protecting forest values on those acres. Maintaining a hazard rating of low across the planning area would involve continued maintenance treatments such as further small diameter thinning and prescribed fire. With prescribed fire minimal damage and minimal cost will occur.

Fire behavior simulation studies have shown that treatments have had consistent and significant effects in reducing forest vulnerability to crown fire (Fulé, et al. 2012). Crown fire potential would be reduced from passive and or active to surface. Reducing passive crown fire potential to a surface fire would reduce the potential for long range spotting. There is little scientific documentation on long term treatment effectiveness. Mechanical fuel treatments have been shown to be very effective at 7 years beyond treatment (Stephens, et al. 2012). Studies have shown that mechanical treatments followed by fire treatments have a longer effectiveness interval (15-20 yrs.) because of low post prescribed fire tree mortality and high initial surface fuel consumption (Stephens, et al 2012). The treatment areas would be maintained through maintenance burning to reduce passive crown fire potential.

#### Surface Fuel Loading

Surface fuel loading would be reduced across approximately 16,934 acres of the planning area. Close to 18 percent of the area would be affected. Four different Society of American Foresters forest cover types were used to model the fuel consumption using the FOFEM 6.0 modeling program. These types included SAF 210, 211, 218 and 237. See tables below for modeling results. Models were run under the dry scenario, as that is most likely when a prescribed burn would take place. Surface fuel reductions would be the same as Alternative 2.

As the charts describe, the surface fuels in the treatment units would be reduced to acceptable levels in regards to the Forest Plan Standards and Guidelines as well as the desired condition of surface fuel reduction across the treated areas within the planning area. The 0-3" size class material would be reduced by 100 percent across the treated areas according to FOFEM. This would likely be a short term effect as the lower branches that are killed from the prescribed fire would begin to drop to the forest floor.

### *Cumulative Effects*

#### Wildfire Hazard and Surface Fuel Loading

Stand and fuel conditions from any past treatments or fires within the Ten Cent planning area were reflected in the Landfire satellite imagery, and so therefore the cumulative effects for wildfire hazard of these treatments/fires along with any proposed treatments in the Ten Cent project can be referenced in the Direct and Indirect Effects for Alternative 3.

## Alternative 4

### *Direct and Indirect*

#### Wildfire Hazard

The wildfire hazard for post-Alternative 4 treatment conditions was predicted using the modeling described in the Analysis Methods section of this report. The resulting predicted wildfire hazard for post-Alternative 4 conditions is shown and compared to the existing condition in Table 3-10.

**Table 3-10: Hazard Rating for Alternative 4**

| Hazard | Alternative 3 Treated Acres* | Existing Condition Acres* |
|---|---|---|
| Low | 8,058 | 25,385 |
| Moderate | 1,845 | 4,344 |
| High | 605 | 2,919 |
| Extreme | 17,699 | 61,783 |

Treatments proposed in Alternative 4 would result in 17,699 acres being moved from an existing condition hazard rating of 'Extreme' to a lower hazard rating. A majority of those acres with Alternative 4 treatments are moved to a hazard rating of 'Low.' This is a substantial change in fire behavior. This change would allow direct attack with hand crews of a wildfire under 97$^{th}$ percentile conditions on an estimated 45,534 acres of the Ten Cent CWPP planning area. Direct attack on these low hazard acres allows unwanted fires to be contained at small fire sizes, thereby protecting forest values on those acres. Maintaining a hazard rating of low across the planning area would involve continued maintenance treatments such as further small diameter thinning and prescribed fire. With prescribed fire minimal damage and minimal cost will occur.

Fire behavior simulation studies have shown that treatments have had consistent and significant effects in reducing forest vulnerability to crown fire (Fulé, et al. 2012). Crown fire potential would be reduced from passive and or active to surface. Reducing passive crown fire potential to a surface fire would reduce the potential for long range spotting. There is little scientific documentation on long term treatment effectiveness. Mechanical fuel treatments have been shown to be very effective at 7 years beyond treatment (Stephens, et al. 2012). Studies have shown that mechanical treatments followed by fire treatments have a longer effectiveness interval (15-20 yrs.) because of low post prescribed fire tree mortality and high initial surface fuel consumption (Stephens, et al 2012). The treatment areas would be maintained through maintenance burning to reduce passive crown fire potential.

#### Surface Fuel Loading

Surface fuel loading would be reduced across approximately 28,208 acres of the planning area. Close to 30 percent of the area would be affected. Four different Society of American Foresters forest cover types were used to model the fuel consumption using the FOFEM 6.0 modeling program. These types included SAF 210, 211, 218 and 237. See tables below for modeling results. Models were run under the dry scenario, as that is most likely when a prescribed burn would take place. Surface fuel reductions would be the same as in Alternative 2.

As the tables describe, the surface fuels in the treatment units would be reduced to acceptable levels in regards to the Forest Plan Standards and Guidelines as well as the desired condition of surface fuel reduction across the treated areas within the planning area. The 0-3" size class material would be reduced by 100 percent across the treated areas according to FOFEM. This would likely be a short term effect as the lower branches that are killed from the prescribed fire would begin to drop to the forest floor.

### *Cumulative Effects*

#### Wildfire Hazard and Surface Fuel Loading

Stand and fuel conditions from any past treatments or fires within the Ten Cent planning area were reflected in the Landfire satellite imagery, and so therefore the cumulative effects for wildfire hazard of these treatments/fires along with any proposed treatments in the Ten Cent project can be referenced in the Direct and Indirect Effects for Alternative 4.

**Table 3-11: Resource Indicators and Measures for Cumulative Effects**

| Resource Element | Resource Indicator | Measure | Existing Condition (Alternative 1) |
|---|---|---|---|
| Wildfire Hazard | Flame length and Crown fire susceptibility | Average < 4 ft. in treated stands, Basal Area range of 30-80 (depending on cover type) | 4.75 ft. (High of 21 ft. and low of 1.3 ft.), Average Basal Area- 118 |
| Surface Fuel Loading | Tons per acre | Average < 9 tons per acre | 11 tons per acre |

### Compliance with Law, Regulation, Policy, and Forest Plans

Fuels treatments for alternatives 2, 3 and 4 in the Ten Cent Community Wildfire Protection Project area are consistent with the Umatilla National Forest Land and Resource Management Plan (pp. 4-110, 4-146, and 4-185-186) and the Wallowa-Whitman National Forest Land and Resource Management Plan (pp. 4-29- 4-30, 4-89-91, 4-94, and 4-97-98). Implementation of prescribed fire will follow Forest Service Policy which includes the Prescribed Fire Planning and Implementation Guide and the Forest Service Manual 5100-Fire Management, Chapter 5140-Fire Use, effective on April 18, 2008. All air quality standards will be met for prescribed fire.

As stated above, the goal of the Grant County CWPP is to "*reduce the risk from wildfire to life, property and natural resources and assist with resource management of lands within Grant County in a manner that benefits the local economy and maintains and enhances natural resources*." Alternatives 2, 3, and 4 all support this goal. Alternative 1 would not support this goal. No treatment would mean no benefits to the local economy nor any enhancement of natural resource conditions. The wildfire hazard would continue to increase across the landscape.

## 3.3 Air Quality

The Clean Air Act requires the Environmental Protection Agency (EPA) to set the NAAQS for the pollutants that are considered harmful or hazardous to public health. There are two types of NAAQS, primary and secondary. Primary standards provide public health protection such as protecting the populations of asthmatics, children and the elderly. Secondary standards provide public welfare protection which includes protection against decreased visibility and damage to animals, crops, vegetation and buildings. See Table 3-12 for the Particulate Matter levels deemed acceptable by the EPA. Units are measured in micrograms per cubic meter of air.

**Table 3-12: NAAQS Table**

| Pollutant | Primary/Secondary | Averaging Time | Level | Form |
|---|---|---|---|---|
| PM2.5 | Primary | 1 year | 12.0 µg/m3 | annual mean, averaged over 3 years |
| | Secondary | 1 year | 15.0 µg/m3 | annual mean, averaged over 3 years |
| | Primary and Secondary | 24 hours | 35 µg/m3 | 98th percentile, averaged over 3 years |
| PM10 | Primary and Secondary | 24 hours | 150 µg/m3 | Not to be exceeded more than once per year on average over 3 years |

The numbers in the tables (Table 3-13, Table 3-14, and Table 3-15) for each alternative indicate that a wildfire would have more adverse effects than if the area was burned as a controlled burn. The prescribed burning would also not take place all at once. The emissions from the wildfire would most likely occur over a short amount of time (1-4 weeks). Granite, Sumpter, Greenhorn,

and surrounding residences may incur have short term smoke impacts during prescribed fires. Roads and trails may also be closed in the area as well. Prescribed fire season has historically taken place during the fall hunting season. There may be impacts to hunters as well as recreationists due to the prescribed fire operation.

On burn days, persons responsible for burning operations may modify ignitions patterns and mop-up procedures to consider the effects to the smoke sensitive areas. Monitoring is done by the State Forester to ensure compliance with the smoke management program to determine effectiveness of smoke management procedures. Other monitoring techniques include posting personnel as lookouts (Desolation or Mt. Ireland Lookouts) on burn days. If a certain threshold is reached where additional particulate release is undesired, firing operations are ceased and immediate mop-up procedures initiated. However, given the location and layout of the project area, some smoke into adjacent communities may be temporarily inevitable, but would not be at a level to cause air quality concerns and would not persist.

## Alternative 2

### *Direct and Indirect*

The amount of particulate matter emitted due to underburning and pile burning within Alternative 2 are shown in Table 3-13.

**Table 3-13: Particulate Matter for Alternative 2**

| Burn Type/Acres | PM10 (lbs. per acre) | Total tons for Alternative | PM2.5 (lbs. per acre) | Total tons for Alternative |
|---|---|---|---|---|
| Landscape/29,217 | 347 lbs. | 5,069 tons | 294 lbs. | 4,295 tons |
| Handpile, Machine pile, and Jackpot Burning/8,582 | 1,010 lbs. | 4,334 tons | 1,153 lbs. | 4,948 tons |
| Wildfire/33,429* | 684 lbs. | 11,433 tons | 579 lbs. | 9,678 tons |

*Average large (over 5,000 acres) wildfire size in acres across the Blue Mountains in last 20 years.

Particulate matter produced from Alternative 2 would be approximately 18,646 tons after completing all prescribed fire. The alternative would be approximately 21,111 tons of PM10 and PM2.5 produced from a wildfire. Wildfire size was based on the average large fire (over 5,000 acres) across the Blue Mountains over the last 20 years (33,429 acres). In contrast to Alternative 1, fuel treatments under Alternative 2 would reduce potential wildfire size per occurrence and emissions produced in the treated units of the project area. Under extreme fire behavior conditions, the remaining untreated dense stands and areas of excessive fuel loading could burn intensely and produce unwanted amounts of smoke in addition to the predicted amounts of smoke for Alternative 2.

## Alternative 3

The amount of particulate matter emitted due to landscape burning and pile burning within Alternative 3 are shown in Table 3-14.

**Table 3-14 Particulate Matter for Alternative 3**

| Burn Type/Acres | PM10 (lbs. per acre) | Total tons for Alternative | PM2.5(lbs. per acre) | Total tons for Alternative |
|---|---|---|---|---|
| Landscape/3,255 | 347 lbs. | 565 tons | 294 lbs. | 478 tons |
| Handpile, Machine pile, and Jackpot Burning/13,711 | 1,153 lbs. | 7,904 tons | 977 lbs. | 6,698 tons |
| Wildfire/33,429* | 684 lbs. | 11,433 tons | 579 lbs. | 9,678 tons |

*Average large (over 5,000 acres) wildfire size in acres across the Blue Mountains in last 20 years.

The particulate matter released by implementing this alternative would be quite a bit lower as the total amount of landscape prescribed fire proposed has been reduced. PM10 and PM2.5 estimates for this alternative are approximately 15,645 tons. The intent of this alternative was to respond to Issue 1 by reducing smoke impacts by reducing prescribed fire in the cold and moist forest types. The dry forest stands were picked out of the proposed action alternative and left in this alternative across locations that could accept prescribed fire with a minimal amount of line construction. This resulted in adding approximately 13 miles of hand or machine constructed fireline to this alternative.

In contrast to Alternative 1, fuel treatments under Alternative 3 would reduce potential wildfire size per occurrence and emissions produced in the treated units of the project area. Under extreme fire behavior conditions, the remaining untreated dense stands and areas of excessive fuel loading could burn intensely and produce unwanted amounts of smoke in addition to the predicted amounts of smoke for Alternative 3.

## Alternative 4

### *Direct and Indirect Effects*

The amount of particulate matter emitted due to landscape burning and pile burning within Alternative 4 are shown in Table 3-15.

**Table 3-15: Particulate Matter for Alternative 4**

| Burn Type/Acres | PM10 (lbs. per acre) | Total tons for Alternative | PM2.5(lbs. per acre) | Total tons for Alternative |
|---|---|---|---|---|
| Landscape/19,663 | 347 lbs. | 3,412 tons | 294 lbs. | 2,890 tons |
| Handpile, Machine pile, and Jackpot Burning/8,582 | 1,153 lbs. | 4,948 tons | 977 lbs. | 4,192 tons |
| Wildfire/33,429* | 684 lbs. | 11,433 tons | 579 lbs. | 9,678 tons |

*Average large (over 5,000 acres) wildfire size in acres across the Blue Mountains in last 20 years.

Particulate matter released during the life of the prescribed fire activities would result in approximately 15,442 tons. This is the lowest out of all the alternatives and is due to reduced amount of slash and jackpot burning under this alternative. In contrast to Alternative 1, fuel treatments under Alternative 4 would reduce potential wildfire size per occurrence and emissions produced in the treated units of the project area. Under extreme fire behavior conditions, the remaining untreated dense stands and areas of excessive fuel loading could burn intensely and produce unwanted amounts of smoke in addition to the predicted amounts of smoke for Alternative 3.

### Alternative 2, 3, and 4

#### *Cumulative Effects*

All burning activities would be conducted in compliance with National Ambient Air Quality Standards and Oregon Department of Environmental Quality regulations and restrictions to ensure that there would be no cumulative effects on air quality. Burning activities on Federal lands near, but not within, the Ten Cent project area are also subject to the same restrictions, requirements, and regulations, so would not have any additive effect on air quality within Northeast Oregon.

### Compliance with Law, Regulation, Policy, and Forest Plan

As noted above all fuels treatments for Alternatives 2, 3 and 4 in the Ten Cent Community Wildfire Protection Project area are consistent with the Umatilla National Forest Land and Resource Management Plan and the Wallowa Whitman National Forest Land and Resource Management Plan. Implementation of prescribed fire will follow Forest Service Policy which includes the Prescribed Fire Planning and Implementation Guide and the Forest Service Manual 5100-Fire Management, Chapter 5140-Fire Use, effective on April 18, 2008. All air quality standards will be met for prescribed fire.

Users of prescribed fire must comply with all applicable federal, state and local air quality regulations. The Clean Air Act establishes air quality goals and provides measures to attain those goals by addressing existing and potential air pollution problems. The air quality goals include attaining National Ambient Air Quality Standards (NAAQS) and preventing significant deterioration of air quality in areas cleaner than the NAAQS. Under Alternatives 1, 2, 3, and 4 there may be times when there would be a deterioration of air quality in areas that are normally cleaner than NAQQS.

The Oregon Smoke Management Plan (OSMP) is intended to minimize smoke impacts by conducting forest burning under weather conditions that disperse smoke and vent it away from populated areas. Under Alternatives 2, 3, and 4 The Forest Service would be required to get approval in advance prior to igniting any prescribed fires. Under Alternative 1, a wildfire scenario, there would be no way to control the regulations set forth by the OSMP. The Umatilla and Wallowa-Whitman National Forests currently voluntarily comply with the Regional Haze Rules set forth for Class I Airsheds. Refer to Smoke Management Plan OAR 629-48-001 for regional haze requirements. Currently John Day, Pendleton, La Grande and Baker City are listed smoke sensitive receptor areas but at this time no restrictions are in place concerning air pollutants as listed above.

## 3.4 Forest Vegetation

### Methodology

Information for this silvicultural analysis was gathered from field reconnaissance, the Umatilla National Forest's Geographic Information System (GIS), historical mapping and the Umatilla National Forest Integrated Resource Management System (INFORMS) vegetation database. Analysis was accomplished by varying methods, including: trends analysis based on similar past activities, GIS/mapping, comparison with pertinent research, field observations, professional judgment based upon observation of past activities and experience within the general location.

The vegetation information used for analyses throughout this document was developed using the most similar neighbor (MSN) imputation process (Moeur and Stage 1995, Crookston et al.

2002). The MSN algorithm uses canonical correlation analysis to derive a similarity function, and then chooses the most similar stand as a proxy from the global set of stands by comparing detailed design attributes (local variables) and lower-resolution indicator attributes (global variables).

## Analysis Indicators and Measures

Historical range of variability (HRV) or range of variation (RV) analysis was used to evaluate forest structure, forest density, and species composition within the landscape containing the Ten Cent project area.

### *Forest Structure*

Structure class is measured by tree canopy and life stage of a forest stand broken into five different structure classes (Martin, 2010)):

- Stand initiation (SI): Following a stand-replacing disturbance, growing space is occupied rapidly by vegetation that either survives the disturbance or colonizes the area.
- Stem Exclusion (SE): Trees initially grow fast and quickly occupy their growing space, competing strongly for sunlight and moisture. Species needing sunlight usually die; shrubs and herbs may go dormant. In this stage, establishment of new trees is precluded by a lack of sunlight (stem exclusion closed canopy) or by a lack of moisture (stem exclusion open canopy).
- Understory Re-initiation (UR): A new tree cohort eventually gets established after overstory trees begin to die or because they no longer fully occupy their growing space.
- Old Forest (OFSS or OFMS): Many age classes and tree layers mark this stage featuring large, old trees. Snags and fallen trees may also be present, leaving a discontinuous overstory canopy.

#### Range of Variability

For the purpose of comparing reference structure conditions with current conditions, the Umatilla National Forest developed a set of percentages to denote the range of variation to use as reference conditions (Martin 2010). Reference conditions were developed for each potential vegetation group (PVG) found on the forest.

### *Forest Density*

Measure of the amount of tree vegetation on a unit of land area. It can be expressed as the amount of basal area (BA), stand density index (SDI) (Reineke 1933), or a variety of other parameters. Stand density analysis was completed to help identify opportunities to use thinning and other density management treatments to address potential wildfire hazard in the Ten Cent project area. The analysis was based on reference conditions as described in Martin (2010); results were used to identify high density stands. A stand with a measure within the low density level would be considered understocked, while a stand with a measure within the high density level would be overstocked (Table 3-16).

**Table 3-16: Density level definitions from Martin (2010).**

| PVG | Density Level | Basal Area (ft2/ac) |
|---|---|---|
| Cold UF | Low | <70 |
| | Medium | 70-110 |
| | High | >110 |
| Dry UF | Low | <45 |
| | Medium | 45-70 |
| | High | >70 |
| Moist UF | Low | <90 |
| | Medium | 90-135 |
| | High | >135 |

*Species Composition*

- Cover type: Tree species composition was evaluated using forest cover types, which are based on the percentage of stocking a tree species occupies within a specific stand.
- Potential Vegetation: offers insights into vegetation-site relationships and can be helpful in projecting the type of vegetation expected under a particular suite of environmental conditions (Pfister and Arno 1980). Derived using plant associations, plant community types, or plant communities (Powell et al. 2007). The Ten Cent project area consists primarily of three distinct forested potential vegetation groups: dry upland forest (Dry UF), moist upland forest (Moist UF) and cold upland forest (Cold UF). For detailed descriptions of these groups, as well as which plant associations are included in each, see Powell et al. (2007).

**Range of Variability**

A range of variability analysis for vegetative cover was conducted comparing present cover type (derived from stand exams and INFORMS Most Similar Neighbor modeling interpolation) to ranges described in Martin (2010). It is important to note that cover type is an indicator of overstory or dominate species within a stand and may not accurately characterize understory species in developing stands.

### Spatial and Temporal Bounding

All silvicultural effects analyses were accomplished at the project area scale, consisting of 59,412 acres (excludes wilderness and private land). Temporal scales used are short term (loosely 0-5 years) and long term (loosely 20 to 100+ years). These time frames were chosen for a very long-lived resource (trees) so that immediate effects of treatments could be discussed, as well as “out-year” effects of alternatives on tree stands.

## Affected Environment

### Forest Structure

Structural diversity across the landscape has decreased somewhat, with the shift of stand structures into the understory re-initiation stage, primarily due to past disturbances. The mosaic (arrangement on the landscape) of stands and structures has changed over the years with fire suppression and other management practices; the extent of open pine stands has been reduced and other stands have become more dense (Hessburg and others, 1999). This shift has changed conditions not only for vegetative species, but also for other species that rely on structural diversity.

The Ten Cent project area is a mix of Cold, Moist and Dry Upland Forest potential vegetation groups (PVGs): Cold UF makes up 44% of the area, Moist and Dry UF each comprise 28% of the area. Existing stand structure has evolved from past disturbances affecting which trees and stands survived to reach larger sizes and different stages, as well as fire suppression that has allowed increased density and more closed-in stands (see silviculture report on the project website). Table 3-17 shows the current area in structural stages across the project area.

**Table 3-17: Forest Structural Stages, Project Area**

| Structural Stage | Description | Current Acres |
|---|---|---|
| OFMS | Old Forest Multi-Strata | 9,447 |
| OFSS | Old Forest Single Stratum | 0 |
| SE | Stem Exclusion | 255 |
| SI | Stand Initiation | 1,175 |
| UR | Understory Re-initiation | 52,569 |

#### *Range of Variability Analysis*

As stated in the Eastside Screens (Forest Plan Amendment #11), the Forest Service is required to conduct an analysis of the current stand structure in an analysis area, comparing current conditions to historical ranges; this is commonly referred to as an “HRV analysis”. A range of variability analysis was conducted for the landscape containing the Ten Cent project, which included comparisons of current and reference conditions of stand structure as recommended in Martin (2010). Analysis summarized in the silviculture report show the current percentage of the understory re-initiation stage is well above its range in all PVGs; OFSS is well below (at zero) its range for all PVGs; OFMS is within its range for the Cold and Dry PVGs; and Moist UF, all stages are below their range except UR.

### Forest Density

A high percentage (50,556 acres, or 87%) of upland forest land in the project area is within the high density category, while only 6% is in the low density category (3,724 acres). See Table 3-16 for definitions of density levels for each potential vegetation group.

The cold upland forest averages a basal area of 108 square feet, a stand density index of 327 and quadratic mean diameter of 3 inches. In the moist upland forest, density values average 119 ft2 of BA, an SDI of 357 and a QMD of 3 inches. These values are reflective of a relatively dense forest composed of small diameter trees, typical of stands in the cold and moist upland forest with a lodgepole pine component, and of young regenerated harvest stands and past fires.

The dry upland forest had the largest average QMD value (5 inches), of any PVG, with an SDI value of 228, and a BA value of 92 $ft^2$. These values indicate the drier and more marginal growing conditions typical of the dry upland forest, where moisture is a limiting factor in tree growth.

#### *Range of Variability Analysis*

All upland forest groups are well above their range for high density levels, and consequently below their ranges for low and moderate density levels. Trees in dense stands tend to be stressed by competition with their neighbors for light and water. Stressed trees are more susceptible to insect attack or disease infestation, and are usually slower growing (Powell 1999). Dense stocking appears to be a noteworthy obstacle for trees and stands in the area to overcome, which,

if this condition continues, would weaken trees and create opportunities for insects or disease to increase above present levels. Increasing levels of mountain pine beetle and balsam wooly adelgid are current examples of this in and around the Ten Cent project area. On the drier sites, many of the large, old ponderosa pine are currently at risk of attack, primarily from bark beetles; their large root systems require greater growing space than smaller trees to maintain tree health. Increased shade cover (less sunlight on the forest floor) and lack of soil exposure for seed germination resulting from a lack of frequent fire, has reduced the amount of ponderosa pine and western larch regeneration in some areas, and encouraged regeneration of shade-tolerant fir and lodgepole pine.

In general, cold and moist upland forests are expected to have higher stand densities. Historically, they experienced disturbances from fires of differing intensities or insects and disease that created openings in susceptible stands and resulted in a landscape mosaic of a variety of stand densities. With fire suppression, the patterns and mosaic of young/open and older/dense stands have become less varied, growing into larger areas of stands of more homogenous conditions where new disturbances, especially fires, have the opportunity to affect larger blocks on the landscape. Insects and diseases that cause tree mortality above “background” levels increase the fuel loads which in turn factor into wildfire size and intensity.

## Species Composition

### *Potential Vegetation*

The Ten Cent project area consists primarily of three distinct forested potential vegetation groups: dry upland forest (Dry UF), moist upland forest (Moist UF) and cold upland forest (Cold UF). Almost half of the potential vegetation in the project area is cold upland forest type (44%), with equal amounts of moist and dry upland forest (28% each) making up the rest. Cold and moist types generally occur on eastern and northern aspects, with dry upland forest occurring more on southern and western aspects. For detailed descriptions of these groups, as well as which plant associations are included in each, see Powell et al. (2007).

**Table 3-18: Potential forest vegetation groups within the project area.**

| Group | PVG Description | Acres | Percent |
|---|---|---|---|
| Cold UF | Cold Upland Forest | 25,493 | 44 |
| Moist UF | Moist Upland Forest | 16,211 | 28 |
| Dry UF | Dry Upland Forest | 16,109 | 28 |
| Sources/Notes: Powell (2007) describes how plant associations and plant community types were assigned to potential vegetation groups. Total acres surveyed 57,913. Only National Forest System land included. | | | |

Stands currently occupying the Ten Cent area vary widely from mixed ponderosa pine and Douglas-fir, to grand fir, lodgepole pine, Engelmann spruce and subalpine fir. Western white pine is present in limited amounts. Specific stand types and conditions vary across units, but most stands show many of the same characteristics. Most obvious are higher levels of downed wood and litter (needles, leaves, etc.) in many stands in all the vegetation types, and regeneration of shade tolerant species (grand fir, Douglas-fir, and lodgepole pine) in what were historically ponderosa pine-dominated stands. These conditions in the dry forest are generally a result of many years of fire suppression in stands that evolved with and adapted to frequent, low-intensity natural fires (Caraher et al. 1992).

### *Cover Type*

Table 3-19 summarizes the area of existing cover types for the forested area of the Ten Cent project. It shows that the predominant forest cover types are lodgepole pine (38% of the area) followed by grand fir (27%) and ponderosa pine (18%). About 2% of the project area is in non-forest cover, primarily grass and herblands.

**Table 3-19: Existing Forest Cover Types, Project Area.**

| Cover Type | Description | Acres |
|---|---|---|
| PIPO | ponderosa pine is the majority species | 10,622 |
| PSME | Douglas-fir is the majority species | 3,536 |
| ABGR | grand fir is the majority species | 15,863 |
| LAOC | western larch is the majority species | 3,086 |
| PIEN/ABLA | Engelmann spruce is the majority species with mix of subalpine fir | 2,811 |
| PICO | lodgepole pine is the majority species | 21,877 |
| PIMO3 | western white pine is the majority species | 118 |

Notes: Summarized from the MSN vegetation database. Forest cover types where one tree species comprises a majority (e.g., it has 50% or more of the stocking) are named for that species (Eyre 1980).

### *Range of Variability*

Table 3-20 shows the results of the species composition range of variability (RV) analysis. Most notably: A few species are above their natural ranges, including lodgepole pine in the Dry and Moist PVGs, and grand fir in the Cold and Dry PVGs. Below their natural ranges are ponderosa pine in the Dry UF, and western larch and Douglas-fir in the Moist UF.

**Table 3-20: Species composition range of variability (RV) based on cover type by potential vegetation group (PVG)**

| PVG | Existing Cover Type | Current % | Range % |
|---|---|---|---|
| Cold UF | Grand fir | 38 | 5-15 |
| | Ponderosa pine | 10 | 0-5 |
| | Douglas-fir | 4 | 5-15 |
| | Lodgepole pine | 39 | 25-45 |
| | Western larch | 8 | 5-15 |
| | Engelmann spruce | 1 | 15-35 |
| Dry UF | Grand fir | 21 | 1-10 |
| | Engelmann spruce | 1 | 0 |
| | Ponderosa pine | 45 | 50-80 |
| | Western larch | 4 | 1-10 |
| | Lodgepole pine | 17 | 0 |
| | Douglas-fir | 13 | 5-20 |
| Moist UF | Grand fir | 17 | 15-30 |
| | Western larch | 3 | 10-30 |
| | Engelmann spruce/subalpine fir | 15 | 1-10 |
| | Lodgepole pine | 56 | 25-45 |
| | Ponderosa pine | 5 | 5-15 |
| | Douglas-fir | 2 | 15-30 |
| | Western white pine | 1 | 0-5 |

Grey cells indicate current percentages above reference range; black cells indicate current percentages below reference range. Reference ranges are derived from Martin (2010).

# Environmental Consequences

## Alternative 1

### *Direct Effects and Indirect Effects*

#### Forest Structure

Continuation of existing management direction, including fire suppression, would allow multi-layered structure stands to remain, and other stands to grow into this condition, within the upland forests. Stand structures would continue in the over-abundant understory re-initiation stage, perpetuating the condition of ladder fuels and closed canopies, inviting conditional and active crown fires.

Dry upland forest will increase in density and layers as compared to historically predominant single-layered stands (Powell 2011). Cold and moist upland forests would likely continue on their path of succession, becoming more homogenous, and increasing in density and susceptibility to larger disturbances. No change, or "ecological leverage" (Powell 2013), would be effected to influence the development of old forest single stratum structure (OFSS) within the dry upland plant association group. Development of the old forest single stratum structure, as defined, may only happen if present tree densities are reduced by some means, leaving the larger trees to become part of this defined structure. These large, old trees would be most at risk for insect or disease attack. In moist and cold upland forest, the current levels of understory reinitiation structure would slowly move towards OFMS through time. These stands would continue to be susceptible to disturbance, with forest structure continuing to be outside of the RV.

#### Forest Density

Taking no action would allow currently dense (well beyond their range of variation) forest stands to continue to remain in that condition, as well as moderate and low density stands to increase in density. This will increase the forest's susceptibility to density-dependent disturbances such and insects and disease, and wildfire effects beyond what would be expected under natural conditions which include wildfire.

#### Species Composition

This alternative would allow the areas identified for treatment at this time to progress through natural successional patterns at their own rate with no outside manipulation except fire suppression. Current biological and ecosystem functions would continue as they are in the present condition. On-going management direction and activities such as grazing, fire suppression, monitoring, and road maintenance would continue. Taking no action in the Ten Cent project area would allow those species compositions that are out of sync with their range of variation to remain so. In all PVGs, fire disturbances, especially large-scale disturbances, would likely result in abundant regeneration of lodgepole pine.

In the dry upland forest, lodgepole pine and grand fir would continue to exceed their ranges and likely increase due to shade tolerance and ability to regenerate beneath overstory trees. As stands fill in, regeneration of ponderosa pine becomes less likely and would make it difficult for the species to maintain a dominance or presence in stands where it should be the primary species. Currently, ponderosa pine and western larch are below their range of variation in dry and moist forests. Under the no action alternative, these two shade-intolerant and fire resilient (Fitzgerald 2005) (USDA Forest Service 1965) species would not likely increase their presence as other species fill in and shade increases. The further species compositions move out of balance in the dry upland forest, the more the landscape would continue to lose its resiliency in the face of disturbance.

### *Cumulative Effects*

The analysis area falls under the description of Forest Cluster 5 in the Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin (ICBMP) (Quigley et al., 1997). An analysis arising from the ICBMP looked at historical and current forest landscapes, and discussed the trends found in vegetation patterns and compositions (Hessburg, et al. 1999). Hessburg, et al. states: "Dramatic change in vital ecosystem processes such as fire, insect, and pathogen disturbances, succession, and plant and animal migration is linked to recent change in vegetation patterns." These types of changes have occurred in the Ten Cent analysis area, and No Action will not change the trends in any way. ICBMP found that "forest landscapes have changed significantly in their vulnerability to major insect and pathogen disturbances" (Hessburg, et al. 1999). This change was influenced by timber harvest, fire suppression and grazing, and resulted in a loss of large trees, an expansion of Douglas-fir cover, and grass/shrub understories replaced by conifers (Hessburg, et al. 1999). No Action, coupled with these trends stemming from the past, will have the cumulative effect of perpetuating the trends.

## Alternatives 2 and 3

Alternatives 2 and 3 have identical tree removal treatments, with Alternative 3 being thinned to the lower ranges of basal area or spacing; units identified for treatment are the same in size and location. There would be no relative difference, silviculturally, between these alternatives and therefore they are analyzed together.

### *Direct and Indirect effects:*

**Forest Structure**

Alternative 2 and 3 would influence forest structure within the project area. Fuels-driven silvicultural prescriptions for thinning from below or using a spacing guideline would generally remove understory and some overstory trees. Most structures would remain roughly the same (a mix of overstory/understory trees), albeit with wider spacing.

To understand the implications of selecting Alternatives 2 and 3, a range of variability analysis was completed to measure the change in structural classes for the project area. The post-treatment RV analysis summarizes the percentage of each structural class by potential vegetation group, as well as showing ranges for each of the structural classes.

Within Dry and Cold UF, while staying within its range, three to four percent of OFMS would shift to OFSS which is currently at zero. Treatment in UR stands does not change their structure and so UR would remain the same. Within Moist UF, treatment would cause no change in structure.

**Table 3-21: Alternatives 2 and 3 structure RV analysis**

| PVG | | FOREST STRUCTURAL CLASSES[1] | | | | |
|---|---|---|---|---|---|---|
| | | SI | SE | UR | OFMS | OFSS |
| Cold | Range % | 20-45 | 10-30 | 10-25 | 10-25 | 5-20 |
| | Current % | 1 | 0 | 78 | 21 | 0 |
| | Alt 2/3 % | 1 | 0 | 78 | 17 | 3 |
| Moist | Range % | 20-30 | 20-30 | 10-20 | 15-20 | 10-20 |
| | Current % | 2 | 0 | 89 | 9 | 0 |
| | Alt 2/3 % | 2 | 0 | 89 | 9 | 0 |
| Dry | Range % | 15-25 | 10-20 | 5-10 | 5-15 | 40-60 |
| | Current % | 4 | 1 | 79 | 17 | 0 |
| | Alt 2/3 % | 4 | 1 | 79 | 14 | 3 |

### Forest Density

Alternatives 2 and 3 would reduce high density stands within Cold, Moist and Dry upland forest in the project area. In this case, of the three Eastside Screens measures, density is a more robust indicator of treatment effects as it represents the open space around the remaining trees. The less dense the stand, the more space each individual tree has, and that translates into a reduction in the chance that a stand could carry a crown fire.

**Table 3-22: Alternatives 2 and 3 density RV analysis.**

| PVG | | FOREST DENSITY High | Medium | Low |
|---|---|---|---|---|
| Cold | Range % | *25-60* | *20-40* | *15-35* |
| | Current % | **87** | **6** | **7** |
| | Alt 2/3 % | **68** | **5** | **27** |
| Moist | Range % | *15-30* | *25-60* | *20-40* |
| | Current % | **86** | **7** | **7** |
| | Alt 2/3 % | **68** | **6** | **27** |
| Dry | Range % | *5-15* | *15-30* | *40-85* |
| | Current % | **86** | **7** | **7** |
| | Alt 2/3 % | **68** | **6** | **27** |

### Species Composition

All proposed treatments in the project area are designed to reduce crown fire risk and crown density by reducing stocking levels in some way. Treatment will likely alter species composition by favoring fire resistant and healthy insect and disease resistant trees and by deliberately favoring ponderosa pine, western larch and Douglas-fir where feasible. As there are varying amounts of these species available in individual stands, from none to many, thinning with a species preference could have little effect on species composition in any given stand.

**Table 3-23: Alternatives 2 and 3 species composition RV analysis**

| | Cold Upland Forest | | | Moist Upland Forest | | | Dry Upland Forest | | |
|---|---|---|---|---|---|---|---|---|---|
| Cover Type | Current % | Range % | Post-Treat% | Current % | Range % | Post-Treat% | Current % | Range % | Post-Treat % |
| GF/mix | 38 | 5-15 | 32 | 17 | 15-30 | 17 | 21 | 1-10 | 17 |
| PP/mix | 10 | 0-5 | 10 | 5 | 5-15 | 5 | 45 | 50-80 | 51 |
| DF/mix | 4 | 5-15 | 3 | 2 | 15-30 | 2 | 13 | 5-20 | 11 |
| LPP/mix | 39 | 25-45 | 38 | 56 | 25-45 | 51 | 17 | -- | 17 |
| WL/mix | 8 | 5-15 | 17 | 3 | 10-30 | 9 | 4 | 1-10 | 4 |
| ES/mix | 1 | 15-35 | 1 | -- | -- | -- | 1 | -- | 1 |
| ES/mix/SAF-mix | -- | -- | -- | 15 | 1-10 | 15 | -- | -- | -- |
| WWP | -- | -- | -- | 1 | 0-5 | 1 | -- | -- | -- |

GF=grand fir, PP=ponderosa pine, DF=Douglas-fir, LPP=lodgepole pine, WL=western larch, ES=Engelmann spruce, SAF=subalpine fir, WWP=western white pine

Most shifts in species composition are subtle, some over-represented species are reduced if not brought back within range, while some under-represented species are lifted into the low end of their ranges: In Cold UF, over-represented grand fir is reduced by 6%; in Moist UF, western larch is lifted into the low end of its range and over-represented lodgepole pine is reduced by

5%; in Dry UF, ponderosa pine is lifted into the low end of its range and over-represented grand fir is reduced by 4%.

## Alternative 4

Alternative 4 has relatively identical tree removal treatments to Alternatives 2 (ranges of basal areas and spacing), with fewer treatment units. The treatment units selected for Alternative 4 are identical to Alternative 2 in their size and spacing, however they may receive a different approach to leaving wildlife islands and "feathering" thinning treatments in select areas to alter effects to wildlife. There would be no relative difference between effects of the two alternatives, silviculturally, other than area treated.

### *Direct and Indirect effects:*

**Forest Structure**

**Table 3-24: Alternative 4 structure RV analysis**

| PVG | | FOREST STRUCTURAL CLASSES[1] | | | | |
|---|---|---|---|---|---|---|
| | | SI | SE | UR | OFMS | OFSS |
| Cold | Range % | 20-45 | 10-30 | 10-25 | 10-25 | 5-20 |
| | Current % | 1 | 0 | 78 | 21 | 0 |
| | Alt 4 % | 1 | 0 | 78 | 18 | 3 |
| Moist | Range % | 20-30 | 20-30 | 10-20 | 15-20 | 10-20 |
| | Current % | 2 | 0 | 89 | 9 | 0 |
| | Alt 4 % | 2 | 0 | 89 | 9 | 0 |
| Dry | Range % | 15-25 | 10-20 | 5-10 | 5-15 | 40-60 |
| | Current % | 4 | 1 | 79 | 17 | 0 |
| | Alt 4 % | 4 | 0 | 79 | 14 | 3 |

Table 3-25 summarizes forest structure by potential vegetation group for the upland forests for Alternative 4. Cold and Dry upland forests show a slight shift in OFMS to OFSS, with OFMS staying within its range and OFSS increasing from zero but still well below its range.

**Forest Density**

As with Alternatives 2 and 3, Alternative 4 would reduce high density stands within the project area after tree removal activities (Table 3-26), but to a lesser extent due to its reduced acreage.

**Table 3-25: Alternative 4 density RV analysis**

| PVG | | FOREST DENSITY | | |
|---|---|---|---|---|
| | | High | Medium | Low |
| Cold | Range % | *25-60* | *20-40* | *15-35* |
| | Current % | 87 | 6 | 7 |
| | Alt 4 % | 68 | 5 | 25 |
| Moist | Range % | *15-30* | *25-60* | *20-40* |
| | Current % | 86 | 7 | 7 |
| | Alt 4 % | 72 | 6 | 22 |
| Dry | Range % | *5-15* | *15-30* | *40-85* |
| | Current % | 86 | 7 | 7 |
| | Alt 4 % | 65 | 5 | 30 |

Low density forest in Cold and Moist UF is lifted from under-represented into lower to mid-range. High density forest remains over-represented and medium density forest remains under-represented in the project area.

#### Species Composition

As with Alternatives 2 and 3, Alternative 4 proposed treatments in the project area are designed to reduce crown fire risk and crown density by reducing stocking levels. Treatment will likely alter species composition by favoring fire resistant and healthy insect and disease resistant trees and by deliberately favoring ponderosa pine, western larch and Douglas-fir where feasible. As there are varying amounts of these species available in individual stands, from none to many, thinning with a species preference could have little effect on species composition in any given stand.

**Table 3-26: Alternative 4 species composition RV analysis**

| | Cold Upland Forest | | | Moist Upland Forest | | | Dry Upland Forest | | |
|---|---|---|---|---|---|---|---|---|---|
| Cover Type | Current % | Range % | Post-Treat% | Current % | Range % | Post-Treat% | Current % | Range % | Post-Treat % |
| GF/mix | 38 | 5-15 | 32 | 17 | 15-30 | 17 | 21 | 1-10 | 18 |
| PP/mix | 10 | 0-5 | 10 | 5 | 5-15 | 5 | 45 | 50-80 | 50 |
| DF/mix | 4 | 5-15 | 3 | 2 | 15-30 | 2 | 13 | 5-20 | 11 |
| LPP/mix | 39 | 25-45 | 35 | 56 | 25-45 | 52 | 17 | -- | 14 |
| WL/mix | 8 | 5-15 | 20 | 3 | 10-30 | 8 | 4 | 1-10 | 7 |
| ES/mix | 1 | 15-35 | 1 | -- | -- | -- | 1 | -- | 1 |
| ES/mix/SAF-mix | -- | -- | -- | 15 | 1-10 | 15 | -- | -- | -- |
| WWP | -- | -- | -- | 1 | 0-5 | 1 | -- | -- | -- |

GF=grand fir, PP=ponderosa pine, DF=Douglas-fir, LPP=lodgepole pine, WL=western larch, ES=Engelmann spruce, SAF=subalpine fir, WWP=western white pine

With this alternative, western larch will likely move above its range in Cold UF and move into its range in Moist UF; ponderosa pine will move up into its range in Dry UF.

### *All Action Alternatives*

#### Cumulative effects

Past activities such as timber harvest, fire suppression and insect/disease impacts have helped create the conditions observed in current stands (see Current Conditions section of the Silviculture Report) (Powell 2011). Stand structures, stand densities, and species compositions have been altered by selective harvest and clearcutting, bark beetles in the 1970's and the spruce budworm epidemic of the 1980's, the absence of fire, accumulations of fuels and the resulting presence of large wildfires, among the most noteworthy. Past activities have been included in the analysis of effects and while there are potential future activities from the Blue Mountain Forests fuels reduction project, they have not been defined beyond a general need for treatment across a broad landscape that includes the Ten Cent project (see Appendix C).

The activities proposed to treat the identified stands in the project area would begin to reverse the trends as discussed in Hessburg's 1999 publication (see cumulative effects discussion under No Action for details). Objectives for reducing crown fire potential, crown density and fuel loadings in the proposed stands near values at risk and roadsides will be met. The intent of the prescriptions for all action alternatives would be to address fire risk, but other secondary effects of those treatments will likely include: bringing stand structures, densities and species

compositions and their pattern on the landscape back toward or within ranges of variation, which when considered with past trends, would begin to restore a more resilient landscape. Thinned stands will likely, even though their emphasis is on reducing fire risk, result in healthier stands of trees with increased growing space and an increased ability to fend off insects and disease.

By moving components of the landscape toward or within their range of variation, proposed treatments would begin creating a forest more resilient in conditions when fire, insects and disease disturbances occur in the future (Powell 2011).

## Action Alternatives

### *Prescribed Burning*

#### Effects Common to All Action Alternatives

All action alternatives propose some amount of prescribed fire treatments for fuel reduction. This burning could be burning of piles or "jackpot" burning of slash created from thinning operations or introducing fire on large blocks of the project area to reduce natural fuels.

*Jackpot/Pile Burning Effects*

The effects of pile burning and jackpot burning on mechanically treated stands will likely be minimal across the project area. Thinned stands will be open, and these types of fire treatments are generally planned to create low intensity fire that will consume only the pile or pocket of fuel that fire is applied to. Some tree loss will likely occur with these prescribed fire treatments. Due to the post-thinning open nature of the stands where fire will be applied, and the planned low intensity of the fire, little effect overall to stand structure, density or species composition is expected.

Lodgepole pine is present in the project area, and it is a species that can regenerate prolifically following a fire due to its seed morphology and abundance of seed (Lotan et al 1985). Future post-prescribed-fire maintenance treatments (such as thinning or burning) will potentially be necessary to retain the open nature of the treated stands and allow them to continue to meet the objectives of this project.

The effects within the burned mechanically-treated areas will remain the same across action alternatives, however the proposed amounts of the treatments will change (8,582 acres in Alternatives 2 and 4 versus 13,712 in Alternative 3). This difference in acres between alternatives is only due to the fact that the jackpot/pile treatments in Alternatives 2 and 4 are overlain by the landscape burn acres, as it makes strategic sense to accomplish those burn acres at the same time on the ground. In Alternative 3, the landscape burning was dropped in some areas, and the underlying jackpot/pile burning acres remain and now show up in the jackpot/pile burning total acres. The bottom line is that the mechanically-treated acres will have their created slash burned, whether it is part of a proposed larger landscape burn (Alternatives 2 and 4) or not (Alternative 3).

*Landscape Burning Effects*

Burning prescriptions will be designed to create low intensity fire within the untreated stands. Stand conditions for structure, density and species composition run the full range of all possibilities within project area: all types of structures including young plantations, pure lodgepole pine stands, and grand fir OFMS; a full range of stand densities from open to closed; and a broad spectrum of species configurations from pure ponderosa pine on dry sites to pure Engelmann spruce and subalpine fir in the upper elevations. The effects of low intensity fire could potentially be as varied as the stand conditions.

Twenty-eight percent of the project area is in Dry UF, and the two ranger districts have extensive experience burning in dry forest, observing the outcomes and refining techniques. Many of the plantations in the project area and beyond, located in all three PVGs, have been burned post-harvest to prepare them for planting. There have been numerous wildfires in and near the project area, two of which occurred in fairly representative stand types.

The two recent wildfires in/near the project area that can help identify potential effects of proposed burning are the most recent 2013 Vinegar fire and the 2009 North Fork Complex.

The Vinegar fire burned within the Ten Cent project area in an upper elevation primarily Engelmann spruce/subalpine fir stand type. The fire burned with varying intensities, with several days of high intensity stand-replacing effects, which moderated to lower intensity underburning as the weather moderated. This fire shows that this stand type, with Engelmann spruce and subalpine fir as the major components, does not withstand even low-intensity fire without increased levels of mortality.

The larger North Fork Complex was a mixed-severity fire that burned outside the project area, however it contains some very similar stand types: grand fir mix with western larch component, lodgepole pine, Douglas-fir mix as well as some drier ponderosa pine on ridge tops. The stands ranged from mature with large trees and heavy understory to young plantations; stands occurred on all aspects. This fire was allowed to burn with minimal direct suppression efforts, and consequently it has areas where it burned hot and killed most of the forest stands in its path, and other areas where it became a backing fire and an underburn. The fire burned in more of a mosaic pattern, and post-fire views show an estimated 25% of the fire area with continuous dead canopy.

Landscape burning could potentially introduce some variability in the more “homogenous” large stands in the project area, by creating a mosaic of areas of higher-severity burn where new trees get established and structures are modified.

Alternatives 2 and 4 have the same amount of landscape burning proposed, while Alternative 3 has 82% less. Although the effects described above, within the area of the burning, will be the same, the amount spread across the project area will be less as fewer acres are treated. Refer to the Fuels report for more discussion of fire effects.

#### Direct Effects

Given that it is impossible to predict the exact effect of any fire, the following is a rough estimate of the direct effects of proposed burning on forest stands in the individual PVGs:

**Cold UF**—Overall, potentially 10-15% of the forested stands would experience 50-100% mortality. This PVG contains most of the grand fir mix of species, with a fair amount of lodgepole pine and western larch. OFMS would experience the least mortality due to closed-canopy conditions and larger, thicker-barked trees. UR stands would experience the most mortality due to existing ladder fuels and younger, thinner-barked trees. SE stands would be in the middle range and SI stands would likely only experience mortality around the edges if they are next to a fuel concentration that is burning. Lodgepole pine stands would likely experience less mortality under the burning conditions of a prescribed fire (likely the burning conditions in a lodgepole pine stand would not carry a fire).

**Moist UF**—Overall, potentially 15-20% of the forested stands would experience 50-100% mortality. The increased range is due to a species mix that has a larger component of Engelmann

spruce and subalpine fir. However, the burning prescription will likely moderate that effect, and the PVG has a large component of lodgepole pine that may also moderate the effects of the burn. OFMS could potentially see more mortality than in the Cold UF due to the spruce/subalpine fir component. The other structures would be similar to Cold UF. The western white pine in this vegetation group is located primarily in plantations and is not likely to experience any mortality, due both to its natural fire resistance and intentional protection during execution of the burn.

**Dry UF**—Overall, potentially 5-10% of the forested stands would experience 50-100% mortality, with the full expectation that it is unlikely to reach 10%. Almost half the cover type in the Dry UF is ponderosa pine, a fire-resistant species. It is likely that much of the burning will function as a typical underburn in ponderosa pine stands, where the pine and western larch survives and grand fir and Douglas-fir succumbs to fire mortality or subsequent insect attacks. Seventeen percent of the area is lodgepole pine and that may experience some mortality depending on the burn prescription. OFMS is expected to experience less mortality due to closed canopies and thicker-barked trees.

#### Indirect Effects

Any fire introduced into a stand has the potential to damage and weaken individual trees but not kill them outright. A tree may survive fire damage, but its weakened condition makes it vulnerable to attack by insects or disease. For example, bark beetles are common secondary agents of mortality in these trees and stands. It is fully expected that this type of mortality will occur following any prescribed burning in the project area, and it is likely that newly-dead trees will appear one to two years afterward.

In areas where fire has burned enough of the surface of the forest floor to make a seed bed, regeneration of conifers will likely occur. Lodgepole pine is the most likely, due to its ability to proliferate following fire; ponderosa pine and western larch are least likely due to their shade intolerance, need for a mineral-soil seed bed and infrequent seed crops. Grand fir and Douglas-fir are shade tolerant and have more frequent seed crops.

#### Cumulative Effects

Past activities such as timber harvest, fire suppression and insect/disease impacts have helped create the conditions observed in current stands (see Current Conditions above) (Powell 2011). Stand structures, stand densities, and species compositions have been altered by selective harvest and clearcutting, bark beetles in the 1970's and the spruce budworm epidemic of the 1980's, the absence of fire, accumulations of fuels and the resulting presence of large wildfires, among the most noteworthy.

The activities proposed to treat the identified stands in the project area would begin to reverse the trends as discussed in Hessburg's 1999 publication (see cumulative effects discussion under No Action for details). Objectives for reducing crown fire potential, crown density and fuel loadings in the proposed stands near values at risk and roadsides will be met. The intent of the prescriptions for all action alternatives would be to address fire risk, but other secondary effects of those treatments will likely include: bringing stand structures, densities and species compositions and their pattern on the landscape back toward or within ranges of variation, which when considered with past trends, would begin to restore a more resilient landscape. Re-introducing fire in a more controlled manner to reduce fuel loading will begin to return stands to conditions where they can potentially experience a more natural fire pattern across the landscape.

By moving components of the landscape toward or within their range of variation, proposed treatments would begin creating a forest more resilient in conditions when fire, insects and disease disturbances occur in the future (Powell 2011).

### Compliance with law, regulation, policy, and the Forest Plan

The Ten Cent Project Silviculture Report (project file) discloses the existing condition of forest stands, and analyzes the potential effects from the proposed activities to this resource. This report provides all necessary scientific information to comply with the NEPA and Forest Service Manual direction and policy. Silvicultural activities proposed for implementation in this project are fully compliant with National Forest Management Act, being consistent with Forest Plan direction, and occurring on lands meeting the definition of forest land and designated suitable for timber production.

Selection of silvicultural treatments proposed Ten Cent Project were guided by the standards of the Umatilla and Wallowa-Whitman National Forest Plan, as amended. Within the individual management areas established by the Forest Plans, all proposed project activities are consistent with the applicable Umatilla and Wallowa-Whitman National Forests' plan goals, desired future conditions, objectives, standards and guidelines as they relate to forest stand management.

## 3.5 Wildlife

The following laws apply to the Ten Cent Community Wildfire Protection Project: Endangered Species Act, Migratory Bird Treaty Act, National Forest Management Act, and the Bald and Golden Eagle Protection Act. Additional policy direction relating to wildlife habitat and species is provided in the Umatilla and Wallowa-Whitman National Forest Land and Resource Management Plans, the Forest Service Manual (FSM 2670), and Executive Order 13186. The Umatilla and Wallowa-Whitman National Forest Land and Resource Management Plans (LRMP, USDA 1990) contains Standards and Guidelines that must be met for specific Management Areas and wildlife habitats. The Regional Forester's Eastside Forest Plans Amendment #2 (USDA 1995) and other direction amends some of the standards contained in the LRMP and establishes standards for old growth habitat, snag and downed wood densities, and habitat connectivity. The standards and guidelines in the LRMPs, as amended, apply to the proposed activities contained in this analysis.

### Methodology

Suitable/source habitat for species included in this wildlife analysis was identified during field reconnaissance and by using the vegetation database for the Ten Cent Project. Vegetation data was queried based on habitat requirements and preferences of selected species, based on the best information available. Suitable habitat queried from GIS was then intersected with proposed treatment units in the Ten Cent project area. Queries used to identify potential wildlife habitats are available in the Ten Cent project file at the North Fork John Day Ranger District office. Analysis indicators used to measure the effects of the no action and proposed activities are described for each habitat type and wildlife species sections.

### Spatial and Temporal Bounding

Spatial boundaries for analysis of the effects to terrestrial wildlife are different based on the species and habitats being considered. For this evaluation and analysis, the term "analysis area" generally refers to National Forest System lands within the Granite Creek watershed (including the Bull Run, Beaver, Upper Granite, Lower Granite, Clear, and Lake subwatersheds), an area of approximately 94,500 acres. "Project area" refers to all the affected areas where the proposed

project would occur on the landscape. “Affected area” is the stand or portion of a stand (unit) where a specific action or activity would occur. The scale of analysis for assessing impacts to wildlife species and habitats will be as follows:

- Late and old structure, old growth habitat, and habitat connectivity are assessed at the scale of National Forest System lands within the Granite watershed, with consideration given to the connectivity of late and old structure habitat and old growth to habitats outside the boundaries of the analysis area. The analysis area for the HRV analysis includes approximately 58,000 acres of National Forest System lands in the immediate vicinity of the Ten Cent project area (see Silviculture Report).
- Snags are assessed at the scale of the Granite watershed (94,500 acres) for the Eastside Mixed Conifer-Eastern Cascade/Blue Mountains, Montane Mixed Conifer, and Lodgepole Pine DecAID wildlife habitat types (WHTs). The analysis area for the Ponderosa Pine/Douglas-fir WHT includes lands within the Granite and North Fork Burnt River watersheds. The analysis area for this WHT was expanded in order to meet minimum size and composition requirements for the DecAID Advisor. Expanding to this size provided sufficient acres in the Ponderosa Pine/Douglas-fir WHT for a valid dead wood analysis. These features are also assessed at the scale of individual treatment units. The primary cavity excavator group (a Management Indicator Species on the Umatilla) is also assessed at this scale. The viability of this group is assessed at the scale of each affected National Forest.
- Downed wood is assessed at the same scale as standing dead wood (snags). These features are also assessed at the scale of individual treatment units within the project area.
- The scale of analysis for the Rocky Mountain elk varies depending on standards and direction given by the Forest Plan. In the C7 and MA18 Management Areas, the scale of analysis is the management area allocation lying within each of the affected Forests; HEI will also be calculated at the subwatershed scale. Viability of this species is assessed at the scale of each of the affected National Forests. Refer to the Rocky Mountain Elk section for further clarification, as lands lying in some subwatersheds were combined based on National Forest boundaries so that standards for one Forest were not applied to lands in the adjacent Forest.
- Potential effects on the pileated woodpecker are assessed at the scale of National Forest System lands within the watershed, with respect to source habitat and snag habitat. Viability of this species is assessed at the scale of each of the affected National Forests.
- The American marten is assessed at the scale of National Forest System lands within the watershed, with respect to potential effects to source habitat. Viability of this species is assessed at the scale of each of the affected National Forests.
- The scale of analysis for the American three-toed woodpecker is all Umatilla National Forest acres lying within the Granite watershed. As the three-toed woodpecker is a MIS only on the Umatilla National Forest, potential impacts to source habitat and viability (at the scale of the Umatilla National Forest) will be assessed at that scale.
- The scale of analysis for the northern goshawk is all Wallowa-Whitman National Forest acres lying within the Granite watershed. As the goshawk is a MIS only on the Wallowa-Whitman National Forest, potential impacts to source habitat and viability (at the scale of the Wallowa-Whitman National Forest) will be assessed at this scale.
- The scale of analysis for Endangered, Threatened, and Sensitive species is generally National Forest System lands within the Granite watershed. For those species not suspected

or documented to occur on the Umatilla, the analysis area would be National Forest System lands on the Wallowa-Whitman National Forest

- Neotropical Migratory Birds and Birds of Conservation Concern are assessed at the scale of National Forest System lands within the Granite watershed; specific habitat types and features are addressed at this scale.

Temporal scale is described as being either short- or long-term. For the purposes of this report, the short term would include immediate impacts and those that last up to 5 years from implementation. The mid-term would include impacts lasting from 5 to 15 years; the long term would apply to impacts that occur or changes that develop in 15 years or longer. Unless noted, the scale of analysis for direct and indirect effects and cumulative effects is the same. Temporal bounding of cumulative effects generally extends into the past 40 years, although activities occurring even further in the past that are still having residual impacts today are also considered in the cumulative effects analyses, where applicable. Accurate information regarding harvest activities and other ground disturbing activities is generally available from this point forward.

## Wildlife Habitat Types

### Old Growth Habitat

#### *Analysis Indicators*

The analysis indicator used to show the differences between all alternatives for old growth habitat is the quality and distribution of old growth habitat. This change will be measured by the differences in acres of proposed prescribed fire. There are no vegetative treatment (hand or mechanical) or temporary roads proposed in Forest Plan old growth habitat (C1, C2, and MA 15), so there would be no impact to the quality or distribution of these stands across the analysis area and planning area (Forest-scale). Connectivity between Forest Plan old growth stands would not be reduced by mechanical vegetation treatments; Forest Plan standards for connectivity would be met under all of the action alternatives. Refer to the Connectivity section for a full description of impacts to these stands.

#### *Affected Environment*

Old growth units are identified in the Forest Plan as Management Areas C1 (Dedicated Old Growth – DOG, Umatilla National Forest), C2 (Managed Old Growth, Umatilla National Forest), and MA15 (Old-Growth Preservation, Wallowa-Whitman). There are no C2 old growth habitat units within the analysis area. There are all or portions of 6 C1 stands within the Ten Cent Analysis Area. These C1 old growth units total approximately 1,244 acres. There are also approximately 1,763 acres of MA 15 within the analysis area. The Land and Resource Management Plans for the Umatilla and Wallowa-Whitman National Forests provide standards and guidelines for the size and spacing of Old Growth stands. In general, Forest Plan Old Growth in the Ten Cent area is comprised of mixed conifer stands with some ponderosa pine and Douglas-fir. All of these stands would be considered suitable or capable pileated woodpecker habitat. The landscape within the Ten Cent analysis area has experienced past commercial harvest; however, connectivity of old growth is generally good.

#### *Environmental Consequences*

**Alternative 1**

*Direct Effects and Indirect Effects*

The quality and distribution of old growth habitat would likely remain in its current state in the short term. In the mid to long term these stands would likely improve for a number of moist and

cold upland forest-associated species, including the northern three-toed woodpecker, pileated woodpecker, and American marten. Patches of old growth habitat in dry upland forest would continue to shift away from an open, single-stratum condition to a closed canopy, multi-strata condition. As long as fires do not occur in the planning area, there would be increasing amounts of old forest, stands with higher tree densities, mid and late seral species, and susceptibility to natural disturbances (Forest Vegetation Section of the EIS). Wildland fire under these conditions would exhibit extreme fire behavior and potentially remove large amounts of old forest. Species that depend upon unburned old forest structure would be displaced if a large stand-replacing fire occurred.

#### All Action Alternatives

*Direct Effects and Indirect Effects*

**Alternative 2 and 4**

Under these alternatives, approximately 540 acres of C1 old growth and 560 acres of MA15 old growth would be landscape burned. This represents approximately one-third of the Forest Plan old growth that is in the analysis area. It is expected that some portion of these acres would burn at moderate and greater severity.

Fire-caused mortality would improve snag and downed wood habitat in the short and mid-term. While there is a potential for large-diameter snags and downed wood consumption during burning (especially those in later stages of decay), these potential impacts are not quantifiable due to the many variables involved. Not all acres within burn blocks would be blackened. While it is difficult to accurately assess the actual number of acres that would be blackened, a general estimate would be 40 to 60 percent. The timing of burning, fuel conditions and stand conditions (post-treatment) would reduce the likelihood of fire reaching the overstory tree layer.

Due to uncertainty regarding burning impacts on the ground in moist and cold upland forest stands, quantifying acres of Forest Plan old forest that may be converted to an early seral condition is difficult.

**Alternative 3**

Under this alternative there would be fewer acres of landscape burning in Forest Plan old growth stands. Approximately 8 acres of C1 old growth and 38 acres of MA15 old growth would be landscape burned under Alternative 3. It is expected that some portion of these acres would burn at moderate and high severity. Refer to the Alternative 2 and 4 section for a description of impacts of prescribed fire.

*Cumulative Effects*

For all action alternatives when the expected effects of prescribed burning are combined with the residual and expected effects of past, present, and reasonably foreseeable future activities, actions, and events in the analysis area, there would be cumulative impacts to old growth habitat quality. Because impacts are expected to be patchy and heterogeneous, it is not expected that burning would impact the planning area network (distribution) of old forest management stands. The timing of prescribed fire treatments would help reduce the potential for widespread high-severity impacts. This would be consistent with Forest Plan direction for the Umatilla and Wallowa-Whitman National Forests.

**Alternative 2 and 4**

When compared to Alternative 3, these alternatives would have a greater cumulative impact (through prescribed landscape burning) on the quality of Forest Plan old growth stands. The effects of prescribed burning on old growth stands under these alternatives would be less than

those that would be expected should a wildfire occur during the height of the fire season. These effects would be consistent with the Forest Plans for the Wallowa-Whitman and Umatilla National Forests.

**Alternative 3**

Because landscape burning would occur on the fewest acres when compared to the other action alternatives, Alternative 3 would have the least cumulative impact on the quality of Forest Plan old growth stands. Unburned areas would continue to be vulnerable to a large, high-severity wildfire. A fire of this type would create a large, homogeneous early-seral stand with little value to old growth-dependent species. The effects expected under Alternative 3 would be consistent with the Forest Plans for the Wallowa-Whitman and Umatilla National Forests.

## Late and Old Structural Stages

### *Analysis Indicators*

Change to historic range of variability or to potential group measured by the amount of acres maintained or enhanced of the late and old structure habitat.

### *Affected Environment*

The wildlife standards in the Regional Forester's Forest Plan Amendment #2 (USDA 1995) require the evaluation of late and old structural stages relative to the quantity of late and old structural stages that occurred on the landscape historically. For the purpose of this standard, late and old structural stages include old forest multi-strata (OFMS) and old forest single-stratum (OFSS) stands. A number of species present on the Umatilla and Wallowa-Whitman National Forests require late and old structure habitat. These species include pileated woodpecker, white-headed woodpecker, Lewis' woodpecker, American marten, northern goshawk, Cooper's hawk, sharp-shinned hawk, flammulated owl, great gray owl, Vaux's swift, Townsend's warbler, Hammond's flycatcher, and others.

The historical range of variability (HRV) and existing old forest habitat in each potential vegetation group (PVG) in the Ten Cent project area is shown on Table 3-27.

**Table 3-27: Historic range of variability (HRV) analysis for late and old forest structural classes in the Ten Cent Project area (see Silviculture Report).**

| Potential Vegetation Group | Old Forest Multi Strata | | Old Forest Single Stratum | | NFS Acres (Total) |
|---|---|---|---|---|---|
| | Historic Range | Current | Historic Range | Current | |
| Dry | 5-15% | 17% | 40-60% | 0% | 2,711 |
| Moist | 15-20% | 9% | 10-20% | 0% | 1,471 |
| Cold | 10-25% | 21% | 5-20% | 0% | 5,265 |

Dark gray indicates a structural stage and potential vegetation group currently below HRV.

The HRV analysis for this project indicates that the dry, moist, and cold upland forest PVGs would all fall into Scenario A of the Eastside Screens (Regional Forester's Forest Plan Amendment #2, USDA 1995). The Screens state that there should be no net loss of old forest habitat from these potential vegetation groups. The Regional Forester's Forest Plan Amendment #2 states that harvest is allowed in LOS stages that are above or within HRV in order to maintain or enhance late and old structure habitat within a particular biophysical environment or to move one type of LOS habitat into an LOS stage that is deficit (below HRV). It also states that there would be no harvest in LOS stages that are below HRV.

**Table 3-28: Existing condition of late and old structure habitat in the Ten Cent LOS analysis area (Granite watershed).**

| National Forest | LOS Structure Type | |
|---|---|---|
| | Old Forest Single Stratum (acres)* | Old Forest Multi-Strata (acres)* |
| Umatilla NF | 0 | 4,050 |
| Wallowa-Whitman NF | 0 | 8,993 |
| TOTAL LOS | 0 | 13,043 |

*These acres were queried from the GIS database using stand structure (old forest single-stratum and old forest multi-strata) to identify late and old structure stands.

### *Environmental Consequences*

#### Alternative 1

*Direct and Indirect Effects*

In the short term, late and old structure habitat would maintain its current quality and extent in the analysis area. As a result, single-layer old forest would remain below the historical range of variability in the dry, moist, and cold upland forest PVGs; multi-layer old forest would also remain below HRV in the moist upland forest PVG. With the existing management direction, including fire suppression, late and old structure stands would become denser, and develop more complex multistory structure. Large trees and structural features indicative of old forest (large snags and downed wood, broken tops, complex structure, etc.) would also develop over time. Perpetuating this multi-layered condition would benefit species such as the pileated woodpecker, American marten, and three-toed woodpecker. These stands would become increasingly susceptible to insect and disease outbreaks and high-severity wildfire. This would largely be consistent with historic conditions. Where dry upland forest conditions exist, conversion to multi-layered old forest and disease/insect activity would increase the risk of crown fire and produce higher flame lengths that could result in larger patches experiencing high severity fire impacts than would have been expected historically. Old forest multi-strata in the moist upland forest PVG would likely be reduced even further below HRV in response to a large, high-severity fire in the analysis area during the peak of fire season. Old forest multi-strata in the cold upland forest PVG may also be reduced below HRV in response to this type of fire event.

#### Alternative 2, 3, and 4

*Direct Effects and Indirect Effects*

The effects of the three action alternatives would largely be the same; the difference between the alternatives results from varying acres of treatment that would be applied within the project area. Refer to the individual alternative discussions for quantification of these differences. Under all of the action alternatives, there would be no net loss of late and old structure habitat. Under Alternatives 2, 3, and 4, there would be no harvest in old forest stands that are currently below HRV.

The largest trees within treatment units, including all trees greater than 21 inches (dbh) would be retained during commercial harvest; design criteria would also provide for the retention of structural features important to late and old structure associated species, skips (untreated areas) of varying size, snags and downed wood densities that exceed the Forest Plan minimums, and connectivity of late and old structure habitat. Treatment would result in stands with more open understories. In some stands, particularly those composed of a homogeneous layer of even-aged trees, canopy closure would be reduced. Reductions in canopy closure, canopy layers, and shade-

tolerant tree species would reduce habitat for multi-strata adapted species currently using these habitats, which includes the pileated woodpecker.

At the unit scale, skips would provide small patches of dense forest habitat that may be utilized by dense-forest associated species for some aspects of their life history. Refer to individual alternative discussions for these changes. Table 3-29 shows acres of treatment by treatment type and Forest.

**Table 3-29: Acres of late and old structure habitat treated by Forest and treatment type.**

| Alt. # | National Forest | Late and Old Structure Stands Treated (acres) | | | | |
|---|---|---|---|---|---|---|
| | | Commercial Thinning | Small Diameter Thinning | RHCA NCT | Mechanical Fuels Treatment | Landscape Rx Fire |
| Alt 2 | UMA | 92 | 0 | 6 | 0 | 1,418 |
| | WW | 766 | 189 | 198 | 46 | 2,327 |
| Alt 3 | UMA | 92 | 0 | 6 | 0 | 94 |
| | WW | 766 | 189 | 198 | 46 | 1,618 |
| Alt 4 | UMA | 90 | 0 | 4 | 0 | 535 |
| | WW | 716 | 189 | 198 | 46 | 2,327 |

Design criteria would provide for the retention of snag densities that exceed Forest Plan minimum standards, and that meet desired levels, where available. Retention densities are based on the best science currently available with regard to wildlife use of dead wood habitat. Refer to the Primary Cavity Excavator section for the full effects analysis for snag habitat.

Burning would occur within LOS habitat within and outside treatment units under all of the action alternatives. Given the composition and density of moist and cold upland forest stands proposed for prescribed burning, it is expected that late and old structure features (large trees, large snags and downed wood, stand complexity/multi-layered conditions) may be impacted to some degree. While there is a potential for mortality of individuals, groups, and larger patches of green overstory trees, and for large-diameter snags and downed wood to be consumed during burning (especially those in later stages of decay), these potential impacts are not quantifiable due to the many variables involved. New snags created by burning would partially compensate for those lost. While it is difficult to accurately assess the proportion of acres that would be blackened, a general estimate would be 40 to 60 percent due to fuel conditions and other factors. Due to the fact that burning would occur at a time and under weather and fuel conditions that would temper fire behavior, it is likely that impacts to late and old structure would be relatively minor. While patches of mortality in late and old structure stands up to 10 acres in size may result, it is not expected that burning would move late and old structure in the dry, moist, and cold upland forest PVGs below the HRV in those areas where it is currently above or within the historic range.

Small diameter thinning would not impact the structure or composition of existing late and old structure habitat under any of the action alternatives. There is a potential that all of these acres would be implemented using heavy machinery (processor, masticator, or similar equipment). Use of machinery to small diameter thin these acres may require additional hazard tree felling in these units. Design criteria would be implemented to protect legacy dead wood in these units. The majority of temporary roads would use existing non-system roadbeds. Where new temporary

road construction occurs, existing openings would be followed where available. The width of proposed temporary roads (approximately 15 feet wide) would minimize impacts to overstory vegetation. The structure and composition of late and old structure stands would generally not be affected by temporary road construction due to the fact that existing openings would be followed where available and the affected area would be narrow.

**Alternative 2**

The effects under this alternative would be similar to those described under Common to All Action Alternatives. Approximately 858 acres of late and old structure habitat would be commercially harvested under this alternative. Alternative 2 would move approximately 1,300 acres of multi-strata late and old structure stands in the dry, cold, and moist upland potential vegetation groups into or toward a single-stratum old forest structural condition. All three of these potential vegetation groups would experience an increase in the acres of single-stratum late and old structure stands; however, all three PVGs would remain below the HRV for this structure type. The moist upland forest PVG would remain below the HRV for the OFMS structural class, while the dry and cold PVGs would remain within the HRV following treatment.

While it would treat the same number of acres of late and old structure habitat as Alternative 3, Alternative 2 would utilize a lighter thin to meet the purpose and need for action. Stands would be thinned to a basal area within the prescribed ranges(40-90). The average basal area would be in the middle of the range, with some stands left at the higher end of the range, and some at the lower end of the range. When skips (untreated areas) within these stands are considered, this alternative would provide for some level of heterogeneity within late and old structure stands.

This alternative would prescribe burn the most acres (3,745 acres) of late and old structure habitat when compared to the other two action alternatives. As a result, it would have the greatest immediate and short term impacts to the quality and distribution of late and old structure habitat across the analysis area.

**Alternative 3**

The effects under this alternative would be similar to those described under Common to All Action Alternatives and Alternative 2. Alternative 3 would mechanically treat (commercial, small diameter, and mechanical fuels treatment) the same number of acres of late and old structure habitat as Alternative 2. This alternative would thin these stands down to the lowest end of the range identified in order to meet the fuels and fire safety portion of the purpose and need for action and to maximize economic benefit of the treatment. As a result, this alternative would have the greatest long term impacts to late and old structure habitat quality and impacts to those species that rely on this habitat. It would be unlikely that species like the pileated woodpecker and American marten would use these stands following treatment under this alternative due to the impacts to overstory structure and complexity. It would take a number of years before stand structure, composition, and density recover to a level that would make these stands suitable breeding habitat for species like the pileated woodpecker, marten, and northern goshawk. Alternative 3 would move approximately 1,300 acres of multi-strata late and old structure stands in the dry, cold, and moist upland potential vegetation groups into or toward a single-stratum old forest structural condition. All three of these potential vegetation groups would experience an increase in the acres of single-stratum late and old structure stands; however, all three PVGs would remain below the HRV for this structure type. The moist upland forest PVG would remain below the HRV for the OFMS structural class, while the dry and cold PVGs would remain within the HRV following treatment.

This alternative would prescribe burn the fewest acres of late and old structure stands (1,712 acres) when compared to the other action alternatives. As a result, it would have the least immediate and short term impacts to the quality and distribution of late and old structure habitat.

**Alternative 4**

The effects under this alternative would be similar to those described under Common to All Action Alternatives. Alternative 4 would have the least immediate and mid-term impacts on late and old structure habitat and associated wildlife, largely due to a decrease in the number of acres treated. This alternative would commercially thin as many as 806 acres and small diameter thin another 437 acres. Design criteria under this alternative would also provide for larger skips within treatment units (where appropriate), a lighter thin, and less impact to connectivity stands. While this alternative would treat fewer acres, dropped acres are generally not in close proximity to values at risk. As a result, it would meet the purpose and need for action related to fuels.

This alternative would burn an intermediate level of late and old structure stands. Approximately 2,862 acres of LOS would be burned under this alternative.

Fewer acres would be moved toward a single-stratum late and old structure condition in the dry upland forest PVG under this alternative (20 fewer acres and 30 fewer acres, respectively). Alternative 4 would move approximately 1,240 acres of multi-strata late and old structure stands in the dry, cold, and moist upland potential vegetation groups into or toward a single-stratum old forest structural condition; however, all three PVGs would remain below the HRV for this structure type. The moist upland forest PVG would remain below the HRV for the OFMS structural class, while the dry and cold PVGs would remain within the HRV following treatment.

*Cumulative Effects*

When the expected effects of mechanical vegetative treatment under all of the proposed action alternatives are combined with the residual and expected effects of past, present, and reasonably foreseeable future activities, actions, and events in the analysis area, there would be no cumulative reduction of late and old structure habitat. When the expected impacts of proposed prescribed burning are considered, there is a chance that the existing quantity and distribution of late and old structure habitat may be cumulatively reduced. All of the action alternatives would contribute to cumulative effects in old forest stands by reducing canopy closure and structural complexity; this would positively impact some species while negatively impacting others. The proposed treatment activities would reduce the probability of crown fire occurring in a portion of the cold and moist upland forest stands in the analysis area; as a result, live overstory structure (including large green trees, snags, and downed wood) would likely be available in greater quantity than if stands burned during the height of fire season or during a wildfire driven by a severe weather event. Desired features, including snags, tree clumps, and others may be reduced by these activities. The negative effects of reduced structural complexity (canopy layers, understory vegetation, felling of snags that are a hazard) could result in reduced use of affected late and old structure habitat by some species, including the pileated woodpecker and American marten.

**Alternative 2**

The cumulative effects under this alternative would be similar to those described under Common to All Action Alternatives. When the expected effects of mechanical vegetation treatment under this alternative are combined with the residual and expected effects of past, present, and reasonably foreseeable future activities, actions, and events in the analysis area, there would be no cumulative reduction of late and old structure habitat. Burning under this alternative would have the greatest immediate and short term cumulative impacts to late and old structure habitat

quality when compared to the other action alternatives. As a result, it would also have the most cumulative impact on late and old structure associated wildlife species including the pileated woodpecker and the American marten. While this is the case, this alternative would likely have less cumulative impact on late and old structure habitat than would a large, high severity wildfire were it to occur at the height of fire season or during an extreme weather event.

**Alternative 3**

The cumulative effects under this alternative would be similar to those described under Common to All Action Alternatives. When the expected effects of this alternative are combined with the residual and expected effects of past, present, and reasonably foreseeable future activities, actions, and events in the analysis area, there would be no cumulative reduction of late and old structure habitat within the analysis area. This alternative would have the most immediate and long term impacts on the quality of OFSS and OFMS when compared to the other action alternatives due to the fact that treatment activities would be more intense.

**Alternative 4**

The cumulative effects under this alternative would be similar to those described under Common to All Action Alternatives. When the expected effects of mechanical vegetation treatment under this alternative are combined with the residual and expected effects of past, present, and reasonably foreseeable future activities, actions, and events in the analysis area, there would be no cumulative reduction of late and old structure habitat. Burning under this alternative would have an intermediate level of immediate and short term cumulative impacts (between Alternatives 2 and 3) to late and old structure habitat quality when compared to the other action alternatives. As a result, it would also have an intermediate level of cumulative impacts on late and old structure associated wildlife species including the pileated woodpecker and the American marten. This alternative would have less cumulative impact on late and old structure habitat than would a large, high severity wildfire were it to occur at the height of fire season or during an extreme weather event.

#### Compliance with law, regulation, policy, and the Forest Plan

All action alternatives would be consistent with the Eastside Screens (Scenario A) with regard to harvest in late and old structure habitat.

## Connectivity

### *Analysis Indicators*

The analysis indicator for connectivity is the distribution and quality of habitat connecting distinct stands identified as late old structure and old growth. The measure is the number of acres proposed for commercial and prescribed burning within identified connectivity corridors.

### *Affected Environment*

Connectivity of late old structure was identified as Issue 6 during scoping. Wildlife standards in the Regional Forester's Forest Plan Amendment #2 (USDA 1995) require late and old structural stands and designated old growth areas to be connected to each other and provide "free movement" for various species across the landscape. The Regional Forester's Amendment #2 allows for treatment within connectivity habitat as long as certain conditions are met. These conditions include: stands maintain medium and large trees (are "common"), canopy closures are within the upper 1/3 of site potential, connections are at least 400 feet wide (where available), and old growth/LOS are connected in at least two directions. Where these conditions cannot be met, the best available connectivity habitat should be provided.

Connectivity of late and old structure habitat and Forest Plan old growth (C1 and MA15) is generally good; portions of the analysis area have poor connectivity due to natural openings, vegetative composition, and past management activities. Connectivity habitat was identified based on stand data (structure, canopy closure, cover type, etc.) in the existing vegetation database. This database was updated with new information gathered in 2015. Stands with the highest canopy closure and complexity were identified to provide the best connections between late and old structure habitat and Forest Plan old growth. Proposed treatment units are present in identified connectivity corridors. Design criteria would be used where proposed units and connectivity corridors overlap to maintain old growth connectivity and to meet the standards provided by the Forest Plan, as amended by the Eastside Screens (USDA 1995). Environmental Consequences

### *Environmental Consequences*

#### Alternative 1(No Action)

*Direct and Indirect Effects*

In the short term, late and old structure stands and old growth stands would remain connected across the landscape and within the project area with stands that generally meet Forest Plan standards. Connectivity habitat would change over time. It is expected that sometime in the future, a large, high severity wildfire would impact the landscape due to vegetation and fuels conditions in the analysis area. High severity fire would change the composition and structure of connectivity habitat. The connectivity of late and old structure and old growth stands would be reduced over a large area. This may limit the free movement of some wildlife species where larger patches of high severity fire cause fragmentation of habitat**. In the short term this Alternative best addresses Issue 6 as identified during scoping. However, in the long term, the occurrence of a high severity wildfire is likely to result in impacts that would significantly reduce connectivity and therefore be the least favorable outcome as identified in Issue 6.**

#### Alternatives 2, 3, and 4

*Direct Effects and Indirect Effects*

Commercial thinning, mechanical fuels treatment, small diameter thinning, roadside treatment, and combinations of these treatment types would occur in stands identified as connectivity corridors during project development. Under all of the action alternatives, treatment within connectivity corridors would meet the intent of the Forest Plan standards. Design criteria would be implemented to provide for higher overstory canopy retention, untreated patches within connectivity corridors, and breaking up the continuity of surface, understory, and overstory fuels in an uneven pattern across the landscape. These corridors would continue to provide connections between late and old structure habitat and Forest Plan old growth and facilitate the movement of wildlife between these habitats following implementation. In general, treatment within connectivity corridors would provide for heterogeneity in these corridors; species requiring dense, homogeneous stands to move between late and old forest stands may be less likely to use these corridors in the short and mid-term. Treatment of proposed units (including connectivity corridors lying in these stands) would reduce the probability of high severity wildfire effects within treatment units, and to a lesser extent, adjacent stands (especially those in a conditional crown fire condition). In the event of a wildfire, the landscape would be more resilient, and green (live) stands providing late and old structure, old growth, and connections to these stands would largely be maintained.

Small diameter thinning would have no impact on the quality of connectivity habitat because overstory composition and structure would not be affected. Untreated patches of small-diameter

conifers would be maintained in small diameter thinned units to provide hiding cover for wildlife.

It is expected that landscape burning would impact overstory composition and structure in connectivity habitat to some extent. Burning would result in individual, small group, and larger group mortality, both immediately and in the years following burning. This activity would impact habitat connectivity; however, the impacts of prescribed burning are expected to be less than those that would result from a wildfire burning at the height of fire season or during an extreme weather event. In the long term, treatment would provide for small and large scale heterogeneity and would provide for the connectivity of late and old structure habitat.

**Alternative 2**

The effects of these alternatives would be similar to those described under the Common to All Action Alternatives section above. Alterative 2 and 3 would mechanically treat the same number of acres of stands providing connections between late and old structure and Forest Plan old growth habitat. Design criteria would be implemented to provide for higher overstory canopy retention, untreated patches within connectivity corridors, and breaking up the continuity of surface, understory, and overstory fuels in identified connectivity corridors in an uneven pattern across the landscape.

This alternative would burn the most acres of connectivity habitat when compared to the two other action alternatives. It is expected that impacts to connectivity habitat and species that require these stands to move across the landscape would be the greatest under this alternative in the short and mid-term. Of the Action Alternatives, Alternative 2 does the least to address Issue 6 as identified during scoping.

**Alternative 3**

The effects of this alternative would be similar to those described under the Common to All Action Alternatives section above and are the same as Alternative 2 with the following exception. Under Alternative 3, there would be less burning in moist and cold upland forest stands. When compared to Alternative 2, Alternative 3 partly addresses the concerns associated with Issue 6 through a reduction in acres of prescribed burning however it does not propose to reduce activity treatments in connectivity stands as described in Alt 4 and therefore does not fully address Issue 6 raised during scoping.

**Alternative 4**

Alternative 4 was developed in response to Issue 6 as identified in scoping. The effects of this alternative would be similar to those described under the Common to All Action Alternatives section above, however stands identified as providing connectivity between LOS and Forest Plan old growth were dropped from commercial treatment activities. As a result Alternative 4 would best address Issue 6 as identified during scoping. As connectivity is being addressed at the stand scale, it was necessary to reduce the width of corridors to the minimum required by the Forest Plan and Eastside Screens to meet the purpose and need along routes that provide egress from private and NFS lands. Under Alternative 4 there would be less burning in moist and cold upland forest stands than Alternative 2 and more acres of burning with the potential to affect connectivity habitat than Alternative 3.

*Cumulative Effects*

There are no ongoing or reasonably foreseeable future activities, actions, and events that are affecting or would affect connectivity habitat in the analysis area.

When the expected effects of these alternatives are combined with the residual and expected effects of past, present, and future actions in the analysis area, there would be no cumulative reduction in connectivity between late and old structure and Dedicated Old Growth habitats through mechanical treatment activities. Connectivity habitat would continue to meet the intent of the amended Forest Plan standards under these alternatives. Proposed landscape burning in cold and moist stands is expected to result in a cumulative loss of connectivity habitat when combined with past activities. It is estimated that the loss in connectivity habitat under these alternatives would be less than under a scenario where wildfire burns through the analysis area during extreme weather and fuel conditions.

**Alternative 2**

This alternative is expected to have the most cumulative impact on the quality of connectivity habitat in the analysis area due to the fact that it would prescribe burn and treat vegetation on the most acres when compared to the other action alternatives. While quality would be affected to some extent through vegetative treatment, these activities would provide for a mosaic of overstory, understory, and ground cover layers, untreated skips, and higher basal area than the surrounding (non-connectivity) stands. The effects resulting from vegetative treatment and prescribed burning are expected to be less than those that would occur under a wildfire scenario, when weather and fuels conditions would be considered extreme.

**Alternative 3**

Cumulative impacts to connectivity would be reduced under this alternative due to the fact that moist and cold stands would largely be dropped from proposed burn units. These acres would be more susceptible to a large, high-severity wildfire in the future. A fire of this type would reduce the amount and distribution of late and old structure habitat and connectivity habitat.

**Alternative 4**

Cumulative impacts to connectivity would be less than those expected under Alternative 2 due to the fact that burning in moist and cold stands would be curtailed to some extent. Cumulative impacts would also be reduced under this alternative due to the fact that treatment acres lying within identified connectivity stands would be dropped from treatment. The current quality (canopy closure, stand density, and composition) of connectivity corridors would be maintained under this alternative on dropped acres.

## Snag Replacement Trees

### *Analysis Indicators*

The analysis indicator for snag replacement green trees is the post treatment number of trees per acre of various species/diameters. The measure for comparing alternatives is the total number of acres proposed for mechanical treatment and prescribed burning.

### *Affected Environment*

Snag replacement trees are analyzed to determine the potential for recruitment of dead tree habitat over time across the landscape. Current direction for green tree replacement (GTR) densities are based on the requirements described in the Eastside Screens (USDA 1995), which requires that all sale activities maintain green replacement trees of ≥ 21 inches dbh (or whatever is the representative dbh of the overstory layer if it is less than 21 inches), at 100% potential population levels of primary cavity excavators. For the North Fork John Day Ranger District, GTR density objectives were enumerated in a memo dated March 22, 1996 entitled “Wildlife Tree and Downed Wood Guidelines” (USDA 1996). Refer to Table 3-30 for these green tree

replacement objectives. Green tree replacement objectives have not been enumerated for the Wallowa-Whitman National Forest.

**Table 3-30: Green tree replacement objectives (USDA 1996).**

| Tree Size (diam. at breast height) | Plant Association | | | |
|---|---|---|---|---|
| | Ponderosa Pine | Warm Grand Fir | Cool Grand Fir | Lodgepole Pine |
| 10-12 inches | 2.0 | 2.0 | 6.4 | 3.0 |
| 12-15 inches | 3.0 | 9.14.0 | 6.6 | 7.0 |
| 15-20 inches | 3.0 | 1.14.0 | 7.9 | ** |
| >20 inches | 4.0 | 6.0 | 5.9 | ** |
| *Total (#/acre) | 12.0 | 16.0 | 26.8 | 10.0 |

*Division of GTRs by diameter does not preclude the partial or total substitution of larger green trees for smaller ones, although it is recognized that a distribution of size classes will provide for snag replacement over a greater period of time.

**If available, larger diameter lodgepole pine should be retained. Retain all residual large fir and western larch; if more than 10 large fir and larch are present per acre, reassess whether stand is actually a lodgepole pine plant association.

Currently, all of the stands proposed for commercial thinning meet minimum green tree replacement objectives.

### *Environmental Consequences*

#### Alternative 1 (No Action)

*Direct and Indirect Effects*

Within the next five years, snag replacement trees (live/green) would continue to occupy the project area at or near current densities and size classes. In the mid and long term (5 to 15+ years), green tree replacements may increase or decrease depending on the events that occur. Green tree replacements would be reduced by disease and insect outbreaks and wildfire in dense multi-strata stands. Although green tree replacements may decrease in the future due to mortality, it is unlikely that green tree replacement levels would fall below objectives. Growth and development over time would tend to increase green tree replacements. In the long term, mortality of overstory trees would increase standing and downed fuel loads, increasing the risk of high-severity wildfire. All Action Alternatives 2, 3, and 4

#### All Action Alternatives

*Direct Effects and Indirect Effects*

Proposed harvest activities (commercial thinning, mechanical fuels, small diameter thinning, and roadside treatments) would directly and indirectly affect green trees in the project area. These treatments would reduce the density of green trees in units; however, all treated stands would meet or exceed objectives for green tree replacements (USDA 1996) following treatment. Commercially thinned stands would provide densities of green trees that would meet these objectives Skips within treatment units would provide for high levels of green tree replacements. Small diameter conifer thinning (small diameter thinning) would improve growing conditions for residual trees. This activity would affect small diameter green trees that do not currently contribute to green tree replacements because if they were to die, they would be largely unusable to primary cavity excavators. Refer to the Primary Cavity Excavator section for a description of potential impacts to future snag habitat.

Landscape burning in the Ten Cent analysis area has the potential to result in single, small group, and larger scale patches of mortality; in general, it is expected that these burns would be mixed severity. In some locations, immediate and delayed mortality of overstory vegetation would reduce or eliminate future green tree replacements for a time. As determining where these

impacts may occur on the landscape is highly speculative, it is not known to what degree this may occur. It is estimated that 40 to 60 percent of the landscape burn area may be blackened, largely due to the fact that fuels moisture and other stand-level factors would limit the ability of prescribed fire to spread in many stands.

*Cumulative Effects*

There are no ongoing or reasonably foreseeable future activities, actions, and events in the analysis area with a potential to affect green tree replacements.

When the expected effects of the proposed commercial thinning and landscape burning are combined with the residual effects of past activities, actions, and events, there may be a cumulative increase in acres below green tree replacement objectives. These impacts would be entirely due to the uncertain impacts that are expected through prescribed burning. While this activity would impact green tree replacements through individual, small group, and larger group mortality, landscape burning that primarily has low and mixed severity impacts would have less cumulative impact on the availability of green tree replacements than would occur in a large scale, homogeneous wildfire characterized by high severity impacts to overstory vegetation.

**Compliance with law, regulation, policy, and the Forest Plan**

All treated stands would meet or exceed objectives for green tree replacements (USDA 1996) following treatment.

## Downed Wood Habitat

### *Analysis Indicators*

The analysis indicator is the abundance (percent cover) and quality (size) of downed wood. The measure of comparison is the number of acres proposed for mechanical treatment and prescribed burning.

### *Affected Environment*

Current Forest Plan direction for downed wood densities is based on the Forest Plan (USDA 1990) and direction given in the Eastside Screens (USDA 1995). The Forest's amended guidelines for downed wood densities and target downed wood levels (based on examination of the best available science) for the Ten Cent analysis area are found in (see wildlife report, Table W-05). Snags and downed wood tend to occur on the landscape as singles, groups, clumps, patches or piles resulting from natural tree mortality and disturbances, such as fires, insect and disease, ice storms, and drought. These random events result in an uneven distribution of downed wood across the landscape. Within the analysis area, a wide range of downed wood habitat conditions exists; some stands have very little to no wood, while others have levels much greater than the Forest Plan standard.

Current distribution of downed wood in the Ten Cent analysis area was compared with the unharvested (reference) distribution of downed wood for each habitat type. These findings and methodologies are described in further detail in the Downed Wood Habitat Section of the Terrestrial Wildlife Report located on the project website.

### *Environmental Consequences*

**Alternative 1 (No Action)**

*Direct and Indirect Effects*

Over the next five years, dead downed wood would continue to occupy the analysis area at or near the current density in all WHTs. Over the next five to fifteen years, falling snags would be

the primary factor contributing to the recruitment of downed wood habitat, potentially increasing downed wood densities across the analysis area. Potential increases in the incidence of insects and disease would cause mortality, increasing potential standing and downed wood in all size classes, and the risk of widespread high-severity wildfire. It is expected that much of moist and cold forest stands would experience high overstory mortality due to intense ground fire driven by woody material/ladder fuels and crown fire. Initially, downed wood would be consumed; then downed wood would increase as snags begin to fall. A mosaic of downed wood conditions would result, with some stands having little downed wood due to repeated disturbance and others having moderate to high levels of downed wood.

**All Action Alternatives 2, 3, and 4**

*Direct Effects and Indirect Effects*

Because Forest Plan standards and desired downed wood levels are expected to be met (where currently available) following vegetative manipulation and untreated areas within proposed units will be available, it is expected that there would be no adverse impacts to the availability and distribution of downed woody material in the analysis area. It is expected that the distribution of downed wood cover classes would continue to be similar to the reference condition (DecAID; Mellen McLean et al. 2012) following treatment. In the ≥5 inch group it is expected that the proportions of habitats with overrepresented downed wood cover classes would likely decrease through a combination of vegetative treatment and landscape burning (see discussion associated with Figures W-01 through W-08 in the Terrestrial Wildlife Resource Report on the project website).

Downed wood would not be removed from small diameter thinning units. Use of machinery to accomplish commercial thinning, mechanical fuels treatment, and small diameter thinning would directly impact downed wood to some degree by crushing, displacing, or fracturing larger pieces in treatment units and along temporary roads. It is not expected that this would appreciably impact densities or percent cover of downed wood following treatment.

Under all of the action alternatives, landscape burning would occur in the analysis area over a period of approximately 10 years. Burning treatments have the potential to affect downed wood retained during mechanical vegetative treatment and affect future downed wood recruitment. It is estimated that landscape burns would blacken approximately 40 to 60 percent of burn acres; high mortality (50 to 100%) is expected to occur in portions (10 to 20 percent) of moist and cold habitat types. Wood in later stages of decay and fine woody material would most likely be consumed by burning. Design criteria (See EIS, Chapter 2) would be implemented to reduce impacts to downed woody material. While charring of downed wood may impact the availability of potential prey (i.e. ants) for some wildlife species to some degree, there will be unaffected areas spread throughout the proposed underburn area. Where burning does occur, it is expected to create snags through immediate and delayed mortality, partially compensating for downed wood that is charred or consumed. Downed wood levels may be reduced below Forest Plan standards (where currently meeting these standards) and desired levels in the short and mid-term. In the mid and long term, downed wood densities and cover are expected to rebound as snags created during burning begin to fall. Species requiring high densities and cover of downed wood may be displaced in the short and mid-term; as downed wood densities increase in the years following burning, species requiring these features would also increase their use of the area.

Danger tree felling along roads used for harvest would also indirectly impact future downed wood densities by removing dead and structurally deficient trees that would be expected to fall to the ground in the short and mid-term. It is not expected that this activity would appreciably

impact downed wood densities at the analysis area scale due to the amount and location of the areas that would be impacted. The areas affected by this activity would be relatively narrow, and situated along roads, where standing and downed wood densities are generally lower due to firewood cutting and past danger tree abatement activities. Road construction (temporary roads) generally would not result in reductions in downed wood. Temporary roads are generally located in existing forest openings. Downed wood may be crushed or pushed out of the road prism to allow for this activity, but it would not be removed.

**Alternative 2**

Alternative 2 would mechanically treat the same number of acres as Alternatives 3. As a result, the expected impacts to downed wood resulting from mechanical treatment activities would be the same under these alternatives. This alternative would burn the most acres when compared to the other action alternatives. As a result, it would have the greatest impact in the short and mid-term. In the long term, landscape burning under this alternative would generally have mixed severity effects that create heterogeneity in stand structure and composition, and downed wood resources; if allowed to burn naturally, more severe, homogeneous, and widespread impacts would be expected.

**Alternative 3**

The effects under this alternative would be very similar to those described under Common to All Action Alternatives and Alternative 2. This alternative would mechanically treat the same number of acres as Alternative 2, so the impacts of these activities would be the same as those under Alternative 2. Under this alternative, landscape burning would largely be restricted to dry upland forest stands outside of the North Fork John Day Wilderness Area. As a result, this alternative would provide for landscape burning on approximately 3,500 acres, a reduction of nearly 26,000 acres when compared to Alternative 2 and 16,200 acres less than Alternative 4. As a result, the short and mid-term impacts of landscape burning on existing downed wood (particularly in the wilderness and moist and cold upland forest stands) would be least under this alternative. While this alternative would reintroduce fire into dry upland forest stands, it would not address crown fire risk or potential high intensity burning that could occur in moist and cold upland forest stands and the wilderness. These wildlife habitats would continue to be overrepresented (currently occurring at levels well in excess of the reference condition) in the highest downed wood percent cover classes. As a result, these areas would be more at risk for large, high severity wildfire that would create a relatively homogeneous landscape with respect to the structure and composition of vegetation and dead wood habitat.

**Alternative 4**

The effects under this alternative would be similar to those described under Common to All Action Alternatives. This alternative would mechanically treat fewer acres of connectivity habitat and provide for more and larger skips (untreated areas) across the landscape (where appropriate given values at risk and other features) to address connectivity concerns raised during scoping. Because it would mechanically treat vegetation on fewer acres than Alternatives 2 and 3, this alternative would also have the least short and mid-term impact on downed wood. Alternative 4 would landscape burn approximately 19,700 acres of dry, moist, and cold upland forest outside of the North Fork John Day Wilderness area. While this alternative would address overrepresentation of the highest downed wood cover classes in moist and cold stands and provide for mixed fire severity and a heterogeneous dead wood landscape post-implementation, it would not address these issues in the wilderness area.

*Cumulative Effects*

Present and reasonably foreseeable future activities that affect downed wood include firewood cutting. Firewood cutting impacts future recruitment of downed wood by removing standing dead trees along roadways. Relatively few snags and downed logs of desirable firewood species are present along some roads in the analysis area due to firewood cutting and the natural growing potential of some areas.

When the expected effects of these alternatives are combined with the residual and expected effects of past, present, and future actions, activities, and events in the analysis area, there would be an incremental reduction in downed woody material in the project area in the short and mid-term. This would be the result of small diameter downed wood in some commercially harvested units, burning, hazard/danger tree felling (and potential removal of those danger trees less than 20 inches in diameter along existing and temporary roads), and reduced recruitment of dead wood following vegetative treatment. The impacts associated with the proposed activities are expected to have minor impacts on downed wood habitat at the analysis area scale. In the mid and long term, the downed wood cover distribution within the analysis area would more closely resemble the reference condition (DecAID; Mellen McLean et al. 2012) as stands in overrepresented downed wood cover classes move toward desired downed wood cover ranges. Forest Plan downed wood standards and desired downed wood cover conditions are expected to be met (where material is currently available) at the unit and larger landscape scale following treatment. In the long term, the amount and intensity of treatment that would be applied to the Ten Cent analysis area, when combined with landscape burning, may result in downed wood levels that fall below Forest Plan standards and desired levels for a time. As downed wood recruitment increases in the long term through snag-fall in the burned portion of the analysis area and dead wood recruitment associated with successional development in treated and untreated stands, downed wood levels are expected to rebound.

**Alternative 2**

The cumulative effects of this alternative would be similar to those described under Common to All Action Alternatives. As this alternative would impact the most acres through mechanical vegetation treatment and burning, it would also have the greatest short and mid-term cumulative impacts on downed wood. Under this alternative, Forest Plan standards and desired downed wood cover levels would continue to be met or exceeded at the stand and analysis area scale following vegetative treatment (short and mid-term) where these standards are currently being met. Because this alternative would provide for heterogeneity and a wide range of downed wood conditions across the landscape, cumulative impacts to downed wood resources would likely be the least in the long term, when considering the potential for a large, high severity fire in the analysis area.

**Alternative 3**

The cumulative effects of this alternative would be similar to those described under Common to All Action Alternatives and Alternative 2. Because this alternative would landscape burn the fewest acres when compared to the other action alternatives, it would have the least short and mid-term cumulative impact on downed wood habitat. In the long term, there would be a greater risk of a large, high severity wildfire that would create a relatively homogeneous landscape with respect to the structure and composition of vegetation and dead wood habitat.

**Alternative 4**

The cumulative effects of this alternative would be similar to those described under Common to All Action Alternatives. Because this alternative would mechanically treat vegetation on fewer

acres than Alternatives 2 and 3 and implement landscape burning on an intermediate number of acres when compared to the other action alternatives, it would have an intermediate short and mid-term cumulative impact on downed wood habitat. In the long term, there would remain a greater risk of a large, high severity wildfire that would create a relatively homogeneous landscape with respect to the structure and composition of vegetation and dead wood habitat in the wilderness. In the long term, the retention of larger skips (untreated patches) within units, untreated stands providing connectivity between late and old structure stands and Forest Plan old growth, and landscape burning during conditions that would promote mixed severity impacts to vegetation and dead wood habitat across the landscape would provide for a high level of heterogeneity with regard to downed wood habitat.

## Management Indicator Species

The Umatilla and Wallowa-Whitman Land and Resource Management Plans (Forest Plans) designate Management Indicator Species (MIS) to represent larger groups of animals associated with the major habitat types on the Forest. Habitat conditions for management indicator species must be managed to maintain viable populations at the Forest or larger scale (Umatilla LRMP page 2-9 and Wallowa-Whitman LRMP page 2-9. MIS species for the Forest are presented in Table 3-31.

**Table 3-31: Management Indicator Species by Forest.**

| Species | Forest (UMA and/or WW) | Habitat Description | Habitat Present in Analysis Area? | Species Present in Analysis Area? |
|---|---|---|---|---|
| Rocky Mountain elk | UMA and WW | General forest habitat and winter ranges | Yes | Documented |
| Pileated woodpecker | UMA and WW | Dead/downed tree habitat (mixed conifer) in mature and old growth stands | Yes | Documented |
| American marten | UMA and WW | Mature and old growth stands at high elevations | Yes | Documented |
| Primary Cavity Excavators (PCEs) | UMA and WW | Dead/downed tree (snag) habitat | Yes | Documented |
| American three-toed woodpecker | UMA | Dead/downed tree habitat (lodgepole pine) in mature and old growth stands | Yes | Documented |
| Northern goshawk | WW | Mature and old growth stands | Yes | Documented |

All of the MIS listed in Table 3-31 have been documented in the analysis area. Effects will be analyzed for all of these species. Viability will be assessed at the Forest scale for the appropriate Forest or Forests.

### Rocky Mountain Elk

The Rocky Mountain elk was selected as a MIS to be an indicator of general forest habitat and winter ranges (Umatilla National Forest) and is also a commonly hunted species and an indicator of mule deer habitat (Wallowa-Whitman National Forest). It is assumed that if good habitat is provided for elk and their population is maintained at some desired level, that adequate habitat is also being provided for other species that share similar habitat requirements (LRMPs, page 2-9).

### *Analysis Indicators*

The evaluation criteria used in this analysis to measure impacts to elk and their habitats are total cover, satisfactory cover, habitat effectiveness index, and elk vulnerability. Open road density will be evaluated as a component of the habitat effectiveness index.

The big game habitat effectiveness model is used to predict the influence of forest management on elk and other big game species. The habitat effectiveness for elk is a relative index of the amount and arrangement of cover and forage areas; these factors measure the potential of a given area to achieve the maximum appropriate use of the area by the maximum number of animals (Thomas et al. 1979). The HEI value is a function of three habitat factors (variables):

1) Percent potential habitat effectiveness derived from the quality of cover in the analysis area (HEc);
2) Percent potential habitat effectiveness achieved in response to open roads (HEr), and
3) Percent potential habitat effectiveness in response to the suitability of size and spacing of cover and forage areas (HEs).

The HEI model is intended to be a relative measure of effectiveness, and does not consider many factors (such as weather, predation, disease, hunting, harvest, etc.) that would influence the actual number of elk found in an area.

### *Spatial and Temporal Bounding*

The Ten Cent analysis area is situated in the Desolation Big Game Management Unit (GMU). National Forest System lands (including lands on the Umatilla, Wallowa WhitmanWallowa-Whitman, and Malheur National Forests) comprise approximately 86 percent (370,000 acres) of the land in the Desolation Game Management Unit (429,000 acres). The analysis area is composed entirely of summer range; no winter range is present within the Granite watershed.

### *Affected Environment*

The Umatilla and Wallowa-Whitman Land and Resource Management Plans (Forest Plans) established standards and guidelines for elk habitat for many of the management areas on the Forests. The analysis area is composed of two management areas that have standards and/or desired conditions for elk habitat: C7 (Special Fish Management) and MA18 (Anadromous Fish Emphasis). The C7 and MA18 management areas can generally be characterized as being mid and higher elevation, gentle to steep topography, with generally heavy timber (except on ponderosa pine dominated slopes). Forested vegetation is largely dominated by a mix of conifer species, with the most common being grand fir, lodgepole pine, western larch, Engelmann spruce, subalpine fir, Douglas-fir, and ponderosa pine.

Table 3-32 compares the Forest Plan standards with the current condition of elk habitat in the Ten Cent analysis area.

**Table 3-32: Comparison of standards and existing conditions for Rocky Mountain elk habitat in the Ten Cent analysis area.**

| Management Area | Forest Plan Standards | | | HEI Analysis Area | Ten Cent Existing Condition | | |
|---|---|---|---|---|---|---|---|
| | HEI | Satisfactory Cover | Total Cover | | HEI | Satisfactory Cover (%) | Total Cover (%) |
| C7 | 45 | 10% (Minimum) | 30% | Umatilla C7 | 54 | 20.6 | 75.3 |
| | | | | Lake | 57 | 13.9 | 65.8 |
| | | | | Clear | 55 | 26.4 | 76.4 |
| | | | | Lower Granite | 53 | 19.2 | 79.7 |
| MA18 | No Standard | No Standard | No Standard | Wallowa-Whitman MA18 | 51 | 5.6 | 67.7 |
| | | | | Beaver | 54 | 6.2 | 59.2 |
| | | | | Bull Run | 49 | 4.5 | 74.7 |
| | | | | Upper Granite | 49 | 7.5 | 66.5 |

Dark-gray shaded fields indicate values currently below Forest Plan standards.

Currently, HEI, satisfactory cover, and total cover in the Lake, Clear, and Lower Granite subwatersheds and the larger C7 management area meet Umatilla LRMP standards. The Beaver, Bull Run, and Upper Granite subwatersheds and the larger MA18 management area are currently below the near-optimum level (HEI = 74) provided in the Planning Assumptions section for MA18.

### *Environmental Consequences*

#### Alternative 1 (No Action)

*Direct and Indirect Effects*

In the short term, elk habitat would remain unchanged. The amount of satisfactory and total cover and the HEI value in the C7 and MA18 management areas would remain the same in the short term. In the mid and long term, stands would continue to grow, recover from past disturbance, and develop a multistory structure, increasing the amount of total cover in these management areas to a small degree. In the mid and long term, HEI in the MA18 management area would likely increase as the cover-to-forage ratio increases, and the distribution of cover and forage across the management area changes.

An increase in cover and multi-layer condition would increase the risk of high-severity wildland fire. It is expected that a large scale, high severity fire would occur. High-severity burned patches would result in a reduction of total cover and satisfactory cover in the analysis area, and an increase in foraging habitat. If a fire of this type occurred in the C7 or MA18 management area, HEI may decrease due to an increased abundance of forage habitat and a reduction in cover. Elk populations would likely decrease (due to a redistribution of the population within their range, not direct impacts of a fire to individuals) soon after a disturbance such as this, but would then increase in response to forage stimulated by fire.

**All Action Alternative 2, 3, and 4**

*Direct Effects and Indirect Effects*

Commercial thinning activities would reduce canopy closure in affected stands and convert stands from a cover condition to foraging habitat. Table 3-33 shows post-treatment HEI and cover levels under Alternatives 2, 3, and 4. HEI, total cover, and satisfactory cover would continue to meet Forest Plan standards in the C7 Management Area under all of the action alternatives.

**Table 3-33: Post-harvest condition of Rocky Mountain elk habitat in the Ten Cent analysis area.**

| Management Area | HEI | % Satisfactory Cover | % Total Cover |
|---|---|---|---|
| **C7 – Special Fish Management** | | | |
| Forest Plan Standard | 45 | 10 | 30 |
| Existing Condition/No Action | 54 | 20.6 | 75.3 |
| Alternative 2 (Proposed Action) | 58 | 19.8 | 67.4 |
| Alternative 3 | 58 | 19.8 | 67.4 |
| Alternative 4 | 57 | 20.0 | 68.9 |
| **MA18 – Anadromous Fish Emphasis** | | | |
| Forest Plan Standard | None | No Standard | No Standard |
| Existing Condition/No Action | 51 | 5.6 | 67.7 |
| Alternative 2 (Proposed Action) | 53 | 5.2 | 61.4 |
| Alternative 3 | 53 | 5.2 | 61.4 |
| Alternative 4 | 53 | 5.2 | 62.6 |

Cover is evaluated as a component of HEI; however, evaluation of impacts to the availability and distribution of cover habitat across a planning area can be helpful in determining potential impacts to elk distribution. Please refer to the Affected Environment section and the Terrestrial Wildlife Specialist Report for a discussion of the Habitat Effectiveness Index model. Table 3-34 shows impacts to cover habitat under the action alternatives.

**Table 3-34: Mechanical vegetation treatment impacts to cover habitat by alternative**

| Management Area | Key Indicators | Alt. 1 | Alt. 2 | Alt. 3 | Alt. 4 |
|---|---|---|---|---|---|
| C7 | Satisfactory cover converted to forage (acres) | 0 | 385 | 385 | 256 |
| | Marginal cover converted to forage (acres) | 0 | 3,525 | 3,525 | 2,875 |
| MA18 | Satisfactory cover converted to forage (acres) | 0 | 192 | 192 | 169 |
| | Marginal cover converted to forage (acres) | 0 | 2,421 | 2,421 | 1,900 |

Commercial thinning (with skips) would reduce stand densities and increase sight distances in cover stands under all of the action alternatives. Under this analysis, commercial thinning will be assumed to convert cover stands to foraging habitat. A portion of commercially thinned stands would be retained in untreated skips. These skips would generally be small (0.5 acres up to several acres), although larger skips may be retained where vegetative conditions are appropriate. They would largely not provide effective cover, but would help in reducing sight distances in treated stands to some degree. Reduced stem densities, reduced small-diameter conifer patches (hiding cover), and reduced stand complexity resulting from commercial thinning would alter elk distribution in the project area in the short and mid-term. Elk would be less likely to linger in these stands because they would be more visible, especially where treated stands are adjacent to open roads. At the scale of the Desolation Big Game Management Unit,

population level impacts would not be measurable. Forage would be stimulated by thinning activities that open up closed canopy upland forest stands.

Small diameter thinning and mechanical fuels treatment would reduce small-diameter tree densities in treatment units. Sight distances would increase and hiding cover would decrease as a result of this activity. Vulnerability of elk would increase, especially where NCT units are adjacent to open roads. Several design criteria would be implemented to reduce visibility of big game in small diameter thinned stands, especially where adjacent to open roads (see EIS Chapter 2, Project Design Criteria). Removal of a portion of the small-diameter trees in these stands would stimulate grass and forb growth where overstory canopy closure allows, improving forage for elk.

It is not expected that landscape burning in dry upland forest stands would appreciably impact elk cover. Occasional single trees and groups of trees may be killed in these areas, but overall cover levels are not expected to be impacted. Immediate and delayed fire mortality in a portion of moist and cold upland forest stands experiencing moderate and high severity impacts would convert cover habitat to a forage condition. While cover habitat would be reduced to some extent, the quality and quantity of forage would improve in moderate and high severity burn patches in the short and mid-term. Elk distribution during high use periods such as hunting season would likely change following burning. While cover would be consumed, it is unlikely that HEI, total cover, or satisfactory cover levels would be reduced below Forest Plan minimum standards for the Umatilla National Forest. On the Wallowa-Whitman National Forest, it is not expected that landscape burning would impact cover to the degree that HEI would be reduced below existing levels (larger analysis area and subwatershed scale) in MA18; the analysis area would maintain or move toward desired conditions for elk habitat in this management area.

Use of the road system, particularly closed system roads, would increase road-related disturbance in the project area. Elk would likely avoid these roads during implementation in favor of areas with fewer disturbances. After implementation, these roads would be closed with the existing closure device (sign, gate, or barricade).

Temporary roads would be decommissioned to the greatest degree possible following implementation. In addition, existing temporary roads that are added back into the road system (all would be closed to motorized travel year-round) would be blocked, barricaded, and/or signed to reduce the risk of non-permitted use. Miles of temporary road, closed road, and haul routes would vary by alternative. Refer to individual alternative descriptions for specific details related to these activities.

#### Alternative 2

The effects of this alternative would be similar to those described under Common to All Action Alternatives. This alternative would commercially thin, small diameter thin, and mechanically treat fuels on the same number of acres as Alternative 3. When these effects are combined with the expected impacts of landscape burning in moist and cold upland forest stands, this alternative would have the greatest impact on elk, elk habitat, and the distribution of elk across the landscape. Cover patches would be less numerous across the landscape and would be smaller when compared to the existing condition. Reductions in cover and the increased availability of forage in the landscape burning area would likely impact the distribution of elk. Elk would likely be concentrated in and around areas with abundant forage in the late spring and summer. With the onset of fall hunting seasons (high disturbance period starting in late August), it is likely that elk would spend a greater proportion of their time in cover stands that remain, especially where

they are more distant from open roads and OHV trails. In some areas, elk may spend a greater proportion of time in less accessible areas such as wilderness and roadless areas.

This alternative would use the same amount of system and temporary roads to access proposed vegetative treatment units as Alternative 3. Approximately 107 miles of closed road, 104 miles of open road, and 5 miles of temporary road would be used under these alternatives. As a result, short term disturbance to elk in the vicinity of roads that are used would be the same as Alternative 3. Additional closed roads may also be utilized to implement landscape burning. Because this alternative would reopen the most miles of closed road and construct the most temporary road, it would have the greatest potential for non-permitted OHV use following treatment and the greatest potential disturbance to elk during implementation.

Alternative 2 would result in an increase in HEI in the MA18 and C7 management areas. HEI would move toward desired future conditions in the MA18 management area and increase further above standards in the C7 management area.

**Alternative 3**

The effects of this alternative would be similar to those described under Common to All Action Alternatives. This alternative would commercially thin, small diameter thin, and mechanically treat fuels on the same number of acres as Alternative 2. Under this alternative, commercial thinning would have greater impacts on overstory and understory stand structure because this alternative would thin these stands heavier than the other action alternatives. Landscape burning would have the least short and mid-term impact on cover acres due to the fact that the fewest acres of burning would occur under this alternative. Under this alternative, there would be more dense stands in moist and cold upland forest due to the fact that most burning in these PVGs would be dropped.

Alternative 3 would result in an increase in HEI in the MA18 and C7 management areas. HEI would move toward desired future conditions in the MA18 management area and increase further above standards in the C7 management area.

**Alternative 4**

The effects of this alternative would be similar to those described under Common to All Action Alternatives. This alternative would mechanically treat vegetation on the fewest acres when compared to the other action alternatives. This is due to the fact that connectivity habitat and some proposed units further from values at risk were dropped during alternative development to address the key issues raised during scoping. Under this alternative, fewer acres of existing cover would be converted to forage by vegetative treatment than under Alternatives 2 and 3. Conversely, this alternative would landscape burn moist and cold upland forest stands outside of the Wilderness; an intermediate level of cover habitat would be converted to forage under this alternative when compared to Alternatives 2 (which would burn in moist and cold upland forest and in Wilderness) and 3 (which would generally only burn dry upland forest outside of Wilderness). As a result, this alternative would have an intermediate impact on cover and HEI. Cover patches would be less numerous across the landscape and would be smaller when compared to the existing condition. Reductions in cover and the increased availability of forage in the landscape burning area would likely impact the distribution of elk. Elk would spend a greater proportion of their time in cover stands that remain, especially where they are more distant from open roads and OHV trails. Under this alternative, there would be more dense stands in moist and cold upland forest than Alternative 2 due to the fact that burning in Wilderness would be dropped.

This alternative would use slightly fewer miles of existing system and new temporary roads to access proposed vegetative treatment units when compared to Alternatives 2 and 3. Approximately 94 miles of closed road, 101 miles of open road, and 4 miles of temporary road would be used under this alternative. As a result, short term disturbance to elk in the vicinity of roads that are used would be the least under this alternative.

Alternative 4 would result in an increase in HEI in the MA18 and C7 management areas. HEI would move toward desired future conditions in the MA18 management area and increase further above standards in the C7 management area.

*Cumulative Effects*

There are currently no ongoing or reasonably foreseeable future activities, actions, and events that would affect elk and elk habitat in the analysis area.

When the expected effects of these alternatives are combined with the residual and expected effects of past, present, and future actions, activities, and events in the analysis area, there would be a cumulative reduction in elk cover habitat under all of the action alternatives. This would be the result of harvest impacts on stand structure and composition and landscape fire impacts, especially in moist and cold upland forest stands. This incremental reduction in cover would add to past reductions in the project area resulting from past timber harvest and wildfire. This cumulative reduction in cover habitat and increase in forage may alter elk distribution at the analysis area scale during the hunting and non-hunting seasons. Cumulatively, HEI would meet Forest Plan standards in the C7 management area and be maintained or move toward the desired future condition in the MA18 management area. Refer to individual alternative discussions for additional information.

**Alternative 2**

The cumulative effects of this alternative on elk and elk habitat would be similar to those described under Common to All Action Alternatives. When the expected effects of Alternative 2 are combined with the residual and expected effects of past, present, and future actions, activities, and events in the analysis area, there would be an incremental reduction in cover that would add to past reductions in the project area resulting from timber harvest and wildfire. Impacts to elk cover, elk vulnerability, and elk distribution in the short and early mid-term would be the greatest under this alternative. This alternative would also do the most to improve foraging conditions for elk in the short and mid-term; the availability of post-fire habitat has likely been reduced in the past due to past fire suppression. When combined, these impacts may result in shifts in elk distribution, especially during high use periods like hunting season.

**Alternative 3**

The cumulative effects of this alternative on elk and elk habitat would be similar to those described under Common to All Action Alternatives. When the expected effects of Alternative 3 are combined with the residual and expected effects of past, present, and future actions, activities, and events in the analysis area, there would be an incremental reduction in cover that would add to past reductions in the project area resulting from timber harvest and wildfire. Impacts to elk cover, elk vulnerability, and elk distribution in the short and early mid-term would be the least under this alternative. This alternative would do the least to reintroduce fire into the moist and cold upland forest PVG in the analysis area. As a result, this alternative would have the least improvement in elk forage in the short and mid-term. Impacts related to vegetative treatment may result in shifts in elk distribution, especially during high use periods like hunting season in commercially and small diameter thinned units.

**Alternative 4**

The cumulative effects of this alternative on elk and elk habitat would be similar to those described under Common to All Action Alternatives. When the expected effects of Alternative 4 are combined with the residual and expected effects of past, present, and future actions, activities, and events in the analysis area, there would be an incremental reduction in cover that would add to past reductions in the project area resulting from timber harvest and wildfire. Impacts to elk cover, elk vulnerability, and elk distribution in the short and early mid-term are expected to be intermediate between Alternatives 2 and 3. This alternative would reintroduce fire into the moist and cold upland forest PVG outside of wilderness, reversing past changes resulting from fire suppression. As a result, this alternative would have an intermediate level of improvement in elk forage in the short and mid-term. Impacts related to vegetative treatment may result in shifts in elk distribution, especially during high use periods like hunting season in commercially and small diameter thinned units; as this alternative would commercially thin fewer acres, this impact is expected to be less than that under Alternatives 2 and 3.

*Compliance with law, regulation, policy, and the Forest Plan*

As Forest Plan standards would be met in the C7 management area and treatment in the MA18 management area would move the analysis area toward the desired condition (an average HEI level of 74 for summer ranges, considered near-optimum in the Forest Plan), all of the action alternatives would be consistent with Forest Plan direction.

At the scale of the Umatilla and Wallowa-Whitman National Forests, cumulative impacts associated with implementation of Alternatives 2, 3, and 4 would not result in short or long term population reductions due to the size of the affected area. All action alternatives would contribute toward meeting the management objectives of the Oregon Department of Fish and Wildlife, which are well in excess of minimum viable populations. Hunting opportunities are also expected to be available at similar levels to those currently available in the Desolation Management Unit. The continued viability of elk is expected on the Umatilla and Wallowa-Whitman National Forests.

## Primary Cavity Excavators

### *Analysis Indicators*

Abundance and quality of snag habitat in the analysis area. The measure for comparison between alternatives is the number of acres proposed for mechanical treatment and prescribed burning. Primary cavity excavators (PCE) include bird species that create holes for nesting or roosting in live, dead, or decaying trees. The Primary Cavity Excavator group (not individual species of cavity excavating birds) was selected as MIS to be an indicator of dead/downed tree (snag) habitat on the Umatilla and Wallowa-Whitman National Forests. Specific threats to different primary cavity excavators, conservation status, population trends, the DecAID data and its use in this analysis, and stand (snag) modeling are located in the Terrestrial Wildlife Report.

### *Affected Environment*

The snag analysis area for the Ten Cent Project includes Forest Service land within the Granite Creek watershed for Decayed Wood Advisor (DecAID) Wildlife Habitat Types (WHTs): Eastside Mixed Conifer (EMC), Montane Mixed Conifer (MMC), and Lodgepole Pine (LP). For the Ponderosa Pine/Douglas-fir (PPDF) WHT, the analysis area includes all acres within the WHT in the Granite Creek and North Fork Burnt River watersheds. Analysis at the watershed (or larger) scale provides statistically valid estimates of snag densities. Snag densities in both size

categories, small (≥10 inch dbh) and large (≥20 inch dbh), largely resemble reference conditions in DecAID.

See the Terrestrial Wildlife Report for more information on cavity excavators, including threats to the species, conservation status, population trends, DecAID data and its use in this analysis and stand (snag) modeling.

### *Environmental Consequences*

See the terrestrial wildlife report for more information about the effect common to all action alternatives. For the purpose of this document key differences between the effects of each action alternative are summarized below.

#### Alternative 1 (No Action)

*Direct and Indirect Effects*

Within the next five years, dead standing trees (snags) would continue to occupy the project area at current densities and size classes, barring disturbance such as a large scale, high severity wildfire. Although snags would continue to be lost and created on the landscape in the short term, the existing snag density distribution in the Ten Cent Analysis Area (Figures W-10 through W-17) would not be expected to change in this short timeframe.

In the mid and long term (5 to 15+ years), existing snags would decay and fall to the ground, increasing downed wood in the analysis area. In the mid and long term, snag densities have the potential to increase in the analysis area through naturally occurring mortality and mortality caused by insect and disease outbreaks and wildfire. As previously managed stands grow, naturally occurring mortality would reduce the proportion of stands with zero to few snags at the analysis area scale. Mortality caused by insects and disease would be patchy, creating small to moderately sized “islands” with high densities of snags in the early stages of decay. These islands would provide habitat for primary cavity excavators (e.g., black-backed woodpecker, three-toed woodpeckers, and Lewis’ woodpecker) and other wildlife that require pulses of high-density snags. The risk of high-severity wildfire would also increase over time in the PPDF, EMC, MMC, and LP wildlife habitat types. Snag densities would initially increase due to immediate and delayed fire mortality; species that show an affinity for post-fire conditions (e.g., black-backed, three-toed, and hairy woodpeckers) would benefit in the short term following this type of event. Ultimately, snags resulting from this event would fall and snags would be relatively scarce until the regenerating stand becomes old enough to produce large trees, a time period ranging from 80 to 100 years.

#### Cumulative Effects

When the expected effects of the action alternatives are combined with the residual and expected effects of past, present, and reasonably foreseeable future actions in the analysis area, they would all contribute to past changes in snag density and distribution across the landscape. An incremental reduction in existing snags would occur in commercially thinned stands. At the stand scale, structural habitat (nesting, foraging, and roosting) for primary cavity excavating birds may be reduced slightly in the short and mid-term through hazard/danger tree felling and felling that may occur to complement the purpose and need for action in close proximity to values at risk. Snag recruitment would also be cumulatively impacted in proposed treatment units. Reduced recruitment would be most apparent in PPDF and drier EMC stands; this would reverse past increases in snag recruitment associated with fire suppression in these habitat types. The effects associated with landscape burning would have much greater impacts on these features and the wildlife species that depend on them than would commercial thinning. Mixed severity burning would create a mosaic of burned and green stands that would contribute toward the habitat needs

of a number of primary cavity excavating species adapted to both post-burn and forested environments. Should this area burn under a wildfire scenario during the height of fire season, burned forest-associated species would benefit, while species requiring overstory structure would be displaced in the long term while these stands recover. The availability of post-fire snag habitat is not expected to be cumulatively reduced due to the fact that high severity fire would not be eliminated on the landscape. Potential habitat for black-backed woodpecker, three-toed woodpecker, and other species that utilize burned forests would therefore be maintained at the analysis area and Forest scale.

It is likely that some primary cavity excavators adapted to higher snag densities in denser stands would be displaced by mechanical treatment and landscape burning. The snag density distribution for the PPDF, EMC, MMC, and LP are expected to change slightly. It is expected that there will be slight increases in the proportion of these habitat types in the lower and mid density groups through commercial thinning, and notable increases in the mid and high density groups through landscape burning. The analysis area would maintain a snag density distribution that resembles the DecAID reference condition; by doing so, habitat for the primary cavity excavator group will be maintained and will contribute towards the viability of this group at the Forest scale (Landres et al. 1999).

#### Alternative 2

*Direct and Indirect Effects*

This alternative would have the greatest impact on snags and those species that depend on this habitat feature due to the fact that it would commercially and small diameter thin and landscape burn the most acres when compared to the other action alternatives. This alternative would commercially thin, small diameter thin, and mechanically treat vegetation on the same number of acres as Alternative 3. Because it would burn the most acres, this alternative would have the most short and long term impact on the snag density distribution at the analysis area scale for the PPDF, EMC, MMC, and LP wildlife habitat types. Because this alternative would apply prescribed fire on the most acres, it would create the most area with a mosaic of post-fire structural and snag density conditions, which will provide habitat for a wide range of fire-associated and green forest-associated primary cavity excavators.

*Cumulative Effects*

The cumulative effects under this alternative would be similar to those described under *Common to All Action Alternatives*. This alternative would contribute slightly less to past reductions in snag habitat through commercial thinning than Alternative 3. Although treatment would occur on the same number of acres, treatment under Alternative 3 would be more intense, resulting in greater impacts to existing snags through hazard tree felling and a more pronounced long term reduction in snag recruitment. As this alternative would landscape burn the most acres, it would also have the greatest cumulative impact on snag dynamics at the stand and analysis area scale. It is expected that there will be slight increases in the proportion of the PPDF, EMC, MMC, and LP wildlife habitat types in the lower and mid snag density groups through commercial thinning, and notable increases in the mid and high snag density groups through landscape burning.

#### Alternative 3

*Direct and Indirect Effects*

This alternative would commercially and small diameter thin and landscape burn the fewest acres when compared to the other action alternatives. Although Alternative 3 would commercially thin, small diameter thin, and mechanically treat vegetation on the same number of acres as Alternative 2, thinning would be more intense (more material removed to meet the lowest end of basal area range). Impacts to existing snags (through hazard tree felling) and the

long term reduction in snag recruitment under this alternative would be greater than Alternative 2. Because it would burn the fewest acres, this alternative would have the least short and long term impact on the snag density distribution at the analysis area scale for the PPDF, EMC, MMC, and LP wildlife habitat types. Unburned acres (generally in the EMC, MMC, and LP wildlife habitat types) would be more susceptible to a large scale, high severity wildfire that would create relatively homogeneous early seral habitat over a large area. While immediate impacts to species that select for homogeneous, dense forested stands would be less, expected wildfire impacts in the long term would be greater than the other two action alternatives.

*Cumulative Effects*

This alternative would contribute the most to past reductions in snag habitat through commercial thinning because it would implement more intense treatment activities than the other action alternatives. As this alternative would landscape burn the fewest acres, it would also have the least cumulative impact on snag dynamics at the stand and analysis area scale in the short term. In the long term, this alternative would perpetuate past changes in snag dynamics that resulted (and continue to result) from fire suppression. Perpetuating this activity would result in homogeneous early seral habitat over a large geographic area (post-wildfire), potentially resulting in negative impacts to the availability of snags and distribution of some individual primary cavity excavators in the long term.

**Alternative 4**

*Direct and Indirect Effects*

This alternative would have an intermediate impact on snags and those species that depend on this habitat feature due to the fact that it would commercially and small diameter thin fewer acres than Alternatives 2 and 3 and landscape burn an intermediate number of acres when compared to the other action alternatives. Commercial thinning under Alternative 4 would have the least short, mid, and long term impacts to existing snags and snag recruitment when compared to the other action alternatives. This alternative would also require fewer miles of open, closed, and temporary roads to implement. As a result, the impacts of danger tree felling would be less under this alternative. This alternative would address crown fire concerns in EMC, MMC, and LP wildlife habitat types (moist and cold upland forest) that are not addressed under Alternative 3. Because it would burn fewer acres than Alternative 2, it would have slightly less short and long term impact on the snag density distribution at the analysis area scale for the PPDF, EMC, MMC, and LP wildlife habitat types. This alternative would create a mosaic of post-fire structural and snag density conditions that will provide habitat for a wide range of fire-associated and green forest-associated primary cavity excavators on non-wilderness lands. This alternative would provide a mix of mixed severity and high severity fire effects in the long term that would support a wide range of primary cavity excavating species.

*Cumulative Effects*

As this alternative would landscape burn an intermediate number of acres, it would also have an intermediate level of cumulative impact on snag dynamics at the stand and analysis area scale in the short term. It is expected that there will be slight increases in the proportion of the PPDF, EMC, MMC, and LP wildlife habitat types in the lower and mid snag density groups through commercial thinning. There would also be notable short and mid-term increases in the mid and high snag density groups through landscape burning under this alternative. In the long term, this alternative would implement actions (burning) that would begin to reverse past changes in snag dynamics that resulted (and continue to result) from fire suppression. This alternative would allow for mixed severity burning in the MMC, LP, and EMC wildlife habitat types, providing for a mosaic of forest and snag conditions.

## Pileated Woodpecker

The pileated woodpecker was selected as a MIS to be an indicator of dead and downed tree habitat in mature and old growth mixed conifer stands. It is assumed that if good habitat is provided for pileated woodpeckers and their population is maintained at some desired level, that adequate habitat is also being provided for other species that share similar habitat requirements.

### *Analysis Indicators*

Quantity and quality of pileated woodpecker source habitat. The measure for comparing alternatives is the number of acres of pileated woodpecker source habitat treated mechanically or with prescribed fire.

### *Affected Environment*

The distribution of snags in unharvested plots for the Eastside Mixed Conifer forest type in DecAID (Mellen-McLean et al. 2012) is used as a surrogate to represent the potential "historic" distribution of snags. This reference condition was compared with the current distribution of snags for the Eastside Mixed Conifer Forest type in the Ten Cent analysis area.

For more information on pileated woodpecker including threats to the species, conservation status, population trends, decayed wood advisor model, and stand modeling see the Terrestrial wildlife report.

### *Environmental Consequences*

See the terrestrial wildlife report for more information about the effect common to all action alternatives. For the purpose of this document key differences between the effects of each action alternative are summarized below.

#### Alternative 1 (No Action)

*Direct and Indirect Effects*

In the short term, pileated woodpecker source habitat would maintain its current quality and extent in the analysis area. In the mid and long term (5 to 15+ years), the structure and composition of pileated woodpecker habitat would change. In this time frame, multi-strata conditions in pileated woodpecker source habitat would continue to develop Young forest stands in an unsuitable condition for pileated woodpecker foraging or nesting would also develop multi-strata characteristics in the mid and long term, increasing the amount of source habitat in the analysis area and improving its distribution. The analysis area would become more susceptible to a large high severity wildfire at this time scale. This is due in part to the fact that the moist and cold upland forest PVGs would be expected to experience mixed and high fire severity events; however, fire suppression has, and would continue to force the analysis area on a trajectory characterized by larger, more intense fires than would have been expected historically. Widespread high-severity effects (high overstory mortality) would change the composition and structure of pileated woodpecker source habitat to an early successional stage with little or no tree cover and cause fragmentation of existing habitat. Pileated would be unlikely to use these habitats due to their structure and composition. This condition would last for as long as 80-100 years as stands reseeded themselves, and grew into a structural stage and size class that would provide snags large enough for nest cavities.

#### Alternative 2

*Direct and Indirect Effects*

This alternative would mechanically treat the same number of acres of pileated woodpecker source habitat as Alternative 3. In terms of impacts to the quality of pileated source habitat

within affected commercial thin units, Alternative 2 would have less impact due to the fact that target post-harvest stand densities (generally measured using basal area) would be higher than those prescribed in Alternative 3. As a result, it is expected that the time required to recover to a suitable source habitat condition would be less under Alternative 2 than it would be under Alternative 3. This alternative would landscape burn approximately 11,000 acres of pileated woodpecker source habitat, the most of all of the action alternatives. It is expected that a proportion of these acres would move from a suitable source habitat condition to an unsuitable condition following burning. As a result, this alternative is expected to have the greatest impact on pileated woodpecker and their habitat in the short, mid, and long term. Vegetative treatment would impact the suitability of approximately 2,100 acres of source habitat on the Umatilla National Forest and 800 acres of source habitat on the Wallowa-Whitman National Forest. This represents approximately 1% of the source habitat on the Umatilla National Forest and less than 1% of the source habitat available on the Wallowa-Whitman National Forest. Landscape burning would also occur on approximately 4% and 1% of the pileated woodpecker source habitat on the Umatilla and Wallowa-Whitman National Forests, respectively. It is likely that overall use of the analysis area would be reduced due to this reduction in the quantity, size, and distribution of pileated woodpecker source habitat.

As Alternatives 2 and 3 would mechanically treat vegetation on the same number of acres, these alternatives would also require the most miles of open, closed, seasonal, and new temporary roads when compared to Alternative 4. As a result, the impacts to existing snags adjacent to roads would be greatest under these alternatives.

*Cumulative Effects*

When the expected effects of this alternative are combined with the residual and expected effects of past, present, and future actions, activities, and events in the analysis area, there would be incremental reduction in the quantity, quality, and patch size of source habitat. It is likely that pileated woodpecker may use the Ten Cent Project area less after harvest and landscape burning due to impacts to the quality and quantity of source habitat, the landscape distribution of these habitats, and short and long term direct and indirect impacts to standing dead wood. This alternative would have the greatest cumulative impact on this species when compared to the other action alternatives.

**Alternative 3**

*Direct and Indirect Effects*

This alternative would mechanically treat the same number of acres of pileated woodpecker source habitat as Alternative 2. In terms of impacts to the quality of pileated source habitat within affected commercial thin units, Alternative 3 would have a greater impact due to the fact that target post-harvest stand densities (generally measured using basal area) would be lower than those prescribed in Alternative 2. Alternative 3 would thin to the lowest portion of the range to maximize economic benefits of the treatment activities. As a result, it is expected that the time required to recover to a suitable source habitat condition would be greater under Alternative 3 than it would be under Alternative 2. It is also expected that Alternative 3 would have a greater impact on long term snag and downed wood recruitment due to the fact that stand densities would be lower (potentially lower density dependent mortality); there would be fewer trees available for recruitment as snags. Under this alternative, vegetative treatment would impact the suitability of approximately 2,100 acres of source habitat on the Umatilla National Forest and 800 acres of source habitat on the Wallowa-Whitman National Forest. This represents approximately 1% of the source habitat on the Umatilla National Forest and less than 1% of the source habitat available on the Wallowa-Whitman National Forest. This alternative would

landscape burn approximately 2,200 acres of pileated woodpecker source habitat, the least of all of the action alternatives. This represents less than 1% of the pileated woodpecker source habitat on the Umatilla and Wallowa-Whitman National Forests. As a result, this alternative is expected to have the least impact on pileated woodpecker and their habitat in the short, mid, and long term. It is likely that overall use of the analysis area would be reduced slightly due to this reduction in the quantity, size, and distribution of pileated woodpecker source habitat.

*Cumulative Effects*

Alternative 3 would contribute to past reductions in pileated woodpecker habitat (quantity, quality, and distribution across the landscape) by converting source habitat to an unsuitable condition. Alternative 3 would have less cumulative impact on pileated woodpecker source habitat than would Alternative 2, largely due to a reduction in landscape burning in moist and cold upland forest. It is likely that pileated woodpecker may use the Ten Cent Project area less after harvest and landscape burning due to impacts to the quality and quantity of source habitat, the landscape distribution of these habitats, and short and long term direct and indirect impacts to standing dead wood. This alternative would have the least cumulative impact on this species when compared to the other action alternatives.

**Alternative 4**

*Direct and Indirect Effects*

This alternative would mechanically treat fewer acres than Alternatives 2 and 3. Under this alternative, vegetative treatment would impact the suitability of approximately 1,900 acres of source habitat on the Umatilla National Forest and 550 acres of source habitat on the Wallowa-Whitman National Forest. This represents approximately 1% of the source habitat on the Umatilla National Forest and less than 1% of the source habitat available on the Wallowa-Whitman National Forest. This alternative would landscape burn approximately 6,400 acres of pileated woodpecker source habitat, which lies between Alternatives 2 and 3. This represents approximately 2% of the source habitat on the Umatilla National Forest and less than 1% of the source habitat on the Wallowa-Whitman National Forest. As a result, this alternative is expected to have a greater impact that Alternative 3, but less impact than Alternative 2, with respect to landscape burning. It is likely that overall use of the analysis area would be reduced slightly due to this reduction in the quantity, size, and distribution of pileated woodpecker source habitat.

*Cumulative Effects*

Alternative 4 would contribute to past reductions in pileated woodpecker habitat (quantity, quality, and distribution across the landscape) by converting source habitat to an unsuitable condition. Alternative 4 would have less cumulative impact on pileated woodpecker source habitat than would Alternative 2, due to a reduction in landscape burning in moist and cold upland forest and a reduction in commercial thinning in source habitat. It is likely that pileated woodpecker may use the Ten Cent Project area less after harvest and landscape burning due to impacts to the quality and quantity of source habitat, the landscape distribution of these habitats, and short and long term direct and indirect impacts to standing dead wood.

*Forest Plan Consistency*

Under all action alternatives the size and distribution of C1 and MA15 old growth habitat would provide for the survival and reproduction of the pileated woodpecker, and meet Forest Plan direction and guidance. These management areas would contribute to the viability of this species at the Forest (Umatilla and Wallowa-Whitman) scale. Dead wood habitat would be maintained at levels that meet or exceed Forest Plan minimums and desired levels. The snag density distribution would be expected to be similar to that expected under the reference condition

provided by DecAID. For these reasons, the Ten Cent Project would be consistent with the Umatilla and Wallowa-Whitman Forest Plans as they relate to pileated woodpecker management; the continued viability of the pileated woodpecker is expected on the Umatilla and Wallowa-Whitman National Forests.

## American Marten

The American marten was selected as a MIS to be an indicator of mature and old growth stands at high elevations. It is assumed that if good habitat is provided for American marten and their population is maintained at some desired level, that adequate habitat is also being provided for other species that share similar habitat requirements (USDA 1990, page 2-9).

### *Analysis Indicators*

Quantity and quality of marten source habitat. The measure for comparing alternatives is the number of acres of marten source habitat proposed for mechanical treatment or prescribed burning.

### *Environmental Consequences*

See the terrestrial wildlife report for more information about the effect common to all action alternatives. For the purpose of this document key differences between the effects of each action alternative are summarized below.

#### Alternative 1 (No Action)

*Direct and Indirect Effects*

In the short term (0 to 5 years), there would be no change in the quality or distribution of marten source habitat in the analysis area. In the mid (5 to 15 years) and long term (15+ years), the quality and distribution of marten habitat would likely change. In this time frame, old forest and young forest stands in the moist and cold upland forest PVGs would continue to develop multiple canopy layers and greater canopy density. Mortality resulting from insects and disease in stressed stands would increase snag and downed wood densities, improving the condition of foraging habitat for the marten. High fuel loading would increase the risk of high severity wildfire in these stands. High severity fire in moist and cold upland forest stands would cause heavy overstory mortality and consume downed wood used for denning and foraging. It would take upwards of 80-100 years for mixed conifer stands to develop a composition and structure that would provide marten source habitat after high severity wildfire.

#### Alternative 2

*Direct and Indirect Effects*

This alternative would mechanically treat the same number of acres of marten source habitat as Alternative 3. It is expected that the time required to recover to a suitable source habitat condition would be less under Alternative 2 than it would be under Alternative 3. It is also expected that Alternative 2 would have less impact on long term dead wood recruitment due to the fact that stand densities would be higher, providing for potentially higher density dependent mortality. Mechanical vegetative treatment would impact the suitability of approximately 3,400 acres of source habitat on the Umatilla National Forest and 1,700 acres of source habitat on the Wallowa-Whitman National Forest. This represents approximately 3% of the source habitat on the Umatilla National Forest and 1% of the source habitat available on the Wallowa-Whitman National Forest. This alternative would landscape burn almost 18,000 acres of marten source habitat, the most of all of the action alternatives. It is expected that a proportion of these acres would move from a suitable source habitat condition to an unsuitable condition following burning. As a result, this alternative is expected to have the greatest impact on marten and their

habitat in the short, mid, and long term. It is likely that overall use of the analysis area would be reduced due to this reduction in the quantity, size, and distribution of source habitat.

*Cumulative Effects*

When the expected effects of this alternative are combined with the residual and expected effects of past, present, and future actions, activities, and events in the analysis area, there would be incremental reduction in the quantity, quality, and patch size of source habitat. It is likely that marten may use the Ten Cent Project area less after harvest and landscape burning due to impacts to the quality and quantity of source habitat, the landscape distribution of these habitats, and short and long term direct and indirect impacts to dead wood. This alternative would have the greatest cumulative impact on this species when compared to the other action alternatives.

**Alternative 3**

*Direct and Indirect Effects*

This alternative would mechanically treat the same number of acres of source habitat as Alternative 2. In terms of impacts to the quality of source habitat within affected commercial thin units, Alternative 3 would have a greater impact due to the fact that target post-harvest stand densities (generally measured using basal area) would be lower than those prescribed in Alternative 2. As a result, it is expected that the time required to recover to a suitable source habitat condition would be greater under Alternative 3 than it would be under Alternative 2. This alternative would also landscape burn approximately 3,200 acres of marten source habitat, the least of all of the action alternatives. As a result, this alternative is expected to have the least impact on marten and their habitat in the short, mid, and long term. It is likely that overall use of the analysis area would be reduced slightly due to this reduction in the quantity, size, and distribution of source habitat.

*Cumulative Effects*

Alternative 3 would contribute to past reductions in marten source habitat (quantity, quality, and distribution across the landscape) by converting source habitat to an unsuitable condition. Alternative 3 would have less cumulative impact on source habitat than would Alternative 2, due to a reduction in landscape burning in moist and cold upland forest. It is likely that marten may use the Ten Cent Project area less after harvest and landscape burning due to impacts to the quality and quantity of source habitat, the landscape distribution of these habitats, and short and long term direct and indirect impacts to dead wood. This alternative would have the least cumulative impact on this species when compared to the other action alternatives.

**Alternative 4**

*Direct and Indirect Effects*

This alternative would mechanically treat the fewest acres of marten source habitat when compared to the other action alternatives. For this reason, it is expected that this alternative would have the least impact on marten and their habitat with regard to mechanical treatment. Vegetative treatment would impact the suitability of approximately 2,600 acres of source habitat on the Umatilla National Forest and 1,400 acres of source habitat on the Wallowa-Whitman National Forest. This represents approximately 2% of the source habitat on the Umatilla National Forest and 1% of the source habitat available on the Wallowa-Whitman National Forest. This alternative would landscape burn approximately 10,300 acres of marten source habitat, an intermediate level when compared to Alternatives 2 and 3. As a result, this alternative is expected to have a greater impact that Alternative 3, but less impact than Alternative 2, with respect to landscape burning. It is likely that overall use of the analysis area would be reduced slightly due to this reduction in the quantity, size, and distribution of marten source habitat.

#### *Cumulative Effects*

Alternative 4 would contribute to past reductions in marten source habitat (quantity, quality, and distribution across the landscape) by converting source habitat to an unsuitable condition. Alternative 4 would have less cumulative impact on marten source habitat than would Alternative 2, due to a reduction in landscape burning in moist and cold upland forest and a reduction in commercial thinning in source habitat. It is likely that marten may use the Ten Cent project area less after harvest and landscape burning due to impacts to the quality and quantity of source habitat, the landscape distribution of these habitats, and short and long term direct and indirect impacts to dead wood.

#### **Forest Plan Consistency**

The Ten Cent Community Wildfire Protection Project is expected to result in a small negative habitat trend at the scale of the Umatilla National Forest and the Wallowa-Whitman National Forest. While use of the area may change in response to vegetative treatment and landscape burning, it is not expected that any of the action alternative would result in short or long term population reductions at the scale of either Forest. For these reasons, the Ten Cent Project would be consistent with the Umatilla and Wallowa-Whitman Forest Plans as they relate to marten management; the continued viability of the marten is expected on the Umatilla and Wallowa-Whitman National Forests under this alternative.

### American Three-Toed Woodpecker

The American three-toed woodpecker (Picoides dorsalis) (formerly known as the northern three-toed woodpecker) was selected as a management indicator species on the Umatilla National Forest to represent dead and down tree habitat in mature and old growth lodgepole pine stands (Table 3-31).

#### *Analysis Indicators*

Analysis indicators are quantity and quality of three-toed woodpecker source habitat. The measure for analyzing alternatives is the number of acres of source habitat proposed for mechanical treatment or prescribed fire.

#### *Affected Environment*

Within the Ten Cent analysis area, there are currently 35,377 acres of three-toed woodpecker source habitat, which is approximately 21% of the source habitat available at the Forest scale. This habitat would support approximately 70 nesting pairs of three-toed woodpecker. Habitat within the Ten Cent analysis area is located in a large block of capable three-toed woodpecker habitat, based on elevation and vegetation characteristics in the area. Recent large fires have created suitable post-fire habitat for this species. There have been two incidental observations of this species in the Ten Cent analysis area. Three-toed woodpecker distribution can be patchy and may change frequently as they follow the path of high-severity fires and insect outbreaks, making it very difficult to determine population trends.

#### *Environmental Consequences*

See the terrestrial wildlife report for more information about the effect common to all action alternatives. For the purpose of this document key differences between the effects of each action alternative are summarized below.

**Alternative 1 (No Action)**

*Direct and Indirect Effects*

In the short term (0 to 5 years), there would be no change in the quality or distribution of three-toed woodpecker source habitat. In the mid (5 to 15 years) and long term (15+ years), the quality and distribution of habitat would likely change. In this time frame, stands in the MMC, LP, and EMC wildlife habitat types would continue to develop multiple canopy layers and greater canopy density. Mortality resulting from insects and disease in stressed stands would increase snag and downed wood densities, improving the condition of foraging and nesting habitat for the three-toed woodpecker. High fuel loading would increase the risk of high severity wildfire in these moist and cold upland forest stands. Habitat created by high severity fire would improve the local and landscape distribution of source habitat for this fire-dependent species.

**Alternative 2**

*Direct and Indirect Effects*

This alternative would mechanically treat the same number of acres of three-toed source habitat as Alternative 3. In terms of impacts to the quality of source habitat within affected commercial thin units, Alternative 2 would have less impact due to the fact that target post-harvest stand densities (generally measured using basal area) would be higher than those prescribed in Alternative 3. Higher retention densities and untreated skips would provide patches where preferred forage (bark beetles) may be available. This alternative would landscape burn almost 14,000 acres of three-toed woodpecker source habitat, the most of all of the action alternatives. While patches of green source habitat (up to 10 cares) may experience high mortality, the resulting burned forest stands (immediate and delayed mortality) would provide excellent habitat for this species for five to ten years post-harvest. As landscape burns would be implemented over a number of years, excellent post fire habitat would be available in the mid-term. Mechanical commercial thinning has the potential to impact up to about 3,100 acres of source habitat under this alternative; despite retention of untreated skips, these acres would generally be considered unsuitable for the three-toed woodpecker after treatment. This represents approximately 2% of the source habitat on the Umatilla National Forest. Use of commercially harvested stands would likely decrease; however, burned areas would receive heavy use in the years following ignition. The approximation of acres of source habitat that would be converted to an unsuitable condition is likely high (skewed above what would likely occur) due to the fact that not all of the acres that have a commercial thin designation in the prescription (CT/NCT, FW/NCT/CT, FW/NCT, and Roadside/FW/NCT/CT) would have commercially-sized trees removed.

*Cumulative Effects*

When the expected effects of this alternative are combined with the residual and expected effects of past, present, and future actions, activities, and events in the analysis area, there would be an incremental reduction in the green source habitat through commercial harvest; however, landscape burning would create high quality burned forest (intermingled with stands that are unburned or experienced low severity impacts) for this species to a greater degree than the other two action alternatives. Mixed severity burning implemented over a number of years would provide for high quality habitat through time. This alternative would have the greatest cumulative reduction in green source habitat and the greatest improvement in burned (mixed severity) source habitat when compared to the other action alternatives.

**Alternative 3**

*Direct and Indirect Effects*

This alternative would mechanically treat the same number of acres of source habitat as Alternative 2. In terms of impacts to the quality of source habitat within affected commercial

thin units, Alternative 3 would have a greater impact due to the fact that target post-harvest stand densities (generally measured using basal area) would be lower than those prescribed in Alternative 2. It is also expected that Alternative 3 would have a greater impact on long term snag and downed wood recruitment due to the fact that stand densities would be lower (potentially lower density dependent mortality). This alternative would landscape burn approximately 2,300 acres of source habitat, the least of all of the action alternatives. As a result, this alternative is expected to have the greatest impact on green source habitat availability, and the least increase in the availability of mixed and high severity burned patches that this species depends on.

*Cumulative Effects*

Alternative 3 would have a greater cumulative impact on source habitat than would Alternative 2 due to the fact that source habitat would be thinned heavier and there would be less landscape burning that would improve three-toed woodpecker source habitat availability in the short and mid-term. By reducing the number of acres of landscape burning that would result in a mosaic of green and burned source habitat, more acres would be susceptible to large scale, high severity wildfire. After 5 to 10 years, a large high severity fire would no longer provide suitable habitat for this species.

#### Alternative 4

*Direct and Indirect Effects*

This alternative would commercially thin the fewest acres of source habitat (2,363 acres) when compared to the other action alternatives. As a result, it would also have the least impact on the availability and distribution of green source habitat for the three-toed woodpecker. This accounts for approximately one percent of the source habitat on the Umatilla National Forest. This figure is considered high given the fact that not all of the acres that have a commercial thin designation in the prescription (CT/NCT, FW/NCT/CT, FW/NCT, and Roadside/FW/NCT/CT) would have commercially-sized trees removed; in many cases, treatment would primarily impact understory vegetation and a small proportion of overstory trees. This alternative would landscape burn approximately 6,500 acres of source habitat. This is intermediate between Alternatives 2 and 3. Because these acres would burn at a time and under a set pre-determined parameters for weather and fuel conditions, a mixed severity fire would be the result. Suitable green source habitat would be intermingled with stands experiencing intermediate and high levels of tree mortality, creating ideal conditions for this species in the short and mid-term.

*Cumulative Effects*

Alternative 4 would have less cumulative impact on green source habitat than would Alternatives 2 and 3 due to the fact that fewer acres of green source habitat may be commercially thinned. This alternative would also burn more acres than Alternative 3. As a result, mixed severity fire would create more burned source habitat for this species (while maintaining patches of green source habitat within the larger burned matrix) than Alternative 3. This activity would improve three-toed woodpecker source habitat availability in the short and mid-term. This alternative would reduce the number of acres that would be susceptible to large scale, high severity wildfire. These acres are generally suitable for a short period of time; mixed severity burning under this alternative would provide for burned and green source habitat in the short, mid, and long term.

### Forest Plan Consistency

The Ten Cent Community Wildfire Protection Project is expected to result in a small negative habitat trend at the scale of the Umatilla National Forest and the Wallowa-Whitman National Forest. It is expected that these impacts would be insignificant at the scale of the Umatilla National Forest. None of the proposed action alternatives are expected to result in short or long

term population reductions at the Forest scale. The Ten Cent Project would be consistent with the Forest Plan as it relates to habitat management of the three-toed woodpecker; the continued viability of the three-toed woodpecker is expected on the Umatilla National Forest .

## Northern Goshawk

The northern goshawk was selected as a MIS for the Wallowa-Whitman National Forest to be an indicator of old growth and mature forest habitat. It is assumed that if appropriate habitat is provided for the northern goshawk and their population is maintained at some desired level, that adequate habitat is also being provided for other species that share similar habitat requirements. The Land and Resource Management Plan for the Wallowa-Whitman National Forest established Old Growth stands (MA15) to provide habitat for the northern goshawk and other old growth associated species. Source habitats for goshawk are old forest and unmanaged young forests in montane, lower montane, and riparian woodland communities. Important habitat attributes of goshawk prey species include snags, downed logs, woody debris, large trees, openings, herbaceous and shrubby understories and an intermixture of various forest structural stages (Wisdom et al. 2000).

### *Analysis Indicators*

Quantity and quality of northern goshawk source habitat. The measure for comparing alternatives is the number of acres of goshawk source habitat treated mechanically or with prescribed fire.

### *Environmental Consequences*

See the terrestrial wildlife report for more information about the effect common to all action alternatives. For the purpose of this document key differences between the effects of each action alternative are summarized below.

#### Alternative 1 (No Action)

*Direct and Indirect Effects*

The quantity, quality, and distribution of source habitat would remain unchanged in the short term. In the mid and long term, stands would continue to grow and develop multiple dense canopy layers. Young stands would develop large trees over time. Openings created by past harvest and wildfire would fill in over time. The availability of source habitat would increase slightly in the long term due to a greater abundance of large trees and dense multi-layered habitat. Also in the long term, dense, multi-layered stand conditions would increase the susceptibility of stands to insects, wildfire, and disease outbreaks. It is expected that a high severity fire would convert suitable source habitat to an unsuitable condition over a large portion of the analysis area. As many as 80 to 100 years would be required for stands regenerating aft er a fire of this severity and extent to reach a structural condition suitable for nesting.

#### Alternative 2

*Direct and Indirect Effects*

This alternative would commercially harvest the same number of acres of source habitat as Alternative 3. In terms of impacts to the quality of goshawk source habitat within affected commercial thin units, Alternative 2 would have less impact due to the fact that target post-harvest stand densities (generally measured using basal area) would be higher than those prescribed in Alternative 3. This alternative would commercially treat vegetation and landscape burn approximately 1,200 and 2,200 acres of goshawk source habitat, respectively. Commercially treated source habitat would be converted to an unsuitable condition. These affected acres represent less than one percent of the source habitat available on the Wallowa-

Whitman National Forest. It is expected that a proportion of burned source habitat acres would move from a suitable source habitat condition to an unsuitable condition following burning. As a result, this alternative is expected to have the greatest impact on the northern goshawk and source habitat in the short, mid, and long term. While use of individual stands is likely to be reduced in the short and mid-term, it is unlikely that overall use of the analysis area would be reduced due to the intensity and extent of impacts.

*Cumulative Effects*

The cumulative impacts of this alternative would be similar to those described under the *Common to All Action Alternatives* section. This alternative would result in the greatest incremental reduction in source habitat when combined with the residual effects of past activities. This alternative would commercially thin and landscape burn the most acres of source habitat when compared to Alternatives 3 and 4. This alternative would have the greatest cumulative impact on this species when compared to the other action alternatives.

**Alternative 3**

*Direct and Indirect Effects*

This alternative would commercially harvest the same number of acres of source habitat as Alternative 2, therefore vegetative treatment would result in the same reduction in source habitat as would occur under Alternative 2. Because Alternative 3 would thin to the low end of the prescribed range, it is expected that the time required to recover to a suitable source habitat condition would be greater than it would be under Alternative 2. This alternative would landscape burn approximately 1,100 acres of goshawk source habitat, the least of all of the action alternatives. As a result, this alternative is expected to have the least impact on the northern goshawk and source habitat in the short, mid, and long term. While use of individual stands is likely to be reduced in the short and mid-term, it is unlikely that overall use of the analysis area would be reduced due to intensity and extent of impacts.

*Cumulative Effects*

The cumulative impacts of this alternative would be similar to those described under the *Common to All Action Alternatives* section. This alternative would result in the least incremental reduction in source habitat when combined with the residual effects of past activities.

**Alternative 4**

*Direct and Indirect Effects*

This alternative would commercially harvest approximately 800 acres of source habitat, the fewest when compared to the other action alternatives. This represents less than one percent of the source habitat on the Wallowa-Whitman National Forest. This alternative would also landscape burn approximately 2,200 acres of goshawk source habitat, which is the same amount that would be affected by Alternative 2. As a result, impacts on goshawk would lie between those described for Alternatives 2 and 3. While use of individual stands is likely to be reduced in the short and mid-term, it is unlikely that overall use of the analysis area would be reduced due to intensity and extent of impacts.

*Cumulative Effects*

The cumulative impacts of this alternative would be similar to those described under the *Common to All Action Alternatives* section. This alternative would result in an intermediate level of cumulative impacts to source habitat when combined with the residual effects of past activities.

### Forest Plan Consistency

Under this alternative, this project is expected to result in a small negative habitat trend at the scale of the Wallowa-Whitman National Forest.. Overall, it is expected that these impacts would be insignificant at the scale of the Wallowa-Whitman National Forest. While use of the area may change in response to vegetative treatment and landscape burning, it is not expected that any of the action alternatives would result in short or long term population reductions at the scale of the Forest. For these reasons, the Ten Cent Project would be consistent with the Wallowa-Whitman Forest Plan for goshawk management; the continued viability of the northern goshawk is expected on the Wallowa-Whitman National Forest.

## Threatened, Endangered, Proposed, Candidate, Sensitive Species

Federally listed and sensitive species with a potential to occur on the Umatilla and Wallowa-Whitman National Forests are found in Table 3-35. This determination is based on observation records, vegetative and wildlife species inventory and monitoring, published literature on the distribution and habitat utilization of wildlife species, information provided by the US Fish and Wildlife Service, and the experience and professional judgment of wildlife biologists on the Umatilla National Forest.

**Table 3-35: Federally ESA listed and Region 6 Sensitive Species with a potential to occur on the Umatilla and Wallowa-Whitman National Forest.**

| Species Common Name | Status[2] | Occurrence[1] | | | Fully Analyzed in this BE |
|---|---|---|---|---|---|
| | | Umatilla National Forest | Wallowa-Whitman National Forest | Ten Cent Analysis Area | |
| American peregrine falcon | SEN | S | D | H | X |
| North American wolverine | SEN | S | D | H | X |
| Canada lynx | THR | S | S | N | |
| Columbia spotted frog | SEN | D | D | K | X |
| Gray wolf | SEN | D | D | H | X |
| Rocky Mountain tailed frog | SEN | D | D | H | X |
| Lewis' woodpecker | SEN | D | D | K | X |
| Bald eagle | SEN | D | D | N | |
| Townsend's big-eared bat | SEN | D | D | K | X |
| Upland sandpiper | SEN | S | D | N | |
| White-headed woodpecker | SEN | D | D | H | X |
| Fir pinwheel | SEN | D | D | H | X |
| Johnson's hairstreak | SEN | D | D | H | X |
| Intermountain sulphur | SEN | S | D | H | X |
| Fringed myotis | SEN | D | D | H | X |
| Western bumblebee | SEN | D | D | H | X |
| Bufflehead | SEN | | D | N | |
| Greater sage-grouse | SEN | | D | N | |
| Black swift | SEN | | D | N | |
| Harlequin duck | SEN | | D | N | |
| Black rosy-finch | SEN | | S | N | |
| Wallowa rosy-finch | SEN | | D | N | |
| Columbian sharp-tailed grouse | SEN | | D | N | |
| Silver-bordered fritillary | SEN | | D | N | |
| Yuma skipper | SEN | | D | H | X |
| Spotted bat | SEN | | S | H | X |

[1] S = Suspected, likely to occur based on habitat availability to support breeding pairs/groups within Forest boundary; D = Documented, reliable, recorded observation within the Forest boundary; K = Species known to occur within or near project area; H = Habitat present in project area; N = Habitat not present in project area. [2] SEN = Sensitive species in USDA Forest Service Region 6; THR = ESA listed as Threatened; END = ESA listed as Endangered; CAN = Candidate for listing under the ESA.

The following species are either known to occur in the project area, are suspected to occur in the project area, or suitable habitat is present in the project areas: American peregrine falcon, North American wolverine, Columbia spotted frog, gray wolf, Rocky Mountain tailed frog, Lewis' woodpecker, Townsend's big-eared bat, white-headed woodpecker, fir pinwheel, Johnson's hairstreak, intermountain sulphur, fringed myotis, western bumblebee, yuma skipper, spotted bat. The other species listed in the Table 3-35 would not be affected by the proposed activities because they are not known or suspected to occur in the project area or suitable habitat is not present in the project area. As a result, there would be no impact on these TES species and invertebrate species and they will not be analyzed in detail. These species include: Canada lynx, upland sandpiper, bald eagle, bufflehead, greater sage grouse, Columbian sharp-tailled grouse, black swift, harlequin duck, black rosy-finch, silver-bordered fritillary.

## Species Analyzed in Detail

### Peregrine Falcon

#### *Analysis Indicators*

Quality of nesting and foraging habitat. The measure for comparing alternatives is the number of acres of treatment with a potential to impact nesting and foraging sites.

#### *Affected Environment*

Suitable habitat for the peregrine falcon includes various open habitats from open grasslands to forested stands in association with suitable nesting cliffs (NatureServe 2016, Marshall et al. 2003). The falcon often nests on ledges or holes on the face of rocky cliffs or crags. Ideal locations include undisturbed areas near water with a wide view and close to plentiful prey. Foraging habitats of woodlands, open grasslands, and bodies of water are generally associated with the nesting territory. Threats include loss of wetland habitat of primary prey, poachers robbing nests, shooting by hunters, and food chain contamination from use of persistent pesticides (NatureServe 2016). A single unconfirmed observation of this species has been recorded in the analysis area in the vicinity of Vinegar Hill. Suitable cliff nesting habitat is present in the southwestern portion of the Ten Cent analysis area. Aerial surveys of potential nest sites were completed on the District in the 1990s. No peregrine falcon eyries were observed. It is unknown if this species currently occurs in the analysis area.

#### *Environmental Consequences*

**Alternative 1 (No Action)**

*Direct and Indirect Effects*

Under this alternative there would be no impacts to potential habitat in the analysis area. Potential breeding cliffs in the Vinegar Hill scenic area and North Fork John Day Wilderness Area would not be affected in the short or long term. Potential foraging habitat in the vicinity would not be affected in the short term. In the long term, the structure and composition of potential foraging habitat may change through a combination of stand succession, wildfire, and other factors. As the peregrine falcon is a habitat generalist, these changes would not impact this species, if present.

**Common to All Action Alternatives (2, 3, and 4)**

*Direct and Indirect Effects*

Under all of the action alternatives, there would be no direct impacts on this species. There would also be no impact on potential nesting cliffs lying in the southwestern portion of the analysis area. There would be no treatment in the vicinity of these cliffs; the nearest treatment units lie 3 miles away. Commercial thinning, small diameter thinning, and burning are not

considered a threat to this species (NatureServe 2016). As this species is a habitat generalist that utilizes a wide range of habitats, proposed treatment activities would maintain the suitability of potential peregrine falcon foraging habitat. Potential food sources (a wide variety of birds are considered prey) would continue to be available within the affected area.

#### *Cumulative Effects*

As there would be no direct or indirect impacts on this species or the suitability of potential habitat in the analysis area, there would also be no cumulative impacts on this species when the impacts of the proposed alternatives are combined with those of past, present, ongoing, and reasonably foreseeable future activities in the analysis area.

#### *Determination and Rationale (All Action Alternatives)*

Alternatives 2, 3, and 4 would have no impact on the peregrine falcon. The rationale for this determination is as follows:

- It is unknown whether this species currently occupies the analysis area.
- Proposed activities would not occur in the vicinity of potential nesting cliffs in the Vinegar Hill area.
- Vegetative treatment and burning would not affect the suitability of potential foraging habitat in the southwest portion of the analysis area (near the town of Greenhorn). This species is a habitat generalist.
- Prey would continue to be abundant in the analysis area. Vegetative treatment and burning would provide for a mosaic of stand conditions and structures that would support potential prey.

### BATS

#### *Analysis Indicators*

Quantity and quality of bat habitat. The measure for comparing alternatives is the number of acres of mechanical treatment and prescribed burning with a potential to impact roost sites.

#### *Affected Environment*

The **Townsend's big-eared bat** is widely distributed throughout the western half of the United States. This species primarily uses caves and abandoned mines for day roosting and hibernating (Verts and Carraway 1998). It has also been noted as using buildings for roosting. Research indicates that this species is sensitive to disturbance at roost sites and may abandon roost sites if disturbed. The Townsend's big-eared bat is known to occur on the North Fork John Day Ranger District. Several individuals were observed within the Granite watershed on private property adjacent to the Forest in the vicinity of the Red Boy Mine. There have been no formal surveys for this species on the District. Potential roost habitat is present in the Ten Cent analysis area. A number of abandoned mines (with shafts) and abandoned buildings that would potentially provide roosting habitat for this species are present.

**Spotted bats** use a variety of habitats including open ponderosa pine, desert scrub, pinon-juniper, and open pastures and hay fields. Prominent rock features appear to be a necessary feature for roosting. They appear to be solitary animals, but occasionally roost or hibernate in small groups. Roost sites are cracks, crevices, and caves, usually high in fractured rock cliffs. Winter range and hibernacula are unknown for most its range, though the species has been captured year-round in the southern part of its range and is may be year-round in central Oregon with the exception of December and January (Western Bat Working Group 2005a). Spotted bats forage primarily on moths, but do not appear to select particular moth species. The database of

record (NRIS Wildlife) contains no observations/records of this species in the Granite Creek Watershed. Potential roosting and foraging habitat exist in the analysis area. The Oregon Biodiversity Information Center does not show this species as present in Baker County, but does indicate it is present in Grant County (Oregon Biodiversity Information Center 2016). NatureServe Explorer suggests that this species is more widely distributed and occurs in Grant and Baker Counties (NatureServe 2016). Cliffs and rock outcrops for roosting and potential foraging habitat exist in the project area.

The **fringed myotis** ranges through much of western North America. It occurs from sea level to 2,850 meters. Distribution is patchy, but appears to be most common in drier woodlands (oak, pinyon-juniper, ponderosa pine), but is also found in a wide variety of habitats including desert scrub, mesic coniferous forest, grassland, and sage-grass steppe (Western Bat Working Group 2005b). Fringed myotis roost in crevices in buildings, underground mines, rocks, cliff faces, and bridges. Roosting in decadent trees and snags, particularly large ones, is common throughout its range in western U. S. and Canada. Roosts have been documented in a large variety of tree species and it is likely that structural characteristics (e.g., height, decay stage) rather than tree species play a greater role in selection of a snag or tree as a roost (Western Bat Working Group 2005b). Fringed myotis forage along forest edges as well as the interior and feed on a variety of invertebrate taxa (flying and non-flying taxa); the relative importance of prey items may vary according to prey availability, geography, or time period. The database of record (NRIS Wildlife) contains no observations/records of this species in the Granite Creek watershed. ORBIC and NatureServe indicate that this species is present in Grant and Baker Counties in the Granite Watershed (Oregon Biodiversity Information Center 2016, NatureServe 2016). Potential roosting and foraging habitat exist in the analysis area.

### *Environmental Consequences*

#### Alternative 1 (No Action)

*Direct and Indirect Effects*

There would be no change in available bat habitat (abandoned buildings, mines, snags in forested landscapes) in the short term. Forested sites that may support roosting would change over time. Snags would fall and be recruited over time. Given past and ongoing fire suppression, stands would become more susceptible to large, high severity wildfire. A fire of this type would initially produce a flush of appropriate roost structure; over time, these structures would fall and very few would be available until the regenerating stand has grown to a point when it will provide large diameter snags.

#### Common to All Action Alternatives (2, 3, and, 4)

*Direct and Indirect Effects*

The proposed activities would not impact potential roosting habitat associated with abandoned mines (shafts/adits), rock outcroppings, or abandoned buildings that may be used by the Townsend's big-eared and spotted bat and the fringed myotis. In some instances, mechanical treatment activities may occur in close proximity to these features. These activities could temporarily disturb roosting bats. Water sources utilized by these species would not be affected. Mechanical treatment activities and connected actions have the potential to impact snags utilized by the fringed myotis for night roosting. Generally, snags would only be felled where they are a hazard or danger to personnel or traffic along roads. In some cases, smaller snags may be removed to meet the purpose and need for action in close proximity to values at risk. Vegetative treatment may reduce future snag recruitment to some degree by reducing density dependent mortality. Impacts to snags are expected to be minor for these reasons; it is not expected that

vegetative treatment activities would limit the availability of potential roosts in the short or long term.

Landscape burning has the potential to affect habitat for the fringed myotis. Existing suitable roost snags may be consumed or be felled for safety reasons. Mixed severity burning would create patches of low, moderate, and high severity fire effects across the landscape. Forested structure would be maintained in low severity stands and moderate severity burned stands. Burning would create a large pulse of snags of all diameters in the short and mid-term that could be utilized by this species once the bark begins to slip. In the mid and long term, fire-created snags would fall. Abandoned buildings, mines, and rock outcroppings would not be affected by burning activities. Historic and eligible structures would be protected from these activities.

*Cumulative Effects*

Past activities, actions, and events in the analysis area that have impacted potential habitat include timber harvest and fuels treatments, mining, firewood cutting, and wildfire (Vinegar Fire). Timber harvest and fuels treatments in portions of the analysis area have altered dead wood resources. Removal of overstory and snags has resulted in some areas not meeting Forest Plan minimum standards for snags. Mining activities (adit/shaft construction, cabins, etc.) created potential roosting habitat for some species of bats. Firewood cutting has impacted the availability of potential roost sites in close proximity to open roads within the analysis area. Road construction has resulted in a permanent loss of potential habitat for bat species. High and moderate severity fire has created high density snag pulses that may be utilized by some species. These activities have combined to create the existing condition of bat habitat in the analysis area.

Ongoing and reasonably foreseeable future activities with a potential to impact habitat include firewood cutting. This activity would continue to affect potential roost snags adjacent to open forest roads.

When the expected effects of these alternatives are combined with the residual and expected effects of past, present, and future actions, activities, and events in the analysis area, there would be a cumulative reduction in snags potentially used by these species in forested stands. Landscape burning proposed under this project would reverse impacts associated with fire suppression; burning would increase heterogeneity by creating a mosaic of burned stands with variable levels of mortality.

**Alternative 2**

*Direct and Indirect Effects*

This alternative would mechanically thin and burn the most acres when compared to the other action alternatives. This alternative would have the most short term impact on potential roost structures (snags) through felling (hazard and danger trees and to meet the purpose and need) and long term impact by altering snag recruitment in treated stands. This alternative would also landscape burn the most acres; it would have the greatest short term impact to existing snags and provide for a mosaic of stand conditions over the most acres, when compared to Alternatives 3 and 4.

*Cumulative Effects*

This alternative would have the greatest cumulative impact on snag availability and do the most to reverse the impacts of fire suppression in the analysis area.

**Alternative 3**

*Direct and Indirect Effects*

While this alternative would commercially treat the same number of acres as Alternative 2, these acres would be thinned to a lower basal area (i.e. thinned heavier). As a result, impacts to existing and future snags are expected to be greater under this alternative than Alternative 2, with respect to mechanical vegetative treatment. This alternative would burn the fewest acres when compared to the other action alternatives. As these acres would generally be in the dry upland forest PVG, it is unlikely that moderate and high severity fire effects would occur over a large area. Snags would be lost to burning and recruited by burning at a much lower level than would be expected under Alternatives 2 and 4.

*Cumulative Effects*

This alternative would have the greatest cumulative impact on snag availability in treatment units in the short and long term, with respect to mechanical vegetative treatment. This alternative would perpetuate changes (higher stand densities and fuel loading, missed fire return intervals, etc.) that have occurred in the moist and cold upland forest PVGs as a result of fire suppression.

**Alternative 4**

*Direct and Indirect Effects*

This alternative would commercially thin slightly fewer acres than Alternatives 2 and 3; as a result, short and long term impacts to snags in vegetative treatment units would be least under this alternative. This alternative would provide for larger untreated skips within units and across the landscape. This alternative would landscape burn an intermediate number of acres when compared to the other action alternatives. Burning in moist and cold upland forest would provide for a mosaic of stand conditions (ranging from high stand mortality to low/no fire mortality) and snag availability through time.

*Cumulative Effects*

The level of commercial thinning and landscape burning proposed under this alternative would result in an intermediate level of cumulative impacts on potential roosts provided by snags.

### *Determination and Rationale (All Action Alternatives)*

Alternatives 2, 3, and 4 would have no impact on the Townsend's big-eared and spotted bats due to the fact that potential roost habitat would not be affected by the proposed activities. With regard to the fringed myotis, Alternatives 2, 3, and 4 may impact individuals or habitat, but are not likely to contribute to a trend towards federal listing or cause a loss of viability to the population or species. The rationale for this determination is as follows:

- The proposed activities would not impact mines or structures that may provide roosting habitat for the Townsend's big-eared or spotted bats.
- Commercial thinning and burning under these alternatives would impact existing and future snags that the fringed myotis may use for roosting; future snag recruitment would be affected in the future, as well.
- As the proposed activities would provide for a mosaic of stand conditions (to a varying degree depending on the selected alternative), there would be no adverse impact on the availability of potential roost structures (snags) in the long term. Activities that promote the resistance and resilience of potential habitat to disturbance would benefit forest-dwelling species in the long term.

## Western Bumblebee

### *Analysis Indicators*

Quantity and quality of potential Western bumblebee nest and foraging habitat. The measure for comparing alternatives is the number of acres treated mechanically or with prescribed fire.

### *Affected Environment*

The western bumblebee was historically broadly distributed across the west coast of North America from Alaska to central California and east through Alberta and western South Dakota. Recent analysis of historic and current observations suggests that this species has experienced significant declines in abundance and distribution in recent years. Since 1998 the western bumblebee has declined most dramatically from western and central California, western Oregon, western Washington, and British Columbia. Although absent from much of its former range, the species is still found in isolated areas, primarily in the Rocky Mountains (Evans et al. 2012). Bumble bees inhabit a wide variety of natural, agricultural, urban, and rural habitats, although species richness tends to peak in flower-rich meadows of forests and subalpine zones. Like other bumble bees, the western bumblebee has three basic habitat requirements: suitable nesting sites for the colonies, nectar and pollen from floral resources available throughout the duration of the colony period (spring, summer and fall), and suitable overwintering sites for the queens. Nests are primarily in underground cavities such as old squirrel or other animal nests and in open west-southwest slopes bordered by trees, although a few nests have been reported from above-ground locations. Bumble bees require plants that bloom and provide adequate nectar and pollen throughout the colony's life cycle. This species is a generalist forager and has been reported to visit a wide variety of flowering plants in Oregon and Washington. Very little is known about overwintering sites, other than they are underground. Primary threats include pathogens from commercial bumble bees and other sources, impacts from reduced genetic diversity, and habitat alterations including conifer encroachment (resulting from fire suppression), grazing, prescribed and natural fire, and logging.

This species has been documented on the Umatilla and Wallowa-Whitman National Forest. There have been no recorded observations of this species in the analysis area; species-specific surveys have not been completed on either Forest.

### *Environmental Consequences*

#### Alternative 1 (No Action)

*Direct and Indirect Effects*

There would be no change in western bumblebee habitat in the short term. In the mid and long term, open forested habitats would continue to fill in with conifer regeneration (in the absence of wildfire). Meadows edges would also continue to be encroached on by conifers. These events would reduce the quality of habitat for this species by shading out and outcompeting flowering plants. A high severity fire would alter stand composition and structure, and promote the growth of flowering vegetation for a number of years; ultimately, conifer regeneration would again reduce habitat quality for this species.

#### Common to All Action Alternatives (2, 3, and 4)

*Direct and Indirect Effects*

Mechanical treatment activities have the potential to impact ground nests that may be in proposed treatment units. Individuals and colonies may be lost to ground disturbance associated with machinery use. Vegetative treatment in upland and riparian sites would improve potential habitat quality for this species by increasing the availability of light and moisture and providing sites where flowering plants can regenerate. Burning also creates potential underground nest sites

through consumption of tree roots and other features. These impacts would persist into the long term, as maintenance activities are expected to occur over time.

Landscape burning would have variable impacts on this species. In the short term, individuals and colonies may be lost during burning. In the short and mid-term, mixed severity burning would create openings where flowering plants could become established. Given the availability of moisture (through snow melt) in much of the proposed burn units, it is likely that flowering plants would be available in these areas during most, if not all, of the growing season. Post-burn habitat quality would increase substantially for this species for upwards of 10 to 15 years; eventually, conifer regeneration would shade out much of the affected area.

*Cumulative Effects*

Past activities, actions, and events in the analysis area that have impacted potential habitat include fire suppression, fuels treatments, road construction, grazing, and wildfire (Vinegar Fire). Fire suppression has impacted the quality of potential habitat in the analysis area. This activity has resulted in an ingrowth of woody vegetation and encroachment of meadows by conifer species; this has led to a reduction in habitat quality. Fuels treatments in portions of the analysis area have opened forested canopies and stimulated the growth of flowering plants that this species depends on. Road construction has resulted in a permanent loss of potential habitat for this and other species. Past grazing likely affected habitat in a portion of the analysis area by altering the composition of vegetation communities potentially used by this species. Grazing historically occurred at very high stocking levels, capable of degrading vegetative communities through much of the Blue Mountains. The Camp Creek Allotment is currently not active and there are no plans to graze it in the foreseeable future. High and moderate severity wildfire stimulated the growth of flowering plants that this species depends on. These activities have combined to create the existing condition of western bumblebee habitat in the analysis area.

Ongoing and reasonably foreseeable future activities with a potential to impact habitat include fire suppression. This activity would continue to promote the development of dense overstories and conifer regeneration, reducing habitat quality for this species.

When the expected effects of these alternatives are combined with the residual and expected effects of past, present, and future actions, activities, and events in the analysis area, there would be a short and long term improvement in the quality of potential habitat. This would aid in reversing past losses of habitat resulting from fire suppression and other activities.

**Alternative 2**

*Direct and Indirect Effects*

This alternative would mechanically thin and burn the most acres when compared to the other action alternatives. This alternative would have the most short term impact on individuals and existing colonies. In the mid and long term, this alternative would improve habitat quality on more acres than the other alternatives.

*Cumulative Effects*

This alternative would do the most toward reversing past losses in habitat and reductions in habitat quality. These impacts would persist for 10 to 15 years in burned stands and longer in commercially harvested stands.

**Alternative 3**

*Direct and Indirect Effects*

While this alternative would commercially treat the same number of acres as Alternative 2, these acres would be thinned to a lower basal area (i.e. heavier). It is expected that habitat improvement in these areas would persist for a longer period prior to encroachment of conifers. This alternative would also burn the fewest acres when compared to the other action alternatives. As these acres would generally be in the dry upland forest PVG, it is unlikely that moderate and high severity fire effects would occur over a large area. Given moisture availability, it is unlikely that flowering plants would be available in these burned stands through the entire summer flight season.

*Cumulative Effects*

This alternative would do the least toward reversing past losses in habitat and reductions in habitat quality when compared to Alternatives 2 and 4, largely due to the fact that burning in moist and cold upland forest PVG stands would largely be dropped from this alternative.

**Alternative 4**

*Direct and Indirect Effects*

This alternative would commercially thin slightly fewer acres than Alternatives 2 and 3; as a result, long term habitat improvement in vegetative treatment units would be slightly less under this alternative. This alternative would landscape burn an intermediate number of acres when compared to the other action alternatives. Burning in moist and cold upland forest would improve habitat conditions for this species in the short and mid-term to a greater degree than would Alternative 3.

*Cumulative Effects*

The level of commercial thinning and landscape burning proposed under this alternative would aid in reversing past losses in habitat and reductions in habitat quality. This cumulative improvement in habitat quality in the short, mid, and long term would be less than that expected under Alternative 2 and slightly greater than what is expected under Alternative 3.

### *Determination and Rationale (All Action Alternatives)*

Alternatives 2, 3, and 4 may impact individuals or habitat, but are not likely to contribute to a trend towards federal listing or cause a loss of viability to the population or species. The rationale for this determination is as follows:

- Commercial thinning and burning under these alternatives may have direct impacts on individuals and colonies. As a relatively small proportion of the landscape would be impacted by mechanical vegetative treatment and burning (40 to 60 percent of proposed burn areas would be blackened), impacts are expected to be minor, if this species is present.
- Vegetative treatment and mixed severity landscape burning would improve habitat conditions by increasing the availability of light, moisture, and nutrients to forbs and herbaceous vegetation. The abundance and species richness of flowering plants would likely increase for 10 to 15 years post burning and longer in commercially treated stands.

## North American Wolverine

### *Analysis Indicators*

The quality of wolverine denning and foraging habitat. The measure for comparing alternatives is the number of acres of mechanical treatment or prescribed burning.

### *Affected Environment*

The wolverine inhabits high elevation, alpine and subalpine conifer forest types, with limited exposure to human interference (Ruggiero et al. 1994, Wolverine Foundation (TWF) 2016). Natal denning habitat includes open rocky slopes (talus or boulders) surrounded or adjacent to high elevation forested habitat and forested and semi-forested subalpine and alpine vegetation. Snow cover appears to be critical to denning habitat selection; wolverine select areas that maintain a snow depth greater than 3 feet into April and May for denning (Aubrey et al. 2007, Parks 2009, Ruggiero et al. 1994, TWF 2016).

Potential natal denning habitat is present in the analysis area. The Ten Cent analysis area includes contiguous subalpine forest types, backcountry habitat (wilderness, Inventoried Roadless, Scenic Areas, and potential wilderness), open rocky slopes at high elevations, and sufficient snow cover for natal denning. None of the proposed activities would occur in potential denning habitat. Potential foraging habitat is present throughout the analysis area. The wolverine is not currently known to occur in the Ten Cent analysis area; there have been no sightings of this species in the area.

### *Environmental Consequences*

#### Alternative 1 (No Action)

*Direct and Indirect Effects*

There would be no change in potential wolverine habitat in the analysis area in the short term. In the mid and long term, potential wolverine foraging habitat would continue to develop multi-strata habitat features including dense canopy layers, understory regeneration and shrub cover, and high stand densities. Increased fuel loads resulting from fire suppression and insect and disease outbreaks would increase the risk of high severity wildfire. A fire of this type would alter stand structure and composition and fragment existing habitat.

#### Common to All Action Alternatives (2, 3, and 4)

*Direct and Indirect Effects*

This species is currently not known or suspected to occur in the analysis area. Potential denning habitat would not be affected under any of the action alternatives because there would be no vegetative treatment or landscape burning in these areas. Commercial thinning, small diameter thinning, and mechanical fuels treatment activities would occur in potential wolverine foraging habitat.

Mechanical treatment of vegetation would result in disturbance to understory vegetation and structural habitat features that provide habitat for potential wolverine prey. Impacts to prey species are expected to be minor since downed wood and snag standards and desired conditions would be met (where dead wood is available), untreated skips would be retained, and landscape connectivity would be maintained in treated and untreated stands.

Small diameter thinning of small diameter conifers would not directly or indirectly impact this species. No new system roads would be constructed under any of the action alternatives, so the level of human disturbance in the project area post-treatment would be similar to the pre-treatment existing condition.

Landscape burning would impact potential foraging habitat quality. It is expected that prescribed burning in moist and cold upland forest stands would result in 10 to 20 percent of these stands experiencing 50 to 100 percent mortality. This level of overstory impacts would generally reduce the suitability of these acres for foraging. High severity burning would generally occur in small patches across the landscape; it is estimated that patches as large as 10 acres may experience

high severity impacts (see Fuels and Silviculture Reports). The vast majority of stands would be unburned (Fuels Specialist estimates that 40 to 60 percent of the burn area will not carry fire) or would burn at low severity due to fuel conditions, aspect, vegetation, and other factors. Dead wood resources would also be affected by burning. Prey species abundance would be impacted in the short and mid-term; as stands regenerate and downed woody material increases, abundance will increase.

*Cumulative Effects*

Past activities, actions, and events in the analysis area that have impacted potential wolverine habitat include commercial thinning, regeneration harvest, and fuels treatment (approximately 16,400 acres since 1982), road construction, road closures, and wildfire (Vinegar Fire). Past harvest activities have impacted the quality and distribution of potential wolverine habitat in the analysis area. These activities resulted in fragmentation of habitat; openings created by these activities are generally avoided by foraging wolverine (Ruggiero et al. 1994). In general, regeneration harvested stands are not currently providing suitable nesting habitat due to a lack of overstory structure and stand complexity. Road construction associated with timber harvest has resulted in increased disturbance and fragmented potential foraging habitat. Road closures associated with Access and Travel Management planning (Umatilla National Forest) reduced disturbance in potential habitat by reducing open road densities. High and moderate severity wildfire has converted potential wolverine foraging habitat to an unsuitable condition. Those portions of the fires that burned at high and moderate severity are unlikely to be used in the short and mid-term due to reductions in overstory canopy closure. These activities have combined to create the existing condition of wolverine habitat in the analysis area.

Ongoing and reasonably foreseeable future activities with a potential to impact wolverine habitat include snowmobile use. This activity results in winter disturbance in suitable foraging and denning habitat. Higher elevation areas with few roads would be the most likely impacted by this activity. This activity would cause disturbance in potential denning habitat that lies outside the North Fork John Day Wilderness Area.

When the expected effects of these alternatives are combined with the residual and expected effects of past, present, and future actions, activities, and events in the analysis area, there would be an incremental reduction in potential foraging habitat. This cumulative reduction would be the result of high severity burning in small patches (up to 10 acres) in the moist and cold upland forest PVGs. It is expected that landscape burning at the time and fuel conditions prescribed would result in less impact to foraging habitat and its connectivity than would a wildfire that would occur at the height of fire season. Landscape burning would create a mosaic of habitats for potential prey. This cumulative impact would have a negligible impact on this species and its habitat at the analysis area scale.

**Alternative 2**

*Direct and Indirect Effects*

This alternative would commercially thin the same number of acres as Alternative 3. It would also landscape burn the most acres of potential foraging habitat when compared to the other action alternatives. This alternative would provide for a range of basal area retention within units. It would create a mosaic of potential foraging habitat over a larger geographic area than would the other alternatives.

*Cumulative Effects*

This alternative would affect the quality of foraging habitat and landscape burn the most acres when compared to the other alternatives. As a result, the cumulative effects under Alternative 2 would be greater than Alternative 3.

**Alternative 3**

*Direct and Indirect Effects*

This alternative would commercially thin the same number of acres as Alternative 2; as a result, impacts associated with vegetative treatment would be similar. Alternative 3 would thin stands heavier (to a lower basal area) than would Alternative 2. This alternative would have slightly more impact on potential prey habitat by thinning these stands heavier (to maximize economics); dead wood and stand complexity would also be impacted to a greater degree under this alternative. This alternative would landscape burn the fewest acres of potential foraging habitat when compared to the other action alternatives. Unburned moist and cold upland forest stands outside and within the wilderness would be more susceptible to stand-replacing fire as a result.

*Cumulative Effects*

Cumulative impacts under this alternative would be similar to those described under Alternative 2. Although potential foraging habitat impacts (through vegetative treatment) would be greater under this alternative, it would burn the fewest acres (mostly in dry and closely-associated moist stands) when compared to the other action alternatives. As there would be less area experiencing high severity impacts to vegetation, the cumulative impacts would be less under this alternative. Conversely, more acres of potential foraging habitat would be susceptible to a large, high severity wildfire in the future, which would reduce the suitability of potential foraging habitat and pose a risk to denning habitat quality in the analysis area.

**Alternative 4**

*Direct and Indirect Effects*

This alternative would commercially thin the fewest acres of potential habitat when compared to Alternatives 2 and 3. This alternative would also landscape burn an intermediate level of potential foraging habitat. As a result, it is expected to have an intermediate level of impact on potential habitat for this species.

*Cumulative Effects*

Cumulative impacts under this alternative would be similar to those described under Alternatives 2 and 3. Because impacts associated with mechanical vegetative treatment would be less than the other alternatives and an intermediate level of landscape burning would occur, it is expected that the cumulative impacts would be intermediate as well. Under this alternative, fewer acres of potential foraging habitat would left in a condition that is susceptible to a large, high severity wildfire.

### *Determination and Rationale (All Action Alternatives)*

Alternatives 2, 3, and 4 may impact individuals or habitat, but are not likely to contribute to a trend towards federal listing or cause a loss of viability to the population or species. The rationale for this determination is as follows:

- Commercial thinning under these alternatives would impact the quality of potential foraging habitat for the wolverine to varying degrees. There would be no reduction in potential foraging habitat.
- No vegetative treatment or landscape burning would occur in potential denning habitat within the analysis area.

- Connectivity of habitat would be maintained.
- Burning would have mixed severity impacts. Although some acres may move from a suitable to an unsuitable foraging habitat condition, prescribed burning would provide for a mosaic of unburned/low severity, moderate severity, and high severity-impacted stands across the landscape in the mid and long term.

## Yuma Skipper (butterfly)

### *Analysis Indicators*

Quality of Yuma Skipper wetland habitat. Measure for comparing alternatives would be acres of activity impacting potential wetland habitat.

### *Affected Environment*

The Yuma skipper is found around reed beds in and around freshwater marshes, streams, oases, ponds, seeps, sloughs, springs, and canals (Pyle 2002). Adults are almost always found in close association with the primary larval host plant *Phragmites australis* (giant or common reed). At the National level, this species is ranked N5 (Secure); in Oregon, it is ranked S1? (Critically Imperiled) (NatureServe 2016). At the species level the Yuma skipper is common in its limited habitat (areas with its host plant) in California, Nevada, Utah, Colorado, northern New Mexico, Arizona, and in isolated areas in Oregon (3 known locations) and Washington. This species is not suspected as occurring on the Umatilla National Forest. This species has been documented on the Wallowa-Whitman National Forest. Site specific threats are unknown but general threats include loss of wetland habitats to urban or agricultural uses, pesticide spraying in and near wetlands, and grazing damage to wetland habitat. There have been no surveys for this species in the analysis area. It has not been observed in the analysis area. Habitat may be present in mine settling ponds adjacent to FS Roads 10, 13, and 1035, near the Wallowa-Whitman-Umatilla National Forest boundary.

### *Environmental Consequences*

#### Alternative 1 (No Action)

*Direct and Indirect Effects*

In the short term, the quality and extent of habitat for this species is not expected to change. In the long term, mining activity on private and NFS lands may disturb potential habitat for this species.

#### Common to All Action Alternatives (2, 3, and 4)

*Direct and Indirect Effects*

Current information indicates that this species is not present in the analysis area. For this reason, there would be no direct or indirect impacts on this species. Potential habitat is present in ponds adjacent to Clear and Granite Creeks. These ponds and the vegetation surrounding them would not be affected by the proposed treatment activities; they would be buffered from all treatment activities.

*Cumulative Effects*

Because there would be no direct or indirect effects on this species and potential habitat, there would also be cumulative effects on this species.

### *Determination and Rationale (All Action Alternatives)*

Alternatives 2, 3, and 4 would have no impact on this species. The rationale for this determination is as follows:

- This species is not known or suspected to occur in the Ten Cent analysis area.
- Potential habitat for this species may be present; however, ponds and the reeds that this species feeds on in the larval stage would not be affected. Ponds would be buffered from treatment activity (see Project Design Criteria).
- There would be no direct, indirect, or cumulative impacts on this species.

## Fir Pinwheel (Terrestrial Snail)

### *Analysis Indicators*

Quality of fir pinwheel Douglas-fir/talus habitats. Measure for comparing alternatives would be acres of treatment occurring within suitable habitat.

### *Affected Environment*

This species is found in moist and rocky Douglas-fir forest with a rich understory of forbs, deciduous shrubs, and bryophytes at mid-elevations in valleys and ravines (NatureServe 2016). This species is often found in or near rock talus or under downed logs. It feeds on detritus and microorganisms on vegetation surfaces. It has been observed at locations in Montana, Idaho, Washington, and Oregon. This species is known from one location on the Umatilla National Forest (Walla Walla Ranger District). The current status of this population is not known for the Umatilla and Wallowa-Whitman National Forests. Threats to this species include alteration of appropriate habitat through logging and grazing. Wildfire, road construction, land development, chemical weed control, and drying of sites are also thought to be threats to this species. This species is ranked as Apparently Secure (G4 and N4) at the Global and National scales (NatureServe 2016). At the state level, this species is ranked S1 (Critically Imperiled) in Oregon (NatureServe 2016). There have been no surveys for this species in the analysis area. The Oregon Biodiversity Information Center does not show fir pinwheel as present in Baker County (Oregon Biodiversity Information Center 2010); it is also not expected to occur in Grant County. Appropriate habitat may be present in the Ten Cent analysis area.

### *Environmental Consequences*

#### Alternative 1 (No Action)

*Direct and Indirect Effects*

In the short and long term, the quality and extent of habitat for this species, if present in the analysis area, is not expected to change.

#### Common to All Action Alternatives (2, 3, and 4)

*Direct and Indirect Effects*

Current information indicates that this species is not present in the analysis area. The specific habitat requirements of this species are not believed to be present in the analysis area. If potential habitat is present, it would be buffered from all treatment activities. Because this is the case, it is expected that there would be no direct or indirect effects on this species and its habitat.

*Cumulative Effects*

Because there would be no direct or indirect effects on this species and its habitat, there would also be cumulative effects on this species.

### *Determination and Rationale (All Action Alternatives)*

Alternatives 2, 3, and 4 would have no impact on this species. The rationale for this determination is as follows:

- This species is not known or suspected to occur in the Ten Cent analysis area.
- Potential habitat may be present in the analysis area; however, it would be buffered from all treatment activities (see Project Design Criteria) if present.
- There would therefore be no direct, indirect, or cumulative impacts on this species.

## Columbia Spotted Frog

### *Analysis Indicators*

Quality of spotted frog pond/RHCA habitat. Measure for comparing alternatives in the number of acres of prescribed burning within riparian habitat conservation areas.

### *Affected Environment*

Columbia spotted frogs are highly aquatic and rarely found far from permanent water, but they can also utilize intermittent streams and meadows in the spring. They occupy the sunny, vegetated margins of streams, lakes, ponds, spring complexes, and marshes. Columbia spotted frogs are mobile; they seasonally move between hibernacula (overwintering sites), breeding habitat, and wet meadow/riparian foraging areas (Bull and Hayes 2002). Some Columbia spotted frogs will remain and overwinter in breeding habitat if conditions are ideal. Hibernacula are typically ponds, slow-moving streams, and springs where water surrounding the frog does not freeze and oxygen levels are adequate (Tait 2007, Bull and Hayes 2002). Breeding occurs in shallow (<60 cm) emergent wetlands such as riverine side channels, beaver ponds, springheads, and the wetland fringes of ponds, small lakes, and livestock ponds. Water levels must persist until eggs are hatched and tadpoles transform. Adults exhibit strong fidelity to breeding sites, with egg deposition typically occurring in the same areas in successive years. Foraging takes place in all types of permanent or ephemeral wetland habitats, including meadows, stream margins, ponds, ditches, and intermittent habitats; these areas constitute movement corridors between breeding and hibernation sites. Because frogs are especially vulnerable to predation during summer foraging, some level of overhead plant cover is optimal. NatureServe ranks the Columbia spotted frog as apparently secure (N4) at the National and Global scale and imperiled/vulnerable (S2/S3) at the state (Oregon) level (NatureServe 2016). The Great Basin subpopulation is ranked as imperiled (T2) due to a high risk of extinction due to very restricted range, very few populations, steep population declines, and other factors. Columbia spotted frogs in northeast Oregon are more closely-affiliated with the Northern Distinct Population Segment (DPS) of the species than they are with the Great Basin DPS (Tait 2007).

This species is known to occur in the Ten Cent analysis area (Granite Watershed). Perennial streams, springs, and ponds (including mine settling ponds) are used by this species for summer foraging, overwintering, and breeding habitat.

### *Environmental Consequences*

#### Alternative 1 (No Action)

*Direct and Indirect Effects*

In the short term, the quality and extent of Columbia spotted frog habitat would not change. In the mid and long term, continued recovery of riparian habitat would improve habitat quality for this species. Riparian areas would continue to recover from past disturbances, resulting in increased riparian shading (overstory and shrubs) along stream channels and pond edges. In the long term, the risk of high severity wildfire would also increase due to continued multi-strata development and increasing fuel loads. High severity impacts could occur in dense riparian habitat along perennial streams that may be used by this species.

**Common to All Action Alternatives (2, 3, and 4)**

*Direct and Indirect Effects*

Under all of the action alternatives, there would be no commercial thinning or other mechanical treatment activities within Riparian Habitat Conservation Areas (RHCAs) potentially used by this species for summer foraging, breeding, or overwintering. Small diameter thinning of small diameter vegetation would occur within some RHCAs within the project area, where this activity is consistent with the Blue Mountains Expedited Consultation Process. Under all of the action alternatives, approximately 3,540 acres of small diameter thinning would occur in the outer portion (further from stream channels) of RHCAs. Because this activity would be done by hand, it is unlikely that this species would be impacted. The Columbia spotted frog tends to stay in close proximity to perennial streams and ponds. Class III streams would be buffered a minimum of 75 feet, while Class II and I streams would be buffered a minimum of 150 feet. Ponds would generally be buffered by 100 feet. Buffers would protect the structure and microclimate of these sites.

Proposed burning has the potential to affect vegetation along stream channels and other perennial water sources used by this species. Mixed severity burning would likely reduce cover at these locations to some degree, making this species more vulnerable to predators and altering the microclimate associated with these sites. Depending on intensity of burning, adult and juvenile (tadpoles) mortality may occur. It is expected that direct impacts to individuals may occur in small patches of intense burning along some streams in the moist and cold upland forest PVG.. It is expected that the ladder fuel treatments in RHCAs will be effective at minimizing the size of high severity patches, typically to less than one acre. It is expected that an occasional individual may be directly impacted by the proposed burning.

Appropriately-sized screens would be utilized on all pumps utilized during implementation of vegetation treatments and burning; tadpoles would not be sucked through pumps or impinged on intake pipes. The amount of water expected to be used from ponds and other water sources would be negligible.

*Cumulative Effects*

Past activities that affected potential spotted frog habitat include timber harvest, cattle grazing, mining, and gravel pit/pond construction. A portion of one grazing allotment is included in the analysis area. Past cattle grazing affected potential habitat by altering the structure and composition of riparian communities. Grazing likely directly impacted spotted frogs at breeding and foraging sites. Grazed habitats are currently recovering from past overgrazing. The Camp Creek Allotment is currently not active and there are no plans to graze it in the foreseeable future. Past cattle grazing also created potential breeding habitat through the construction of water sources (ponds) where they previously did not exist. Rock pit ponds created through road construction also increased available habitat for the spotted frog in upland areas. Past timber harvest affected riparian areas through the removal of streamside vegetation and disturbance of riparian communities. These activities increased the vulnerability of this species to predation by removing cover and altered suitable habitat (slow moving streams, wet meadows, springs, etc.). Mining activities have also altered in-stream habitat. These activities have generally led to a decrease in off-channel habitat and an increase in deeper ponds used during mining activities (settling, water, etc.). These activities have also resulted in acid mine drainage reaching potential habitat. Naturally occurring heavy metals and water with chronically low pH draining from mines has the potential to impact amphibians, especially during embryonic development (Lacki et al. 1992, Freda and Dunson 1985). These past activities have combined to create the existing condition of spotted frog habitat in the analysis area.

Ongoing activities with the potential to affect the spotted frog include mining. Ongoing mining activities are generally having less impacts than past placer and load mines; operations are small scale. Acid mine drainage remains an issue throughout the analysis area.

Reasonably foreseeable future activities with a potential to affect this species include the Granite/Desolation Aquatic Restoration Project, mining, and maintenance of water sources. The Granite/Desolation Aquatic Restoration Project has the potential to impact a small number of individuals during culvert replacement activities within the Granite watershed. Project activities would be limited spatially and temporally. Future mining is expected to have the same effects as those described above. Maintenance of water sources has the potential to affect breeding sites and cause mortality of developing tadpoles. These effects would not persist beyond the year in which pond cleaning occurs.

When the expected effects of these alternatives are combined with the residual and expected effects of past, present, and future actions, activities, and events in the analysis area, there would be no incremental reduction in suitable breeding, overwintering, or foraging habitat. No mechanical treatment activities would occur in suitable riparian habitat. Burning is expected to temporarily impact the quality of habitat along perennial streams and water sources. These impacts would be temporary; as stands recover following moderate and high severity burning, cover would be provided.

**Alternative 2**

*Direct, Indirect, and Cumulative Effects*

Alternative 2 proposes to landscape burn the most acres when compared to the other action alternatives. As a result, it would potentially have the greatest impact on individual Columbia spotted frogs in the analysis area. While there would be no cumulative reduction in suitable habitat, habitat quality would be impacted the most in the short and mid-term under this alternative.

**Alternative 3**

*Direct, Indirect, and Cumulative Effects*

Alternative 3 proposes to landscape burn the fewest acres when compared to the other action alternatives. As a result, it would have the least impact on individual Columbia spotted frogs in the analysis area. Habitat quality would be impacted the least in the short and mid-term under this alternative.

**Alternative 4**

*Direct, Indirect, and Cumulative Effects*

Alternative 4 proposes to landscape burn more acres than Alternative 3 but fewer than Alternative 2. As a result, impacts to individual Columbia spotted frogs and their habitat under this alternative would be greater than under Alternative 3 but less than those under Alternative 2.

### *Determination and Rationale (All Action Alternatives)*

Alternatives 2, 3, and 4 may impact individuals or habitat, but are not likely to contribute to a trend towards federal listing or cause a loss of viability to the population or species. The rationale for this determination is as follows:

- Commercial thinning and mechanical activity fuels treatment would not occur within suitable habitat in RHCAs. Hand thinning would occur in a portion of RHCAs. This activity would not impact breeding, summer foraging, or overwintering habitat quality.

- Untreated buffers would be applied to areas with perennial water (springs, ponds, streams) to protect microclimate at these sites (see Project Design Criteria, EA Chapter 2).
- Pumping of water from ponds potentially used for breeding would not impact individuals; screens would eliminate the possibility of direct mortality of developing tadpoles.
- Burning may result in mortality of individuals. If this occurs, it would include a few individuals at isolated sites where high intensity burning occurs in RHCAs. Impacts to population levels in the analysis area would be unlikely.
- There would be no cumulative reduction in suitable breeding, overwintering, or foraging habitat under the proposed action alternatives. All impacts to habitat quality are expected to be temporary.

## Rocky Mountain Tailed Frog

### *Analysis Indicators*

Quality of Rocky Mountain tailed frog stream/RHCA habitat. Measure for comparing alternatives in the number of acres of prescribed burning within riparian habitat conservation areas.

### *Affected Environment*

The tailed frog differs from other frogs found on or adjacent to the Umatilla National Forest by selecting cold, high gradient, boulder and cobble dominated streams for breeding. Streams with dense overstory shade are preferred. Froglets and adults are closely associated with the streams, often hiding in gravel and cobble substrates. Tadpoles cling to boulders and cobbles; full development of this species requires as many as 8 years to complete (NatureServe 2016). NatureServe ranks this species as apparently secure (G4) globally, and imperiled (S2) at the scale of the state of Oregon (NatureServe 2016).

The distribution of this species in Oregon is relatively restricted to the northeast corner of the state. Observations have been recorded in Wallowa, Union, Baker, and Umatilla Counties. There are no observation records for this species in the analysis area. There are a number of perennial, high gradient streams in the analysis area that have the potential to be used by this species for breeding, foraging, and rearing habitat based on geomorphology, gradient, and stream temperature. It is assumed present based on the availability of suitable habitat in the Granite watershed.

### *Environmental Consequences*

#### Alternative 1 (No Action)

*Direct and Indirect Effects*

In the short term, the quality and extent of Rocky Mountain tailed frog habitat would not change. In the mid and long term, continued recovery of riparian habitat would improve habitat quality for this species. Riparian areas would continue to recover from past disturbances, resulting in increased riparian shading (overstory and shrubs) along stream channels and pond edges. In the long term, the risk of high severity wildfire would also increase due to continued multi-strata development and increasing fuel loads. High severity impacts could occur in dense riparian habitat along perennial streams that may be used by this species.

#### Common to All Action Alternatives (2, 3, and 4)

*Direct and Indirect Effects*

Under all of the action alternatives, there would be no commercial thinning or other mechanical treatment activities within suitable Riparian Habitat Conservation Areas (RHCAs) potentially used by this species. Small diameter thinning of small diameter ladder fuels would occur within

some RHCAs in the project area, where this activity is consistent with the Blue Mountains Expedited Consultation Process. Stream channels would be buffered 50 feet (Class IV), 75 feet (Class III), or 150 feet (Class II and I) from all treatment activity. As the tailed frog spends the majority of the time in or in vegetation immediately adjacent to perennial streams, it is unlikely that hand treatment of ladder fuels would affect this species or streamside habitat (microclimate, litter, etc.) that it may use.

Proposed burning has the potential to affect vegetation along stream channels and other perennial water sources used by this species. Mixed severity burning would likely reduce cover at these locations to some degree, making this species more vulnerable to predators and altering the microclimate associated with these sites. Depending on intensity of burning, adult and juvenile (tadpole) mortality may occur. It is expected that the ladder fuel treatments in RHCAs will be effective at minimizing the size of high severity patches, typically to less than one acre . It is expected that if these impacts occur, they would affect a small number of individuals.

*Cumulative Effects*

Past activities that affected potential tailed frog habitat include timber harvest, cattle grazing, and mining. A portion of one grazing allotment is included in the analysis area. Past cattle grazing had relatively minor impacts on this species due to the fact that cattle likely did not frequent high gradient, boulder and cobble-dominated streams. The Camp Creek Allotment is currently not active and there are no plans to graze it in the foreseeable future. Past timber harvest affected riparian areas through the removal of streamside vegetation and disturbance of riparian communities. These activities increased the vulnerability of this species to predation by removing cover and altered suitable habitat (reduced downed wood recruitment, etc.). Mining activities have also altered in-stream habitat potentially used by this species. These past activities have combined to create the existing condition of tailed frog habitat in the analysis area.

Ongoing activities with the potential to affect the tailed frog include mining. Ongoing mining activities are generally having less impacts than past placer and load mines; operations are small scale. Acid mine drainage remains an issue throughout the analysis area.

Reasonably foreseeable future activities with a potential to affect this species include mining. Mining activities are expected to have the same effects as those described above.

When the expected effects of these alternatives are combined with the residual and expected effects of past, present, and future actions, activities, and events in the analysis area, there would be no incremental reduction in suitable habitat for the tailed frog. No mechanical treatment activities would occur in suitable riparian habitat. Burning is expected to temporarily impact the quality of habitat along perennial streams. These impacts would be temporary; as stands recover following moderate and high severity burning, cover would be provided.

**Alternative 2**

*Direct, Indirect, and Cumulative Effects*

Alternative 2 proposes to landscape burn the most acres when compared to the other action alternatives. As a result, it would potentially have the greatest impact on individual tailed frogs. While there would be no cumulative reduction in suitable habitat for this species, habitat quality would be impacted the most in the short and mid-term under this alternative.

#### Alternative 3

*Direct, Indirect, and Cumulative Effects*

Alternative 3 proposes to landscape burn the fewest acres when compared to the other action alternatives. As a result, it is expected to have the least impact on individual tailed frogs. Habitat quality would be impacted the least in the short and mid-term under this alternative.

#### Alternative 4

*Direct, Indirect, and Cumulative Effects*

Alternative 4 proposes to landscape burn more acres than Alternative 3 but fewer than Alternative 2. As a result, impacts to individual tailed frogs and their habitat under this alternative would be greater than under Alternative 3 but less than those under Alternative 2.

### *Determination and Rationale (All Action Alternatives)*

Alternatives 2, 3, and 4 may impact individuals or habitat, but are not likely to contribute to a trend towards federal listing or cause a loss of viability to the population or species. The rationale for this determination is as follows:

- Commercial thinning and mechanical activity fuels treatment would not occur within suitable habitat in RHCAs. Hand thinning would occur in a portion of RHCAs. This activity would not impact in-stream habitat quality for this species.
- No treatment buffers would be applied to areas with perennial water (springs, ponds, streams) to protect microclimate at these sites (see Project Design Criteria, EA Chapter 2).
- Burning may result in mortality of individuals. If this occurs, it would include a few individuals at isolated sites where high intensity burning occurs in RHCAs. Impacts to population levels in the analysis area would be unlikely. Habitat quality would be temporarily affected; a reduction in cover would make frogs more vulnerable to predation.
- There would be no cumulative reduction in suitable habitat under the proposed action alternatives.

## White-headed and Lewis' Woodpecker

### *Analysis Indicators*

Quality and distribution of open ponderosa pine stands. The measure for comparing alternatives is the number of acres of mechanical treatment or prescribed fire.

### *Affected Environment*

These species will be assessed together because they are associated with similar habitats. The white-headed woodpecker utilizes mature, single-stratum ponderosa pine-dominated habitats for nesting and foraging (NatureServe 2016). The Lewis' woodpecker is typically associated with open ponderosa pine woodland habitat near water. Both species have been found to utilize post-fire stands (mixed severity and mosaic burns) for foraging and nesting (Wightman et al. 2010). While white-headed woodpeckers use relatively open landscapes, a mosaic of open habitat for nesting in close proximity to closed-canopy forests which provide foraging habitat is important for this species. (Mellen-McLean et al. 2013, Hollenbeck et al. 2011). The Lewis' woodpecker also utilizes mixed conifer stands for foraging and nesting. The white-headed woodpecker relies heavily upon the seeds from large ponderosa pine cones for its foraging needs, but has also been found to glean insects during poor seed production years. The Lewis' woodpecker is an aerial insectivore that uses dominant snags in burned and unburned areas for perching. Both species utilize large diameter dead and dying trees for nesting. Although ponderosa pine appear to be the most selected species for cavities, cottonwood, white fir, lodgepole pine, and others are utilized (Raphael and White 1984).

The Interior Columbia Basin Ecosystem Management Project (Wisdom et al. 2000) indicates that basin-wide, >50% of watersheds have strong negative declines in the availability of source habitats (old growth ponderosa pine, aspen/cottonwood/willow, large diameter ponderosa pine snags) for the white-headed woodpecker. It also indicates that 85% of watersheds in the basin show a strong negative trend in source habitats (old forest single-stratum structural stages of ponderosa pine and multi-strata stages of Douglas-fir and western larch, and riparian cottonwood woodlands) for the Lewis' woodpecker. Similar patterns exist for the Blue Mountains of Oregon and Washington.

The White-headed Woodpecker Conservation Strategy (Mellen-McLean et al. 2013) recommends that the following management activities or actions be taken to restore white-headed woodpecker habitat:

- Retain, protect, and grow more large, older ponderosa pine trees used for foraging;
- Retain, protect, and grow large snags used for nesting;
- Reduce shrub cover and excess downed wood to reduce numbers of small mammal which prey on nests;
- Reduce canopy density across the landscape to provide interspersion of open and closed pine/dry forest stands;
- Retain and create spatial heterogeneity within stands;
- Reintroduction of rust-resistant white pine or sugar pine where appropriate would provide an alternative winter food source (applicable to the Ten Cent analysis area in that burning was deferred in some stands where white pine is present).

Both of these species are present on the Umatilla and Wallowa-Whitman National Forests. The white-headed woodpecker has been observed in the Umatilla National Forest portion of the analysis area; The Lewis' woodpecker has not been observed on the Umatilla portion of the analysis area. Due to fire suppression in dry upland forest habitats, many areas that historically supported open stands of large diameter ponderosa pine now support mixed ponderosa pine, Douglas-fir, grand fir, and larch stands. The Silviculture Report indicates that there are currently zero acres of old forest single-stratum habitat in the analysis area. This structural type is generally believed to be synonymous with suitable white-headed woodpecker habitat, although dense stands are used as well.

#### *Environmental Consequences*

**Alternative 1 (No Action)**

*Direct and Indirect Effects*

In the short term, there would be no change in existing habitat for these species. In the mid and long term, shade tolerant tree species would continue to encroach into historically open ponderosa pine habitats. The composition of these stands would change; a higher proportion of shade tolerant tree species would be present in these stands. Invading tree species would compete with ponderosa pine for resources. Ultimately, large diameter ponderosa pine trees and snags would be less common, reducing habitat quality for the white-headed and Lewis' woodpeckers. As forested stands became denser and more widespread, the risk of high severity wildfire impacts would also increase. Given the fact that there is a high proportion of moist and cold upland forest stands and dry upland forest stands in close proximity, it is expected that widespread high severity fire effects would occur through much of the analysis area. While habitat quality in burned stands would initially improve in the short and perhaps mid-term, ultimately, there would be a reduction in large diameter green trees over more acres and in larger patches than would be expected under historic conditions. Low and moderate severity burn

patches would provide habitat for these species until such time as stands recovering from fire reach an age and structure desired by these species.

**Common to All Action Alternatives (2, 3, and 4)**

*Direct and Indirect Effects*

Generally, the effects associated with each of the action alternatives on these species and their habitat would be the same; only the extent, or the number of acres treated, would vary between alternatives. Treatment would not occur in old forest single-stratum stands; none of these habitats are available in the analysis area. Treatment would occur in dry upland and moist upland forest stands potentially used by these species. Commercial thinning has the potential to remove commercially-sized conifers to reduce fire intensity adjacent to values at risk. The probability of crown fire in these stands would be reduced. Overall, much of the treatments identified as having a commercial component would focus on smaller diameter overstory material and dense understory regeneration of conifers (including lodgepole pine, white fir, and others). In many cases, there would be no to very little impact on the sparse overstory layer that is present. In dry upland forest stands and some moist upland forest stands, thinning would improve habitat conditions and compliment management actions identified above by reducing stand density and the encroachment of small diameter conifers into historically open stands. While generally moving toward a basal area target, the proposed activities would provide for stand heterogeneity by retaining untreated skips and feathering treatments back from values at risk (see Project Design Criteria). Reduced stand densities would improve stand health and stimulate growth in residual trees. Skips within commercial thinning units would provide for endemic or greater insect and disease activity that will provide white-headed woodpecker forage in years with poor ponderosa pine seed production. If present, these species may be temporarily avoid treatment units during implementation.

Snags potentially used for nesting may be impacted by hazard tree felling in units, danger tree felling along roads, and a reduction in density-dependent mortality that creates snags in the long term. In general, snags would be retained except where immediately adjacent to a value at risk and where their removal would complement the purpose and need for action by reducing the risk of crown fire and decreasing fire intensity adjacent to values at risk. Overall, impacts to snag densities and distribution in potential habitat are expected to be minor at the scale of the analysis area (see MIS: Primary Cavity Excavator section). These activities are not expected to measurably impact this species or the availability of potential nesting snags in the Ten Cent project area or the larger snag analysis area.

Small diameter thinning would not impact habitat quality for this species, as snags and overstory trees would not be impacted by this activity.

Landscape burning in potential white-headed and Lewis' woodpecker habitat (dry upland forest stands and closely-associated moist upland forest stands) would generally result in low intensity underburning with small pockets of moderate and high severity impacts. Where larger blocks of moist forest habitat are burned, a higher proportion of moderate and high severity fire impacts (up to 20 percent with 50 to 100 percent mortality) would be expected. Moderate and high severity portions of landscape burns would provide high post-fire snag densities for these species in the short and mid-term and provide for heterogeneity in stand structure and composition, and dead wood habitat in the mid and long term. Burning has the potential to reduce potential nesting sites through the consumption of snags. Studies have found that the vast majority of snags lost to burning were small diameter (<10" dbh); impacts to large snags were relatively minor, especially in dry upland forest stands (Hessburg et al. 2010, Harrod et al. 2009). Burning is also expected to

create snags; losses of existing snags would be offset or exceeded by new snag creation (Hessburg et al. 2010, Harrod et al. 2009, Thies et al. 2008). It is not expected that there would be an adverse impact on these species resulting from proposed landscape burning.

*Cumulative Effects*

Past activities, actions, and events that affect the white-headed and Lewis' woodpeckers and their habitat within the analysis area include timber harvest and fire suppression. Past timber harvest targeted large diameter open-grown (single-strata) ponderosa pine that this species is dependent on for foraging, reducing the quality and quantity of habitat for this species. Harvest also impacted large diameter ponderosa pine snags used for nesting. Fire suppression has allowed for the encroachment of fire-intolerant conifer species into historically open ponderosa pine stands. The composition and structure of these stands has changed, reducing the quality of these stands for the white-headed and Lewis' woodpecker. These activities, actions, and events have combined to create the existing condition of white-headed woodpecker and Lewis' woodpecker habitat in the analysis area.

Ongoing (present) and reasonably foreseeable future activities in the analysis area that affect these species and their habitat include fire suppression. This activity is having the same effects as those described previously.

When the effects of these alternatives are combined with the residual and expected effects of past, present, and future activities in the analysis area, there would be an incremental improvement in habitat for these species in the mid and long term resulting from commercial and small diameter thinning in dry upland forest stands. The proposed activities under Alternatives 2, 3, and 4 would have a beneficial effect on white-headed and Lewis' woodpecker habitat in the short and long term. While there would be a short term reduction in snags due to hazard and danger tree felling and limited snag felling elsewhere to meet the purpose and need for action, the impact is expected to be minor. When combined with past activities, it is not expected that there would be an adverse cumulative impact on this species.

**Alternative 2**

*Direct and Indirect Effects*

This alternative would have similar impacts as those described in the *Common to All Action Alternatives* section. This alternative would commercially thin the same number of acres as Alternative 3. Under this alternative, basal area retention would be greater than would occur under Alternative 3. As a result, there would be a greater potential for snag creation under this alternative in the long term. This alternative would also burn the most acres when compared to the other alternatives. While all three alternatives would generally burn the same number of acres of dry upland forest habitat (outside of wilderness), this alternative would burn the most acres of moist and cold upland forest. Burning in these areas would create or enhance the most acres of post-fire (mixed severity) habitat for these species.

*Cumulative Effects*

This alternative would have the greatest positive incremental effect on habitat for these species. It would do the most to reverse past habitat changes resulting from fire suppression and past harvest through vegetative treatment and burning. While snag habitat would likely be reduced to a small degree, it is not expected that there would be an adverse impact on these species given design criteria to reduce impacts to snags.

**Alternative 3**

*Direct and Indirect Effects*

This alternative would commercially thin the same number of acres as Alternative 2; however, these stands would be thinned heavier than they would under Alternative 2. As a result, there would be a lower potential for density-dependent snag creation under this alternative in the long term. This alternative would also burn the fewest acres when compared to the other alternatives. This alternative would drop all wilderness burning and burning in moist and cold upland forest stands to address concerns raised during project scoping. As a result, these acres would be more susceptible to a large high severity wildfire. High severity wildfire would create relatively homogeneous post fire habitat, as opposed to heterogeneous stands that would result from mixed severity landscape burning. Homogeneous stands resulting from wildfire would be suitable for a shorter period of time than would heterogeneous stands resulting from landscape burning.

*Cumulative Effects*

Although this alternative would mechanically treat vegetation on the same acres as Alternative 2, there would be less incremental improvements in habitat quality due to the level of impact in these stands. Existing and future snag recruitment would likely be cumulatively impacted to a greater degree under Alternative 3 than under the other two action alternatives. The cumulative impacts under this alternative are not expected to adversely impact this species.

**Alternative 4**

*Direct and Indirect Effects*

This alternative would commercially thin the fewest acres when compared to the other action alternatives. Higher basal area retention and larger untreated skips would provide for higher density dependent mortality (snag creation) in the mid and long term. Impacts of burning would be similar to those described under *Common to All Action Alternatives*. This alternative would also burn an intermediate number of acres; all wilderness burning would be dropped under this alternative. Fewer acres of moist and cold upland forest stands would be affected under this alternative when compared to Alternative 2.

*Cumulative Effects*

This alternative would have less positive incremental effect on habitat for these species due to the fact that it would commercially treat and burn fewer acres than Alternative 2. It would aid in reversing past shifts in habitat through vegetative treatment and burning. While snag habitat would likely be reduced, it is not expected that there would be an adverse impact on these species given design criteria to reduce impacts to snags.

### *Determination and Rationale (Alternatives 2, 3, and 4)*

Alternatives 2, 3, and 4 may impact individuals or habitat, but are not likely to contribute to a trend towards federal listing or cause a loss of viability to the population or species. The rationale for this determination is as follows:

- The white-headed woodpecker has been observed in the analysis area; the Lewis' woodpecker is assumed to occur due to the presence of suitable habitat.
- Treatment would affect suitable habitat for the Lewis' woodpecker and capable habitat for the white-headed woodpecker.
- Thinning (with skips) to meet the purpose and need to reduce fire intensity near values at risk and reduce crown fire potential would have positive impacts on the mid and long term structure and composition of suitable and potential habitat. Some snags potentially used by these species may be affected; however, it is not expected that there would be appreciable

impacts to snag availability. Design Criteria would be implemented to protect snags where this does not conflict with the purpose and need for action.

- Future snag recruitment may be impacted through a reduction in density-dependent mortality. This long term impact to snags is not expected to adversely impact this species or potential dry upland forest habitat.
- Burning would create post-fire burned forest habitat for these species. These stands, especially when interspersed with unburned and low-severity burned patches, would complement habitat for these species.

## Gray Wolf

### *Affected Environment*

Gray wolves (*Canis lupus*) are the largest wild members of the dog family (Canidae). The wolf is a habitat generalist inhabiting a variety of plant communities, typically containing a mix of forested and open areas with a variety of topographic features (Verts and Carraway 1998). Suitable habitats are those that have a high proportion of forested cover and public lands, high elk densities, low road densities, and low livestock densities (NatureServe 2016, Oakleaf et al. *in* USDI 2009c).

There are currently 11 wolf packs and a number of pairs (not classified as packs) known to occur in northeast Oregon; none are located in the Ten Cent analysis area. The gray wolf was on the species lists provided by the US Fish and Wildlife Service identifying species with a potential to occur in the Ten Cent analysis area (USDI 2016). While unconfirmed sightings have occurred in the vicinity, there are no Known Areas of Wolf Activity (AKWAs), denning sites, or rendezvous sites known to occur in the Ten Cent analysis area.

### *Environmental Consequences*

#### Alternative 1 (No Action)

*Direct and Indirect Effects*

There would be no direct or indirect impacts to wolves because there are no known den and rendezvous sites located in the analysis area. Direct impacts to dispersing wolves would be unlikely.

#### Common to All Action Alternatives (2, 3, and 4)

*Direct and Indirect Effects*

Vegetative treatments and burning would not directly affect the gray wolf because this species is a habitat generalist, and is not known to occur in the analysis area. Dens and rendezvous sites would also not be affected by the proposed activities because none are known to occur in the analysis area. If a wolf or wolves were in the area during implementation, they could be temporarily displaced; this would have no impact on wolf populations, reproduction, or mortality of individual wolves.

*Cumulative Effects*

Because this project would have no direct or indirect effect on gray wolves, it would also have no cumulative effects on gray wolves and their habitat.

### *Determination and Rationale (Alternatives 2, 3, and 4)*

Under all of the action alternatives, the proposed activities may impact individuals or habitat, but are not likely to contribute to a trend towards federal listing or cause a loss of viability to the population or species. The rationale for this determination is as follows:

- The gray wolf is not currently known to occur in the Ten Cent analysis area. There are no known den and rendezvous sites.
- This species would not be directly, indirectly, or cumulatively impacted by the proposed activities. If a wolf were to pass through the area during implementation, it would likely avoid project activities while they are occurring.

## Intermountain Sulphur (Butterfly)

### *Analysis Indicators*

Quality and distribution of Intermountain Sulphur meadow/roadside habitat including larval and adult forage sources. The measure for comparing alternatives is the number of acres of mechanical treatment or prescribed fire with the potential to impact roadside/meadow habitat features.

### *Affected Environment*

The intermountain sulphur butterfly inhabits open woodland from 3,400 to 5,000 feet in elevation, including meadows, roadsides, and open forest. Warren (2005) states that members of this subspecies are most often found on steep sunny slopes at the ecotone between forest and shrub-steppe or grassland habitats. Habitat for this species includes sagebrush with scattered ponderosa pine, including both south and east facing slopes. The larvae of this subspecies feed on *Lathyrus* (sweat pea) species. This species has an unknown status at the National Level, and has not been evaluated for the state of Oregon (NatureServe 2016). This species is found from the eastern Blue Mountains in Washington, through the Blue and Ochoco Mountains in Oregon, along the Snake River in Idaho, and south into western Utah. This species is suspected to occur on the Umatilla National Forest and has been documented on the Wallowa-Whitman National Forest. Loss of habitat due to agricultural conversion and development are the primary threats to this species. Pesticide use, especially aerial applications, also poses serious threats to this species.

There have been no surveys for this species in the analysis area or on the Umatilla or Wallowa-Whitman National Forest. Potential habitat for this species is present in the analysis area. Based on the fact that potential habitat is present, this species is assumed present in the analysis area.

### *Environmental Consequences*

#### Alternative 1 (No Action)

*Direct and Indirect Effects*

The quality of potential intermountain sulphur habitat is not expected to change in the short term. Habitat adjacent to roads and along tailings would continue to recover from past mining and vegetative treatment. Wildfire effects would generally be short-lived, as grassland and shrubland generally recover quickly.

#### Common to All Action Alternatives (2, 3, and 4)

*Direct and Indirect Effects*

Under all of the action alternatives, there would be treatment in roadside units that may provide habitat for this species. Machinery use in these areas has the potential to directly impact nectaring plants, larval host plants (*Lathyrus* species), and individuals in the short term. Treatment that reduces overstory canopy cover would likely promote the growth or nectar-producing plants in the mid and long term. Proposed landscape burning also has the potential to impact habitat for this species; following initial impacts to habitat and individuals, this activity would also promote the growth of larval and nectaring plants in the mid and long term, prior to ingrowth of conifer species.

#### *Cumulative Effects*

Past activities and events in the analysis area that affected potential intermountain sulphur habitat include livestock grazing, fuels treatment, and mining activity. Past grazing occurred at high stocking levels; overutilization and limited forage likely resulted in greater utilization of forbs, including preferred food plants and larval host plants. Mining activities have resulted in a permanent loss of habitat in some locations; in others, vegetative communities have recovered to some extent. These areas are generally associated with placer mining claims in the area. These activities, actions, and events have combined to create the existing condition of intermountain sulphur habitat in the analysis area.

There are no ongoing or reasonably foreseeable future activities with a potential to impact potential intermountain sulphur habitat in the analysis area. The Camp Creek Allotment is no longer an active allotment, and there are no plans to graze it in the foreseeable future.

When the expected effects of these alternatives are combined with the residual and expected effects of past, present, and future actions, activities, and events in the analysis area, there would be no cumulative reduction in habitat for this species or adverse impacts to the species. Expected impacts to potential habitat quality would be temporary, and would be spread through both time and space. Because burning would occur over approximately ten years across the analysis area, it is not expected that there would be an adverse cumulative impact on this species (if present).

#### *Determination and Rationale (All Action Alternatives)*

Under all of the action alternatives, the proposed activities may impact individuals or habitat, but are not likely to contribute to a trend towards federal listing or cause a loss of viability to the population or species. The rationale for this determination is as follows:

- The intermountain sulphur is not known to occur in the analysis area.
- Mechanical treatment activities have the potential to impact habitat and individuals in the short term.
- In the mid and long term, potential habitat quality may improve by reducing canopy closure adjacent to roads and maintaining these changes through time.
- Burning would affect habitat quality in the short term. Due to the intensity, timing, and mosaic nature of proposed landscape burns, and the fact that burning would be spread over the analysis area over a number of years, it is not expected that this species (if present) or potential habitat would be adversely impacted.

### Johnson's Hairstreak (Butterfly)

#### *Analysis Indicators*

Quality and abundance of old growth habitat featuring dwarf mistletoe. Measure for comparing alternatives is the number of acres of mechanical treatment or prescribed burning.

#### *Affected Environment*

Larvae of this butterfly are associated with coniferous forests that contain mistletoes of the genus *Arceuthobium* (dwarf mistletoes). The Johnson's hairstreak larvae feed exclusively on the aerial shoots of dwarf mistletoe plants (*Arceuthobium spp*.). Adults feed on a variety of nectar flowers. This species is considered to be an obligate old growth butterfly; due to their association with and tendency to reside in the forest canopy, this species is not often encountered. This species will also use late successional second growth forests. The Johnson's hairstreak is globally ranked as G3G4 (Vulnerable/Apparently Secure) (NatureServe 2016). Its status is uncertain; it is vulnerable and at moderate risk of extinction due to a restricted range, relatively few

populations, recent or widespread declines, or other factors, or it is uncommon but not rare. Due to declines or other factors there is some cause for long-term concern. In Oregon this species of butterfly is ranked S2 (imperiled) (NatureServe 2016). Scattered sightings of this species have occurred in the Blue Mountains, Wallowa Mountains, Siskiyou Mountains, the Coast Range, and the Cascade Mountains. The current range of the butterfly is not well understood, as most observations tend to be old. This species has been observed on the Umatilla and Wallowa-Whitman National Forests, but has not been observed in the Ten Cent analysis area. Threats to this species include habitat destruction (timber harvest, sanitation harvest, fire, etc.) and application of pesticides (including BTK bacterium) and herbicides.

Surveys for this species were initiated in the summer 2012 on the North Fork John Day Ranger District. Genetic analysis of possible Johnson's hairstreak larvae failed to identify this species on the District. Dwarf mistletoe is present in the analysis area; infections are generally light and restricted to drier sites. While this species is not currently known to occur in the analysis area, it may be present due to the fact that potential habitat is present.

#### *Environmental Consequences*

##### **Alternative 1 (No Action)**

*Direct and Indirect Effects*

The quality of potential Johnson's hairstreak habitat is not expected to change in the short term. In the mid and long term, habitat for this species would increase in some areas and decrease in others. Continued fire suppression would allow for the continued ingrowth of small diameter conifers in dry forest stands, and continued fuel accumulation in all upland forest PVGs. The risk of a high severity wildfire over a large portion of the landscape would increase in the future. High severity fire in the cold, moist, and dry upland forest PVGs would cause high overstory mortality, resulting is a reduction in the availability and distribution of mistletoe at a large scale over the long term.

##### **Common to All Action Alternatives (2, 3, and 4)**

*Direct and Indirect Effects*

Under all of the action alternatives, the primary purpose and need is to reduce fire behavior adjacent to values at risk and reducing the probability of crown fire and spotting. This would include breaking up the continuity of ladder and surface fuels, where needed. Where removal of infected trees would complement the purpose and need, potential habitat for this species may be impacted. In relatively uninfected western larch and ponderosa pine stands, the desired condition would be to maintain the status quo and limit infection of regenerating understory conifers of desired species. Outside of these specific areas, mistletoe-infected overstory trees and understory vegetation would be retained within treated portions of units. Skips (untreated areas within units) would provide for locally high levels of mistletoe infection within the proposed treatment units.

Danger tree felling would also likely impact mistletoe infected trees to some extent; those trees with dead mistletoe brooms that have the potential to interact with traffic on roads may be felled. While potential larval forage may be reduced to some degree, dwarf mistletoe would still be available within proposed mechanical treatment units following implementation. These trees, in addition to those infected trees located outside of proposed vegetative treatment units, would provide forage for this species, if present. Small diameter thinning may also impact dwarf mistletoe infected trees to a small degree. Generally, larger trees are used for egg deposition due to more numerous and larger mistletoe clumps (i.e., fruiting bodies), so the expected impact in small diameter thinning would be minor.

Landscape burning has the potential to affect the abundance and distribution of dwarf mistletoe. Landscape burning would create a mosaic of stand structure and composition across the landscape, with the majority of acres in the moist and cold upland forest PVGs burning at low and moderate severity; dry upland forest stands would generally burn at low severity. Overall, it is expected that 40 to 60 percent of burn unit acres would not carry fire. It is likely that infected trees would remain distributed across the landscape in lightly burned or unburned stands.

*Cumulative Effects*

Past activities, actions, and events in the Ten Cent analysis area that have impacted potential Johnson's hairstreak habitat include fire suppression and timber harvest. Fire suppression has likely allowed dwarf mistletoe to become more widespread and infections more severe within the analysis area and the larger landscape. Past harvest activities impacted potential Johnson's hairstreak habitat through direct removal of mistletoe infected trees of all size classes. These activities have combined to create the existing condition of Johnson's hairstreak habitat in the analysis area.

There are currently no ongoing or reasonably foreseeable future activities, actions, and events in the analysis area that are affecting Johnson's hairstreak habitat.

When the expected effects of these alternatives are combined with the residual and expected effects of past, present, and future actions, activities, and events in the analysis area, there would be an incremental reduction in potential larval foraging habitat in treatment units. However, mistletoe would likely continue to be more widespread than would be expected under historic conditions. Mistletoe infected trees are expected to be present in treatment units (general matrix, skips) following implementation. Landscape burning is also expected to result in a cumulative reduction in dwarf-mistletoe infected trees, as larger patches of overstory vegetation would be affected. When compared to the expected impact under the no action alternative (i.e. a large, high severity wildfire), the proposed action alternatives would provide for a greater abundance and distribution of dwarf mistletoe across the analysis area.

**Alternative 2**

*Direct and Indirect Effects*

This alternative would mechanically treat the same number of acres as Alternative 3. As a result, these alternatives would have similar impacts on potential habitat for this species, with respect to mechanical treatment. This alternative would landscape burn the most acres when compared to the other action alternatives; as a result, this alternative would have the most short and mid-term impact on the distribution and abundance of dwarf mistletoe-infected trees.

*Cumulative Effects*

This alternative would have the most cumulative impact on the abundance and distribution of potential habitat when compared to the other alternatives. Given the fact that mistletoe infected trees would be available within commercially harvested stands, low and mixed fire severity acres, and untreated areas, it is not expected that there would be an adverse cumulative impact on this species or its habitat under this alternative.

**Alternative 3**

*Direct and Indirect Effects*

This alternative would mechanically treat the same number of acres as Alternative 2 and landscape burn the fewest acres (primarily dry forest stands) when compared to the other action alternatives. As a result, it would have the least short and mid-term impact on the abundance and

distribution of dwarf mistletoe. In the long term, a larger proportion of the analysis area would be susceptible to further infection.

*Cumulative Effects*

This alternative would have the least cumulative impact on the abundance and distribution of potential habitat when compared to the other alternatives. Given the fact that mistletoe infected trees would be available within commercially harvested stands, low and mixed fire severity acres, and untreated areas, it is not expected that this species or its habitat would be adversely impacted under this alternative.

**Alternative 4**

*Direct and Indirect Effects*

This alternative would mechanically treat the fewest acres when compared to the other action alternatives. This alternative would also burn an intermediate number of acres compared to Alternatives 2 and 3. As a result, this alternative would allow for more widespread mixed severity burning in the analysis area. Overall impacts to this species and its habitat are expected to be intermediate between Alternatives 2 and 3.

*Cumulative Effects*

This alternative would have an intermediate cumulative impact on the abundance and distribution of potential habitat when compared to the other alternatives. Given the fact that mistletoe infected trees would be available within commercially harvested stands, low and mixed fire severity acres, and untreated areas, it is not expected that this species or its habitat would be adversely impacted under this alternative.

*Determination and Rationale (All Action Alternatives)*

Under all of the action alternatives, the proposed activities may impact individuals or habitat, but are not likely to contribute to a trend towards federal listing or cause a loss of viability to the population or species. The rationale for this determination is as follows:

- The Johnson's hairstreak butterfly is not known to occur in the analysis area; it is assumed present based on the presence of suitable habitat.
- Commercial thinning, and to a much lesser degree small diameter thinning, would impact the larval host plant (dwarf mistletoe) in order to complement the purpose and need and provide for long term stand health in the wildland urban interface. Potential larval foraging habitat would be available within (general matrix and skips) and outside of proposed treatment units following implementation.
- Burning would impact habitat to some degree. While the distribution of suitable habitat may be impacted, mixed severity burning would provide for patches of dwarf mistletoe infection across the landscape, especially in dry upland forest stands.

## Other Species

These are species that are "of interest" to the public at the local or regional level, or were identified as a species of concern by the US Fish and Wildlife Service. Occurrence determinations are based on observation records, vegetative and wildlife species inventory and monitoring, published literature on the distribution and habitat utilization of wildlife species, and the experience and professional judgment of wildlife biologists on the Umatilla and Wallowa-Whitman National Forests.

## Neotropical Migratory Birds

### *Analysis Indicators*

Quality and distribution of Neotropical bird nesting and foraging features (large trees/snags, variable structure/canopy closure, burned forest, regeneration) within the dry forest, mesic-mixed conifer, and sub-alpine habitat types. Measures for comparing alternatives is the number of acres of mechanical treatment or prescribed fire.

### *Affected Environment*

Neotropical migratory birds are those that breed in the U.S. and winter south of the border in Central and South America.

**Table 3-36: Birds of Conservation Concern (2008) with a potential to occur in the Ten Cent analysis area and their preferred habitat1,2**

| Bird Species | Preferred Habitat |
|---|---|
| Flammulated Owl | Associated with ponderosa pine forests and mixed conifer stands with a mean 67% canopy closure, open understory with dense patches of saplings or shrubs. |
| Calliope Hummingbird | Predominantly a montane species found in open shrub sapling seral stages (8-15 years) at higher elevations and riparian areas. |
| Olive-sided Flycatcher | Open conifer forests (< 40 % canopy cover) and edge habitats where standing snags and scattered tall trees remain after a disturbance. |
| Cassin's Finch | Open, mature coniferous forests of lodgepole and ponderosa pine, aspen, alpine fir, grand fir and juniper steppe woodlands |

[1]Species for which there have been no observations and no suitable habitat is present in the analysis area are not displayed here.

[2]The bald eagle, peregrine falcon, upland sandpiper, black swift, black rosy-finch, Williamson's sapsucker, Lewis' woodpecker, and white-headed woodpecker are addressed elsewhere in this document. There will be no further analysis of effects for these species in this portion of the document.

*The Conservation Strategy for Landbirds in the Northern Rocky Mountains of Eastern Oregon and Washington* (Altman 2000) was published by the Oregon-Washington Chapter of Partners in Flight in 2000. The Strategy uses a priority habitat and focal species approach to conserving landbirds. By managing for a group of focal species representative of important habitat components, many other species and elements of biodiversity would be accounted for. Table 3-37 displays focal species and associated priority habitats from the Altman (2000) publication.

**Table 3-37: Priority habitat features and focal species for habitats in the Northern Rocky Mountain Province as described in Altman (2000)**

| Habitat Type | Habitat Feature/Conservation Focus | Focal Species |
|---|---|---|
| Dry Forest | Large patches of old forest with large trees and snags | White-headed woodpecker |
| | Old forest with large trees & snags interspersed with grassy openings and dense thickets | Flammulated owl |
| | Open understory with regenerating pines | Chipping sparrow |
| | Patches of burned old forest | Lewis' woodpecker |
| Mesic Mixed Conifer | Large snags | Vaux's swift |
| | Overstory canopy closure | Townsend's warbler |
| | Structurally diverse; multi-layered | Varied thrush |
| | Dense shrub layer in the forest understory or forested openings | MacGillivray's warbler |
| | Edges and openings created by wildfire | Olive-sided flycatcher |
| Riparian Woodland | Large snags in riparian woodlands | Lewis' woodpecker |

| Habitat Type | Habitat Feature/Conservation Focus | Focal Species |
|---|---|---|
| | Riparian woodland canopy foliage | Red-eyed vireo |
| | Riparian woodland understory vegetation | Veery |
| Riparian Shrub | Shrub density; willow/alder shrub patches | Willow flycatcher |
| Unique Habitats | Subalpine | Hermit thrush |
| | Montane Meadow | Upland sandpiper |
| | Steppe-shrubland | Vesper sparrow |
| | Aspen | Red-naped sapsucker |
| | Alpine | Gray-crowned rosy finch |

Habitat types (defined in Altman 2000) present within the analysis area include Dry Forest (equivalent to the dry upland forest PVG), Mesic Mixed Conifer Forest (generally equivalent to the moist upland forest PVG), and subalpine (generally equivalent to the cold upland forest PVG).

#### Dry Forest Habitat

Approximately 20 percent of the analysis area is made up of dry upland forest habitat. The dry forest habitat type includes coniferous forest composed exclusively of ponderosa pine, or dry stands co-dominated by ponderosa pine and Douglas-fir or grand fir (Altman 2000). Bird species associated with dry forest have shown the greatest population declines and range retractions in the northern Rocky Mountain province (Altman 2000). In particular, bird species highly associated with snags and old-forest conditions have declined. These species include white-headed woodpecker, flammulated owl, white-breasted nuthatch, pygmy nuthatch, Williamson's sapsucker, and Lewis' woodpecker. Old forest, single-story ponderosa pine habitat has declined by 96 percent in the Blue Mountains ERUs (Ecological Reporting Units) of the Interior Columbia Basin, primarily due to timber harvest and fire suppression (Wisdom et al. 2000). Habitat restoration is the primary strategy for conservation of landbirds associated with this habitat type.

The dry upland forest habitat within the analysis area generally meets the dry forest habitat criteria provided by Altman (2000), with the exception of the size and spacing of old forest single-stratum (OFSS) habitat criteria. Old forest single stratum habitat is currently well below the Historical Range of Variability (HRV) in the dry upland forest PVG in the analysis area. All four of the dry forest focal species listed in the Altman (2000) report are believed to be present in the analysis area, either due to observation records, or assumptions that are based on the presence of potential habitat. The chipping sparrow is common on the District; the other species are uncommon. The Lewis’ and white-headed woodpeckers were also analyzed as Sensitive species. Refer to the *Threatened, Endangered, Proposed, Candidate, and Sensitive Species* section for further discussion of these species.

#### Mesic Mixed Conifer Habitat

Mesic mixed conifer habitat occurs mostly at higher elevations, wetter sites, northerly aspects, and in draws where soils are mesic and well developed. It is generally composed of stands in the moist upland forest PVG. This type includes coniferous forest composed primarily of cool moist Douglas-fir/grand fir, cool dry Douglas-fir, and western larch. Lodgepole pine may also be present in some locations. Late successional stages have been commonly harvested with regeneration prescriptions such as clearcutting or shelterwood harvesting to reduce insect and disease damage. Bird species associated with late successional stages have been impacted by the loss of late-seral conditions and snags. The desired condition is a late successional, multi-layered

forest with a diversity of structural elements. Mesic mixed conifer habitat accounts for approximately 39% of the analysis area.

#### Subalpine Habitat

Subalpine forest habitat occurs at high elevations and wetter sites. These sites are typically associated with moderate to heavy winter snowpack. This habitat type is generally composed of stands in the cold upland forest PVG. This type includes coniferous forest composed primarily of lodgepole pine, subalpine fir, Engelmann spruce, grand fir, and western larch. These habitats are characterized as having multiple canopy layers, dense understory shrub layers, and high dead wood levels. These stands are characterized by infrequent, large scale disturbance events (fire). The desired condition for this habitat type is multilayered stands with well-developed understory shrub layers. The focal species for this habitat type is the hermit thrush. Approximately 39 percent of the analysis area is composed of subalpine habitat.

### *Environmental Consequences*

#### Alternative 1 (No Action)

*Direct and Indirect Effects*

The current condition of habitat for land birds in the analysis area would not change in the short term or early mid-term. In the long term, dry forest habitats would continue to be invaded by shade tolerant tree species due to fire suppression. This would further restrict development of old forest single stratum habitat; this habitat type would continue to be well below the HRV in the long term. Mesic mixed conifer stands would also continue to develop multiple canopy layers and dense understories. Stress resulting from overstocking in upland forest stands would increase the susceptibility of these stands to insects and disease, which would in turn increase snags and downed fuel loadings and increase the risk of high severity fire. High severity burn effects have the potential to impact large green trees and snags. Fire would create edges and perches that would benefit some species (olive-sided flycatcher and Lewis' woodpecker), and encourage shrub regeneration, and increase conifer seed production in the short term (Cassin's finch). Species requiring high canopy closure and multiple canopy layers would be negatively impacted by a fire that creates larger patches of high overstory mortality. High severity fire would also negatively impact habitat for the hermit thrush in subalpine forest habitat due to the fact that overstory structure and understory shrub layers would experience high mortality. The calliope hummingbird may benefit in the short and mid-term as flowering vegetation growth is stimulated.

#### Alternative 2

*Direct and Indirect Effects*

This alternative would have similar effects to those described under the *Common to All Action Alternatives* section. Alternatives 2 and 3 would commercially thin (with skips), small diameter thin, and mechanically treat fuels on the same number of acres. Disturbance to potential nesting habitat, potential nest loss, and snag reductions (through hazard/danger tree felling, felling as part of stand prescriptions, and landscape burning) would be the greatest under this alternative. This alternative would have long term benefits on dry upland forest stands; proposed activities (burning and vegetative treatment) in these areas would improve habitat conditions for the white-headed woodpecker, Lewis' woodpecker, chipping sparrow, and flammulated owl in the mid and long term. This alternative would also have the most impact on mesic mixed conifer and subalpine forest migratory birds that require dense canopies, structurally diverse and multi-layer forests, and dense stands with heavy shrub and understory regeneration in the long term through vegetative treatment and landscape burning. This impact would be less than if the No Action Alternative were implemented. Under this alternative, fire would be placed on the landscape at a

time and under fuels conditions that are favorable to mixed severity fire effects. Under the No Action Alternative, a large, high severity fire would be expected to create homogeneous habitat over a large area. While several species (Lewis' woodpecker, olive-sided flycatcher, Cassin's finch, calliope hummingbird) would benefit from a fire of this type in the short and mid-term, mixed severity burning expected under this alternative would provide for burned forest stands and regenerating grasses, forbs, and shrubs selected for by these species while maintaining dense patches and multi-layered stands for other species.

*Cumulative Effects*

The cumulative impacts of this alternative would be similar to those described under the *Common to All Action Alternatives* section. When the residual and expected effects of past, present, and reasonably foreseeable future activities are combined with the expected effects of this alternative, Alternative 2 would have the greatest incremental reduction in nesting and hiding cover and cause the most disturbance on migratory birds and their habitat in the short and mid-term. This is due to the fact that this alternative would mechanically treat vegetation and landscape burn the most acres when compared to Alternatives 3 and 4. Landscape burning in moist and cold upland forest PVGs under this alternative would begin to reverse the effects of past fire suppression; while habitat for mesic mixed conifer and subalpine forest species requiring complex, dense stands would be reduced, a mosaic of fire affected stands would be provided, improving habitat distribution for some species.

**Alternative 3**

*Direct and Indirect Effects*

This alternative would have similar effects to those described under the *Common to All Action Alternatives* section. Alternatives 3 would commercially thin (with skips), small diameter thin, and mechanically treat fuels on the same number of acres as Alternative 2. Disturbance to potential nesting habitat, potential nest loss, and snag reductions in proposed vegetative treatment units would be the greatest under this alternative due to the fact that it would treat these acres more intensively than Alternative 2. Because this alternative would drop all Wilderness burning and burning in the moist and cold upland forest PVGs, a higher proportion of the landscape would be left susceptible to a large, high severity wildfire similar to the No Action Alternative.

*Cumulative Effects*

The cumulative impacts of this alternative would be similar to those described under the *Common to All Action Alternatives* section. When the residual and expected effects of past, present, and reasonably foreseeable future activities are combined with the expected effects of this alternative, there would be an incremental reduction in nesting and hiding cover and increased disturbance on migratory birds and their habitat in the short and mid-term. Cumulative impacts to structurally diverse and multi-layer forests and dead wood in commercial thinning units would be greater under this alternative due to the fact that it would thin these areas to the minimum basal area. This alternative would also landscape burn the fewest acres; this activity would generally contribute to reversing past reductions in suitable habitat for the chipping sparrow, white-headed woodpecker, and flammulated owl. Landscape burning in mesic mixed conifer and subalpine forest would largely be dropped under this alternative. In the short and mid-term, this would maintain existing habitat conditions; in the mid and long term, leaving these stands untreated would exacerbate past habitat changes that have occurred as a result of fire suppression.

**Alternative 4**

*Direct and Indirect Effects*

This alternative would have similar effects to those described under the *Common to All Action Alternatives* section. Disturbance to potential nesting habitat, potential nest loss, and snag reductions (through hazard/danger tree felling, felling as part of stand prescriptions) would be the least under this alternative due to the fact that it would mechanically treat the fewest acres. This alternative would have less short and mid-term burning impacts on mesic mixed conifer and subalpine forest migratory birds that require dense canopies, structurally diverse and multi-layer forests, and dense stands with heavy shrub and understory regeneration than Alternative 2. In the long term, acres dropped from burning would be more susceptible to high severity wildfire, which would impact structure desired by most mesic mixed conifer and subalpine focal species over a large area, as opposed to the mosaic nature of proposed landscape burning.

*Cumulative Effects*

The cumulative impacts of this alternative would be similar to those described under the *Common to All Action Alternatives* section. When compared to the other action alternatives, mechanical vegetation manipulation under Alternative 4 would have the least incremental reduction in nesting and hiding cover in the short and mid-term. Landscape burning in moist and cold upland forest PVGs under this alternative would begin to reverse the effects of past fire suppression. While habitat for mesic mixed conifer and subalpine forest species requiring complex, dense stands would be reduced, a mosaic of fire-affected stands would be provided, improving habitat distribution for some species. These cumulative impacts would be slightly less than Alternative 2 due to the fact that fewer acres of burning would occur in mesic mixed conifer habitat and subalpine habitat under Alternative 4.

## Summary of Impacts to Proposed, Endangered, Threatened, and Candidate Wildlife and R6 Sensitive Wildlife Species and Habitat

### Biological Evaluation

The following constitutes the Biological Evaluation for the Ten Cent Community Wildfire Protection Project as required by the Endangered Species Act and outlined in Forest Service Manual 2670.The species in the table below are those Federally ESA listed and Region 6 Sensitive Species that were analyzed for the Ten Cent Community Wildfire Protection Project. Impacts were not evaluated for the peregrine falcon, Canada lynx, bald eagle, upland sandpiper, bufflehead, greater sage grouse, black swift, harlequin duck, black rosy-finch, Wallowa rosy-finch, Columbian sharp-tailed grouse, and silver-bordered fritillary because they are not present in the analysis area, have no suitable or potential habitat within the analysis area, or both. For this reason, the proposed project would have no impact on these Region 6 Sensitive Species and no effect on the Threatened Canada lynx. Table 3-38 summarizes the determinations made for those species analyzed fully in this biological evaluation.

**Table 3-38: Summary of Determinations**

| Species | Designation | Determination | | |
|---|---|---|---|---|
| | | Alt 2 | Alt 3 | Alt 4 |
| Townsend's big-eared bat | Sensitive | NI | NI | NI |
| Spotted bat | Sensitive | NI | NI | NI |
| Fringed myotis | Sensitive | MIIH | MIIH | MIIH |
| Western bumblebee | Sensitive | MIIH | MIIH | MIIH |
| North American wolverine | Sensitive | MIIH | MIIH | MIIH |
| Yuma skipper | Sensitive | NI | NI | NI |
| Fir pinwheel | Sensitive | NI | NI | NI |

| Species | Designation | Determination | | |
|---|---|---|---|---|
| | | Alt 2 | Alt 3 | Alt 4 |
| Columbia spotted frog | Sensitive | MIIH | MIIH | MIIH |
| Inland tailed frog | Sensitive | MIIH | MIIH | MIIH |
| White-headed woodpecker | Sensitive | MIIH | MIIH | MIIH |
| Lewis' woodpecker | Sensitive | MIIH | MIIH | MIIH |
| Gray wolf | Sensitive | NI | NI | NI |
| Intermountain sulphur | Sensitive | MIIH | MIIH | MIIH |
| Johnson's hairstreak | Sensitive | MIIH | MIIH | MIIH |

**NE -** No effect on a proposed or listed species or critical habitat; **NLAA** - May affect, but not likely to adversely affect a listed species or critical habitat; **LAA** - May affect and likely to adversely affect a listed species or critical habitat; **NI -** No Impact to R6 sensitive species individuals, populations, or their habitat; **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; **WI -** Will impact individuals or habitat with a consequence that the action will contribute to a trend towards federal listing or cause a loss of viability to the population or species.

# 3.6 Soils

## Methodology

Terrestrial Ecosystem Unit Inventory (TEUI) soil survey data to determine the types of soils present within the planning area. Some of the taxonomic information (texture) was used in the WEPP[6] (Elliott & Robichaud, 2001) erosion analysis; along with estimated vegetation data. The erosion analysis was conducted to determine if the proposed activities would create a risk to either soil productivity or water quality (sediment). Analysis was done for all mapped soil textures in the project area (Loam, Sandy Loam, Silt Loam and Clay Loam). The TEUI is mapped to such detail that unstable locations can be eliminated, in the planning process units were altered or eliminated by this stability analysis. A Soil Productivity Index was developed for each TEUI Map Unit (MU) within the project area. The TEUI contains the taxonomic names of all soils within the surveys map units. These taxonomic names were utilized to identify the Soil Productivity Index (Soil PI) of each unit in the proposal (Schaetzl et al. 2014).

Soil productivity (Soil PI) has been evaluated by soil taxonomic name for this proposal. A 2014 evaluation system was developed in concert with the Forest Service and the University of Michigan (Schaetzl, 2012). This analysis used this information to discern which units may be labeled low moderate or high soil productivity. Also to provide an understanding of soil productivity within proposed units, and how past activities may have influenced the soil resource; remote observations were made to identify legacy impacts. These observations began as remote sensing of historic aerial photos and contemporary aerial photographs.

Observations were made early in the project for soil stability and field examinations for these features do not conflicted with completed soil mapping (TEUI). The remote sensing identified unstable landforms in unit 4, 93 & 140. Alterations and exclusions were made to the proposed units in the planning process to minimize risk of accelerated movement on these slopes. There were some locations where overland flow could offer sediment, but due to the gentle slopes and minor scour of the exposed soil; it is assumed that this occurrence was likely within background erosion and sediment volumes.

The criteria for disturbed soil were defined by Page-Dumroese, et al 2009 & Napper et al 2009. The descriptions within the Soil Disturbance Protocol were then used to validate the presence or absence of detrimental disturbance mapped from remote sensing. Some field validation was conducted in 2015. These observations and data collection helped to determine detrimental

[6] WEPP – Water Erosion Prediction Program, an internet based erosion model.

impact to the soil resource remaining in an impacted state and if it is to be considered to be in a detrimental condition. Observations and measurements were taken every 100 feet. The worksheet offered in Page-Dumroese, et al 2009, Appendix C-3 was adapted for data collection. The form was altered to gather data on live trees within mapped trails.

### Analysis Indicators and Measures

The Umatilla NF LRMP has soil productivity goals that are used as indicator of change. The LRMP directs that land management projects will:

**Table 3-39: Resource Indicators and Measures (RIM) for Assessing Effects**

| Resource Element | Resource Indicator | Measure | Used to address: P/N, or key issue? | Source (LRMP S/G; law or policy, BMPs, etc.)? |
|---|---|---|---|---|
| Slope Stability | Landslide or other movement in proposed activity unit | Mapped area of unstable acres in proposal | Yes | LRMP, FSM, Multi-Use Sustainable Yield Act |
| Soil Productivity (DSC) | >80% acceptable productivity potential | <20% Increase in volcanic soil Bulk Density (Db) | Yes (Issue 3 & 4) | |
| | | <15% Increase in non-volcanic soil Bulk Density (Db) | | |
| | | < 50% top soil loss within 100 sq. ft. | | |
| | | Mineral soil altered from burning and charring | | |
| Soil Productivity | Erosion loss to soil productivity or change in water quality | Loss of surface soil | | |
| Water Quality | | Change in water quality | | |

### Spatial and Temporal Bounding

The spatial boundaries for analyzing the direct and indirect effects to the soil resource are all sites where soil disturbing activities will occur. Because the soil resource moves spatially on a geologic timeframe.

The temporal boundaries for analyzing the direct and indirect effects are from the initiation of historic forest activities, because soil disturbance can remain on the landscape for many decades.

## Affected Environment

The soil orders within the project area range from slight (Andisols, Entisols, and Inceptisols) to intermediate (Alfisols and Mollisols) in their degree of development (Brady and Weil, 1999). For context soil development can range from hundreds of years to thousands of years, depending upon the competency of the parent material and the climate of the area.

Soil taxonomy offers clues as to how the landscape may have looked long ago. For example four of the five soil orders identified can develop under a forested environment. Entisols (<1 percent of unit soils) are mineral soils that are weakly developed without subsurface horizons or with recently developing horizons (Brady and Weil, 1999), and are formed on recent alluvial parent material. Entisols found within the project area are mostly found near steeper slopes where

erosion rates over cede soil-forming processes. Soil productivity is typically higher in areas of alluvium and low in areas of shifting sand or steep slopes. The implication of this finding is Entisols (poorly developed soils) played a minor role in the current conditions of the project area.

The soil order with the largest acreage within the project area is Andisols (~48 percent of unit soils). Andisols are formed when there is a deposition of volcanic flow of pumice material or the deposition laden with ash and pumice, such as those found within the Ten Cent area (Brady and Weil, 1999). In the Ten Cent area it is assumed that the presence of intact over burden of ash air fall is a sign of increased productivity (Garrison-Johnston et al., 2007), when compared to non-Andic soils. Andisols in the project area are found in gently to moderately sloping convex landforms, deposited from volcanic ash. The location of capped Andisols on convex landforms above concave landforms composed of Inceptisols and Entisols suggests that there was mixing and deposition of ash, and that overlying Andisols have stabilized overtime. Alfisols (12 percent) are soils typically associated with development under forested conditions (Brady and Weil, 1999). Characteristically Alfisols form under native deciduous forest, however in the Mediterranean climate of the area; it is likely they formed under grass savannah as the native vegetation (Brady and Weil, 1999). Alfisols are good productive soils and rank favorably with Mollisols in productivity (Brady and Weil, 1999).

Mollisols (~9 percent) typically form in a grassland environment; some Mollisols form under forest, but mostly in depressions (Brady and Weil, 1999). Mollisols are characterized with having a dark color (Chroma of 2 or less), the presence of high organic matter content, and >50 percent saturation with base-forming cations Ca2+, Mg2+, and so forth (Brady and Weil, 1999). Given the locations of the Mollic soils mapped in the area, it is not likely these soils formed under topographic depressions in the landscape, meaning the soil habitat may have been best described as savannah with widely spaced trees. It is not known what may have created the conditions, which formed these soils, but it is very likely that fire had a role in density management that produced the area's Mollisols.

## Resource Indicator and Measures for Existing Soil Conditions

**Table 3-40: Resource Indicators and Measures for the Existing Conditions**

| Resource Element | Resource Indicator | Measure | Existing Detrimental Soil Condition (ac) |
|---|---|---|---|
| Soil Stability | Soil Mass Failure | Active areas identified and dropped from proposal | 51 |
| Soil Productivity | Erosion | Activity unit acres modeled >0.03t/ac | 0.0 |
| Water quantity | Sediment | Activity units that may produce >0.03t/ac | 0.0 |
| Existing Detrimental Soil Conditions[7] | Change or absence in vegetation growth | Existing trails in proposed Harvest Units | 75.2 |

[7]This estimate of DSC is based on Ten Cent field observations.

## Human Influences to the Soil Resource

As mentioned in Methodology (Field Observations), there have been human caused influences that caused some change to the soil resource. Some of these influences have been recognized as having either beneficial, no effect, or detrimental effects to the soil resource.

In the past, human ignited fire could be partially responsible for stand densities consistent with Mollisol soil development. In a general sense, it is assumed that maintenance burning will beneficially consume fuels, preventing high intensity and long duration fires that can detrimentally heat alter the soil resource. Conversely, current human suppression of fire has built up wildland fuel loads that may create detrimental effects on soil resources (i.e. heat altered soil). Heat altered soil is commonly associated with sterilization of the topsoil and the formation of hydrophobic layers that promote erosion and stream sediment.

The presence (or absence), growth and development of trees in mapped trails was considered to be a surrogate measure for soil productivity. Soil disturbance measurements were taken in 12 by 12ft plots, along the mapped trail. Plot size was based on the average 12ft width of trails. Information gathered showed a presence or absence of tracks (ruts), berms or burned soil and the depth of the disturbance. The presence of ruts or berms is a sign of soil disturbing equipment traffic (soil molding). Since trails are expected to recover to natural soil conditions over time, it was assumed these changes in vegetation and soil structure were a signature of declining soil productivity (i.e. DSC) within the prism of these mapped features. To measure a change in soil structure or lost soil productivity each data collection point was excavated by shovel to measure any change in the soil structure. Excavations were made to approximately 30 cm (12 inches) and evaluations were made for three depths; 0-10 cm (~0- 4 inch), 10-20 cm (~4-8 inch), and 20-30 cm (~8-12 inch). Changes to soil structure and/or density were compared to nearby soil structure of a less disturbed or undisturbed area. Within the less or undisturbed observation sites, vegetation did not appear to have been limited by some other previous forest activity, so it served as a good benchmark of soil change.

### *Erosion and Sediment*

Baseline overland erosion and the sediment it may create were modeled with WEPP, for slopes and soil textures found within proposed harvest units. This modeling also took into account the differing soil textures & rock percent's associated dominant soils in all units; unit slopes ranges, and the EGC were also part of the variables in the modeling. To generate baseline sediment and the probability of its occurrence, the range of variables in units were populated in the model to test the greatest distance offered within the model (1200ft). This modeling showed a baseline that was low probability (0%) of sediment and low volumes of sediment (undetectable). Since this is a model and may not represent actual occurrences, the nearby Barometer Watershed report (Harris, et.al. 2007) was used to define a baseline estimates to be used with the modeled results for sediment; this soils analysis assumes that modeled estimates above 0.03t/ac will need some mitigation or avoidance measures to allow for proposed activates to be considered sustainable from the perspective of the soil resource.

### **Soil Stability**

Observations were made early in the project for soil stability and field examinations for these features did not conflict with completed soil mapping (TEUI). Known Mass Failure features were mapped and deleted from the project units. Therefore this resource indicator of slope stability is not a further factor in this analysis.

#### Soil Productivity

Presence of erosion was detectable, but field observations are consistent with expected sedimentation rates noted by WEPP. Modeled levels below 0.03t/ac occurred, however may not be measureable in the field.

#### Water Quality

Evidence of scour (sediment movement was recorded in the examination of streams (i.e. Class 4 identification). However it is assumed that field observations are consistent with expected sedimentation rates noted by WEPP. Modeled levels below 0.03t/ac occurred, however may not be measureable in the field.

#### Detrimental Soil Conditions (DSC)

The presence of DSC was found in association with existing trails. It is assumed that most of these trails were left from previous harvest activities, but some may have been created from unregulated recreation in the area. Topography of the area is conducive to access for most forms of vehicles used in recreation activities. Estimates of DSC are based on the 2015 Ten Cent field observations; in those site visits 51.7 miles (75.2 acres) of trails were considered DSC (including system roads).

## Environmental Consequences

### Alternative 1

#### *Direct and Indirect Effects*

#### Soil Stability

Two mass failure sites were identified in the area and are present in a limited number of the proposed activity units. It is assumed that mass failure could be influenced by proposed activities. In order to eliminate potential of further acceleration of known mass failures, those areas (50.8 ac) are excluded from the proposed project units. Despite removing these areas from proposed units and activities, these unstable lands are likely to continue to move under this and all other alternatives. This movement will continue to affect Forest Service Road 7300, north of the town of Granite, as rock fall and ditch cleanout are chronic problems in this stretch of road due to this hillside feature. The second Mass Failure site, though unlikely to create noticeable effects on gentle slopes, may slump further under certain precipitation events onto a proposed haul route.

#### Soil Productivity

If the project area were to continue unchanged by further disturbance from humans or natural events; it would remain on its current soil developmental trajectory with no direct change to the resource indicator of erosion. This assessment was made despite the presence of DSC (existing trails), that are assumed to be detrimentally impacted from previous harvest. While the presence of some DSC is known to increase sediment, it is currently covered with adequate Effective Ground Cover (EGC) to limit erosion above background levels.

Due to the presence of DSC, in the form of existing trails, erosion could be an indirect effect to this alternative (i.e. wildfire loss of vegetation). This alternative does not reduce fuel loads, thus the wildland fire assumptions in the analysis are for High Severity Burn in the erosion analysis.

The most productive part of the soil is often the closest to the mineral surface (Brady and Weil, 1999). Erosion would either change the location of productive soil; or be a loss of soil productivity to the site and provide stream sediment inputs. Additionally, the network of existing trails can offer means to route surface flow and sediment to streams. In an effort to understand

this effect, WEPP modeling added the variable of EGC loss to the harvest scenarios modeled. As with the no action alterative showed previously, tree canopy removal with adequate EGC did not have a measureable effect to erosion.

#### Water Quality

If the project area were to continue unchanged by further disturbance from humans or natural events; it would remain on its current soil developmental trajectory with no direct change to the resource indicator of sediment. This assessment was made despite the presence of DSC, in the form of existing trails, assumed to be detrimentally impacted from previous harvest. While the presence of some DSC is known to increase sediment, it is currently covered with adequate EGC to limit sediment above background levels (WEPP modeling).

#### Detrimental Soil Conditions (DSC)

Without human intervention there are not many cases when the soil resource can be influenced. Thus the inhibition of the growth of tree and brush (per FSM 2551.5 exhibit 01) would be considered an expression of a detrimental change to the productivity of the soil resource. Within the proposed planning area there are human created trails that measure approximately 51.7 miles of assumed trail. These trails appeared to have inhibited vegetation growth and type of vegetation (Figure 1).

The inhibition on plant growth seems to be related to trees and brush (lodgepole pine being less affected); grasses, herbs and forbs in general may also have been influenced, but no measureable change was identified in the soils report. Estimates of DSC (Table 3-41) are based on the 2015 Ten Cent field observations. While a quantitative measure was not included in the field evaluation, locations of disturbance were recorded and matched in a remote sensing. The remote sensing was conducted with ArcMap and recent aerial photography. The canopy closure of the area did not prevent observation of past trails and other disturbance in the photo for many cases. It is assumed that some disturbances were not observed by either partial canopy closure or are not visible without a site visit. However if the canopy closure did occur this might be an indication that DSC are not preventing stand growth.

**Table 3-41: Resource Indicators and Measures (RIM) for Alternative 1**

| Resource Element | Resource Indicator | Measure | Existing DSC Effects mi (ac) (Alt. 1) |
|---|---|---|---|
| Soil Stability | Soil Mass Wasting | No active areas identified | 51.7 |
| Soil Productivity | Erosion | Activity unit acres modeled $\geq$0.03t/ac | 0 (0) |
| Water quantity | Sediment | Activity units that may produce $\geq$0.03t/ac | 0 (0) |
| Detrimental Soil Conditions (DSC) | Change or absence in vegetation growth | Existing roads and trails in proposed Harvest Units[4] | 75 |

### Alternative 2, 3, and 4

From a soil perspective the alternatives vary mostly in acres of treatment, but have little variation to the resource indicator measures. Some narrative discussion may cover the minor differences between all alternatives. The proposed action is to meet the purpose and need of the project include roadside treatments, small diameter thinning and commercial thinning (up to 21 inches in diameter at breast height), mechanical fuels reduction, riparian habitat conservation treatment, prescribed burning, and prescribed fire in wilderness.

### *Direct and Indirect Effects*

The direct and indirect effects discussion are combined for this analysis. Additionally the differences between the alternatives for the soil resource are very similar for the soil resource so all three alternatives will also be covered in this section.

Of the units with some measure of wet soils mapped in the TEUI only ground based units 61, 62 and 63 are mapped with aquic (wet) soils. These road side units have a variety of proposed treatment types listed and no designation of treatment for a given acre. Therefore, to analyze the activity all units will be viewed as being ground based (the most impactful) in their implementation to err on the side of the soil resource.

#### Slope Stability

In the planning process all known and observed locations of unstable ground and the zone of influence above the slope instability were dropped from the proposal. The zone of influence was assumed to be either the slope shoulder or an obvious change in geology seen in the slopes parent material. Since there are no unstable slopes within proposed units this Resource Indicator and Measure will not be analyzed further.

#### Soil Productivity

Erosion is a concern to soil productivity and adds to sediment production when that erosion continues to a water source, before it can be slowed and deposited on the landscape. When looking at the base erosion rates for the area. Modeling within the WEPP program showed that with the appropriate Effective Ground Cover ≥65% (EGC) erosion can be reduced or immeasurable on this landscape. It is assumed that both the low precipitation rates for the area and EGC can work together to minimize the risk of erosion. Many previous activities on the Umatilla NF have shown that 65% EGC is easy to attain in harvest, fuels and mastication activities; these are the activities which have the potential to cause erosion.

Within some units there are designations of wet or moist soils. When equipment is allowed to travel on soils that has lost bearing strength from elevated moisture or saturation it can lead to erosion being elevated. Within these all units (regardless of moisture designation of Aquic, Udic or Xeric) a BMP (soil 4) will stop activities when they reach a rutting depth of 4 inches. It is assumed that in the project area, that 4 inches is a reasonable depth of freeze/thaw in the soil. 4 inches is a freeze/thaw depth which could mitigate compaction less than 4 inches.

#### Water Quality

Due to the anticipated low erosion rates sediment action will also be low, especially since sediment does not occur without erosion.

Within some units there are designations of wet or moist soils. When equipment is allowed to travel on soils that has lost bearing strength from elevated moisture or saturation it can lead to sediment being elevated. Within these all units (regardless of moisture designation of Aquic, Udic or Xeric) a BMP (soil 4) will stop activities when they reach a rutting depth of 4 inches. It is assumed that in the project area, that 4 inches is a reasonable depth of freeze/thaw in the soil. 4 inches is a freeze/thaw depth which could mitigate compaction less than 4 inches.

#### Detrimental Soil Condition (DSC)

Soil disturbance can detrimentally impact plant growth and development. That disturbance can take the form of harvest equipment (Bulmer et al. 2010, Elliott et al 2001, Han et al 2006 Henninger et al 2002, Napper et al 2009 and Reeves et al 2001) or wildfire. Of the concern for

this project both equipment used for proposed actions harvest and equipment used for proposed fuels management will be an evaluating element.

Within every alternative there was a proposal to use some form of equipment for harvest or fuels reduction. In either case, equipment can create detrimental soil effects, provided the equipment is not used with certain mitigations to prevent soil damage. When using normal skidders, (dozer, tracked or rubber tired) equipment can be limited to specific spacing to limit its footprint across an activity unit. When a spacing of 600 feet between temporary roads is used with a 100 foot spacing of skid trails; followed by the obliteration of temporary roads an activity units can easily assume 8% to 10% DSC. For this analysis 10% was used for the presumed disturbance within proposed units with any mention of ground based activities. When the proposed activity was matched with observed DSC totals were made to account for direct and indirect impacts to DSC; in no case was there a unit that exceeded the LRMP limits of 20% DSC in an activity unit.

If a proposed activity used a skid trail spacing that is closer or implemented the project without obliterating temporary roads DSC would be elevated and could influence the next entry.

**Table 3-42. Resource Indicators and Measures (RIM) for all action alternatives**

| Resource Element | Resource Indicator | Measure | Alt. 2 Existing DSC & proposed Effects (ac) | Alt 3 Existing DSC & proposed Effects (ac) | Alt 4 Existing DSC & proposed Effects (ac) |
|---|---|---|---|---|---|
| 1. Soil Stability | Soil Mass Wasting | No active areas identified | 0.0 | 0.0 | 0.0 |
| 2. Soil Productivity | Erosion | Activity unit acres modeled ≥0.03t/ac | 0.0 | 0.0 | 0.0 |
| 3. Water quantity | Sediment | Activity units that may produce ≥0.03t/ac | 0.0 | 0.0 | 0.0 |
| 4. Detrimental Soil Conditions (DSC) | Change or absence in vegetation growth | Existing and new roads and trails in proposed Harvest Units[4] | 297 | 297 | 290 |

### *Cumulative Effects*

With the exception of reasonably foreseeable activities of future harvest, none of the mentioned activities will have an influence to the soil resources in the proposed activities area.

#### Soil Stability

During the planning process some areas with slope stability issues were identified. Those areas have been dropped from the proposal, therefore there are no issues related to Resource Indicator and Measure 1.

#### Soil Productivity

The proposal has some ground based activities within units 61, 62 and 63. The TEUI mapping shows these units being associated with aquic soils. These types of soil are known for being moist or wet into summer months. These units will need close evaluation and monitoring during activities to ensure they do not exceed BMP limits. Compaction can be associated with these types of soil, which can lead to erosion. Soil productivity can be influenced by erosion, but with the exception of units 61, 62 and 63 in Alternatives 2&4 there is little risk of accelerate erosion

within the units. If the proposal utilizes adequate EGC the risk can be managed or brought to unmeasurable levels.

#### Water Quality

Sediment delivery is not expected to be elevated from the proposal, due to low erosion risk. Therefore, the proposal (with EGC limits) will promote issues with Resource Indicator and Measure 3.

#### Detrimental Soil Condition (DSC)

Cumulatively as harvest occurs with each entry skid trails can be left to accumulate in total area. If these skid trails have not lessened in compaction or accumulated surface organic matter then the past, and proposed effects could have a detrimental effect to future soil productivity within a given activity unit. The effects of this accumulated area of disturbance can potentially reduce the future vegetative growth or desired species of plants or lead to undesired plants entering the unit.

### Compliance with Law, Regulation, Policy, and Forest Plan

For the proposed actions within this proposed project there are no activities expected to exceed DSC defined by the forest plan. The project with described mitigation and BMPs in place should be able to meet the intent and direction of the LRMP as it pertains to the soil resource. It is assumed that the project being able to meet LRMP and FSM will lead to a project that will be considered sustainable in the terms of the Sustained Yield Act.

## 3.7 Hydrology

### Methodology

Multiple lines of evidence and the best available science were used to estimate the effects of the project, and the likelihood they will accumulate with the past effects. Project area, unit sizes, road and stream information, past activities, etc. are derived from Geographic Information System (GIS) databases which are maintained by the Forest Service. Background historic, climatic, geologic, and hydrologic information may be found in Forest Service and other agency documents and surveys, and scientific literature. Analysis of cumulative effects includes Forest Service activities with the potential to influence watershed conditions.

Project roads, crossings, temporary road sites, units, and streams were screened for aquatic concerns and opportunities. This information was used by the Interdisciplinary Team to design the Ten Cent Project.

### Analysis Indicators and Measures

Enhancement of hydrological resources was not identified as part of the purpose and need for the project, and no issues regarding hydrology were identified during scoping. For these reasons, most of the discussion of impacts presented are qualitative in nature. Analysis indicators used were stream temperature, biological criteria, and stream sediment. Changes to wildfire hazard rating, road miles in riparian areas used for log haul, and equivalent clearcut area (an estimate of the increase in open space in the forest) were used to quantify these changes.

### Spatial and Temporal Bounding of Analysis Area

The spatial boundaries for analysis of the hydrologic effects are the project area and downstream areas, primarily riparian areas within the larger boundary. Temporal scale is described as being either short- or long-term. Short-term effects are less than ten years. Long-term effects are ten to 100 years. Direct and indirect effects of project activities are expected to take place over

approximately 10 years, and be limited to the units, burn blocks, and roads used in this project. Actions considered for cumulative effects are future foreseeable and ongoing actions that overlap within the Granite Watershed. Impacts of past actions were considered and discussed as part of the affected environment.

## Affected Environment

In the long-term, wildfire hazard would continue to be rated as High or Extreme on 64,702 acres of the project area (see Fuels report). A wildfire could directly impact shade resulting in increased stream temperatures and negative impacts to biological criteria. Increases in sediment may also be likely after a wildfire (Silins et al. 2009, Helvey 1980).

Currently, there are 493 miles of roads in the project area, and 144 miles of roads in riparian areas within the project area. Erosion from roads can contribute to stream sedimentation. The existing equivalent clearcut area is 4.7 percent.

## Environmental Consequences

### Alternative 1

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

Over the short-term, shade over streams would increase as plants continue to grow, and stream temperatures would decrease. However, over the long term, the High and Extreme wildfire hazard rating areas would be more likely to burn at a high intensity, which could negatively impact shade and sediment. Shade affects both stream temperature and biological criteria.

Existing roads would continue to effect the project area as they are at present in the short term. In the long term, eventual infrastructure failures such as stream crossing culverts could cause increases in sediment. Equivalent clearcut area would decrease overall in the short term as plants continue to grow. However, over the long term, more severe wildfires may cause significant increases in the equivalent clearcut area, which could cause increases in peak flows, and change channel geometry, planform, or bedload sediment transport at the reach scale.

### Alternatives 2, 3, and 4

#### *Direct Effects and Indirect Effects*

Alternative 2 would reduce the amount of land that is currently rated as High or Extreme wildfire hazard by 24,897 acres, with the majority being rated as low hazard after the treatments (see Fuels report). This is a 38% reduction compared to the number of acres currently rated as High or Extreme (64,702). Alternative 3 would reduce the amount of land that is currently rated as high or extreme wildfire hazard by 10,577 acres, and Alternative 4 by 18,304 acres. These reductions would be beneficial to shade, which would benefit stream temperature and biological criteria, because of the reduced risk of high severity wildfire which could remove a significant portion of shading vegetation. Sediment can significantly increase after a severe wildfire, so these reductions would also have a beneficial impact to sediment.

The project area contains approximately 493 miles of motorized routes, including Forest Service and county roads. Alternatives 2 and 3 would use approximately the 241 miles of existing roads for haul routes (see Chapter 2). Alternative 2 would construct 5.0 miles of temporary roads for a total of approximately 246 miles of haul routes. None of the new temporary roads would be located in riparian areas, and there would be no new stream crossings. BMPs would be used in the construction and decommissioning of the new temporary roads. They would be

decommissioned after harvest, and stabilized by removing culverts, ripping, and possibly recontouring. Since no temporary roads would be built in RHCAs and since BMPs would be used, it is not expected that the construction and decommissioning would contribute to stream sedimentation. Alternative 4 would use 220 miles of existing roads for haul routes. Alternatives 2 and 3 would use approximately 72.3 miles of haul routes in RHCAs. Alternative 4 would use 70.7 miles in RHCAs. Any effects would be localized and of limited duration.

Alternative 2 is modeled to increase Equivalent Clearcut Area (ECA) from 4.7 percent to 14.2 percent. This ECA is less than the 15 percent threshold for detectable changes in peak flows on the maximum effect line in transient snow zones derived by Grant et al. (2008). Alternative 3 is modeled to increase ECA from 4.7 percent to 11.5 percent. Alternative 4 is modeled to increase ECA from 4.7 percent to 12.4 percent. These increases are also less than the level for detectable changes in peak flows, and thus are also not expected to result in detectable peak flow increases. Because any Ten Cent peak flow increases would be expected to be small, of short duration, and localized, they would not be expected to measurably change channel geometry, planform, or bedload sediment transport at the reach scale.

All alternatives are compliant with the Clean Water Act through planning, application , and monitoring of Best Management Practices in conformance with the Clean Water Act, regulations, and Federal guidelines. Impacts to analysis indicators would not be expected to be measurable, and benefits to hydrological resources due to the decreased risk of high intensity wildfire may be significant.

#### *Cumulative Effects*

Effects of other actions in the project area include those from continued mining in the Granite watershed, and Granite Aquatic Restoration. Mining can have an effect on temperature, biological criteria, and stream sediment. The road maintenance and culvert replacements planned as part of Granite Aquatic Restoration and other road maintenance activities may contribute sediment to streams in the short term, but would be likely to improve sediment conditions over the long term.

### Compliance with Law, Regulation, Policy, and Forest Plans

The proposed Ten Cent Project Environmental Impact Statement (EIS) is consistent with the Umatilla and Wallowa-Whitman National Forest Plan, as amended, with respect to hydrology. This finding is based on the above discussions of existing conditions, the mechanisms and causes of change to hydrological systems, and the inclusion of prevention measures.

## 3.8 Fisheries

The proposed alternatives for the Ten Cent Community Wildfire Protection were designed to be in compliance with the Blue Mountain Project Design Criteria Section 7 Programmatic Biological Opinion (available in the project record). These provide a streamlined Section 7 consultation tool by describing a set of routinely conducted, defined forest management actions (such as thinning or prescribed fire) with predictable and consistent effects. There are restrictions on activities such as thinning and prescribed fire to assure effects to aquatic Endangered Species Act (ESA) listed species and their designated critical habitat (DCH) will not result in adverse effects.

## ESA Listed Species

**Table 3-43: ESA Listing History of Steelhead and Columbia River Bull Trout**

| Species | Listing Status<br>Listing Date and Reference | Critical Habitat<br>Listing Date and Reference |
|---|---|---|
| Middle Columbia River Steelhead<br>(*Oncorhynchus mykiss*) | Threatened<br>3/25/1999 (64FR 57)<br>1/5/2006 (71FR 834) | Designated<br>9/2/2005 (70FR 52630) |
| Bull Trout<br>(*Salvelinus confluentus*) | Threatened<br>6/10/1998 (63 FR 31647) | Designated<br>10/18/2010 (75FR 63698) |

Note: In 2014 Essential Fish Habitat designation was removed from the North Fork John Day River and Granite watershed.

## Management Indicator Species (MIS)

Middle Columbia River steelhead (anadromous) and rainbow trout (resident redband) are the designated aquatic Management Indicators Species (MIS) for the UNF and WWNF. Steelhead and rainbow trout are different life history expressions of the same species, *Onchorhynchus mykiss*.

## Sensitive Species

Information on the Regional Forester's Sensitive Species suspected or known to occur on the UNF and WWNF can be found below in Table 3-44 (Regional Forester's Sensitive Species List 2015 on file).

**Table 3-44: Regional Forester's List of Sensitive Invertebrate and Vertebrate Species Documented or Suspected in the Project area on the Umatilla NF and Wallowa-Whitman NF.**

| Regional Sensitive Species | Habitat Description | Habitat Present in Analysis Area | Species Present in Analysis Area | Known Current Distribution |
|---|---|---|---|---|
| Western Ridged Mussel (*Gonidea angulata*) | Occur in streams of all sizes of low to mid-elevation watersheds. Common in stable stream reaches, tolerant of fine sediments and occupy depositional areas. | Documented in the UNF project area, and suspected in WW. | Documented and assumed present in the analysis area. | Widely distributed west of the Continental Divide, CA to BC. It is mainly distributed east of the Cascades. |
| Shortface Lanx (*Fisherola nuttalli*) | Occurs in large low to mid-elevation riverine habitats. Common in unpolluted, cold, well oxygenated, perennial streams with cobble-boulder substrate. | Suspected in the project area. | Suspected and assumed present in the analysis area. | Found throughout the Snake River, Mid-Columbia basin limited to the Upper and Lower Deschutes, Lower John Day, Upper Columbia (Okanagan R.) |
| Columbia clubtail (*Gomphus lynnae*) | A variety of river habitats, which can range from sandy or muddy or rocky, shallow rivers with occasional gravelly | Suspected in the project area. | Suspected and assumed present in the analysis area. | Yakima River, Benton Co. John Day River, Wheeler and Grant Co. from Twickenham to |

| Regional Sensitive Species | Habitat Description | Habitat Present in Analysis Area | Species Present in Analysis Area | Known Current Distribution |
|---|---|---|---|---|
| | rapids. Water flow tends to be slow-moving. | | | Monument, Owyhee River, Malheur Co. |
| Pacific Lamprey (*Entosphenus tridentatus*) | A variety of river habitats, which range from sand, mud or rocky, shallow rivers with gravelly rapids. | Documented in the project area. | Documented and assumed present in the analysis area. | Found from the Pacific Coast of North America and Asia. |
| Westslope cutthroat trout (*Onchorhynchus clarkii lewsii*) | Prefer to occupy deep, slow moving, boulder strewn, glides, along the river bank and the tails of slower moving pools. | Documented in the project area. | Documented and assumed present in the analysis area. | Upper tributaries of the John Day River. |

## Methodology

This analysis is focused on the indicators which have the potential to affect aquatic species and their habitat when the Project is implemented, incorporating all Best Management Practices and Project Design Criteria. This report incorporates by reference the soils and hydrology reports, and evaluates the indicators of the potential effect of increased temperature and increased sediment from Project activities on aquatic organisms and habitat.

Based on the analysis in the soils and hydrology report and a review of existing information, the following project components have a potential to affect fish and aquatic resources:

- Riparian Habitat Conservation Area (RHCA) Handwork (including small diameter thinning, pruning and ladder fuel removal, and hand piling and burning)
- Landscape and Prescribed Fire
- Road Use

A component of PACFISH are Riparian Management Objectives (RMOs) (PACFISH 1995). RMOs describe good habitat for anadromous fish. These interim RMOs provide the “criteria” against which to measure attainment of riparian goals. RMOS are summarized in Table 3-45. Water temperature is a PACFISH RMO potentially affected by Project activities. No other project activities have the potential to affect RMOs because of the design of the project and protections to RHCAs by the Blue Mt. PDCs limited activity stream buffers.

**Table 3-45: PACFISH Riparian Management Objectives (RMOs)**

| Habitat Feature | RMO’s |
|---|---|
| Water Temperature | Compliance with Water Quality standard or maximum Temp. <68 ºF |
| Pool Frequency | |
| Wetted Width (feet) | 10 20 25 50 75 100 125 150 200 |
| Number of pools/mile | 96 56 47 26 23 18 14 12 9 |
| Large Woody Debris | Eastern Oregon > 20 pieces/mile, >12 inch diameter, >35 ft. length |
| Bank Stability | >80 percent stable |
| Width/Depth Ratio | <10, mean wetted width divided by mean depth |

Sediment is also an indicator since there is a potential for increased sedimentation, which can have a negative impact on aquatic species.

## Affected Environment
## Environmental Consequences

### Alternative 1

#### *Direct and Indirect Effects*

Under Alternative 1 the riparian canopy would continue to grow providing more shade to streams improving water temperature. No harvest or ground disturbance are proposed for this Alternative and there would be no effect to stream temperature. As described in the hydrology report, effects of wildfire would remain the same. Existing road use and maintenance activities would not change. There would be no effect to stream temperature.

Under Alternative 1 no silvicultural or fuels treatments are proposed for this alternative. No harvest or ground disturbance are proposed for this alternative. There is no mechanism to mobilize sediment. Alternative 1 would allow existing forest stands and other vegetation to move through successional stages and recovery at their own rate whereby ground fuels accumulate, and ladder fuels expand the connection between ground fuels and the canopy thereby increasing the risk of high-severity wildfire and the risk that ground fire would spread to the forest canopy. Existing road use and maintenance activities would not change. Sedimentation from road use would remain at the current levels under Alternative 1.

#### *Cumulative Effects*

The cumulative effects of No Action Alternative would be the continued growth of trees and vegetation in the Project area. Conditions would improve with respect to stream shading; however, increased vegetation may increase risk of high-intensity wildfire, which could have deleterious effects on fisheries and aquatic ecosystems.

### Alternative 2, 3, and 4

#### *Direct and Indirect Effects*

Project activities that could potentially affect stream temperature include small diameter thinning, pruning and ladder fuel removal. All activities are restricted as described in the Blue Mt. PDCs., including no activity buffer widths, retention of all shade providing trees, and location and size of vegetation hand piles.

Prescribed fire will be implemented under conditions in which fire growth would be greatly reduced by environmental factors such as rain or snow (FIRE-1). Prescribed fire will be allowed to back into RHCAs, and could potentially, although unlikely, travel near stream channels. Ignition of prescribed fire will occur outside of RHCAs. Because the inner halves of the RHCAs will receive no thinning and because the canopy is lower in the NCT sized timber than in mature forest it is not expected that riparian shade or stream temperature would be affected by this Project. There are no direct effects to temperature because there are no activities in streams. Project activities will be maintained 50-150 feet from streams dependent on RHCA Category (Blue Mountain PDC). In addition, Class 4 intermittent streams stop flowing between approximately July and October. For these reasons it is unlikely that the RHCA treatments and burning would have a measurable effect on stream temperature during the critical low flow, high temperature season.

Because there are no activities in or near streams there are no direct effects to sediment. There is a potential for indirect effects to sediment from the log haul at road/stream crossings. During the life of this project, approximately 10 years, the preparation and use of the haul roads may expose soil and cause small scale, localized increases in stream sediment. Activities are distributed across the six watersheds, and will be implemented over many years. This temporal component decreases the impact of log haul.

#### *Cumulative Effects*

Sedimentation may increase above the amount what the road system produces without log haul, but this amount is minute compared to the background sedimentation from stream beds, banks, and historical gold mining at the Watershed scale. As described in the hydrology report, sedimentation would be limited by the use of BMPs and PDCs, including haul when conditions are dry or the ground is frozen. Any indirect effects to sedimentation at road/stream crossings would be localized and not measureable.

Overall, because of the very small, and not measureable changes to temperature and sediment, effects to all aquatic species will also be very small and not measureable.

**Table 3-46: Summary of Effects to Indicators**

| Indicator | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| Temperature<br>(Alts 2 – 4 combined because of the very similar effects) | No changes from current management activities. | The inner halves of the RHCAs will receive no thinning, and other treatments such as prescribed fire are not expected to measurably affect riparian shade, thus it is unlikely to measurably affect stream temperatures. | | |
| Sediment<br>(Alts 2 – 4 combined because of the very similar effects) | No changes from current management activities. | BMPs and PDCs are expected to keep any sediment transported to stream channels from road use at an insignificant and not measureable level. | | |

## Compliance with Law, Regulation, Policy, and Forest Plan

#### *Forest Plan Compliance*

Management Area 18 on the WWNF and Management Area C7 on the UNF are intended to achieve and maintain optimum conditions for anadromous fish. Alternatives 2-4 with provisions provided through BMPs and PDCs minimize or eliminate effects to aquatics and fish and fish habitat. Alternatives 2-4 are in compliance with both Forest Plans.

#### *PACFISH Compliance*

Project activities have been designed to be consistent with relevant PACFISH goals, RMOs and Standards and Guidelines. These include consistency with water quality and channel integrity goals, RMOs for water temperature (as described earlier) and Standard and Guide FM-1. Fuel management actions will not prevent attainment of RMOs.

#### *ESA Compliance*

There are two ESA listed species found in the Ten Cent Project area, Columbia River Bull Trout and Middle Columbia River steelhead. The Ten Cent Community Wildfire Protection Project (the Project) was reviewed by the Umatilla Level 1 ESA streamlining team during the winter of 2016 for compliance with the Blue Mt. PDCs. The Level 1 team sent a letter dated April 4, 2016 to Ian Reid, North Fork John Day District Ranger, documenting the Project determination of

"may affect, and not likely to adversely affect" for MCR steelhead and Columbia River Bull trout and their DCH. Copies of the ESA Section 7 documents are on file at the North Fork John Day Ranger District.

# 3.9 Heritage Resources

This section evaluates and compares the existing and reference conditions of heritage resources within the assessment area. The term "heritage resources" is used to encompass archeological sites, in-use historic buildings (and other structures and features), and traditional cultural properties (TCPs). Many of these heritage resources have multiple associations and use values. With a few exceptions, these remains (or, in the case of natural landscapes, the period of traditional use of that landscape) must be at least 50 years old.

## Methodology

To complete this analysis, several types of information were used to gather heritage resource data. This includes heritage resource types and the distribution of those resources on the landscape, in order to understand how this project could affect them. A literature search identified site types and the effects on those sites by other similar projects completed in the past, and also helped to describe the distribution of heritage resources based on key indicators of potential site distribution. Maps were used as a visual tool to identify heritage resource distribution based on location and topography. Previous data and investigations do provide a general picture of the types of sites present and their locations.

### Analysis Indicators

Indicators for analyzing project effects and potential risk to heritage properties are: (1) the number of historic properties in the project area that are at risk from project activities and (2) the degree (level) to which the integrity of historic values of these properties may be at risk to be diminished by the project activities. Direct and indirect effects, as well as the effects of reasonably foreseeable future actions (cumulative effects), that may diminish the integrity of historic properties identified in the area of potential effects are analyzed. At-risk historic properties are those that are significant or unevaluated. The degree, or risk, to which a historic property or its integrity has the potential to be diminished by project activities, is indicated by relative degree within four categories—negligible, minor, moderate, or major. The following factors were considered in determining the risk rating in assessing the effects of the overall project activities, with specific attention placed on the values at risk, protection capability (i.e., design criteria), and other factors such as ignition risk.

Wildfires and prescribed burns have the potential to directly impact heritage resources (by burning wooden historic and prehistoric structures and damaging or destroying flammable artifacts and features of archaeological sites). High-intensity fires may impact non-flammable artifacts, such as lithic materials. Indirect impacts related to fire include post-fire erosion losses resulting from burned vegetation cover and hydrophobic soils; deterioration and weathering after the artifacts and features are initially damaged by extreme temperatures; changes in the landscape adjacent to heritage/cultural resources; and looting and vandalism due to increased site visibility. Impacts would tend to be greater in wildfire situations than they would for prescribed burns. This is because of extreme fire temperatures, an inability to control the impacts, and because it would be almost impossible to plan inventories of heritage/cultural resources in advance.

Each alternative is considered based on the proposed management actions and their potential level of effects to historic properties and cultural resources. If an action alters in any way the characteristics that qualify the property or resource for inclusion on the NRHP, it is considered to have an effect. The degree (level) to which the potential eligibility or integrity of a resource is diminished by the proposed actions are classified by relative degree of risk and are presented in summary form in Table 3-49.

### Temporal Bounding

Consistent with 36 CRF 800.16(d) (ACHP 2004), the Area of Potential Effect (APE) for this undertaking has been defined as the geographic areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is considered all of the lands within analysis area, based on the Granite Creek Watershed boundaries. As the analysis area is based on the Granite Creek Watershed, there is a small portion consisting of approximately 160 acres on the Malheur Nation Forest. There are no planned treatments or actions for this portion of the analysis area; hence, it is excluded from further analysis.

Direct physical impacts to heritage resources can occur if alterations are made to the integrity of the resource itself or to its surroundings. A project is regarded as having an effect on a heritage property if it alters any of the characteristics that qualify the property for inclusion in the National Register of Historic Places (NRHP). An adverse effect is one that diminishes the integrity of any of those characteristics that qualify the resource for inclusion in the NRHP. Projects are considered to have no adverse effect if the sites have been shown to be ineligible or the impacts to the qualities that make the heritage resource important are modified or reduced so as to not diminish those characteristics or integrity, as defined in 36 CFR 800.9(c)1.

## Affected Environment

The NEPA analysis of the potential impacts to cultural/heritage resources within the APE begins with an overview of the nature and types of previous inventories, as well as the nature and type of heritage resources. This is followed by an overview of the prehistoric, ethnographic, and historic periods that directly related to the nature of the sites in the analysis area.

There have been numerous previous heritage surveys conducted across the project area. There are over one hundred and ninety recorded previous inventories that intersected the project area (152 Wallowa-Whitman and 52 Umatilla, of these, 14 overlap). However, not all of these have been inventoried adequately to the standards outlined in the survey strategies outlined for each forest or to present professional standards. These did result in the identification and some level of documentation for two hundred and sixty four known heritage resources (185 Wallowa-Whitman and 79 Umatilla, with some overlapping). Even though many of these surveys or site documentations are not up to current standards, this established body of work did result in documentation of archaeological sites and information related to the types of sites and density of sites that would be expected in the area.

The cultural resources within the boundaries of the analysis area represent a range of prehistoric to ethnographic, both frontier and post-frontier mining technologies, industrial land-use patterns, domestic settlement patterns, transportation networks, local population structure, and economic patterns. The most common heritage resource types are historic and directly relate to various aspects of the development of the mining industry in the area.

## Prehistoric

The project area is situated in a landscape with a long and rich prehistoric and historic record. Native American occupation of the area dates back over 10,000 years. It lies within a larger geographic area known as the Blue Mountain Physiographic Province of the central Columbia Plateau. Based on excavations along the Columbia and Lower Snake river region, several chronological frameworks were developed for the southern Columbia Plateau. The chronology developed by Leonhardy and Rice (1970) and later refined by Leonhardy in 1975 was devised through the analysis of several artifact assemblages from excavated sites along the Lower Snake river and is composed of four periods, each consisting of several phases (Leonhardy and Rice 1970; McPherson et al. 1981:65-66). These are summarized in Table 3-47.

**Table 3-47: Prehistoric Phases**

| Phase | Time Period | Diagnostic Artifacts | Emphasis |
|---|---|---|---|
| Windust | 10,000-8,000 | Large lanceolate and stemmed projectile points | Broad-spectrum foragers. Big game hunting emphasis with evidence of vegetal procurement and exploitation of riverine resources |
| Cascade | 8,000-5,000 | Well-made lanceolate with later appearance of large side-notched darts such as Northern or Cold Springs projectile points | An increased emphasis on plant resources |
| Tucannon | 5,000-2,500 | Diagnostic projectile points of this phase are fairly crude, triangular in plan with contracting sterns or corner-notches with an expanding stem | Sustenance is focused on the procurement of riverine and plant resources. Singular pithouses residences appear for the first time |
| Harder | 2500-250 | Diagnostic of the earlier subphase (2500-700 B. P.) are large basal-notched and corner-notched dart points and the later subphase is characterized by delicate, small stemmed, corner, and basal-notched arrow points that remain in use to historic contact | Increased emphasis on seasonally sedentary settlement pattern, a diverse subsistence base oriented toward riverine and terrestrial resources |

## Ethnographic

In the Ethnographic period the project area falls within the Plateau culture area, key resources of the Plateau (salmon, roots of certain plants, and large mammals) along with limited political complexity, broad kinship ties across groups, institutionalized regional trading networks, and settlements along rivers are distinguishing features (Walker 1998).

Winter villages of each of these tribes were usually situated in areas that contained plentiful resources. Winter villages of the Walla Walla were located around the present location of Wallula and extended north to the confluence of the Snake and Columbia rivers. Villages of the Umatilla were to the southwest near the confluence of the Umatilla River with the Columbia, upstream along the Umatilla, and west along the Columbia to a point near Alderdale, Washington. Cayuse winter encampments were inland and situated along drainages between the Blue Mountains and the Columbia River. Several winter camps were located near the present towns of Pilot Rock, Cayuse, and Milton Freewater, and along McKay Creek (Suphan 1974).

The Northern Paiute, who inhabited the Great Basin, seasonally came into the Blue Mountains in search of food. They were not permanent residents and during the winter months they occupied

portions of the John Day and Snake rivers within the Blue Mountain region. They were a nomadic people and normally traveled in small groups of extended families. Subsistence patterns were based upon a seasonal round, in which the people exploited various vegetative zones as plant resources became available (Suphan 1974).

Ethnographic information gathered in the early 20th century indicates that the Blue Mountains were not only utilized by the Umatilla, Cayuse, and Walla Walla bands but also by the Northern Paiute and Nez Perce. Subsistence areas were not claimed by any one group but were used by all. Frequently, root grounds, fishing and gathering areas were in use at the same time by one or more ethnic group. It was customary for tribes to meet at various places during their summer travels for the purposes of trading and socializing (Suphan 1974).

Control of territory and specific resources had significant meaning only in close proximity to a winter village. Management and control became less recognizable the further a resource was from the village. Consequently, strict political boundaries for these groups are almost impossible to determine with precise accuracy. European diseases impacted Plateau populations many years before actual contact with Europeans, and various epidemics killed a very large percentage of the Plateau population (Suphan 1974). *Mits Qooi Nux Sa Kin Noon Im Pa*: A Partial Traditional Use Area Inventory of the Umatilla National Forest and the Wallowa-Whitman National Forest (Minthorn 1994) speaks to specific use of areas within the project area.

The earliest documents containing descriptions of the tribes along the Columbia River are found in the early narratives and journals of explorers, fur traders, missionaries, and pioneers. In 1805-1806, when Lewis and Clark traveled down the Columbia River the southern shore was virtually abandoned. Later expeditions that moved through the southeastern Columbia Plateau, observed large permanent encampments at specific locations along both sides of the Columbia. These accounts indicate that the Cayuse, Umatilla, and Walla Walla inhabited the area. At the time of contact, these people lived in earthen or mat lodges that were situated along the Columbia River and its tributaries (Suphan 1974).

### Historic

The Lewis and Clark Expedition of 1804, is considered the beginning of the historic period. In 1849, Oregon became a state, and in 1855, much of the lands claimed by the Native Americans were ceded to the U.S. Government. The Umatilla, Cayuse, and other Indian tribes were confined to reservations. People entering northeastern Oregon prior to 1860 were generally headed for the Willamette Valley. These pioneers began their arduous journey west to Oregon, over a route that is now called the Oregon Trail. In 1845, a group of immigrants, traveling along the Oregon Trail, bound for the Willamette Valley, discovered gold in northeastern Oregon. This discovery started the major influx of settlers into this area.

Settlements later developed in river valleys and towns were established which served mining, farming, and livestock interests. The establishment of a transportation network throughout the region significantly increased settlement. Early wagon roads liked settlements to markets around the region, and subsequent railroads increased the influx of immigrants. The project area was greatly exploited during the search for, extraction of, and processing of gold and sliver bearing ore, thus the number of mining-related cultural resources in high. There are a number of placer and quartz mining operations, small-scale mining and prospecting, habitation, and water transportation systems (Chappel 1995). Important date ranges, themes and historical highlights are summarized in Table 3-48.

The mining frontier in the Blue Mountains of Northeastern Oregon was primarily the realm of men. They came from as near as the Willamette Valley and as far away as New York, Prussia, and the Orient. During the first few years of the Blue Mountains gold rush the mining community mostly consisted of Euroamericans with a few European emigrants, but soon after the Chinese outnumbered them four to one. The placer gold fields of Granite paid well to the individual prospector during the first decade of the gold rush. Granite Creek, Bull Run Creek, the North Fork of the John Day River, and the many tributaries of those streams well-satisfied early miner's appetites for gold from the first discovery in 1862 through the 1870s. After that, prices dropped and the surface gold was largely mined out, although the placer fields were still being squeezed of the last particles of gold dust (primarily by the hard-working Chinese) In the 1890s the price of gold rose again, and prospectors searched for paystreaks and sold their discoveries to larger mining corporations. Along with those investors came related business as people again flocked to the area (Chappel 1995).

The history of placer and lode mining, has transformed the landscape of the Granite Mining District since the first settlement of the area by non-Indians in 1862. Placer mining especially has left its mark by changing the course of major streams, water conveyance systems (ditches, flumes, pipelines, etc) leaving acres of churned up gravels and cobbles, tailings left by dredging (from 1910 to about 1950). The effect of lode mining in the district is noted in the multitude of adits, shafts, prospects, and trenches that mark the surface of the district. The architectural and industrial ruins of cabins, bunkhouses, shops, mills, and roads are tangible reminders of the gold and silver mining boom(s). Many of the same locations were mined and mined again, over and over, as technological advancements were made (Chappel 1995).

**Table 3-48: Significant periods, themes, and events for the Granite Mining District (Chappel 1995)**

| Date | Theme | Historic Highlights |
|---|---|---|
| 1862-1886 | Mining Frontier Period | Beginnings of placer mining in Granite area, mining camp of Granite founded 1862, post office established c. 1875; silver and gold quartz mining commences; several silver quartz claims located; railroad reaches Baker City 1886. |
| 1886-1896 | Mineral Exploration and Pre-Development | Capital investment of lode mines begins; silver market bottoms out, gold prices rise 1890s; placer mining continues mostly by Chinese; large placer mines patented; Granite town platted 1895; railroad reaches Sumpter 1896. |
| 1896-1908 | Quartz Mining Boom | Intense lode mine development, placer fields still active through 1900; introduction of new mining and milling technologies; intensive lode mine development; Sumpter smelter 1903-1907; first dredging operation on Crane Creek 1905; Panic of 1907 marks beginning of end of boom. |
| 1908-1934 | Mining Bust | Scaling down of operation or complete closure of many mines; dredging operations on Bull Run Creek 1910-1914; small production of chromite (1917), copper, lead, zinc (1920s) at some lode mines; Sumpter burns 1917. |
| 1934-1942 | Second Mining Boom | Gold Reserve Act passed 1934; new claims filed, old claims reworked; dredging in Granite Creek and Bull Run Creek 1938-1951. |
| 1942-1946 | World War II, Second Mining Bust | Passage of wartime emergency order ceases mining operation 1942; mines scavenged for scrap metal and other materials for war effort. |

## National Historic Preservation Act and Section 106

Current environmental review policies must be in compliance with antiquities mandates and guidelines established by NEPA, Section 106 and 110 of the National Historic Preservation Act

(NHPA), and regulations of the Advisory Council on Historic Preservation (e.g., ACHP, 36 CFR 800). These mandates require public agencies to identify, evaluate, and protect heritage resources on lands under their jurisdiction, and to ensure that their actions do not inadvertently impact heritage remains. Federal agencies have the option of developing alternatives means of complying with Section 106 by adopting their own procedures, using programmatic agreements (PA) and prototype PAs, or establishing exempted categories of undertakings. PAs are appropriate for multiple or complex federal undertakings where 1) effects to historic properties cannot be fully determined in advance, 2) for federal agency programs, 3) for routine management activities by an agency, or 4) to tailor the standard Section 106 process to better fit in with agency management or decision making.

Programmatic Agreements generally fall into two types: "project PAs" and "program PAs." There are occasions where completing the Section 106 process prior to making a final decision on a particular undertaking is not practical. The regulations allow an agency to pursue a "project PA" (36 CFR § 800.14(b)(3)), rather than an MOA under certain circumstances. The most common situation where a project PA may be appropriate is when, prior to approving the undertaking, the federal agency cannot fully determine how a particular undertaking may affect historic properties or the location of historic properties and their significance and character. For instance, the agency may be required by law to make a final decision on an undertaking within a timeframe that simply cannot accommodate the standard Section 106 process, particularly when the undertaking's area of potential effects encompasses large areas of land or when the undertaking may consist of multiple activities that could adversely affect historic properties.

In order to develop a PA a key step is the Identification of Historic Properties 800.4(b)(1) The standard for identification is a "reasonable and good faith effort" to identify historic properties, depending on a variety of factors (including, but not limited to, previous identification work). Additional identification efforts are ongoing and initial efforts are targeted towards a landscape analysis approach that locates, identifies, and documents all cultural resources that can be detected from aboveground inspection including those resources that are known or suspected to occur in the project area. The aboveground inspection will combine material pertinent to the project area including: manuscripts, site records, Forest Service files, SHPO records, GLO and other historic maps, and aerial or satellite images to formulate a site-specific cultural resource inventory strategy prior to field survey with the goal to identify potential sites to then guide the fieldwork. This document will also provide an evaluative context and framework, along with future management recommendations.

The resulting literature review would provide the range and scope of activities the undertaking will encompass, the range of historic properties currently known and what may still be present within the APE, and how each could be affected. Providing this context is key so that the consulting parties and stakeholders have a broad understanding of the undertaking will better allow them to provide the agency with sound and relevant advice about how to resolve adverse effects in the public interest. Upon completion of this literature review a letter for a project update to SHPO and appropriate stakeholders, that it has completed the initial phase for identification and evaluation, and that Section 106 review for the project will be completed using the phased process.

Under this approach annual Section 106 inventories, evaluation, and consultation would be completed on acres in response to prescribed burn plans or other treatments will be completed. All unevaluated and eligible heritage resources will be avoided or treated in such a way as to avoid adverse effects. Project design criteria provide mechanisms to reduce risks to these

irreplaceable assets. These resource protection measures are designed to minimize or mitigate adverse effects to eligible properties may include project relocation, redesign or modification, physical protection measures, stabilization, restoration, rehabilitation, documentation, monitoring, repair, and data recovery. Any treatment of an unevaluated or eligible site must be consistent with Federal standards and other guidelines, policies, and directions.

## Environmental Consequences

Under the National Historic Preservation Act, Section 304 and the Archaeological Resources Protection Act of 1979, Section 9a, Protection of Archaeological Resources (36 CFR 296), Protection of Historic Properties (36 CFR 800) the disclosure of information revealing the location or character of historic or archaeological resources is prohibited when this information would open the resources or their settings to a substantial risk of harm, theft, or destruction. Therefore, discussion of the effects of this project is generalized to types of historic properties and cultural resources rather than individual properties or resources. Project design criteria and the discussion of the analysis are generalized as to protect these resources while not disclosing their locations.

Direct effects are caused by the actions to implement an alternative, and occur at the same time and place. Indirect effects are caused by the implementation action and are later in time or removed in distance, but are still reasonably foreseeable (i.e., likely to occur within the duration of the project). A cumulative effect is the effect on the environment that results from the incremental effect of the action when added to the effects of other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes the other actions and regardless of land ownership on which the other actions occur. Direct physical impacts to heritage resources can occur if alterations are made to the integrity of the resource itself or to its surroundings. A project is regarded as having an effect on a heritage property if it alters any of the characteristics that qualify the property for inclusion in the National Register of Historic Places (NRHP). An adverse effect is one that diminishes the integrity of any of those characteristics that qualify the resource for inclusion in the NRHP. Projects are considered to have no adverse effect if the sites have been shown to be ineligible or the impacts to the qualities that make the heritage resource important are modified or reduced so as to not diminish those characteristics or integrity, as defined in 36 CFR 800.9(c)1.

Under all of the alternatives, the preferred management strategy for eligible and unevaluated sites would be to protect these sites from direct, indirect, and cumulative effects. Eligible and unevaluated sites are non-renewable resources, and they would lose integrity, heritage value, and potentially important information if they were destroyed or altered. Measures (i.e., design criteria) would continue to be implemented in order to avoid the impacts to sites. Treatments designed to minimize or mitigate adverse effects to eligible properties may include project relocation, redesign or modification, physical protection measures, stabilization, restoration, rehabilitation, documentation, monitoring, repair, and data recovery. Any treatment of an unevaluated or eligible site must be consistent with Federal standards and other guidelines, policies, and directions.

### Alternative 1 (No Action)

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

Under this no action alternative, there would be no direct or indirect impacts to heritage resources. The implementation of the No Action Alternative would not change or alter the significant characteristics or the integrity of heritage resources. Under this alternative, the levels

of natural fuels would continue to accumulate and fire risk is increased. The risk for loss or degradation of heritage resources from high-intensity wildfire increases in areas with heavy fuel loads increases. For example, depending on fire behavior and fuel moistures, wooden structures or artifacts can be adversely affected or lost; high temperatures can also melt artifacts and split stone artifacts.

## Alternative 2 (Proposed Action)

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

Design criteria and heritage management recommendations will be implemented to protect heritage values and avoid ground disturbing actions on sites. Direct effects include physical disturbance of heritage resources through the implementation of treatment types. There would be a greater risk for damage to heritage sites in areas where multiple treatments of commercial harvest, pre-commercial thinning, grapple piling, and activities fuels treatments are scheduled over time because there would be a greater need for coordination and several entries over 5 to 10 year period.

Direct effects also include the potential for loss of resources to prescribed fire. Selected resources may be pretreated (such as with hand line and removal of fuels within property boundaries) prior to implementation of fuels reduction activities, which would ensure that they are not burned over or otherwise damaged. Under this alternative, wildfire could then potentially burn fewer acres at a lower intensity than under Alternative 1 (No Action), so there may been some level of risk management to avoid the loss of historic artifacts, sites, and structures. Pretreatment of sites should also provide some measure of protection against low intensity wildfire. Fuels treatments would reduce fire behavior and rate of spread, which would reduce the risk of a heritage resource from being burned.

## Alternative 3

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

Like Alternative 2, the effects resulting from the proposed treatments in Alternative 3 would be managed by applying the design criteria and would be modified through layout and design to avoid and protect heritage resources. This alternative reduces the ancillary risks associated with prescribed burning by the elimination of wilderness burning, it does increase the level of slash and pile but risk is reduced through application of design criteria. There will be an increased need for coordination between the road engineer and the archaeologist.

## Alternative 4

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

Overall, this alternative presents a reduction in commercial thinning and temporary road construction in comparison to Alternative 2. Based on the implementation of design criteria the effects and associated risks are also the same.

**Table 3-49: Comparison of All Action Alternatives (2, 3, and 4).**

| Treatment Type | Overall Generalization | Risk Level |
|---|---|---|
| Commercial Thinning Acres | Reduced risk under A4 | Moderate |
| Firewood | Reduced risk under A4 | Minor |
| Mechanical Fuels (Mastication) | Equal risk | Moderate |
| Small diameter Thinning | Equal risk | Moderate |
| RHCA Small diameter Thinning | Equal risk | Moderate |

| Treatment Type | Overall Generalization | Risk Level |
|---|---|---|
| Landscape Burning (Non-Wilderness) | Reduced risk A3 | Moderate/Major |
| Landscape Burning (Wilderness) | No risk A3, A4 | Moderate/Major |
| Jackpot Burning (Slash and Pile Burning) | Reduced risk A2, A4 | Minor |
| Temporary Road Construction | Reduced risk A4 | Moderate |
| Fireline Construction | No risk A2, A4 | Minor |

### Forest Plan Consistency

The project area encompasses a large and diverse assemblage of prehistoric archaeological sites, historical archaeological sites and localities, and locations of traditional cultural value. These non-renewable resources provide a record of prehistoric and historical cultures and events and have use value for many contemporary groups, including local residents, scientists, and Native Americans. Protection and preservation of the various prehistoric and historical-period cultural heritage resources of remarkable value are located within the area of interest. Both the Wallowa-Whitman NF and the Umatilla NF land management plans identify the need for the protection, preservation, and interpretation of cultural heritage resources for a larger public. These plans often refer back to the Forest Service Manual, which specifically states:

- “Protect cultural resources from the effects of Forest Service or Forest Service-authorized undertakings, unauthorized use, and environmental damage.” (FSM 2360.3)
- “Fully integrate opportunities for preservation, protection, and utilization of cultural resources into land use planning and decisions.” (FSM 2360.3)
- “Ensure that land use decisions and management practices do not have an inadvertent adverse effect on the characteristics that qualify cultural resources for listing on the National Register . . .” (FSM 2364.03)

## 3.10 Botanical Resources

The botanical resources report/Biological Evaluation (BE) located in the project record presents the existing conditions and analyzes effects from potential proposed actions to plants, lichens, and fungal species (and their respective habitats) that are federally-listed as threatened, endangered, or proposed for federal listing under the Endangered Species Act of 1973 as amended. It also discusses species currently identified as sensitive by the Regional Forester of the Pacific Northwest Region (FSM 2670.5, USDA Forest Service, July 13, 2015). Species designated as sensitive are those for which there are conservation concerns, and for which special management considerations may be implemented. There is also a discussion of the existing condition of Umatilla National Forest species of scientific interest. These species are unusual in the area, and/or have local conservation concerns. For this section and in the body of the report, these species are collectively called TES species. No botany related key or analysis issues, or indicators were identified during scoping. The following analysis will focus on effects as outlined in the Forest Service biological evaluation process.

### Methodology

The United States Forest Service biological evaluation (BE) process was completed by a journey-level botanist for this project. This process includes a pre-field review of existing information, botanical surveys to search for sensitive plants, and development of project design criteria to protect both known sensitive plant populations and potential sensitive plant habitat. Potential direct, indirect, and cumulative effects to federally listed, candidate, and proposed plant species were analyzed. Potential effects to Region six designated sensitive plants were also

analyzed. There are seven documented sensitive plant species in the project planning area. Of these, only one, the mountain moonwort, has been found in any areas where there are proposed activities.

Rather than evaluate effects to so many species individually, the botanical resource report focuses on how potential activities may impact habitats that may support sensitive plant populations. The report describes sensitive plant species, and their habitats, potentially found in the planning area and is summarized for this draft EIS. Species documented in the project area are addressed individually. All discussion of potential impacts to sensitive plant populations and habitat is based upon general experience and inferred responses based upon observations and studies of more common species.

### Analysis Indicators and Measures

Enhancement of botanical resources was not identified as part of the purpose and need for the project, and no issues regarding botanical resources were identified during scoping. For these reasons, most of the discussion of impacts presented are qualitative in nature. See Table 3-50 Resource elements and indicators for a list of quantitative resource measures for this project. These measures include the number of documented sensitive plant populations, and the number of acres of potential sensitive plant habitat potentially impacted by project activities for each alternative.

**Table 3-50 Resource indicators and measures**

| Resource Element | Indicator |
|---|---|
| Documented sensitive plant populations | Number of sensitive plant populations potentially impacted |
| Potential sensitive plant habitat | Number of acres of potential sensitive plant habitat that may potentially be impacted |

### Spatial and Temporal Bounding of Analysis Area

#### *Direct and Indirect Effect Boundaries*

Spatial boundary for analysis of the effects to botanical resources is the Ten Cent Project area. Since plants do not generally move over large areas quickly, and no downstream effects are anticipated, it is not necessary to analyze effects to sensitive plants outside of the planning area. Temporal scale is described as being either short- or long-term. Short-term effects are usually one to two years after project implementation. Long-term effects are usually more than two years after implementation of all activities (including prescribed fire) is complete.

#### *Cumulative Effects Boundaries*

The spatial boundaries for analyzing the cumulative effects to botanical resources is the project area because plants do not move across the landscape to any significant extent. The temporal boundaries for analyzing the cumulative effects are from the time of colonization by Europeans to ten years into the future.

## Affected Environment

A query of the USFS Natural Resources Manager database shows that much of the Umatilla National Forest portion of the area has had some level of botanical survey since the early 1990s. For the Wallowa-Whitman portion of the project area the limited documented surveys are all from the 1990s. The information in the database on these surveys often only includes a date and a mapped survey area. There is no information in the database on which species were searched

for, or any information on habitat conditions. When most of these surveys were done there were only vascular plants on the sensitive plant list. The current sensitive list now includes non-vascular plants and lichens, as well as several vascular plants that were not on the sensitive list at the time of the historic surveys.

Project specific botanical surveys for this project were conducted in accordance with Forest Service procedures (USDA Forest Service 2008). Surveys were performed using the standardized intuitively controlled technique common to the profession. Thus, large areas are surveyed employing an emphasis on adequately sampling all habitat elements on the landscape within the planned treatment units in the assumption that this will result in a comprehensive snapshot of plant biodiversity within the area. A summary of botanical surveys is available in the botanical resource report.

There are currently 66 species of Forest Service designated sensitive plants documented, or at least moderately suspected to occur on the Oregon portion of the Umatilla National Forest. There are 101 sensitive species listed as documented or suspected for the entire Wallowa-Whitman National Forest (USDA Forest Service, July 13, 2015). Many sensitive species are listed for both forests. In addition, many of the species on the Wallowa-Whitman NF list are associated with low elevation canyons, or high elevation subalpine areas; there is no suitable habitat for these species in the project area. There are no documented or suspected species for the project area on the Wallowa-Whitman list that are not also on the Umatilla NF list. For this reason, all discussion here includes all listed sensitive species as they relate to both the Umatilla NF and to the portions of the Whitman RD that are in the project area. A complete list of sensitive plant species within potential habitat within the Ten Cent project are available in the botanical resource report, Appendix A. Maps showing the locations of sensitive and species of local concern can be found in the biological resource report.

## Documented Rare Plant Populations

### *Federally listed, proposed, and candidate species*

The U.S. Fish and Wildlife Service website and the Forest Service NRM databases were queried to determine which plants of concern under the Federal ESA may be present in the project area (query conducted on June 14, 2016). The only species listed on the FWS website is whitebark pine, a federal candidate. Whitebark pine grows in cold high elevation settings on shallow rocky soils. There are several documented stands of whitebark pine present in the southwestern portion of the planning area. It is also in the Mount Ireland area, just to the north of the project area. The primary distributor of whitebark pine seed, Clark’s nutcracker, is active in the planning area (numerous personal observations, M. Darrach). It is therefore possible that abandoned seed caches have resulted in the establishment of isolated whitebark pine trees in the project area. There are no proposed activities anywhere near the documented whitebark pine trees and their potential habitat.

### *Documented Region Six sensitive plants*

There are seven documented sensitive plant species in the project planning area. Of these, only one, the mountain moonwort, has been found in any areas where there are proposed activities. The information listed below discusses the habitat, range, and locations of these species in the planning area.

#### *Mountain moonwort (Botrychium montanum)*

There are five documented populations of this species in the planning area. None of these populations have been visited since their original discovery in 1992 and 1993. This species tends

to occur in wet meadows, wet spruce forests, and in the transition zone areas between wet meadows and the adjacent forest. This species is very tiny (<3 inches tall) and difficult to find. It is highly likely that there are additional undiscovered populations of this species (as well as other species of moonworts) in the project area.

*Russett sedge (Carex saxatilis)*
Russett sedge is documented in one population in the southwestern portion of the planning area. This species grows in fens, bogs, lakeshores, wet tundra, roadside ditches, ponds, and slow moving streams; often in shallow water. It is always found at high elevations.

*Sticky paintbrush (Castilleja viscidula)*
A small population of this species is documented in the southern portion of the planning area. It is also found on the slopes of Mt. Ireland just north of the planning area. Additional undocumented populations of this plant have also been observed in the Vinegar Hill area, in the southwestern portion of the project area (Brooks and Darrach, June 2016). This species occurs in subalpine open rocky areas that are generally dominated by mountain big sagebrush. Although no new populations of this species were found during field surveys for this project, there may be additional undiscovered populations of this species in high elevation portions of the planning area.

*Great mountain flapwort (Harpanthus flotovianus)*
The great mountain flapwort is a livewort that grows in bogs and fens; mostly on humus, soil covered rocks, and decaying wood in forests. Site on Umatilla NF is in a sub-alpine meadow, surrounded by subalpine fir and spruce forest. There is one small population of this species in the southwestern portion of the project area.

*Northern twayblade (Listera borealis)*
One population of northern twayblade has been documented in the southern portion of the project area. It occurs mostly at moderate elevations, in moist, rich humus of mossy coniferous forest, swamps, often along cold streams, in acidic soils. Most known sites are in older forests. Associated tree species include spruce, true firs, and Doug fir. This is a tiny species that can only be identified when it is in bloom. It is highly probable that there may be additional undiscovered populations of this species in the project area. Most sites would be within riparian conservation habitat areas.

*Gillman's paw-wort (Lophozia gillmanii)*
Gillman's paw-wort is a tiny liverwort that has been documented in two locations within the southern portion of the project area. It is found on peaty soils in fens, or on mossy wet cliffs or ledges. It also occurs on bare banks and rocks by streams. It is generally reported to occur on calcareous or basic soils, but on mixed grained sediments or mixed lithologies in Blue Mountains. It is possible that there are additional populations of this species in the high elevation southwestern portion of the project area.

*Bridge's cliffbrake (Pellaea bridgesii)*
Bridge's cliffbrake is documented, directly south of the planning area on the Wallowa-Whitman NF. There is also a population in the southern portion of the planning area. Bridge's cliffbrake occurs on rocky slopes and cliffs, scree, talus slopes, often on granitic substrates. In the Wallowa and Blue Mountains it is usually found on southern exposures on argillite rocks. There may be additional undiscovered populations in the planning area.

## Documented Strategic and Umatilla NF Species of Scientific Interest

The species discussed below include Region Six designated strategic species that are documented in the project area. These are species for which there is currently not enough information to be able to determine if they below on the Region Six sensitive plant list. Also discussed here are species that botanists on the Umatilla NF have determined merit documentation and tracking due to local conservation concerns, and/or because they are too newly discovered to be included on the current Region Six sensitive or strategic lists. The Wallowa-Whitman does not track any plant species of local scientific or conservation concern (G. Yates, personal communication September 1, 2016). See the botany report for the specific locations of these populations.

*Rattlesnake fern (Botrypus virginianum)*

This species is included as a Umatilla NF species of scientific interest due to its rarity on the Umatilla National Forest. The species is known from several populations on the Wallowa-Whitman and Malheur National Forests. Is has been recorded only twice before on the Umatilla National Forest. The species was encountered three times in small fens under dense forest canopy in co-occurrence with Blandow's feather-moss (*Elodium blandowii*). A total of 14 non-reproductive plants were found within the project area.

*Long-bearded mariposa lily (Calochortus longebarbatus var. longebarbatus)*

Long-bearded mariposa lily was removed from the Region Six sensitive list prior to 2004 due to it being relatively common on the LaGrande District of the Wallowa-Whitman National Forest, as well as documented at many sites in south central Oregon. However, it is apparently quite rare on the Umatilla National Forest. This species was found as a linear population of approximately 150 plants along the margins of a seasonally wet meadow just to the west of Lake Creek. This species has been found twice previously on the Umatilla National Forest, but the locations are poorly documented. The meadow in which it is located is slated for a landscape-scale prescribed burn. The population is not considered to be under threat from this activity.

*Blandow's feather moss (Elodium blandowii)*

This formerly sensitive species (delisted in 2015) is present at several sites within and adjacent to the planning area. It is most typically restricted to groundwater dependent fens. The species is known from a cluster of populations around Olive Lake and a few sites on the Wallowa-Whitman NF portion of the project area. Four separate small sites were encountered while conducting surveys in August of 2015.

*Spider biscuit-root (Lomatium tarantularioides)*

This newly described species is only known to occur on the Umatilla NF. It grows in very scabby, open areas with an underlying serpentine rock type. There are two documented populations in the project area. No activities are planned in these locations.

*Darrach's cinquefoil ("Potentilla darrachii")*

This newly discovered species that has not yet been published in a scientific journal. It occurs in high elevation sites, in open area. It is documented in the southwestern portion of the project area. No activities area planned in this area, or other potential habitat

*Tomentypnum moss (Tomentypnum nitens)*

This formerly sensitive moss species (delisted as of July 2015) is documented near Mahoney Meadows on the Wallowa-Whitman portion of the planning area. The species is found in wet fen settings.

*Felwort (Swertia perennis)*

Felwort was just added to the R6 strategic list in 2015. This species grows in mid to high elevation wetlands and fens. There is one population of this species in the southwestern portion of the planning area. No activities are proposed in this area.

### Sensitive plant habitat in the project area

The wide-ranging elevation and precipitation zones of the Umatilla National Forest support a wide diversity of plant species and communities. This diversity includes wet to dry grasslands, sagebrush dominated steppe, wet meadows and diverse riparian areas. Trees adapted to various moisture and temperature regimes define the various forest habitat types. Virtually every habitat may potentially support one or more Forest Service sensitive plant species. See the botanical resource report for a description of each habitat type. It is not practical to try to quantify how many acres of each habitat type are in the project area. Each sensitive plant species has been assigned to one or more of these habitat types.

It is assumed for the purposes of the effects analysis that all plants growing in a particular habitat would have similar responses to activities. If there are specific cases that are different, they will be discussed individually. Potential project impacts will be discussed in regards to the habitat type affected. Sensitive plant species documented in the project planning area are discussed individually.

Most areas that do not support trees are described simply as “non-forested” or “shrubland” in the Forest Service existing vegetation database, and associated GIS layers. There is generally no further distinction for various shrub and grassland types. Due to this generalization, it is not possible to quantify how many acres of various non-forested habitat types are present in the project planning area. Habitat types that occur in the project planning area that conform to the potential vegetation classification system will be briefly discussed, as will special habitats that are not covered by the classification system (e.g. fens).

## Environmental Consequences

As per Forest Service direction, analysis and effects determinations are not made in this document for strategic or Umatilla NF species of scientific interest. In order to discuss potential impacts to sensitive plant habitat, the following analysis is largely based upon potential impacts to various habitat types. It is assumed that all plants growing in a particular habitat would have similar responses to project activities. Table 3-50, Resource indicators and measures in the topics and issues addressed section of this document, displays the quantitative resource indicators and measures used to analyze botanical resources. See botanical resource report and Biological Evaluation Appendix A for the complete list of sensitive species and their associated effects calls.

### Alternative 1

#### *Direct Effects and Indirect Effects*

Alternative 1 does not propose any new activities in the project planning area. By definition, direct and indirect effects (40 CFR 1508.8), and cumulative effects (40 CFR 1508.7) result from the proposed action, and thus are not germane to Alternative 1. Therefore, there would be no direct, indirect, or cumulative effects to sensitive plant populations, or potential habitat. Since the No action alternative will not change management on the ground, the choice of this alternative will lead to “no effect (NE)” to any federally listed, candidate, and proposed plant species. In addition, there would be “no impact (NI)” to any Forest Service Region six designated sensitive plant species.

## Alternative 2, 3, and 4

### *Direct Effects and Indirect Effects*

All three action alternatives, all documented populations of sensitive plants will be designated as areas to protect for all ground disturbing project activities. Implementation of fire in documented sensitive plant populations will be done in a manner that should not adversely impact the populations. Therefore, there will be “no impact (NI)” to any currently documented population of sensitive plants for any of the action alternatives.

Since there are no activities proposed in subalpine habitats for all action alternatives, there would be “no impact (NI)” to any species that occur in those habitats. The call for all sensitive species affiliated with low to moderate elevation cliffs, rock outcrops, or talus slopes is also “no impact (NI)”. This is because there are no ground disturbing activities proposed in these habitat types, and any fire that may occur should not negatively impact undiscovered populations that may be there.

The species with greatest risk due to project activities from all three action alternatives are those that occur in upland coniferous and aquatic and riparian dependent communities. The effects call for all sensitive plant species that occur in these areas is “May impact individuals or habitat, but would not likely contribute to a trend toward federal listing or cause a loss of viability to populations of sensitive plant species (MIIH)”. The risk to riparian dependent species is significantly less than the risk to upland coniferous communities. This is due to the fact that the heavy equipment that will be used in upland coniferous communities has much greater potential to negatively impact habitat and associated soils. No heavy equipment will be used in aquatic and riparian dependent communities, and no mechanical slash piling will be allowed in those areas.

Table 3-51 Sensitive plant populations and habitat potentially impacted by various alternatives displays how many sensitive plant populations and how many acres of potential sensitive plant habitat may be potentially impacted by project activities for each alternative.

### *Cumulative Effects*

Direct and indirect effects to sensitive plant populations and potential habitat have been described above. The determination of either “May Impact Individuals and Habitat (MIIH), or No Impact (NI) was made for known populations of sensitive plants in and immediately adjacent to the project planning area. Since these determinations indicate that there would be minor or no impact to these resources, there should be no cumulative effects to those resources resulting directly from project activities. It is intended that projects such as this ultimately provide a beneficial impact to sensitive plant communities in the long run, and may even enhance sensitive plant resiliency over time.

**Table 3-51: Sensitive plant populations and habitat potentially impacted by various alternatives**

| Resource Element | Indicator | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|---|
| Documented sensitive plant populations | Number of sensitive plant populations potentially impacted | No sensitive plant populations would potentially be impacted | 8 populations in areas with no proposed activities<br>One population in logging Unit 60. It will be avoided by designation as an ATP<br>No populations in areas of proposed burning | 8 populations in areas with no proposed activities<br>One population in logging Unit 60. It will be avoided by designation as an ATP<br>One population may be subject to slash and pile burning (fire unit 581). | 8 populations in areas with no proposed activities<br>One population in logging Unit 60. It will be avoided by designation as an ATP<br>One population may be subject to slash and pile burning (fire unit 581).<br>Four populations may be subject to landscape scale burning (fire unit 517) |
| Potential sensitive plant habitat | Number of acres of potential sensitive plant habitat that may potentially be impacted | No sensitive plant habitat would potentially be impacted. | 9,907 acres of upland coniferous habitat may be impacted by ground disturbing activities.<br>3,538 acres of riparian habitat conservation areas subject to hand tree felling, hand pile burning, and landscape burning<br>8,582 acres subject to mechanically piled burning<br>29,220 acres may be subject to landscape burning | 9,907 acres of upland coniferous habitat may be impacted by ground disturbing activities<br>3,538 acres of riparian habitat conservation areas subject to hand tree felling, hand pile burning, and landscape burning<br>13,712 acres subject to mechanically piled burning<br>3,512 acres may be subject to landscape burning | 8,546 acres of upland coniferous habitat may be impacted by ground disturbing activities<br>3,535 acres of riparian habitat conservation areas subject to hand tree felling, hand pile burning, and landscape burning<br>8,582 acres may be subject to mechanically piled burning<br>19663 acres may be subject to landscape burning |

## Compliance with law, regulation, policy, and the Forest Plan

Whitebark pine is a federal candidate species that occurs in the southwestern portion of the project area. No activities are planned in areas where this species is documented. There is some potential habitat where isolated whitebark pine trees may occur in the project area. If any whitebark pine trees are found before in activity areas, or during project implementation, the populations will be analyzed and protected from negative impacts due to project implementation. Therefore, this project will have no effect to whitebark pine, and therefore, all alternatives comply with the Endangered Species Act and its implementing regulations.

This biological evaluation discloses the existing condition of sensitive plant populations and habitats, and analyzes the potential effects from the proposed activities to these resources. This report therefore provides all necessary scientific information to comply with the National Forest Management Act and the National Environmental policy act and the Forest Service Manual direction and policies regarding sensitive species and native plant restoration management.

All proposed project activities are consistent with the applicable Umatilla and Wallowa-Whitman National Forest plan goals, desired future conditions, objectives, standards and guidelines as they relate to botanical resources. The BE process that was undertaken for this project include the pre-field review process to access potential species and habitat in the area, on the ground botanical surveys in high probability habitats, development of project design features, and viability analysis for sensitive plant species. These analysis steps comply with the Umatilla and Wallowa-Whitman Forest Plan components as they relate to botanical resources.

# 3.11 Invasive Plants

The Ten Cent Project is tiered to a broader scale analysis (the Pacific Northwest Region Final Environmental Impact Statement (FEIS) for the Invasive Plant Program, 2005, hereby referred to as the R6 FEIS 2005). The R6 FEIS 2005 culminated in a Record of Decision (R6 2005 ROD) that amended the Umatilla and Wallowa-Whitman National Forest Plan by adding management direction relative to invasive plants. This project will comply with the new management direction.

The terms invasive plant species, noxious weeds, and weeds are used interchangeably in this document to refer to those non-native plant species that are of environmental concern and whose control is addressed as a land management priority at national, regional and local levels (Forest Service Manual 2080, R6 FEIS 2005, Umatilla LRMP 1990, Wallowa-Whitman LRMP 1990).

## Methodology

### Analysis Indicators and Measures

Measurement of the relative effects of the Ten Cent Project on noxious weeds is based on the potential risk of spread of known infestations from proposed activities and the potential risk of the establishment of new infestations. Risk of spread is broken into three different categories: Low, Moderate, or High risk.

A series of assumptions documented in the Invasive Species Resource Report allows calculation of the number of acres at high risk of weed spread, depending on the activities and the location of activities in relation to existing weed populations. The underlying premise is that areas closest to existing infestations and undergoing the most soil disturbance will be at the highest risk of supporting future weed spread. To model this effect, “buffer” areas of high risk are calculated around known sites based on proposed activities. Thus, a commercial thin unit using equipment that includes an existing weed site is assumed to be at high risk as compared to hand thinned unit is considered as low risk.

This model is useful primarily in assessing the relative impacts of **proposed** levels of activity on future possible weed infestations. **The purpose is not to predict the actual number of acres that may become infested, but is to show the comparative risk of the different activities and alternatives.** Assumptions for calculating direct and indirect effects of all alternatives on the distribution of acres at Low, Moderate, or High risk are listed in the Invasive Species Report in the project record.

### Spatial and Temporal Bounding of Analysis Area

The spatial boundary for analysis of the effects to invasive species is the Ten Cent planning area. The temporal scale is described as being either short- or long-term. Short-term is defined as 2-3 years after treatment activities and long term is defined as 5 to 10 years after treatment activities.

## Affected Environment

Weed infestations currently documented in the national Natural Resource Inventory System (NRIS) database include 11 species occurring separately or in combination at 94 sites on Forest Service land within the Ten Cent planning area, covering approximately 815 acres (Table 1 of the Invasive Species Report).The majority of the known infestations are along road corridors and areas along roads where past disturbance has occurred. Roads have been identified as a primary vector for weed invasion in the current published literature reviewed in the white paper on causal mechanisms of noxious weed spread (Kimberling et al. 2004). Forest-wide, the presence of roads is the primary factor predisposing a given area to weed infestation (UMA Road Analysis 2002).

Spotted and diffuse knapweed are the most prevalent weed species within the planning area and are most often associated with roads in the planning area. Treatment efforts are being implemented to reduce current known infestations. Low priority weed species are known to occur throughout the planning area. These species are generally not inventoried because they are known to occur throughout the area. Canada thistle, St. Johnswort, and bull thistle are known to occur through the planning area.

## Environmental Consequences

### Alternative 1

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

The spread of invasive plants from currently existing populations and off-Forest seed sources is not expected to be extensive, as existing populations, both on and off-Forest, are relatively small and isolated. Furthermore, existing native plant populations are healthy and thriving in the absence of recent wildfire or other disturbances. It is likely that infestations will continue to be found along active roads within the analysis area. There are currently 834 acres of known infestations of invasive plants. These infestations are considered high risk areas for potential spread within the analysis area.

### Alternatives 2, 3, and 4

#### *Direct and Indirect Effects*

Within the Ten Cent project boundary, the primary difference in effects to invasive plant species from the three project alternatives is shown by the differing numbers of acres that are placed at high risk of noxious weed spread. Alternative 2 creates the most acreage at high vulnerability for weed infestation, due to the slightly larger amount of ground disturbing activities proposed. The smaller area of ground disturbance in Alternative 4 results in fewer acres at high risk. There is potential for a rapid increase in noxious weed infestation within the planning area due to existing conditions. No matter which alternative is implemented, execution of prevention measures and careful and thorough monitoring, with rapid treatment by whatever means are available, will remain critical for minimizing future weed spread.

**Table 3-52: Amount of acres for areas at low, medium, and high risk to noxious weed establishment and spread for action alternatives**

| Risk Level | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|
| Low | 31,246 | 5,538 | 21,659 |
| Moderate | 8,529 | 8,529 | 8,288 |
| High | 2,553 | 2,557 | 1,462 |

*Cumulative Effects*

Existing infestations are a result of past ground disturbing activities with effects that overlap in space and time with the direct and indirect effects of the activities proposed under Alternatives 2, 3, and 4. The spread of invasive plants from currently existing populations and off-forest seed sources will continue at the current level. Animal and vehicle vectors will likely be the primary means of seed introduction into the planning area. Ongoing and future foreseeable activities are not expected to cumulatively increase the amount of areas considered as high risk to invasive plant establishment because they occur along roadways, which are already classified as high risk.

### Compliance with law, regulation, policy, and the Forest Plan

The proposed Ten Cent Project Environmental Impact Statement (EIS) is consistent with the Umatilla and Wallowa-Whitman National Forest Plan, as amended, with respect to noxious weeds. This finding is based on the above discussions of existing condition, the mechanisms of invasive species spread, and the inclusion of prevention measures.

## 3.12 Range

There are only 104 acres within the 94,000 acre planning area where cattle grazing is authorized. There is less than 1 acre of proposed activities that are located within active allotments. Within the planning area, there are 8,552 acres that overlap with vacant allotments. There are no reasonably foreseeable plans to authorize grazing with vacant allotments. Table 3-53 below displays the amount of acres and the status of allotments within the planning area and the acres of proposed activities located within allotments.

The Ten Cent project would have no effects to range management. Less than one acre of treatments would occur within active allotments and would not affect the overall management of livestock grazing in the area. Contract requirements will ensure that range improvements are protected during the implementation of proposed activities.

**Table 3-53: Allotments that overlap the Ten Cent planning area**

| Allotment | Status | Acres within Planning Area | Acres of Proposed Activities within Allotment |
|---|---|---|---|
| Camp Creek Allotment | Vacant | 7,777 | 0 |
| Meadows Pasture Indian Creek Allotment | Closed Pasture | 287 | 0 |
| Indian Crane Allotment | Vacant | 488 | 0 |
| Snow Creek Allotment | Active | 72 | 1 |
| Upper Middle Fork | Active | 18 | 0 |
| Lower Middle Fork | Active | 14 | 0 |

## 3.13 Recreation

### Methodology

Geographic Information Systems mapping was used to portray spatial relationships between recreation use areas and activities that could affect the continued use of the area. Effects of harvest on visual quality were also determined using these maps. Areas of concern were then verified on the ground.

### Spatial and Temporal Bounding of Analysis Area

Spatial boundary for analysis of the effects to Recreation and Scenery Report is the Ten Cent Project boundary (37,800 acres). Temporal scale is described as being either short- or long-term. Short-term effects are usually two to three year after implementation.

## Affected Environment

### Recreation Opportunity Spectrum

Each Forest Plan Management Area within the Ten Cent analysis area is assigned a class under the Recreation Opportunity Spectrum (ROS) (Table 3-54). Each class is defined by the degree certain recreation experience needs are satisfied. This is based on the extent that the natural environment has been modified, the type of facilities provided, the degree of outdoor skills needed to enjoy the area, and the relative density of recreation use. See the recreation resource report for definition of each ROS classification.

**Table 3-54: ROS Classes within the Ten Cent analysis area**

| Management Area | Acres | ROS Class |
|---|---|---|
| **Umatilla National Forest** | | |
| A3 – Viewshed 1 (FSR 73, FSR 10 east of Olive Lake) | 2,619 | Roaded Natural |
| A4 - Viewshed 2 (FSR 10 west of Olive Lake) | 40 | Roaded Natural to Roaded Modified |
| A8 – Scenic Area (Greenhorn/Vinegar Hill Scenic Area) | 3044 | Semi-Primitive Non-motorized |
| A9 – Special Interest Area (Greenhorn, Olive Lake-Fremont Powerhouse) | 1,084 | Semi-Primitive or Roaded Natural |
| B1 - Wilderness | 25,203 | Primitive and Semi-Primitive Non-motorized |
| C1 – Dedicated Old Growth | 1,247 | Primitive to Roaded Natural |
| C7 – Special Fish Emphasis | 16,259 | Roaded Natural to Roaded Modified |
| D2 – Research Natural Area | 34 | None identified |
| **Wallowa-Whitman National Forest** | | |
| 18 – Anadromous Fish | 37,883 | Roaded Modified and Roaded Natural |
| 6 – Backcountry | 985 | Semi-primitive non-motorized and semi-primitive motorized |
| 15 – Old Growth Preserve | 1,763 | Roaded Natural and Roaded Modified |
| **Malheur National Forest** | | |
| 7 – Scenic Area | 167 | Semi-primitive non-motorized, Semi-primitive motorize (winter only) |

### Visual Quality

Visual quality standards for each of the management areas within the Ten Cent analysis area are listed in Table 3-55. For definitions of VQOs see the Recreation Resource Report.

**Table 3-55: Visual Quality Objectives within the Ten Cent Planning Area**

| Forest Plan Mgt. Area | Visual Quality Objective |
|---|---|
| **Umatilla National Forest** | |
| A3-Viewshed 1 | Retention in foreground and Partial Retention in middleground |
| A4-Viewshed 2 | Partial Retention in foreground and Modification in middleground |
| A8-Scenic Area | Retention |
| A9-Special Interest Area | Retention |
| B1-Wilderness | Preservation (primary) & Retention (for management activities) |
| C1-Dedicated Old Growth | Retention |
| C7-Special Fish Emphasis | Retention to Maximum Modification |
| D2-Research Natural Area | Retention |
| **Wallowa-Whitman National Forest** | |
| 18-Anadromous Fish | |
| 6-Backcountry | Foreground Retention |
| 15-Old Growth Preserve | |
| **Malheur National Forest** | |
| 7-Scenic Area | Retention |

## Developed Recreation

**Olive Lake Campground** is the only developed campground within the Ten Cent project area, occurring on the western boundary of the project area within the Umatilla N.F. A9 – Special Interest Area management area (see Table 3-54 and Table 3-55). Olive Lake Campground has 28 campsites, 8 vault toilets, two docks, a boat ramp, and a 2-mile long hiking trail around the lake's perimeter. Occupancy is low to moderate Memorial Day through Labor Day, then greatly tapers off. The entire campground lies within a somewhat dense mixed conifer forest with scattered spruce and sub-alpine fir.

**Fremont Powerhouse Complex** is a combination interpretive site with four cabins available for rent and lies on the Umatilla N.F. within the A9 – Special Interest Area management area (see Table 3-54 and Table 3-55).

**Other interpretive sites** within the project area are associated with the Elkhorn Drive State Scenic Byway: **Ah Hee Diggings** and **Forest Practices**. Both occur on the Wallowa-Whitman N.F. in Management Area 18. The Forest Practices Interpretive Site is a small roadside stop located along the Elkhorn Drive Scenic Byway. This small roadside site includes an interpretive panel describing the different types of harvesting and thinning treatments of the lodgepole pine forest in the foreground. Due to the age of the interpretive site, much of the area that was treated is now blocked by 15-20 feet of lodgepole pine regrowth. The Ah Hee Diggins Interpretive Site is also located along the scenic byway north of the town of Granite. The site is comprised of a paved parking pull-out with a 3-panel display portraying the efforts of Chinese miners in the late 1800s and the resulting hand-stacked rock tailings that can be seen below. The interpretive site is located on a bluff above the tailings, offering a broad-scale view of the landscape. The adjacent forest is dense mixed conifer, with lodgepole pine occupying the tailings area almost to the point of obscuring the tailings.

**Boundary Guard Station** is located on the Wallowa-Whitman N.F. along County Road 24 east of the town of Granite in Management Area 18-Anadromous Fish. This is an administrative site and once served as crew quarters in the summer season. This guard station was built in the depression years by Civilian Conservation Corps (CCC) crews, and has many unique details that

were crafted with care. This building is no longer used by Forest Service crews. From 2002 through 2006 the cabin was available for public recreation rental. However due to the limited amount of water, lack of occupancy, and other safety issues it was removed from the rental system.

**Gold Center Spring** is also located along County Road 24 east of the town of Granite on the Wallowa-Whitman N.F. in Management Area 18. This site is a source of drinking water used by travelers and the local community of Granite and is currently under a Special Use Permit to the City of Granite. The site consists of a parking area and mortared rock water fountain. At one time, there was a small settlement that served as a stage coach stop and supply depot for local mining activities. The forest around this area was burned off by the miners to make gold prospecting easier.

**Blue Spring Summit Snowpark** is located on the eastern boundary of Ten Cent on County Road 520, just off of the Elkhorn Drive Scenic Byway. The facility is situated at 5,864 feet above sea level and occurs within the Wallowa-Whitman N.F. Management Area 18. In the winter, this centrally located site is used as a snowmobile trailhead and is maintained by the Grant County Road Department. Late spring through fall it serves as the northern OHV trailhead for the Blue Mountain OHV Trail and is maintained by the Forest Service. The site consists of a large parking area, vault toilet, site sign, information board, and trailhead. This is set in a mixed conifer stand on the summit between the Powder River, Burnt River and North Fork John Day River watersheds.

### Trails and Dispersed Recreation

There are five developed trailheads within the Ten Cent analysis area: Lake Creek, Lost Creek/Saddle Camp, Granite Creek, Mt. Ireland, and Blue Springs Summit. The first three are on the Umatilla National Forest, with the remaining two on the Wallowa-Whitman National Forest. Developed trailheads usually consist of a parking area, sign and information board. In addition, the Blue Springs Summit Trailhead also has a vault toilet.

Dispersed camping has traditionally been a popular activity in the Ten Cent area, with sites heavily used during the three-month big game hunting seasons in the fall and occasionally in the summer months for campers and wood cutters. There are 43 inventoried dispersed campsites within the Ten Cent planning area—35 are on the Umatilla N.F. and 8 are on the Wallowa-Whitman N.F. Sites are predominantly located along Forest Roads 10, 1035, 1035012, 1310, 1900, and County Road 24.

The analysis area is used for many types of recreation: ATV and snowmobile riding, horse riding, hiking, camping, sightseeing, wildlife viewing, fishing, firewood collection, food gathering, and rock collecting/gold hunting. The analysis area also includes a large portion (21%) of the North Fork John Day Wilderness. Big game hunting predominates in the autumn. The analysis area falls within the Desolation Big Game Management Unit designated by the Oregon Department of Fish and Wildlife (Ten Cent Wildlife Report). The hunting season typically begins at the end of August and extends through the end of November.

There are 110 total miles of trail within the Ten Cent project area, including 51.9 miles on the Wallowa-Whitman National Forest, 57.9 on the Umatilla National Forest, and 0.2 miles on the Malheur National Forest. Trail types include snowmobile, OHV, Wilderness, and non-motorized/non-wilderness. All OHV trails within the Ten Cent project area are located on closed roads. In addition to the OHV trails identified in, mixed-use travel (OHVs and full-sized

vehicles) is allowed on all open unpaved Forest Service Roads unless signed as closed to OHVs (i.e. FSR10).

## Environmental Consequences

### Alternative 1

#### *Recreation Opportunity Spectrum*

Recreation conditions would only be affected by ongoing management and changes caused by natural events. The Recreation Opportunity Spectrum (ROS) identified for each management area would not be affected by this alternative.

#### *Visual Quality*

There would be no change to visual quality within the analysis area. Visual quality within the A3-Viewshed 1 and A4-Viewshed 2 along FSR 10 would range from retention to partial retention. Travelers of this route would experience a range of open to dense forest views with some brief vistas. The A3-Viewshed 1 along FSR 73 would continue to meet the Visual Quality Objective of “retention” with some evidence of historic mining (Cougar/Independence Mill site and Ah Hee Diggings). Dense thickets of lodgepole and evidence of past mining would continue to be evident in the foreground along Country Road 24, The A3-Viewshed 1 along County Road 24 would continue not to meet the Visual Quality Objective as existing conditions meet the definition of “modification”. The A3-Viewshed 1 along FSR 10 would continue to meet the Visual Quality Objective of “retention”, with isolated spots of partial retention (Fremont Powerhouse and pipeline).

Retention would continue to be the norm within the Vinegar Hill/Greenhorn Scenic Area except where fire suppression activities in 2013 adjacent to the town of Greenhorn resulted in a modified landscape that does not meet visual quality objectives. The A9-Special Interest Area associated with Olive Lake and the Fremont Complex would continue to meet a VQO of Retention. There would be no changes to scenic attractiveness or integrity in any of the above-mentioned management areas as a result of implementing this alternative.

#### *Developed Recreation*

Visitors at Olive Lake Campground and Fremont Powerhouse rental cabins would remain undisturbed by nearby noise or harvest activity. Traffic on FSR 10 would remain light to moderate (during the hunting seasons). The vegetation surrounding these areas would continue to display a full overstory and relatively dense understory.

Views from the Ah Hee Diggings, Forest Practices, and Gold Center Spring would remain unchanged except by natural disturbance. The view from Ah Hee Diggings would become increasingly obscured by tree growth. Vegetation adjacent to the Boundary Guard Station would continue to increase in density, increasing the risk of fire damage to the cabin should a wildfire occur. Vegetation adjacent to the five trailheads would also increase in density.

Campers using dispersed sites would not be disturbed by noise, smoke, or increased traffic. Dispersed campsite use patterns would change only due to natural events (fire, windthrow, etc).

#### *Trails and Dispersed Recreation*

Trail use and dispersed recreation would continue unchanged by management activities. Natural fire cycles in the North Fork John Day Wilderness would continue to be interrupted by fire suppression and existing fuels would continue to accumulate (Ten Cent Fire & Fuels Report).

The type of high intensity wildfire indicated by existing fuel loads would remove vegetation from thousands of acres (as occurred in 1996 with the Bull, Summit, and Tower wildfires). This would remove cover for big game, produce an influx of sediment into anadromous fish spawning habitat, and increase water temperatures due to loss of shade. The quality of the recreation experience would also decline for a period of time after such a wildfire. Prescribed fire could make some historic features more visible due to the loss of vegetation.

## Alternative 2, 3, and 4

### *Recreation Opportunity Spectrum*

Proposed activities within management areas A8 and A9 would temporarily change the Recreation Opportunity Spectrum from Semi-Primitive (which calls for a "*predominantly natural or natural-appearing environment*") to a Roaded Natural by leaving debris, stumps and disturbed soil. Mitigation measures would minimize these effects, including no treatment of some highly visible portions along the road. As a result, deviation from the assigned ROS class for both management areas would be short-term lasting 2-3 years until vegetative growth hides the evidence of disturbance.

### *Visual Quality*

Proposed thinning would increase visual diversity along the A3 and A4 Viewshed corridors by opening views in dense stands and emphasizing large, old trees and trees that change color in the fall. Varied tree spacing would blend with natural openings and tree clumps. Visual quality would be reduced for up to three years following treatments until freshly cut wood fades, soil disturbance is revegetated, and plant growth disguises stumps. The identified mitigation would help restore a natural appearance more quickly. The visual quality objective of Retention (equivalent to a high scenic integrity level) in the Foreground and Partial Retention (equivalent to a moderate scenic integrity level) in the middle and background would be achieved in A3 (except along County Road 24 where mine tailings are currently resulting in a modified landscape). Scenic integrity would temporarily decrease for 1-3 years following treatments until ground vegetation covers soil disturbance and stumps. Proposed fuel reduction in the A-9 management area would create a fuelbreak along Forest Road 10, providing a greater opportunity of protecting the Fremont pipeline if wildfire occurs in this area, as well as reducing the hazard of trees falling on it. Prescribed burning would temporarily reduce scenic attractiveness in all management areas—pile burning more so than landscape burning since pile burning would not leave a natural pattern on the ground. However, the effects of prescribed fire would become visually subordinate to the surrounding area within one to two years.

### *Developed Recreation*

Recreationists at Olive Lake and Fremont Powerhouse Complex would be temporarily affected by noise, traffic, dust and smoke from the adjacent proposed activities. Increased traffic would last through much of the recreation season, though by avoiding operations on weekends during the hunting seasons (August through mid-November) there would be fewer public/equipment traffic interactions on FSR 10. After all associated activities are completed, FSR 10 would serve as a fire break increasing the likelihood that the campground and Fremont Complex would survive a wildfire as well as providing a safe evacuation route for recreationists. This is particularly beneficial to the Fremont Complex because of the critical role the complex plays as an interpretive site showcasing Eastern Oregon's settlement history. Vegetation along FSR 10 would be much more open in the foreground, allowing motorists to see and avoid wildlife collisions. Proposed treatments could help restore views of interpretive sites such as Ah Hee Diggings along FSR 73 where the view is becoming obscured by tree growth. Three developed

trailheads (Lake Creek, Granite Creek, and Lost Creek/Saddle Camp) would experience increased traffic and dust while proposed activities are implemented. By avoiding fuel treatment activities on weekends during August through mid-November and on popular weekends (mitigation RC4) most traffic concerns should be alleviated. After treatments are complete the roads associated with the Lake Creek, Lost Creek/Saddle Camp, Granite Creek, and Blue Springs Summit trailheads would serve as fire breaks providing safe evacuation routes for visitors using these trailheads in the event of a wildfire. Blue Springs Summit Snowpark and Mt. Ireland Trailhead are outside any proposed treatment units and so should not be affected.

#### *Trails and Dispersed Recreation*

There are 22 inventoried dispersed campsites within 300 feet of a proposed thinning units and 38 that lie on proposed haul routes. The listed mitigation (RC5) would protect the integrity of sites, although use of these sites could be temporarily interrupted (1-2 weeks) while thinning is implemented. This should only affect a few sites at one time, and there are many other sites available throughout the project area. Eight sites are within viewshed corridors could be used as log landings in order to reduce impacts to visual quality throughout these viewsheds. This would make these campsites unusable for 1-3 years. Thinning could improve camper safety by removing weakened or dead trees that could otherwise fall and cause injury. All dispersed campsites would be affected to some degree by smoke from prescribed burning. This would generally occur on the fringes of the camping season and late fall campers (primarily hunters) would be the most likely affected. Dense smoke could cause campers to relocate to another area, but the duration that this impact would occur would be short (1-2 weeks). Burning would also improve elk forage for several years, which could improve the quality of the hunting experience during that period. Alternative 2 would affect the most dispersed campsites due to its large-scale prescribed burning, and Alternative 4 would affect the least due to fewer thinning units and the omission of burning in the wilderness.

Firewood gathering could diminish slightly after thinning activities and prescribed burning, as dead material is either removed or consumed by fire. This could be offset by some of the treatment units being specifically identified for use as firewood as well as new snags being created by prescribed burning. Mushroom gathering would dramatically increase due to the amount of prescribed fire-particularly in alternatives 2 and 4.

The opportunity for a quality hunting experience could be reduced if the proposed prescribed burning occurs in the fall, causing big game to relocate out of the project area until disturbance ceases. Hunters could also be directly displaced by proposed activities although the effect would be temporary (1-2 weeks). The alternative most likely to have this impact is Alternative 2 because of extensive prescribed fire, including the North Fork John Day Wilderness. After the proposed activities are completed, hunting opportunities could increase due to improved big game forage.

There are 12 snowmobile trails, 12 OHV trails, and three hiking/horseback riding trails that cross proposed thinning units. Trails could be temporarily closed during treatment activity for safety reasons, however this would only affect one to two trails at a time. Effects to trails would be limited to one season or less and mitigation would ensure any damage to trail tread is repaired. Trails within prescribed fire units would need to be monitored for hazardous trees created by the burn and identified hazard trees within one tree-height of trails would be felled.

# 3.14 Wilderness and Inventoried Roadless Areas

## Affected Environment

All of the Greenhorn Unit and the southern portion of the North Fork John Day Unit of the North Fork John Day Wilderness on the Umatilla National Forest are within the Ten Cent planning area (25,203 acres). In addition, 2,489 acres of the Greenhorn Inventoried Roadless Area (IRA) on the Umatilla and Wallowa-Whitman national forests and 2,930 acres of the Twin Mountain IRA on the Wallowa-Whitman National Forest are also within the Ten Cent planning area. About 51 acres of the North Fork John Day Wild & Scenic River are also within the planning area.

The North Fork John Day Wilderness contains several notable features of value: high water quality, anadromous fish spawning habitat, big game habitat, and historic features associated with mining. The North Fork John Day Wilderness Action Plan (Action Plan) identifies that vegetative changes resulting from prescribed fire would not be considered unacceptable changes in forest cover or visual/scenic qualities. The mosaic of vegetation created by fires over time is a natural ecological condition and provides vegetative and scenic diversity (Action Plan pages 24-25). Past fire suppression within the Wilderness has affected wilderness character by causing trammeling and disrupting natural burning cycles, thus allowing a buildup of fuels that would have otherwise burned during those cycles. Current fire regimes for the portion of the Wilderness planned for treatment indicates that 96 percent of this portion of the Wilderness (Fire Regimes III and IV) should have burned one to three times in the last hundred years and the remainder (Fire Regime I) should have burned three or more times if fire had been allowed to play its natural role. There have been numerous fire starts, but constant fire suppression has led to excessive fuel build-up increasing the probability that when fire finally does occur it will be of high severity consuming most vegetation and soil cover.

A portion of the Greenhorn IRA (9% of the total IRA) lies within the southwestern part of the Ten Cent planning area. This is 6% of all inventoried roadless areas within the North Fork John Day Ranger District of the Umatilla National Forest and less than 1% of IRAs on the adjoining Wallowa-Whitman National Forest districts (172 acres). This portion of the IRA is associated with Umatilla Forest Plan management area A8 (Scenic Area). About 5% of the Twin Mountain IRA lies within the northeastern part of the Ten Cent planning area. This is 4% of all inventoried roadless areas within the Whitman Ranger District of the Wallowa-Whitman National Forest. This portion of the IRA is associated with Wallowa-Whitman Forest Plan management areas 6 (Backcountry), 15 (Old Growth), and 18 (Anadromous Fish). Inventoried Roadless Areas provide primitive recreation opportunities, quality wildlife and fish habitat, cold, clean water and clean air.

The portion of the North Fork John Day Wild & Scenic River that lies within the Ten Cent planning area is a wild segment (51 acres) completely contained within the North Fork John Day Wilderness. The Wild & Scenic Rivers Act requires that a river be free flowing and possess one or more “outstandingly remarkable values”. This river was designated in 1988 based on its scenic, fisheries, wildlife, and historic outstandingly remarkable values. According to the North Fork John Day Wild & Scenic River Management Plan (Management Plan), the viewing area of wild river sections will have an essentially natural appearance. (Management Plan page 5). River sections located within the Wilderness will be managed under Wilderness or Wild and Scenic River principles and standards and guidelines, whichever is most restrictive. (Management Plan page 7). Manage visual resources to meet standards as follows: in wild segments, preservation (ecological changes only) is the norm. (Management Plan page 10). Prescribed burning will be permitted. Low intensity prescribed fires, producing minimal scorch and rapid recovery will be

the most desirable. Use fire as a tool to meet vegetation management needs. Fire has a natural role in the management of the river corridor. (Management Plan page 18)

## Environmental Consequences

### Alternative 1

#### *Direct and Indirect Effects*

Natural fire cycles in the North Fork John Day Wilderness, Greenhorn and Twin Mountain IRAs, and North Fork John Day Wild & Scenic River would continue to be interrupted by fire suppression and existing fuels would continue to accumulate (Ten Cent Fire & Fuels Report). The type of high intensity wildfire indicated by existing fuel loads would remove vegetation from thousands of acres (as occurred in other portions of the Wilderness in the last 30 years with the Bull, Summit, Tower, Trout Meadows, North Fork Complex, Ryder Creek, Trout Creek and Vinegar wildfires). This would remove cover for big game, produce an influx of sediment into anadromous fish spawning habitat, and increase water temperatures due to loss of shade. The quality of the recreation experience would also decline for a period of time after such a wildfire and affected trails could become impassible with fallen trees. Many historic features would become more visible due to the loss of vegetation.

### Alternative 2

#### *Direct and Indirect Effects*

A Minimum Requirements Decision Guide was completed to determine the appropriate management and tools for applying fire in the North Fork John Day Wilderness (incorporated by reference). As a result, prescribed fire would be applied both outside the wilderness and allowed to back into the wilderness, and ignition would also occur along existing trails and ridgelines within the wilderness. No tree cutting or fireline construction would occur within the wilderness. Prescribed fire in the wilderness would begin to reduce fuel loadings and configurations to that which would be experienced under uninterrupted natural fire cycles. This would begin to restore naturalness in both fuel loads and vegetation type and density. Since the fire would only be controlled once it reaches the wilderness boundary, control features such as fire line trenches or tree stumps would not occur in the wilderness. Removal of fuels under prescribed fire conditions would protect other wilderness features of value such as big game and anadromous fish habitat, high water quality, and historic features.

The only activities proposed within the IRAs would be prescribed fire, which would have effects similar to those discussed for wilderness. Fire could creep down to the Wild & Scenic River corridor, but the effects of such would appear natural, meeting the “preservation” standard. Views of the fire would appear as a mosaic from the river corridor, again meeting standards specified in the Wild and Scenic River Management Plan.

### Alternative 3 and 4

#### *Direct and Indirect Effects*

Alternative 3 and 4 were developed in response to Issue 4. No prescribed fire is proposed within the North Fork John Day Wilderness area, therefore effects to the wilderness would be similar to Alternative 1. Effects to IRAs would be similar to Alternative 2.

# 3.15 Lands with Wilderness Characteristics

## Methodology

The identification of lands with wilderness characteristics process was conducted through a sequence of GIS and database analyses, field verification, and application of professional judgment. The judgment applied was situational and instance by instance.

The first step in determining areas with substantially noticeable management involved creating a map that depicts past management activities from the FACTS and Legacy Harvest databases together with an orthophoto of the project area. This information was viewed both in terms of type of management and year of implementation. Where the orthophoto did not clearly indicate substantially noticeable management (i.e. a uniform change in tree crown size and height, consistently open tree spacing, etc.) stand conditions were verified on the ground.

Maps and all criteria were considered and accounted for are provided in Appendix A of the Lands with Wilderness Characteristics Report documents the application and outcome of specific criteria. Examples of typical situations that required applications of professional judgment included, but are not limited to:

1. Determining whether other improvements or evidence of past human activities are substantially noticeable or are not substantially noticeable in the area as a whole (71.22b).
2. Extending placement of boundaries to the edges of development for purposes of inclusion in the analysis (71.22b (10).

### Analysis Indicators and Measures

The measures used to compare between alternatives lands that may have wilderness characteristics are:

- Intrinsic biophysical values (soils, water, fisheries, plants, wildlife)
- Intrinsic social values (recreation, apparent naturalness, remoteness, scenic quality, cultural resources)
- Other locally identified unique characteristics
- Change in acres of lands with wilderness characteristics
- Effect on availability for future wilderness evaluation in Forest Plan revision

### Scale of Analysis

The scale of this analysis includes all acres contained within the Ten Cent project planning area and adjacent USFS and other federal lands, as appropriate, sufficient to consider and identify affected lands with wilderness characteristics 144,459 acres). Where areas that lacked substantially noticeable management abutted the project boundary, lands outside the boundary were also analyzed to the extent that the next area with substantially noticeable management was encountered. The scale of analysis is appropriate because it considers all lands within and adjacent to the Ten Cent project that are bounded by non-conforming improvements such as roads, past harvest activity and private land (LWWC & Undeveloped Lands Report Appendix A, Maps A-1 through A-5).

## Affected Environment

The table below is a summary of all the acres evaluated for lands with wilderness characteristics for this project. Information summarized in this table can be found in Appendix A of the Lands with Wilderness Characteristics Report. The maps included in the report (maps A-1 to A-5) show a visual progression of the analysis process and the final result. The effects to lands with

wilderness characteristics and other undeveloped lands were based on maps created using agency procedures (Appendix A of Lands with Wilderness Characteristics Report) and are considered and disclosed below.

**Table 3-56: Lands with Wilderness Characteristics Analysis Summary**

| Lands with Wilderness Characteristics (LWC) Analysis Summary | Approximate Acres within Ten Cent LWC Analysis Area |
|---|---|
| Total acres considered within analysis area* (Map A-1). | 144,459 |
| Lands within the analysis area that are not National Forest (i.e. private lands) | 4,145 |
| Existng Wilderness | 25,203 |
| Acres of non-conforming 'other improvements' excluded consistent with 71.22b(1-12). e.g. Acres of substantially noticeable timber harvest and prior road construction (3), developed campgrounds (7) etc. (Map A-2) | 32,566 |
| Acres of non-conforming 'road improvements' excluded consistent with 71.22a(2a,b,c1-4). e.g. roads maintained to level 2, 3, 4, or 5 (Map A-3). | 2,248** |
| Acres of land remaining to consider and compare to size criteria at 71.21 (Map A-4). | 80,307*** |
| Acres of land identified with wilderness characteristics consistent with all criteria in Chapter 70, section 71 (Map A-5). | 55,354 |
| Acres of other undeveloped lands that did not meet criteria at FSH 1909.12 Chapter 70, section 71. (Map A-5) | 27,117 |

*This includes all acres contained within the Ten Cent project planning area and other adjacent USFS and federal lands, as appropriate, sufficient to consider and identify affected lands with wilderness characteristics.

**Some of these acres may overlap with acres of substantially noticeable harvest.

***This number does not include polygons less than one acre in size. This also includes acres that are outside the 10 Cent project boundary, but within the analysis area for lands with wilderness characteristics.

Approximately 55,354 acres were identified within the analysis area as lands with wilderness characteristics (identified as an blue speckled polygon in associated maps), which are located between the two units of the North Fork John Day Wilderness and adjacent to the Twin Mountain Inventoried Roadless Area on the east side of the Ten Cent project area. These acres account for about 38 percent of the 144,459 acre analysis area. All polygons appear forested, though the northwestern portion of Polygon #300 (associated with Olive Lake) was burned in previous wildfires. The polygons adjacent to the Twin Mountain area contain numerous maintenance level 1 roads. Polygons 58, 104, and 300 all straddle the 10 Cent project boundary. Only 2 acres of Polygon 58 (12,005 acres total), while 4,834 acres of Polygon #104 (11,680 acres total) and 4,271 acres of Polygon #300 (27,574 acres total) lie within the 10 Cent project boundary.

Lands with wilderness characteristics occur within the Desolation Big Game Management Unit. The analysis area is composed entirely of elk summer range; no winter range is present within the Granite watershed. The Umatilla and Wallowa-Whitman Land and Resource Management Plans (Forest Plans) established standards and guidelines for elk habitat for many of the management areas on the Forests. Currently, HEI, satisfactory cover, and total cover in the Lake, Clear, and Lower Granite subwatersheds and the larger C7 management area meet Umatilla Forest Plan standards. The Beaver, Bull Run, and Upper Granite subwatersheds and the larger MA18 management area are currently below the near-optimum level (HEI = 74) provided in the Planning Assumptions section for MA18 in the Wallowa-Whitman Forest Plan (see Wildlife Section pages 81-82). Many wildlife species rely on Late and Old Structure (LOS) habitat. Within lands with wilderness characteristics, there is no Old Forest Single Stratum habitat and a deficiency of Old Forest Multi Strata in the Moist Potential Vegetation Group (see Wildlife

Section page 66). There is currently pileated woodpecker source habitat within the lands with wilderness characteristics.

Within lands with wilderness characteristics polygons, there are approximately 22 miles of Class 1 streams, 13 miles of Class 2 streams, 21 miles of Class 3 streams, and 23 miles of Class 4 streams. The Class 1, 2, and 3 streams and most springs have perennial flow, while Class 4 streams stop flowing each summer. All streams and springs are important to watershed integrity, but perennial streams provide their services during the hot, dry summer months when they are most needed by the environment. The lands with wilderness characteristics contain the headwaters of Clear, Lake, Lost, and Granite creeks. Granite Creek is currently the only stream with the polygons that is 303(d) listed by the State of Oregon for water quality impairment (sediment).

There are 35 miles of fish-bearing streams (Classes 1 and 2) within the lands with wilderness characteristics polygons. Steelhead (a Threatened species) and its designated critical habitat occur within these streams (associated with Polygons 104, 300, and 506).The lands with wilderness characteristics polygons contain 7 points of diversion for water rights and 9 places of use that intersect in some part of the polygons. There are also spring developments for the beneficial use of livestock and wildlife watering. The developments generally consist of metal boxes with pipe outlets that are buried in the springs, with fencing to protect the spring's source area. Water is piped from the metal box to a nearby watering trough. Some springs appear to have been developed by excavating a pond in the spring or in the channel of an intermittent stream. All of the water developments are used each year by livestock. In addition, the water systems and fences are maintained annually as needed. The water developments are necessary for operation of the grazing permits, as most streams stop flowing from July to October. Perennial springs and streams are the only water sources during summer months. The developments are also necessary for wildlife in the area. The springs and their associated wetlands are unique features and provide important ecosystem functions.

## Environmental Consequences

### Alternative 1 (No Action)

#### *Direct and Indirect Effects*

All 55,354 acres of lands with wilderness characteristics would remain as described in the Affected Environment section. The area would continue to appear predominantly natural. Scenic integrity within much of the area would remain very high, with only brief glimpses of closed roads on the landscape. There would be no changes to Late Old Structure wildlife habitat or pileated woodpecker source habitat. There would also be no changes to fisheries habitat and streams would remain unaffected by forest treatments within the polygon. Therefore, selecting this alternative would not affect any future wilderness decision associated with a forest plan revision.

**Table 3-57: Lands With Wilderness Characteristics in 10 Cent Analysis Area by Alternative**

| Alternative | Acres Prior to Activity | Acres Remaining After Implementation | Amount of Analysis Area Affected by Treatments* | Percent Loss of Lands With Wilderness Characteristics |
|---|---|---|---|---|
| 1 | 55,354 | 55,354 | 0% | No loss |
| 2 | 55,354 | 54,808 | Less than 1% | 1% |
| 3 | 55,354 | 54,808 | Less than 1% | 1% |
| 4 | 55,354 | 54,849 | Less than 1% | 1% |

* Does not include prescribed fire treatments, as these would have effects similar to natural wildfire.

## All Action Alternatives

Table 3-56 displays the treatments proposed within lands with wilderness characteristics by alternative and how much of the polygon would remain unaffected by non-conforming activities and Table 3-57 shows how much of the analysis area would remain unaffected by non-conforming activities.

**Table 3-58: Activities proposed in Lands with Wilderness Characteristics (LWC) in the 10 Cent Analysis Area by Alternative**

| Activity | Alternatives 2 | Alternatives 3 | Alternatives 4 |
|---|---|---|---|
| Commercial thinning, Small diameter Thinning, Firewood, and Mechanical Fuels Treatment | 546 acres | 546 acres | 505 acres |
| Riparian Small diameter Thinning | 259 | 259 | 259 |
| Closed Road Reopened | 0 miles | 0 miles | 0 miles |
| Temporary Road Constructed | 0.3 miles | 0.3 miles | 0.3 miles |
| Prescribed Fire-Landscape | 2,120acres | 60 acres | 21,18 acres |
| Prescribed Fire-Slash and Pile Burn | 720 acres | 825 acres | 720 acres |
| Acres of LWC Remaining After Implementation | 54,549 | 54,549 | 54,590 |

Most of the proposed harvest within lands with wilderness characteristics would occur along Roads 10, 1030-020, 13, and 1310 and along the edge of the Twin Mountain Inventoried Roadless Area. All harvest would occur along the edges of lands with wilderness characteristics polygons and would not bisect any of the polygons. The areas where harvest activities occur would no longer appear natural; numerous stumps would be apparent and spacing would be much more open. Reopening of closed roads and temporary road construction would expose soil and remove shrub and tree cover, making them more noticeable as well. The sense of remoteness would be reduced as the sights and sounds of management would intrude. Scenic integrity would be reduced to a moderate level due to the heavy concentration of activities. This would last for several decades until soils are re-vegetated, stumps substantially deteriorate, and tree regrowth blends with the remaining forest. Prescribed fire would have little effect on lands with wilderness characteristics in that the majority of the treated area would still appear natural, with some non-conforming fire control lines and periodic stumps related to removal of hazardous snags. Pile burning would appear less natural, as blackened circles spaced somewhat regularly on the ground, but vegetation regrowth would begin to disguise this in one year, and by three years only burn scars on trees should be noticeable. No roads would be necessary for prescribed burning, although existing closed roads could be used for fire control lines. Sense of remoteness would not be affected, and while scenic attractiveness would be reduced by the blackened landscape, scenic integrity would remain high because the landscape would still appear to be intact.

Selecting any of the action alternatives would affect a future wilderness decision associated with a forest plan revision; the only difference between the alternatives would be the number of acres affected. Harvested acres would be considered non-conforming within lands with wilderness characteristics would not be brought forward for consideration in a future wilderness analysis.

Commercial thinning activities would reduce canopy closure in affected stands and convert stands from an elk habitat cover condition to foraging habitat under all three of the action alternatives (Table 3-58). Small diameter thinning and mechanical fuels treatment would reduce small-diameter tree densities in treatment units. Sight distances would increase and hiding cover would decrease as a result of this activity. Vulnerability of elk would increase, especially where NCT units are adjacent to open roads. These losses would be cumulative with past losses

resulting from timber harvest, wildfire, and other factors. It is not expected that landscape burning in dry upland forest stands would appreciably impact elk cover. Occasional single trees and groups of trees may be killed in these areas, but overall cover levels are not expected to be impacted. Immediate and delayed fire mortality in a portion of moist and cold upland forest stands experiencing moderate and high severity impacts would convert cover habitat to a forage condition. While cover habitat would be reduced to some extent, the quality and quantity of forage would improve in moderate and high severity burn patches in the short and mid-term. Elk distribution during high use periods such as hunting season would likely change following burning. Under all of the action alternatives, there would be no net loss of late and old structure habitat due to vegetation treatments. However, prescribed fire would have direct and cumulative effects in late old structure habitat as some portion of the treated acres would burn at moderate and greater severity (Alternative 3 would affect the fewest acres). Fire-caused mortality would improve snag and downed wood habitat in the short and mid-term. While there is a potential for large-diameter snags and downed wood consumption during burning (especially those in later stages of decay), these potential impacts are not quantifiable due to the many variables involved. Not all acres within burn blocks would be blackened. While it is difficult to accurately assess the actual number of acres that would be blackened, a general estimate would be 40 to 60 percent. Treatment under all of the action alternatives would impact the size and suitability of pileated woodpecker habitat in this portion of the analysis area. Landscape burning would move a proportion of pileated woodpecker suitable source habitat condition to an unsuitable condition following burning (Alternative 2 affecting the most area). Under all action alternatives the size and distribution of C1 and MA15 old growth habitat would provide for the survival and reproduction of the pileated woodpecker and meet Forest Plan direction and guidance.

The action alternatives have the potential to impact surface water quality and groundwater (see Water Resource section of EIS). However, the project contains site-specific Best Management Practices which are designed to prevent further impairment to water quality and to protect groundwater. These Best Management Practices would also prevent impacts on fish. In addition, the potential for high intensity wildfire in the riparian areas would be reduced (see Fish section of EIS).

# 3.16 Other Undeveloped Lands

## Methodology

An outcome of the lands with wilderness characteristics analysis process was the identification of polygons of other undeveloped lands. These polygons did not meet criteria as lands with wilderness characteristics and they are not inventoried roadless areas or a designated wilderness area. Each individual polygon of land has no substantially noticeable harvest activity and does not contain maintenance level 2, 3, 4, or 5 forest roads. They are stand-alone polygons of varying acreages all less than 4,999 acres within the analysis area. All polygons less than one (1) acre were dropped from detailed study because individual polygons this small could easily result from mapping error and they are too small to be meaningful. Detailed information regarding the methodology used for the Ten Cent project analysis, along with maps and tables is located in Appendix A of the associated report.

There are no forest-wide or management area standards specific to other undeveloped lands in either the Umatilla or Wallowa-Whitman forest plans. All lands, including other undeveloped lands, are managed consistent with forest-wide standards and guidelines and by designated Forest Plan management area allocations.

### Scale of Analysis

The scale of analysis is those areas described as other undeveloped lands and totals 27,117 acres. Other undeveloped lands have intrinsic ecological and social values because they do not contain history of management or the past harvest is no longer substantially noticeable and the lands do not contain forest roads maintained to levels 2, 3, 4, and 5.

### Analysis Indicators

The following values are used as indicators of comparison to display effects among alternatives on other undeveloped lands:

- Intrinsic biophysical values (soil, water, fisheries, plants, wildlife)
- Intrinsic social values (recreation, apparent naturalness, remoteness, scenic quality)
- Other locally identified unique characteristics
- Change in acres of other undeveloped lands

## Affected Environment

Table 3-39 displays the acres of other undeveloped lands within the Ten Cent analysis area along with references to maps in Appendix A of the Lands with Wilderness Characteristics and Other Undeveloped Lands Report for a visual representation. In the 144,459 acre analysis area, approximately 227,117 acres (about 19 percent of the analysis area) have been identified as isolated polygons of other undeveloped lands that are at least one acre in size. Individual polygons of other undeveloped lands less than an acre (343 polygons totaling 42 acres) were eliminated from further study because they are too small to be meaningful.

Table 3-59 displays the number, size class, and approximate acres of other undeveloped lands represented. For perspective, one square mile is about 640 acres. The residual shape of each undeveloped polygon is the result of boundaries created by substantially noticeable past management activities and maintenance level 2, 3, 4, or 5 roads.

**Table 3-59: Size Class and Acres of Other Undeveloped Lands in the Ten Cent Analysis Area**

| Number of Polygons | Size Class | Approximate Acres |
|---|---|---|
| 80 | 1 to 10 acres | 307 |
| 51 | 11 to 100 acres | 1,848 |
| 15 | 101 to 1,000 acres | 3,625 |
| 9 | 1,000 to 4,999 acres | 21,337 |
| **155** | **Total** | **27,117** |

Human influences have had limited impact to long-term ecological processes within the other undeveloped lands. Disturbance by insects and fire has been and most likely will continue to be the factors with the most potential to impact the area.

Soils on other undeveloped lands may still experience the effects of compaction and displacement from management activities that are no longer substantially noticeable on the surface. Compaction and displacement within the prism of the management impacts (equipment trails) may still have the capacity to diminish vegetative growth and ground cover (Froehlich & McNabb1983, Amaranthus et al, 1996, Bulmer et al, 2010 and Miller 2004). Vegetation outside of the impact area often offers a source of ground cover from falling dead organic matter. While these management impacts may not be visible within feet of the impact; they can be viewed in aerial photography where not obscured by canopy closure. The existence of canopy closure does

not mean the impacts are no longer present. Maintenance level 1 roads may also still be experiencing residual soil effects (such as potential instability) because on the whole, these roads were not returned to their original contour. These roads have had drainage structures removed and their surfaces may be largely re-vegetated, but there may be areas of localized erosion and much of their length would still be compacted. Where no roads or past management have occurred, soils would be unimpaired by humans.

Water resources on other undeveloped lands would be largely unimpaired by humans. Exceptions would include maintenance level 1 roads and spring developments, both of which intercept ground water and potentially alter over-surface flows. There are perennial springs within the other undeveloped lands, most of which have been developed for livestock and wildlife. These water systems and fences are maintained annually as needed. The water developments are necessary for operation of the grazing permits. A few have been inventoried, and a sub-set support groundwater dependent ecosystems (Fritz and Hernandez, 2014). Where no water developments, roads or past management have occurred, water flows and quality would be unimpaired by humans.

Plant communities, particularly habitat for threatened, endangered, and sensitive species, would be mostly unimpaired by human activities. Areas impacted by past management activities and maintenance level 1 roads have altered plant communities progressing through various stages of succession. Noxious weeds have fewer transport venues in undeveloped areas and less opportunity to become established. However noxious weeds have many vectors, such as wind and wildlife, and infestations in remote areas not often visited likely go undetected and untreated.

Wildlife habitat on other undeveloped lands varies widely in structure, composition, and density. These stands provide habitat for a wide range of wildlife species dependent on open canopy forest, closed canopy forest, grasslands, shrublands, early successional stages, dead wood, and other features. This variation in structure, composition, density, and other habitat features (including snags and downed wood) are the result of multiple factors including historic disturbance regimes, topographical features (aspect, slope position, moisture gradients, etc.), past management (harvest, fire suppression, etc), and other factors. In some areas, past management is no longer substantially noticeable in terms of evidence of harvest or maintenance level 1 roads, but changes in species composition and density (due to fire suppression or removal of certain species and size classes) and dead wood availability are noticeable. Areas where there have been no timber management activities often provide snag densities that exceed those expected based on data from reference stands. Where no road building, past timber management, or natural disturbance events have occurred, snag and downed wood dynamics and stand structure, composition, and density (which contribute to habitat quality for a wide suite of wildlife species) are similar to what would have been expected historically and show no impairment by humans. Larger blocks of other undeveloped lands (areas 1,000 acres or more) would serve as movement corridors for many wildlife species. Where moisture and other factors allow, undeveloped lands and those areas where management activities are no longer noticeable (in terms of stand structure) provide higher quality and better distributed cover habitat for elk and dense dry upland forest stands for species like the pileated woodpecker.

Recreation in other undeveloped lands would consist of cross-country hiking, horseback riding, hunting, bird and wildlife viewing, and gathering of natural foods and medicines. The existence of maintenance level 1 roads would not substantially change the recreation experience, although they could provide easier travel where not blocked by down wood or rocks. Other undeveloped

lands in the northwest half of the 10 Cent analysis area are very dissected and dispersed. Opportunities for a feeling of remoteness are limited by the size and shape of polygons. Distance and topographic screening are also factors in creating such opportunities. Nearby, non-conforming sights and sounds of roads and timber harvest can be heard and often seen from within the other undeveloped lands. In larger polygons of other undeveloped lands (>1,000 acres), there are numerous management created openings scattered throughout the polygons. A sense of remoteness may be experienced in the portions of such polygons where past management is not visible. Visual integrity within many other undeveloped lands would be pristine in the foreground, but views of managed landscapes could intrude, depending on the amount of screening provided by topography and tree cover. Cultural resources within other undeveloped lands would be undisturbed by management and the historic integrity and character of these sites be intact.

No additional special or unique values in other undeveloped lands associated with the 10 Cent analysis area have been identified by project resource specialists.

The existing condition of all remaining land within and affected by the 10 Cent analysis area that are not lands with wilderness characteristics or other undeveloped lands present a landscape that has been managed and is generally developed in nature; these lands contain evidence of past harvest and forest roads. Past management actions and current conditions reflect the multiple-use intent and decisions made in the Forest Plan (1990 as amended), and reflects consistency with Forest Plan management area allocations.

## Environmental Consequences

### Alternative 1 (No Action)

#### *Direct and Indirect Effects*

There would be no direct effects to other undeveloped lands because no activities would occur in these areas. The affected environment would remain unchanged, except by natural processes and ongoing management activities (see description of affected environment in Chapter 3 for a full list of resources considered). Biological and ecosystem functions would continue. The landscape would likely continue developing complex fuel loads. A wildfire would have potential to result in extensive mortality within denser forest stands which would result in larger acreages of blackened landscapes compared to prescribed fires. Some forest visitors would avoid blackened landscapes, at least until green vegetation predominantly returns (3 to 5 years). However, fire is a natural occurrence and expected disturbance process in this landscape. All polygons of other undeveloped lands would continue to not meet criteria as lands with wilderness characteristics and would continue to not be an inventoried roadless area or a designated wilderness area.

For the No Action alternative, the Ten Cent project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present, and reasonably foreseeable future actions. Based on the definition provided in the CEQ regulations there would be no cumulative effects for the No Action Alternative.

**Table 3-60: Other Undeveloped Lands in 10 Cent Analysis Area by Alternative**

| Alternative | Acres Prior to Activity | Acres Remaining After Implementation | Amount of Analysis Area Affected by Treatments* | Percent Loss of Undeveloped Lands |
|---|---|---|---|---|
| 1 | 27,117 | 27,117 | 0% | No loss |
| 2 | 27,117 | 23,465 | 16.2% | 7% |
| 3 | 27,117 | 23,465 | 16.2% | 7% |
| 4 | 27,117 | 23,783 | 16.5% | 6% |

* Does not include prescribed fire treatments as these would have effects similar to natural wildfire.

## All Action Alternatives

### *Direct and Indirect Effects*

Effects to the intrinsic physical and biological resources of other undeveloped lands within the Ten Cent planning area (soils, water, wildlife, recreation, fisheries, etc.) are disclosed in the applicable resource sections of the EIS and only briefly summarized here. .

Where management would occur within other undeveloped lands, soils would be exposed to compaction and displacement from heavy equipment and erosion due to soil surface exposure during skidding or road construction/reconstruction. However, given the design criteria, a minimum of 80 percent of an activity area would remain in a condition of acceptable productivity potential consistent with Forest Plan standards.

The action alternatives have the potential to impact surface water quality and groundwater. However, the project contains site-specific Best Management Practices which are designed to prevent further impairment to water quality and to protect groundwater. These Best Management Practices would also prevent impacts on fish. In addition, the potential for high intensity wildfire in the riparian areas would be reduced.

Design criteria would protect threatened, endangered, or sensitive plants. Areas of disturbed soil would be open to colonization by noxious weeds.

Vegetation treatments would move treated forests to early seral species and tend to promote more open stands composed of larger, older ponderosa pine. These changes would benefit some wildlife species associated with open conditions, while reducing habitat for species associated with closed canopies and greater proportions of fir. Where cover is reduced, elk could disperse to other areas with cover and low levels of motorized disturbance. It is likely that vegetation treatment and road use in undeveloped lands would reduce existing snag densities to a small degree and impact the context of habitat (conversion of more dense stands to more open stands). Vegetative treatments would also impact future snag recruitment over a large portion of the forested acres in the analysis area. While snag densities in treatment units would likely be reduced in the short and mid-term (and in some cases the long-term) it is not expected that the snag density distribution at the analysis area scale would be affected appreciably

Recreation would change slightly, adding dispersed camping, motorized sports, and firewood collection to the potential uses within other undeveloped lands. The quality of the hunting experience would be reduced if elk are displaced. Where treatment occurs within undeveloped lands, there would be a loss of apparent naturalness. Recreationists seeking a primitive experience or a sense of remoteness would have less area available due to harvest in the large polygons of other undeveloped lands (2,877 acres in Alternatives 2 and 3, and 2,621 acres in

Alternative 4), whereas the small polygons have already been infringed upon by adjacent sights and sounds of management and human presence prior to implementation. On acres treated by commercial or noncommercial thinning, management activities would be substantially noticeable for up to 50 years, depending on the rate of stump decay and recovery of disturbed soils. Prescribed fire would have little effect on undeveloped lands characteristics in that the majority of the treated area would still appear natural, with some non-conforming fire control lines and periodic stumps related to removal of hazardous snags. Pile burning would appear less natural, as blackened circles spaced somewhat regularly on the ground, but vegetation regrowth would begin to disguise this in one year, and by three years only burn scars on trees should be noticeable. Visual quality within other undeveloped lands where management occurs would still meet Forest Plan standards, although views would no longer be pristine. There are several cultural resource sites within these other undeveloped lands, however no impacts are expected on known cultural resources since all would be avoided by project activities. All of the proposed activities will not affect the historic integrity or historic character of these sites.

Environmental effects to resources in other undeveloped lands due to the implementation of proposed project activities would be consistent with applicable laws, regulations, and Forest Plan management area standards and guidelines (see applicable sections of the EIS for Findings of Consistency for each resource).

All action alternatives propose some level of activity within other undeveloped lands, varying only by the number of acres or miles treated (see Table 3-61). Refer to the LWWC and Undeveloped Lands Report Appendix and associated maps to see the location of activity units and other undeveloped lands and the EIS Chapter 2 for a listing of harvest activity units and logging method.

**Table 3-61: Activities proposed in Other Undeveloped Lands in Ten Cent**

| Activity | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|
| Commercial Thinning, Small diameter Thinning, Firewood, and Mechanical Fuels Treatment | 1,766 acres | 1,766 acres | 1,510 acres |
| Riparian Small diameter Thinning | 1,111 acres | 1,111 acres | 1,111 acres |
| Temporary Road Constructed | 0.8 miles | 0.8 miles | 0.7 miles |
| Closed Road Re-opened for Hauling | 37.8 miles | 37.8 miles | 36.4 miles |
| Prescribed Fire—Landscape | 4,564 acres | 1,833 acres | 4,565 acres |
| Prescribed Fire—Slash and Pile Burning | 2,428 acres | 2,565 acres | 2,428 acres |

Other undeveloped lands with no proposed treatments would remain the same as described in the affected environment. All 27,117 acres of other undeveloped lands within the analysis area would still not be considered lands with wilderness characteristics, roadless areas, inventoried roadless areas, or a designated wilderness area.

### *Cumulative Effects*

The cumulative effects geographic boundary is the 144,459 acre Ten Cent analysis area. This boundary is appropriate because a larger scale would dilute the effects on other undeveloped lands and their intrinsic biophysical and social values. The temporal boundary for this cumulative effects analysis is 50 years. This timeframe is appropriate because that is how long it would take harvest and temporary road construction to no longer be substantially noticeable (based on field observations of other past management in the Ten Cent analysis area).

In the project area the increased numbers of stumps, the open nature of the forest stand, and soils disturbed by skid trails, temporary roads, and landings would likely be the most apparent change resulting from implementation. In the long term (about 50+ years), the proposed activities would result in the development of historic open, park-like conditions, characterized by larger diameter trees. Prescribed burning and future wildfires would cumulatively change composition and structure of vegetation (EIS, Chapter 3 Forest Vegetation section). Burned areas would display a prominent blackened color for about one year, becoming subordinate on the landscape as grass and other vegetation grows. Outside the treated areas, the conditions described in the affected environment would remain unchanged except by natural processes and ongoing activities such as grazing and hunting.

The intrinsic biophysical values of other undeveloped lands would be cumulatively impacted by implementation of the Ten Cent project, grazing, past harvest and road construction. For other undeveloped lands in which project activities would occur, the cumulative effects to soil; water quality; plant and animal communities; habitat for threatened, endangered, and sensitive species; recreation; and cultural resources are disclosed in the applicable resource sections of the EIS and are not reiterated here. Apparent naturalness and a sense of remoteness would be cumulatively impacted by grazing, dispersed camping, and motorized ATV and vehicle use on roads. Effects associated with recreational use, including noxious weed spread, erosion, litter, and evidence of fire rings, are expected to remain cumulatively minor.

# 3.17 Economics

## Methodology

This section deals with the economic viability of the potential Ten Cent Project area timber sales. Economic viability is dependent on costs and revenues associated with a particular timber sale. Timber sales, small diameter thinning, fuel treatments, and associated resource work can generate employment and stimulate the local economy.

The direct costs and revenue are identified for each alternative measuring the value of wood products to determine the estimated value of each alternative and viability of the Ten Cent Project with the alternatives identified. While there are other economic values in terms of revenues and costs that will be created from the implementation of this project to wildlife (terrestrial, aquatic), recreation, roads, soil, water and vegetation, the values are intangible and subject to individual personal judgment. Therefore s those values are subjective and cannot be analyzed.

Other environmental factors such as water quality, fish, wildlife, productivity, have value that can be expressed in economic or non-economic terms. However, these other environmental factors do not have financial benefits and cost that are identifiable and quantifiable with relationship to the activities proposed for the Ten Cent Project. Therefore, an analysis would not show any financial or economic difference in those factors between alternatives. Therefore, economic analysis of those other environmental factors will not be included in this report.

### *Volume*

Total and per acre volume for the Ten Cent economic analysis are based off of a limited pre-cruise of the project units identified as having a possible commercial component including commercial thinning, post and pole, and firewood sales. The prescription used for determining cut volume was based on the residual basal area targets for the different stand types and experience with local fuel and silvicultural objectives. The pre-cruise estimates are assumed to

apply to all potentially commercial acres in the project area, this volume estimate will go up in some areas that will make viable commercial units and down in others that are non-viable commercial units.

#### *Harvest Systems*

Harvest systems within the project area were primarily determined using a GIS Digital Elevation Model raster supplemented with some field observations. Continuing field work will improve the optimal harvest system determination. An assumption of the analysis is that entire analysis units will be treated in the same way. Ground-based systems are used for those units with average slopes less than 35%. Skyline units are those units with average slopes greater than or equal to 35%. Roadside units are treated as a mix of skyline and ground-based systems. The purpose of this determination is to inform harvesting cost but the determination is likely to change as technicians get a look at the ground.

#### *Harvest Cost and Revenue*

Harvest costs have been estimated using the Forest Service Region 6 programs LogCost v15.0, Haulcost v15.0, and Jipo Truck Cost. Data used in the programs for equipment, routes, and costs are based on project GIS, pre-cruise, and other recently appraised sales.

Revenue estimates are based on pre-cruise data of species, diameter, and stocking. Along with average delivered log prices from the R6_TEACOST program.

Timber values and logging costs have the most direct effect on the economic values of this project. Market conditions may fluctuate widely throughout the year, and depending on the time of year the sales are offered for auction, the current estimates may or may not be accurate, which could have an impact on the final sales values. Rising or falling fuel and delivered log prices could create a substantial increase or decrease in sale operation and manufacturing costs.

#### *Consideration of Small Diameter Wood Removal*

The logging cost vs. revenue will be a limiting factor when considering this project as a timber sale. From the limited preliminary cruise data the quadratic mean diameter (QMD) is 9.8 inches across all species (46 percent lodgepole pine, 29 percent white fir, 10 percent alpine fir, 10 percent ponderosa pine, and 5 percent Douglas-fir) The logging costs per unit volume rise rapidly as the average or QMD of stems removed decreases. This is because more stems are needed to create the same volume, for example four average lodgepole pine with a diameter of 9 inches have the same merchantable volume as two 12 inches or one 15 inch lodgepole pine, but each stem requires relatively the same amount of time to fall, skid, process and load. While operating costs remain the same the total volume produced from stump to landing daily may be half as much with QMD of 9.8 inches versus a QMD of 12 inches.

### Safety

Safety will not be analyzed for each alternative however it is in important to note that an additional consideration for timber management is the safety of woodworkers. Despite advances in safety and harvest technology and strict adherence to OSHA standards logging remains one of most dangerous occupations in the USA. From 1980-89 an estimated 14,920 workers died from traumatic injuries received in the logging industry. This translates into an annual fatality rate of 164 deaths per 100,000 loggers. For comparison, the annual fatality rate for all US workers is 7 deaths per 100,000 employees. Over this same 10-year period, the logging industry recorded an annual workplace injury rate of 14,000 injuries per 100,000 loggers. This compares with a rate of 8,000 injuries per 100,000 for all US workers. Approximately 60% of all logging injuries and

fatalities occurred when the workers were struck by falling or flying objects or were caught between objects. Approximately 90% of these injuries and fatalities involved trees, logs, snags or limbs (NIOSH Pub No. 95-101).

The mechanization of ground-based harvesting has dramatically reduced the fatality and injury rates within the industry. Mechanized equipment such as feller-bunchers and cut-to-length processors are designed to protect the operator from being struck by falling logs and debris from tree felling and processing. According to a 6-year study in West Virginia mechanical harvesters have reduced injury rates from 19,400 per 100,000 loggers to 5,200 per 100,000 loggers, a decrease of 73% (Bell, J.L. 2001).

Mechanization of forest treatments not only improves production rates it more importantly has decreased the amount of time workers spend unprotected near unmitigated hazards such as snags in the woods. Hazard tree felling and removal can mitigate some of the trees near roadsides and landings where unprotected workers congregate. Mechanization and hazard tree removal will not eliminate risk from gravity or other operational hazards but they do reduce exposure time and frequency.

### Analysis Indicators

The following indicators were used to measure the economic effects of proposed action:

- Sawlog and biomass/fiber volume is measured by 100 cubic feet of solid wood or CCF.
- Timber Gross Revenue is measured by the dollar amount of revenue based on pre-cruise data and average delivered log prices (see economic methodology above). Cost of harvest or net cost per acre is measured by the dollar amount of costs associated with harvest per acre of treatment.
- Firewood measured by the amount of cords available.

### Spatial and Temporal Bounding

The affected area, or economic impact zone, for the Umatilla National Forest consists of Grant, Morrow, Umatilla, Union, Wallowa, and Wheeler counties in Oregon. The Ten Cent Project area is within Grant county Oregon. Economic profiles have been developed for Wheeler and Grant counties and are available at the Heppner Ranger district. The profiles summarize demographic, employment, and income trends in those counties. Refer to the Umatilla National Forest, land and Resource Management Plan, Final Environmental Impact Statement, Appendix B, for additional detail description of the main social and economic characteristics of the area (USDA 1990).

Timber values and logging costs have the most direct effect on the economic viability of this project. Market conditions may fluctuate widely throughout the year, and depending on the time of year the sales are offered for auction, the current estimates may or may not be accurate, which could have an impact on the final sales values. Rising or falling fuel and delivered log prices could create a substantial increase or decrease in sale operation and manufacturing costs.

## Affected Environment

Timber harvest in Grant County has averaged 29.3 MMBF over the past 15 years and declined from a high of 86.9 MMBF in 2004 to a low of 13.4 MMBF in 2013 according to the University of Montana Bureau of Business and Economic Research (2015).

The majority, 67%, of timber harvest in Grant County from 2002-2007 was from industrial and non-industrial private forestlands. From 2008 to 2014 the majority, 70%, of timber harvest was

from National Forestlands (BBER 2015). The shift reflects the overall downward trend of timber prices leading to the 2008-2009 low-point in timber values.

## Environmental Consequences

### Alternative 1 (No Action)

#### *Direct Effects and Indirect Effects*

Under the No Action Alternative, no commercial timber harvest, pre-commercial thinning, or fuel reduction activities associated with the Ten Cent project would occur. Except for the in-house planning costs, Alternative 1 would incur no costs, produce no revenue, and would not change the conditions or level of economic activity in the surrounding counties. This alternative may, however, contribute to a decline in the local timber industry and local economy, since it would keep federal timber from the market and provide no revenue or support direct, indirect or induced employment. Current downward trends in timber harvesting from National Forests lands would continue into the future. Current employment in the wood products sector of the local economy would remain unchanged.

### Alternative 2 and 3

#### *Direct and Indirect Effects*

Alternative 2 does not appear to be financially viable solely from a timber economics viewpoint. The costs of harvesting and hauling small diameter merchantable timber exceeds the expected revenues for a total project cost of $3,777,826. Harvesting costs are lower per CCF compared with Alternative 4 because of shorter average skidding and yarding distances distance. This option has a higher total net cost than Alternative 3 because it would mechanically treat more acres, though it has a lower net cost per acre because of the difference in average skidding distance.

**Table 3-62: Alternative 2 and 3 Economic Analysis**

| Logging System/ Product | Vol (ccf) | value | Total ($)Stump-to-truck | Total($) Log Haul | Road Maint ($/total) . $/total | total ($)BD & Erosion | Total Temp Road ($) | Sum of Costs | Net Value |
|---|---|---|---|---|---|---|---|---|---|
| 1 Ground based saw | 14,287 | 2,428,820 | 1,308,277 | 557,200 | 50,005 | 36,289 | 14,287 | 1,966,058 | 462,762 |
| 1 Ground based fiber | 12,171 | 912,792 | 1,722,134 | 474,652 | 42,597 | 30,913 | 12,171 | 2,282,466 | -1,369,674 |
| 2 Roadside Saw | 13,711 | 2,330,922 | 1,981,284 | 534,741 | 47,990 | 34,827 | | 2,598,841 | -267,919 |
| 2 Roadside fiber | 11,680 | 876,000 | 2,376,881 | 455,520 | 40,880 | 29,667 | | 2,902,948 | -2,026,948 |
| 3 Skyline Saw | 4,518 | 768,012 | 858,366 | 176,191 | 15,812 | 11,475 | 4,518 | 1,066,362 | -298,350 |
| 3 Skyline fiber | 3,848 | 288,632 | 1,079,483 | 150,089 | 13,469 | 9,775 | 3,848 | 1,256,665 | -968,033 |
| **Totals** | 60,215 | 7,605,177 | 9,326,424 | 2,348,392 | 210,753 | 152,947 | 34,824 | 12,073,339 | -4,468,162 |

| Logging System/ Product | Vol (ccf) | value | Total ($)Stump-to-truck | Total($) Log Haul | Road Maint ($/total) . $/total | total ($)BD & Erosion | Total Temp Road ($) | Sum of Costs | Net Value |
|---|---|---|---|---|---|---|---|---|---|
| Road Const. | | | 5 | miles | 2,000 | Cost per Mile | | 10,000 | |
| Total Project | | | | | | | | | **-4,478,162** |
| **Net Cost/ac** | | | **8018** | **Total Acres** | | | | | **-559** |

## Alternative 4

### *Direct and Indirect Effects*

Alternative 4 does not appear to be financially viable solely from a timber economics viewpoint. The costs of harvesting and hauling the small diameter merchantable timber exceed the expected revenues by $3,560,210. Alternative 4 would treat 1291 acres less than Alternatives 2 and 3 but would also cost more per CCF due to longer skidding and yarding distances. This option has a lower net cost than Alternative 2 because it would treat fewer acres, though it has a higher net cost per acre due to the difference in average skidding distance. It would also supply less commercial firewood harvesting opportunities than Alternatives 2 and 3.

**Table 3-63: Alternative 4 Economic Analysis**

| Logging System/ Product | Vol (ccf) | value | Total ($)Stump-to-truck | Total($) Log Haul | Road Maint. $/total | total ($)BD & Erosion | Total Temp Roads( $) | Sum of Costs | Net Value |
|---|---|---|---|---|---|---|---|---|---|
| 1 Ground based saw | 9,899 | 1,682,869 | 885,981 | 386,070 | 34,647 | 25,144 | 9,899 | 1,341,742 | 341,128 |
| 1 Ground based fiber | 8,433 | 632,451 | 1,210,089 | 328,874 | 29,514 | 21,419 | 8,433 | 1,598,330 | -965,879 |
| 2 Roadside Saw | 13,075 | 2,222,684 | 1,889,281 | 509,910 | 45,761 | 33,210 | | 2,478,162 | -255,478 |
| 2 Roadside fiber | 11,138 | 835,322 | 2,266,508 | 434,368 | 38,982 | 28,290 | | 2,768,147 | -1,932,824 |
| 3 Skyline Saw | 4,307 | 732,162 | 843,063 | 167,967 | 15,074 | 10,939 | 4,307 | 1,041,350 | -309,188 |
| 3 Skyline fiber | 3,669 | 275,159 | 1,048,355 | 143,083 | 12,841 | 9,319 | 3,669 | 1,217,266 | -942,107 |
| Totals | 50,520 | 6,380,647 | 8,143,278 | 1,970,271 | 176,819 | 128,320 | 26,308 | 10,444,996 | -4,064,349 |
| Road Const. | | | 5 | miles | 2,000 | Cost per Mile | | 10,000 | |
| Total Project | | | | | | | | | -4,074,349 |
| **Net Cost/ac** | | | **6727** | **Total Acres** | | | | | **-606** |

## All Alternatives

### *Cumulative Effects*

#### Past Activities

Past timber harvest activities on all ownerships within the local area have affected the viability of timber harvest to the extent that the present industrial infrastructure and workforce have developed as a result of the past activities. The effects of specific activities on the viability of timber harvest are not measurable.

#### Present and Reasonably Foreseeable Activities

Due to the competitiveness of the market, and its global nature, none of the alternatives would in themselves affect prices, costs or harvest viability of other present or reasonably foreseeable timber sales in the area. The overall trend of decreasing harvest could lead to a decrease in local capacity and demand for wood products.

# 3.18 Transportation Summary

The transportation systems on the North Fork John Day and Whitman Ranger Districts serve a variety of resource management and access needs. Most roads on these districts were originally constructed for commercial uses, including timber and grazing, as well as recreational uses. Road construction within the analysis area correlated closely with timber harvest. Roads 10, 19, and 73 are arterial roads that would be resurfaced if funding were available. The commercial value of the forest products resulting from this project may not support this. Road Surface Replacement (RSR) deposits will be collected on maintenance levels 3 and above. All the arterial haul routes connect with county roads.

There are multiple haul routes available that connect to county roads. Appraisals are done with maximum economy in mind, i.e. via the least expensive route. From Oregon Highway 7, haul may go west toward Prairie City/John Day or east toward Baker City.

**Table 3-64: Existing Transportation System**

| Functional Class | Objective Maintenance Level | Length (MI) |
|---|---|---|
| A - Arterial | 5 - HIGH DEGREE OF USER COMFORT | 5 |
| A - Arterial | 4 - MODERATE DEGREE OF USER COMFORT | 13 |
| A - Arterial | 3 - Suitable for Passenger Car | 5 |

## Current Condition

The Umatilla NF Land and Resource Management Plan suggested an average open road density of about 2.0 miles/sq. mile, forest-wide. The North Fork John Day Travel Plan, signed in 1990, had a goal of reducing open road densities by approximately 60-70 percent.

**Table 3-65: Umatilla Road Densities**

| Road Status | Current Umatilla Road Densities | | |
|---|---|---|---|
| | Miles | % | Density (Mi. /Sq. Mi.) |
| Total Roads | 133 | | 3.5 |
| Roads Open[1] | 64 | | |
| Roads used as Motorized Trails | 16 | | |
| Motorized Use | 80 | 60% | 2.1 |
| Roads Closed | 42 | 32% | 1.1 |

[1]Roads Open include State, County and Motorized trails and not seasonally closed roads or trails as they are open outside of the critical time periods.

The Wallowa-Whitman NF Land and Resource Management Plan suggested an average open road density of about 2.5 miles/sq. mile. The forest is currently following this guideline until the Forest Plan revision is completed and Subpart B can be completed.

**Table 3-66: Wallowa-Whitman Road Densities**

| Road Status | Current Wallowa-Whitman Road Densities | | |
|---|---|---|---|
| | Miles | % | Density (Mi. /Sq. Mi.) |
| Total Roads | 273 | | 4.3 |
| Roads Open[1] | 155 | 57% | |
| Motorized Trails | 16 | | |
| Motorized Use | 171 | 63% | 2.7 |
| Roads Closed | 118 | 43% | 1.9 |

[1]Roads Open include State, County and Motorized trails and not seasonally closed roads or trails as they are open outside of the critical time periods.

## Transportation System for Project

Following is the transportation system proposed for use by the project, by alternative. The roads shown currently exist. Temporary roads shown are actually former road prisms, whether formerly authorized for use or not, that are proposed for temporary use by the project, and shall be decommissioned/restored upon completion of the project.

Open, seasonal, and closed roads will be reconstructed as necessary to facilitate forest product removal. All roads will be maintained for project use. Road maintenance work includes pre-haul and post haul blading, removal and replacement of earth mound barricades, cleaning of culverts and ditches, temporary culvert installations, and brushing of smaller than 6 inch diameter trees, and log out of down trees as necessary.

**Table 3-67: Summary of road status by alternatives in miles**

| Road Status | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|
| County Roads | 15 | 15 | 15 |
| Open Roads | 98 | 98 | 98 |
| Seasonal Roads | 17 | 17 | 17 |
| Closed Roads | 107 | 107 | 93 |
| Temporary | 5 | 5 | 5 |
| **Total Road Miles Used** | **241** | **241** | **220** |

A full summary and maps of proposed transportation system haul routes by alternative are included in Appendix D. The Travel Action Plan can also be viewed at the North Fork Ranger District or on the project website.

# 3.19 Minerals and Special Uses

From local information, surveys, and data from the Department of Oregon Geology and Minerals Industries (DOGAMI), it is estimated that over 100 historic or abandoned mines exist in the Granite Creek Watershed. Inventory and assessment of these mines is an ongoing project and occurs as funding allows. The ranger districts' minerals program managers supplied site inspections from past mining operations documented annually for all known mining operations

on the district for the Granite Creek Watershed Mining final EIS. A list of identified existing and/or abandoned mines within the Granite Creek Watershed are included in the Granite Creek Watershed Mining Plans project website and incorporated here by reference.

There are occasional public use rock permits issued for the project area. There are three major rock pits currently being used by the public and other agencies in the Granite area. These the following rock pits and there locations (FS 7350 (T8S R35 ½ E sec 28), 1031 (T9S R35E sec 2), and 4500 (T9S R33E sec 1)). The proposed action does not close any of these pits or remove access to this pits from the public. There are a number of other rock pits used by the Forest Service in the proposed project area but the roads accessing those site will still be maintained and are usable. No change to developed Mineral resources through this project. There are a number of rock pits located in this area.

Proposed activities will have no measurable impact to the mining or land special uses within the project area. There are no known fossils in this area but some potential. Implementation of this project may change how the miners access an area during initial prospecting, but it will not take away their access to the public domain land. This project is consistent with the Umatilla and Wallowa-Whitman National Forest Land and Resource Management Plans Forest-wide and management area specific standards for minerals, paleontology, and special uses and does not remove any ground from its future mineral exploration or use.

## 3.20 Climate Change

This proposed action would affect approximately 13,428 acres of forest by commercial and small diameter thinning and approximately 23,220 acres of landscape burning. This scope and degree of change resulting from proposed activities would be minor relative to the amount of forested land being affected on the Umatilla and Wallowa-Whitman National Forests as a whole. A project of this size would have such minimal contributions of greenhouse gasses that its impact on global climate change at the global scale, the proposed action’s direct and indirect contribution to greenhouse gasses and climate change would be negligible. Because the direct and indirect effects would be negligible, the proposed action’s contribution to cumulative effects on greenhouse gasses and climate change would also be negligible.

According to the Intergovernmental Panel on Climate Change, the top three anthropogenic (human-caused) contributors to greenhouse gas emissions (from 1970-2004) are: fossil fuel combustion (56.6% of global total), deforestation (17.3%), and agriculture/waste/energy (14.3%). IPCC subdivides the deforestation category into land use conversions, and large scale deforestation. Deforestation is defined as removal of all trees, most notably the conversion of forest and grassland into agricultural land or developed landscapes (IPCC 2000). The Ten Cent Wildfire Protection Project does not fall within any of these main contributors of greenhouse gas emissions. Forested land will not be converted into a developed or agricultural condition. In fact, it is expected that treatments proposed in the action alternative for this project will benefit forest through thinning and fuel-reduction treatment designed to help change how wildfire can be controlled and promote fire-resistant tree species.

This project is also consistent with IPCC recommendations for land use to help mitigate climate change. The 2007 IPCC report summarizes sector-specific key mitigation "technologies". For the forestry sector, the report recommends forest management including management to "improve tree species" and increase biomass. The proposed action is consistent with these recommendations because the action alternatives would increase forest resiliency by moving forested vegetation towards its range of variation (see Forested Vegetation, Chapter 3).

Timber management projects can influence carbon dioxide sequestration in three main ways: (1) by increasing new forests (afforestation), (2) by avoiding their damage or destruction (avoided deforestation), and (3) by manipulating existing forest cover (managed forests). Land-use changes, specifically deforestation and regrowth, are by far the biggest factors on a global scale in forests' role as sources or sinks of carbon dioxide, respectively (IPCC, Intergovernmental Panel on Climate Change, 2000). Thinning and fuel-reduction treatments will not eliminate wildfire from the project area but can help change how wildfire can be controlled (as discussed in the Fuels and Fire Resource Report), thereby likely reducing carbon dioxide emissions resulting from wildfire. Projects that increase forest resiliency from large scale wildfire and increase the likelihood of wildfire suppression efforts are positive factors in carbon sequestration. The proposed action falls into this category.

## 3.21 Short-term Uses and Long-term Productivity

NEPA requires consideration of "the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 CFR 1502.16). As declared by the Congress, this includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101).

### *Soils*

Related to temporary roads in general, provided they are positioned on a soil depth were restoration is possible. Temporary roads can truly be temporary on the landscape. (Archuleta, 2007 and 2008, Heninger et al 2002, Luce 1997). Taking this information into account we can assume that the installation (or reconstruction), use then obliteration of temporary roads will be short-term and that the effects will not harm the long-term productivity of the soil resource.

## 3.22 Unavoidable Adverse Effects

In areas where a temporary road is placed upon a shallow soil, the result may be a road which cannot be obliterated per the forest plan (LRMP 4-85). If this condition occurs it will reduce the soil productivity within the prism of the road template. No other unavoidable adverse effects over and above those addressed in the Forest Plan FEIS (Chapter 4, pages IV-231 to 233) have been identified.

## 3.23 Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period of time such as the temporary loss of timber productivity in forested areas that are kept clear for use as a power line rights-of-way or road.

### *Forest Vegetation*

#### Environmental Consequences Unique to No Action

There would be irretrievable loss of tree growth within the untreated forests. Additionally, untreated forests will likely become increasingly susceptible to stand structure, density and species composition attributes that, under certain disturbance conditions such as wildfire, insects

or disease, will result in irreversible and irretrievable changes in forest resiliency and permanent loss of historical forest conditions.

#### Environmental Consequences Common to all Action Alternatives

There would be an irretrievable loss of tree growth within the untreated forests. Additionally, landscape attributes that remain outside of RV (stand structure, density, and species composition) inside and outside treatment units after alternative implementation could, under certain disturbance conditions such as wildfire, insects or disease, result in irreversible and irretrievable changes in forest resiliency and permanent loss of historical forest conditions.

##### *Soils*

As it may apply to temporary roads placed on shallow soils, these effects may be irreversible depending upon the depth of impact, organic matter present in the soil and the depth of the soil itself. While these areas are of minimal importance to overall timber production, these acres have a multitude of other resource values. Impacts to temporary roads over time may be colonization by noxious weeds and other pioneer species suited to such undeveloped conditions. Therefore temporary roads are expected to be placed on deep soils where possible to minimize to reduce the occurrence of irreversible damage of temporary roads on shallow soil.

##### *Heritage*

Under all of the alternatives, the preferred management strategy for eligible and unevaluated sites would be to protect these sites from direct, indirect, and cumulative effects. Due to the unpredictable nature of high intensity wildfire effects, Alternative 1 (No Action) has the highest potential for irretrievable and irreversible loss of heritage resources. The risk is highest under this alternative due to the existing fuel loads and potential for wildfire. The Forest and private property would continue to be at risk for high-intensity fire. The action alternatives would increase the protection of heritage resources by reducing the likelihood for high intensity wildfire in the project area.

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# Chapter 4. Other Required Disclosures

NEPA at 40 CFR 1502.25(a) directs "to the fullest extent possible, agencies shall prepare draft environmental impact statements concurrently with and integrated with …other environmental review laws and executive orders."

## 4.1 Other Applicable Environmental Laws

### Archaeological and Historic Preservation Act

This act requires Federal agencies to collect, protect, and preserve historic and archaeological data that result from agency undertakings and actions. This act also applies to agencies' actions that fund or license projects and the effects these projects have on heritage resources.

### Archaeological Resources Protection Act

This act imposes civil penalties for the unauthorized excavation, removal, damage, alteration, or defacement of archaeological resources.

### National Historic Preservation Act

This act protects historic and archaeological values during the planning and implementation of Federal projects (CFR 36.800 and CFR 36.60). The law requires the following: (1) location and identification of cultural resources during the planning phase of a project, (2) a determination of "significance" for potentially affected resources, and (3) provisions for mitigation of any significant sites that may be affected.

A streamlined compliance process with the NHPA is outlined in the 2004 Programmatic Agreement (PA) Among the United States Department of Agriculture, Forest Service, Pacific Northwest Region (Region 6), the Advisory Council on Historic Preservation (ACHP), and the Oregon State Historical Preservation Officer (SHPO) Regarding Cultural Resources Management in the State of Oregon by the USDA Forest Service.

### The American Indian Religious Freedom Act

This act protects American Indian rights to exercise traditional religions including access to sites and freedom to worship through ceremonial and traditional rites.

### Native American Graves Protection and Repatriation Act

American Indian burials and sacred items are protected by this act. If human remains or objects of cultural patrimony are discovered, this law requires consultation with the Indian tribe most closely related to the individual. The tribe then determines the appropriate treatment of the remains. This may include repatriation or scientific study and curation at a university.

### Treaty Trust Responsibilities

Consultation with tribal entities on a government-to-government basis in reference to activities related to potential disturbance of cultural heritage resources, which include sites, sacred sites, gathering areas, springs and any other areas of interest to tribal nations, is mandated under various executive orders, policies, statutes and case law. Federal land managing agencies including the Forest Service are authorized to consult with American Indian Nations not only under mandated law but also under the U.S. Government's trust responsibility to tribal nations.

The primary focus of the federal government trust responsibility is the protection of the treaty rights and interests that tribes reserve on land included in this project. These rights, such as hunting, fishing, and gathering roots and berries, have been acknowledged by the United States Supreme Court. All of these tribes have a direct interest in the restoration, and the enhancement of culturally significant plants and animals for the perpetual cultural, economic, and sovereign benefit of the Tribes. The success of resource management is measured by the availability and utilization of these resources. The sustainability of these resources is considered by them the minimum ecological condition necessary to meet the trust responsibility of the United States.

Traditional cultural sites include areas used in the past or present for gathering or collecting plants for food, medicine or other purposes—there are known areas within the project area. Ground disturbance from machinery or fire occurring before plants are dormant could adversely affect these areas and plant populations and could be measurable affects. Conversely, prescribed fire may benefit plant populations when applied during the appropriate plant cycle. In addition access to these areas is of potential concern for neighboring Tribes and activities like closing roads could restrict access (not just for the exercising of hunting/gathering treaty rights but also access to sites of religious significance and sacred sites) which are legally protected rights

Effects of proposed activities to water quality, terrestrial and aquatic wildlife species, and botanical resources are disclosed in Chapter 3 of this document. Blue Mountain Project Design Criteria would be followed for all action alternatives and other design criteria (Chapter 2) and BMPs (Appendix B) were developed to protect water quality, wildlife, and botanical resources.

### Endangered Species Act and Regional Forester's Sensitive Species

The Endangered Species Act requires protection of all species listed as "threatened" or "endangered" by federal regulating agencies (Fish and Wildlife Service and National Marine Fisheries Service). Biological Evaluations for Endangered, Threatened, and Sensitive plant, wildlife, and fish species have been completed and can be found in the project record. Determinations were made that none of the proposed projects would adversely affect, contribute to a trend toward Federal listing, nor cause a loss of viability to the listed plant and animal populations or species.

Details regarding the actual species found within the Ten Cent project area and the potential effects of proposed activities on those species and their habitat are contained under the Wildlife, Fisheries, and Botany sections: Proposed, Endangered, Threatened, and Sensitive species sections of this EIS.

### Migratory Bird Treaty Act

All action alternatives are consistent with the 1918 Migratory Bird Treaty Act and the Migratory Bird Executive Order 13186. The Conservation Strategy for Landbirds (Altman 2000) was utilized to determine effects to focal bird species. Design features such as retention of adequate snags and downed logs, retention of large trees, and restoration of riparian areas proposed in this project would minimize take of migratory birds and meet the intent of current management direction.

### Bald and Golden Eagle Protection Act

All action alternatives comply with the National Bald Eagle Management Guidelines (USFWS 2007) and the Bald and Golden Eagle Protection Act. There are no observations of the bald eagle recorded in the database of record (NRIS Wildlife) in the Granite Creek Watershed. Anecdotal information indicates that the bald eagle may occasionally pass through the analysis area during

the non-breeding season; these instances likely occur during seasonal movements between summer breeding/foraging habitat and wintering habitat. This species is not known to breed in the analysis area.

### Inventoried Roadless Areas, Wilderness, and Wild and Scenic Rivers

All of the Greenhorn Unit and the southern portion of the North Fork John Day Unit of the North Fork John Day Wilderness on the Umatilla National Forest are within the 10 Cent planning area (25,203 acres). In addition, 2,489 acres of the Greenhorn Inventoried Roadless Area (IRA) on the Umatilla and Wallowa-Whitman national forests and 2,930 acres of the Twin Mountain IRA on the Wallowa-Whitman National Forest are also within the Ten Cent planning area. About 51 acres of the North Fork John Day Wild & Scenic River are also within the planning area.

Administrative action is needed to reduce fuel loading within the wilderness boundary. Numerous residences and the communities of Granite and Greenhorn exist on private lands adjacent to the wilderness boundary. This area is identified in the Grant County Community Wildfire Protection Plan as a high risk area in the Communities At Risk assessment. Existing fuel loads and continuity make it difficult and extremely hazardous to protect adjacent private lands. Treating areas outside the wilderness would not reduce fuel loading and configuration within the wilderness. Addressing only the fuels outside of wilderness would also not provide enough space to adequately defend adjacent residences and communities.

Activities for landscape prescribed burning within wilderness is proposed and will be completed following Alternative 1 (prescribed fire ignition without prohibited uses) of the Minimum Requirements Decision Guide Workbook (see project record) and will have no significant effects to congressionally designated areas.

The Ten Cent project is consistent with all laws and policies regarding IRAs, designated wilderness areas, and wild and scenic rivers. See Lands with Wilderness Characteristics and Other Undeveloped Lands Specialist Report in the project file for further information on how IRAs and designated wilderness were considered in the context of this project.

### Clean Water Act

All alternatives meet or exceed state requirements in accordance with the Clean Water Act for protection of waters of the State of Oregon (OAR Chapter 340-341) through planning, application, and monitoring of Best Management Practices (BMPs, Appendix B) in conformance with the Clean Water Act, regulations, and Federal guidelines. All of the activities proposed in this project were designed to be consistent with the Clean Water Act.

### Clean Air Act

This section incorporates by reference the Ten Cent Fire and Fuels Report contained in the project record. Methodologies, assumptions, and limitations of analysis and other details are contained in the report and the affected environment and predicted effects of the proposed action and its alternatives are discussed in Air Quality section of this document.

All prescribed burning operations within the project would comply with the State of Oregon's Smoke Management Implementation Plan, and would be implemented within guidelines of the Smoke Management Program. Therefore, this project would comply with the requirements of the Clean Air Act and be conducted in accordance with the operational guidelines agreed to by the Forest Service and the Oregon Department of Environmental Quality.

### National Forest Management Act

The National Forest Management Act of 1976 (P.L. 94-588), including its amendments to the Forest and Rangeland Renewable Resources Planning Act of 1974 (P.L. 93-378), states that when trees are cut to achieve timber production objectives, the cuttings shall be made in such a way that "there is assurance that such lands can be adequately restocked within 5 years after harvest" (P.L. 93-378, Sec. 6, (g), (3), (E), (ii)).

This reforestation policy is based specifically on language from the National Forest Management Act of 1976 (P.L. 94-588), including its amendments to the Forest and Rangeland Renewable Resources Planning Act of 1974 (P.L. 93-378): "Sec. 3 (d) (1) It is the policy of the Congress that all forested lands in the National Forest System be maintained in appropriate forest cover with species of trees, degree of stocking, rate of growth, and conditions of stand designed to secure the maximum benefits of multiple use sustained yield management in accordance with land management plans."

Silvicultural activities proposed for implementation in this project are fully compliant with NFMA, being consistent with Forest Plan direction, and occurring on lands meeting the definition of forest land and designated suitable for timber production.

### Prime Farm, Range, Park, and Forest Lands

The Ten Cent project is consistent with the USDA Departmental Regulation 9500-3. The activities and effects of the Ten Cent project would not affect or convert prime or unique farmlands, farmlands of statewide or local importance, or prime rangelands. There are no parklands or ecologically critical areas that could be affected by this action. Prime forest land does not apply within the National Forest System lands.

### Forest Plan Consistency

This project is consistent with both the Umatilla and Wallowa-Whitman National Forest Plans. Disclosures of Forest Plan consistency are included in each resource section of this document and incorporated by reference of associated resource reports available in the project record.

### Energy Requirements and Conservation Potential

Consumption of fossil fuels will occur with the action alternatives during logging and hauling trees that have been cut. No unusual energy requirements are included in action alternatives nor do opportunities exist to conserve energy at a large scale.

### Consumers, Minority Groups, and Women

Effects on civil rights, including those of minorities and women, would be minimal. Activities associated with the action alternatives 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.

### Multi-Use Sustainable Yield Act

Multi-Use Sustained Yield Act of 1960, directs the agency to manage resources (outdoor recreation, range, timber watershed and fish) in combination that best meets the needs of the American people. Sustained yield means achieving and maintaining into perpetuity a high-level

annual or regular periodic output of renewable resources without impairment of the productivity of the land.

The project with described mitigation and BMPs in place meet the intent and direction of the Sustained Yield Act. Sustained yield means achieving and maintaining into perpetuity a high-level annual or regular periodic output of renewable resources without impairment of the productivity of the land.

### Incomplete or Unavailable Information

Applicable scientific information is discussed in the resource sections of this document and related resource reports. Incomplete or unavailable information will not influence the disclosure of effects on other resources in this project.

## 4.2 Executive Orders

### Executive Orders 11988 and 11990: Floodplains and Wetlands

**Floodplains - Executive Order (EO) 11988** requires the Forest Service to avoid “to the extent possible the long and short term adverse impacts associated with the ... occupation ... or modification of floodplains...” The Ten Cent Project does not propose to occupy or modify any floodplain. For this reason, the Ten Cent Project is consistent with this EO.

**Wetlands - Executive Order (EO) 11990** requires the Forest Service to "avoid to the extent possible the long and short term adverse impacts associated with the ... destruction or modification of wetlands." The Ten Cent Project does not propose to destroy or modify any wetland. For this reason, the Ten Cent Project is consistent with this EO.

### Executive Order 12898: Environmental Justice

Executive Order 12898 requires that federal agencies adopt strategies to address environmental justice concerns within the context of agency operations. With implementation of the proposed action or any of its alternatives there would be no 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, thinning, planting, fuels treatment, and burning activities. Racial and cultural minority groups could also be prevalent in the work forces that implement planting, prescribed fire or thinning activities. Public health and safety would be improved with the implementation of all alternatives and is disclosed in the recreation and fire and fuels sections of this document. Safety was considered in proposed alternatives including removal of roadside hazards. Contracts contain clauses that address worker safety.

### Executive Order 13186: Neotropical Migratory Birds

This section incorporates by reference the Ten Cent Project Wildlife Report and Biological Evaluation contained in the project record. The Partners in Flight Bird Conservation Plan is used to address the requirements contained in Executive Order (EO) 13186 (January 10, 2001), Responsibilities of Federal Agencies to Protect Migratory Birds. Under Section 3(E) (6), through the National Environmental Policy Act, the EO requires that agencies evaluate the effects of proposed actions on migratory birds, especially species of concern.

Activities under all action alternatives would be designed using the Partners in Flight Conservation Plan and Conservation Strategy for Landbirds (Altman 2000), and therefore would

be consistent with Executive Order 13186. See the Migratory Landbirds section (Wildlife section, Chapter 3 of this EIS) for further discussion of effects on Neotropical migratory birds.

### Executive Order 13007: Indian Sacred Sites

This order directs Federal agencies to accommodate access to and ceremonial use of American Indian sacred sites by tribal religious practitioners, to avoid adversely affecting the physical integrity of such sacred sites, and, where appropriate, to maintain the confidentiality of sacred sites. Annual Section 106 inventories, evaluation, and consultation would be completed on acres in response to prescribed burn plans or other treatments will be completed.

All unevaluated and eligible heritage resources will be avoided or treated in such a way as to avoid adverse effects. Project design criteria provide mechanisms to reduce risks to these irreplaceable assets. These resource protection measures are designed to minimize or mitigate adverse effects to eligible properties may include project relocation, redesign or modification, physical protection measures, stabilization, restoration, rehabilitation, documentation, monitoring, repair, and data recovery.

### Executive Order 13175: Consultation and Coordination with Indian Tribal Governments

This order directs Federal agencies to establish regular and meaningful consultation and collaboration with Tribal officials in the development of Federal policies that have Tribal implications. Tribal governments were contacted and provided information during the analysis process (see Tribal Relations Section, Chapter 1). The Ten Cent project was also discussed during Program of Work and Government-to-Government Consultation meetings.

# Chapter 5. Preparers and Contributors

The Forest Service consulted the following individuals, Federal, State, and local agencies, tribes and other organization and individuals during the development of this environmental impact statement:

## 5.1 Consultation and Coordination

### Interdisciplinary Team Members

**Table 5-1: List of team members and associated roles**

| Member Name | Member Title | Expertise and Team Role |
|---|---|---|
| Archuleta, Jim | Umatilla Forest Soil Scientist | Soils Resource Specialist |
| Archuleta, Joy | Umatilla Forest Hydrologist | Reviewer for Water Quality Analysis |
| Baxter, Lea | Certified Silviculturist | Forest Vegetation Specialist |
| Berkley, Elizabeth | Umatilla National Forest Biologist | Review of Wildlife Analysis |
| Brock, David* | Former South Zone Environmental Coordinator | NEPA Writer, Editor, Coordinator and Assistant Team Lead |
| Brooks, Paula | Umatilla Forest Botanist (lead) | Lead Botanical Resource Specialist and Reviewer for Botanical Analysis |
| Christie, Jennifer* | Former South Zone Environmental Coordinator (detail) | NEPA Writer, Editor, Coordinator and Assistant Team Lead |
| Cissel, Richard | South Zone Hydrologist | Water Quality Specialist |
| Crump, Sarah | Wallowa-Whitman National Forest Archaeologist | Review and Support for Wallowa-Whitman Forest Cultural and Heritage Resource |
| Darrach, Mark | Botanist | Botanical Resource Specialist |
| Donnelly, Steven* | Measurements Specialist | Logging Systems, Timber, and Operations |
| Evans, John | Umatilla Forest Environmental Coordinator | Review for NEPA Sufficiency and Umatilla National Forest Plan Compliance |
| Farren, Edward* | Former South Zone Hydrologist (retired) | Water Quality Specialist |
| Frazee, Joan* | Botanist (retired) | Botanical Resource Specialist |
| Helberg, Christine | South Zone Minerals and Special Uses Coordinator (retired) | Mineral Claims Coordination |
| Hickman, Tracii | Umatilla Forest Fisheries Biologist | Review of Fisheries Analysis |
| Lacey, Andrew | GIS/Data Services Specialist | GIS Support and Database Management |
| Lacey, Janel | Recreation and Wilderness Specialist | Recreation, Wilderness, Inventoried Roadless Areas, Lands with Wilderness Characteristics, and other Undeveloped Lands Analysis |
| Lathrop, Bradley | Range Management Specialist | Range and Invasive Species Analysis |
| Madril, Allen | Umatilla Forest Archaeologist | Reviewer for Heritage and Cultural Resources Analysis |
| Magaña, Hugo | South Zone Fisheries Biologist | Fisheries and Aquatic Organisms Specialist |
| Millar, Sophia | Wallowa-Whitman Interdisciplinary Planner | Review for NEPA Sufficiency and Wallowa-Whitman Forest Plan Compliance |
| Neal, Leticia | South Zone Archaeologist | Heritage and Cultural Resource Specialist |
| Popek, Gary* | Former GIS/Data Service Specialist (retired) | GIS Support and Database Management |

| Member Name | Member Title | Expertise and Team Role |
|---|---|---|
| Reid, Ian | North Fork John Day District Ranger, Umatilla National Forest | Line Officer and Deciding Official |
| Reynolds, Terry | South Zone Wildlife Biologist (detail) | Review and Summary of Wildlife Analysis |
| Scarlett, Randall* | Former South Zone Wildlife Biologist | Wildlife Specialist |
| Seitz, Lori | Civil Engineering Technician | Transportation Plan and Timber Sale Roads Appraisal |
| Shelley, Melissa | Environmental Coordinator for Whitman Ranger District | Review for NEPA Sufficiency and Wallowa-Whitman Forest Plan Compliance |
| Spivey, Brian | Timber Management Assistant | Review of Economics, Logging Systems, Timber, and Operations |
| Stinchfield, Andrew | North Fork John Day District Fire Management Officer | Fire, Fuels, and Air Quality Specialist and Project Team Lead |
| Tanner, Alissa | Umatilla Forest Silviculturist | Review of Forest Vegetation Analysis |
| Taylor, Leslie | Current South Zone Environmental Coordinator | NEPA Writer, Editor, Coordinator and Assistant Team Lead |
| *Thompson, Erik | Timber Sale Administrator | Economics, Logging Systems, Timber, and Operations |
| Tomac, Jeff | Whitman District Ranger, Wallowa-Whitman National Forest | Line Officer and Deciding Official |
| Young, Mary | Pathways Soil Scientist | Soils Existing Condition and Alternative Analysis |

*Former team members who are no longer working on the project or for the Forest Service

## 5.2 Distribution of the Draft Environmental Impact Statement

This environmental impact statement has been distributed to individuals who specifically requested a copy of the document. In addition, copies have been sent to the following Federal agencies, federally recognized tribes, State and local governments, and organizations representing a wide range of views.

### Tribes

Confederated Tribes of the Umatilla Indian Reservation

Confederated Tribes of the Warm Springs Reservation of Oregon

Nez Perce Tribe

### Federal, State, and Local Agencies

Malheur National Forest

Council on Environmental Quality

Environmental Protection Agency

United States Fish and Wildlife Service

National Oceanic and Atmospheric Administration, National Marine Fisheries Service (North West Region)

Oregon State Historic Preservation Office

Oregon Department of Forestry

Oregon Department of Fish and Wildlife

Grant County Board of Commissioners

City of Granite (Mayor Sandra Smith)

Oregon Department of Forestry

Grant County Community Wildfire Protection Plan (Irene Jerome)

## Others

Wilderness Watch

Blue Mountain Forest Partners

Oregon Wild

Oregon Natural Desert Association

Blue Mountains Biodiversity Project

Hells Canyon Preservation Council

Eastern Oregon Mining Association

Integrated Biomass Resources

Parma Post and Pole

Boise Cascade Corporation

Umatilla Forest Collaborative Group

Ecotrust Forest Management Inc.

Backcountry Horsemen of Oregon

Sierra Club

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# Literature Cited

Advisory Council on Historic Preservation (ACHP). 2004. 36 CFR 800 – *Protection of Historic Properties (incorporating amendments effective August 5, 2004)*. Available at: http://www.achp.gov/regs-rev04.pdf.

Agee J.K.2002. Fire Behavior and Fire Resilient Forests. Fire in Oregon's Forests: Risks, Effects, and Treatment Options, Fitzgerald S.A., ed. Oregon Forest Resources Institute.

Agee, J.K. 2002. Fire as a course filter for snags and logs. Forest Service General Technical Report PSW-GTR-181.

Agee, J.K. 2002. The fallacy of passive management: managing for firesafe forest reserves. Conservation In Practice. 3(1): 18-25. doi:10.1111/j.1526-4629.2002.tb00023.x

Agee, J.K.; Bahro, B.; Finney, M.A.; Omi, P.N.; Sapsis, D.B.; Skinner, C.N.; van Wagtendonk, J.W.; Weatherspoon, C.P. 2000. The use of shaded fuelbreaks in landscape fire management. Forest Ecology and Management. 127(1-3): 55-66. doi:10.1016/S0378-1127(99)00116-4

Ager, Alan A., and Caty Clifton. 2005. Software for Calculating Vegetation Disturbance and Recovery by Using the Equivalent Clearcut Area Model. USDA Forest Service Gen. Tech. Rep. PNW-GTR-637.

Albini, F. 1976. Estimating Wildfire and Behavior Effects. Gen. Tech. Rep. INT-30. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 100 p.

Alexander, M.E., Cruz, M.G., Vaillant, N.M., Peterson, D.L. 2013. Crown fire behavior characteristics and prediction in conifer forests; a state-of-knowledge synthesis. JFSP Research Project Reports. Paper 43.

Altman, Bob. 2000. Conservation strategy for landbirds in the northern Rocky Mountains of eastern Oregon and Washington. Oregon-Washington Partners in Flight. 86pp.

Amaranthus M.P., Page-Dumroese, D., Harvey, A., Cazares, E. and Bednar, L.F. 1996. Soil Compaction and Organic Matter Affect Conifer Seedling Nonmycorrhizal and Ectomycorrhial Root Tip Abundance and Diversity. PNW-RP-494.

Anderson, G., R. Ottmar, & S. Prichard. 2008. Consume, version 3.0. USDA Forest Service, Pacific Northwest Research Station.

Anderson, H.E. 1982. Aids to Determining Fuel Models for Estimating Fire Behavior. Gen. Tech. Rep. INT-122. Ogden, UT: USDA Forest Service, Intermountain Forest and Range Experiment Station. 28 p.

Andrews, P., Bevins, C., Seli, R. 2008. Behave Plus fire modeling system Version 4.0 User Guide. Gen. Tech. Rep. RMRS-GTR-106WWW Revised. Ogden, UT. USDA, Forest Service, Rocky Mountain Research Station. 116 p.

Andrews, P., Rothermel, R. 1982. Charts for Interpreting Wildland Fire Behavior Characteristics. Gen. Tech. Rep. INT-131. Ogden, UT. USDA Forest Service, Intermountain Forest and Range Experiment Station. 24 p.

Anthony, R.G., and F.B. Isaacs. 1981. Characteristics of bald eagle nest sites in Oregon. Journal of Wildlife Management 53(1): 148-159.

Archuleta, J. 2007. Temporary Road and Landing obliteration within Skyline Logging Units. In proceedings of: THE INTERNATIONAL MOUNTAIN LOGGING AND 13TH PACIFIC NORTHWEST SKYLINE SYMPOSIUM, At Corvallis, OR, Volume: 1

Aubry, K.B., K.S. McKelvey, and J.P. Copeland. 2007. Distribution and broadscale habitat relations of the wolverine in the contiguous United States. Journal of Wildlife Management 71(7): 2147-2158.

Bate, L.J., M.J. Wisdom, and B.C. Wales. 2007. Snag densities in relation to human access and associated management factors in forests of Northeastern Oregon, USA. Landscape and Urban Planning 80: 278-291.

BBER 2015. University of Montana, Bureau of Business and Economic Research. http://www.bber.umt.edu/FIR/HarvestOR.aspx Harvest by County, Grant County, 2015.

Beckwith, R.C. and E.L. Bull. 1985. Scat analysis of the arthropod diet component of pileated woodpecker diet. The Murrelet 66(3):90-92.

Beier, P. and J.E. Drennan. 1997. Forest structure and prey abundance in foraging areas of northern goshawks. Ecological Applications 7(2):564-571.

Bell, J.L. Changes in Logging Injury Rates Associated with Use of Feller-bunchers in West Virginia. Proceeds from “The International Mountain Logging and 11th Pacific Northwest Skyline Symposium 2001”.

Belt, George H, Jay O'Laughlin, and Troy Merrill, Design of Forest Riparian Buffer Strips for the Protection of Water Quality: Analysis of Scientific Literature, Idaho Forest, Wildlife and Range Policy Analysis Group Report No. 8, June 1992.

Black, Thomas A. and Charles H. Luce. 1999. Sediment Production from Forest Roads in Western Oregon. Water Resources Research, vol. 35, issue 8, pp. 2561-2570

Brady, N. C., and R. R. Weil. "The nature and properties of soil 12th ed." (1999). Figure 3.4

Bull, E.L. 1987. Ecology of the pileated woodpecker in Northeastern Oregon. Journal of Wildlife Management 51(2): 472-481.

Bull, E.L. 2000. Seasonal and sexual differences in American marten diet in Northeastern Oregon. Northwest Science 74(3): 186-191.

Bull, E.L. and A.K. Blumpton. 1999. Effects of fuels reduction on American marten and their prey. Research Note PNW-RN-539. USDA Forest Service, Pacific Northwest Research Station. March 1999.

Bull, E.L. and E.C. Meslow. 1977. Habitat requirements of the pileated woodpecker in Northeastern Oregon. Journal of Forestry 75(6): 335-337.

Bull, E.L. and M.P. Hayes. 2002. Overwintering of Columbia spotted frogs in northeastern Oregon. Northwest Science 76(2): 141-147.

Bull, E.L. and R.S. Holthausen. 1993. Habitat use and management of pileated woodpeckers in northeastern Oregon. Journal of Wildlife Management. 57(2): 335-345.

Bull, E.L. and T.W. Heater. 1995. Intraspecific predation on American marten. Northwestern Naturalist 76(2):132-134.

Bull, E.L. and T.W. Heater. 2000. Resting and denning sites of American marten in Northeastern Oregon. Northwest Science 74(3): 179-185.

Bull, E.L. and T.W. Heater. 2001a. Home range and dispersal of the American marten in Northeastern Oregon. Northwestern Naturalist 82(1): 7-11.

Bull, E.L. and T.W. Heater. 2001b. Survival, causes of mortality, and reproduction in the American marten in Northeastern Oregon. Northwestern Naturalist 82(1): 1-6.

Bull, E.L., A.A. Clark, and J.F. Shepherd. 2005a. Short term effects of fuel reduction on pileated woodpeckers in northeastern Oregon – A pilot study. Research Paper PNW-RP-564. Portland, Oregon: US Department of Agriculture, Forest Service, Pacific Northwest Research Station. 17p.

Bull, E.L., C.G. Parks, and T.R. Torgersen. 1997. Trees and logs important to wildlife in the interior Columbia River basin. Forest Service General Technical report PNW-GTR-391. Pacific Northwest Research Station.

Bull, E.L., N. Nielsen-Pincus, B.C. Wales, and J.L. Hayes. 2007. The influence of disturbance events on pileated woodpeckers in northeastern Oregon. Forest Ecology and Management 243: 320-329.

Bull, E.L., R.C. Beckwith, and R.S. Holthausen. 1992. Arthropod diet of pileated woodpeckers in northeastern Oregon. Northwestern Naturalist 73: 42-45.

Bull, E.L., T.W. Heater, and J.F. Shepherd. 2005b. Habitat selection by the American marten in Northeastern Oregon. Northwest Science 79(1): 37-43.

Bull, Evelyn L. and Jerome A. Jackson. 1995. Pileated Woodpecker (Dryocopus pileatus), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/148.

Bulmer, C.E. and Simpson, D.G. 2010 Soil Compaction Reduced the Growth of Lodgepole Pine and Douglas-fir Seedlings in Raised Beds after Two Growing Seasons. Soil Sci. Soc. Am. 74:2162-2174. doi:10.2136/sssaj2009.0458

Burroughs, E.R. Jr and J.G. King, 1989. Reduction of Soil Erosion on Forest Roads. General Technical Report INT-264. United States Department of Agriculture, Forest Service, Intermountain Research Station, Ogden, Utah.

Buskirk, S.W. and L.F. Ruggiero. 1994. Chapter 2 American Marten in: The scientific basis for conserving forest carnivores: American marten, fisher, lynx, and wolverine in the western United States. Gen. Tech. Rep. RM-GTR-254. Fort Collins, CO: U.S.

Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 184 p

Buskirk, S.W., S.C. Forrest, M.G. Raphael, and H.J. Harlow. 1989. Winter resting site ecology of marten in the central Rocky Mountains. Journal of Wildlife Management 53(1):191-196.

Caraher, David L.; Henshaw, John; Hall, Fred [and others]. 1992. Restoring ecosystems in the Blue Mountains: a report to the Regional Forester and the Forest Supervisors of the Blue Mountain forests. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Region. 14 p.

Chapin, T.G., D.J. Harrison, and D.D. Katnik. 1998. Influence of landscape pattern on habitat use by American marten in an industrial forest. Conservation Biology 12(6):1327-1337.

Chappel, J.1995. Granite Mining District: Historic Overview and Management Plan. Wallowa-Whitman National Forest. Baker, Oregon.

Clark, T.W., E. Anderson, C. Douglas, and M. Strickland. 1987. Martes Americana. Mammalian Species 289: 1-8.

Clean Water Act (1972) and amendments. http://www.epa.gov/npdes/pubs/cwatxt.txt

Cole, E.K., M.D. Pope, and R.G. Anthony. 1997. Effects of road management on movement and survival of Roosevelt elk. Journal of Wildlife Management 61:1115–1126.

Consortium of Pacific Northwest Herbaria. 2007-2015. University of Washington Herbarium, Burke Museum of Natural History and Culture, University of Washington, Seattle. Viewed online on various dates <http://www.pnwherbaria.org/data/search.php>.

Conway, G.A., Lincoln, J.M., Bradley, H.J., Manwaring, J.C., Klatt, M.L., Thomas, T.K. Alaska's Model Program for Surveillance and Prevention of Occupational Injury Deaths. Public Health Reports. November/December 1999 Vol. 114.

Cook J.G., B.K. Johnson, R.C. Cook, R.A. Riggs, T. Delcurto, L.D. Bryant, and L.L. Irwin. 2004. Effects of summer-autumn nutrition and parturition date on reproduction and survival of elk. Wildlife Monographs 155: 1-61.

Crist, M.R., B. Wilmer, and G.H. Aplet. 2005. Assessing the value of roadless areas in a conservation reserve strategy: biodiversity and landscape connectivity in the northern Rockies. Journal of Applied Ecology 42: 181-191.

Csuti, Blair, A. J. Kimerling, T. A. O'Neil, M. M. Shaughnessy, E. P. Gaines, and M. M. Hus. 1997. Atlas of Oregon Wildlife: distribution, habitat, and natural history. Oregon State University Press, Corvallis, OR 492p.

D.E. Walker, Jr (ed.) 1998. *Handbook of North American Indians Volume 12: Plateau*. Smithsonian Institution Press, Washington D.C.

Daw, S.K. and S. DeStefano. 2001. Forest characteristics of northern goshawk nest stands and post-fledging areas in Oregon. Journal of Wildlife Management 65(1): 59-65.

DeVelice, R.L, and J.R. Martin. 2001. Assessing the extent to which roadless areas complement the conservation of biological diversity. Ecological Applications 11(4):10008-1018.

Elliot, William J., David E. Hall, Dayna L. Scheele, Disturbed WEPP (Draft 02/2000), WEPP Interface for Disturbed Forest and Range Runoff, Erosion, and Sediment Delivery, Technical Documentation. USDA Forest Service, Rocky Mountain Research Station and San Dimas Technology and Development Center.

Elliott, W.J.; Robichaud, P.R., 2001. Comparing Erosion Risks from Forest Operations to Wildfire. Proceedings The International Mountain Logging and 11th Pacific Northwest Skyline Symposium p78-89.

Elmore, Wayne and Robert L. Beschta, Riparian Areas, Perceptions in Management; Rangelands, Vol. 9, No. 6 (December, 1987), pages 260-265.

Environmental Protection Agency. 2012. Final Additions to Oregon's 2010 303(d) List. Accessed online September 16, 2016 at https://yosemite.epa.gov/r10/water.nsf/TMDLs/R10addsto2010ORList

Executive Order (EO) 11988, http://www.archives.gov/federal-register/executive-orders/1977-carter.html

Executive Order (EO) 11990, http://www.archives.gov/federal-register/executive-orders/1977-carter.html

Eyre, F.H., editor. 1980. Forest cover types of the United States and Canada. Washington, DC: Society of American Foresters. 148 p.

Farren, Edward C. 2006 (a). Harvest and Road Forest Plan Monitoring for the South Zone, Umatilla National Forest. Unpublished paper on file at: USDA Forest Service, Umatilla National Forest, North Fork John Day Ranger District, Ukiah, OR.

Farris, K.L., M.J. Huss, and S. Zack. 2004. The role of foraging woodpeckers in the decomposition of ponderosa pine snags. The Condor 106:50-59.

Feeney, S.R., T.E. Kolb, W.W. Covington, and M.R. Wagner. 1998. Influence of thinning and burning restoration treatments on presettlement ponderosa pines at the Gus Pearson Natural Area. Canadian Journal of Forestry 28: 1295-1306.

Ferguson, Sue A; THE SPACIAL AND TEMPORAL VARIABILITY OF RAIN-ON-SNOW; In Proceedings of the International Snow Science Workshop, 1-6 October 2000, Big Sky, Montana, American Avalanche Association, 178-183.

Finney, M.A. 2006. An Overview of FlamMap Fire Modeling Capabilities. In: Andrews, Patricia L.; Butler, Bret W., comps. 2006. Fuels Management-How to Measure Success: Conference Proceedings. 28-30 March 2006; Portland, OR. Proceedings RMRS-P-41. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. p. 213-220

Fitzgerald, S.A. 2005. Fire ecology of ponderosa pine and the rebuilding of fire-resilient ponderosa pine ecosystems. In: Ritchie, M.W.; Maguire, D.A.; Youngblood, A., tech. coords. Proceedings of the symposium on ponderosa pine: issues, trends, and management. Gen. Tech. Rep. PSW-GTR-198. Albany, CA: USDA Forest Service, Pacific Southwest Research Station: 197-225.

Fitzgerald, S.A. 2005. Fire ecology of ponderosa pine and the rebuilding of fire-resilient ponderosa pine ecosystems. In: Ritchie, M.W.; Maguire, D.A.; Youngblood, A., tech. coords. Proceedings of the symposium on ponderosa pine: issues, trends, and management. Gen. Tech. Rep. PSW-GTR-198. Albany, CA: USDA Forest Service, Pacific Southwest Research Station: 197-225.

Flanagan, D.C. and S.J. Livingston (eds.). 1995. USDA-Water Erosion Prediction Project: User Summary. NSERL Report No. 11. USDA-ARS National Soil Erosion Research Laboratory, West Lafayette, IN 47097-1196. 131 pp.

Ford, M.J. (Ed.), Cooney, T., McElhany, P., Sands, N., Weitkamp, L., Hard, J., McClure, M., Kope, R., Myers, J., Albaugh, A., Barnas, K., Teel, D., Moran, P., and Cowen, J. 2011. Status Review Update for Pacific Salmon and Steelhead Listed Under the Endangered Species Act: Northwest. Draft U.S. Department of Commerce. NOAA Technical Memorandum NOAA-TM-NWFSC-XXX. 346 p. [Online] URL:http://www.nwr.noaa.gov/Publications/Biological-Status-Reviews/upload/SR-2010-all-species.pdf

Forest Service Manual 5100- Wildland Fire Management. Effective September 17, 2014.

Forest Service Manual 5140- Hazardous Fuels Management and Prescribed Fire. Effective October, 12 2012.

Froehlich, H.A and McNabb, D.H. 1983. Minimizing Soil Compaction in Pacific Northwest Forests. Presented 6th North American Forest Soils Conference on Forest Soils and Treatment Impacts.

Fryer, Janet L. 2002. Pinus albicaulis. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2015, November 11].

Fulé, P.Z.; McHugh, C.W.; Heinlein, T.A.; Covington, W.W. 2001. Potential fire behavior is reduced following forest restoration treatments. In: Vance, R.K.; Edminster, C.B.; Covington, W.W.; Blake, J.A., comps. Ponderosa pine ecosystems restoration and conservation: steps toward stewardship. Proceedings RMRS-P-22. Ogden, UT. USDA Forest Service, Rocky Mountain Research Station: 28-35.

Garrison-Johnston, M.T., Mika P.G., Miller D.L., Cannon, P., and Johnson L.R. 2007 Proceedings RMRS-P-44; Fort Collins, CO: Ash Cap Influences on Site Productivity and Fertilizer Response in Forests of the Inland Northwest. Volcanic-Ash-Derived Forest Soils of the Inland Northwest: Properties and Implications for Management and Restoration. 9-10 November 2005; Coeur d'Alene, ID.

Gatto, A.E., T.G. Grubb, and C.L. Chambers. 2005. Red-tailed hawk dietary overlap with northern goshawks on the Kaibab Plateau, Arizona. Journal of Raptor Research 39(4):439-444.

Graetz, D.H., Sessions, J. Garman, S.L. 2007. Using stand-level optimization to reduce crown fire hazard. Landscape and Urban Planning. 80: 312-319

Graham, R.T.; McCaffrey, S.; Jain, T.B. 2004. Science basis for changing forest structure to modify wildfire behavior and severity. Gen. Tech. Rep. RMRS-GTR-120. Fort Collins, CO: USDA Forest Service, Rocky Mountain Research Station. 43 p. http://www.treesearch.fs.fed.us/pubs/6279

Grant, Gordon E., Sarah L. Lewis, Frederick J. Swanson, John H. Cissel, and Jeffery J. McDonnell. 2008. Effects of Forest Practices on Peak Flows and Consequent Channel Response: A State-of-the-Science Report for Western Oregon and Washington. USDA Forest Service Gen. Tech. Rep. PNW-GTR-760.

Greenwald, D.N., D. Coleman-Crocker Bedford, L. Broberg, K.F. Suckling, and T. Tibbitts. 2005. A review of northern goshawk habitat selection in the home range and implications for forest management in the western United States. Wildlife Society Bulletin 33(1):120-129.Hargis, C.D., J.A. Bissonette, and D.L. Turner. 1999. The influence of forest fragmentation and landscape pattern on American marten. Journal of Applied Ecology 36:157-172.

Gucinski, Hermann, Michael J. Furness, Robert R. Ziemer, and Martha H. Brookes, editors, Forest Roads: A Synthesis of Scientific Information, General Technical Report PNW-GTR-509, Portland, OR; US Department of Agriculture, Forest Service, Pacific Northwest Research Station, 2001, 103 p.

Hann, W.J., Strohm, D.J. 2003. Fire regime condition class and associated data for fire and fuel planning: methods and applications. in L. A. Joyce, editor. Fire, fuel treatments, and ecological restoration – April 16-18, 2002; Fort Collins, CO. RMRS-P-29. USDA, Forest Service, Rocky Mountain Research Station, Fort Collins, CO. pp 397-434

Han, H.S., Page-Dumroese, D., Han, S.K., Tirocke, J. 2006. Effects of Slash, Machine Passes, and Soil Moisture on Penetration Resistance in a Cut-to-length Harvesting. Int. J. of For. Engr. Vol. 17 (2): 11-24.

Harris, H. 2007. Terrestrial Wildlife Inventory. Unpublished Report. Umatilla National Forest. March 13, 2007.

Harris, R.M., Clifton, C.F., and Wonzell, S.M. 2007. Hillslope Erosion Rates in Areas with Volcanic Parent Materials and the Effects of Prescribed Fires in the Blue Mountains of Eastern Oregon and Washington, USA. M Furniss, C Clifton, and K Ronnenberg, eds., 2007. Advancing the Fundamental Sciences: Proceedings of the Forest Service National Earth Sciences Conference, San Diego, CA, 18-22 October 2004, PNWGTR-689, Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Harrod, R.J., D.W. Peterson, N.A. Povak, and E.K. Dodson. 2009. Thinning and prescribed fire effects on overstory tree and snag structure in dry coniferous forests of the interior Pacific Northwest. Forest Ecology and Management 258(5):712-721.

Haufler, J.B., C.A. Mehl, and G.J. Roloff. 1996. Using a course-filter approach with species assessment for ecosystem management. Wildlife Society Bulletin 24(2): 200-208.

Helvey, J.D. 1980. Effects of North Central Washington Wildfire on Runoff and Sediment Production. Water Resources Bulletin, vol. 16, no. 4, pp. 627-634.

Heninger, R., Scott, W., Dobkowski, A., Miller, R., Anderson, H., and Duke, S. 2002. Soil disturbance and 10-year growth response of coast Douglas-fir on nontilled and tilled skid trails in the Oregon Cascades. Can. J. For. Res. 32: 233–246

Hessburg, P.F., N.A. Povak, and R.B. Salter. 2010. Thinning and prescribed fire effects on snag abundance and spatial pattern in an eastern Cascade Range dry forest, Washington, USA. Forest Science 56(1):74-87.

Hessburg, Paul F.; Smith, Bradley G.; Kreiter, Scott D.; Miller, Craig A.; Salter, Brion R.; McNicoll, Cecilia H.; Hahn, Wendel J. 1999. Historical and current forest and range landscapes in the Interior Columbia River basin and portions of the Klamath and Great basins; Part I: Linking vegetation patterns and landscape vulnerability to potential insect and pathogen disturbances. Interior Columbia Basin Ecosystem Management Project: Scientific Assessment. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, General Technical Report PNW-GTR-458. 357 p.

Jackson, J. G., G. Hammerson, and F. Dirrigl, Jr.. Revisions by D.W. Mehlman. 1998. The Nature Conservancy Species Management Abstract Pileated Woodpecker. The Nature Conservancy.

Johnson, D.H. and T.A. O'Neil. 2001. Wildlife-habitat relationships in Oregon and Washington. Oregon State University Press.

Kalies, E.K.; Kent, L.L.Y. 2016. Tamm Review: Are fuel treatments effective at achieving ecological and social objectives? A systematic review. Forest Ecology and Management. 375: 84-95.

Keyes, C.R., O'Hara, K.L. 2002. Quantifying Stand Targets for Silvicultural Prevention of Crown Fires. Western Journal of Applied Forestry. 17(2): 101-109.

Kimberling, D. N.; Parks, C. G.; Shanafelt, B. J.; Knecht, D. E., and DePuit, E. J. 2005. Potential influences of Forest Service land management on invasive plant species in Pacific Northwest forests and rangelands: a review. In: Pacific Northwest Region invasive plant program final environmental impact statement, III: Appendix D, pp.1-32.

Kirk, T.A. and W.J. Zielinski. 2009. Developing and testing a landscape suitability model for the American marten (Martes americana) in the Cascade Mountains of California. Landscape Ecology 24:759-773.

Kolb, T.E., J.K. Agee, P.Z. Fule, N.G. McDowell, K. Pearson, A. Sala, and R.H. Waring. 2007. Perpetuating old ponderosa pine. Forest Ecology and Management 249: 141-157.

Korol, J.J., M.A. Hemstrom, W.J. Hann, and R.A. Gravenmier. 2002. Snags and downed wood in the Interior Columbia Basin Ecosystem Management Project. Forest Service General Technical Report PSW-GTR-181.

Landres, P.B., P. Morgan, and F.J. Swanson. 1999. Overview of the use of natural variability concepts in managing ecological systems. Ecological Applications 9(4):1179-1188.

Lawler J. J., M. Mathias, A. E. Yahnke, and E. H. Girvetz. 2008. Oregon's Biodiversity in a Changing Climate. Report prepared for the Climate Leadership Initiative, University of Oregon.

Leonhardy, F.C. and D.G. Rice 1970. A Proposed Culture Typology for the Lower Snake River Region, Southeastern Washington. In *Northwest Anthropological Research Notes*, Vol. 4, No. 1. Washington State University - University of Idaho.

Leonhardy, Frank C. 1975. The Lower Snake River Culture Typology—1975, Leonhardy and Rice Revisited. Abstract of paper presented at 28th Annual Meeting, *Northwest Anthropological Conference. Northwestern Anthropological Research Notes* 10:61.

Logan, J.A., W.W. MacFarlane and L Willcox. 2010. Whitebark pine vulnerability to climate-driven mountain pine beetle disturbance in the Greater Yellowstone Ecosystem. Ecological Applications 20: 895-902.

Long, R.A., J.L. Rachlow, J.G. Kie, and M. Vavra. 2008. Fuels reduction in a western coniferous forest: Effects on quality and quantity of forage for elk. Rangeland Ecology and Management 61:302-313.

Lotan, J., Brown, J. and Neuenschwander, L. 1985. Role of fire in lodgepole pine forests, pp. 133-152 in D. Baumgartner et al. (eds) Lodgepole pine the species and its management Symposium Proceedings. Washington State University, Pullman, WA.

Loucks, C., N. Brown, A. Loucks, and K. Cesareo. 2003. USDA Forest Service roadless areas: potential biodiversity conservation reserves. Conservation Ecology 7(2): 5.

Luce, C. H. 1997. Effectiveness of Road Ripping in Restoring Infiltration Capacity of Forest Roads. Restoration Ecology, Vol. 5, No.3, pp 265-270, September, 1997.

Luce, C. H., and T. A. Black, 2001 (b), Spatial and temporal patterns in erosion from forest roads, in Influence of Urban and Forest Land Uses on the Hydrologic-Geomorphic Responses of Watersheds, edited by M. S. Wigmosta and S. J. Burges, pp. 165–178, AGU, Washington, D. C.

Luce, C. H., D. G. Tarboton, E. Istanbulluoglu, and R. T. Pack (2005), Reply to comment by Jonathan J. Rhodes on ‘‘Modeling of the interactions between forest vegetation, disturbances, and sediment yields,’’ J. Geophys. Res., 110, F01013, doi:10.1029/2004JF000279.

Luce, C.H. and T.A. Black, 1999. Sediment Production from Forest Roads in Western Oregon. Water Resources Research 35(8):2561-2570.

Luce, C.H. and T.A. Black, 2001 (a), Effects of Traffic and Ditch Maintenance on Forest Road Sediment Production. In Proceedings of the Seventh Federal Interagency Sedimentation Conference, March 25-29, 2001, Reno, Nevada. pp. V67–V74.

Luce, C.H. and Z.A. Holden, Declining annual streamflow distributions in the Pacific Northwest United States, 1948–2006, GEOPHYSICAL RESEARCH LETTERS, VOL. 36, L16401, doi:10.1029/2009GL039407, 2009.

Luce, C.H., 1997. Effectiveness of Road Ripping in Restoring Infiltration Capacity of Forest Roads, Restoration Ecology 5(3):265-270.

Marshall, D.B., M.G. Hunter, and A.L. Contreras, Eds. 2003. Birds of Oregon: A general Reference. Oregon State University Press, Corvallis, OR. 768p

Martin, Kevin. 2010. Range of variation direction for forest vegetation project planning; file designation 1920-2-1, memorandum to S.O. Staff and District Rangers. Pendleton, OR: U.S. Department of Agriculture, Forest Service, Umatilla National Forest, Supervisor's Office. 6 p. On file with: Umatilla National Forest, Supervisor's Office, Pendleton, OR 97801.

Mason, R., Countryman, B. 2010. CVS inventory plot snag and down wood data for the Blue Mountain Forest Plan Revision. Unpublished report (9/1/2010) on file Wallowa-Whitman NF. Baker City, OR.

McPherson, Penny J., Carol A. Coe, Lois Ann Day, David M. Hall, and Vincent J. McGlone 1981 *Archeological Excavation in the Blue Mountains: Mitigation of Sites 35UN52, 35UN74, and 35UN95 in the Vicinity of Ladd Canyon, Union County, Oregon*. Volume 1: Research Orientation and Methodology.

Meehan, WR; FJ Swanson; and JR Sedell. 1977. Influences of riparian vegetation on aquatic ecosystems with particular reference to salmonid fishes and their food supply. IN: Importance, Preservation and Management of Riparian Habitat. USDA Forest Service Gen. Tech. Rep. RM-43. pp. 137-143.

Mellen-McLean, K., B. Wales, and B. Bresson. 2013. A Conservation Assessment for the White-headed Woodpecker (Picoides albolarvatus). USDA Forest Service, Region 6 and USDI Bureau of Land Management, Oregon and Washington.

Mellen-McLean, Kim, Bruce G. Marcot, Janet L. Ohmann, Karen Waddell, Susan A. Livingston, Elizabeth A. Willhite, Bruce B. Hostetler, Catherine Ogden, and Tina Dreisbach. 2012. DecAID, the decayed wood advisor for managing snags, partially dead trees, and down wood for biodiversity in forests of Washington and Oregon. Version 2.20. USDA Forest Service, Pacific Northwest Region and Pacific Northwest Research Station; USDI Fish and Wildlife Service, Oregon State Office; Portland, Oregon. http://www.fs.fed.us/r6/nr/wildlife/decaid/index.shtml

Mellen-McLean, Kim, Bruce G. Marcot, Janet L. Ohmann, Karen Waddell, Susan A. Livingston, Elizabeth A. Willhite, Bruce B. Hostetler, Catherine Ogden, and Tina Dreisbach. 2012b. DecAID Implementation Guide Comparison of Historical Range of Variability for Dead Wood: DecAID vs. Other Published Estimates. Version 2.20. USDA Forest Service, Pacific Northwest Region and Pacific Northwest Research Station; USDI Fish and Wildlife Service, Oregon State Office; Portland, Oregon. http://www.fs.fed.us/r6/nr/wildlife/decaid-guide/hrv-dead-wood-comparison.shtml

Miller, R.E., Colbert, S.R., and Morris, L.A. 2004. EFFECTS OF HEAVY EQUIPMENT ON PHYSICAL PROPERTIES OF SOILS AND ON LONG_TERM PRODUCTIVITY: A REVIEW OF LITERATURE AND CURRENT RESEARCH Technical Bulletin No. 887 Nat. Council for Air and Stream Improvement.

Minthorn, A. 1994. *Mits Qooi Nux Sa Kin Noon Im Pa*: A Partial Traditional Use Area Inventory of the Umatilla National Forest and the Wallowa-Whitman National Forest. Pendleton, Oregon.

Mitchell, R.G., and P.E. Buffam. 2001. Patterns of long-term balsam woolly adelgid infestations and effects in Oregon and Washington. Western Journal of Applied Forestry 16(3): 121-126.

Moeur, M., Stage, A. 1995. Most similar neighbor: an improved sampling inference procedure for natural resource planning. Forest Science. 41:337-359.

Moore, K.R. and C.J. Henny. 1983. Nest site characteristics of three coexisting accipter hawks in northeastern Oregon. Journal of Raptor Research 17(3): 65-76.

Naiman, Robert J, Timothy J Beechie, Lee E Benda, Dean R Berg, Peter A Bisson, Lee H. MacDonald, and E Ashley Steel; Fundamental Elements of Ecologically Healthy Watersheds in the Pacific Northwest Coastal Ecoregion; in Watershed Management, Balancing Sustainability and Environmental Change, Robert J Naiman editor, Springer-Verlag, New York, 1992.

Napper, C.; Howes, S; Page-Dumroese, D. et al. 2009. Soil Disturbance Field Guide. 0819 1815-SDTDC

National Institute for Occupational Safety and Health (NIOSH). Preventing Injuries and Deaths of Loggers. NIOSH Publication No. 95-101. May 1995. http://www.cdc.gov/niosh/docs/95-101/

National Marine Fisheries, 2011. Middle Columbia River steelhead 5-Year Status Reviews. Portland, OR [online]. http://www.nmfs.noaa.gov/pr/pdfs/species/middlecolumbiariver_steelhead_5yearreview.pdf.

National Wildfire Coordination Group (NWCG). 2001. Smoke Management Guide for Prescribed and Wildland Fire 2001 Edition. NFES 1279. Boise, ID: U.S. Department of Agriculture, U.S. Department of the Interior, National Association of State Foresters. 226 p.

National Wildfire Coordination Group (NWCG). 2014. Interagency Prescribed Fire Planning and Implementation Guide. PMS 484. Boise, ID: 59 p.

NatureServe Explorer: An online encyclopedia of life [Online]. 2012. Version 7.1. Arlington, VA, USA: NatureServe. Available: http://www.natureserve.org/explorer/.

North American Bird Conservation Initiative, U.S. Committee. 2010. The State of the Birds 2010; Report on Climate Change. U.S. Department of the Interior: Washington, DC.

Oakleaf et al. in USDI Fish and Wildlife Service 2009b. Endangered and Threatened Wildlife and Plants; Final Rule To Identify the Northern Rocky Mountain Population of Gray Wolf as a Distinct Population Segment and To Revise the List of Endangered and Threatened Wildlife; Final Rule. Federal Register Vol. 74, No. 62, pages 15123 to 15188. Dept. of Interior, Fish and Wildlife Service. Washington D.C. April 2.

Ohmann, JL, MJ Gregory. 2002. Predictive mapping of forest composition and structure with direct gradient analysis and nearest-neighbor imputation in coastal Oregon, USA. Canadian Journal of Forest Research 32(4):725-741.

Oregon Biodiversity Information Center. 2013. Rare, Threatened and Endangered Species of Oregon. Institute for Natural Resources, Portland State University, Portland, Oregon. 111 pp.

Oregon Department of Environmental Quality, 303 (d) list: <http://www.deq.state.or.us/wq/assessment/rpt2010/search.asp>, 2010. beneficial uses: <http://www.deq.state.or.us/wq/standards/uses.htm>, 2008

Oregon Department of Environmental Quality. 2010. 303 (d) list: <http://www.deq.state.or.us/wq/assessment/rpt2010/search.asp>, beneficial uses: <http://www.deq.state.or.us/wq/standards/uses.htm.

Oregon Department of Fish and Wildlife. 2003. Oregon's Elk Management Plan. ODFW, 2501 S.W. First Avenue. Portland, Oregon 97201.

Oregon Department of Fish and Wildlife. 2008. Oregon State Sensitive Species List. ODFW, 2501 S.W. First Avenue. Portland, Oregon 97201.

Oregon Department of Fish and Wildlife. 2012. Northeast Oregon Rocky Mountain Elk Final Herd Composition Data, June 1, 2012. ODFW, 2501 S.W. First Avenue. Portland, Oregon 97201.

Oregon Department of Forestry Smoke Management Plan. 2014. Available at: http://arcweb.sos.state.or.us/pages/rules/oars_600/oar_629/629_048.html

Page-Dumroese, D.S.; Abbott, A.M.; Rice, T.M.et al. 2009. Forest Soil Disturbance Monitoring Protocol Volume I: Rapid Assessment. Gen Tech. Report WO-82a. U.S. Dept. Agriculture, Forest Service, Rocky Mountain Research Station.

Parks, N. 2009. Science Findings: On the track of the elusive wolverine. US Department of Agriculture, Pacific Northwest Research Station, Portland, OR. Issue No. 114, July 2009.

Pfister, R.D.; Arno, S.F. 1980. Classifying forest habitat types based on potential climax vegetation. Forest Science 26(1): 52-70.

Powell, D.C. 2010. Estimating crown fire susceptibility for project planning. Fire Management Today. 70(3): 8-15. http://www.fs.fed.us/fire/fmt/fmt_pdfs/FMT70-3.pdf

Powell, D.C. 2010. Estimating crown fire susceptibility for project planning. Fire Management Today. 70(3): 8-15. http://www.fs.fed.us/fire/fmt/fmt_pdfs/FMT70-3.pdf

Powell, D.C., C.G. Johnson Jr., E.A. Crowe, A. Wells and D.K. Swanson. 2007. Potential vegetation hierarchy for the Blue Mountains section of northeastern Oregon, southeastern Washington, and west-central Idaho. USDA Forest Service General Technical Report PNW-GTR-709.

Powell, David C. 1999. Suggested stocking levels for forest stands in Northeastern Oregon and Southeastern Washington: An implementation guide for the Umatilla National Forest. Pendleton, Oregon: U.S. Department of Agriculture, Forest Service, Pacific Northwest Region, Umatilla National Forest, F14-SO-TP-03-99. 300 p.

Powell, David C. 2011. Active management of dry forests in the Blue Mountains: Silvicultural considerations. White Paper F14-SO-WP-Silv-4. Umatilla National Forest. Pendleton, OR: U.S. Department of Agriculture, Forest Service, Umatilla National Forest, Supervisor's Office. 128 p.

Powell, David C. 2013. Silviculture Terminology. Umatilla National Forest. Pendleton, OR: U.S. Department of Agriculture, Forest Service, Umatilla National Forest, Supervisor's Office. 24 p. On file with: Umatilla National Forest, 2517 SW Hailey Avenue, Pendleton, OR 97801.

Powell, David C.; Johnson, C. G.; Crowe, E. A.; Wells, A; Swanson, D. K. 2007. Potential vegetation hierarchy for the Blue Mountains section of northeastern Oregon, southeastern Washington, and west-central Idaho. PNW-GTR-709. U.S. Department of Agriculture, Pacific Northwest Research Station, Portland, OR. 87p.

Prescribed Fire Planning and Implementation Guide and the Forest Service Manual 5100-Fire Management, Chapter 5140-Fire Use, effective on April 18, 2008

Pyle, R. M. 2002. The Butterflies of Cascadia, A Field Guide to All the Species of Washington, Oregon, and Surrounding Territories. Seattle Audubon Soc. Seattle, WA. 420 pp.

Quigley, Thomas M.; Arbelbide, Sylvia J., technical editors. 1997. An assessment of ecosystem components in the Interior Columbia Basin and portions of the Klamath and Great Basins: volume 2. General Technical Report PNW-GTR-405. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 4 volumes: 337-1055.

R6 FEIS: Pacific Northwest Region Invasive Plant Program Final Environmental Impact Statement, 2005. Publication R6-NR-FHP-PR-02-05,USDA Forest Service, Pacific Northwest Region, Portland, Oregon.

Raley, C.M. and K.B. Aubry. 2004. Pileated woodpecker foraging ecology on Sun Pass State Forest, Oregon: pilot study. Summary report of data collection efforts for field season 2003.

Raphael, M.G. and L.L.C. Jones. 1997. Characteristics of resting and denning sites of American martens in central Oregon and western Washington. Pages 146-165 in: Martes: taxonomy, ecology, techniques, and management. G. Proulx, H.N. Bryant, and P.M. Woodard, editors.

Raphael, M.G. and M. White. 1984. Use of Snags by Cavity-Nesting Birds in the Sierra Nevada. Wildlife Monographs 86. 66pp.

Raphael, M.G., M.J. Wisdom, M.M. Rowland, R.S. Holthausen, B.C. Wales, B.G. Marcot, and T.D. Rich. 2001. Status and trends of habitat of terrestrial vertebrates in relation to land management in the interior Columbia River basin. Forest Ecology and Management 153:63-88.

Rasmussen et al. 2012 The 2012 Forest Report, An Economic Assessment of Oregon's Forest and Wood Products Manufacturing Sector. Prepared for: Oregon Forest Resources Institute. State of Oregon.

Record of Decision. 2005. Pacific Northwest Region Invasive Plant Program Final Environmental Impact Statement, Record of Decision. U.S. Department of Agriculture, Forest Service, Portland, OR.

Record of Decision. 2010. Umatilla National Forest Invasive Plants Treatment Final Environmental Impact Statement. Umatilla National Forest, U.S. Department of Agriculture Forest Service, Pendleton, Oregon. http://www.fs.fed.us/nepa/project_content.php?project=15119. (Accessed 2010).

Record of Decision. 2010. Wallow Whitman National Forest Invasive Plants Final Environmental Impact Statement. Wallowa Whitman National Forest, U.S. Department of Agriculture Forest Service, Baker City, Oregon.

Reeves, Derrick; Page-Dumroese, Deborah; Coleman, Mark. 2011. Detrimental soil disturbance associated with timber harvest systems on National Forests in the Northern Region. Res. Pap. RMRS-RP-89 Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 12 p.

Reid, L. M., Dunne, T., 1984, Sediment Production from Forest Road Surfaces. Water Resources Research 20, 1753-1761.

Reineke, L.H. 1933. Perfecting a stand-density index for even-aged forests. Journal of Agricultural Research. 46:627-638.

Reinhardt, E.D.; Crookston, N.L., tech. eds. 2002. The fire and fuels extension to the Forest Vegetation Simulator. Gen. Tech. Rep. RMRS-GTR-116. Ogden, UT: USDA Forest Service, Rocky Mountain Research Station. 209 p. http://www.treesearch.fs.fed.us/pubs/5593

Reynolds, Richard T., Graham, Russell T., and Reiser, M. Hildegard. 1992. Management recommendations for the northern goshawk in the southwestern United States. Gen. Tech. Rep. RM-217, Ft. Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 90 p.

Rose, C.L., B.G. Marcot, T.K. Mellen, J.L. Ohmann, K.L. Waddell, D.L. Lindley, and B. Schreiber. 2001. Decaying wood in Pacific Northwest forests: Concepts and tools for habitat management. Chapter 24 in Wildlife-Habitat Relationships in Oregon and Washington (Johnson and O'Neill 2001)

Rothermel, Richard C. 1983. How to Predict the Spread and Intensity of Forest and Range Fires. USDA Forest Service, Intermountain Forest and Range Experiment Station. Ogden, UT. Research Paper INT-143.

Rothermel, Richard C. 1991. Predicting Behavior and Size of Crown Fires in the Northern Rocky Mountains. USDA Forest Service, Intermountain Research Station. Ogden, UT. Research Paper INT-438. 46pp.

Rowland, M.M., M.J. Wisdom, B.K. Johnson, and J.G. Kie. 2000. Elk distribution and modeling in relation to roads. Journal of Wildlife Management 64(3): 672-684.

Rowland, M.M., M.J. Wisdom, B.K. Johnson, and M.A. Penninger. 2004. Effects of roads on elk: implications for management in forested ecosystems. Transactions of the 69th North American Wildlife and Natural Resources Conference.

Ruediger, Bill, J. Claar, S. Mighton, B. Naney, T. Rinaldi, F. Wahl, N. Warren, D. Wenger, A. Williamson, L. Lewis, B. Holt, G. Patton, J. Trick, A. Vandehey, and S.Gniadek. 2000. Canada Lynx Conservation Assessment and Strategy. USDA, Forest Service. January 103p

Ruggiero, L. F.; Aubry, K. B.; Buskirk, S. W.; Lyon, L. J.; Zielinski, W. J. 1994. The scientific basis for conserving forest carnivores: American marten, fisher, lynx and wolverine in the Western United States. Gen. Tech. Rep. RM-254. Fort Collins, CO: Rocky Mountain Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture; 183 p.

Ruggiero, Leonard F., K. B. Aubry, S. W. Buskirk, G. M. Koehler, C. J. Krebs, K. S. McKelvey, and J. R. Squires. 2000. Ecology and Conservation of Lynx in the United States. Univ. Press of Colorado. Bolder, CO and USDA, Forest Service, Rocky Mountain Research Station. General Technical Report, RMRS-GTR-30WWW, October. 480p.

Sala, A., G.D. Peters, L.R. McIntyre, and M.G. Harrington. 2005. Physiological responses of ponderosa pine in western Montana to thinning, prescribed fire and burning season. Tree Physiology 25: 339-348.

Sauer, J. R., J. E. Hines, J. E. Fallon, K. L. Pardieck, D. J. Ziolkowski, Jr., and W. A. Link. 2011. The North American Breeding Bird Survey, Results and Analysis 1966 - 2010. Version 12.07.2011 USGS Patuxent Wildlife Research Center, Laurel, MD

Scarlett, R. 2011. Snag monitoring report: Wildcat II Vegetation Management Project. May 19, 2011.

Schaetzl R.J., Krist, F.J., and Miller BA, 2014. A Taxonomically Based Ordinal Estimate of Soil Productivity for Landscape-Scale Analyses. Soil Sci 2012; 177: 288-299. DOI: 10.1097/SS.0b013e3182446c88.

Scott, Joe H., Burgan, Robert E. 2005. Standard Fire Behavior Fuel Models: A Comprehensive Set for Use with Rothermel's Surface Fire Spread Model. Gen. Tech. Rep. RMRS-GTR-153. Fort Collins, CO: US Department of Agriculture, Forest Service, Rocky Mountian Research Station. 72 p.

Section 7 Fish Habitat Monitoring Protocol for the Upper Columbia River Basin. 1994. U.S. Department of Agriculture, Forest Service, Pacific Northwest Region.

Silins, Uldis, Micheal Stone, Monica B. Emelko, Kevin D. Bladon. 2009. Sediment Production Following Severe Wildfire and Post-Fire Salvage Logging in the Rocky Mountain Headwaters of the Oldman River Basin, Alberta. Catena 79, pp. 189-197.

Simmons et al. 2015. Oregon's Forest Products Industry and Timber Harvest, 2013. University of Montana, Bureau of Business and Economic Research.

Skov, K.R., T.E. Kolb, and K.F. Wallin. Difference in radial growth response to restoration thinning and burning treatments between young and old ponderosa pine in Arizona. Western Journal of Applied Forestry 20(1): 36-43.

Slauson, K.M., W.J. Zielinski, and J.P. Hayes. 2007. Habitat selection by American martens in coastal California. Journal of Wildlife Management 71(2): 458-468.

Smith, J.M., J. Paritsis, T.T. Veblen and T.B. Chapman. 2015. Permanent forest plots show accelerating tree mortality in subalpine forests of the Colorado Front Range from 1982 – 2013. Forest Ecology and Management 341: 8-17.

St. John, Alan. 2002. Reptiles of the Northwest: California to Alaska – Rockies to the Coast. Lone Pine Publishing. Renton, WA. 272p.

Stephens, S.L.; Collins, B.M.; Roller, G. 2012. Fuel treatment longevity in a Sierra Nevada mixed conifer forest. Forest Ecology and Management. 285: 204-212. doi:10.1016/j.foreco.2012.08.030

Sugden, Brian D., and Scott W. Woods, 2007. Sediment Production From Forest Roads in Western Montana. Journal of the American Water Resources Association (JAWRA) 43(1):193-206. DOI: 10.1111/j.1752-1688.2007. 00016.x

Suphan, Robert J. 1974. *Ethnological Report on the Umatilla, Walla, and Cayuse Indians Relative to Socio-Political Organization and Land Use*. Re: The Confederated Tribes of the Umatilla Reservation of Oregon vs. the United State of America. Indian Land Claims Commission Docket #'s 264 and 198, Defense exhibit #18.

Suring, L.H., W.L. Gaines, B.C. Wales, K. Mellen-McLean, J.S. Begley, S. Mohoric. 2011. Maintaining populations of terrestrial wildlife through land management planning: a case study. Journal of Wildlife Management 75(4):945-958.

Swift, Lloyd W, Soil Losses from Roadbeds and Cut and Fill Slopes in the Southern Appalachian Mountains, Southern Journal of Applied Forestry, 1984.

Swift, Llyod W. 1988. Forest Access Roads: Design, Maintenance, and Soil Loss. In W.T. Swank and D.A. Crossley Jr. (Eds.) *Forest Hydrology at Coweeta*, pp. 313-324. Springer New York, DOI: 10.1007/978-1-4612-3732-7_23, online ISBN 978-1-4612-3732-7.

Tait, Cynthia. 2007. Conservation Assessment of the Great Basin Population of the Columbia Spotted Frog (Rana luteiventris). Written for: USDI Bureau of Land Management and USDA Forest Service Region 6. January 19, 2007. 80 pages.

Thies, Walter G.; Westlind, Douglas J.; Loewen, Mark; Brenner, Greg. 2008. A field guide to predict delayed mortality of fire-damaged ponderosa pine: application and validation of the Malheur model. Gen. Tech. Rep. PNW-GTR-769. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 16 p.

Thomas, J. W. editor. 1979. Wildlife Habitats in Managed Forests, the Blue Mountains of Oregon and Washington. USDA, Forest Service, Agri. Hdbk #553. Sept.

Thorson, T.D., Bryce, S.A., Lammers, D.A., Woods, A.J., Omernik, J.M., Kagan, J., Pater, D.E., and Comstock, J.A., 2003. Ecoregions of Oregon (color poster with map, descriptive

text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,500,000).

Toweill, D.E. and J.W. Thomas, Editors. 2002. North American Elk: Ecology and Management. Smithsonian Institute Press, Washington D.C. 962pp.

USDA, Forest Service (USDA Forest Service). Umatilla National Forest Environmental Assessment for the Management of Noxious Weeds. 1995. U.S. Department of Agriculture, Forest Service. Pendleton, Oregon.

USDA, Forest Service, Forest Service Handbook 1909.12 Chapter 70.

USDA, Forest Service, Landscape Aesthetics: A Handbook for Scenery Management. Agriculture Handbook #701. December 1995.

USDA, Forest Service, Landscape Aesthetics: A Handbook for Scenery Management. Agriculture Handbook #701. December 1995.

USDA, Forest Service, Pacific Northwest Region; Land and Resource Management Plan for the Umatilla National Forest. 1990.

USDA, Forest Service, Pacific Northwest Region; Land and Resource Management Plan for the Wallowa-Whitman National Forest.

USDA, Forest Service, Pacific Northwest Region; Land and Resource Management Plan for the Umatilla National Forest.

USDA and USDI. 1995. Decision notice/decision record finding no significant impact: environmental assessment for the interim strategies for managing anadromous fish-producing watersheds in eastern Oregon and Washington, Idaho and portions of California (PACFISH).

USDA Forest Service 2002. Timber Sale Preparation Handbook Chapter 10 – Sale Program Development – Gate System and Chapter 20 – Timber Sale Project Development Gate 1.

USDA Forest Service and USDI BLM. 2014. Biological Assessment for USDA Forest Service (Malheur, Wallowa-Whitman and Umatilla National Forests) and USDI Bureau of Land Management (Vale and Prineville Districts) Blue Mountain Province Expedited Process Instrument II for Programmatic Informal Consultation with Project Design Criteria For Federal Land Management Activities Affecting ESA and MSA Listed Animal and Plant Species. (Blue Mountain PDCs).

USDA Forest Service and USDI Bureau of Land Management, Decision Notice/Decision Record, Finding of No Significant Impact, Environmental Assessment for the Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH), February, 1995.

USDA Forest Service, and USDI Bureau of Land Management. 1996. A Framework for Ecosystem Management in the Interior Columbia Basin and Portions of the Klamath and Great Basins. General Technical Report, PNW-GTR-374.

USDA Forest Service, National Best Management Practices for Water Quality Management on National Forest System Lands, Volume 1, National Core BMP Technical Guide, FS 990a, April, 2012.

USDA Forest Service, Pacific Northwest Region, Aquatic and Riparian Conservation Strategy, August 13, 2008.

USDA Forest Service, Pacific Northwest Region, Land and Resource Management Plan, Umatilla National Forest, 1990. http://www.fs.usda.gov/main/umatilla/landmanagement/planning

USDA Forest Service, Pacific Northwest Region, Oregon DEQ and U.S. Forest Service Pacific Northwest Region Water Quality MOU, OMB 0596-0217, Jan 14, 2014.

USDA Forest Service. Umatilla National Forest Invasive Plants Treatment Final Environmental Impact Statement. 2010. Umatilla National Forest, U.S. Department of Agriculture Forest Service, Pendleton, Oregon. http://www.fs.fed.us/nepa/project_content.php?project=15119. (Accessed September 2010).

USDA Forest Service. 1965. Silvics of forest trees of the United States. Agriculture Handbook No. 271. U.S. Department of Agriculture, Washington D.C. 762 p.

USDA Forest Service. 2012. National Best Management Practices for Water Quality Management on National Forest System Lands, Volume 1, National Core BMP Technical Guide, FS 990a.

USDA Forest Service. 1990. Land and resource management plan: Umatilla National Forest. U.S. Department of Agriculture, Forest Service, Pacific Northwest Region. Portland, OR.

USDA Forest Service. 2006. Regional Forester’s Letter, subject: Canada lynx conservation agreement amendment. 2670/1950 Memo (to Forest Supervisors). U.S. Dept.of Agriculture (USDA), Forest Service-Pacific Northwest Region (6). Portland, OR. June 20, 2006.

USDA Forest Service. 2008. Forest Service Manual (FSM 2670, Section 2672.4).

USDA Forest Service. 2011. Updated Regional Forester’s Sensitive Animal List. 2670/1930 Memo to Forest Supervisors. U.S. Dept. of Agriculture (USDA), Forest Service-Pacific Northwest Region (6). Portland, OR. December 9, 2011.

USDA Forest Service. December 9, 2011. Pacific Northwest Regional Forester’s Sensitive Species List. Available online at: http://www.fs.fed.us/r6/sfpnw/issssp/agency-policy

USDA, Forest Service (FS). 1990. Land and Resource Management Plan, Umatilla National Forest (“Forest Plan”). Pendleton, OR: USDA, Forest Service, Pacific Northwest Region (6), Umatilla National Forest. Sept.

USDA, Forest Service, 1995. Interim Management Direction Establishing Riparian, Ecosystem and Wildlife Standards for Timber Sales, (``Eastside Screens"), Regional Forester's

Forest Plan Amendment #2 . Appendix B Revised Interim Direction. U.S. Department of Agriculture, Forest Service. Pacific Northwest Region (6), Portland, Oregon. June. 14p.

USDA, Forest Service. 1990. Forest Planning Process: Forest Process Document No. 118.

USDA, Forest Service. 1993. Memo; Subj: Interim snag guidance for salvage operations. USDA, Forest Service, Pacific Northwest Region (6), Umatilla National Forest, Jeff Blackwood, Forest Supervisor. April 14, 1993.

USDA, Forest Service. 2003. Memo; Subject: Guidance for Implementing Eastside Screens. USDA, Forest Service, Pacific Northwest Region (6), Umatilla National Forest, Jeff Blackwood, Forest Supervisor. September 5, 2003.

USDI Fish and Wildlife Service. 1978. Endangered and Threatened Wildlife and Plants; Reclassification of the Gray Wolf in the United States and Mexico, with Determination of Critical Habitat in Michigan and Minnesota; Final Rule. Federal Register Vol. 43, No. 47, pages 9607 to 9615. Dept. of Interior, Fish and Wildlife Service. Washington D.C. March 9.

USDI Fish and Wildlife Service. 2000. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Contiguous U.S. Distinct Population Segment of the Canada Lynx and Related Rule. Federal Register Vol. 65, No. 58, pages 16052 to 16086. Dept. of Interior, Fish and Wildlife Service. Washington D.C. March 24, 2000.

USDI Fish and Wildlife Service. 2006a. Amendment to the Canada Lynx Conservation Agreement between the US Fish and Wildlife Service and the USDA Forest Service, dated May 12, 2006. 4p.

USDI Fish and Wildlife Service. 2007a. Endangered and Threatened Wildlife and Plants; Removing the Bald Eagle in the Lower 48 States From the List of Endangered and Threatened Wildlife; Final Rule; Endangered and Threatened Wildlife and Plants; Draft Post-Delisting and Monitoring Plan for the Bald Eagle (Haliaeetus leucocephalus) and Proposed Information Collection; Notice. Federal Register Vol. 72, No. 130, pp 37345 to 37372. Dept. of Interior, Fish and Wildlife Service. Washington D.C. July 9.

USDI Fish and Wildlife Service. 2007b. National Bald Eagle Management Guidelines. United States Department of the Interior Fish and Wildlife Service. May 2007.

USDI Fish and Wildlife Service. 2008. Birds of Conservation Concern. Division of Migratory Bird Management. Arlington, Virginia. December 2008.

USDI Fish and Wildlife Service. 2009a. US Fish and Wildlife Service Critical Habitat Portal. Web-based mapping and analysis tool. Available: http://crithab.fws.gov/

USDI Fish and Wildlife Service. 2009b. Endangered and Threatened Wildlife and Plants; Final Rule To Identify the Northern Rocky Mountain Population of Gray Wolf as a Distinct Population Segment and To Revise the List of Endangered and Threatened Wildlife; Final Rule. Federal Register Vol. 74, No. 62, pages 15123 to 15188. Dept. of Interior, Fish and Wildlife Service. Washington D.C. April 2.

USDI Fish and Wildlife Service. 2013a. US Fish and Wildlife Service Federally Listed, Proposed, Candidate Species, and Species of Concern Which May Occur Within Grant and Wheeler Counties, Oregon list and cover letter. USDI Fish and Wildlife Service Pacific Region, La Grande Field Office. February 2, 2013.

USDI Fish and Wildlife Service. 2013b. Endangered and Threatened Wildlife and Plants; Threatened Status for the Distinct Population Segment of the North American Wolverine Occurring in the Contiguous United States; Establishment of a Nonessential Experimental Population of the North American Wolverine in Colorado, Wyoming, and New Mexico; Proposed Rules. Federal Register Vol. 78, No. 23, pages 7863 to 7891. Dept. of Interior, Fish and Wildlife Service. Washington D.C. February 4, 2013.

USDI, Fish and Wildlife Service (FWS). 1986. Recovery Plan for the Pacific Bald Eagle. U.S. Department of the Interior, Fish and Wildlife Service. Portland, Oregon. 160pp.

van Mantgem, P.J., N.L. Stephenson, J.C. Byrne, L.D. Daniels, J.F. Franklin, P.Z. Fule, M.E. Harmon, A.J. Larson, J.M. Smith, A.H. Taylor and T.T. Veblen. 2009. Widespread Increase in Tree Mortality Rates in the Western United States. Science 323: 532-523.

Van Wagner, C.E. 1977. Conditions for the start and spread of crown fire. Canadian Journal of Forest Research. 7: 23-34.

Van Wagner, C.E. 1993. Prediction of crown fire behavior in two stands of jack pine. Canadian Journal of Forest Research. 23: 442-449

Verts, B.J. and L.N. Carraway. 1998. Land Mammals of Oregon. University of California Pres. Berkeley, California. 668p

Wales, B. C., K. Mellen-McLean, W. L. Gaines and L. Suring. 2011. Focal species assessment of current condition and the proposed action (alternative B) for the Blue Mountains forest plan revisions (draft October 2011). Baker City, OR, Unpublished paper on file at: U.S. Department of Agriculture Forest Service, Wallowa-Whitman National Forest, Blue Mountain Forest Plan Revision Team.

Wales, B.C., Gaines W.L, Suring, L.H, Mellen-McLean-Mclean K. 2011. Viability analysis of focal species for the Blue Mountain National Forests – Forest Plan Revisions (draft June 2011). Unpublished report on file Wallowa-Whitman NF. Baker City, OR.

Walker, G.W. and MacLeod, N.S., 1991, Geologic map of Oregon: U.S. Geological Survey, scale 1:500,000

Walling, DE, Measuring Sediment Yield From River Basins (summary), Soil Erosion Research Methods. Winrock International, Arlington Virginia. 1988. p 39-73. 12 fig, 5 tab, 106 ref.

Warren, A.D. 2005. Butterflies of Oregon: Their Taxonomy, Distribution, and Biology. Lepidoptera of North America 6. Contributions of the C.P. Gillette Museum of Arthropod Diversity. Colorado State University, Fort Collins, Colorado. 408 pp.

Water Quality Standards: <http://arcweb.sos.state.or.us/rules/OARs_300/OAR_340/340_041.html>, 2008.

Weatherspoon, C.P. 1996. Fire-silviculture relationships in Sierra forests. In: Sierra Nevada Ecosystem Project, Final Report to Congress, II: Assessments, scientific basis for management options, ed., vol. II: Assessments and scientific basis for management options. Centers for Water and Wildland Resources, University of California, Davis, Water Resources Center Report No. 37, pp. 1167–1176.

Western Cultural Resource Management, Inc., Boulder, Colorado. Prepared for Northwest Pipeline Corporation, Salt Lake City, Utah.

Wiens, J.D., B.R. Noon, and R.T. Reynolds. 2006. Post-fledging survival of northern goshawks: the importance of prey abundance, weather, and dispersal. Ecological Applications 16(1): 406-418.

Wightman, C.S., V.A. Saab, C. Forristal, K. Mellen-McLean, A. Markus. 2010. White-headed woodpecker nesting ecology after wildfire. Journal of Wildlife Management 74(5):1098-1106.

Wilson, CC. 1977. Fatal and near-fatal forest fires: the common denominators. International Fire Chief. 43(9). 6 p.

Wisdom, M. J.; R.S. Holthausen, B.C. Wales, C.D. Hargis, V.A. Saab, D.C. Lee, W.J. Wendel, T.D. Rich, M.M. Rowland, W.J. Murphy, M.R. Eames. 2000. Source habitat for terrestrial vertebrates of focus in the interior Columbia basin: broad scale trends and management implications. Volume 1-3. Gen. Tech. Rep. PNW-GTR-485. Portland, OR. USDA, Forest Service, Pacific Northwest Research Station. (Quigley, T.M., tech. ed.; Interior Columbia Basin Ecosystem Management Project: scientific assessment).

Wisdom, M.J., A.A. Ager, H.K. Preisler, N.J. Cimon, and B.K. Johnson. 2004. Effects of off-road recreation on mule deer and elk. Transactions of the 69th North American Wildlife and Natural Resources Conference. Pages 531-550.

Wohl, Ellen; Mountain Rivers; Water Resources Monograph 14; American Geophysical Union, Washington, DC, 2000.

Wolverine Foundation Inc., The (TWF): Wolverine life history, ecology, and management [Online]. 2012. Kuna, Idaho, USA. Available: http://www.wolverinefoundation.org

Zielinski, W.J., K.M. Slauson, C.R. Carroll, C.J. Kent, and D.G. Kudrna. 2001. Status of American martens in coastal forests of the Pacific states. Journal of Mammalogy 82(2):478-490.

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# Appendix A: Project Vicinity and Treatment Maps

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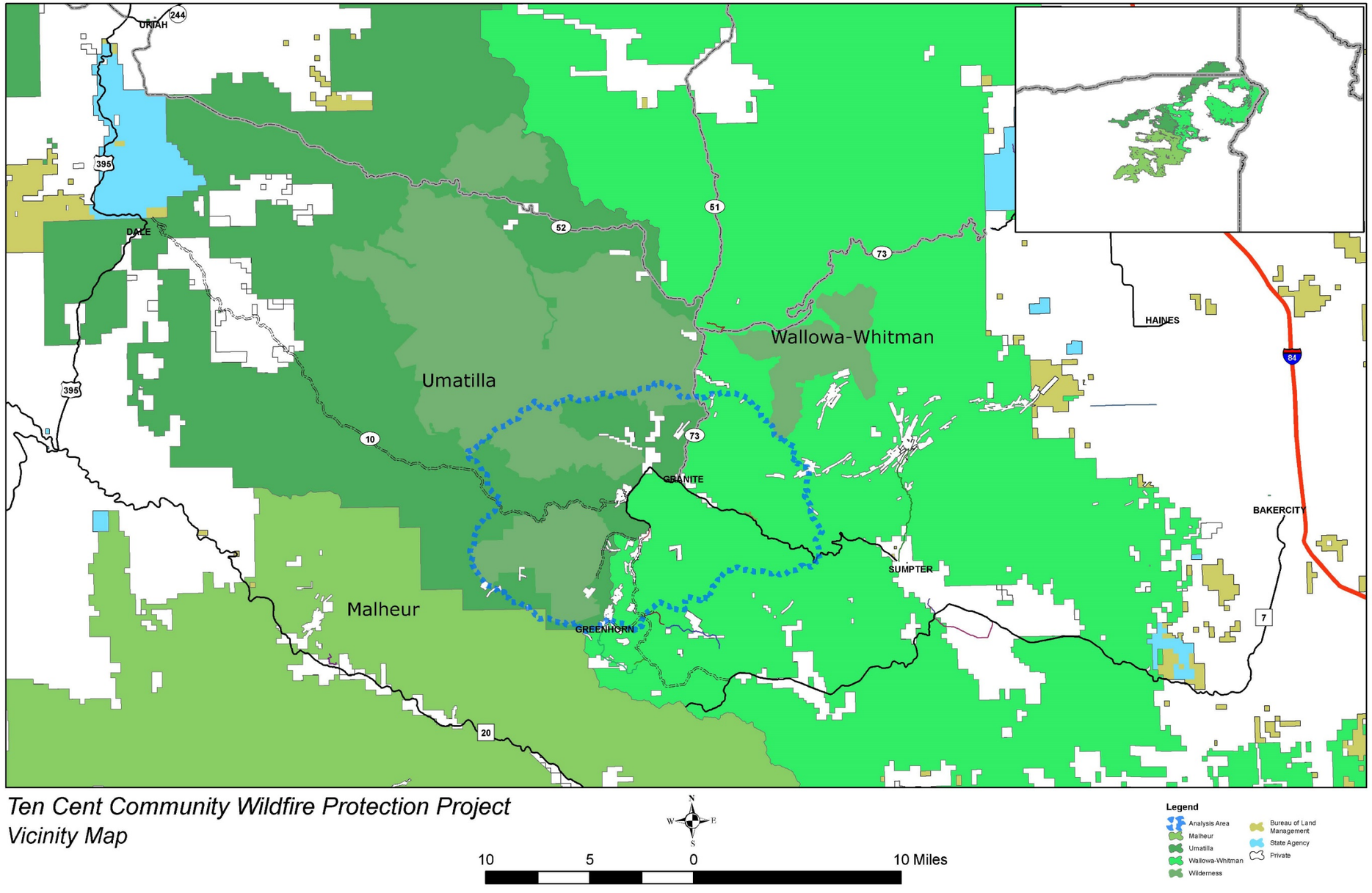
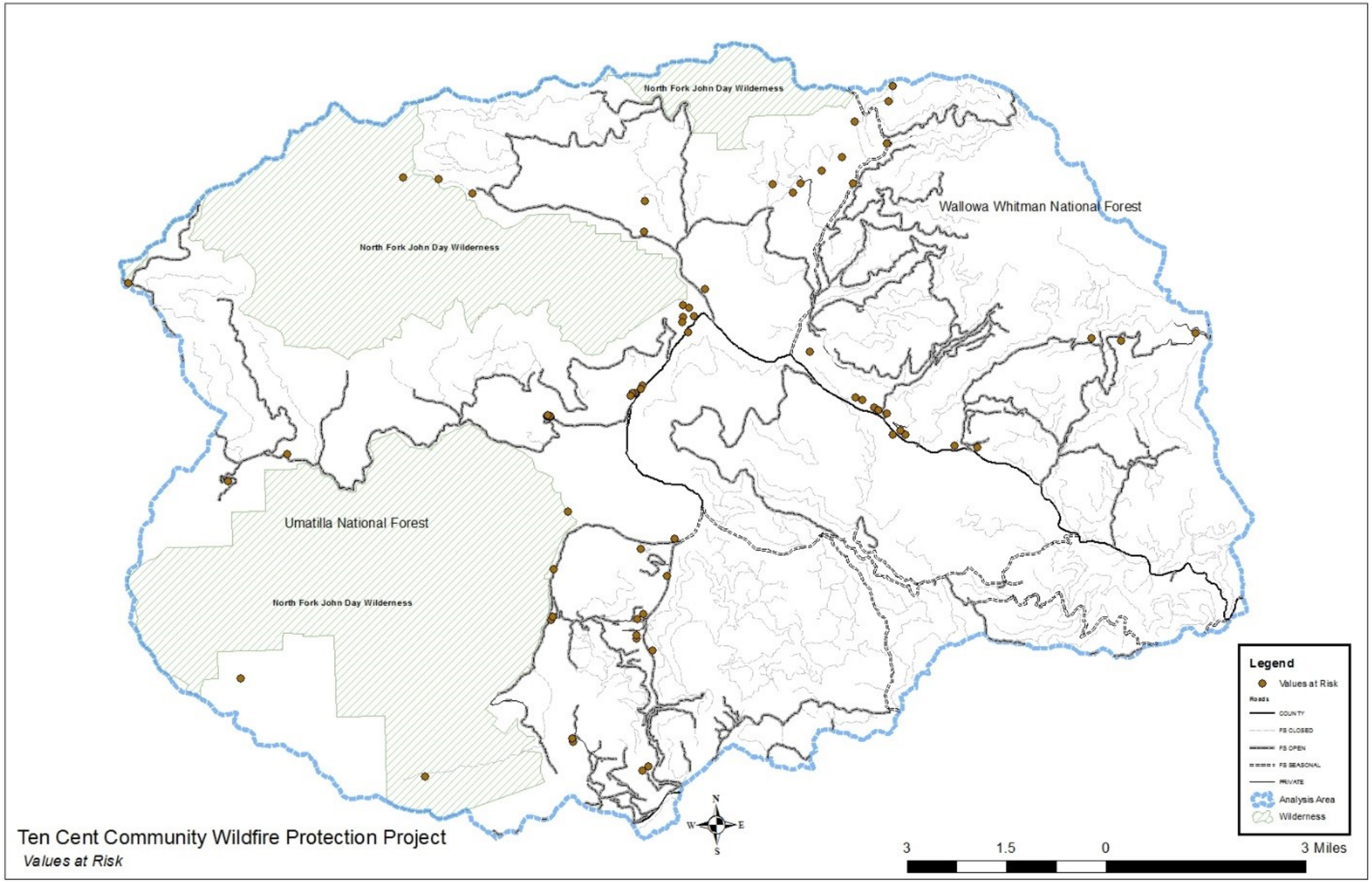
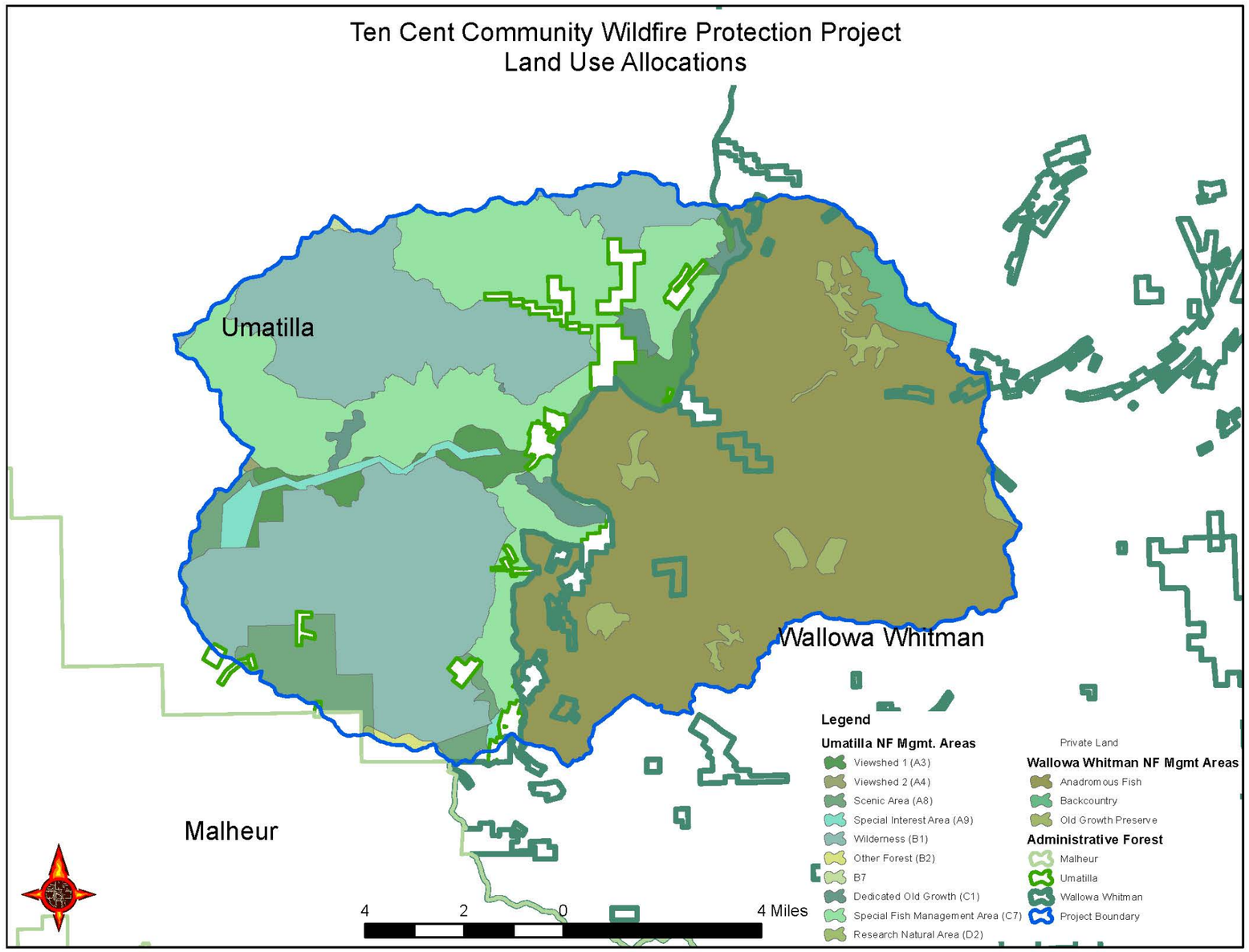
**Map A-1: Vicinity Map**



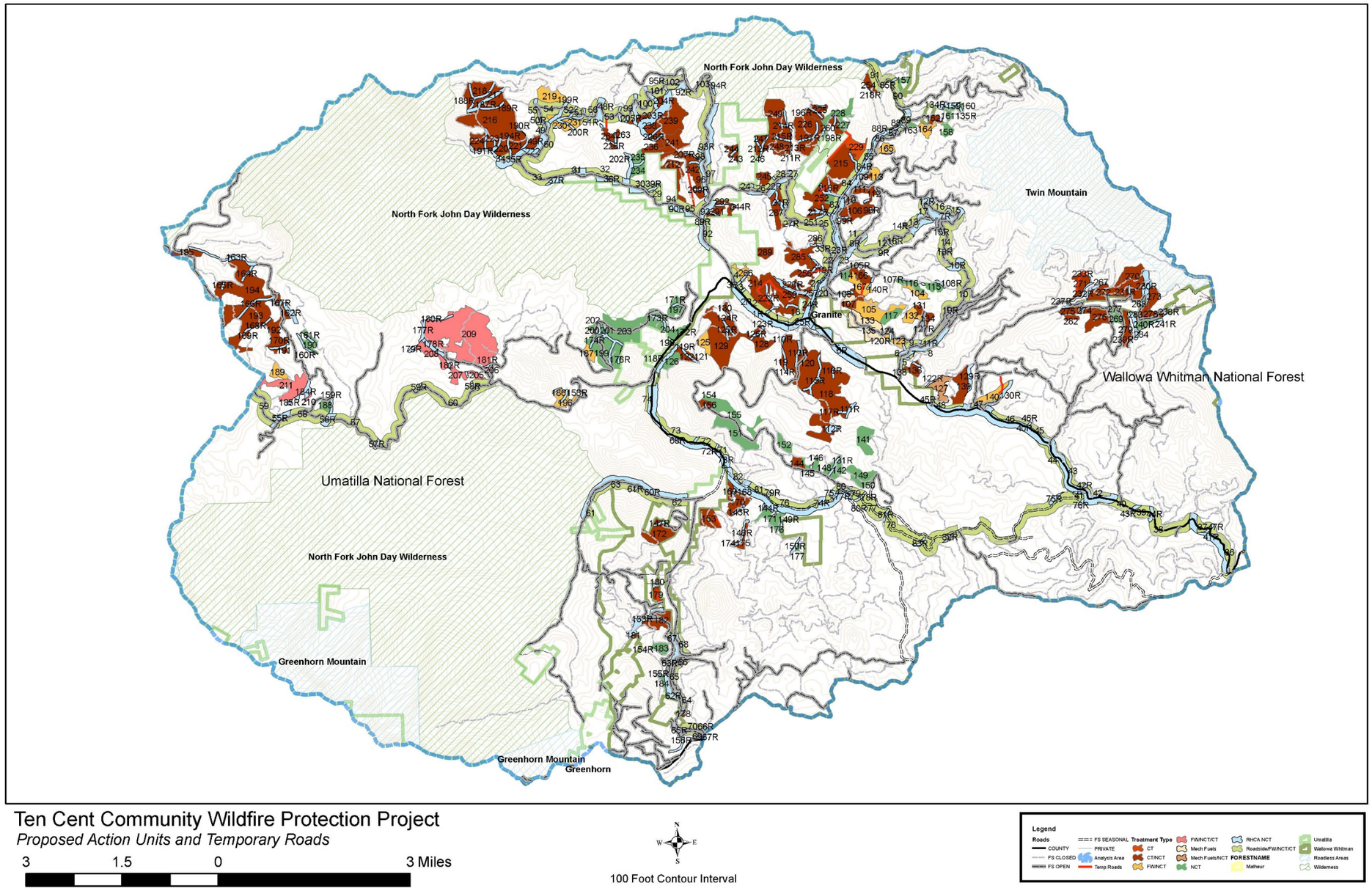
**Map A-2: Values at Risk**



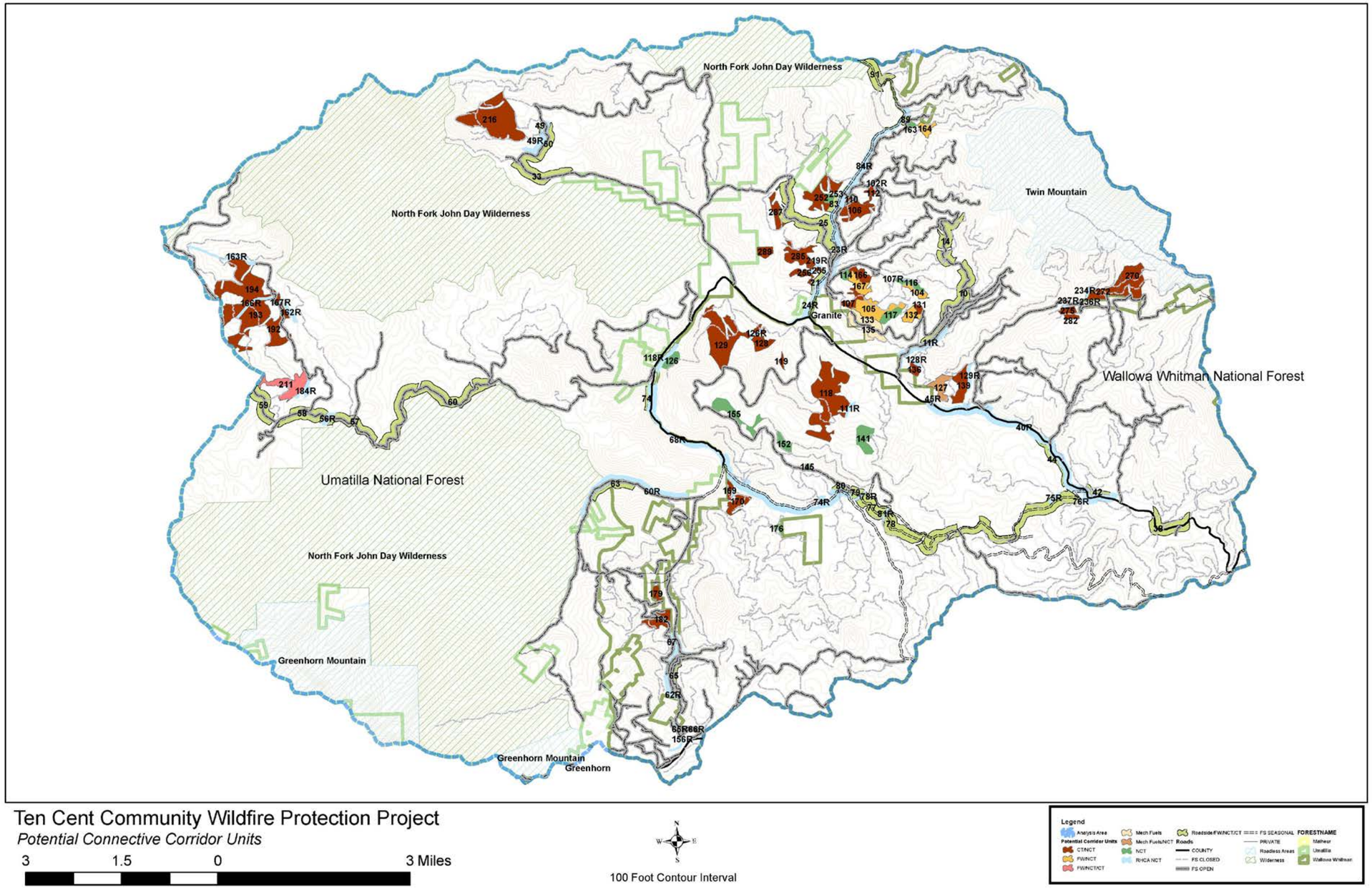
**Map A-3: Land Management Areas**



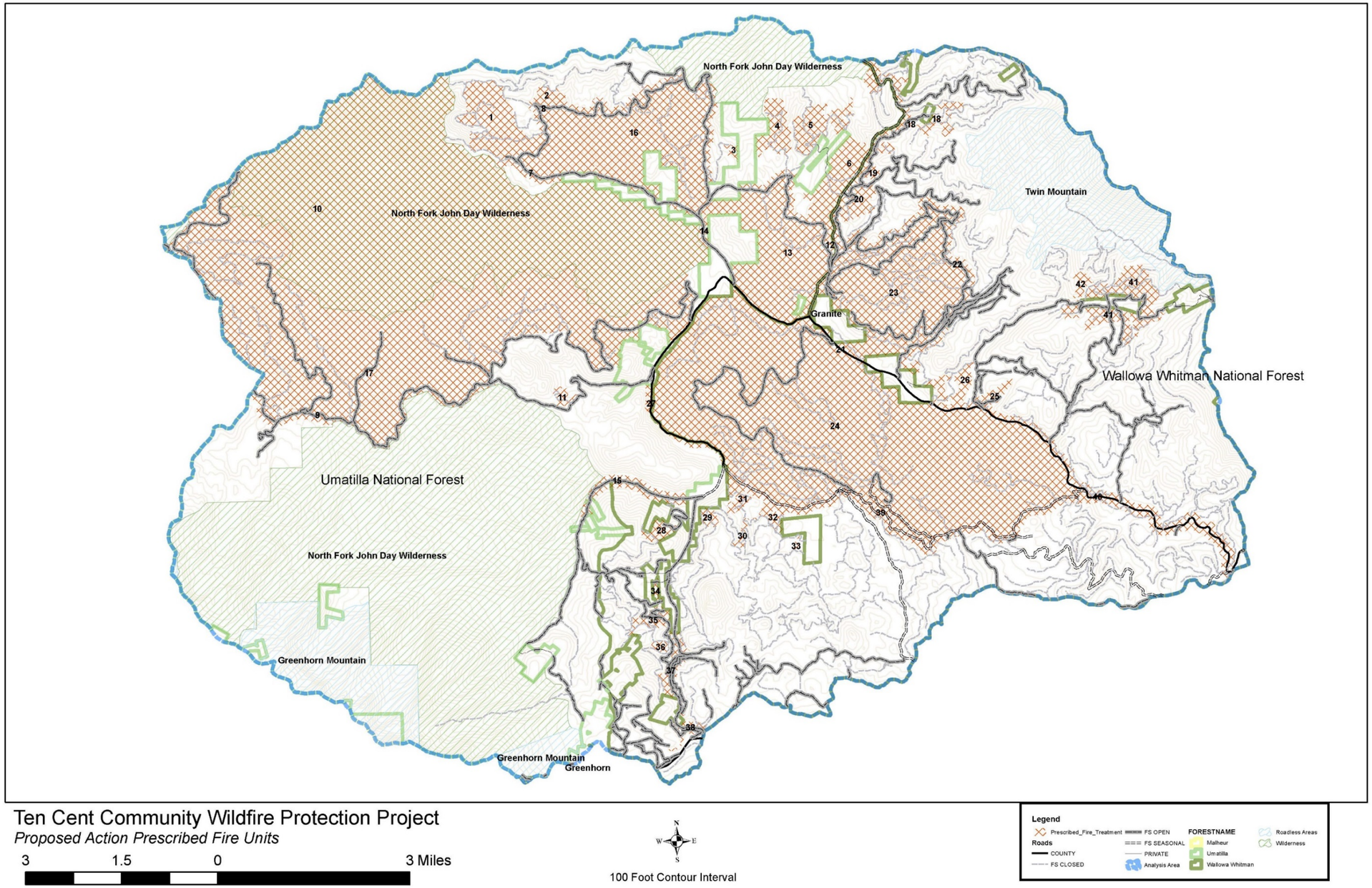
**Map A-4: Alternative 2 (Proposed Action) Units and Temporary Roads**



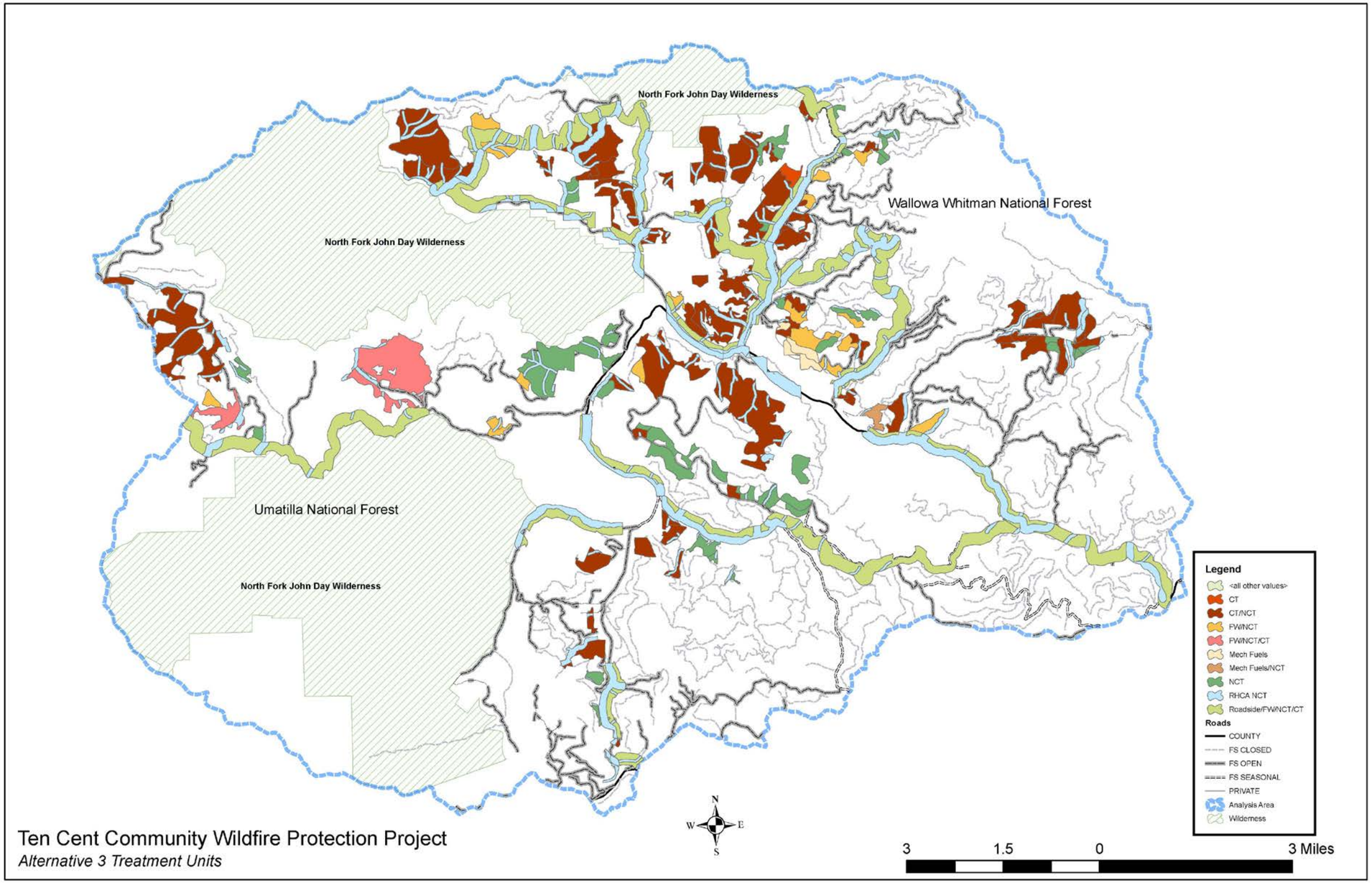
**Map A-5: Potential Connective Corridor Units**



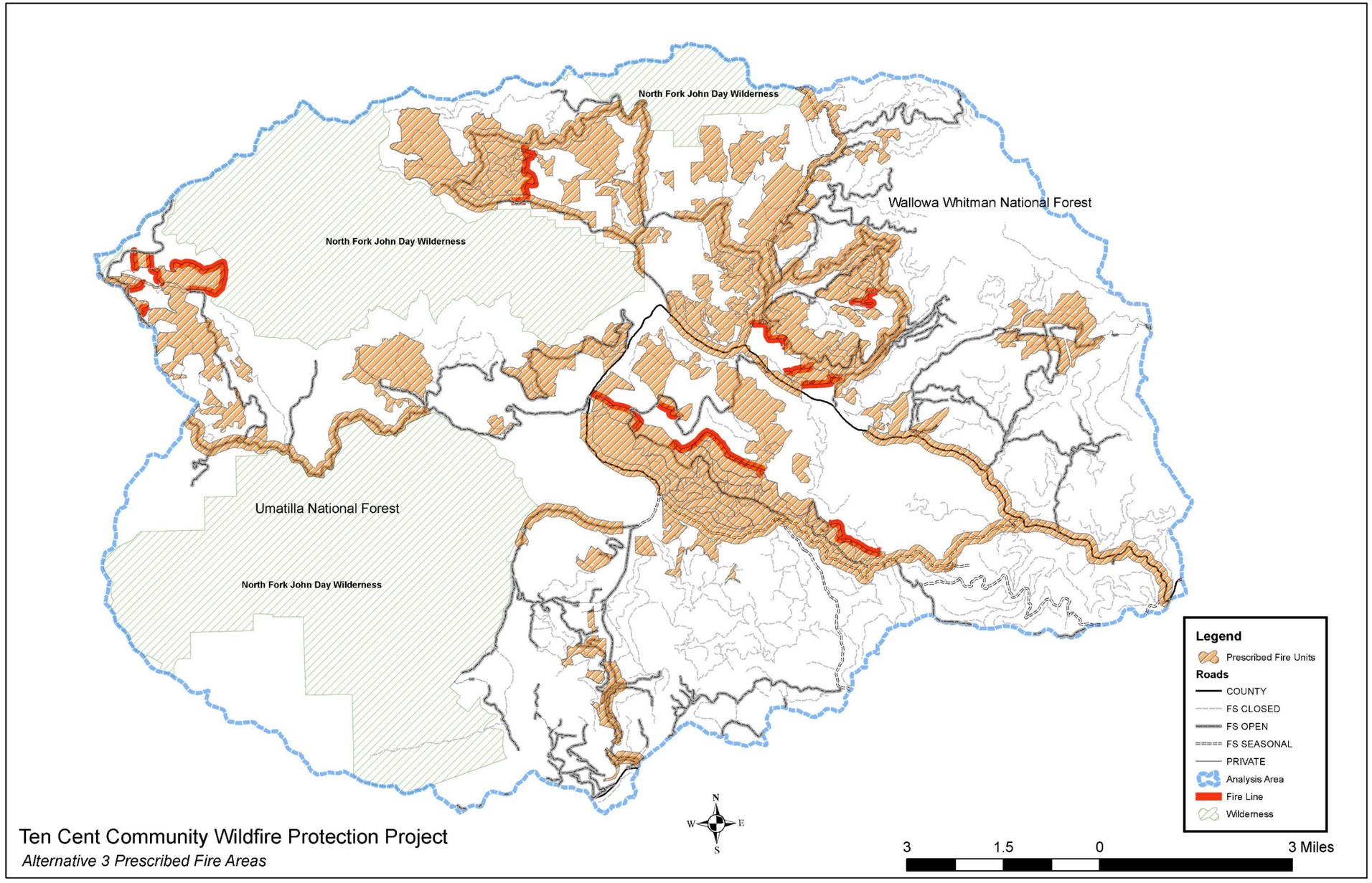
**Map A-6: Alternative 2 (Proposed Action) Prescribed Fire Units**



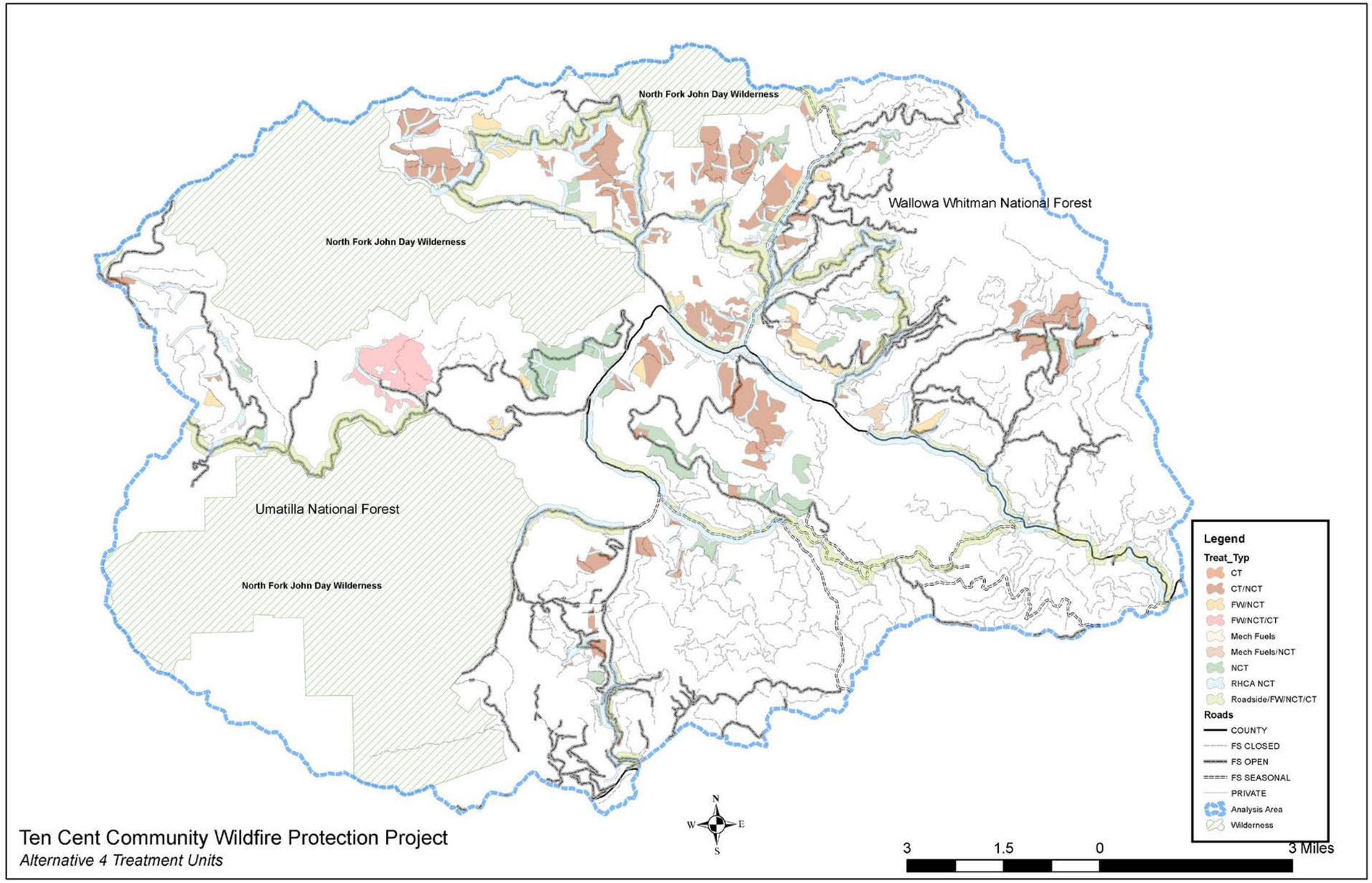
**Map A-7: Alternative 3 Treatment Units**



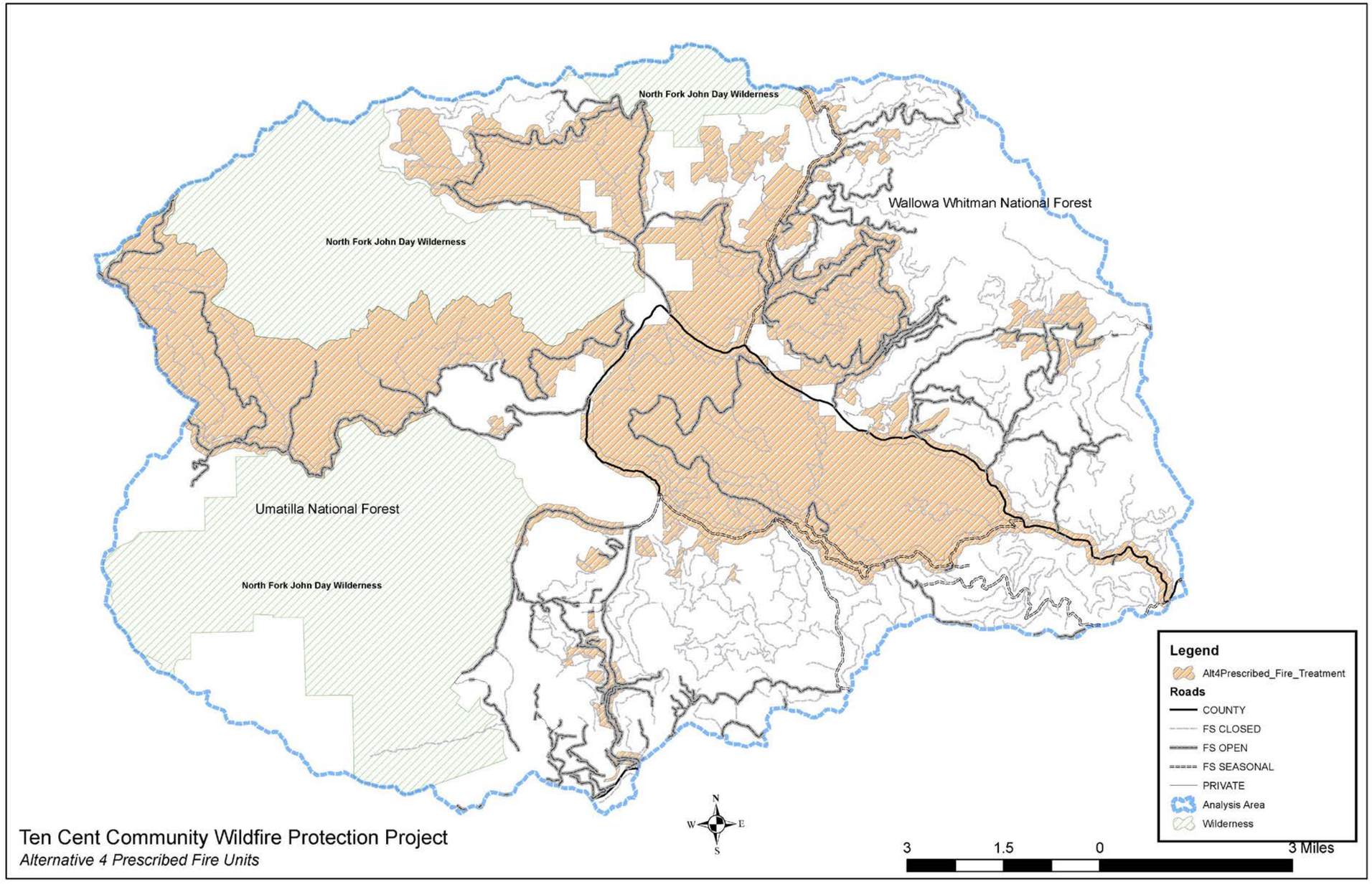
**Map A-8: Alternative 3 Prescribed Fire Units**



**Map A-9: Alternative 4 Treatment Units**



**Map A-10: Alternative 4 Prescribed Fire Units**



# Appendix B: Best Management Practices

The general practices that the Forest Service uses to maintain water quality are called Best Management Practices (BMPs). The Forest Plans (USDA, 1990) requires that projects meet "state requirements in accordance with the Clean Water Act ...through planning, application, and monitoring of BMPs ..." BMPs are practices designed to reduce or eliminate nonpoint sources of water pollution. The goal of BMP use is to avoid, minimize, or mitigate impacts to meet water quality objectives.

Project planning and application BMPs are found in National Best Management Practices for Water Quality Management on Nation Forest System Lands (USDA Forest Service, 2012). Planning BMPs are implemented during the NEPA planning process. BMPs deemed applicable for the 10 Cent Project were selected from the categories listed below:

Plan-1 Forest and Grassland Planning
Plan-2 Project Planning and Analysis
Plan-3 Aquatic Management Zone Planning
Fire-2 Use of Prescribed Fire
Road-1 Travel Management Planning and Analysis
Road-3 Road Construction and Reconstruction
Road-4 Road Operations and Maintenance
Road-5 Temporary Roads
Road-6 Road Storage and Decommissioning
Road-7 Stream Crossings
Road-8 Snow Removal and Storage
Road-10 Equipment Refueling and Servicing
Veg-1 Vegetation Management Planning
Veg-2 Erosion Prevention and Control
Veg-3 Streamside Management Zones
Veg-4 Ground-Based Skidding and Yarding Operations
Veg-6 Landings
Veg-7 Winter Logging
Veg-8 Mechanical Site Treatment

These BMPs are reviewed as part of the NEPA Interdisciplinary process. Based on the review, and local conditions, site specific BMP prescriptions were developed for the specific needs of the Ten Cent Project. The BMP prescriptions are contained in one or more of the following: Ten Cent Project Design Criteria, Ten Cent Timber Sale Advertisement, Ten Cent Timber Sale Contract, and the Forest Plans. They are implemented as part of the timber sale or stewardship contract administration or as part of road uses, fuels treatments, or AOP projects.

## BMP Effectiveness

Forest management in the past, including logging, road construction and maintenance, grazing, and fuel treatments have caused reductions in stream shade, alterations of stream banks and channels, and increases in stream sedimentation. This past management reduced water quality in the project area and downstream. In order to halt the decline and ultimately to improve water quality, the Forest Plan and later amendments require the use and monitoring of BMPs to insure that water quality objectives are met.

In 2011, the South Zone Interdisciplinary Team developed a structured approach for insuring that project design criteria are carried through to project implementation. The project design criteria table is located in Chapter 2 of this EIS. Design Element is referenced to the Forest Plan, National BMP Handbook, or the Timber Sale Contract. Where applicable, IDT notes on implementation are included.

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# Appendix C: Actions Considered for Cumulative Effects

This appendix lists the current and reasonably foreseeable future actions that may be considered in addition to the proposed project. The list of ongoing and reasonably foreseeable actions includes actions on the Umatilla and Wallowa-Whitman National Forests within the Granite Creek Watershed. The present and reasonably foreseeable future actions that are considered for cumulative effects analysis may vary by resources (see Chapter 3 and resource reports for resource-specific details).

**Table C-1: Actions Considered for Cumulative Effects**

| Past, Ongoing, or Future Project | Name of Project | Forest(s) | Notes |
|---|---|---|---|
| **P** | Bull run Culverts Decision signed 6/24/13 | WWNF | Bull Run Culvert/Corrigal Springs (7375 Road) T. 9 S, R. 36 E., Sec. 19):<br><br>The existing culvert was removed and disposed of off National Forest System land and replaced with an appropriately sized structure to meet a 100-year flood event and allow fish passage. New culverts have an open bottom design with concrete footings. |
| **P** | Culverts on 10 Cent Creek | UNF | Three culverts on Ten Cent Creek were replaced in 2012 for fish improvement. |
| **F** | Granite Culvert Replacements | WWNF | This project proposes to remove and replace 7 culverts with fish passage friendly structures throughout the area around the town of Granite, OR. Projected implementation summer 2015. |
| **P** | Storm Damage Risk Reduction (SDRD) | UNF | SDRD – (Storm Damage Risk Reduction). Culvert replacement and other drainage improvements on the 1035 1038, and the 7335 road systems. (Fortifying road edges, planting trees and shrubs, improving ditch lines and drainage dips, and restoring unusable roads beds to forested land.) |
| **P, O** | Road use and Road Maintenance | WWNF & UNF | The analysis area has an extensive Forest Service road system that was built during the period of large-scale logging which took place in the 1960s and 1970s. Road maintenance is an ongoing activity. The main gravel roads receive surface maintenance usually once a year. On about a 5-year schedule, all other roads get inspected for deferred maintenance. Problems identified during inspections are taken care of within the year. Over 6 miles of road were decommissioned (full obliteration) with Legacy Road funds in 2008 in Lower Granite Creek. |
| **P, O, F** | Invasive Species Management | WWNF & UNF | The WWNF and UNF both completed Invasive Plants Treatment FEIS's and ROD's in 2010. The WWNF ROD is currently under litigation, but certain types of treatments are still allowed (see Invasive Species section below). Both forests will continue to implement treatments to prevent the introduction and spread of noxious weeds. |

| Past, Ongoing, or Future Project | Name of Project | Forest(s) | Notes |
|---|---|---|---|
| **P, O** | Fire, Fuels Reduction and Timber Harvest | WWNF & UNF | Greenhorn Thinning (ongoing) and Granite Interface (past – 2004)<br><br>Granite WUI – Ten Cent fuels area – Blue Mtn Forests fuels reduction project:<br><br>This work may include; setting of prescribed fires to improve the composition, structure, condition and health of stands or improve wildlife habitat, removing vegetation or other activities to promote healthy forests, reduce fire hazards, or achieve other land management objectives, watershed restoration and maintenance, restoration and maintenance of wildlife and fish habitat, control of noxious weeds and exotic weeds, and re-establishment of native plant species. |
| **O** | Dispersed Recreation | WWNF & UNF | The project area is used recreationally for hunting, hiking, berry picking, firewood cutting, dispersed camping and picnicking, snowmobiling, cross country skiing, and OHV use. A portion (3,021 acres) of the Vinegar Hill/Indian Rock Scenic Area lies within the analysis area, and includes several hiking (non-motorized) trails. |
| **O** | Developed Recreation – Olive Lk. Campground, | UNF | Olive Lake Campground is the only developed campground within the analysis area. There are 26 campsites, 2 day use sites, a fishing platform, boat ramp/dock and a 2.5 mile hiking trail around the perimeter of the lake. Fishing, boating, picnicking, overnight camping, and hiking are popular activities at this site. |
| **O** | Trailheads | UNF | The Saddle Camp/Lost Creek Trailhead (T9S, R35E, s14) is the only developed trailhead accessing the scenic area within the analysis area. Facilities include a graveled parking pad, signing and a bulletin board.<br><br>Granite Creek Trail Head (T8S, R35E, s20) accesses the wilderness area. Has a gravel parking area and a bulletin board<br><br>Ben Harrison Trail Head (T9S, R35E, s22) this is an undeveloped site which access the wilderness.<br><br>Olive Lake Trail Head (T9S, 34E, s15) this trail head is located in the Olive lake Campground and access Saddle camp and the lost Creek trail. |
| **O** | Recreation Rentals – Fremont Powerhouse | UNF | The turn of the century Fremont Powerhouse site is a popular location for visitors to learn more about the area's early mining history. The four old employee houses are part of the cabin rental program and are available for rent thought out the year. The site will continue to have occasional administrative use as well and all houses may not be available for rent at one time. |
| **P, O, F** | Recreational Special Use Permits | WWNF & UNF | Throughout the years there have been occasional Special Use Permits (SUP) for a recreational event and/or outfitter guide services. To date, there are currently no SUP's authorized in the analysis area. As new request are received they will be evaluated and analyzed at that time. |

| Past, Ongoing, or Future Project | Name of Project | Forest(s) | Notes |
|---|---|---|---|
| **O** | Long-term Special Use Permits | WWNF & UNF | Currently, there are only a few lands related Special Uses in the Granite watershed area. These consist of power, electrical and water transmission lines to the local communities and residences of the area. They include the City of Greenhorn Water transmission line, Pine Telephone phone transmission line, and OTEC (Oregon Trails Electric Company) power transmission line (project file). |
| **O** | OHV use | WWNF & UNF | On the WWNF, with the exception of the North Face Vehicle Closure, the entire area is open to motorized travel including off-road travel. All maintenance level 1 roads (closed roads) are open to off-road vehicles.<br><br>On the Umatilla NF, there are no designated OHV (Off Highway Vehicle) trails in the area. However, OHV activity is permitted and does occur on open roads in the analysis area. This includes riding motorcycles (Class III) and four-wheelers (Class I) on these roads. With the exception of Forest Service Road 10, all open roads within the analysis area are open to OHV travel, per the 2001 Interim Program for ATV/OHV Strategy on the Umatilla National Forest (UNF). Additionally, the 1000460, 1000520, 1010370, 1035060, 1035080, 1038060, 7350050, 7350052 and 7350070 are forest system roads open seasonally to OHV use but closed to other motorized trails. Note that State law does not allow ATV use on two lane roads. All double digit roads 73, 10 etc are considered two lane roads and not useable to ATV's unless they are highway certified. |
| **O** | Snowmobiling | WWNF & UNF | On the WWNF, several miles of designated snowmobile trails occur within the area. These trails utilize snow-covered forest system roads that are mechanically groomed (snow-packed). The designated trails are used by snowmobiles during the winter months, generally December through the middle of March. Occasionally, snowmobilers use non-designated roads.<br><br>On the Umatilla NF, Forest Service Road 10 is groomed for snowmobile use from the junction of Rd. 13 and Rd. 10 to Desolation Guard Station. All of FS Rd. 10 within the analysis area serves as a groomed snowmobile trail during the winter months. A local snowmobile club grooms the trail (Rd. 10) when there is adequate snow coverage, typically between the months of December and March. Because snowmobile use would occur outside of the time when miners typically operate, there would be no measurable impact to snowmobile activity from the action alternatives. |
| **P** | Grazing | WWNF & UNF | Inactive Range Allotment – Camp Creek C&H Allotment. No ongoing grazing in the watershed. |
| **P, O, F** | Notice Level Mining | WWNF & UNF | Approximately 1 – 4 Notice of Intent (NOI) requests for mining operations are submitted to the Forests per year. These are typically small- scale activities and last for one summer or less (testing, panning, pick and shovel work). Activities larger in scale and longer term are required to provide Plans of Operations. Due to the current gold market, it is expected that NOI's will continue to be submitted in the future and they will be reviewed by the District Rangers as they are received. |

| Past, Ongoing, or Future Project | Name of Project | Forest(s) | Notes |
|---|---|---|---|
| **P, O** | Private Land activities | WWNF & UNF | Granite and Greenhorn – Cabins, Residences, Past Harvest small-scale timber harvest. ODF regulates timber harvest on private land. Private lands within and immediately adjacent to the Granite Mining analysis area are forested tracts, similar to Forest Service and BLM ownership lands. These areas generally experience minimal harvest. Some mining activities occur on private land, and are mostly limited to what the land owners can do on their own. Oregon Department of Environmental Quality issued a revised 700PM General Permit for Small-Scale, In-Water Mining May 15, 2015. In addition, effective January 1, 2014, Oregon Department of State Lands issued new administrative rules for the General Authorization for Recreational Placer Mining. Placer and suction dredge mining can occur if appropriate permits are acquired and regulations are followed. This includes a minimum distance of 500 feet maintained between motorized dredge equipment. Additional mining could occur on private lands within the Granite Mining project area, and based on activities in the recent past activities would be small-scale. |
| **P, O, F** | Redboy, Bluebird, and Black Jack Mine Restoration Improvements - NFJD Watershed Council and Forest Service | UNF | Ongoing maintenance and repair of the pipeline and settling ponds. In 2013 the piping system to move the water from the adit to the settling ponds was upgraded and replaced.<br><br>The EE/CA completed by Cascade Earth Systems found that arsenic concentrations on lower Clear Creek are slightly above Oregon DEQ criteria for toxic pollutants. Other dissolved metal concentrations in surface water were below the minimum detection level (MDL) of 50µg/L. Sediment concentrations of arsenic are above the EPA Threshold Effect Levels. Sediment concentrations of copper, cadmium, manganese, nickel and zinc are also in excess of state and/or federal comparison criteria. The Clear Cr. WRAPs addresses essential project work for ongoing water quality monitoring.<br><br>Blue Bird and Black Jack Mines - Annual maintenance on the outlet pipes and the settling ponds for the acid drainage from the adits. Protection measures in Alternative 3 are designed to prevent a cumulative effect from maintenance or any potential restoration failure at Blue Bird and Black Jack.<br><br>Additional evaluations are needed and the site was placed on Confirmed release list in 2003. |
| **F** | CERCLA investigations | WWNF & UNF | CERCLA site identified for investigation that overlap proposed Plans include Eddy Shipman from the historic Central and the East Eddy adits. |

| Past, Ongoing, or Future Project | Name of Project | Forest(s) | Notes |
|---|---|---|---|
| **P, O** | AML mine restoration and reporting | WWNF & UNF | State and local agencies are continuing clean up and conduct rehabilitation work areas outside of the proposed Plans in the Granite Creek watershed. Watershed monitoring and assessment work is being conducted through a contractor on Clear Creek. Work at the Red Boy Mine continues. Granite Creek received some stream side restoration in 2013 and other areas are being considered for future restoration. The Beaver Creek and Clear creek junction received soil in which vegetation and trees were planted in order to restore that area.<br><br>Over 100 historic and or abandon mines exist in the Granite Creek Watershed. Inventory and assessment work of these mines is ongoing.<br><br>Between 2001 and 2007, 2 miles of Granite Creek and 3 miles of Clear Creek had restoration work done on the dredge trailing in order to return them to a more natural condition and improve stream habitat. Restoration included planting of 5000 shrubs, hardwoods, and conifers, and approximately 400 lbs of native seed.<br><br>In 2013 the Watershed council and the CTU did a stream restoration project on the private land section of Granite Creek near the junction with Clear Creek.<br><br>Redboy Mine (see above).<br><br>Blue Bird and Black Jack Mines - Annual maintenance on the outlet pipes and the settling ponds for the acid drainage from the adits.<br><br>In accordance with the CERCLA act a number assessment reports have already been completed in this area but there is still more to do. |
| **P, O** | Ditches | WWNF & UNF | Approximately 30 miles of existing ditchlines, mostly on WWNF used for irrigation, none of which are currently under special use permits with the Forest Service. |
| **O** | Authorized State Water Withdrawals | WWNF & UNF | Mining operators with valid water rights issued by the State of Oregon in the Granite Creek watershed. |
| **P** | Historic Towns – private land | WWNF & UNF | The historic mining towns of Granite and Greenhorn still exist today, but currently cater more to tourist and summer homes. Sumpter to the south has a state park, and along with the Fremont Power House is part of the historic dredge tour. |
| **O** | Olive Lake Dam Improvement | UNF | In 2013 all debris was removed from the entrance of the Olive Lake spillway. A new debris boom replaced the old debris boom at the same location. The log boom was placed with two 75-foot floats linked in a “V” shape.<br><br>In the future, as funding is available, the spillway will be reshaped to its original elevation and configuration and then lined with riprap. Vegetation will be cleared from the spillway; currently, vegetation is trapping sediment, which reduces the spillways capacity. The lakeside face of the dam will also be lined with riprap. This maintenance work will include in-water work or placement of material along the face of the dam and spillway locations. |

| Past, Ongoing, or Future Project | Name of Project | Forest(s) | Notes |
|---|---|---|---|
| **O** | Vinegar Fire & recovery | UNF | About 1500 acres burned from a lightning caused fire in the Vinegar Hill and Salmon Creek area in the fall of 2013. A number of restoration measures were put into place before winter and the area was monitored in 2014 for any additional needs. |
| **P,O, F** | Noxious Weed control | WWNF & UNF | Yearly weed treatments of known sites is conducted on the WWNF and UNF through a programmatic EIS. As new sites are found, they are documented, monitored and treated. |
| **O** | Clear Creek Mining Tailing Terraforming | UNF | Managed by the Rocky Mountain Research Station (RMRS - Debbie Page-Dumroese-Lead Investigator) utilized as a research site for the restoration of the dredge tailings with biochar and biosolid amendments. These soil amendments have been shown to be viable soil restoration materials. This study would help to identify the types of soil amendments that could be used to rebuild soil organic matter content and Cation Exchange Capacity (CEC) in these degraded dredge tailings. CE category for conducting research (7 CFR 1b.3(a)(3)) |
| **O, F** | Granite Creek Watershed Mining | WWNF & UNF | Authorization of 28 plans of operations submitted by miners; the use of 4.18 miles of previously closed or decommissioned Forest Service Roads (3.73 closed and 0.45 decommissioned); the use of 8.21 miles of existing miner-created temporary roads and .43 miles miner created new temporary roads; use of 9 existing fords on FS closed or existing miner-created roads, construction of one new ford; placement of one temporary bridge that will be removed at the end of each operating season; and the installation or 3 new gates. |
| **O, F** | Granite-Desolation Aquatic Restoration Project | UNF | Storm damage risk reduction on a total of 93.7 miles of roads, decommissioning of a total of 5.9 miles of unclassified roads, and maintenance of 29.2 miles of roads. Maintenance includes upgrading seven culverts to restore connectivity for Mid-Columbia River steelhead/interior redband trout and Westslope cutthroat trout. Instream and riparian restoration on about 99 miles of stream—treatments include a combination of large wood placement including falling, tree lining and boulder placement as well as riparian planting. Removal of conifer encroachment along meadow edges within 265 acres of identified meadows—trees removed will be hand piled and burned or used in instream restoration. Meadow restoration will include pre-commercial thinning, prescribed fire, re-vegetation with native plants, fencing, and relocation of spring developments. |

# Appendix D: Transportation System Summary

Following is the transportation system proposed for use by the project, by alternative. The roads shown currently exist. Temporary roads shown are actually former road prisms, whether formerly authorized for use or not, that are proposed for temporary use by the project, and shall be decommissioned/restored upon completion of the project

Open, seasonal, and closed roads will be reconstructed as necessary to facilitate forest product removal. All roads will be maintained for project use. Road maintenance work includes pre-haul and post haul blading, removal and replacement of earth mound barricades, cleaning of culverts and ditches, temporary culvert installations, and brushing of smaller than 6 inch diameter trees, and log out of down trees as necessary.

**Table D-1: Summary of road status by alternatives in miles**

| Road Status | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|
| County Roads | 15 | 15 | 15 |
| Open Roads | 98 | 98 | 98 |
| Seasonal Roads | 17 | 17 | 17 |
| Closed Roads | 107 | 107 | 93 |
| Temporary | 5 | 5 | 5 |
| **Total Road Miles Used** | **241** | **241** | **220** |

## Alternative 2 and 3

**Table D-2: Transportation System Haul Routes Alternative 2 and 3**

| Transportation System Haul Routes Alternative 2 and 3 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Road Number | Ranger Districts | LANES | Maintenance Level | SURFACING | Length | Open Miles | Seasonal Miles | Closed Miles | Comment |
| 1000000 | NFJD | DOUBLE | 4 | AGGREGATE | 12.62 | 12.62 | 0.00 | 0.00 | |
| 1000460 | NFJD | SINGLE | 2 | AGGREGATE | 0.09 | 0.09 | 0.00 | 0.00 | |
| 1000460 | NFJD | SINGLE | 1 | AGGREGATE | 1.41 | 0.00 | 0.00 | 1.41 | |
| 1000470 | NFJD | SINGLE | 1 | AGGREGATE | 2.18 | 0.00 | 0.00 | 2.18 | |
| 1000500 | NFJD | SINGLE | 2 | AGGREGATE | 3.89 | 3.89 | 0.00 | 0.00 | |
| 1000520 | NFJD | SINGLE | 1 | AGGREGATE | 1.95 | 0.00 | 0.00 | 1.95 | |
| 1000530 | NFJD | SINGLE | 2 | NATIVE | 0.17 | 0.17 | 0.00 | 0.00 | |
| 1000650 | NFJD | SINGLE | 1 | AGGREGATE | 0.48 | 0.00 | 0.00 | 0.48 | |
| 1010000 | NFJD | SINGLE | 2 | NATIVE | 5.85 | 5.85 | 0.00 | 0.00 | |
| 1010000 | NFJD | SINGLE | 2 | AGGREGATE | 1.36 | 1.36 | 0.00 | 0.00 | |
| 1010350 | NFJD | SINGLE | 2 | AGGREGATE | 0.60 | 0.60 | 0.00 | 0.00 | |
| 1010360 | NFJD | SINGLE | 2 | AGGREGATE | 0.20 | 0.00 | 0.00 | 0.20 | |

| Transportation System Haul Routes Alternative 2 and 3 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1010370 | NFJD | SINGLE | 1 | AGGREGATE | 2.32 | 0.00 | 0.00 | 2.32 | |
| 1010380 | NFJD | SINGLE | 2 | AGGREGATE | 2.07 | 2.07 | 0.00 | 0.00 | |
| 1030000 | NFJD | SINGLE | 2 | AGGREGATE | 0.79 | 0.79 | 0.00 | 0.00 | |
| 1030020 | NFJD | SINGLE | 2 | NATIVE | 0.92 | 0.92 | 0.00 | 0.00 | |
| 1030020 | NFJD | SINGLE | 2 | NATIVE | 0.68 | 0.00 | 0.00 | 0.68 | |
| 1030025 | NFJD | SINGLE | 2 | NATIVE | 1.08 | 0.00 | 0.00 | 1.08 | |
| 1030030 | NFJD | SINGLE | 2 | NATIVE | 0.39 | 0.00 | 0.00 | 0.39 | |
| 1031000 | NFJD | SINGLE | 2 | AGGREGATE | 4.62 | 4.62 | 0.00 | 0.00 | |
| 1031085 | NFJD | SINGLE | 1 | AGGREGATE | 0.39 | 0.00 | 0.00 | 0.39 | |
| 1031090 | NFJD | SINGLE | 1 | AGGREGATE | 0.43 | 0.00 | 0.00 | 0.43 | |
| 1031095 | NFJD | SINGLE | 1 | AGGREGATE | 0.24 | 0.00 | 0.00 | 0.24 | |
| 1035000 | NFJD | SINGLE | 2 | AGGREGATE | 5.76 | 5.76 | 0.00 | 0.00 | |
| 1035010 | NFJD | SINGLE | 2 | AGGREGATE | 0.29 | 0.29 | 0.00 | 0.00 | |
| 1035012 | NFJD | SINGLE | 2 | AGGREGATE | 0.81 | 0.00 | 0.00 | 0.81 | |
| 1035060 | NFJD | SINGLE | 1 | AGGREGATE | 1.93 | 0.00 | 0.00 | 1.93 | |
| 1035062 | NFJD | SINGLE | 2 | NATIVE | 0.46 | 0.00 | 0.00 | 0.46 | |
| 1035063 | NFJD | SINGLE | 2 | NATIVE | 0.32 | 0.00 | 0.00 | 0.32 | |
| 1035065 | NFJD | SINGLE | 2 | NATIVE | 0.84 | 0.00 | 0.00 | 0.84 | |
| 1035070 | NFJD | SINGLE | 2 | NATIVE | 0.80 | 0.00 | 0.00 | 0.80 | |
| 1035080 | NFJD | SINGLE | 2 | AGGREGATE | 0.67 | 0.00 | 0.00 | 0.67 | |
| 1035080 | NFJD | SINGLE | 2 | AGGREGATE | 0.72 | 0.00 | 0.00 | 0.72 | |
| 1035084 | NFJD | SINGLE | 2 | NATIVE | 0.31 | 0.00 | 0.00 | 0.31 | |
| 1038000 | NFJD | SINGLE | 2 | AGGREGATE | 6.20 | 6.20 | 0.00 | 0.00 | |
| 1038010 | NFJD | SINGLE | 2 | NATIVE | 0.99 | 0.00 | 0.00 | 0.99 | |
| 1038011 | NFJD | SINGLE | 1 | NATIVE | 0.22 | 0.00 | 0.00 | 0.22 | |
| 1038021 | NFJD | SINGLE | 1 | NATIVE | 0.94 | 0.00 | 0.00 | 0.94 | |
| 1038030 | NFJD | SINGLE | 2 | AGGREGATE | 1.90 | 0.00 | 0.00 | 1.90 | |
| 1038041 | NFJD | SINGLE | 1 | NATIVE | 0.40 | 0.00 | 0.00 | 0.40 | |
| 1038042 | NFJD | SINGLE | 1 | NATIVE | 0.22 | 0.00 | 0.00 | 0.22 | |
| 1038050 | NFJD | SINGLE | 2 | NATIVE | 0.46 | 0.00 | 0.00 | 0.46 | |

| Transportation System Haul Routes Alternative 2 and 3 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1038060 | NFJD | SINGLE | 1 | AGGREGATE | 2.51 | 0.00 | 0.00 | 2.51 | |
| 1038061 | NFJD | SINGLE | 2 | NATIVE | 0.28 | 0.00 | 0.00 | 0.28 | |
| 1038062 | NFJD | SINGLE | 2 | NATIVE | 0.13 | 0.00 | 0.00 | 0.13 | |
| 1038090 | NFJD | SINGLE | 2 | NATIVE | 1.01 | 0.00 | 0.00 | 1.01 | |
| 1038110 | NFJD | SINGLE | 2 | NATIVE | 0.43 | 0.00 | 0.00 | 0.43 | |
| 1046000 | Unity | SINGLE | 2 | NATIVE | 0.01 | 0.01 | 0.00 | 0.00 | |
| 1300000 | NFJD | SINGLE | 2 | AGGREGATE | 0.66 | 0.00 | 0.66 | 0.00 | |
| 1305000 | Unity | SINGLE | 2 | PIT RUN | 4.57 | 4.57 | 0.00 | 0.00 | |
| 1305012 | Unity | SINGLE | 2 | NATIVE | 0.35 | 0.35 | 0.00 | 0.00 | |
| 1305014 | Unity | SINGLE | 2 | NATIVE | 0.76 | 0.76 | 0.00 | 0.00 | |
| 1305020 | Unity | SINGLE | 1 | NATIVE | 1.48 | 0.00 | 0.00 | 1.48 | |
| 1305021 | Unity | SINGLE | 1 | NATIVE | 0.90 | 0.00 | 0.00 | 0.90 | |
| 1305025 | Unity | SINGLE | 1 | NATIVE | 0.89 | 0.00 | 0.00 | 0.89 | |
| 1305048 | Unity | SINGLE | 2 | NATIVE | 0.08 | 0.08 | 0.00 | 0.00 | |
| 1305050 | Unity | SINGLE | 2 | NATIVE | 0.10 | 0.10 | 0.00 | 0.00 | |
| 1305080 | Unity | SINGLE | 2 | AGGREGATE | 0.05 | 0.05 | 0.00 | 0.00 | |
| 1305080 | Unity | SINGLE | 2 | NATIVE | 0.11 | 0.11 | 0.00 | 0.00 | |
| 1305080 | Unity | SINGLE | 2 | PIT RUN | 1.78 | 1.78 | 0.00 | 0.00 | |
| 1305080 | Unity | SINGLE | 2 | PIT RUN | 0.42 | 0.42 | 0.00 | 0.00 | |
| 1305080 | Unity | SINGLE | 2 | NATIVE | 0.10 | 0.10 | 0.00 | 0.00 | |
| 1305080 | Unity | SINGLE | 2 | PIT RUN | 0.33 | 0.33 | 0.00 | 0.00 | |
| 1305082 | Unity | SINGLE | 2 | NATIVE | 0.13 | 0.13 | 0.00 | 0.00 | Repair Culvert |
| 1305083 | Unity | SINGLE | 2 | NATIVE | 0.16 | 0.16 | 0.00 | 0.00 | |
| 1305092 | Unity | SINGLE | 1 | NATIVE | 0.87 | 0.00 | 0.00 | 0.87 | |
| 1305096 | Unity | SINGLE | 2 | NATIVE | 0.38 | 0.38 | 0.00 | 0.00 | |
| 1305097 | Unity | SINGLE | 2 | NATIVE | 0.40 | 0.40 | 0.00 | 0.00 | |
| 1305098 | Unity | SINGLE | 1 | NATIVE | 0.26 | 0.00 | 0.00 | 0.26 | |
| 1305099 | Unity | SINGLE | 1 | NATIVE | 0.32 | 0.00 | 0.00 | 0.32 | |
| 1305100 | Unity | SINGLE | 2 | NATIVE | 0.34 | 0.34 | 0.00 | 0.00 | |
| 1305102 | Unity | SINGLE | 2 | NATIVE | 0.20 | 0.20 | 0.00 | 0.00 | |

| Transportation System Haul Routes Alternative 2 and 3 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1305102 | Unity | SINGLE | 1 | NATIVE | 1.62 | 0.00 | 0.00 | 1.62 | |
| 1305120 | Unity | SINGLE | 2 | NATIVE | 0.26 | 0.26 | 0.00 | 0.00 | |
| 1305125 | Unity | SINGLE | 2 | NATIVE | 1.06 | 1.06 | 0.00 | 0.00 | |
| 1305145 | Unity | SINGLE | 1 | NATIVE | 0.22 | 0.00 | 0.00 | 0.22 | |
| 1305145 | Unity | SINGLE | 1 | AGGREGATE | 0.25 | 0.00 | 0.00 | 0.25 | |
| 1305145 | Unity | SINGLE | 1 | NATIVE | 0.08 | 0.00 | 0.00 | 0.08 | |
| 1305145 | Unity | SINGLE | 1 | AGGREGATE | 0.12 | 0.00 | 0.00 | 0.12 | |
| 1305200 | Unity | SINGLE | 2 | NATIVE | 0.74 | 0.74 | 0.00 | 0.00 | |
| 1305205 | Unity | SINGLE | 2 | NATIVE | 0.21 | 0.21 | 0.00 | 0.00 | |
| 1305210 | Unity | SINGLE | 2 | NATIVE | 0.08 | 0.08 | 0.00 | 0.00 | |
| 1310000 | NFJD | SINGLE | 2 | AGGREGATE | 0.33 | 0.33 | 0.00 | 0.00 | |
| 1310000 | NFJD | SINGLE | 2 | NATIVE | 1.93 | 1.93 | 0.00 | 0.00 | |
| 1310000 | NFJD | SINGLE | 2 | NATIVE | 1.78 | 1.78 | 0.00 | 0.00 | |
| 1310025 | NFJD | SINGLE | 1 | NATIVE | 0.41 | 0.00 | 0.00 | 0.41 | |
| 1900000 | Unity | SINGLE | 2 | PIT RUN | 1.25 | 0.00 | 0.22 | 0.00 | |
| 1900000 | Unity | SINGLE | 2 | NATIVE | 1.93 | 0.00 | 1.81 | 0.00 | |
| 1900660 | Unity | SINGLE | 1 | NATIVE | 0.63 | 0.00 | 0.00 | 0.63 | |
| 1900662 | Unity | SINGLE | 1 | NATIVE | 1.10 | 0.00 | 0.00 | 1.10 | |
| 1900690 | Unity | SINGLE | 1 | NATIVE | 1.56 | 0.00 | 0.00 | 1.56 | |
| 1900710 | Unity | SINGLE | 1 | NATIVE | 0.75 | 0.00 | 0.00 | 0.75 | |
| 1970000 | Unity | SINGLE | 1 | NATIVE | 3.36 | 0.00 | 0.00 | 3.36 | |
| 1970000 | Unity | SINGLE | 1 | NATIVE | 1.33 | 0.00 | 0.00 | 1.33 | |
| 1970000 | Unity | SINGLE | 1 | NATIVE | 2.40 | 0.00 | 0.00 | 2.40 | |
| 1970000 | Unity | SINGLE | 1 | NATIVE | 0.76 | 0.00 | 0.00 | 0.76 | |
| 1970000 | Unity | SINGLE | 1 | NATIVE | 1.66 | 0.00 | 0.00 | 1.66 | |
| 1970035 | Unity | SINGLE | 1 | NATIVE | 1.18 | 0.00 | 0.00 | 1.18 | |
| 1970038 | Unity | SINGLE | 1 | NATIVE | 1.99 | 0.00 | 0.00 | 1.99 | |
| 1970165 | Unity | SINGLE | 1 | NATIVE | 1.14 | 0.00 | 0.00 | 1.14 | |
| 1970180 | Unity | SINGLE | 1 | NATIVE | 0.12 | 0.00 | 0.00 | 0.12 | |
| 1970190 | Unity | SINGLE | 1 | NATIVE | 0.12 | 0.00 | 0.00 | 0.12 | |

| Transportation System Haul Routes Alternative 2 and 3 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 7300000 | Baker | DOUBLE | 5 | PAVED | 5.08 | 0.00 | 5.08 | 0.00 | |
| 7300590 | NFJD | SINGLE | 2 | NATIVE | 0.61 | 0.00 | 0.00 | 0.61 | |
| 7300590 | NFJD | SINGLE | 2 | NATIVE | 0.31 | 0.00 | 0.00 | 0.31 | |
| 7300600 | NFJD | SINGLE | 1 | AGGREGATE | 0.58 | 0.00 | 0.00 | 0.58 | |
| 7300650 | Baker | SINGLE | 1 | NATIVE | 0.37 | 0.00 | 0.00 | 0.37 | |
| 7300700 | Baker | SINGLE | 2 | NATIVE | 1.41 | 1.41 | 0.00 | 0.00 | |
| 7300710 | Baker | SINGLE | 2 | NATIVE | 0.13 | 0.13 | 0.00 | 0.00 | |
| 7300710 | Baker | SINGLE | 1 | NATIVE | 0.06 | 0.00 | 0.00 | 0.06 | |
| 7300715 | Baker | SINGLE | 2 | NATIVE | 0.19 | 0.19 | 0.00 | 0.00 | |
| 7300715 | Baker | SINGLE | 1 | NATIVE | 0.25 | 0.00 | 0.00 | 0.25 | |
| 7300720 | Baker | SINGLE | 2 | NATIVE | 0.44 | 0.44 | 0.00 | 0.00 | |
| 7300720 | Baker | SINGLE | 2 | AGGREGATE | 0.73 | 0.73 | 0.00 | 0.00 | |
| 7300720 | Baker | SINGLE | 2 | NATIVE | 0.92 | 0.92 | 0.00 | 0.00 | |
| 7300720 | Baker | SINGLE | 1 | NATIVE | 1.86 | 0.00 | 0.00 | 1.86 | |
| 7300725 | Baker | SINGLE | 1 | NATIVE | 0.23 | 0.00 | 0.00 | 0.23 | |
| 7300735 | Baker | SINGLE | 1 | NATIVE | 0.31 | 0.00 | 0.00 | 0.31 | |
| 7300755 | Baker | SINGLE | 2 | NATIVE | 4.27 | 4.27 | 0.00 | 0.00 | |
| 7300760 | Baker | SINGLE | 1 | NATIVE | 3.84 | 0.00 | 0.00 | 3.84 | |
| 7300763 | Baker | SINGLE | 1 | NATIVE | 0.76 | 0.00 | 0.00 | 0.76 | |
| 7300765 | Baker | SINGLE | 1 | NATIVE | 1.59 | 0.00 | 0.00 | 1.59 | |
| 7300771 | Baker | SINGLE | 1 | NATIVE | 0.08 | 0.00 | 0.00 | 0.08 | |
| 7300773 | Baker | SINGLE | 1 | NATIVE | 0.33 | 0.00 | 0.00 | 0.33 | |
| 7300774 | Baker | SINGLE | 1 | NATIVE | 0.72 | 0.00 | 0.00 | 0.72 | |
| 7300776 | Baker | SINGLE | 1 | NATIVE | 0.35 | 0.00 | 0.00 | 0.35 | |
| 7300780 | Baker | SINGLE | 1 | NATIVE | 0.51 | 0.00 | 0.00 | 0.51 | |
| 7300783 | Baker | SINGLE | 1 | NATIVE | 0.62 | 0.00 | 0.00 | 0.62 | |
| 7300785 | NFJD | SINGLE | 1 | NATIVE | 0.45 | 0.00 | 0.00 | 0.45 | |
| 7300795 | Baker | SINGLE | 1 | NATIVE | 0.50 | 0.00 | 0.00 | 0.50 | |
| 7300796 | Baker | SINGLE | 1 | NATIVE | 0.27 | 0.00 | 0.00 | 0.27 | |
| 7300800 | Baker | SINGLE | 1 | NATIVE | 0.18 | 0.00 | 0.00 | 0.18 | |

| Transportation System Haul Routes Alternative 2 and 3 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 7300820 | Baker | SINGLE | 1 | NATIVE | 0.15 | 0.00 | 0.00 | 0.15 | |
| 7300830 | Baker | SINGLE | 1 | NATIVE | 0.47 | 0.00 | 0.00 | 0.47 | |
| 7300835 | Baker | SINGLE | 2 | NATIVE | 0.19 | 0.19 | 0.00 | 0.00 | |
| 7300850 | Baker | SINGLE | 1 | NATIVE | 0.55 | 0.00 | 0.00 | 0.55 | |
| 7300850 | Baker | SINGLE | 1 | NATIVE | 0.13 | 0.00 | 0.00 | 0.13 | |
| 7300870 | Baker | SINGLE | 1 | NATIVE | 0.88 | 0.00 | 0.00 | 0.88 | |
| 7300900 | Baker | SINGLE | 1 | NATIVE | 0.34 | 0.00 | 0.00 | 0.34 | |
| 7300915 | Baker | SINGLE | 2 | NATIVE | 0.06 | 0.06 | 0.00 | 0.00 | |
| 7345040 | Baker | SINGLE | 1 | NATIVE | 1.97 | 0.00 | 0.00 | 1.97 | |
| 7350000 | NFJD | SINGLE | 2 | AGGREGATE | 4.02 | 4.02 | 0.00 | 0.00 | |
| 7350020 | NFJD | SINGLE | 2 | AGGREGATE | 0.84 | 0.00 | 0.00 | 0.84 | |
| 7350022 | NFJD | SINGLE | 2 | NATIVE | 0.21 | 0.00 | 0.00 | 0.21 | |
| 7350030 | NFJD | SINGLE | 2 | AGGREGATE | 0.87 | 0.00 | 0.00 | 0.87 | |
| 7350032 | NFJD | SINGLE | 2 | NATIVE | 0.21 | 0.00 | 0.00 | 0.21 | |
| 7350050 | NFJD | SINGLE | 2 | AGGREGATE | 1.05 | 0.00 | 0.00 | 1.05 | |
| 7350050 | NFJD | SINGLE | 2 | AGGREGATE | 0.95 | 0.00 | 0.00 | 0.95 | |
| 7350052 | NFJD | SINGLE | 1 | NATIVE | 0.76 | 0.00 | 0.00 | 0.76 | |
| 7350055 | NFJD | SINGLE | 2 | AGGREGATE | 0.72 | 0.00 | 0.00 | 0.72 | |
| 7350070 | NFJD | SINGLE | 1 | AGGREGATE | 1.83 | 0.00 | 0.00 | 1.83 | |
| 7350090 | NFJD | SINGLE | 1 | NATIVE | 0.12 | 0.00 | 0.00 | 0.12 | |
| 7355000 | Baker | SINGLE | 2 | NATIVE | 5.15 | 5.15 | 0.00 | 0.00 | |
| 7355010 | Baker | SINGLE | 2 | NATIVE | 0.23 | 0.23 | 0.00 | 0.00 | |
| 7355011 | Baker | SINGLE | 1 | NATIVE | 1.42 | 0.00 | 0.00 | 1.42 | |
| 7355015 | Baker | SINGLE | 2 | NATIVE | 0.74 | 0.74 | 0.00 | 0.00 | |
| 7355017 | Baker | SINGLE | 2 | NATIVE | 0.29 | 0.29 | 0.00 | 0.00 | |
| 7355020 | Baker | SINGLE | 2 | NATIVE | 1.01 | 1.01 | 0.00 | 0.00 | |
| 7355025 | Baker | SINGLE | 1 | NATIVE | 0.25 | 0.00 | 0.00 | 0.25 | |
| 7355061 | Baker | SINGLE | 2 | NATIVE | 0.06 | 0.06 | 0.00 | 0.00 | |
| 7355070 | Baker | SINGLE | 2 | NATIVE | 1.22 | 1.22 | 0.00 | 0.00 | |
| 7355085 | Baker | SINGLE | 2 | NATIVE | 0.22 | 0.22 | 0.00 | 0.00 | |

| Transportation System Haul Routes Alternative 2 and 3 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 7355085 | Baker | SINGLE | 1 | NATIVE | 1.30 | 0.00 | 0.00 | 1.30 | |
| 7355090 | Baker | SINGLE | 1 | NATIVE | 0.95 | 0.00 | 0.00 | 0.95 | |
| 7355096 | Baker | SINGLE | 1 | NATIVE | 0.57 | 0.00 | 0.00 | 0.57 | |
| 7355100 | Baker | SINGLE | 1 | NATIVE | 0.99 | 0.00 | 0.00 | 0.99 | |
| 7362000 | Baker | SINGLE | 1 | NATIVE | 2.15 | 0.00 | 0.00 | 2.15 | |
| 7366000 | Baker | SINGLE | 2 | PIT RUN | 2.23 | 2.23 | 0.00 | 0.00 | |
| 7366001 | 0616 | SINGLE | 1 | NATIVE | 0.76 | 0.00 | 0.00 | 0.76 | |
| 7366010 | Baker | SINGLE | 1 | NATIVE | 0.99 | 0.00 | 0.00 | 0.99 | |
| 7366012 | Baker | SINGLE | 1 | NATIVE | 0.74 | 0.00 | 0.00 | 0.74 | |
| 7366015 | Baker | SINGLE | 1 | NATIVE | 0.91 | 0.00 | 0.00 | 0.91 | |
| 7366015 | Baker | SINGLE | 2 | NATIVE | 0.31 | 0.31 | 0.00 | 0.00 | |
| 7366023 | Baker | SINGLE | 2 | NATIVE | 0.45 | 0.45 | 0.00 | 0.00 | |
| 7366040 | Baker | SINGLE | 2 | NATIVE | 2.67 | 2.67 | 0.00 | 0.00 | |
| 7366041 | Baker | SINGLE | 2 | NATIVE | 0.10 | 0.10 | 0.00 | 0.00 | |
| 7370000 | Baker | SINGLE | 2 | PIT RUN | 2.78 | 2.78 | 0.00 | 0.00 | |
| 7370000 | Baker | SINGLE | 2 | NATIVE | 1.09 | 1.09 | 0.00 | 0.00 | |
| 7370000 | Baker | SINGLE | 2 | PIT RUN | 2.88 | 2.88 | 0.00 | 0.00 | |
| 7370010 | Baker | SINGLE | 2 | NATIVE | 0.43 | 0.43 | 0.00 | 0.00 | |
| 7370015 | Baker | SINGLE | 2 | NATIVE | 0.56 | 0.56 | 0.00 | 0.00 | |
| 7370035 | Baker | SINGLE | 1 | NATIVE | 0.45 | 0.00 | 0.00 | 0.45 | |
| 7370037 | Baker | SINGLE | 1 | NATIVE | 0.93 | 0.00 | 0.00 | 0.93 | |
| 7370062 | Baker | SINGLE | 1 | NATIVE | 0.38 | 0.00 | 0.00 | 0.38 | |
| 7370065 | Baker | SINGLE | 1 | NATIVE | 0.41 | 0.00 | 0.00 | 0.41 | |
| 7370100 | Baker | SINGLE | 2 | NATIVE | 0.29 | 0.29 | 0.00 | 0.00 | |
| 7370100 | Baker | SINGLE | 1 | NATIVE | 1.18 | 0.00 | 0.00 | 1.18 | |
| 7370120 | Baker | SINGLE | 1 | NATIVE | 1.37 | 0.00 | 0.00 | 1.37 | |
| 7370120 | Baker | SINGLE | 1 | NATIVE | 0.49 | 0.00 | 0.00 | 0.49 | |
| 7370123 | Baker | SINGLE | 1 | NATIVE | 0.16 | 0.00 | 0.00 | 0.16 | |
| 7370130 | Baker | SINGLE | 1 | NATIVE | 1.03 | 0.00 | 0.00 | 1.03 | |
| 7370132 | Baker | SINGLE | 1 | NATIVE | 0.07 | 0.00 | 0.00 | 0.07 | |

| Transportation System Haul Routes Alternative 2 and 3 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 7370148 | Baker | SINGLE | 1 | NATIVE | 0.31 | 0.00 | 0.00 | 0.31 | |
| 7370150 | Baker | SINGLE | 2 | NATIVE | 2.73 | 2.73 | 0.00 | 0.00 | |
| 7370151 | Baker | SINGLE | 1 | NATIVE | 0.81 | 0.00 | 0.00 | 0.81 | |
| 7370158 | Baker | SINGLE | 1 | NATIVE | 0.20 | 0.00 | 0.00 | 0.20 | |
| 7370250 | Baker | SINGLE | 2 | NATIVE | 0.18 | 0.18 | 0.00 | 0.00 | |
| 7370400 | Baker | SINGLE | 1 | NATIVE | 0.94 | 0.00 | 0.00 | 0.94 | |
| 7375000 | Baker | SINGLE | 2 | AGGREGATE | 2.77 | 0.00 | 2.77 | 0.00 | |
| 7375000 | Unity | SINGLE | 2 | AGGREGATE | 2.67 | 0.00 | 2.67 | 0.00 | |
| 7375010 | Baker | SINGLE | 1 | NATIVE | 0.39 | 0.00 | 0.00 | 0.39 | |
| 7375011 | Baker | SINGLE | 1 | NATIVE | 0.17 | 0.00 | 0.00 | 0.17 | |
| 7375021 | Baker | SINGLE | 2 | NATIVE | 0.19 | 0.19 | 0.00 | 0.00 | |
| 7375130 | Unity | SINGLE | 2 | NATIVE | 1.51 | 0.00 | 1.51 | 0.00 | |
| 7375130 | Unity | SINGLE | 1 | NATIVE | 0.02 | 0.00 | 0.00 | 0.02 | |
| 7375130 | Unity | SINGLE | 1 | NATIVE | 1.89 | 0.00 | 0.00 | 1.89 | |
| 7375135 | Unity | SINGLE | 2 | NATIVE | 0.84 | 0.00 | 0.84 | 0.00 | |
| 7375137 | Unity | SINGLE | 1 | NATIVE | 2.02 | 0.00 | 0.00 | 2.02 | |
| 7375140 | Unity | SINGLE | 1 | NATIVE | 1.64 | 0.00 | 0.00 | 1.64 | |
| 7375160 | Unity | SINGLE | 2 | NATIVE | 3.78 | 3.78 | 0.00 | 0.00 | |
| 7380030 | Baker | SINGLE | 1 | NATIVE | 0.22 | 0.00 | 0.00 | 0.22 | |
| 7382250 | Baker | SINGLE | 1 | NATIVE | 0.53 | 0.00 | 0.00 | 0.53 | |
| 7386000 | Unity | SINGLE | 2 | NATIVE | 0.03 | 0.03 | 0.00 | 0.00 | |
| | | | | | **226.46** | **103.86** | **15.58** | **107.02** | |

**Table D-3: Miles of Temporary Roads for Alternative 2 and 3**

| Temporary Road Number | Miles |
|---|---|
| T1038 | 0.2 |
| T1038035 | 0.6 |
| T7350050 | 0.6 |
| T7300785 | 0.4 |
| T7350020 | 0.2 |
| T7350 | 0.4 |
| T7300796 | 1.0 |
| T1305097 | 0.2 |

| Temporary Road Number | Miles |
|---|---|
| T1970038 | 0.2 |
| T7370015 | 0.3 |
| T735509 | 0.2 |
| T7370123 | 0.4 |
| | **4.6** |

## Alternative 4

**Table D-4: Transportation System Haul Route Alternative 4**

| Transportation System Haul Route Alternative 4 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Road Number | Ranger Districts | LANES | Maintenance Level | SURFACING | Length | Open Miles | Seasonal Miles | Closed Miles | Comment |
| 1000000 | NFJD | DOUBLE | 4 | AGGREGATE | 12.62 | 12.62 | 0.00 | 0.00 | |
| 1000500 | NFJD | SINGLE | 2 | AGGREGATE | 3.89 | 3.89 | 0.00 | 0.00 | |
| 1000520 | NFJD | SINGLE | 1 | AGGREGATE | 1.95 | 0.00 | 0.00 | 1.95 | |
| 1000650 | NFJD | SINGLE | 1 | AGGREGATE | 0.48 | 0.00 | 0.00 | 0.48 | |
| 1010000 | NFJD | SINGLE | 2 | NATIVE | 5.85 | 5.85 | 0.00 | 0.00 | |
| 1010000 | NFJD | SINGLE | 2 | AGGREGATE | 1.36 | 1.36 | 0.00 | 0.00 | |
| 1010350 | NFJD | SINGLE | 2 | AGGREGATE | 0.60 | 0.60 | 0.00 | 0.00 | |
| 1010360 | NFJD | SINGLE | 2 | AGGREGATE | 0.20 | 0.00 | 0.00 | 0.20 | |
| 1030000 | NFJD | SINGLE | 2 | AGGREGATE | 0.79 | 0.79 | 0.00 | 0.00 | |
| 1030020 | NFJD | SINGLE | 2 | NATIVE | 0.92 | 0.92 | 0.00 | 0.00 | |
| 1030020 | NFJD | SINGLE | 2 | NATIVE | 0.68 | 0.00 | 0.00 | 0.68 | |
| 1030025 | NFJD | SINGLE | 2 | NATIVE | 1.08 | 0.00 | 0.00 | 1.08 | |
| 1030030 | NFJD | SINGLE | 2 | NATIVE | 0.39 | 0.00 | 0.00 | 0.39 | |
| 1031000 | NFJD | SINGLE | 2 | AGGREGATE | 4.62 | 4.62 | 0.00 | 0.00 | |
| 1031085 | NFJD | SINGLE | 1 | AGGREGATE | 0.39 | 0.00 | 0.00 | 0.39 | |
| 1031090 | NFJD | SINGLE | 1 | AGGREGATE | 0.43 | 0.00 | 0.00 | 0.43 | |
| 1031095 | NFJD | SINGLE | 1 | AGGREGATE | 0.24 | 0.00 | 0.00 | 0.24 | |
| 1035000 | NFJD | SINGLE | 2 | AGGREGATE | 5.76 | 5.76 | 0.00 | 0.00 | |
| 1035010 | NFJD | SINGLE | 2 | AGGREGATE | 0.29 | 0.29 | 0.00 | 0.00 | |
| 1035012 | NFJD | SINGLE | 2 | AGGREGATE | 0.81 | 0.00 | 0.00 | 0.81 | |
| 1035060 | NFJD | SINGLE | 1 | AGGREGATE | 1.93 | 0.00 | 0.00 | 1.93 | |

| Transportation System Haul Route Alternative 4 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1035062 | NFJD | SINGLE | 2 | NATIVE | 0.46 | 0.00 | 0.00 | 0.46 | |
| 1035063 | NFJD | SINGLE | 2 | NATIVE | 0.32 | 0.00 | 0.00 | 0.32 | |
| 1035080 | NFJD | SINGLE | 2 | AGGREGATE | 0.67 | 0.00 | 0.00 | 0.67 | |
| 1035080 | NFJD | SINGLE | 2 | AGGREGATE | 0.72 | 0.00 | 0.00 | 0.72 | |
| 1035084 | NFJD | SINGLE | 2 | NATIVE | 0.31 | 0.00 | 0.00 | 0.31 | |
| 1038000 | NFJD | SINGLE | 2 | AGGREGATE | 6.20 | 6.20 | 0.00 | 0.00 | |
| 1038010 | NFJD | SINGLE | 2 | NATIVE | 0.99 | 0.00 | 0.00 | 0.99 | |
| 1038011 | NFJD | SINGLE | 1 | NATIVE | 0.22 | 0.00 | 0.00 | 0.22 | |
| 1038021 | NFJD | SINGLE | 1 | NATIVE | 0.94 | 0.00 | 0.00 | 0.94 | |
| 1038030 | NFJD | SINGLE | 2 | AGGREGATE | 1.90 | 0.00 | 0.00 | 1.90 | |
| 1038041 | NFJD | SINGLE | 1 | NATIVE | 0.40 | 0.00 | 0.00 | 0.40 | |
| 1038042 | NFJD | SINGLE | 1 | NATIVE | 0.22 | 0.00 | 0.00 | 0.22 | |
| 1038050 | NFJD | SINGLE | 2 | NATIVE | 0.46 | 0.00 | 0.00 | 0.46 | |
| 1038060 | NFJD | SINGLE | 1 | AGGREGATE | 2.51 | 0.00 | 0.00 | 2.51 | |
| 1038061 | NFJD | SINGLE | 2 | NATIVE | 0.28 | 0.00 | 0.00 | 0.28 | |
| 1038062 | NFJD | SINGLE | 2 | NATIVE | 0.13 | 0.00 | 0.00 | 0.13 | |
| 1038090 | NFJD | SINGLE | 2 | NATIVE | 1.01 | 0.00 | 0.00 | 1.01 | |
| 1038110 | NFJD | SINGLE | 2 | NATIVE | 0.43 | 0.00 | 0.00 | 0.43 | |
| 1046000 | Unity | SINGLE | 2 | NATIVE | 0.01 | 0.01 | 0.00 | 0.00 | |
| 1300000 | NFJD | SINGLE | 2 | AGGREGATE | 0.66 | 0.00 | 0.66 | 0.00 | |
| 1305000 | Unity | SINGLE | 2 | PIT RUN | 4.57 | 4.57 | 0.00 | 0.00 | |
| 1305012 | Unity | SINGLE | 2 | NATIVE | 0.35 | 0.35 | 0.00 | 0.00 | |
| 1305014 | Unity | SINGLE | 2 | NATIVE | 0.76 | 0.76 | 0.00 | 0.00 | |
| 1305020 | Unity | SINGLE | 1 | NATIVE | 1.48 | 0.00 | 0.00 | 1.48 | |
| 1305021 | Unity | SINGLE | 1 | NATIVE | 0.90 | 0.00 | 0.00 | 0.90 | |
| 1305025 | Unity | SINGLE | 1 | NATIVE | 0.89 | 0.00 | 0.00 | 0.89 | |
| 1305048 | Unity | SINGLE | 2 | NATIVE | 0.08 | 0.08 | 0.00 | 0.00 | |
| 1305050 | Unity | SINGLE | 2 | NATIVE | 0.10 | 0.10 | 0.00 | 0.00 | |
| 1305080 | Unity | SINGLE | 2 | AGGREGATE | 0.05 | 0.05 | 0.00 | 0.00 | |
| 1305080 | Unity | SINGLE | 2 | NATIVE | 0.11 | 0.11 | 0.00 | 0.00 | |

| Transportation System Haul Route Alternative 4 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1305080 | Unity | SINGLE | 2 | PIT RUN | 1.78 | 1.78 | 0.00 | 0.00 | |
| 1305080 | Unity | SINGLE | 2 | PIT RUN | 0.42 | 0.42 | 0.00 | 0.00 | |
| 1305080 | Unity | SINGLE | 2 | NATIVE | 0.10 | 0.10 | 0.00 | 0.00 | |
| 1305080 | Unity | SINGLE | 2 | PIT RUN | 0.33 | 0.33 | 0.00 | 0.00 | |
| 1305082 | Unity | SINGLE | 2 | NATIVE | 0.13 | 0.13 | 0.00 | 0.00 | Repair Culvert |
| 1305083 | Unity | SINGLE | 2 | NATIVE | 0.16 | 0.16 | 0.00 | 0.00 | |
| 1305092 | Unity | SINGLE | 1 | NATIVE | 0.87 | 0.00 | 0.00 | 0.87 | |
| 1305096 | Unity | SINGLE | 2 | NATIVE | 0.38 | 0.38 | 0.00 | 0.00 | |
| 1305097 | Unity | SINGLE | 2 | NATIVE | 0.40 | 0.40 | 0.00 | 0.00 | |
| 1305098 | Unity | SINGLE | 1 | NATIVE | 0.26 | 0.00 | 0.00 | 0.26 | |
| 1305099 | Unity | SINGLE | 1 | NATIVE | 0.32 | 0.00 | 0.00 | 0.32 | |
| 1305100 | Unity | SINGLE | 2 | NATIVE | 0.34 | 0.34 | 0.00 | 0.00 | |
| 1305102 | Unity | SINGLE | 2 | NATIVE | 0.20 | 0.20 | 0.00 | 0.00 | |
| 1305102 | Unity | SINGLE | 1 | NATIVE | 1.62 | 0.00 | 0.00 | 1.62 | |
| 1305120 | Unity | SINGLE | 2 | NATIVE | 0.26 | 0.26 | 0.00 | 0.00 | |
| 1305125 | Unity | SINGLE | 2 | NATIVE | 1.06 | 1.06 | 0.00 | 0.00 | |
| 1305145 | Unity | SINGLE | 1 | NATIVE | 0.22 | 0.00 | 0.00 | 0.22 | |
| 1305145 | Unity | SINGLE | 1 | AGGREGATE | 0.25 | 0.00 | 0.00 | 0.25 | |
| 1305145 | Unity | SINGLE | 1 | NATIVE | 0.08 | 0.00 | 0.00 | 0.08 | |
| 1305145 | Unity | SINGLE | 1 | AGGREGATE | 0.12 | 0.00 | 0.00 | 0.12 | |
| 1305200 | Unity | SINGLE | 2 | NATIVE | 0.74 | 0.74 | 0.00 | 0.00 | |
| 1305205 | Unity | SINGLE | 2 | NATIVE | 0.21 | 0.21 | 0.00 | 0.00 | |
| 1305210 | Unity | SINGLE | 2 | NATIVE | 0.08 | 0.08 | 0.00 | 0.00 | |
| 1310000 | NFJD | SINGLE | 2 | AGGREGATE | 0.33 | 0.33 | 0.00 | 0.00 | |
| 1310000 | NFJD | SINGLE | 2 | NATIVE | 1.93 | 1.93 | 0.00 | 0.00 | |
| 1310000 | NFJD | SINGLE | 2 | NATIVE | 1.78 | 1.78 | 0.00 | 0.00 | |
| 1310025 | NFJD | SINGLE | 1 | NATIVE | 0.41 | 0.00 | 0.00 | 0.41 | |
| 1900000 | Unity | SINGLE | 2 | PIT RUN | 1.25 | 0.00 | 0.22 | 0.00 | |
| 1900000 | Unity | SINGLE | 2 | NATIVE | 1.93 | 0.00 | 1.81 | 0.00 | |
| 1900660 | Unity | SINGLE | 1 | NATIVE | 0.63 | 0.00 | 0.00 | 0.63 | |

| Transportation System Haul Route Alternative 4 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1900662 | Unity | SINGLE | 1 | NATIVE | 1.10 | 0.00 | 0.00 | 1.10 | |
| 1900690 | Unity | SINGLE | 1 | NATIVE | 1.56 | 0.00 | 0.00 | 1.56 | |
| 1900710 | Unity | SINGLE | 1 | NATIVE | 0.75 | 0.00 | 0.00 | 0.75 | |
| 1970000 | Unity | SINGLE | 1 | NATIVE | 3.36 | 0.00 | 0.00 | 3.36 | |
| 1970000 | Unity | SINGLE | 1 | NATIVE | 1.33 | 0.00 | 0.00 | 1.33 | |
| 1970000 | Unity | SINGLE | 1 | NATIVE | 2.40 | 0.00 | 0.00 | 2.40 | |
| 1970000 | Unity | SINGLE | 1 | NATIVE | 0.76 | 0.00 | 0.00 | 0.76 | |
| 1970000 | Unity | SINGLE | 1 | NATIVE | 1.66 | 0.00 | 0.00 | 1.66 | |
| 1970035 | Unity | SINGLE | 1 | NATIVE | 0.77 | 0.00 | 0.00 | 1.18 | |
| 1970038 | Unity | SINGLE | 1 | NATIVE | 1.99 | 0.00 | 0.00 | 1.99 | |
| 1970165 | Unity | SINGLE | 1 | NATIVE | 1.14 | 0.00 | 0.00 | 1.14 | |
| 7300000 | Baker | DOUBLE | 5 | PAVED | 5.08 | 0.00 | 5.08 | 0.00 | |
| 7300590 | NFJD | SINGLE | 2 | NATIVE | 0.61 | 0.00 | 0.00 | 0.61 | |
| 7300590 | NFJD | SINGLE | 2 | NATIVE | 0.31 | 0.00 | 0.00 | 0.31 | |
| 7300600 | NFJD | SINGLE | 1 | AGGREGATE | 0.58 | 0.00 | 0.00 | 0.58 | |
| 7300650 | Baker | SINGLE | 1 | NATIVE | 0.37 | 0.00 | 0.00 | 0.37 | |
| 7300700 | Baker | SINGLE | 2 | NATIVE | 1.41 | 1.41 | 0.00 | 0.00 | |
| 7300720 | Baker | SINGLE | 2 | NATIVE | 0.44 | 0.44 | 0.00 | 0.00 | |
| 7300720 | Baker | SINGLE | 2 | AGGREGATE | 0.73 | 0.73 | 0.00 | 0.00 | |
| 7300720 | Baker | SINGLE | 2 | NATIVE | 0.92 | 0.92 | 0.00 | 0.00 | |
| 7300720 | Baker | SINGLE | 1 | NATIVE | 1.86 | 0.00 | 0.00 | 1.86 | |
| 7300725 | Baker | SINGLE | 1 | NATIVE | 0.23 | 0.00 | 0.00 | 0.23 | |
| 7300735 | Baker | SINGLE | 1 | NATIVE | 0.31 | 0.00 | 0.00 | 0.31 | |
| 7300755 | Baker | SINGLE | 2 | NATIVE | 4.27 | 4.27 | 0.00 | 0.00 | |
| 7300760 | Baker | SINGLE | 1 | NATIVE | 3.84 | 0.00 | 0.00 | 3.84 | |
| 7300763 | Baker | SINGLE | 1 | NATIVE | 0.76 | 0.00 | 0.00 | 0.76 | |
| 7300765 | Baker | SINGLE | 1 | NATIVE | 1.59 | 0.00 | 0.00 | 1.59 | |
| 7300771 | Baker | SINGLE | 1 | NATIVE | 0.08 | 0.00 | 0.00 | 0.08 | |
| 7300773 | Baker | SINGLE | 1 | NATIVE | 0.33 | 0.00 | 0.00 | 0.33 | |
| 7300774 | Baker | SINGLE | 1 | NATIVE | 0.72 | 0.00 | 0.00 | 0.72 | |

| Transportation System Haul Route Alternative 4 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 7300776 | Baker | SINGLE | 1 | NATIVE | 0.35 | 0.00 | 0.00 | 0.35 | |
| 7300780 | Baker | SINGLE | 1 | NATIVE | 0.51 | 0.00 | 0.00 | 0.51 | |
| 7300783 | Baker | SINGLE | 1 | NATIVE | 0.62 | 0.00 | 0.00 | 0.62 | |
| 7300795 | Baker | SINGLE | 1 | NATIVE | 0.50 | 0.00 | 0.00 | 0.50 | |
| 7300796 | Baker | SINGLE | 1 | NATIVE | 0.27 | 0.00 | 0.00 | 0.27 | |
| 7300800 | Baker | SINGLE | 1 | NATIVE | 0.18 | 0.00 | 0.00 | 0.18 | |
| 7300820 | Baker | SINGLE | 1 | NATIVE | 0.15 | 0.00 | 0.00 | 0.15 | |
| 7300830 | Baker | SINGLE | 1 | NATIVE | 0.47 | 0.00 | 0.00 | 0.47 | |
| 7300835 | Baker | SINGLE | 2 | NATIVE | 0.19 | 0.19 | 0.00 | 0.00 | |
| 7300850 | Baker | SINGLE | 1 | NATIVE | 0.55 | 0.00 | 0.00 | 0.55 | |
| 7300850 | Baker | SINGLE | 1 | NATIVE | 0.13 | 0.00 | 0.00 | 0.13 | |
| 7300870 | Baker | SINGLE | 1 | NATIVE | 0.88 | 0.00 | 0.00 | 0.88 | |
| 7300900 | Baker | SINGLE | 1 | NATIVE | 0.34 | 0.00 | 0.00 | 0.34 | |
| 7300915 | Baker | SINGLE | 2 | NATIVE | 0.06 | 0.06 | 0.00 | 0.00 | |
| 7345040 | Baker | SINGLE | 1 | NATIVE | 1.97 | 0.00 | 0.00 | 1.97 | |
| 7350000 | NFJD | SINGLE | 2 | AGGREGATE | 4.02 | 4.02 | 0.00 | 0.00 | |
| 7350050 | NFJD | SINGLE | 2 | AGGREGATE | 1.05 | 0.00 | 0.00 | 1.05 | |
| 7350050 | NFJD | SINGLE | 2 | AGGREGATE | 0.95 | 0.00 | 0.00 | 0.95 | |
| 7350052 | NFJD | SINGLE | 1 | NATIVE | 0.76 | 0.00 | 0.00 | 0.76 | |
| 7350055 | NFJD | SINGLE | 2 | AGGREGATE | 0.72 | 0.00 | 0.00 | 0.72 | |
| 7350070 | NFJD | SINGLE | 1 | AGGREGATE | 1.83 | 0.00 | 0.00 | 1.83 | |
| 7350090 | NFJD | SINGLE | 1 | NATIVE | 0.12 | 0.00 | 0.00 | 0.12 | |
| 7355000 | Baker | SINGLE | 2 | NATIVE | 5.15 | 5.15 | 0.00 | 0.00 | |
| 7355010 | Baker | SINGLE | 2 | NATIVE | 0.23 | 0.23 | 0.00 | 0.00 | |
| 7355011 | Baker | SINGLE | 1 | NATIVE | 1.42 | 0.00 | 0.00 | 1.42 | |
| 7355015 | Baker | SINGLE | 2 | NATIVE | 0.74 | 0.74 | 0.00 | 0.00 | |
| 7355017 | Baker | SINGLE | 2 | NATIVE | 0.29 | 0.29 | 0.00 | 0.00 | |
| 7355020 | Baker | SINGLE | 2 | NATIVE | 1.01 | 1.01 | 0.00 | 0.00 | |
| 7355061 | Baker | SINGLE | 2 | NATIVE | 0.06 | 0.06 | 0.00 | 0.00 | |
| 7355070 | Baker | SINGLE | 2 | NATIVE | 1.22 | 1.22 | 0.00 | 0.00 | |

| Transportation System Haul Route Alternative 4 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 7355085 | Baker | SINGLE | 2 | NATIVE | 0.22 | 0.22 | 0.00 | 0.00 | |
| 7355085 | Baker | SINGLE | 1 | NATIVE | 1.30 | 0.00 | 0.00 | 1.30 | |
| 7355090 | Baker | SINGLE | 1 | NATIVE | 0.95 | 0.00 | 0.00 | 0.95 | |
| 7355096 | Baker | SINGLE | 1 | NATIVE | 0.57 | 0.00 | 0.00 | 0.57 | |
| 7362000 | Baker | SINGLE | 1 | NATIVE | 2.15 | 0.00 | 0.00 | 2.15 | |
| 7366000 | Baker | SINGLE | 2 | PIT RUN | 2.23 | 2.23 | 0.00 | 0.00 | |
| 7366001 | 0616 | SINGLE | 1 | NATIVE | 0.76 | 0.00 | 0.00 | 0.76 | |
| 7366010 | Baker | SINGLE | 1 | NATIVE | 0.99 | 0.00 | 0.00 | 0.99 | |
| 7366015 | Baker | SINGLE | 1 | NATIVE | 0.91 | 0.00 | 0.00 | 0.91 | |
| 7366015 | Baker | SINGLE | 2 | NATIVE | 0.31 | 0.31 | 0.00 | 0.00 | |
| 7366023 | Baker | SINGLE | 2 | NATIVE | 0.45 | 0.45 | 0.00 | 0.00 | |
| 7366040 | Baker | SINGLE | 2 | NATIVE | 2.67 | 2.67 | 0.00 | 0.00 | |
| 7370000 | Baker | SINGLE | 2 | PIT RUN | 2.78 | 2.78 | 0.00 | 0.00 | |
| 7370000 | Baker | SINGLE | 2 | NATIVE | 1.09 | 1.09 | 0.00 | 0.00 | |
| 7370000 | Baker | SINGLE | 2 | PIT RUN | 2.88 | 2.88 | 0.00 | 0.00 | |
| 7370010 | Baker | SINGLE | 2 | NATIVE | 0.43 | 0.43 | 0.00 | 0.00 | |
| 7370015 | Baker | SINGLE | 2 | NATIVE | 0.56 | 0.56 | 0.00 | 0.00 | |
| 7370035 | Baker | SINGLE | 1 | NATIVE | 0.45 | 0.00 | 0.00 | 0.45 | |
| 7370037 | Baker | SINGLE | 1 | NATIVE | 0.93 | 0.00 | 0.00 | 0.93 | |
| 7370100 | Baker | SINGLE | 2 | NATIVE | 0.29 | 0.29 | 0.00 | 0.00 | |
| 7370100 | Baker | SINGLE | 1 | NATIVE | 1.18 | 0.00 | 0.00 | 1.18 | |
| 7370120 | Baker | SINGLE | 1 | NATIVE | 1.37 | 0.00 | 0.00 | 1.37 | |
| 7370120 | Baker | SINGLE | 1 | NATIVE | 0.49 | 0.00 | 0.00 | 0.49 | |
| 7370123 | Baker | SINGLE | 1 | NATIVE | 0.16 | 0.00 | 0.00 | 0.16 | |
| 7370130 | Baker | SINGLE | 1 | NATIVE | 1.03 | 0.00 | 0.00 | 1.03 | |
| 7370132 | Baker | SINGLE | 1 | NATIVE | 0.07 | 0.00 | 0.00 | 0.07 | |
| 7370148 | Baker | SINGLE | 1 | NATIVE | 0.31 | 0.00 | 0.00 | 0.31 | |
| 7370150 | Baker | SINGLE | 2 | NATIVE | 2.73 | 2.73 | 0.00 | 0.00 | |
| 7370151 | Baker | SINGLE | 1 | NATIVE | 0.81 | 0.00 | 0.00 | 0.81 | |
| 7370158 | Baker | SINGLE | 1 | NATIVE | 0.20 | 0.00 | 0.00 | 0.20 | |

| Transportation System Haul Route Alternative 4 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 7370250 | Baker | SINGLE | 2 | NATIVE | 0.18 | 0.18 | 0.00 | 0.00 | |
| 7370400 | Baker | SINGLE | 1 | NATIVE | 0.94 | 0.00 | 0.00 | 0.94 | |
| 7375000 | Baker | SINGLE | 2 | AGGREGATE | 2.77 | 0.00 | 2.77 | 0.00 | |
| 7375000 | Unity | SINGLE | 2 | AGGREGATE | 2.67 | 0.00 | 2.67 | 0.00 | |
| 7375010 | Baker | SINGLE | 1 | NATIVE | 0.39 | 0.00 | 0.00 | 0.39 | |
| 7375011 | Baker | SINGLE | 1 | NATIVE | 0.17 | 0.00 | 0.00 | 0.17 | |
| 7375021 | Baker | SINGLE | 2 | NATIVE | 0.19 | 0.19 | 0.00 | 0.00 | |
| 7375130 | Unity | SINGLE | 2 | NATIVE | 1.51 | 0.00 | 1.51 | 0.00 | |
| 7375130 | Unity | SINGLE | 1 | NATIVE | 0.02 | 0.00 | 0.00 | 0.02 | |
| 7375130 | Unity | SINGLE | 1 | NATIVE | 1.89 | 0.00 | 0.00 | 1.89 | |
| 7375135 | Unity | SINGLE | 2 | NATIVE | 0.84 | 0.00 | 0.84 | 0.00 | |
| 7375137 | Unity | SINGLE | 1 | NATIVE | 2.02 | 0.00 | 0.00 | 2.02 | |
| 7375140 | Unity | SINGLE | 1 | NATIVE | 1.64 | 0.00 | 0.00 | 1.64 | |
| 7375160 | Unity | SINGLE | 2 | NATIVE | 3.78 | 3.78 | 0.00 | 0.00 | |
| 7380030 | Baker | SINGLE | 1 | NATIVE | 0.22 | 0.00 | 0.00 | 0.22 | |
| 7382250 | Baker | SINGLE | 1 | NATIVE | 0.53 | 0.00 | 0.00 | 0.53 | |
| 7386000 | Unity | SINGLE | 2 | NATIVE | 0.03 | 0.03 | 0.00 | 0.00 | |
| | | | | | **210.25** | **101.11** | **15.58** | **93.56** | |

**Table D-5: Miles of Temporary Roads in Alternative 4**

| Temporary Road Number | Miles |
|---|---|
| T1038 | 0.2 |
| T1038035 | 0.6 |
| T7350050 | 0.6 |
| T7300785 | 0.0 |
| T7350020 | 0.0 |
| T7350 | 0.0 |
| T7300796 | 1.0 |
| T1305097 | 0.2 |
| T1970038 | 0.2 |
| T7370015 | 0.3 |
| T735509 | 0.0 |
| T7370123 | 0.4 |
| | **3.5** |