United States Department of Agriculture
Forest Service

January 2015

Junction Vegetation Management Project

Environmental Assessment

Bend-Fort Rock Ranger District, Deschutes National Forest
Deschutes County, Oregon

Township 20 South, Range 9 East, Sections 1, 12, 13, 24, 25; T20S, R10E sections 3, 5-11, 14-22, 27-31; and T19S, R10E, sections 28-33; Willamette Meridian

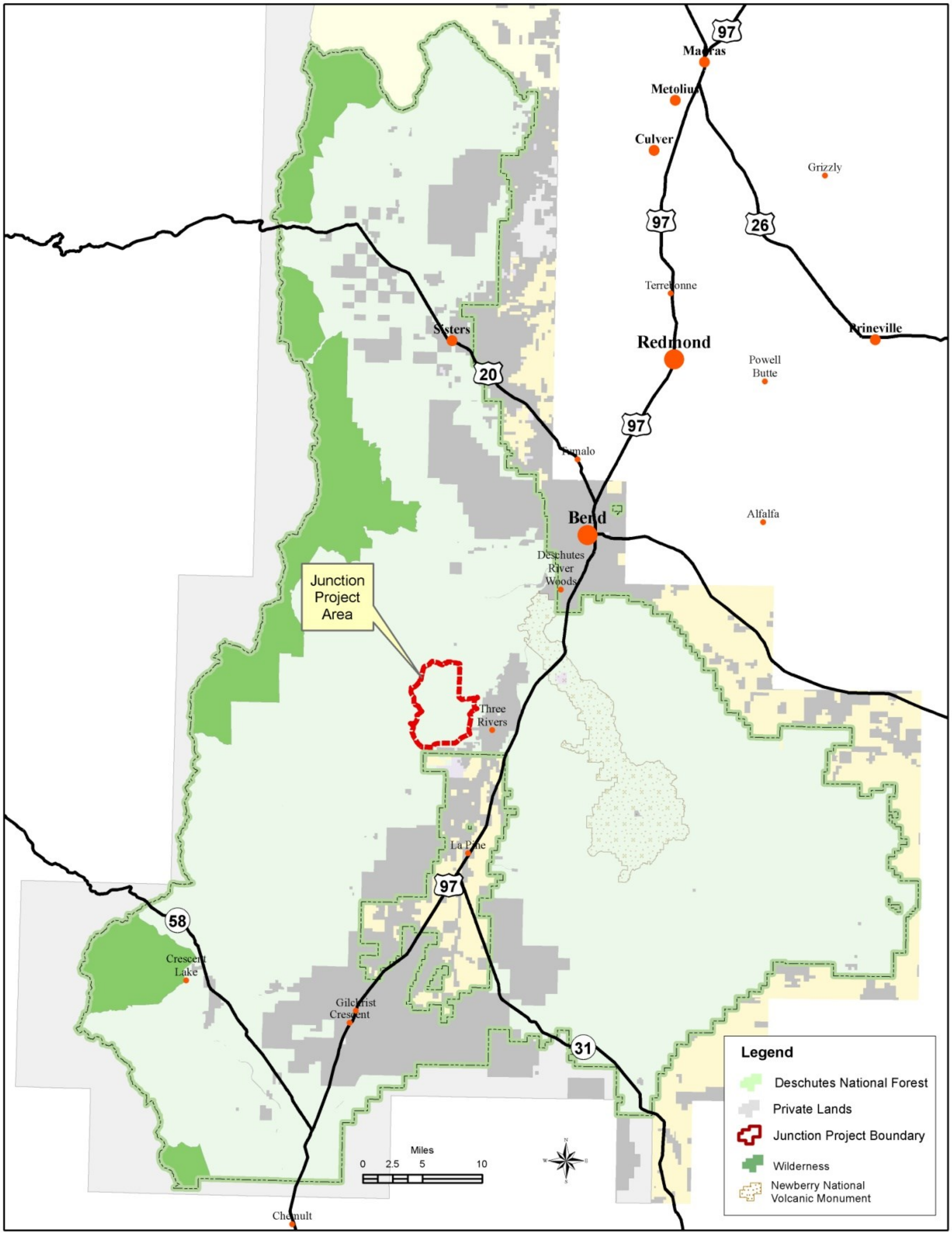


Figure 1: Junction Vegetation Management Project vicinity within the Deschutes National Forest.

Table of Contents

Chapter 1: Purpose and Need for Action

1.1 Introduction and Background

The Bend-Fort Rock Ranger District of the Deschutes National Forest has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. This environmental assessment (EA) discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and any other alternative, including a no action alternative. Additional documentation, including more detailed analyses of project area resources, may be found in the project planning record located at the Bend-Fort Rock Ranger District in Bend, Oregon.

The purpose of this EA is to evaluate the potential effects of proposed activities that are designed to address forest health and fuels issues as well as timber production objectives. The 17,556 acre Junction Vegetation Management project area is located approximately 15 air miles southwest of the City of Bend and less than 5 miles west of the community of Sunriver (Figure 1). The project area is located within portions of the Spring River, Fall River and Deschutes Braid-Deschutes River subwatersheds (12th field) within the Fall River-Deschutes River watershed (10th field). Major roads that cross the project area include Forest Roads 40, 42, and 45 (figure 2). The legal location for this project are T20S, R9E sections 1, 12, 13, 24, 25; T20S, R10E sections 3, 5-11, 14-22, 27-31; and T19S, R10E, sections 28-33, Willamette Meridian.

Across most of the project area lodgepole pine is the dominant stand type (70%), due mostly to the relatively flat topography which creates cold conditions. Most of the lodgepole pine stands have been managed in the past creating a mosaic of predominantly younger stands interspersed with older stands. Records of management date back to the 1960s. Most of the past activities within lodgepole stands involved salvage harvest. Ponderosa pine occurs on small buttes and where there is more topography such as Pistol and Sitkum Buttes (see Figure 1 and figure 2). Many ponderosa pine stands include trees of all size classes. Large numbers of understory trees and a heavy brush component compete with the older, generally larger trees for moisture and nutrients. All ponderosa pine stands have been previously entered with the exception of Pistol Butte.

The majority of the area is within the General Forest management allocation where the primary goal is to emphasize timber production while providing forage production, visual quality, wildlife habitat, and recreational opportunities. The objective in General Forest is to continue to convert unmanaged stands to managed stands and manage the forest to have stands in a variety of age classes with all stands utilizing the site growth potential (LRMP p. 4-117).

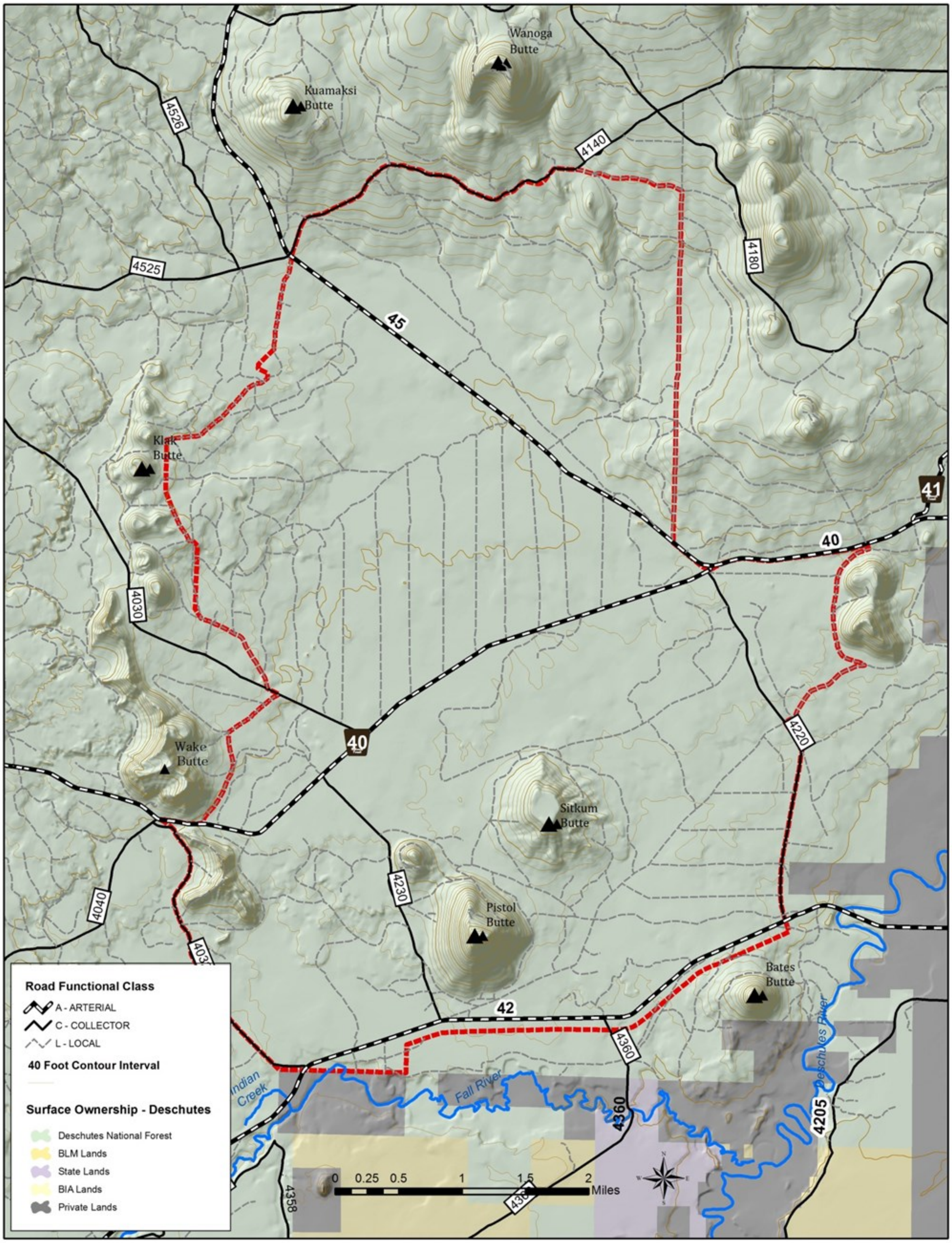


Figure 2: Map of Junction project area displaying buttes, elevation contours, roads, and proximity of Fall River and Deschutes River.

Current Conditions

The project area is relatively flat, interspersed with scattered buttes, and is dominated by stands of lodgepole pine. Due to past harvest activities, stands of younger structural stages are common throughout the area intermixed with other age classes. Salvage harvest took place across much of the lodgepole pine that was killed by mountain pine beetle. The remaining green overstory is infected with dwarf mistletoe. Where understories are developing, they are being infected by overstory dwarf mistletoe. Unmanaged stands of lodgepole pine have experienced and continue to experience mortality associated with mountain pine beetle activity. In many lodgepole pine stands, stand growth and vigor have declined and stand structure and integrity are being affected by increasing mortality. Ponderosa pine stands are experiencing declining growth rates and increasing levels of stress also increasing the risk of bark beetle infestations. Suppressed, overstocked trees are more susceptible to insect and disease attacks and overstocked stands could result in higher levels of mortality which could also increase hazardous fuel levels.

Over 70% of the project area is currently rated at extreme for fire hazard. In the event of wildfire, this creates conditions of high flame length and crown fire potential and an inability for direct suppression by firefighters. Major routes provide access to the western part of the district include Forest Roads 40, 42, and 45. These roads serve as travel routes for forest users to access the lakes and resorts along the Cascade Lakes Highway and access to Mt. Bachelor. The Upper Deschutes Community Wildfire Protection Plan (CWPP) has also designated these routes as critical transportation corridors, so safe ingress and egress is important. Forest stands that border these routes are dense and lack stand development. If current conditions continue, these overstocked stands increase the likelihood of stand loss to insect and disease mortality and/or wildfire. Defensible space along access routes is currently not provided, which limit where firefighters could safely engage in wildfire suppression actions in the event of a wildfire. Two of these major routes (FSR 40 and 42) are also Scenic Views management areas (

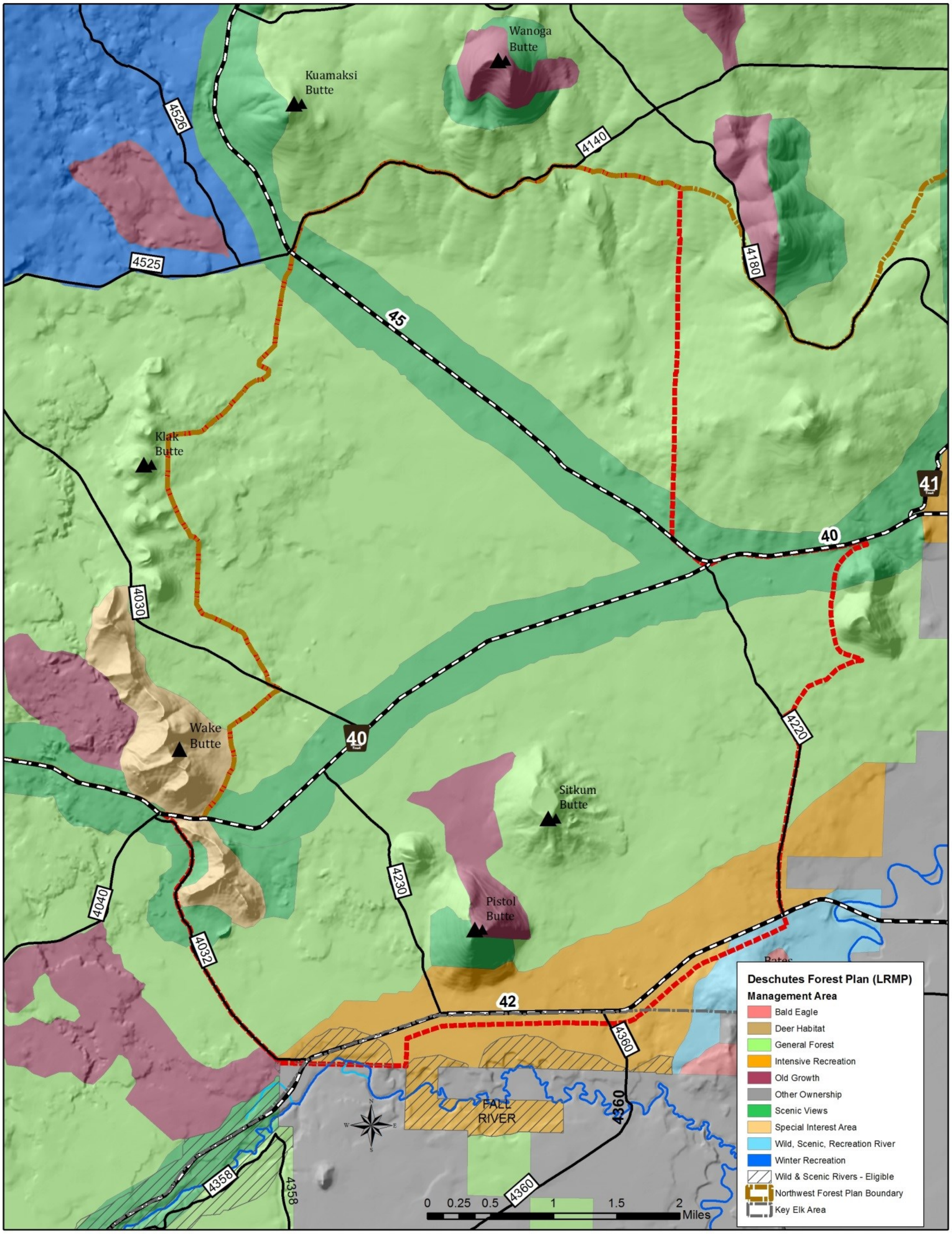


Figure **3**). Forest Plan objectives for Scenic Views are not being met because the area lacks visual diversity; stands are overstocked, of uniform age, species compositions, and size classes.

Just south of the 42 Road, about 0.2 mile of Fall River dips into the project area (figure 2). The forest along this piece of the river is similar to surrounding forests, where high density poses a risk of losing trees that provide shade.

Known populations of Castilleja chlorotica (green-tinged paintbrush), listed on the Region 6 Forester's Sensitive Plant List (May 13, 1999), is found within the planning area. This area is the primary population core for this species on the west side of this Bend/Ft. Rock Ranger District. Ideal habitat for green-tinged paintbrush (GTPB) is grassy forest openings in ponderosa, lodgepole pine, or mixed conifer stands. Green-tinged paintbrush has also been found in non-forested sagebrush-bitterbrush plant types. Existing stand and fuels conditions do not provide ideal habitat for this species.

Stands on Pistol Butte, which are within and adjacent to an Old Growth Management Area contain high stand densities and multiple canopy layers increasing the susceptibility to insect and disease outbreaks and the risk of a high intensity stand replacement fire.

Wake Butte Special Interest Area (SIA) – Vegetative conditions within the Wake Butte SIA are currently overstocked in the understory and mid-layers. These conditions make stands increasingly more susceptible for a surface fire to transition to a crown fire thus increasing the loss of this unique vegetation that characterizes this SIA.

According to the Forest Plan the three most important industries in the local area are agriculture, wood products manufacturing, and recreation and tourism. Approximately 84% of Deschutes County is managed by the Forest Service and BLM making wood products an important source of local jobs and revenue for Central Oregon. According to the Oregon Emplyment Department, the wood product manufacturing industry experienced large employment losses during the recession. Employment in the industry remains lower than before the recession.

1.2 Purpose and Need

The overall objective of this project is to meet Forest Plan goals and create landscape-level vegetative conditions that reflect historic vegetation and disturbance patterns and scales that can be maintained over time.

In the Junction project area, there is a need to:

- Reduce stocking in ponderosa pine stands to increase vigor and resilience to insects, disease, and wildfire;
- Address forest health and fuel issues in lodgepole pine stands by releasing the understory to grow healthy without infection of dwarf mistletoe from overstory and to increase vigor.
- Reduce hazardous fuels to protect values at risk to wildfire such as scenic corridors, critical transportation routes, public safety, Old Growth management Areas, and unique plant and wildlife habitats; and
- Contribute forest products, including commercial and small tree material to local and regional economies.

1.3 Management Direction

Deschutes National Forest Land and Resource Management Plan (LRMP), 1990

This environmental assessment is tiered to the Final Environmental Impact Statement (FEIS) for the Deschutes National Forest Land and Resource Management Plan 1990, as amended. The Forest Plan guides all management activities on the Forest. It establishes overall goals and objectives, and standards and guidelines for proposed activities, including specific management area guidance for resource planning. Major plan amendments relevant to this project include:

The Revised Interim Management Direction Establishing Riparian, Ecosystem, and Wildlife Standards for Timber Sales, as signed on May 20, 1994, which provides additional standards and guidelines (USDA, 1994, and commonly known as the Eastside Screens). The Eastside Screens amendment was the result of a large-scale planning effort to determine the best approach for maintaining future options concerning wildlife habitat associated with late and old structural stages, fish habitat, and old forest abundance. The Eastside Screens contain guidelines for management of timber sales in Late Old Structure (LOS) relative to the Historic Range of Variability (HRV), wildlife corridors, snags, coarse woody debris, and goshawk management. With new peer reviewed science providing new direction, the Regional Forester has encouraged the consideration of Forest Plan amendments in cases where the proposed treatments would move landscape conditions towards HRV. The Eastside Screen amendment was intended as interim direction in 1995, it remains an applicable amendment to the Deschutes LRMP.

Inland Native Fish Strategy (INFISH), as signed in 1995, which provides additional riparian standards and guidelines. INFISH delineated Riparian Habitat Conservation Areas (RHCAs) for riparian-dependent resources to receive primary emphasis. These RHCAs include traditional riparian corridors, wetlands, intermittent streams, and other areas that help maintain the integrity of aquatic ecosystems. These areas are to be managed to maintain or restore water quality, stream channel integrity, channel processes, sediment regimes, instream flows, diversity and productivity of plan communities in riparian zones, and riparian and aquatic habitat to foster unique genetic fish stocks that evolved within the specific region. The standard widths for RHCAs from INFISH that are applicable to this project would be adopted.

This project lies east of the spotted owl range and therefore is not under jurisdiction of the Northwest Forest Plan.

The LRMP provides management direction for the Forest it includes management goals and objectives and standards and guidelines, both forest-wide and specific to land allocations. Management areas within the Junction project area are described in the following table.

Table 1: Deschutes LRMP Management Areas

Management Area	Goals / Objectives	Acres
General Forest **MA-8**	The primary goal of this management area is to emphasize timber production while providing forage production, visual quality, wildlife habitat and recreational opportunities for public use and enjoyment. The objective is to continue to convert unmanaged stands to managed stands and manage the forest to have stands in a variety of age classes with all stands utilizing the site growth potential (LRMP, page 4-117). This is achieved through stand treatments which include (but are not limited to) controlling stocking levels; maintaining satisfactory growth rates; protecting stands from insects, disease, and damage; controlling species composition; and regenerating stands that are no longer capable of optimum growth performance. Direction for silviculture treatments is outlined in the Forest Wide Standards and Guidelines for Timber Management (TM-1 to TM-68, LRMP pg. 4-37 to 4-49). These guidelines cover the requirements for silvicultural prescriptions; direction for uneven-aged management; management of advanced and natural regeneration; species preference; diversity of plant and animal communities;	**12,264**

	and horizontal, vertical, and species diversity of stands.	
Scenic Views **MA-9**	The primary goal of this management area is to provide high quality scenery representing the natural character of Central Oregon. Landscapes seen from selected travel routes and use areas would be managed to maintain or enhance their appearance. To the casual observer, results of activities either would not be evident or would be visually subordinate to the natural landscape (LRMP, page 4/121). A small amount of foreground and middleground scenic views are present within this project area. Landscapes would be enhanced by opening views; programmed timber harvest is permitted to improve the visual quality of the stands. Timber stands, which have remained unmanaged in the past because of their visual sensitivity, would begin receiving treatments to avoid loss of stand to natural causes. Negative visual impacts such as skid roads or activity residue would be rehabilitated.	**3,296**
Intensive Recreation **MA-11**	In this management area, the objective is to provide a wide variety of recreation opportunities such as, but not limited to, activities dependent on various intensities of development (LRMP, page 4-135). Facilities and sights and sounds of humans would be evident. Generally, high concentrations of visitors would occur around developments and fewer numbers would occur outside developments. Expect frequent encounters between visitors. Fall River provides recreational opportunities within the project area.	**1,380**
Old Growth **MA-15**	The objective in this management area is to manage old growth forests to provide 1) large trees; 2) abundant standing and downed dead trees; and 3) vertical structure that would maintain the historic range (LRMP, page 4-149). Direction for maintaining and enhancing the old growth ecosystems is outlined in the Forest Wide Standards and Guidelines for Forest Health (FH-1 to FH8, LRMP pg. 4-36, 37). These guidelines cover management strategies that would maintain and enhance the vigor of old growth area through the control of forest pests.	**384**
Wake Butte Special Interest Area **MA-1**	In this management area, the goal is to preserve and provide interpretation of unique geological, biological, and cultural areas for education, scientific, and public enjoyment purposes. Unusual geological or biological sites and areas are preserved and managed for education and research. The primary benefiting uses of these areas would be for developed and dispersed recreation, research, and educational opportunities. Vegetation management will be allowed when necessary to meet objectives of the special interest area. The Forest Plan identifies this SIA where protection of vegetation is important, and provides guidance for management activities that are appropriate to achieving that goal (LRMP 4-91)	**203**
Upper Deschutes Wild and Scenic River Corridor	The Upper Deschutes Wild and Scenic River and State Scenic Waterway Comprehensive Management Plan provides direction for protection and enhancement of the Outstandingly Remarkable Values (ORVs). ORVs are geologic, fishery, vegetation, cultural, and recreation.	**29**
	Total	**17,556**
Wild and Scenic Rivers MA-17	This management direction pertains to a ¼ mile wide corridor along Fall River, which has been determined to be eligible for consideration as a Wild and Scenic River. The goal for this management area is to protect and enhance	**108**

	those outstandingly remarkable values of qualified segments of rivers for the inclusion in the National Wild and Scenic Rivers System. The standards and guides (S&G) for this area serve as an interim direction until a formal river corridor management plan is completed. The ¼ mile wide corridor overlaps about 108 acres of the Intensive Recreation MA between Highway 42 and the project area boundary (Figure 3).	

Community Wildfire Protection Plan

Deschutes National Forest lands within the Junction project area which border Three Rivers subdivision, Big River subdivision, and Fall River Estates are categorized as Wildland Urban Interface (WUI). The East/West Deschutes County and Upper Deschutes Community Wildfire Protection Plans (CWPPs) were developed collaboratively and have specific guidance for federal lands within the Junction area. In addition to treating within the WUI, critical transportation routes or ingress/egress that could serve as escape route from communities at risk are also to be treated. In the Junction project area, these routes are County Roads 40 and 45.

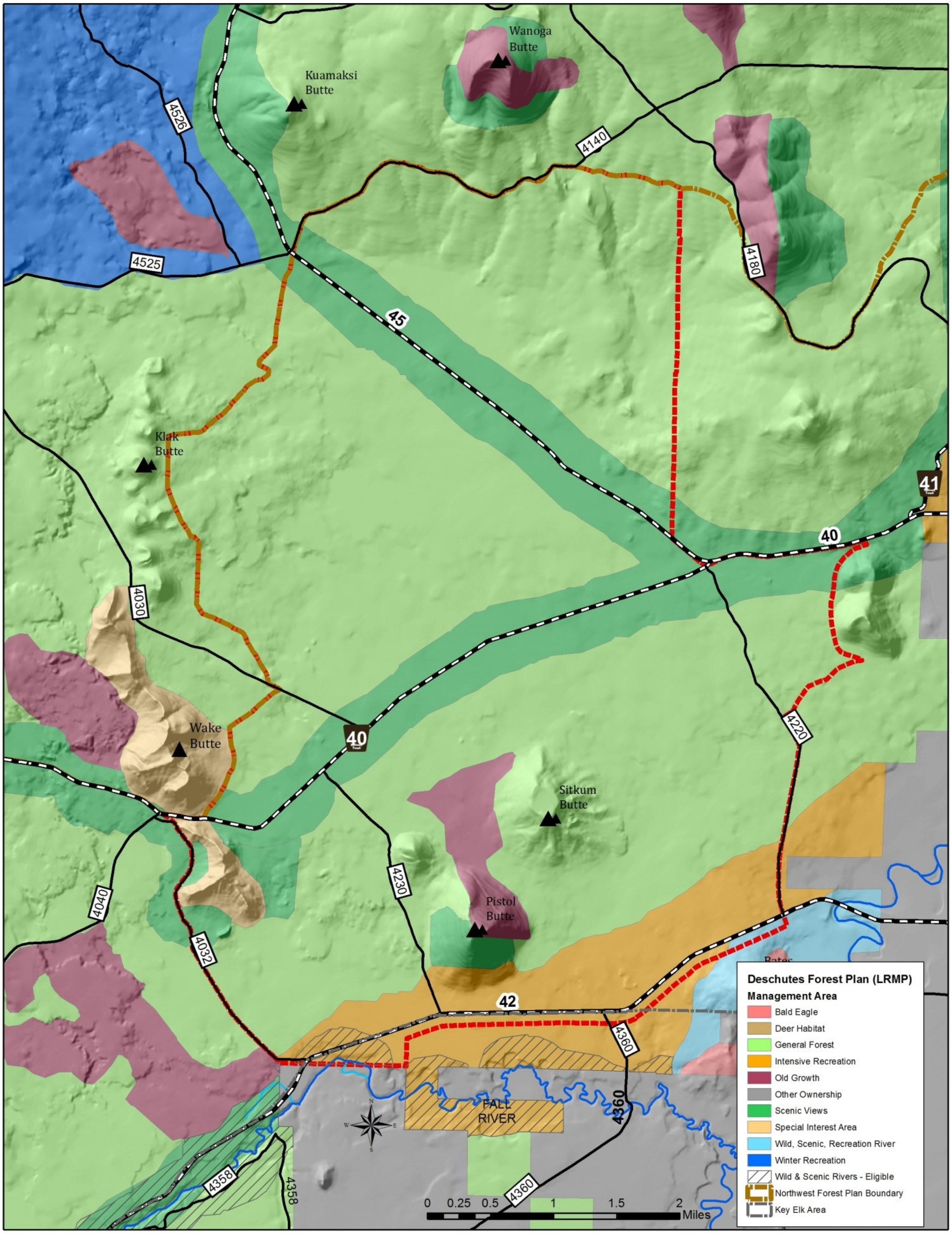


Figure 3: Deschutes National Forest Plan Management Areas

1.4 Proposed Action

In order to meet the purpose and need described above the Bend/Ft. Rock Ranger District proposes actions on 16,034 acres in the Junction project area (Table 2). The proposed action is considered Alternative 2, as described in Chapter 2.

Wildlife objectives built into the proposed action are as follows:

- Retain large contiguous blocks in the lodgepole pine PAG untreated. The intent is to retain areas as large as a home range for either the black-backed woodpecker or three-toed woodpecker and other species such as martens, Cooper's hawk, or solitude for mule deer or elk. Lodgepole pine OGMA corridors left untreated will also retain high densities of snags for various woodpeckers.
- The development or restoration of white-headed woodpecker habitat is expected to also provide and enhance habitat for other species, such as pygmy nuthatch and Lewis' woodpecker that rely on large ponderosa pine trees and snags. Additionally, by treating the ponderosa pine PAG in the northern and western portions of the project area, it would create a buffer or reduce the risk of a stand replacement fire into the northern spotted owl range.
- Returning fire in the ponderosa pine PAG will raise the crown base height, and improve grasses and forbs for various wildlife species.
- Provide for diversity by retaining all size classes of ponderosa pine snags; provide size class diversity; retains all ponderosa pine and white fir trees greater than 21" dbh; and provide 10% retention areas in fuel units.

Project design would improve habitat for green-tinged paintbrush populations. Thinning treatments nearby known populations would open up forested stands creating openings that provide ideal habitat for this species.

Table 2: Proposed Action

Overstory and Understory Tree Treatment	Fuel Treatment	Acres
Roadside Fuel Break Treatments: Associated with safety corridors identified in the Upper Deschutes Community Wildfire Protection Plan	Thin, Pile & Burn Slash, and Mow	1,874
Fuel Reduction: A combination of thinning, mowing, and underburning to reduce fuel loadings and ladder fuels in ponderosa pine stands.	Small/medium Tree Thinning, Piling & Burning Slash, Mowing, Underburn	2,875
Fuel Reduction: Mowing and underburning in managed and unmanaged ponderosa pine stands to restore and maintain desired fuel loadings	Mow, Underburn	2,137
Lodgepole and Ponderosa: In previously harvested stands with a residual seed-tree or shelterwood overstory and a well-established understory is present, an overstory removal harvest would be used to allow for the continued development and management of the	Overstory Removal Harvest, Thin, Pile & Burn Slash	1,484
	Overstory Removal Harvest, Thin, Lop & Scatter Slash	1,978

understory.	Overstory Removal Harvest, Thin, Pile & Burn Slash, Mow, Underburn	838
Lodgepole: Where stand growth and vigor have declined and stand structure and integrity are being affected by increasing mortality, a shelterwood or seed-tree harvest would be used.	Seed Tree Harvest, Thin, Pile & Burn Slash	153
	Seed Tree Harvest, Thin, Pile & Burn Slash and/or scarify	2,473
Lodgepole & Ponderosa: Small/medium tree thinning to allow continued development and management of established second growth stands.	Small/Medium Tree Thinning, Pile & Burn Piles	1,590
	Small/medium Tree Thinning, Lop & Scatter Slash	2,238
	Total Acres Proposed	**16,034**

This proposed action was refined during planning and became Alternative 2, as described on pages 21-25 of Chapter 2.

1.5 Public Involvement and Scoping

The Junction Vegetation Management project was published in the Deschutes Schedule of Proposed Actions (SOPA), a quarterly publication, in the summer of 2010 and has appeared in each quarterly SOPA since then. This quarterly report is distributed to interested individuals, organizations, and agencies Forest-wide. The SOPA is also posted on the Deschutes and Ochoco National Forest webpage at http://www.fs.usda.gov/goto/centraloregon/projects.

Project information and the proposed action shown in Table 2 were made available for initial public comment on August 9, 2010 during a month long scoping period. A letter requesting public involvement was mailed to approximately 193 individuals, businesses, and organizations. Included in the mailing were the Confederated Tribes of Warm Springs, Burns Paiute Tribe, The Klamath Tribes, and the Confederated Tribes of the Umatilla Indian Reserve. Also included in the mailing was The Bulletin, the local newspaper of record that reported on the proposed project area. Announcement of the proposed action was included on the Deschutes and Ochoco National Forest webpage at http://data.ecosystem-management.org/nepaweb/nepa_project_exp.php?project=32816.

Comments were received from the following organizations and individuals: Asante Riverwind, Deschutes County, American Forest Resource Council, Oregon Wild, Jim Larsen, and the Klamath Tribe. Comments included feedback on topics such as overstory removal and salvage, impacts of roads and impacts to roads as a result of timber haul, gaps and untreated areas, goshawk management, and retention of trees with old growth characteristics. Comments received during scoping are a part of the analysis file for the Junction project at the Bend/Fort Rock Ranger District office. Some comments were used to develop issues and alternatives to the proposed action.

The Forest has been involved in updates to Community Wildfire Protection Plans. The Upper Deschutes Coalition plan was updated in 2013 and the Greater LaPine plan is currently being updated. The Forest has been involved in these plans and has kept those community stakeholders informed about the Forest Service's plans for conducting fuels reduction and vegetation management including the Junction project. The Forest also participates monthly in the Upper Deschutes River Coalition (UDRC) meetings. The UDRA represents numerous small communities in the vicinity of the Junction project.

1.6 Issues

The Interdisciplinary team of Forest Service resource specialists developed this list of issues with input from public scoping. Issues and concerns are used to formulate and develop alternatives or develop constraints and mitigation measures to reduce or eliminate environmental effects.

Issues are generally divided into two groups: key issues and analysis issues. Non-significant issues are also briefly discussed.

Key issues are those that represent a point of debate or concern that cannot be resolved without consideration of the trade-offs involved. These issues spur the design of alternatives to the proposed action that provide a different path to achieve project objectives. Trade-offs can be more clearly understood by developing alternatives and displaying the relative impacts of these alternatives weighed against the proposed action.

Analysis issues, as used in this EA, were identified as those that do not drive an alternative, or address the purpose and need, and that can be addressed through standards and guidelines, mitigation, analysis and/or monitoring. These items did not result in differing design elements among alternatives but are important for providing the Responsible Official with complete information about the effects of the project.

1.6.1 Key Issues

Key Issue 1 – Managing for Wildlife Habitat within PAGs

Comments suggested that treatments should be developed with consideration to plant association groups (PAGs) because presence of certain PAGs may indicate ecological value to its associated wildlife species. Comments expressed concerns with lodgepole pine treatments that would remove overstory, so skips in treatment should be at a scale to provide habitat for species that prefer denser forest. Comments also expressed the preference for thinning to be conducted in younger denser stands of ponderosa pine that have experienced ingrowth due to fire exclusion.

A wildlife species that is highly associated with the dry ponderosa pine PAG is the white-headed woodpecker. This woodpecker is a Forest Service Region 6 sensitive species and is listed as a Management Indicator Species (MIS) in the Deschutes Forest Plan. Additionally, this species is listed in *A Conservation Strategy for Landbirds in the Columbia Plateau in Oregon and Washington* (citation) and is listed in the U.S. Fish and Wildlife Service Birds of Conservation Concern. The white-headed woodpecker population status is imperiled mainly due to the lack of large patches of mature or old growth ponderosa pine habitat. Due to the amount of black-bark ponderosa pine and for the most part, a lack of large trees across the project area, commercial thinning under the proposed action would favor ponderosa pine for development of large trees to develop or maintain habitat on 4,219 acres.

Two wildlife species associated with the dry lodgepole pine PAG is the black-backed and three-toed woodpeckers, these species may occur in the mixed conifer PAG. Both species are listed as MIS in the Forest Plan, and the black-backed is listed as a focal species in the landbird strategy mentioned above; both species are listed as vulnerable. The proposed action calls for retaining an 870 acre contiguous block of dense forest, in addition to other leave areas.

The comments led to the development of Alternative 3, which would retain an additional large block of dense, older lodgepole pine forest that would provide quality habitat for black-backed and three-toed woodpeckers, and would treat fewer acres of ponderosa pine through commercial thinning, but would thin to a lower basal area to maintain white-headed woodpecker habitat for a longer period of time. Both alternatives provide skips and gaps in treatment across the project area to provide diversity in stand structure; overall Alternative 3 would leave more area untreated.

- Indicators Acres of large lodgepole pine leave blocks for black-backed and three-toed woodpeckers
- Acres treated for White Headed Woodpecker at different basal areas

Key Issue 2 – Managing Vegetation while Providing for Landscape Diversity

The project area is primarily lodgepole pine, in a kind of unique topographic setting; the LOS lodgepole pine is actually above HRV. There will be no net loss of LOS for ponderosa pine and mixed conifer PAGs. Treatments within these PAGs would thin out the understory promoting the development of trees moving towards LOS conditions. Comments received during scoping identified the following concerns: thinning could further reduce existing diversity levels by removing “character” trees, trees that exhibit mature or old characteristics; thinning could also reduce down wood, minor species, stand age diversity, and/or large diameter trees that could be more resistant to wildfire events; and the combination of harvest, burning, and/or mowing may further reduce variability and diversity resulting in a more homogenous landscape.

The ID team designed the project by maintaining a mosaic of stands in various age classes for vegetation diversity to mimic HRV, while still providing and/or maintaining habitat for various wildlife and plant species. Either alternative would retain all ponderosa pine and white fir trees greater than 21”dbh, while Alternative 3 would retain ponderosa pine and white fir trees less than 21” dbh if they meet old tree characteristics (Van Pelt 2008). The Forest Plan, including the Eastside Screens also provides management direction and guidance to provide for snags and down wood levels.

Indicators:

- Number of acres retained as untreated blocks including wildlife corridors, unmanaged stands, etc. Number of acres of unmanaged stands (no management activities within the past 40 years) post harvest.

Key Issue 3 – Management of Unique and Limited Habitats

The planning area contains unique habitats and species that are underrepresented on the landscape or are present in small, scattered locations (mixed conifer PAG, Pistol and Sitkum Buttes, Wake Butte SIA, and old and mature trees or forest). Public comments expressed concerns about treatments in these areas, suggesting that treatments may further reduce the quantity, quality, or distribution of those habitats and/or species. The alternatives vary by how much treatment occurs in these areas. Under Alternative 3, the prescribed burning on Pistol and Sitkum Buttes would not occur and no commercial harvest would occur within the Wake Butte SIA.

Indicators:

- Acres prescribe underburned on Pistol and Sitkum Buttes
- Acres treated within the Wake Butte SIA

1.6.2 Analysis Issues

Analysis issues, as used in this EA, were identified as those that do not drive an alternative, or address the purpose and need, and that can be addressed through standards and guidelines, mitigation, analysis needs or monitoring. These items did not result in differing design elements among alternatives but are important for providing the Responsible Official and the public with complete information about the effects of the project.

The following elements were not considered to be key issues but are relevant to the project and tracked through the analysis:

- ✓ Forested Vegetation
- ✓ Recreation
- ✓ Wildlife: management indicator species; proposed, endangered, threatened, and sensitive wildlife species; migratory Birds; snags and down wood.
- ✓ Water Quality, Fisheries, and Riparian Habitat
- ✓ Scenery
- ✓ Botany: Proposed, Endangered, Threatened, and Sensitive Plant Species
- ✓ Noxious Weeds
- ✓ Soil Quality
- ✓ Heritage Resources
- ✓ Access and Travel
- ✓ Air Quality and Smoke Management
- ✓ Economics

1.6.3 Non-Significant Issues

The Council on Environmental Quality (CEQ) NEPA regulations require delineation of non-significant issues. Sec. 1501.7 directs us to "...identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)...." The following is a list of reasons that identified issues are non-significant:

1. Issue is outside the scope of the proposed action;
2. Issue is already decided by law, regulation, Forest Plan, or other higher level decision;
3. Issue is adequately addressed in all alternatives; or
4. Issue is conjectural and not supported by scientific or factual evidence.

Table 3: Non-significant issues

Issue	Rationale
Concerns were raised on large trees being removed. Comments suggested creating diameter limits and including provisions for the retention of all mature and/or old characteristic trees.	Eastside Screens direction prohibits removal of green trees > 21" dbh. Eastside screens was established for the purposes of maintaining future options concerning wildlife habitat associated with late and old structural stages, fish habitat, and old forest abundance. The Eastside Screens contain guidelines for management of timber sales in Late Old Structure (LOS) relative to the Historic Range of Variability (HRV), wildlife corridors, snags, coarse woody debris, and goshawk management. There is no net loss of late and old structures from the action alternatives. Alternative 3 does include the provison of retaining old character ponderosa pine and white fir trees.
Concerns were raised over the number of snags in the project area	Project design would retain all diameter size ponderosa pine snags, unless for safety reasons. In stands where overstory lodgepole pine trees are not commercially viable, the overstory trees would be girdled to create snags.
Commenters felt that this project should qualify under the healthy forest restoration act.	The Healthy Forest Restoration Act (HFRA) passed in December 2003. This act provided improved statutory processes for hazardous fuels reduction projects and provided direction to help reduce hazardous fuels and restore healthy forest and

Issue	Rationale
	rangeland conditions. A special administrative review process for projects authorized by HFRA takes place before the decision is made. This project does not qualify as an authorized hazardous fuels reduction project under HFRA the projects purpose and need is broader in scope than just reducing hazardous fuels and protecting values at risk. Yes this project would protect defined ingress/egress routes, adjacent communities, and natural resources by treating hazardous fuels, and is within or adjacent to an at-risk community covered by a Community Wildfire Protection Plan (Title I, Section 102 – Authorized Hazardous Fuel Reduction Projects, Part (a) (1)).

1.7 Project Record

This EA hereby incorporates by reference the Project Record (40 CFR 1502.21). The Project Record contains Specialist Reports and other technical documentation used to support the analysis and conclusions in this EA. Chapter 3 provides a summary of the Specialist Reports in adequate detail to support the decision rationale; appendices provide supporting documentation.

Incorporating these Specialist Reports and the Project Record help implement the Council on Environmental Quality (CEQ) Regulations provision that agencies should reduce NEPA paperwork (40 CFR 1500.4), that the document shall be “analytic rather than encyclopedic,” and that the document “shall be kept concise and no longer than absolutely necessary” (40 CFR 1502.0). The objective is to furnish adequate site-specific information to demonstrate a reasoned consideration of the environment impacts of the alternative and how these impacts can be mitigated, without repeating detailed analysis and background information available elsewhere. The Project Record is available for review at the Bend-Fort Rock District Office, 63095 Deschutes Market Road, Bend, Oregon 97701, Monday through Friday 7:45 a.m. to 4:30 p.m.

1.8 Decision to be Made

The responsible official for deciding the type and extent of management activities in the Junction analysis area is the Forest Supervisor of the Deschutes National Forest. The responsible official can decide on several courses of action ranging from no action, to selecting one of many possible combinations for managing resources in the project area. The responsible official would decide on whether or not to amend the Deschutes National Forest LRMP. This project proposes a non-significant Forest Plan amendment under Alternative 2 and Alternative 3. The non-significant Forest Plan amendment to be decided on includes project activities creating a visual impact for an extended period of time (5 years) and underburning (>5 acres) in Scenic Views (MA 9) areas.

The responsible official will consider the following factors when making a decision:

1. How well the alternative(s) meets the project’s purpose and need.
2. How well does the alternative respond to the issues.
3. Have public comments been considered during this analysis?
4. What are the likely environmental effects of the proposed action and alternative(s), and have mitigation measures that will apply to project implementation been identified.

Chapter 2 – Alternatives, Including the Proposed Action

This chapter describes and compares the alternatives considered for the Junction project. This chapter is intended to present the alternatives in comparative form, sharply defining the issues and providing a clear basis for choice among options by the decision maker and the public (40 CFR 1502.14).

This chapter of the EA has been updated since the 30-day public comment period. In response to public comments about the Forest Plan amendments, the description of the amendments has been clarified and a more precise figure of the amount of area impacted is provided. There has been general editing throughout the chapter including the maps.

2.1 Alternative Development Process

The Interdisciplinary Team used information from public scoping, including the key issues identified for the project (see Chapter 1), and in conjunction with the field-related resource information, to formulate a reasonable range of alternatives. A reasonable range of alternatives to the proposed action was developed to 1) meet the purpose and need for the project, which includes identifying objectives that do not exceed the Standards and Guidelines of the Forest Plan, and 2) consider a reasonable range of solutions for the key issues.

The alternatives were developed to address and define issues identified by the Interdisciplinary Team, through public scoping, and through consultation with specialists from the Forest Service.

The chapter includes an overview of mitigation measures, monitoring and other features common to the alternatives, a description and map of each alternative considered in detail, and a comparison of these alternatives focusing on the key issues.

2.2 Alternatives Considered but Eliminated from Detailed Study and Non-significant Issues

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). Public concerns received in response to the proposed action expressed concerns they had with the proposal and provided suggestions for different course of action. Some of these alternatives may have duplicated the alternatives considered in detail or were determined to be unable to meet the project's purpose and need. Alternatives that were considered but not analyzed in detail are summarized below.

2.2.1 Do Not Build Temporary Roads, Use Existing Roads Only

Public comments raised an issue with constructing temporary roads and the maintenance of system roads to support project activities. There would be little change in the present maintenance level of Forest system roads. During harvest activities, where necessary, road maintenance activities would be conducted on roads designated for use. Type of work that would be expected as maintenance include: brushing for improved sight distances, removal of danger trees, blading and shaping of travel ways, cleaning culverts and ditches, restoring existing surface drainage features such as water bars and rolling dips. The drainage features would be constructed with armoring to ensure longevity. This maintenance is important because roads can be a source of sediment, intercept groundwater flow, increase the drainage network, and confine stream channels preventing lateral stream movement. Roads that fall within maintenance level 1 (closed) would be re-closed following project activities, and existing closures would be maintained or improved where closure failures are occurring.

Temporary roads are customarily constructed to provide access to the landings that are not immediately adjacent to existing portions of the transportation system. Temporary roads would be constructed primarily on flat ground and excavation and construction of embankments would be negligible. Temporary roads would be built to low construction standards, with constraints of grade, curve radius, compaction, surfacing, and width being tailored to the minimum capabilities of the intended user vehicles. The temporary roads would subsequently be restored to pre-project conditions.

2.2.2 Redesign Pistol Butte Old Growth Management Area

The north portion of Pistol Butte is within an OGMA. The Forest Plan has defined OGMAs and has set aside management goals and objectives along with standards and guidelines specific to land allocations. This management areas primary goal is to provide naturally evolved old growth forest ecosystems for 1) habitat for plant and animal species associated with old growth forest, 2) representations of landscape ecology, 3) public enjoyment of large, old-tree environments, and 4) the needs of the public from an aesthetic spiritual sense. The objective to manage old growth forests to provide 1) large trees, 2) abundant standing and downed dead trees, and 3) vertical structure that would maintain the historic range (LRMP, page 4-149). Direction for maintaining and enhancing the old growth ecosystems is outlined in the Forest Wide Standards and Guidelines for Forest Health (FH-1 to FH8, LRMP pg. 4-36, 37). These guidelines cover management strategies that would maintain and enhance the vigor of old growth area through the control of forest pests. Redesigning the Pistol Butte OGMA is outside the projects purpose and need.

2.3 Elements Common to the Action Alternatives

Below is a general overview of treatment elements that are common to the action alternatives (Alternative 2 and Alternative 3). Treatment type and acres may vary between alternatives. Alternative specifics are described below in Section 2.5 Alternative Descriptions.

Tree Treatments

Commercial harvest would be conducted using ground-based equipment to fall and transport trees to landings. Cutting would be limited to trees less than 21 inches dbh to comply with Eastside Screens standards and guides. Yarding would occur to transport felled trees to landings. There trees would be delimbed, bucked into lengths, decked and loaded onto trucks. Wherever possible, existing landings and skid trails would be used to minimize soil disturbance and impacts.

In addition to the primary harvest objective described below, dead lodgepole pine, standing and down, excess to wildlife standards and guidelines, will be removed. Dead lodgepole pine is present across the project area and is intermixed with green trees. Ponderosa pine snags, of all sizes, would be retained.

Seed Tree Harvest: Seed Tree Harvest (HST) or shelterwood harvest is an initial regeneration harvest in lodgepole pine stands. Ten overstory trees (expected range of 7 to 12) would be retained per acre to provide a seed source for lodgepole pine stands. Follow up treatments include whip falling of undesirable understory trees, machine piling the slash, and burning slash piles. Piling would adequately prepare a seedbed, and the stands would naturally regenerate. Although biomass potential is high in seed tree areas, biomass utilization would depend on market conditions. Gopher control through the use of baiting or trapping may be required in Seed Tree units in order to ensure successful seedling establishment.

Commercial Thinning: Commercial thinning treatments are proposed for ponderosa pine stands. Thinning would be from below and favor ponderosa pine for retention in order to promote the development of future white-headed woodpecker habitat. Overstory ponderosa would be thinned to 70 square feet of residual basal area (expected range 60 to 80) in Alternative 2 and 50 square feet residual basal area (expected range 40 to 60) in Alternative 3. In ponderosa pine areas that currently have low density, desired stocking levels would not be met. Lodgepole pine in the overstory would be removed, especially if mistletoe is present or in areas scheduled for underburning. Follow up treatments could include one or some of the following: ladder fuel reduction, precommercial thinning, hand or machine piling, burning of piles, and mowing. The potential to utilize biomass in these treatment areas is moderate and would depend on the residual spacing of the understory. Wider understory spacing would yield more material and be easier for machinery to operate amongst the residual stand. Narrower understory spacing would likely preclude biomass utilization.

Overstory Removal: This treatment is primarily proposed in pure lodgepole pine stands. In mixed stands where ponderosa pine is present it would be favored for retention while removing all overstory lodgepole pine trees that are no longer needed as a seed source. In stands where there is insufficient volume per acre to support a commercial timber sale, overstory trees may be girdled to create snags rather than removed. This is estimated to be the case on four units totaling 354 acres. Follow up treatments could include one or some of the following: precommercial thinning, ladder fuels reduction, lopping and scattering, hand or machine pile and pile burning, mowing and underburning. Where lodgepole is removed from mixed stands of lodgepole and ponderosa, the stands would be underburned using mowing as a pre-treatment to reduce surface fuels. Underburning would not occur in stands that are predominantly lodgepole pine.

Whip Falling: Whip falling is used in stands to fall the non-merchantable trees left after commercial harvest which are not desired due to disease or poor condition including small crowns, bole damage, or very poor growth. Small tree material would be left on site.

Precommercial Thinning and Ladder Fuel Reduction: Precommercial thinning (PCT) and ladder fuel reduction (LFR) would cut or remove small trees located in the understory to various residual densities. These treatments would occur in plantations or in the understory of stands of other ages. LFR is specified when the primary intent is fuels reduction. The following table displays the desired densities and associated treatments to achieve these densities (Table 4).

Table 4: Description of target tree density for precommercial thinning.

Target Density in Trees Per Acre (TPA)	Resulting Density Range (TPA)	Associated Treatments	Potential for Biomass Utilization
100	70-130	Machine piling and burning; mowing; underburning	High
200	150-250	Hand piling and burning; mowing; underburning	Moderate
300	250-350	Lop and scatter slash	Low

Slash and Natural Fuels Treatments

Lop and Scatter: In areas where noncommercial treatments (PCT, LFR, Whip falling) have created areas of light slash, lop and scatter treatments (L&S) would be used. Lop and scatter reduces fuel loadings by lopping slash down to 18 inches or less using chainsaws. The slash profile on the ground would be reduced. If economically feasible, slash generated biomass would be removed for energy generation or as secondary wood products. If the slash would be removed for biomass than a mechanical entry would be needed.

Hand Pile and Burn: Where noncommercial treatments create areas of moderate slash hand piling of slash and burning of piles would occur. Hand pile and burn (HPB) would also be used in areas where the slash concentration is light. If economically feasible, slash generated biomass would be removed for energy generation or as secondary wood products. This would require a mechanical entry to remove slash.

Machine Pile and Burn: Where fuel loadings created by noncommercial treatments are expected to be heavy, the slash created would be machine piled and burned. If economically feasible, slash generated biomass would be removed for energy generation or as secondary wood products.

Mow: The objective of mowing is to decrease the height of live or dead brush through the mastication of brush in the stands. About 80% of each unit would be mowed; up to 100% of safety corridor units would be mowed. Units planned for mowing may also be followed with underburning.

Biomass: Biomass is project-generated woody debris or slash that could be utilized for energy generation or as secondary wood products. This is an alternative to burning slash. Potential biomass material is divided into a high, medium, low category for the potential amount of material that could be available.

Prescribed Fire Underburn: Prescribed burning would occur when weather and fuel conditions are appropriate to meet the objectives and prescriptions for each unit. Prescribed fire treatments would occur in nearly all fuel treatment units in the ponderosa pine PAGs and may be preceded by mowing. Typical underburning conditions occur during spring and fall seasons, but depending on the season, objectives may still be achieved any time of the year. Prescribed fire units are designed to be large blocks and each large block includes a 10% retention area that would not be treated. Roads and existing fireline would be used wherever possible. Up to 14,000 feet of new machine or hand line may need to be constructed. Upon completion of burning, firelines would be rehabilitated by pulling slash and other materials back over the line to prevent use by motorized vehicles.

Roadside Fuel Breaks: Fuel breaks treatments are associated with safety corridors (Forest system roads 40, 42, and 45) identified in the Upper Deschutes Community Wildfire Protection Plan. Road systems allow for ground suppression forces to access wildfires and fuel breaks along roads provide a safe defensible zone for suppression forces to engage in the fire. Fuel break treatments are designed to reduce surface and ladder fuels and would consist of thinning small diameter trees to 20 by 20 foot spacing for the first 250 feet of the fuel break and then to 15 by 15 foot spacing for the next 250 feet. Slash is piled and burned, and then the units are mowed. Alternative 2 and Alternative 3 proposes to treat approximately 1.76 acres along safety corridors.

Retention Areas

Both action alternatives retain areas in an untreated condition across the project area. For Alternative 2 about 40% of the project area is not entered with this project; Alternative 3 retains about 44% of the project area untreated. The stands left untreated fall into two categories:

- Untreated stands that have not been previously entered for timber harvest would receive no vegetation treatment in this entry. These stands typically have an abundance of standing dead and down fuels and ladder fuels. Approximately 12% of the project area in this condition would be left untreated under Alternative 2 and approximately 16% of the project area would be left untreated in Alternative 3.
- Stands that have been treated previously but are deferred from commercial treatment in this entry. These areas would provide diverse stands for wildlife. Approximately up to 2,416 acres of these areas could receive some type of noncommercial thinning or fuels reduction treatments

such as: mowing, precommercial thinning, lop and scatter, hand or machine piling and/or pile burning

Connected Actions

Roadside Hazard Tree Removal: Danger trees are standing trees that present a hazard to people due to conditions such as, but not limited to, deterioration or physical damage to the root system, trunk, stem, or limbs and the direction of the lean of the tree would allow that tree to reach the roadway if it fell. These trees would be cut along haul routes. If the trees are within a riparian habitat conservation area or needed to meet down wood requirements, they would be cut and left on site. If the danger tree is outside of those areas or it is not required to be retained for other resource needs and are of commercial value, then they may be removed with this timber sale.

Forest Plan Amendments: The current LRMP standards and guidelines for maintaining visual quality restrict activities that can be visible to the "casual observer" within certain areas in the Scenic Views MA 9 management allocations that occur along Forest Service roads 40 and 45. The Junction project proposes to modify the Deschutes National Forest Plan through a non-significant Forest Plan Amendment for project activities causing visual impacts an extended period of time after project completion and underburning in Scenic View MA 9 areas. The Deschutes Forest Plan was signed in 1990. Over the ensuing years, new information has come out of a variety of sources, which has been studied and is considered best available science these studies have not been integrated with the resource protection and objectives of the outdated Forest Plan. In order to integrate these other resource needs, a non-significant Forest Plan amendment would be needed as part of this decision to meet treatment needs within this project area.

The LRMP goals and objectives for Scenic Views MA 9 areas are as follows:

Goals: To provide Forest visitors with high quality scenery that represents the natural character of Central Oregon.

General Theme and Objectives: Landscapes seen from selected travel routes and use areas will be managed to maintain or enhance their appearance. To the casual observer, results of activities wither will not be evident or will be visually subordinate to the natural landscape.

Landscapes will be enhanced by opening views to distant peaks, unique rock forms, unusual vegetation, or other features of interest. Timber harvest is permitted, but only to protect and improve the visual quality of the stands both now and in the future. Timber stands, which have remained unmanaged in the past because of their visual sensitivity, will begin receiving treatment to avoid loss of the stand to natural causes. Landscapes containing negative visual elements, such as skid roads, activity residue, or cable corridors will be rehabilitated.

The desired condition for ponderosa pine is to achieve and maintain visual diversity through variations of stand densities and size classes. Large, old-growth pine would remain an important constituent, with trees achieving 30 inches in diameter or larger and having deeply furrowed, yellowbark characteristics.

For other species, the desired condition requires obtaining visual variety through either spatial distribution of age classes and species mixes, through density manipulation, or through a mixture of age classes within a stand.

The Deschutes National Forest Land and Resource Management Plan (Forest Plan) would be amended to include changed to the following section outlined below.

<u>Amendment 1:</u> Visual impacts from management activities lasting for an extended period of time in Management Area 9, Scenic Views. The amendments are specific to partial retention foreground only.

Current Direction: M9-27 (LRMP 4-125) In Partial Retention foregrounds, logging residue or other results of management activities will not be obvious to the casual forest visitor two years following the activity.

Amended Direction: M9-27 (LRMP 4-125) In Partial Retention foregrounds, logging residue or other results of management activities will not be obvious to the casual forest visitor two years following the activity. However, treatment activities may occur: a) along designated critical transportation routes (determined by the CWPP), b) when visual quality and long-term resiliency would be improved and c) the visual impact from activities would be short-term (5 years).

Treatments include thinning, PCT, LFR, and whip felling. Under Alternative 2 approximately 1,564 acres of the overstory would receive treatments and 2,976 acres of the understory would receive treatments in partial retention foreground areas. Alternative 3 would treat approximately 1,559 acres of the overstory and 2,973 acres of the understory. Activity fuels (slash and slash piles) would be treated as soon as possible along travel corridors. The use of prescribed fire in ponderosa pine would create visible impacts (e.g. blackened, scorched vegetation and tree trunks which would be visible for approximately five years on about 60 acres.

Alternative 2 units or portion of units within scenic view foreground areas receiving overstory treatments: 6, 7, 17, 20, 21, 22, 25, 28, 30, 31,50, 52, 65, 67, 77, 78, 85, 87, 88, 91, 92, 94, 95, 99, 100, 101, 102, 105, 106, 107, 108, 109, 115, 116, 122, 132, 141, 144, 146, 150, 152, 154, 155, 204, 205, 206, 230, 231, 236, 247, 259, 285

Alternative 2 units or portion of units within scenic view foreground areas receiving understory treatments: 4, 6, 7, 20, 21, 22, 25, 28, 30, 31, 32, 50, 52, 65, 66, 67, 77, 78, 85, 87, 88, 91, 92, 94, 95, 99, 100, 101, 102, 105, 106, 107, 108, 109, 115, 116, 117, 122, 132, 141, 144, 146, 150, 152, 154, 155, 156, 180, 204, 205, 206, 219, 224, 230, 231, 236, 244, 245, 247, 248, 250, 252, 253, 254, 258, 259, 264, 268, 287

Alternative 3 units or portion of units within scenic view foreground areas receiving overstory treatments: 6, 7, 17, 20, 21, 22, 25, 28, 30, 31,50, 52, 65, 67, 77, 78, 85, 87, 88, 91, 92, 94, 95, 99, 100, 101, 102, 105, 106, 107, 108, 109, 115, 116, 122, 132, 141, 144, 146, 150, 152, 154, 155, 205, 206, 230, 231, 236, 247, 259, 285

Alternative 3 units or portion of units within scenic view foreground areas receiving understory treatments: 4, 6, 7, 20, 21, 22, 25, 28, 30, 31, 32, 50, 52, 65, 66, 67, 77, 78, 85, 87, 88, 91, 92, 94, 95, 99, 100, 101, 102, 105, 106, 107, 108, 109, 115, 116, 117, 122, 132, 141, 144, 146, 150, 152, 154, 155, 156, 180, 205, 206, 219, 224, 225, 230, 231, 236, 244, 245, 247, 248, 250, 252, 253, 254, 258, 259, 264, 268, 287

<u>Amendment 2:</u> Underburning in Management Area 9, Scenic Views

Current Direction: M9-90 (LRMP 4-131) Low intensity prescribed fires will be used to meet and promote the Desired Visual Condition within each stand type. Prescribed fire and other fuel management techniques will be used to minimize the hazard of a large high intensity fire. In foreground areas, prescribed fires will be small, normally <5 acres, and shaped to appear as natural occurrences. If burning conditions cannot be met such that scorching cannot be limited to the lower 1/3 of the forest canopy, then other fuel management techniques should be considered.

Amended Direction: Low intensity prescribed fires will be used to meet and promote the Desired Visual Condition within each stand type. Prescribed fire and other fuel management techniques will be used to minimize the hazard of a large high intensity fire. In foreground areas, prescribed fires will be small, normally <5 acres, and shaped to appear as natural occurrences. However, prescribe fire may occur on more than 5 acres to meet the goal of reducing wildfire risk, providing safety corridors for the public (critical transportation routes defined by the CWPP), or creating a defensible fuel break.

Prescribed fire under this amendment would occur on approximately 60 acres of ponderosa pine stands. It is necessary to use prescribed fire on more than 5 acres within foreground Scenic Views to meet stand and fire management objectives. Treating these areas would reduce stands risk to mortality from wildfire and providing a safe ingress/egress route for the public. Maintain scorching below 30% of the crown and conduct burn operations during favorable weather conditions to minimize scorch, mortality, and smoke impacts. Where there is sufficient material to warrant piling construct piles to minimize scorch to the residual stand.

Alternative 2 units or portions of units within scenic view foreground areas receiving prescribed fire treatments: 4, 154, 155, 180, 204, 205, 206, 219, 236

Alternative 3 units or portions of units within scenic view foreground areas receiving prescribed fire treatments: 4, 154, 155, 180, 202, 205, 206, 219, 236

Transportation System

Pre-haul maintenance and road reconstruction would occur prior to harvest activities. Maintenance items would consist of that work necessary to sustain the road during project activities. Needed road work could involve brushing, blading, ditch reconditioning, spot surfacing placement, culvert inlet, outlet cleaning, and occasional culvert replacement. As the activities near completion, these roads would receive maintenance necessary to sustain a self-maintaining status. Danger tree reduction would be in accordance of Forest Service Manual 7733 - Transportation System, Operations and Maintenance.

Table 5: Recommended Road Work

Road	Maintenance Level	From Mile	To Mile	Total Miles	Work Needed
Arterial Roads					
40	5	6.26	11.26	5.00	Chip seal, restore drainage, remove danger trees and brush
Collector Roads					
4020000	2	0.00	2.98	2.98	Restore road prism and drainage, resurface with 6 inches of compacted dense ¾ inch crushed aggregate
4030000	2	0.00	0.73	0.73	Roadside brushing, drainage restoration, blade and shape the road surface
4032000	2	0.00	2.65	2.65	Roadside brushing, spot surfacing, drainage restoration, blade and shape the road surface
4140000	2	0.00	2.81	2.81	Roadside brushing, spot surfacing, drainage restoration, blade and shape the road surface
4220000	2	0.00	3.1	3.1	Resurface the road with ¾ inch dense graded aggregate
4230000	2	0.00	2.24	2.24	Roadside brushing, spot surfacing, drainage restoration, blade and shape the road surface
4360000	2	6.50	6.60	0.10	Resurface the road with ¾ inch dense graded aggregate

2.4 Alternative Descriptions

This EA assesses the potential effects of three alternatives: a no action alternative (Alternative 1), the proposed action (Alternative 2), and an alternative way to enhance landscape vegetative conditions (Alternative 3).

2.4.1 Alternative 1 – No Action

This interpretation of the no action alternative is that the proposed action would not take place. Under this alternative, no vegetation management, fuels reduction activities, or prescribed burning would occur. Stands would continue to be overstocked and fuel loadings would continue to accumulate.

2.4.2 Alternative 2 – Proposed Action

Alternative 2 was developed by natural resource staff as a way of bridging the gap between the existing condition and the desired future condition of the project area. Alternative 2 would respond to the purpose and need by completing overstory treatments on 10,619 acres of the 17,560 acres in the project area and would provide approximately 19.5 mmbf timber volume. This alternative would modify the Forest Plan through a non-significant Forest Plan Amendment for project activities causing visual impacts an extended period after project completion and underburning in Scenic View MA 9 areas.

Refer to Appendix A for a list of all units and the integrated prescriptions. The following is a summary of the activities associated with Alternative 2.

Table 6: Summary of activities included in Alternative 2.

Activity	Acres
Thinning	3,849
Seed Tree Harvest (initial regeneration)	2,338
Overstory Removal (already regenerated)	4,432
Total Commercial Harvest	**10,619**
Precommercial Thinning	4,486
Ladder Fuel Reduction	6,211
Whip Felling	2,338
Total Understory Treatment	**13,035**
Prescribed Underburning	5,551
Shrub Mowing / Mastication	7,746

The following described the type of treatments and treatment acres in this alternative.

Retention Areas: Approximately 6,940 acres or nearly 40% of the project area would have limited or no treatment. This alternative was specifically designed to provide the following areas of no commercial harvest:

- Approximately 1,581acres of the project area would have no vegetation treatment. These areas have not been previously entered for timber harvest.
- Around 5,355 acres that have had previous vegetation treatments would be deferred from commercial treatment during this entry. Up to 2,416 acres of these areas could receive some type of noncommercial thinning or fuels reduction treatments such as: mowing, precommercial thinning, lop and scatter, hand or machine piling and/or pile burning.
- An 870 acre continuous patch of untreated lodgepole pine will be retained for woodpecker habitat.

Overstory Treatments: Thinning (HTH) of overstory trees would occur on 3,849 acres, seed tree harvest (HST) would occur on 2,338 acres, and overstory removal (HOR) would occur on 4,432 acres. Lodgepole would be removed from 4,649 acres within thinning and overstory removal units. Commercial harvest would occur on approximately 10,619 acres with approximately 19.5 million board feet (MMBF) of volume recovered.

Understory Treatments: Treatments in the understory include PCT on 4,486 acres, LFR on 6,211 acres, and whip felling on 2,338 acres.

Fuels Treatments: Prescribed fire would occur on approximately 5,551 acres. Project generated slash would be treated by hand piling and burning on 3,663 acres, machine pile and burning on 6,116 acres and lopping and scattering of slash on 3,256 acres. Mowing, to reduce brush height, would occur on 7,746 acres.

The potential for biomass removal also exists within the project area. Approximately 2,633 acres have a high potential for biomass removal, 5,437 acres with a medium potential, and 4,965 acres with a low potential. Overall 13,035 acres have the potential for biomass removal.

Approximately 1,762 acres of treatments along FSR 40, 42, and 45 are designed to provide a roadside fuel break.

The potential for biomass removal also exists within the project area. Biomass removal is an alternative method to burning slash, if economically feasible, would be to remove slash generated biomass for energy generation or as secondary wood products. Approximately 2,633 acres have a high potential for biomass removal, 5,437 acres with a medium potential, and 4,965 acres with a low potential. Overall 13,035 acres have the potential for biomass removal.

Access and Removal Systems: Commercial product generated from treatments would be removed using ground based systems. To access units approximately 14 miles of ML1 and ML2 roads would receive limited maintenance to support project needs. Upon completion, these roads would be returned to ML1 (closed) status. Temporary roads, approximately 18.6 miles, to access units would be constructed. Approximately 15.2 of the 18.6 miles would be on existing disturbed ground and 3.4 miles would be new disturbance. At the conclusion of this project, temporary roads would be returned in their original state. This project also proposes to decommission 2.6 miles of system roads (FSR 4360900, 4230530, 4032400, 4140700, 4230403, and 4230655) and close 0.57 miles of system roads (FSR4032530 and 4220910).

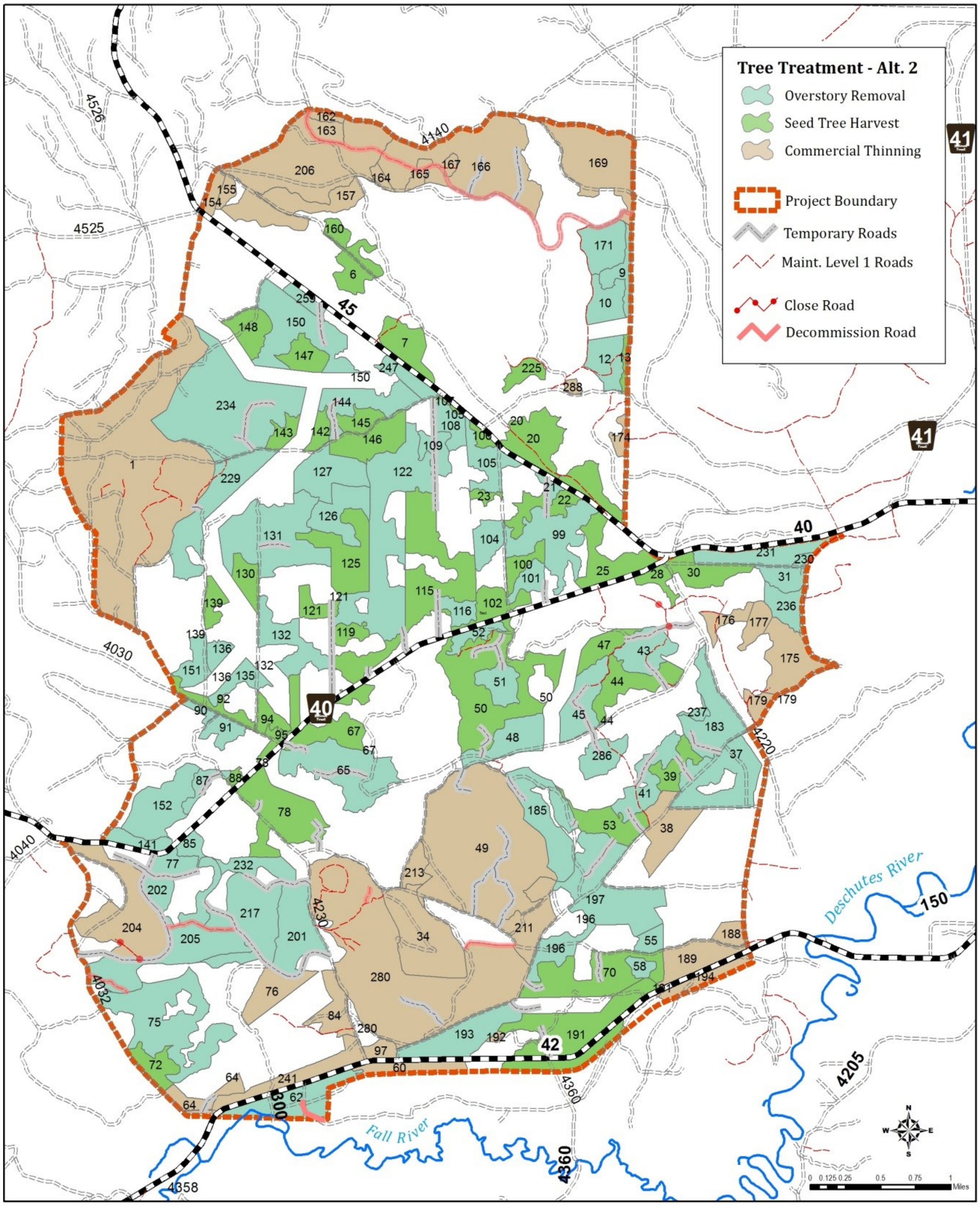


Figure 4: Alternative 2 overstory tree treatments.

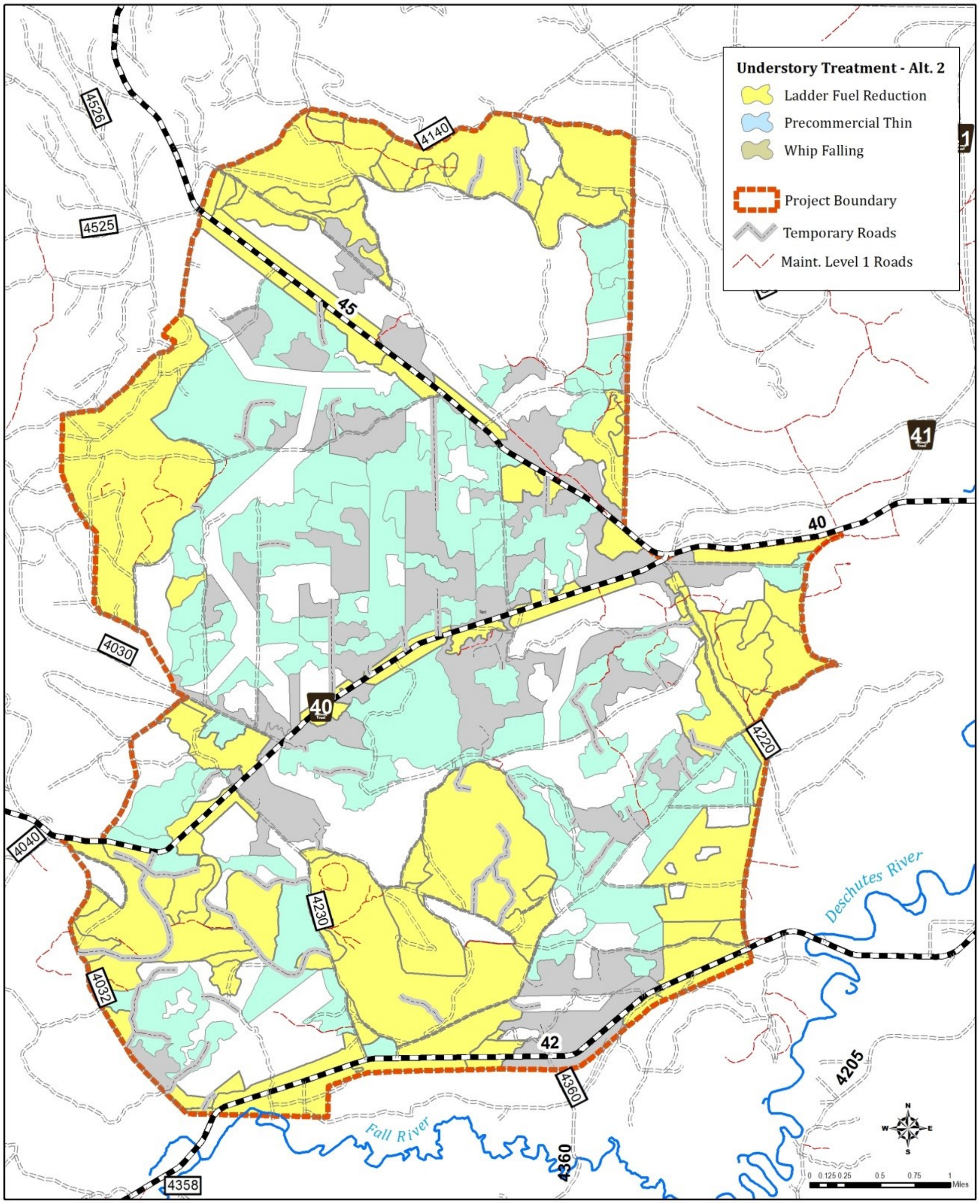


Figure 5: Alternative 2 understory tree treatments

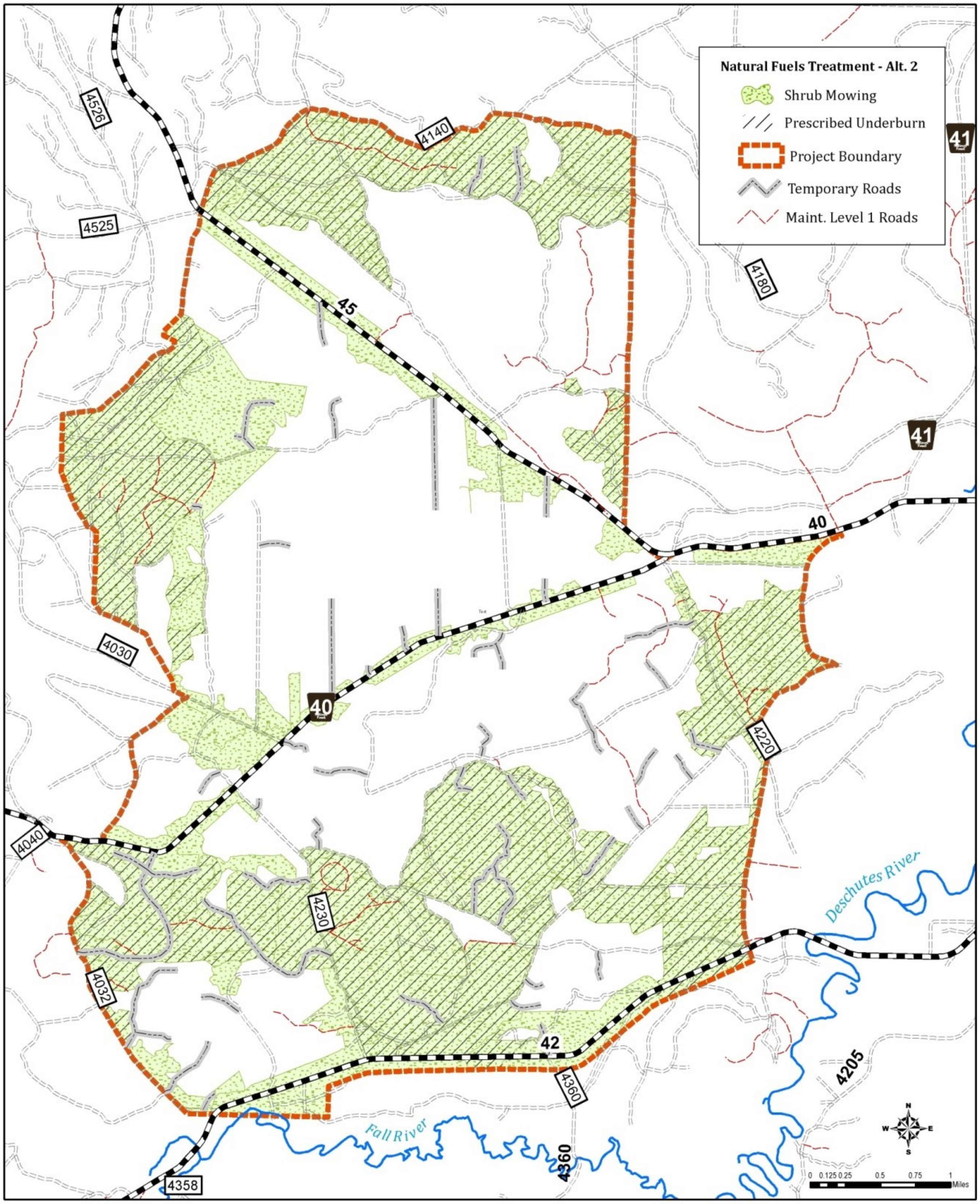


Figure 6: Alternative 2 natural fuels treatments.

2.4.3 Alternative 3

Alternative 3 was developed in response to issues raised during public scoping. Alternative 3 would respond to the purpose and need by completing overstory treatments on 9,864 acres of the 17,560 acres in the project area (about 56% of the project area), and provides about 18 mmbf timber volume. This alternative is consistent with the management direction set forth in the Deschutes Forest Plan. This alternative would modify the Forest Plan through a non-significant Forest Plan Amendment for project activities causing visual impacts an extended period of time after project completion and underburning in Scenic View MA 9 areas (Section 2.4.5). Refer to Appendix A for a list of all units and the integrated prescriptions.

Alternative 3 would retain all trees with old growth characteristics.

The following Key Issues were used in developing Alternative 3:

Key Issue 1 – Managing for Wildlife Habitat within PAGs. Treatment units were modified to include two large leave blocks (1,243 total acres) of dense, older lodgepole pine forest that would provide quality habitat for woodpeckers. Prescriptions were modified to treat fewer acres of ponderosa pine through commercial thinning and in treatment units thinning would occur at a lower basal area to maintain white-headed woodpecker habitat for a longer period of time. Skips and gaps in treatment units would also provide diversity in stand structure. To address this issue, the following resource objectives were included in Alternative 3:

All old-character ponderosa pine trees would be retained, regardless of size (Van Pelt 2008); see project design.

An 870 acre and 650 acre leave block of lodgepole pine would be retained for woodpecker habitat.

Retain fewer trees per acre in commercial thinning units in ponderosa pine PAGs to create and maintain white-headed woodpecker habitat. Ponderosa pine stand would be more open by thinning at a lower basal area (average residual basal area under Alternative 2 is 70 ft^2 basal area 50 ft^2 under Alternative 3).

Key Issue 2 – Landscape Diversity. Variability in thinning across the landscape would increase diversity and variability across the landscape. To address this issue Alternative 3 would:

Retain all trees with old growth characteristics

Vegetation treatments in dense stands would improve forest health and enhance diverse landscape conditions for at least two decades into the future.

Vegetation treatments in currently less dense stands would maintain landscape diversity by maintaining forest health of these areas longer into the future than if left untreated. By protecting the vegetation from wildfire, underburning on 5,738 acres in conjunction with mowing on 7,911 acres would maintain vegetative diversity on the landscape.

The number and size of green tree replacements (GTR's) would decrease. On 2,332 HST acres, 10 large trees/acre would be available as green tree replacements. On 4,435 HOR acres, the 100 to 300 residual trees/acre available as GTR's would average up to 4" dbh. On 3,843 acres of HOR treatment, 3 overstory trees per acre would be retained; on 38 acres of HOR treatment, all overstory trees would be retained. The amount of trees available for GTR's between 8" and 18" DBH would be 12.8 trees per acre. On ponderosa pine PAGS an unknown amount of additional trees greater than 18" dbh would be available for use as GTRs. The lodgepole pine overstory dwarf mistletoe infection source would be reduced to lower levels within the 3,843 HOR acres where it currently exists. Removing lodgepole pine would create small openings and add to horizontal diversity.

Post-treatment snag densities would remain the same on 7,730 acres in areas having no overstory treatments; as stand densities increase over time, additional snags would occur on 5,318 of these acres. Ponderosa pine snag levels would not be reduced, except for safety considerations, as a result of treatments proposed throughout the planning area. On 9,864 acres proposed for overstory treatments lodgepole pine snag numbers would be reduced from current levels due to salvage harvesting of standing dead lodgepole pine.

Key Issue 3 – Management of Unique and Limited Habitat –This issue is addressed with Alternative 3 by:

Treatments in the Wake Butte SIA, Pistol Butte OGMA and the north side of Sitkum Butte would not occur. Approximately 585 acres of sensitive soils exclusive to Alternative 3 would not be treated, nearly all on steep slopes. The majority of these acres would be associated with the north side of Pistol and Sitkum Buttes, and Wake Butte. A small amount of forested lavas between Pistol and Wake Buttes would also be excluded from management. Because there have been few prior entries on the buttes, the extent of detrimental soil conditions is currently low, and would remain so in the absence of mechanical ground-based operations.

By not treating Wake Butte SIA, Pistol Butte OGMA and north side of Sitkum Butte these areas could provide higher quality habitat for wildlife species hat rely on denser forest habitats. By allowing natural succession to occur within the lodgepole pine OGMA corridors, it would retain high densities of snags for various woodpeckers.

By providing untreated areas, it would create a mosaic of habitats across the planning area and conserve wildlife habitat at its present state.

Retaining ponderosa pine and white fir having old tree characteristics, regardless of size, would provide size class diversity for various wildlife.

Table 7: Summary of activities included in Alternative 3.

Activity	Acres
Thinning	3,307
Seed Tree Harvest	2,322
Overstory Removal	4,235
Total Commercial Harvest	**9,864**
Precommercial Thinning	4,213
Ladder Fuel Reduction	5,745
Whip Falling	2,322
Total Understory Tree Treatment	**12,280**
Prescribed Underburning	5,738
Shrub Mowing/Mastication	7,911

The following describes the type of treatments and treatment acres in this alternative

Retention Areas: Approximately 7,692 acres or nearly 44% of the project area would have limited or no treatment. This alternative was specifically designed with

- Approximately 2,297 acres of the project area would have no vegetation treatment. These areas have not been previously entered for timber harvest

- Around 5,395 acres that have had previous vegetation treatments would be deferred from treatment during this entry. These areas would provide diverse stands for wildlife. Approximately up to 2,416 acres of these areas could receive some type of noncommercial thinning or fuels reduction treatments such as: mowing, precommercial thinning, lop and scatter, hand or machine piling and/or pile burning
- Two areas an approximate 870 acre and 650 acre continuous patch of untreated lodgepole pine for woodpecker habitat

Overstory Treatments: Commercial thinning trees would occur on 3,307 acres, seed tree harvest would occur on 2,322 acres, and overstory removal would occur on 4,235 acres. Lodgepole would be removed from 4,112 acres within thinning and overstory removal units. This would be a total of 9,864 acres of commercial harvest creating approximately 18 million board feet (MMBF) of volume recovered.

Understory Treatments: Treatments in the understory include precommercial thinning on 4,213 acres, ladder fuel reduction on 5,745 acres, and whip felling on 2,322 acres.

Fuels Treatments: Prescribed fire would occur on approximately 5,738 acres. Project generated slash would be treated by hand piling and burning on 3,508 acres, machine pile and burning on 6,380 acres and lopping and scattering of slash on 3,040 acres. Mowing, to reduce brush height, would occur on 7,911 acres.

The potential for biomass removal also exists within the project area. Approximately 2,617 acres have a high potential for biomass removal, 5,543 acres with a medium potential, and 4,768 acres with a low potential. Overall 12,928 acres have the potential for biomass removal.

Approximately 1,762 acres of treatments along FSR 40, 42, and 45 are designed to provide a roadside fuel break.

Access and Removal Systems: Commercial product generated from treatments would be removed using ground based systems. To access units approximately 14 miles of ML1 and ML2 roads would receive limited maintenance to support project needs. Upon completion, these roads would be returned to ML1 (closed) status. Temporary roads, approximately 14.3 miles, to access units would be constructed. Approximately 11 of the 14.3 miles would be on existing disturbed ground and 3.3 miles would be new disturbance. At the conclusion of this project, temporary roads would be returned in their original state. This project also proposes to decommission 2.6 miles of system roads (FSR 4360900, 4230530, 4032400, 4140700, 4230403, and 4230655) and close 0.57 miles of system roads (FSR4032530 and 4220910).

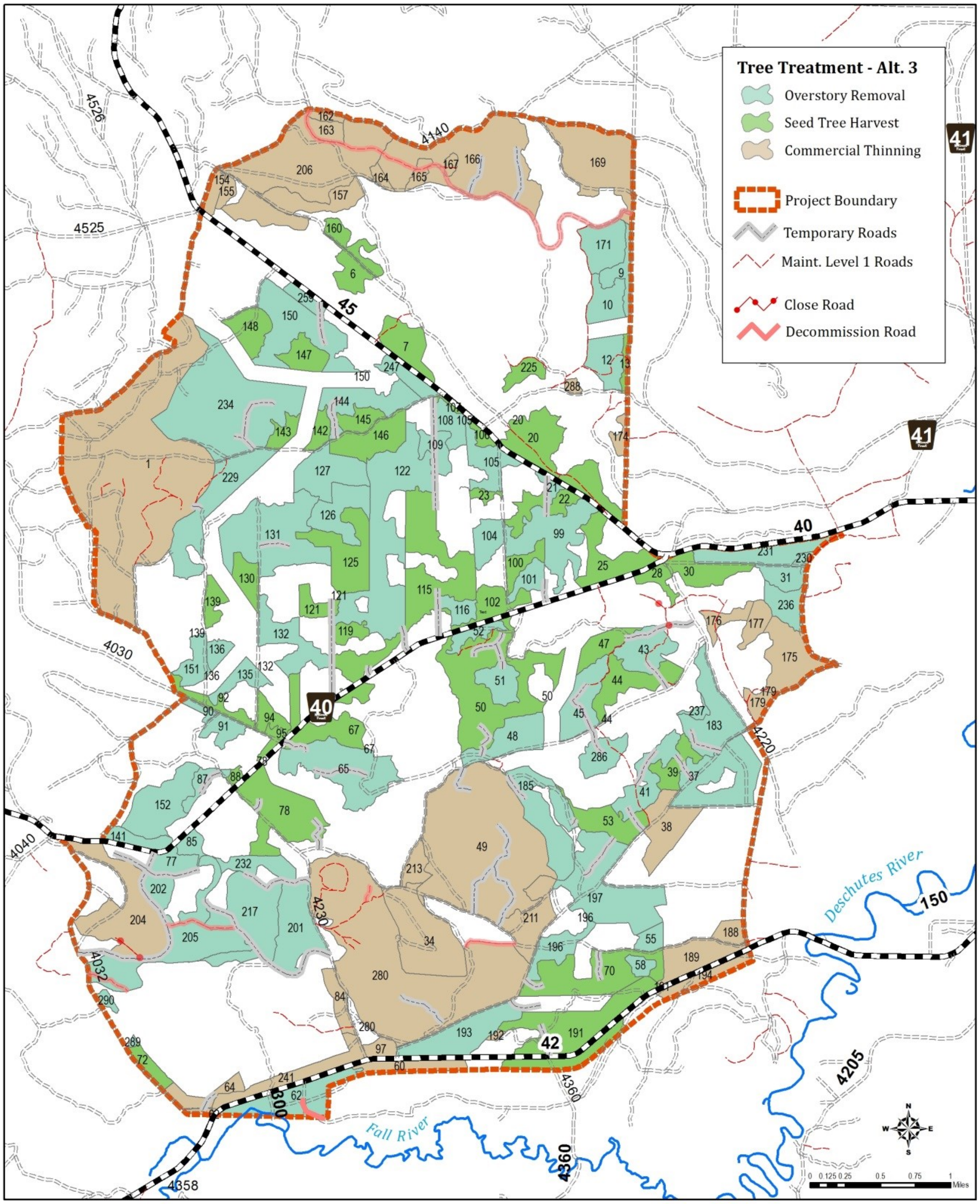


Figure 7: Alternative 3 overstory tree treatments

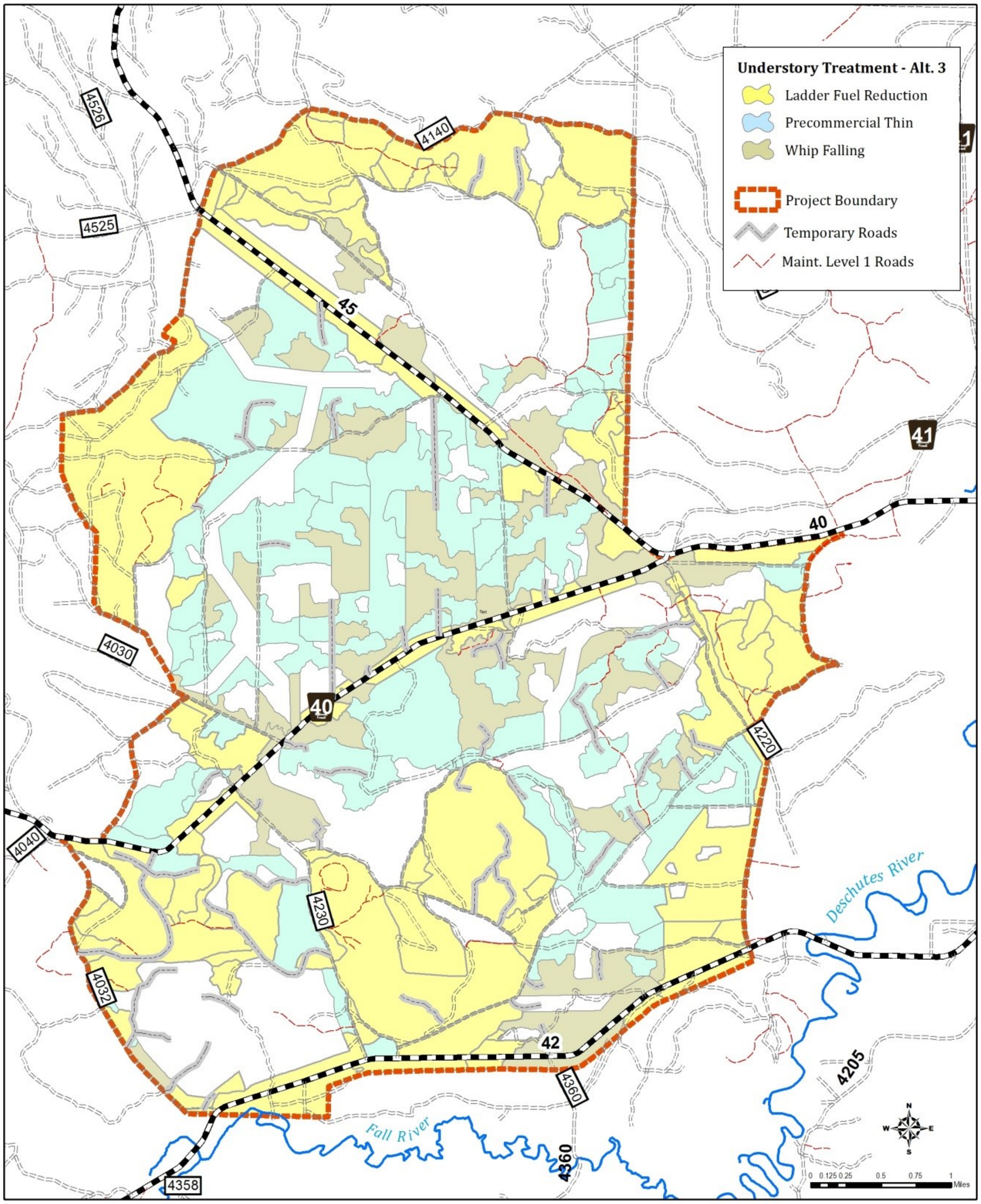


Figure 8: Alternative 3 understory tree treatments

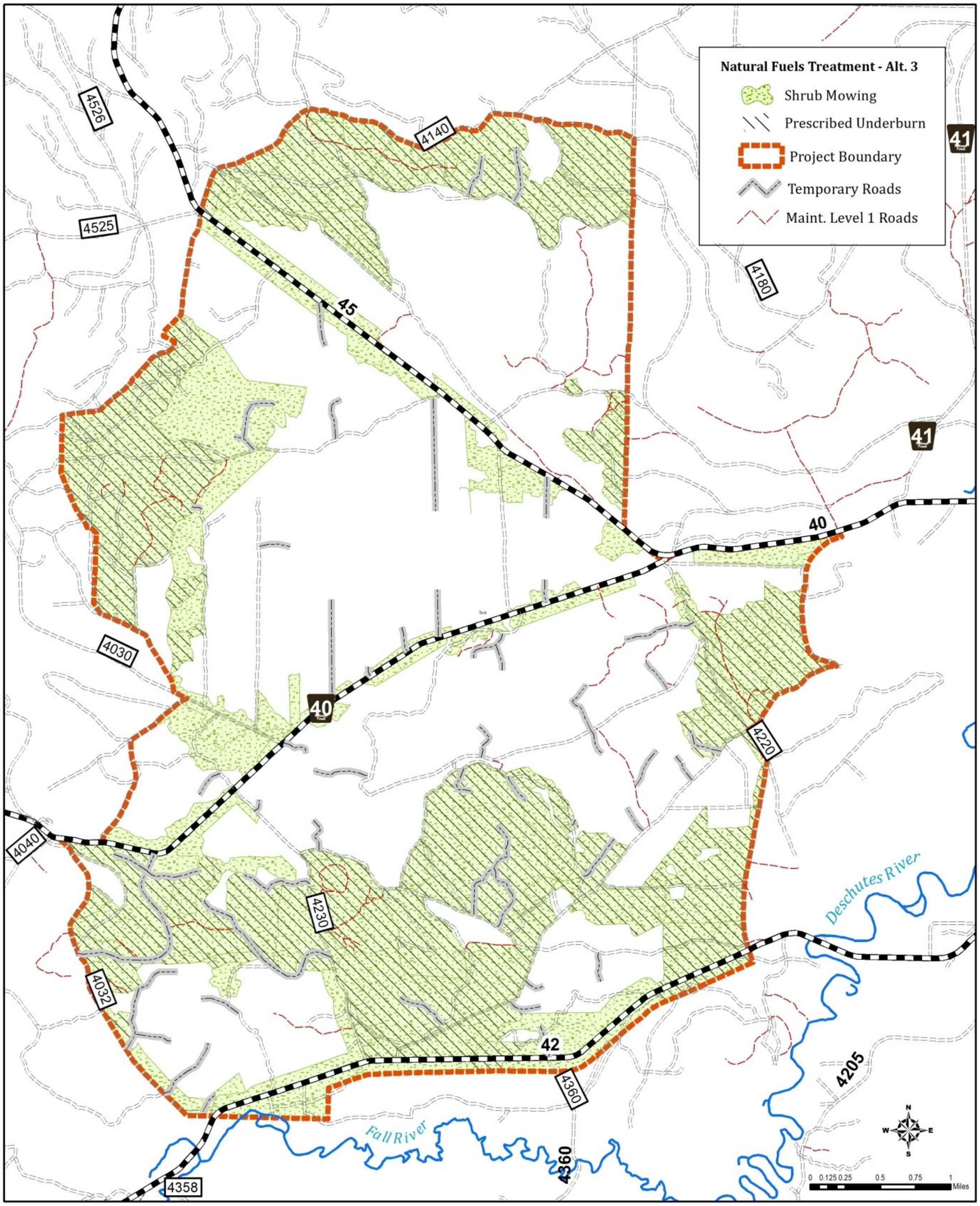


Figure 9: Alternative 3 fuels treatments

2.5 Resource Protection Measures

The following items are part of Alternative 2 and Alternative 3, unless otherwise indicated, and provide the measures necessary to keep project impacts at acceptable levels. These items would be applied to the project as it is implemented on the ground. They include, but are not limited to best management practices (BMPs), standards and guidelines, and standard operating procedures.

Resource Protect Measure	Units
Wildlife Species and Habitat	
Provide a 300 foot buffer around wildlife guzzlers	10, 275, 142, 229, 219, 274
Retain ponderosa pine trees regardless of size that exhibit old tree characteristics (from Van Pelt) except where they are either 1) ladder fuels which pose a threat to larger diam. trees or 2) individual DMT-infected trees that contribute to infection potential of desired understory trees. Ponderosa old tree characteristics include all of the following 1) orange bark with plates generally more than three times wider than the darker fissures that separate them, 2) rounded crown, and 3) below the main crown, few if any dead branches present and knots not noticeable.	All
Retain all ponderosa pine snags	All
To reduce disturbance within northern spotted owl habitat adjacent to project area: Do not conduct project activities between March 1 and Sept. 30	169
To reduce disturbance to riparian-dependent species during breeding season, such as great blue herons: Do not conduct project activities between March 1 and August 31 unless cleared through monitoring There are no known active nests along the portion of Fall River that is proposed for treatment, however prior to implementation; the wildlife biologist shall monitor the proposed treatment area for any potential nests for that year.	62
Great Gray Owl	
If a nest is discovered protect every known active nest from March 1 to June 30 from disturbing activities within a ¼ mile (WL-31, 32 and 33, LRMP pg. 4-54).	None known
Townsends Big Eared Bat	
If a bat roost is discovered during implementation management activities shall cease and a Bend-Fort Rock wildlife biologist would be notified. If a roost is discovered during the course of prescribed burning, quit lighting within a 250 foot radius to minimize smoke inhalation to bats.	None known
Old Growth Management Area	
Where available, ponderosa pine down wood shall be maintained at 3 to 6 pieces per acre, with 12 inches diameter at the small end, at least 6 feet long, and the total pieces should be 20 to 40 feet in length.	
During prescribed fire operations do not light fuels near the small patch of white fir on the northeast slope of Pistol Butte (below the 630 road) in order to preserve this habitat type for a variety of wildlife species.	34
Leave the vegetation on the upslope and down slope near the gate or at the base of	

Resource Protect Measure	Units
the 630 road to discourage illegal ATV use going around the gate.	
Goshawk	
If a nest is discovered: (1) protect every known active and historical nest-site from March 1st –August 31st (previous 5 years) from disturbance such as logging, ladder fuels reduction activities and human disturbance; (2) protect 30 acres of the most suitable nesting habitat surrounding all active and historical nest tree(s) and defer from harvest; and (3) a 400 acre "post-fledgling" (PFA) would be established around every known active nest site. Review project activities to ensure that within the PFA the project would retain the LOS stands and enhance younger aged stands towards LOS conditions, as possible. There would also be no activity conducted within newly discovered goshawk nest stands or post-fledgling areas during the season restriction period.	None known
Scenery	
To preserve scenic views (MA9) along FS roads 40 and 45 and to eliminate recreational and visual conflicts the following measures should be followed: • Locate landings, skid trails, slash piles or staging areas using existing openings and skid trails and minimize bole damage to remaining vegetation along scenic travel corridors and access to developed recreation sites. • Design underburning activities to minimize short-term visual effects by maintaining crown scorch at less than 30 percent and minimize bole scorch up to 10 feet in height. • Minimize amount of leave-tree markings and black out tagging units with vertical orange paint on both sides of trees along scenic travel corridors and access to developed recreation sites after sale closes. • Flush cut stumps (6 inches or less with angle cut away from line of sight in immediate Foreground areas (0-300 feet). • Remove all boundary flagging as part of the post treatment activities within two years.	4, 6, 7, 17, 20, 21, 22, 25, 28, 30, 31, 50, 52, 52, 65, 67, 77, 78, 85, 87, 88, 91, 92 94, 95, 97, 99, 102, 105, 106, 107, 108, 115, 116, 141, 154, 156, 188, 189, 191, 193, 194, 219, 230, 231, 241, 244, 245, 247, 248, 250, 252, 254, 258, 259, 264, 268, 287
Soils	
Sensitive Soil: Frost Pockets or high degree of existing detrimental soil disturbance	
Overstory Treatments • Restrict operations to winter only if feasible. Winter logging would only be executed when conditions are cold enough that the ground is consistently frozen throughout the day. Place new landings in existing roadways Understory Treatments • Avoid post-harvest mechanical operations; conduct by hand as is practicable. For young stand management , limit equipment travel and utilize machines with long boom reach, designate and maximize distance between primary travel routes Fuels Treatments • Prohibit mechanical operations off of existing primary skid trails • Prescribe hand only treatments where feasible • Maintain effective ground cover and organics, retain >50% of litter/duff depth if it exists • Retain existing large CWD or as much as is acceptable	Units: 1, 3-5, 13, 14, 16, 20, 21, 23, 27, 32-34, 37, 38, 41, 43, 45, 48, 49, 52, 54, 55, 57, 59, 62, 66, 70, 84, 86, 90, 97, 109, 116, 131, 134, 135, 140, 141, 146, 148, 149, 152, 153, 156, 158, 166, 167, 173, 174, 179, 182, 185, 186, 187, 189, 191, 193, 194, 196, 197, 199, 201, 205, 206, 211, 212, 216, 217, 219,

Resource Protect Measure	Units
	221, 229, 233, 243, 245, 249, 250, 252, 253, 258, 260, 261, 263, 266, 270, 273, 274, 276, 279, 280, 283, 287
Sensitive Soil: steep slopes ≥30% and >200 feet in length	
Overstory Treatments • Avoid operating late in the dry season • Minimize side slope movements by heavy equipment • Require a parallel skid trail network Understory Treatments • Prohibit mechanical operations off of existing primary skid trails • Supplement with hand-only treatments where practicable Fuels Treatments • Prohibit mechanical operations off of existing primary skid trails • Supplement with hand-only treatments where practicable • Maintain effective ground cover and organics, retain >50% litter/duff layer wherever it exists • Minimize upslope pre-heating when underburning to maintain low intensity burning, target burning in cool, moist conditions	Units: 2, 14, 34, 48, 49, 166, 168, 185, 194, 204, 216, 219, 266, 275, 277, 280, 284, 288
Sensitive soils – shallow soils on forested lavas	
Overstory Treatments • Too shallow to subsoil, thus avoid new landings and temporary roads as is feasible • Locate new landings in existing roadways • Restrict operations to winter only if feasible Understory Treatments • Prohibit mechanical operations off of existing primary skid trails • Supplement with hand-only treatments where practicable Fuels Treatments • Prohibit mechanical operations off of existing primary skid trails • Supplement with hand-only treatments where practicable • Maintain effective ground cover and organics, retain >50% of litter/duff depth wherever it exists, retain existing large CWD or as much as is feasible	Units: 1, 5, 49, 58, 70, 76, 84, 148, 149, 153, 199, 201, 202, 204, 205, 209, 210, 216-218, 220, 232, 234, 246, 256, 257, 277-280
Sensitive soils Sitkum and Wake Buttes	
All Activities • Avoid all ground disturbing activities, defer activities on sparsely vegetated steep slopes	Units: 204
Best Management Practices Many Best Management Practices (BMPs) are employed during operations to protect resources. They	

Resource Protect Measure	Units
generally follow those defined in the guide, National Best Management Practices for Water Quality Management on National Forest System Lands (USDA 2012). Local variations to these have evolved over the last several decades to adapt to changing practices, methods, and markets. Listed below are BMPs most commonly practiced to minimize detrimental soil impacts that are applicable to the activities being proposed in the Junction project.	
Convey to all equipment operators the need to limit ground disturbance as much as is feasible. Avoid traveling over untrammeled ground unless necessary.	BMPS apply in all units.
Avoid repetitive passes by heavy equipment except over designated primary routes (i.e., roads or skid trails). Restrict travel of heavy equipment off designated primary routes to two passes or fewer.	
Limit as is feasible heavy equipment, particularly tracked machinery from pivoting or unnecessary side-hill travel on slopes >15%. Travel should mostly be down the fall-line and perpendicular to the contour of the slope.	
Minimize travel of heavy equipment on slopes >15% late in the season when soils are extremely dry and susceptible to excessive soil displacement.	
Suspend operations during wet periods when soil moisture is high and heavy equipment tracks sink deep below the soil surface, particularly during spring thaw or after heavy rains.	
Heavy equipment should avoid using the bottom of dry swales or draws as primary travel routes. The location of temporary roads would be approved by the Forest Service and would be prohibited from being routed down swales or dry natural drainage ways.	
Operations on sensitive soils or where the extent of existing detrimental soil impacts is high should be conducted over frozen ground as is feasible, or when the snowpack is at a depth sufficient to protect mineral soil. Travel of heavy equipment off designated primary routes on sensitive soils should be avoided as much as is feasible. All attempts should be made to avoid new landings and skid trails in previously managed stands on sensitive soils.	
Re-use existing log landings and primary skid trails whenever feasible. Locations of new landings, primary skid trails, and temporary roads must be approved by the Forest Service prior to use.	
For whole-tree harvest systems, primary skid trails would be spaced at least 100 to 150 feet apart, except at convergence zones around landings or where terrain limitations dictate otherwise.	
For cut-to-length harvest systems, spacing of primary forwarder trails should be at least 65 feet, except where terrain limitations dictate otherwise. To the extent possible, slash mats should be deposited over primary forwarder trails during cutting operations.	
Restrict grapple skidders to designated areas only (i.e., roads, landings, primary skid trails) and on slopes ≤30%.	
Install waterbars on all segments of primary designated travel routes and temporary roads on slopes ≥10%. Space of waterbars shall depend on the steepness of the slope and its length.	
Conduct preventive road maintenance regularly to avoid deterioration of the prism and prevent accelerated erosion	
Avoid locating temporary roads on sensitive soils.	

Resource Protect Measure	Units
Subsoil or decompact all temporary roads to a depth of at least 24 inches after use. Outslope any segments requiring a cut into the hillslope.	
Piling of post-activity fuels should be limited as is feasible to existing primary travel routes and skid trails. Restrict travel of heavy equipment off designated primary routes to two passes or fewer. On sensitive soils, prohibit machine travel off primary skid trails.	
Machine constructed slash piles should be located on primary designated travel routes as much as is feasible.	
Except where there are heavy concentrations of residual slash, retain as much residual CWD as possible. In previously harvested areas, refrain from incorporating existing CWD in slash piles as much as is feasible.	
Minimize the amount of large diameter CWD that is incorporated into slash piles, particularly those that are relatively sound (decay classes 1 through 3).	
Underburning activities should be conducted so that at least 50% of the duff and litter layer remains intact. Sites where the organic layers are thin such as frost pockets or heavily disturbed sites where effective ground cover is <50%, conduct underburning in a manner that retains as much of the duff and litter layer as possible.	
Minimize the consumption of sound, large diameter CWD during prescribed underburns. Where CWD is close to or in contact with the ground attempt to minimize the duration and intensity that it burns to lessen effects to soil resources.	
Restore as much machine-constructed fire lines as is feasible by redistributing displaced topsoil and unburned woody debris over the disturbed surface.	
Mitigation necessary to restore soil quality Mitigation would consist of subsoiling, obliterating temporary roads, and possible soil amendments in frost pockets. Subsoiling would be used as a means for reducing the extent of detrimental soil conditions by ameliorating heavy compaction on landings and converging segments of primary skid trails. In some cases particularly in frost pockets mulch, wood chips, or slash mats could be added as a protective ground cover and soil amendment where feasible. All of the temporary roads would be reclaimed as well. This would entail de-compacting the road surface, installing waterbars as needed, and hiding their entry or barricading it. Those in frost pockets should also be covered with a layer of mulch or wood chips across their surface. Subsoiling units are listed in Appendix B.	
Fisheries and Water	
Water quality and fisheries habitat would be protected by the use of the following Best Management Practices (USDA, 2012) and other project design features:	
All log landings shall be located outside of RHCAs to prevent potential sedimentation (Best Management Practice (BMP) Veg-4 Ground-based Skidding and Yarding Operations, and INFISH S&G RF-2(b).	
Minimize skid trails within RHCAs to prevent potential sedimentation (BMP Veg-4 Ground-based Skidding and Yarding Operations).	
To prevent pollutants from entering water, all servicing and refueling of equipment shall occur outside of RHCAs (BMP Veg-3 – Aquatic Management Zone, and INFISH S&G RA-4.	
The following project design features are specific to Unit 62, the only unit in the project area within an RHCA, based on BMP Veg-3 – Aquatic Management Zone (approximately	62

Resource Protect Measure	Units
12 acres within the RHCA of Fall River and the hatchery canal would receive mechanical and hand treatments within this unit): • Management activities to only occur on north side of Fall River. • No thinning or management activities to occur in riparian vegetation. • Heavy equipment is restricted to top of slope break, or 100 feet from stream where no defined slope break exists, whichever is greatest. Adjacent to hatchery canal, heavy equipment restricted to 50 feet from canal. • Handpiling is allowed 50 feet or greater from Fall River and canal. Placement of handpiles would focus on upslope areas and avoid areas of washes and depressions that may facilitate water run-off toward Fall River. Burning would occur under conditions that do not allow excessive creeping from the pile, generally 10 feet or less. Handpiles should not exceed 50 square feet. • Retain all snags in RHCA of Fall River within 100 feet of riparian vegetation. For hazard trees that must be felled within 100 feet of stream, fall toward stream and leave on-site. • The RHCA (300 feet slope distance from Fall River and the hatchery canal) is the Aquatic Management Zone for the Junction Project. The RHCA is divided into zones for the purpose of applying Best Management Practices. **North side of Fall River and canal RHCA (south facing) Thinning Requirements** **Zone 1** (high water line of stream edge to 12 feet): No management activities allowed. This zone includes a narrow band of riparian vegetation typically 3-4 feet wide along the streambank, composed primarily of sedges and grasses. Lodgepole pine are also located within this zone, with root masses being incorporated into the streambank. Vegetation quickly transitions into lodgepole pine and bitterbrush away from the streambank. **Zone 2** (12 feet to 30 feet): Hand thinning of trees < 4” dbh allowed. Machinery is excluded. Vegetation is lodgepole pine overstory and understory, with bitterbrush and grasses. **Zone 3** (30 feet to 50 feet): Hand thinning of trees < 60 feet height. Machinery is excluded. Vegetation is similar to that described above for Zone 2. **Zone 4** (50 feet to outer limit of RHCA, which is 300 feet slope distance from stream and canal): Thinning of trees >60 feet height but heavy machinery only allowed 100 feet or greater from Fall River (50 feet from canal). Thinning prescription can be the same as adjacent unit located outside the RHCA. Vegetation is similar to that described above for Zone 2.	
Botanical Resources	
To protect green-tinged paintbrush populations *Overstory Treatments* (Seed tree harvest, commercial thinning, and overstory removal):	7, 20, 21, 22, 28, 30, 31, 43, 44, 45, 48, 50, 51, 52, 58,

<table>
<tr><th>Resource Protect Measure</th><th>Units</th></tr>
<tr><td>

In implementation units with green-tinged paintbrush populations, avoid ground disturbance and damage to these populations by employing winter logging. Winter logging would only be executed when conditions are cold enough that the ground is consistently frozen throughout the day. Operations need to be cleared by the Timber Sale Administrator.
If conditions do not allow for proper winter logging in the units specified above or if there are road hauling constraints upon which winter logging is not appropriate then:

a) The District Botanist would be notified promptly to permit ample time for site preparations which may include hiring seasonal help, map making, and locating and flagging populations on the ground.

b) Green-tinged paintbrush populations would be flagged in such a manner that they would be clearly visible to equipment operators.

c) Flagging of sites would be done during summer months when plants are visible.

d) Heavy machinery would not enter the flagged areas; however, if the machinery is operating with a boom, harvesters may reach into the flagged area to retrieve materials.

e) Do not lay slash in flagged areas.
Before temporary road construction occurs, consult with the District Botanist to prevent construction on known green-tinged paintbrush populations.
Log landings would not be placed on known populations. Timber Sale Administrators would consult with the District Botanist about landing placement.
During unit layout, mark unit boundaries to ensure that any adjacent green-tinged paintbrush sites remain outside of the unit. If needed, the botanist(s) would be available to assist in unit layout.

Understory Treatments (Ten percent retention, whip, precommercial thinning, ladder fuel reductions, slash treatments, mowing, and prescribed fire):

Green-tinged paintbrush populations in understory and slash treatment units (units referred to above) would be flagged during the summer months when plants are visible. All understory project work occurring in these units must be cleared with the District Botanist prior to implementation.
Heavy machinery, including mowers, must avoid traveling through a flagged boundary. However, if the machinery is operating with a boom than it may reach into the flagged area to retrieve material.
Remove all slash and understory materials from flagged sites. Do not pile materials within these sites.
Understory treatment operations that do not require heavy equipment may treat within flagged sites. All trees felled within the area must be removed and no piles would be built in flagged areas.
In order to maintain healthy, vigorous green-tinged paintbrush populations, keep fire outside of flagged areas. Burn Bosses must consult with the District Botanist prior to prescribed fire treatments in the following units: 175, 176, 183, 185, 202, and 236. If possible, have a District botany representative present during fire treatments to assist with the protection of these populations.

</td><td>65, 67, 70, 77, 78, 87, 88, 95, 99, 101, 102, 105, 115, 116, 122, 125, 131, 135, 142, 144, 146, 147, 150, 151, 152, 175, 176, 183, 185, 191, 202, 231, 234, 236, 247, 286.</td></tr>
</table>

Resource Protect Measure	Units
Noxious Weeds Prevention	
Clean all equipment before entering National Forest System lands. Remove mud, dirt, and plant parts from equipment before moving it into the project units and before proceeding to the next project.	
All fill material to be used would be inspected for weeds by the District Botanist prior to use.	
If a weed site is located on a landing or skid trail, an alternative uninfested route would be used, unless a workable solution is found between the noxious weed coordinator and sale administrator.	
Weed sites in and adjacent to the Junction planning area along Forest Service roads 40 and 42 would be treated prior to project activities (as authorized in the Forest-wide Weed EIS.	
Any water sources proposed for this project would be evaluated for weeds by the District Botanist and if weeds are found, another source may be recommended, or if possible, the site would be treated prior to use.	
Noxious Weed Prevention Practices Guidelines (USDA Forest Service Guide to Noxious Weed Prevention Practices)	
Weed prevention specific to timber harvest operations	
Where there is a potential for being spread by contractors' equipment, treat prior to entry.	
Train contract administrators or make sure that they are aware of the noxious weed problem and what those weeds look like. Select lower risk sites for landings and skid trails.	
Discuss noxious weed problems with operators during pre-work meetings and the required prevention practices.	
Use standard timber sale contract provisions to ensure appropriate equipment cleaning.	
To minimize soil disturbance logging should take place during a snow period. For the protection of sensitive species logging must be completed when the ground is frozen, if conditions are not suitable other measures would be considered.	
Existing landings and skid trails within the Junction planning area would be reused. If weeds are found then the site would not be used.	
Weed prevention specific to Road Management	
For road maintenance and decommissioning related to timber sale contracts, use standard timber sale contract provisions to ensure appropriate equipment cleaning.	
Evaluate water sites that would be used for dust abatement for noxious weeds. Avoid acquiring water for dust abatement where access is through weed-infested sites. If an alternative site is not feasible and if it is practical and possible, treat the area prior to use.	
Temporary roads that would be subsoiled need to be inventoried for weeds after subsoiling takes place and as budget permits. If weeds are found then treatment would be necessary.	
Recreation	

Resource Protect Measure	Units
Treatment activities along the unnumbered access road to Fall River Hatchery would be conducted during fall and winter months to avoid public access issues.	
Notify Oregon Department of Fish and Wildlife prior to treatment activities around there helispot to allow helicopter flights to be scheduled outside of the schedule for project work.	
Special use administrator would need to provide alternative routes for the OHV outfitter so they can continue their tours.	
When possible obliterate unauthorized motorized routes.	
Specific project design related to units with trails • When possible, retain trees that hold signs and mark winter trails. Replace any signs that may be damaged or removed during logging and/or burning operations. • Design treatments units to maintain access to large trail systems that are located beyond treatment units. For example, if a large trail system is accessed by two primary trail access points, consider unit boundaries and implementation schedules that would maintain access to at least one trail access point. • Snow berms created by winter logging activities, which conflict with winter recreation routes (snowmobile routes) or create a hazard for recreationists, would be leveled immediately where standards are recognized in Road User Permit stipulations. • Post signs and educational materials where project activities occur near trailheads, campgrounds, snow parks, or other developed recreation sites to inform users of project activities. If possible, use before and after photos to help the public understand what treatment results would look like.	154, 162, 163, 164, 165, 166, 167, 169, and 206
Heritage Resources	
Known heritage sites would be avoided. Should any new sites be discovered during project activities, work shall be halted and the Bend-Fort Rock archaeologist would be notified immediately. Appropriate protection measures would be implemented.	
Danger trees identified within known sites would be directionally felled towards the associated access route.	

2.6 Sale Area Improvement Projects

Money may be collected from the timber sales to complete certain projects such as required reforestation or enhancement and restoration projects in the vicinity of the timber sales. Required mitigation measures have the highest priority for funding, but may be funded by other means such as appropriated funds to insure that requirements are accomplished.

This list is intended to serve as an overall guide for the project area. As timber sales are defined, specific priorities may be adjusted to meet the needs for each sale area. Projects not covered in this EA would require documentation through a separate NEPA process unless not subject to NEPA.

Table 8: Potential Post-Sale Projects Listed

Sale Area Improvement Project	Covered in this EA
Subsoiling (Soil restoration units identified in Appendix B)	Yes

Subsoiling landings, skid trails, and temporary roads	Yes
Guzzler maintenance	Yes
Road closure and decommissioning	Yes
Road closure maintenance	Yes
Whipfalling in seed tree harvest units	Yes
Gopher control on seed tree harvest units	Yes
Ladder fuel reduction	Yes

2.7 Comparisons of Alternatives

Table 9: Summary of actions included in each alternative.

Alternative Elements			Alternative 1	Alternative 2	Alternative 3
Overstory Tree Treatments	Commercial Thinning		0	3,849	3,307
	Overstory Removal		0	4,432	4,235
	Seed Tree or Shelterwood Creation		0	2,338	2,322
	Commercial Thin / Remove all lodgepole (part of 3,849 acres)		0	3,300	2,763
	Overstory Removal / Remove all lodgepole (part of 4,432 acres)		0	1,349	1,349
	Total		**0**	**10,619**	**9,864**
	Volume Recovered		0	19.5 MMBF	18 MMBF
Understory Tree Treatments	Precommercial Thinning		0	4,486	4,213
	Ladder Fuel Reductions		0	6,211	5,745
	Whip Felling		0	2,338	2,322
	Total		**0**	**13,035**	**12,280**
Fuel Treatments	Prescribed Underburning		0	5,551	5,738
	Mow (Mechanical Shrub Treatment)		0	7,746	7,911
	Activity Slash Treatment	Hand Pile & Burn	0	3,663	3,508
		Machine Pile & Burn	0	6,116	6,380
		Lop and Scatter	0	3,256	3,040

	Roadside Fuels Breaks (accomplished through thinning, mowing, burning, acres are displayed in other treatments)		0	1,762	1,762
	Potential for Biomass Removal	High	0	2,633	2,617
		Medium	0	5,437	5,543
		Low	0	4,965	4,768
Road Work	Temporary Roads on Pre-disturbed Ground (miles)		0	15.2	11
	Temporary Roads New Disturbance (miles)		0	3.4	3.3
	Roads to be Closed (miles)		0	0.57	0.57
	Roads to be Decommissioned		0	2.62	2.62

Table 10: Summary of how the alternatives address the purpose and need

Purpose and Need	Alternative 1	Alternative 2	Alternative 3
Reduce stocking in ponderosa pine to increase vigor and resilience; protect or enhance ponderosa pine LOS	Trees in overstocked stands would remain slow growing. Mountain pine beetle activity would continue at present levels or increase. Dwarf mistletoe would increase and continue to spread to healthy trees.	Move 4,219 acres of the 4,824 acres of the ponderosa pine PAG towards LOS conditions	Move 3,804 acres of the 4,824 acres of the ponderosa pine PAG towards LOS conditions
Reduce hazardous fuels to protect values at risk	14% of project area rated low wildfire hazard 12,570 acres rated extreme wildfire hazard	Move 6,100 acres from extreme wildfire hazard to a lower hazard rating (majority of those acres are moved to a low hazard rating)	Move 5,777 acres from extreme wildfire hazard to a lower hazard rating (majority of those acres are moved to a low hazard rating)
Address forest health issues in lodgepole pine	0 acres of mistletoe infected stands treated 0 acres of modification to stand structure or size class diversity in lodgepole pine	727 acres of structural stages 2, 3; 1,317 acres of structural stages 5, 6, and 7 moved to stand initiation stage.	762 acres of structural stages 2, 3; 1,305 acres of structural stages 5, 6, and 7 moved to stand initiation stage.
Contribute forest products	0 board feet	19.5 million board feet	18 million board feet

Table 11: Summary of how the alternatives address the key issues

Key Issue	Alternative 1	Alternative 2	Alternative 3

Key Issue	Alternative 1	Alternative 2	Alternative 3
Managing for Wildlife Habitat within PAGs	0 acres of currently suitable black-back woodpecker habitat treated.	1 large contiguous 870-acre block of habitat retained. 2,474 leave acres All trees 21 dbh and larger would be retained. Thin ponderosa pine PAG units to create and maintain white-headed woodpecker habitat – thin 4,219 acres to 70 ft^2 basal area (range 60-80).	2 large contiguous blocks (870 and 373 acres) of habitat retained. 2,514 leave acres All old-character ponderosa pine trees would be retained, regardless of size. Retain fewer trees per acres in commercial thinning ponderosa pine PAG units to create and maintain white-headed woodpecker habitat for a longer period of time – thin 4,219 acres to 50 ft2 basal area (range 40-60).
Managing Vegetation while Providing Landscape Diversity		Retain 1,581acres of the project area would have no vegetation treatment. These areas have not been previously entered for timber harvest Retain 5,355 acres that have had previous vegetation treatments would be deferred from treatment during this entry. These areas would provide diverse stands for wildlife. Approximately up to 2,416 acres of these areas could receive some type of noncommercial thinning or fuels reduction treatments such as: mowing, precommercial thinning, lop and scatter, hand or machine piling and/or pile burning	Retain 2,297 acres of the project area would have no vegetation treatment. These areas have not been previously entered for timber harvest Retain 5,395 acres that have had previous vegetation treatments would be deferred from treatment during this entry. These areas would provide diverse stands for wildlife. Approximately up to 2,416 acres of these areas could receive some type of noncommercial thinning or fuels reduction treatments such as: mowing, precommercial thinning, lop and scatter, hand or machine piling and/or pile burning
Management of Unique and Limited Habitats	0 acres treatment in SIA ponderosa pine	185 acres thinning in SIA ponderosa pine Underburn 150 acres on Pistol Butte and 483 acres on Sitkum Butte	0 acres treatment in SIA ponderosa pine Underburn 0 acres on Pistol Butte and 350 acres on Sitkum Butte

Chapter 3 – Environmental Consequences

3.1 Introduction

This chapter discusses the existing condition of resources in the Junction project area and discloses the direct, indirect, and cumulative effects of each of the alternatives (including the no action) would be expected to have on the resources. The duration of these effects may vary depending on the resource in question. The effects analysis forms the basis of comparison of the alternatives. The discussions are organized by Specialist Reports. The chapter concludes with a discussion of specifically required disclosures. Since the public comment period, updates to the EA include general editing as well as clarifications and improvements to the effects analysis disclosure.

3.2 Cumulative Actions and Activities

Analysis of effects is generally at the project scale, which is 17,556 acres in size. Some resources are analyzed at the subwatershed or watershed scale. The scale of analysis is identified within the resource sections. The distribution of the project area in relation to 10th field subwatersheds and the 10th field watershed is displayed in the following table.

Table 12: Watershed and Subwatershed Acres within Junction Project Area

10th Field Watershed	12th Field Subwatershed	Total Subwatershed Acres	Acres of Subwatershed within the Project Area Boundary
Fall River	Deschutes Braid-Deschutes River	11,829	1,122
	Fall River	39,965	10,766
	Spring River	16,406	5,668

Probable effects are discussed in terms of environmental changes from the existing condition and include qualitative and quantitative assessments of direct, indirect, and cumulative effects. Direct effects are those effects which are caused by the action and occur at the same time and place as the action. Indirect effects are those effects which are caused by the action but are later in time or farther removed in distance what are still reasonable foreseeable.

The following section on environmental consequences includes discussion of cumulative effects. Where there is an overlapping zone of influence, or an additive effect, this information is disclosed. In order to understand the contribution of past actions to the cumulative effects of the proposed action and alternatives, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects. Most of these actions and natural events are displayed in Table 13. By looking at current conditions, we are sure to capture all the residual effects of past human actions and natural events, regardless of which particular action or event contributed those effects. This approach is consistent with Forest Service NEPA regulations at 36 CFR 220.4(f).

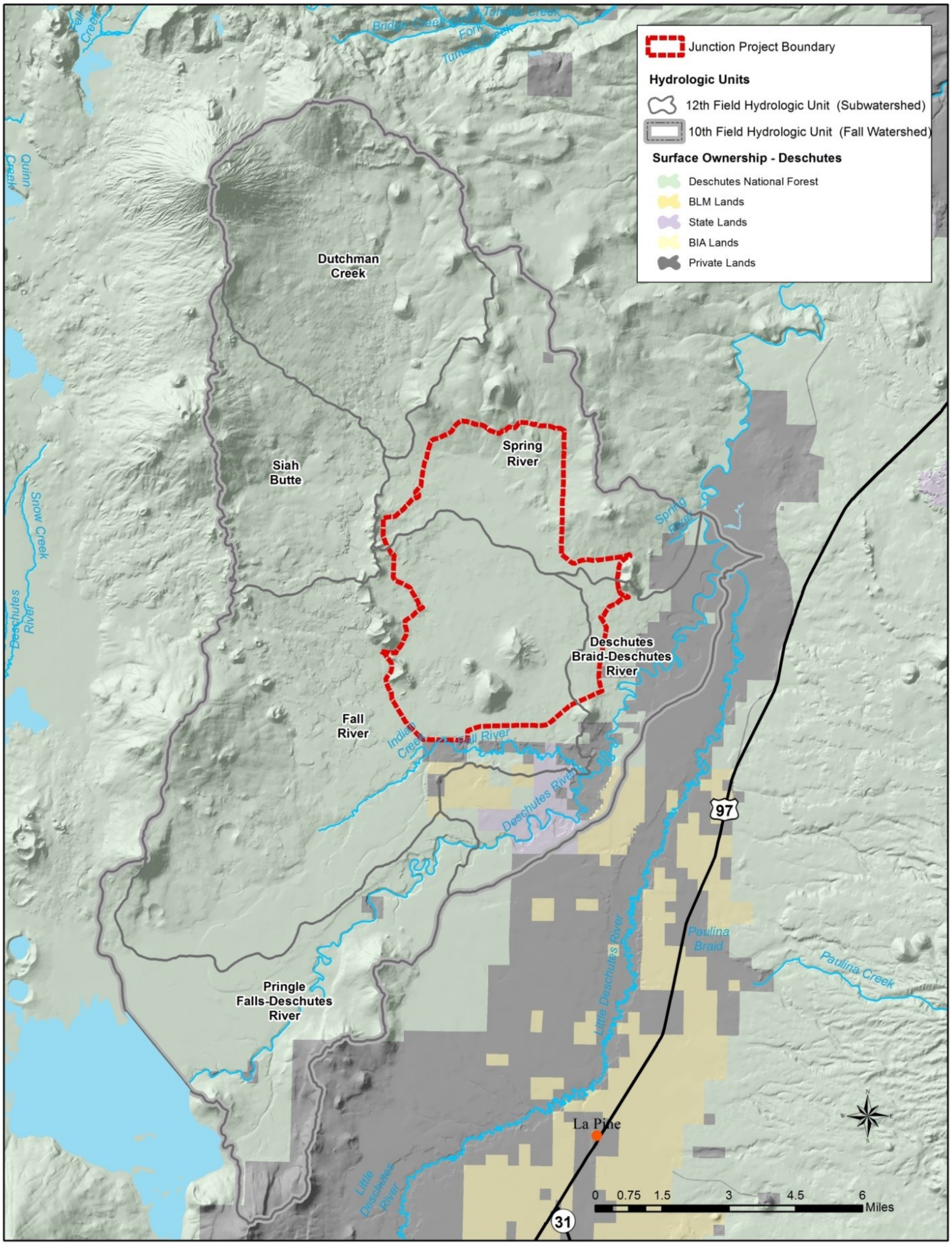


Figure 10: Fall River 10th field watershed and associated subwatersheds.

The following table lists the actions that have contributed to the existing condition within the project area and surrounding landscape. Effects analysis considers these past actions as contributing to the current condition or addresses individual projects that may continue to have an overlapping effect with the Junction project actions.

Table 13: Past and ongoing projects considered during cumulative effects analysis.

Activity	Year	Acres	Time
Lost Man Fire	1918	4,547	Past
Commercial Thinning in the project area	1991-2006	2,876	Past
Overstory Removal in the project area	1984-2006	842	Past
Partial Removal in the project area	1996	74	Past
Precommercial Thinning in the project area	1973-2010	6,163	Past
Salvage in the project area	1993-1996	910	Past
Shelterwood Establishment Cut	1984-1996	2,053	Past
Shelterwood Removal Cut	1985-2006	1,620	Past
Stand Clear Cut	1968-2001	229	Past
Thinning for Hazardous Fuels Reduction	1996-2007	1,037	Past
TSI Need Created Precommercial Thin	2003-2009	2,711	Past
Underburn-Low Intensity (Majority of Unit)	1998-2009	834	Past
Wake Butte Fire	1991	365	Past
Spring River Butte Fire	1999	84	Past
45 Road Straightening	2008	NA	Past
42 Road Repair	2009	NA	Past
Road Closures at Anne's Butte	2009	NA	Past
Roadkill Public Use Firewood Area	2009-2010	NA	Past
Operations at Fall River Fish Hatchery	NA	NA	Ongoing
Mineral use at Pistol Butte	NA	NA	Ongoing
Guzzler Management	Ongoing	NA	Ongoing

3.3 Environmental Effects Analysis by Resource

3.3.1 Forested Vegetation

Introduction

Today, characteristics of dry forests have greatly changed from historic conditions. Characteristics include some of the following: a) an accumulated mass of down woody debris and continuity of the fuels mosaic at landscape scales, b) increased densities of small trees and fewer large trees, c) greater amounts of young multi-storied forests with fire intolerant conifers in both the understory and overstory strata, d) increased ladder fuels that contribute to greater flame lengths during wildfire events, and e) new or altered regional climate patterns influencing plant community structure and organization. Increases in stand densities have led to an increased competition among trees which reduces tree vigor and increases susceptibility to insect and disease-caused mortality. Altered stand structural conditions could contribute to increased probability of multiple, interacting stresses (wildfire, insect and disease, tree competition).

Insects are major components of forest ecosystems, representing most of the biological diversity and affecting virtually all processes and uses. Bark beetles (Coleoptera: Curculionidae, Scolytidae) heavily influence the structure and function of low elevation dry conifer forests by regulating certain aspects of primary production, nutrient cycling, ecological succession and the size, distribution and abundance of forest trees (Fettig et al. 2007). While we know little about pre-Euro-American arthropod abundance and their interspecific relationships (Short and Negrón 2003), these forests likely supported many indigenous phytophagous insect species that killed trees. Phloem-boring bark beetles and cambium and wood boring beetles (Coleoptera: Buprestidae and Cerambycidae) were especially prevalent, with some preferring large, old, slow growing trees, some attacking lower boles and roots exposed after fires, some attacking the tops of trees weakened by fire, and others attacking trees with growth rates slowed by density dependent competition, drought stress, or other localized disturbances that enabled the beetles to circumvent tree defenses (de Groot and Turgeon 1998, McCullough et al. 1998). Attacks often led to mortality of individual and small groups of trees, created snags, altered the accumulation of fuels and vegetation, and created canopy gaps that provided opportunities for new seedling cohorts (Hessburg et al. 1994, Hayes and Daterman 2001).

Today, many of these same dry forests have characteristics that place them at greater risk of uncharacteristic disturbances. These features include an accumulated mass of down woody debris and continuity of the fuels mosaic at landscape scales, more small trees and fewer large trees, greater amounts of young multi-storied forests with fire-intolerant conifers in both understory and overstory strata, increased fuel ladders that contribute to greater flame lengths during fires, and new or altered forcing of regional climate on plant community structure and organization (Agee 1993, Covington and Moore 1994, Arno et al. 1997, Taylor and Skinner 1998, Harrod et al. 1999, Youngblood et al. 2004, Hessburg et al. 2005, Stephens and Gill 2005, Youngblood et al. 2006, McKenney et al. 2007). In many dry forests of the Pacific Northwest, the altered fuelbeds and shifts in forest structure and composition resulted from fire exclusion and suppression, livestock grazing, timber management activities, and changes in climate (Bergoffen 1976, Steele et al. 1986, Dolph et al. 1995, Arno et al. 1997, Richardson et al. 2007).

Increases in overall stand density over the past century have led to increased competition among trees for below-ground nutrients, water, and growing space. Increased competition among trees and reduced tree vigor increases susceptibility to attack from bark beetles and other forest insects and diseases (Mitchell 1990, Hessburg et al. 1994, Oliver 1995, Fettig et al. 2007). Mortality in ponderosa pine attributed to mountain pine beetle is positively correlated with high stand density (Sartwell and Dolph 1976, Fettig et al. 2007). Mortality in pine beetle outbreaks is not restricted to suppressed and intermediate classes; many of the largest trees in the stand are killed *(Mitchell and others 1983, 1991, 1993)*. Thinning has been shown to reduce the amount of ponderosa pine mortality caused by mountain pine beetle unless surrounding areas are allowed to develop epidemic population levels (Fettig et al. 2007). Thinning can nearly eliminate suppression mortality, reduce residue problems, lower the probability of serious mortality from pine beetles, and allow merchantable-sized trees to develop in a reasonable period *(Cochran and Dahms, 2000)*. The mountain pine beetle often kills extensively when contiguous stands or landscapes become vulnerable. These changes have occurred more recently against a backdrop of natural and human-caused climate change that may first be manifest in the distribution of herbaceous species and woody shrubs, and may eventually result in a redistribution of tree species (McKenney et al. 2007, Richardson et al. 2007). Collectively, these altered structural conditions contribute to increased probability of multiple, interacting stresses and may lead to altered or new disturbance regimes.

Existing Condition

The existing conditions in the watershed are the result of past activities and natural events such as wildfires, insects, and diseases. Past activities include vegetative management treatments, primarily natural fuels reduction and both commercial and non-commercial density reduction treatments (Table 13). Activities more than 30 years in the past are assumed to have a negligible effect on current conditions. Approximately 11,500 acres of the planning area have been treated since the 1960s and approximately 6,050 acres or 34% have not been previously entered with vegetation management activities.

The three main plant association groups (PAGs) within the Fall River watershed are lodgepole pine, ponderosa pine and mixed conifer. The lodgepole pine PAG dominates both at the watershed scale and in the project area (Table 14 and Figure 11). Plant associations are classified based on vegetation that would occupy a site in the absence of disturbance. The following table displays how much of each PAG falls within the Fall River watershed and within the Junction planning area. This table does not display PAGs that are outside the Junction planning area; refer to the specialist report in the project record for all PAGs within Fall River watershed.

Table 14: Acres of each plant association group (PAG) within the Fall River Watershed (110,215 acres) and the Junction Planning area.

Plant Association Group	Fall River Watershed Acres	Junction Project Area Acres
Lodgepole Pine Dry	39,311	11,255
Lodgepole Pine Wet	8,175	1,121
Mixed Conifer Dry	16,501	138
Mixed Conifer Wet	14,077	165
Ponderosa Pine Dry	23,442	3,649
Ponderosa Pine Wet	8,058	1,130
Cinder	237	17
Rock	117	32
Meadow	297	2

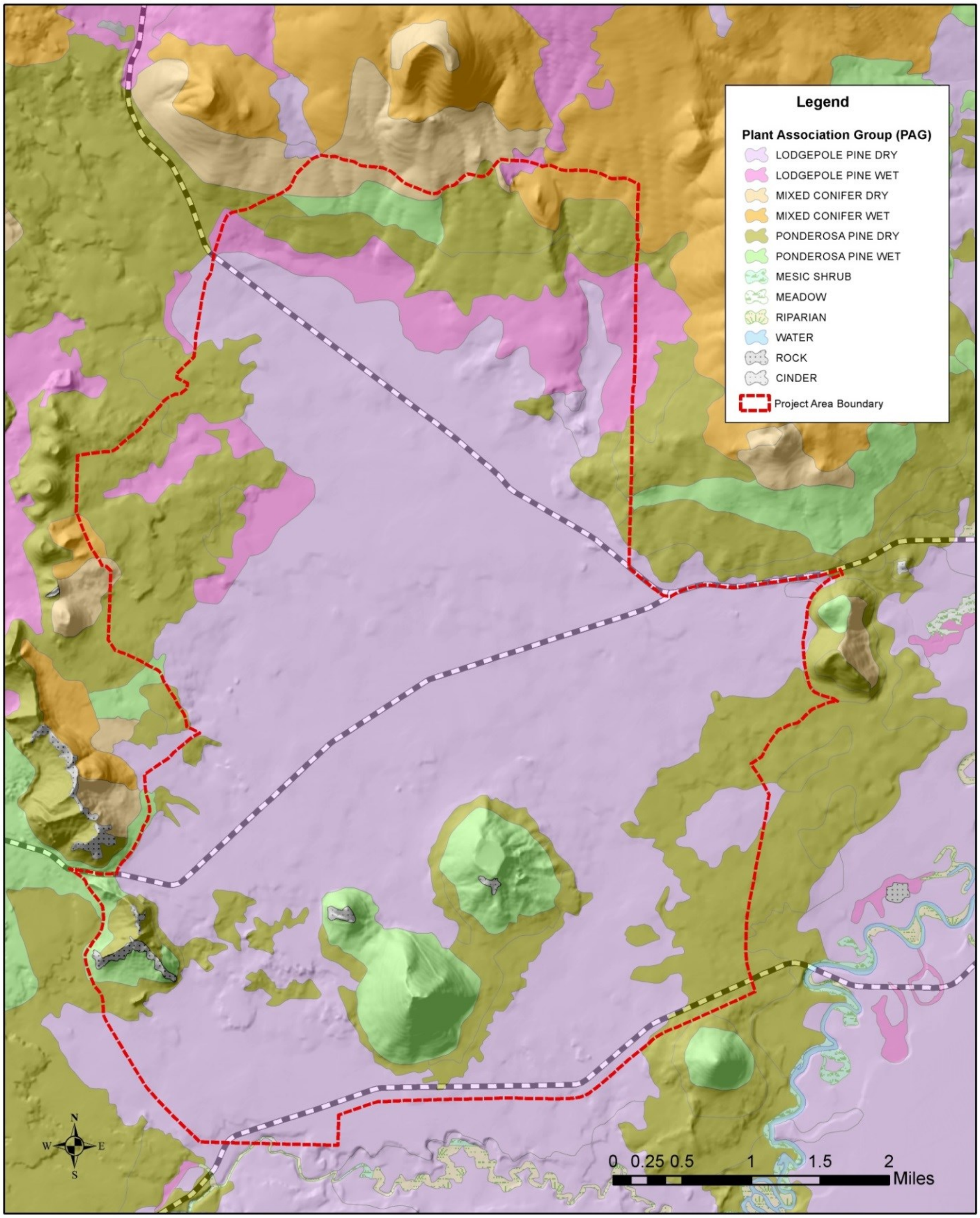


Figure 11: Junction Project area is predominantly lodgepole pine plant associations with ponderosa

pine plant associations located on the buttes and edges of the project area.

Lodgepole Pine Wet and Dry PAGs (12,376 acres, 70% of project area)

Where cold air drainage is poor, lodgepole pine of all sizes occurs in pure or nearly pure stands. Given the relatively flat topography and the resultant cold conditions, lodgepole pine is the dominant tree species on over 70% of the project area. The predominant lodgepole pine plant association is lodgepole pine/bitterbrush/western needlegrass. Past mountain pine beetle outbreaks have killed many of the large lodgepole pine trees; combined with past harvest and salvage, the result is a mosaic of young lodgepole stands within the project area. The stand initiation structural stage is within the HRV in the watershed. Lodgepole pine is a prolific seed producer with viable seed crops produced every few years. Although records show that initially in the past, natural regeneration has been variable, stocked-to-overstocked stands of lodgepole pine have often resulted in nearly all areas within ten years of harvest. Gophers were recorded as a problem primarily in the early-to-mid 1980s. Stands treated more recently are adequately stocked and appear to be more open in the understory with a sometimes patchy distribution of trees. Lodgepole pine dwarf mistletoe is present in varying amounts throughout the project area. Bitterbrush is the primary brush species, occurring in openings and where the trees are not overly dense. In the absence of brush and trees, sedges and needlegrass are the predominant ground vegetation.

Ponderosa Pine Wet and Dry PAGs (4,779 acres, 27% of project area)

Pure and nearly pure stands of ponderosa pine of all sizes occur mainly on elevated areas where cold air drainage down slope moderates air temperatures. The predominant ponderosa pine plant associations in these areas are ponderosa pine/bitterbrush/western needlegrass and ponderosa pine/bitterbrush/Idaho fescue. In the Junction project area many of these stands consist of all sizes of ponderosa. Ponderosa pine dwarf mistletoe is present in varying amounts throughout the Junction planning area. Some stands are dwarf mistletoe free. Ponderosa pine stands, especially those that have not been entered in the recent past, are generally overly dense for healthy tree vigor. Large numbers of understory trees compete with the older, generally bigger trees for moisture and nutrients. In many areas, a 1 to 4 foot tall brush component covers up to 100% of the ground. This component of snowbrush Ceanothus, bitterbrush, and green leaf manzanita also competes with the trees for moisture and nutrient. Pine grass and sedge occupy sites where brush provides less than 100% cover. With the exception of the stands on Pistol Butte nearly all ponderosa pine stands within the project area have been previously entered.

Mixed Conifer Wet and Dry PAGs (303 acres, 2%)

Mixed conifer PAGs extend upward in elevation from the higher end of ponderosa pine PAGs; environmental conditions are usually cooler and moister at these higher elevations. Mixed conifer PAGs can be found along the northern boundary (approximately 275 acres) and the far western end of the project area while the remainder is found in the far western end of the planning area.

Although stands are composed of a variety of tree species, the predominant species are true firs, ponderosa pine, and lodgepole pine. The mixed conifer areas have nearly all been entered in the past primarily to reduce stand densities through thinning. Although a few, scattered large trees may be present, residual stands are composed of smaller, <20" dbh trees. The moist growing conditions favor Ceanothus as the primary brush species. The brush is often so dense that other ground vegetation is shaded out.

Historic Range of Variability

The Eastside Screens require proposed timber sales and associated watersheds to be characterized for patterns of stand structure by biophysical environment. This characterization is to be compared to the historic range of variability (HRV), which should be developed for large landscapes across which forest types, environmental settings, and disturbance regimes are relatively uniform. It should be based on conditions in the pre-settlement era.

The HRV for the Junction project is conducted at the watershed scale. Biophysical environments are the three main plant association groups (wet and dry combined). The following table displays the exiting structural stages within the Fall River watershed and Historic Range of Variability (HRV) by PAGs.

Table 15: Current structural stage distribution compared to the Historic Range of Variability for forested areas in the Fall River watershed.

<table>
<tr><th rowspan="2">Structural Stage*</th><th colspan="2">Ponderosa pine</th><th colspan="2">Lodgepole Pine</th><th colspan="2">Mixed Conifer</th></tr>
<tr><th>HRV</th><th>Current</th><th>HRV</th><th>Current</th><th>HRV</th><th>Current</th></tr>
<tr><td>Stand Initiation (SS1)</td><td>10-20%</td><td>3,002 ac
9%
Below HRV</td><td>20-30%</td><td>12,056 ac
28%
Within HRV</td><td>25-35%</td><td>2,388 ac
7%
Below HRV</td></tr>
<tr><td>Stem Exclusion, Open Canopy (SS2)</td><td rowspan="4">30-40%</td><td rowspan="4">24,682 ac
78%
Above HRV</td><td rowspan="3">50-60%</td><td rowspan="3">13,836 ac
33%
Below HRV</td><td rowspan="4">40-50%</td><td rowspan="4">27,349 ac
77%
Above HRV</td></tr>
<tr><td>Stem Exclusion, Closed Canopy (SS3)</td></tr>
<tr><td>Under story Re-initiation (SS4)</td></tr>
<tr><td>Multi-story without Large Trees (SS5)</td><td rowspan="3">15-35%</td><td rowspan="3">16,569 ac
39%
above</td></tr>
<tr><td>Multi-story with Large Trees (SS6)</td><td>10-20%</td><td>4,088 ac
13%
Within HRV</td><td>1
5-25%</td><td>5,557 ac
16%
Within HRV</td></tr>
<tr><td>Single-story with Large Trees (SS7)</td><td>20-30%</td><td>32 ac
<1%
Below HRV</td><td>5-10%</td><td>309 ac
<1%
Below HRV</td></tr>
</table>

*See description Table 16

The HRV analysis shows that within the Fall River watershed, the stand initiation structural stage is below HRV for both ponderosa pine and mixed conifer PAGs. Those PAGs are also below HRV for the single-story with large trees structural stage. The lack of open stands where large trees are common is due to past harvest practices and fire suppression. Within the lodgepole pine PAG, structural stages 5, 6, and 7 are above HRV; these structural stages are well represented in the Junction area as is the lodgepole pine stand initiation structural stage (Figure 12).

Table 16: Description of structural stage classifications used in the HRV analysis.

Structural Stage Classification	Definition	Description
Stand Initiation SSI	Growing space is reoccupied following a stand replacing disturbance (such as a fire or harvest event) typically by early seral species.	Grass, forb, seedling/saplings. Scattered overstory may be present as in seed tree or open shelterwood.
Stem Exclusion Open Canopy SS2	Crowns are open growing, canopy is broken, may be a moisture limiting area or maintained by frequent underburning, density management or high water tables	Small diameter trees <21" dbh. Crown closure of 25% or less. Scattered overstory may be present as described in SSI.
Stem Exclusion Closed Canopy SS3	Occurrence of new tree stems is mostly limited by light availability and stand density. Tighter tree canopy is present.	Similar to SS2; however, crown closure is ≥26%
Understory Re-initiation SS4	Understory is beginning to become established. Overstory mortality creates growing space for new trees in the understory.	Overstory canopy is broken due to mortality. Overstory consists of small to medium size trees and the understory is characterized by seedlings or saplings.
Multi Stratum without Large Trees SS5	Several canopy layers are established due to management, fires, insect and disease mortality. Large trees* generally are absent due to harvest or other disturbances.	Broken overstory canopy, multi layers with the absence of large trees. Stands are characterized by diverse distributions of trees and tree sizes ranging from seedlings, saplings, poles, small and medium trees.
Multi Stratum with Large Trees SS6	Multi canopy layers, multi strata stands with large, old trees.	Broken overstory canopy, multiple layers with large trees dominant. Stands are characterized by diverse distributions of trees and tree sizes.
Single Stratum with Large Trees SS7	Single canopy of large, old trees	Broken or continuous single canopy of large old trees. Understory is absent or consists of seeds/saplings, grass, forbs, and/or shrubs.

* Large trees are defined as trees ≥21" dbh except for lodgepole pine which is considered large at 12" dbh.

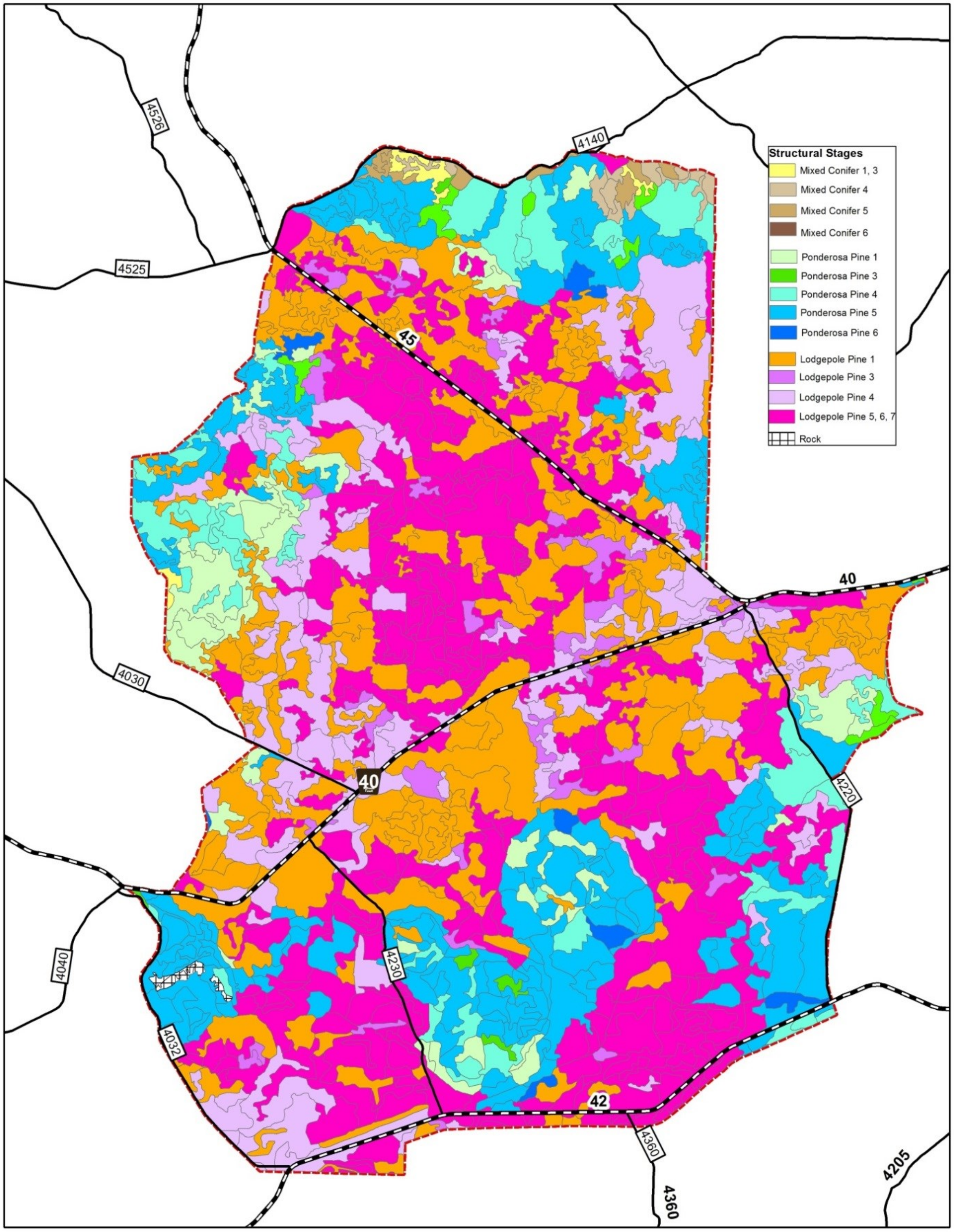


Figure 12: Structural Stages within the Junction Project Area. The structural stages considered to be LOS are lodgepole pine 5, 6, and 7; ponderosa pine 6 and 7; and mixed conifer 6 and 7. Lodgepole pine LOS is above HRV in the watershed and is common in the project area.

Effects Analysis

The scale for analysis is the project area where treatments are proposed, except for HRV and stand structure, which are analyzed at the Fall River watershed scale. Treatments would have no effect on stand density, diameter distribution, species composition, and canopy structure outside of the project area. Cumulative effects are analyzed at the Fall River watershed scale.

Direct and Indirect Effects of the Action Alterantives

Thinning increases tree growth and vigor. Thinning is recommended for maturing lodgepole pine stands based on data relating mountain pine beetle outbreaks to stand age, density and diameter distributions **(Fettig et al. 2007)**. Reductions in stand density associated with thinning treatments would increase the proportion of forested acres with a potential to develop relatively quickly into late or old structure. With longer rotations and increased individual tree growth in thinned stands, much larger trees would be produced than in unthinned stands **(Cochran and Barrett 1999)**. To retain trees with large diameters, stands need to be managed so that they do not become susceptible to serious pine beetle outbreaks (**Cochran and Barrett 1999b)**. Thinning, mowing, and burning treatments would increase the likelihood that treated stands would move towards LOS conditions. Treatments would maintain or accelerate tree diameter growth and reduce the hazard of crown fires and bark beetle outbreaks. Thinning from below, which generally removes trees from the lower canopy levels, would temporarily increase the average quadratic mean diameter of the stands.

Descired outcomes of the action alternatives

These paragraphs describe the desired future condition outlined in the Forest Plan, which are also the expected effects of the proposed activities. Ponderosa pine (Alternative 2 treats 4,219 acres; Alternative 3 treats 3,804 acres)**:** Both overstory and understory densities would be reduced to promote healthy, vigorous residual trees (FH-1, FH-2, LRMP 4-36). Larger, healthier trees would be retained (FH-3, LRMP 4-36). Smaller, less fire tolerant trees would have been removed favoring larger, more fire resistant trees. Growth rates would improve for two decades or more. Dwarf mistletoe would still be present but in reduced amounts. The resilient stands would be more open with fewer ground fuels due to mowing of the brush and/or underburning (FH-4, LRMP 4-36). Wildfires that may occur in the area would be of a low intensity and likely to cause little residual tree mortality. Healthier stand transition to later seral stages would continue at an increased rate as outlined by the Deschutes LRMP.

Lodgepole pine (Alternative 2 treats 8,511 acres; Alternative 3 treats 8,197 acres)**:** Overstory trees would be reduced or removed and previously treated stands would become more even-aged in appearance and structure (TM-21, TM-57, LRMP 4-42, 48). Understory densities would also be reduced resulting in improved residual vigor in trees of all sizes. Dwarf mistletoe would be present but in reduced amounts. If not piled or removed for biomass, thinning slash would remain on site and naturally dissipate. Residual understory lodgepole pine tree numbers in treated areas would range from 100 to 300 trees per acre. Underburning would not be done in lodgepole pine areas (FF-11, LRMP 4-74). However, a minor amount of lodgepole pine mortality is expected from fire creeping into lodgepole pine areas when prescribed fire is applied in adjacent ponderosa pine dominated areas. Regeneration in seed tree areas may take up to a decade to adequately become established. These more open areas would provide some landscape diversity with the dense, previously regenerated areas. Bitterbrush would increase over time as more light and moisture become available due to tree density reduction under the proposed actions. Healthier residual stands would have a more even aged appearance.

Stands in No Treat areas would remain unchanged from current conditions. Standing and down dead trees would be abundant. Dwarf mistletoe levels would remain the same and can be expected to increase gradually over time. No Treat/retention areas would continue to provide diverse areas for both visual purposes and for wildlife species.

Mixed Conifer (Alternative 2 treats 252 acres; Alternative 3 treats 252 acres)**:** Residual mixed conifer stands would contain a mix of species (TM-64, TM-66, LRMP 4-48, 49), while meeting objectives for long term health and vigor (TM-65, LRMP 4-49). Smaller, less fire tolerant trees would have been removed favoring larger, more fire resistant trees. The resilient stands would be more open with fewer ground fuels due to mowing of the brush and/or underburning (FH-4, LRMP 4-36). Healthier stand transition to later seral stages will continue at an increased rate as outlined by the Deschutes LRMP.

Alternative 1 – No Action

Landscape Diversity

Under this alternative the project area would not receive treatments; therefore, there would be no immediate change in landscape diversity. Overly dense under and overstories would remain and stand densities in area not fully occupied by vegetation would gradually increase as stand development continues.

Green tree replacements (GTRs) would remain across the landscape and all trees would continue to be available for use as GTRs (future snags). The amount of GTRs between 8 and 18 inches dbh available would remain at current levels of 23 trees per acre on average. Snags are expected to increase over time as insects and overly dense stands continue to contribute to tree mortality. Down woody debris levels would increase as snags continue to fall.

Trees in overstocked stands would remain slow growing. Mountain pine beetle activity would continue at present levels or increase. Dwarf mistletoe would increase and continue to spread to healthy trees. Existing infections would continue to utilize tree nutrients, weakening the infected trees and killing them in the long-term. The risk of fire-caused mortality would remain and increase as stands do.

Management of Unique and Limited Habitats

The ponderosa pine PAG would not receive treatment and stand development to LOS conditions would continue at current levels and would not be accelerated. Density-induced mortality could impact development of LOS conditions.

Approximately 35 acres of the Wake Butte Special Interest Area (SIA) received recent stand density reduction treatments; as a result of treatments, trees are expected to be free to grow for two decades. The remaining 170 acres would remain untreated and stand conditions would change from existing to overly dense overtime. Overtime stand conditions, without treatment, would become overly dense resulting in increased competition and greater susceptibility to beetle caused mortality.

All ponderosa pine and white fir having old tree characteristics would be retained.

The old growth area (384 acres) would remain as is and development of large tree, characteristic of old growth, would not be accelerated.

Previously untreated stands (6,050 acres) would remain in their untreated condition and would continue to provide diversity across the landscape.

The risk of wildfire would not be reduced on Pistol and Sitkum Buttes.

Green-tinged paintbrush individuals and populations would continue to compete with trees and overtime competitive stresses would continue to degrade habitat for individuals and populations.

Alternative 2

Landscape Diversity

Approximately 12,982 acres would receive overstory treatments within the project area. Vegetation treatments in dense stands would improve forest health and enhance stand diversity for at least two decades. Treatments in less dense stands would maintain forest health longer into the future than if left untreated. Underburning (5,551 acres) and mowing (7,746 acres) would help protect vegetation from wildfire and maintain vegetation diversity.

The amount and size of GTRs would be reduced. In areas receiving seed tree treatments (2,338 acres) 10 trees per acre would be available. Overstory treatment (4,432 acres) 100 to 300 trees per acre up to 4 inches dbh would be available as GTRs. The amount of trees available as GTRs between 8 and 18 inches would be 13.5 trees per acre.

Post treatment snags densities would remain the same on acres receiving no overstory treatments (6,940 acres) and as stand densities increase additional snags would occur on 4,524 of these acres. Ponderosa pine snag levels would not be reduced, except for safety considerations (Hazard Tree direction). On 10,619 acres proposed for overstory treatments, lodgepole pine snag numbers would be reduced due to salvage harvesting of standing dead lodgepole pine.

Management of Unique and Limited Habitats

Alternative 2 would treat approximately 4,219 acres or the 4,824 acres of the ponderosa pine PAG. Treatments would develop stands, at an accelerated pace, towards LOS conditions. Large ponderosa pine trees are a favored habitat of white-headed woodpeckers. This habitat would develop more rapidly as a result of treatments. Re-entry to reduce tree densities would not be needed of an estimated 20 years.

Approximately 185 acres of the 203 acre Wake Butte SIA would be treated under Alternative 2 and approximately 35 acres recently received stand density reduction treatments with the Pit and Fall Timber Sales. Trees on the treated 35 acres are expected to grow freely for at least two decades. Conditions on the post-treated 185 acres would change allowing trees to freely grow for two decades. Thinning dense stands around the base of the butte could reduce the risk of wildfire from spreading into or out of the unthinned stands up-slope. Treatments would also help to release the overstory and enhance site productivity and growth.

All ponderosa pine and white fir having old tree characteristics would be retained on 4,989 acres.

Approximately 180 of the 384 old growth acres would be treated accelerating development of large tree characteristics on treated acres.

Approximately 1,881 acres (31%) of the 6,050 previously untreated acres would not receive treatment under this alternative. Untreated stands would continue to develop and continue to provide diversity across the landscape.

Pistol and Sitkum Buttes (1,275 of the 1,335 acres) would be burned. Stand conditions would change as a result of burning by reducing the risk of wildfire.

Stand density reductions would improve green-tinged paintbrush populations and habitat in 53 units.

Alternative 3

Landscape Diversity

Alternative 3 would treat approximately 12,253 acres of the 17,556 acre project area. Vegetation treatments in dense stands would improve forest health and enhance stand diversity for at least two decades. Treatments in less dense stands would maintain forest health longer into the future than if left untreated. Underburning (5,088 acres) and mowing (7,259 acres) would help protect vegetation from wildfire and maintain vegetation diversity across the landscape.

The number and size of GTRs would be reduced. In areas receiving seed tree treatments (2,322 acres) 10 trees per acre would be available as GTRs. Overstory treatment (4,235 acres) 100 to 300 trees per acre up to 4 inches dbh would be available as GTRs. On 3,843 acres of overstory treatments, three overstory trees per acre would be retained and on 38 acres all overstory trees would be retained. The amount of trees available as GTRs between 8 and 18 inches would be 12.8 trees per acre.

Post treatment snags densities would remain the same on acres receiving no overstory treatments (7,730 acres) and as stand densities increase additional snags would occur on 5,318 of these acres. Ponderosa pine snag levels would not be reduced, except for safety considerations (Hazard Tree direction). On 9,826 acres proposed for overstory treatments, lodgepole pine snag numbers would be reduced due to salvage harvesting of standing dead lodgepole pine.

Managing Unique and Limited Habitats

Alternative 3 would treat approximately 3,804 acres of the 4,824 acres of the ponderosa pine PAG. Treatments would develop stands, at an accelerated pace, towards LOS conditions.

The Wake Butte SIA would remain untreated under Alternative 3. Approximately 35 acres recently received stand density reduction treatments with the Pit and Fall Timber Sales. Trees on the treated 35 acres are expected to grow freely for at least two decades. No such treatments have occurred or would occur on the remaining 170 acres. Overtime stand conditions on the untreated acres would become overly dense resulting in increased competition and greater susceptibility to beetle caused mortality.

All ponderosa pine and white fir having old tree characteristics would be retained on all acres.

Treatments would not occur in old growth areas (384 acres). Development of large tree characteristics would not be accelerated on these acres.

Approximately 2,121 acres (35%) of the 6,050 previously untreated acres would not receive treatment under this alternative. Untreated stands would continue to develop and continue to provide diversity across the landscape.

Pistol and Sitkum Buttes (980 of the 1,335 acres) would be burned. Stand conditions would change as a result of burning by reducing the risk of wildfire.

Stand density reductions would improve green-tinged paintbrush populations and habitat in 53 units.

Summary of Alternative 2 and Alternative 3 Direct and Indirect Effects

Changes in PAG structural stage acres differ slightly (35 acres) between the action alternatives (Alternative 2 and Alternative 3); therefore, changes in structural stages is considered the same for the action alternatives (Table 17). There is no net loss of late old structure (LOS) in PAGs from the action alternative treatments.

Ponderosa Pine PAG: Treatments in both the overstory and understory would reduce tree densities and promote healthy residual trees. Larger, healthier trees would be retained while smaller, less fire tolerant trees would be removed. In commercial thin units where the lodgepole overstory would be removed the objective is to favor the growth of ponderosa pine. Growth rates would improve for two or more decades. Dwarf mistletoe would be in reduced amounts. Stands would be more open with fewer ground fuels as a result of fuels treatments resulting in low intensity wildfires.

In ponderosa pine PAGs approximately 59 acres move from mid to an early structure stage which equates to about 1% of the project area PAG acres and 0.1% of the Fall River watershed PAG acres. No LOS ponderosa pine would be modified.

Lodgepole Pine PAG: Overstory and understory tree densities would be reduced resulting in a more even age overstory and a less dense understory ranging from 100 to 300 trees per acre. Dwarf Mistletoe would be reduced in stands. If not piled or removed for biomass, thinning slash would remain onsite and naturally dissipate. Bitterbrush would increase over time as more light and moisture become available due to reduced tree densities.

Stands in No Treat units would have abundant standing and down dead trees. Dwarf mistletoe levels are expected to increase gradually over time in those areas.

Within the lodgepole pine PAGs, 2,044 or 2,068 acres would move into the early structure stage of stand initiation (Table 17). This change would represent 5% of the lodgepole pine PAG in the watershed. LOS stands in this PAG are currently above the HRV in the Fall River watershed. The 1,300 acre plus reduction in LOS would move this PAG to within the upper end of HRV amounts within the watershed. The intent of treatments is to meet direction for even age management in lodgepole pine areas and also to favor single strata stands in lodgepole pine visual areas.

Mixed Conifer PAG: Mixed conifer stand densities and ground fuels would be reduced. Smaller, less fire tolerant trees would be removed while favoring larger, more fire resistant species.

Within the mixed conifer PAGs, there are no changes in the amounts of acres by structural stage as a result of the action alternatives (Table 17).

Table 17: Changes in structural stages by alternative within the Junction project area.

<table>
<tr><th rowspan="2">Structural Stage</th><th colspan="2">Ponderosa pine</th><th colspan="2">Lodgepole Pine</th><th colspan="2">Mixed Conifer</th></tr>
<tr><th>Alternative 2</th><th>Alternative 3</th><th>Alternative 2</th><th>Alternative 3</th><th>Alternative 2</th><th>Alternative 3</th></tr>
<tr><td>Stand Initiation (SS1)</td><td>+59</td><td>+59</td><td>+2,044</td><td>+2,068</td><td>0</td><td>0</td></tr>
<tr><td>Stem Exclusion, Open Canopy (SS2)</td><td rowspan="4">-59</td><td rowspan="4">-59</td><td rowspan="3">-727</td><td rowspan="3">-762</td><td rowspan="4">0</td><td rowspan="4">0</td></tr>
<tr><td>Stem Exclusion, Closed Canopy (SS3)</td></tr>
<tr><td>Under story Re-initiation (SS4)</td></tr>
<tr><td>Multi-story without Large Trees (SS5)</td><td rowspan="3">-1,317</td><td rowspan="3">-1305</td></tr>
<tr><td>Multi-story with Large Trees (SS6)</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Single-story with Large Trees (SS7)</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
</table>

With no more than 35 acres difference between the action alternatives, changes in structure stage by alternative are nearly identical. There are no changes in the amounts of acres by structural stage for the mixed conifer PAGs as a result of either alternative. For Ponderosa pine PAGs the 59 acres that move from a mid to an early structure stage is about 1% of the Junction planning area PAG acres and 0.1% of the watershed PAG acres. Any impact from such a small change would be minor. There is no loss of LOS in either of these PAGs as a result of the proposed activities. The proposed thinning activities in each of these PAGs would accelerate large tree development enabling a more rapid development of this key old growth component.

Within the lodgepole pine PAGs, a relatively large number of acres move into the early structure stage from the late and mid structure stages. The 2,000+ acres that would become early structure stage represents approximately 5% of the lodgepole pine PAG within the watershed. Available data indicates that the late and old structure stands are currently above the historic range for the watershed; the 1,300+ acre reduction in late and old structure stands would reduce the watershed total for this category to within the upper end of HRV amounts. Because of more rapid tree growth as a result of thinning small diameter lodgepole pines, stand development would accelerate to later structure stages.

Cumulative Effects

The action alternatives propose some sort of treatment activity (overstory, understory, or fuels treatments) on approximately 74% of the project area which could affect 11% of the Fall River watershed. Ongoing projects within the watershed include pile burning or underburning in the Klak, Katalo, Fall Pit, Nut, and Charlie Brown project areas. Harvest activities within these project areas have already been completed and any changes to the structural stages is reflected in Table 15. EXF Thinning, Fuels Reduction, and Research project is currently being implemented on approximately 2,500 acres. Although the EXF project is thinning in LOS ponderosa pine and causing 7 acres to no longer meet the criteria for LOS, the Junction project would not remove ponderosa pine LOS therefore there would be no cumulative effect to LOS acres. Thinning in ponderosa pine structural stages that are currently above would combine with thinning treatments in EXF to further move the watershed closer to HRV. Ongoing activities when combined with proposed activities would increase tree vigor across the landscape which would increase trees resistance to insect and thus reducing the likelihood of landscape level tree mortality. Another cumulative effect from ongoing and proposed activities would be the reduction of fuel continuity across the landscape reducing the potential wildfire intensity. Lower fire intensities could make a fire easier to control and/or suppress which would improve firefighter and public safety.

Eastside Screens

There would be no net loss of LOS. No timber sale harvest activities are associated with LOS stagest that are below HRV. All proposed harvest treatments would retain all live trees greater than or equal to 21 inches dbh. Harvest activities will move ponderosa pine stands towards LOS. Reduced stand density will maintain or accelerate tree diameter growth and will reduce conditions favorable for bark beetle outbreak. Accelerated diameter growth and reduced beetle hazard would maintain or accelerate the trajectory towards LOS. Harvest in ponderosa pine stands will move them closer to open park-like conditions that occurred historically.

3.3.2 Fire and Fuels

Introduction

Most of the Junction project area is rated extreme for fire hazard and high to very high for wildfire risk. Several high use roads traverse the project area providing major recreation travel routes. Protecting the public and enhancing firefighter safety along these major transportation routes is a key purpose in this project and will provide safe egress of local residents of Fall River Estates and forest users, as well as safe ingress/egress of firefighters in the event of a wildfire. Treatments in the ponderosa pine primarily enhance stand resiliency and reduce potential wildfire intensities. Treatments in the lodgepole pine enhance stand resiliency to mistletoe infestations while contributing forest products.

Guidance for addressing the wildland fire problem is contained in the National Cohesive Wildland Fire Management Strategy (2010), as outlined in the Fire and Fuels Report. Additional and more specific guidance is contained in Community Wildfire Protection Plans as introduced in Chapter 1 of this EA (p. 6). The goal for fuel management from the Deschutes LRMP is "To provide a well-managed fire protection and prescribed fire program that is cost efficient, responsive to land stewardship needs, and resource management goals and objectives."

Analysis Methods, Assumptions, and Scope

One purpose of the Junction project 'is to create landscape level vegetative conditions that reflect historic vegetation and disturbance patterns and scales that can be maintained over the long term.' Landscape historic conditions and disturbance patterns are commonly measured in terms of fire regimes and condition class that develop over time and at a larger scale than the project level (see Existing Condition discussion). For this reason, the existing condition may be described in those terms, but because the proposed action alternatives happen within a set amount of time may not be measured for each of the proposed action alternatives within the project area. The ability to support historic conditions and disturbance patterns as they relate to fire at the project level may be implicated by potential wildfire behavior, measured in this report as Fire Hazard and Fire Risk, within the project area. This fire and fuels analysis addresses the effects to fuels and fire behavior as a result of the no action and two action alternatives.

The area of analysis was initially expanded in order to be large enough to encompass average natural disturbance events (like fire or insect outbreaks) within each vegetation type. This larger area could be a specific Hydrologic Unit Code (HUC), which is a watershed of particular size or the area could be something more arbitrary but still larger than the bound planning area. Even if a larger area was initially used for analysis, for the purpose of this report most results are shown as having been bound by the Junction project area. In the case where analysis results represent an expanded area of analysis, a note of such will be made.

The attributes used to evaluate the analysis were Fire Hazard, Fire Risk, and Air Quality. The following measures were used for the analysis:

Measure 1 Fire Hazard: Acres of the project area within each fire hazard class. Fire hazard for this measure is represented by a matrix of both flame length potential and crow fire potential.

Measure 2 Fire Risk: Acres of project area falling within each fire risk class. Fire risk for this measure is represented by burn probability.

Measure 3 Air Quality: This measure is represented by Production of Particulate Matter (PM) 10 and 2.5.

The scope of the analysis for this project is focused on the area bound by the Junction planning area. Only fire and fuels reduction activities that occurred within the project area during the preceding 15 years were considered in the analysis of cumulative effects for fire and fuels hazard reduction. District experience and field reviews have shown that vegetation management activities such as thinning followed by mowing and prescribed fire have the beneficial effect of reducing fire intensity and fire behavior for an average of 15 years, perhaps longer depending on location and treatment intensity.

Existing Condition Analysis Methods

Fire behavior for the existing condition/no action of the Junction Planning area has been predicted by using a number of state of the art tools. Remote sensing satellite imagery from 2004 was updated using

ArcFuels (Ager et al., 2011) to reflect activities accomplished since 2004. The data was then analyzed in the computer model FlamMap (v. 3.0) under specific weather conditions. FlamMap, a fire behavior mapping and analysis program that computes fire behavior characteristics (rates of spread, flame length, crown fire potential, etc.) over an entire landscape, was used to determine the existing stand condition's potential fire behavior. FlamMap is a state of the art tool used by many researchers and modelers (Finney, 2006, Stratton, 2004, Ager, Finney & McMahon, 2006, Gercke & Stewart, 2006, Opperman et al., 2006, Ager et al., 2006, Yohay et al, 2009, Krasnow et al., 2009, Arca et al., 2007, Stratton, 2006, Knight & Coleman, 1993). FlamMap output lends itself well to landscape comparisons (e.g. pre- and post-treatment effectiveness) and for identifying hazardous fuel and topographic combinations, thus aiding in prioritization and assessments (Stratton, 2004). Although the (modeling) approach has limitations, model outputs yield useful information for planning, assessing, and prioritizing fuel treatments (Stratton, 2004).

The data inputs necessary for FlamMap include aspect, slope, elevation, fuel model, canopy height, canopy base height, crown bulk density, and crown class. The fuel and weather conditions used were those representing the 97th percentile weather from the Round Mountain Remote Access Weather station. The Round Mountain RAWS is the weather station closest to the project area (approximately 5-10 air miles from any given portion of the project area) and that best represents summer weather and fuel conditions for the project area. The 97th percentile fuel moisture conditions and wind conditions used can be referenced in Section 3 of the Fuels Report Appendix. More information on 97th percentile weather can also be found in the General Assumptions section on pages 11-12. A fuel moisture conditioning period of August 10th at 1300 to August 12th at 1300 was used. The weather (.wtr) and wind (.wnd) files used for fuel moisture conditioning are for Round Mountain and can be referenced in Section 3 of the Appendix to the fuels report. The model assumes constant weather and fuel moisture conditions (beyond the fuel moisture conditioning period) for each scenario. Results from modeling in FlamMap were analyzed in ArcFuels and are shown in this report as both tabular and spatial outputs.

Analysis Methods for Action Alternatives Fire Behavior Measures #1 and #2

Predicted fire behavior for the Action Alternatives was analyzed using the same technique as the analysis for the existing condition (no action alternative). The updated remote sensing satellite imagery data (representing existing conditions) was changed using ArcFuels(Ager et al., 2011) to reflect the proposed treatments on the ground, as per the professional judgment (and FVS modeling) of Paul Brna, silviculturist and Deana Wall, fuels specialist. The change in data can be referenced in the Fuels Reprot Appendix Section 4. Once the data was changed, the data was modeled in FlamMap, under the same 97th percentile extreme summer weather conditions from Round Mountain weather station that were used for the existing condition. Results from modeling in FlamMap were analyzed in ArcFuels and are shown in this report as both tabular and spatial outputs.

Analysis Methods for Existing Condition and Action Alternatives Smoke Management Measure #3

In order to determine the differences in particulate matter released during wildfire compared to prescribed fire or pile burning for either the existing condition/no action alternative or the two action alternatives, an analysis was done in the computer models FOFEM (First Order Fire Effects Model) (Keane et al., 2000) and Consume 3.0 (Anderson et al, 2008). FOFEM is a computer program that was developed to meet needs of planners in predicting and planning for fire effects, including smoke impacts. Consume 3.0 is a computer program that was designed for resource managers and scientists to estimate fuel consumption and emissions (used in this analysis strictly for pile burning). The assumptions made within FOFEM, as well as Consume 3.0, are as follows;

- Prescribed underburning occurs in Interior Ponderosa Pine (SAF 237) and wildfires occur under both Interior Ponderosa Pine (SAF 237) and Lodgepole Pine (SAF 218) under natural fuel conditions
- Prescribed underburning is conducted under spring and moderate fuel moisture default conditions; wildfires occur under summer and very dry fuel moisture default conditions with an adjustment of the 10 hour fuels to 4%, and 1000 hour fuels to 9% (97th percentile conditions)
- Prescribed underburning would be conducted with light 3+ inch diameter fuels and sparse herbaceous, shrub, foliage, and branch conditions; wildfires occur under typical, default conditions for all fuel types
- Pile burning emissions represent an assumed 'worst case scenario' of consuming 29.64 tons/acre (regardless of machine or hand piles). Primary species of lodgepole pine, secondary of ponderosa pine, pile type #2 (see Consume 3.0 for details), 0% soil and of clean quality.

General Assumptions made in Effects Analysis

Alternative development and environmental effects are based on the following assumptions:

- Lightning will remain a source of potential ignitions.
- The earth has entered an era of rapid environmental change and global warming that present unknown challenges (Millar et al., 2007)
- An increase in average tree diameter of the stand reduces fire severity. Larger trees have thicker bark and are more resistant to flame scorch from surface fuels. The more acres thinned from below, the greater the average diameter of remaining trees.
- Treatment of natural surface fuels will reduce fire severity.
- Wildland fire will not be eradicated in these ecosystems. A successful strategy will be built upon designing a vegetative environment, including species and structural characteristics that will produce desired, safely manageable fire behavior in the event of an unplanned ignition.
- There are no ecosystems that are completely "fire safe." Certain combinations of ignition, fuel moisture in the live and dead vegetation, wind, and relative humidity can combine under extreme circumstances to threaten any vegetated ecosystem.
- Public and firefighter safety is the top priority in fuels and fire management. Treatments in the forest will focus on creating a safe working environment for fire suppression forces.
- Ground suppression forces can operate safely adjacent to flames that are 4 feet in length and less. Extreme fire behavior, including crown fire, rapid surface spread and long range spotting, create an unsafe environment for the public and firefighters.
- The Junction Planning Area is valued for a variety of reasons, including wildlife habitat, unique vegetative communities and visual quality among others. Any management done in the name of hazardous fuels reduction in that zone must also consider the other objectives.
- Weather conditions at the 97th percentile for FlamMap analysis are defined as the combination of temperature, relative humidity, and wind speed on a summer day that is warmer, drier, and windier than 97% of all other recorded summer days. "Fire season" is defined as the 92 day period between July 1st and September 30th, during which most fires and acres burn. Under 97th percentile conditions, there will be about 3 days on average that are hotter, drier, and windier than those 97th percentile conditions.

- For the analysis in this document, the effects of treatments are assumed to cover 100% of the treatment area. There is currently no way to spatially analyze untreated areas within treatment units (i.e. it is not possible to capture the analysis of the effect of leaving 10 or 20% of mowing units unmowed). Leaving certain areas of units untreated would likely reduce the effectiveness of hazard fuel reduction indicated in the analysis, but to what extent is unknown.
- Any analysis completed using the FlamMap model adopts all limitations and assumptions of the model itself, see Finney et al., 2006.
- Tree mortality from potential wildfire is not predicted by any of the models used in this analysis, and thus mortality from potential wildfire is not measured in any quantifiable way. It is assumed from best available science that fuels treatments reduce fire severity and crown scorch (Pollet & Omi, 1999; Ritchie, Skinner & Hamilton, 2007). It is assumed from best available science that larger diameter and taller trees generally survive greater levels of fire damage (Wyant et al., 1986; Harrington, 1993; Regelbrugge and Conard, 1993; Stephens and Finney, 2002; Thies et al., 2005). It is also assumed from best available science that fire damage to the crown and bole influences a tree's probability of surviving fire, and that either crown scorch, consumption or a combination of the two are important to mortality of ponderosa pine trees (Dieterich, 1979; Wyant et al., 1986; Saveland and Neuenschwander, 1990; Stephens and Finney, 2002; Wallin et al., 2003; McHugh & Kolb, 2003; McHugh et al., 2003). Ground fire severity is also assumed to be linked with postfire mortality (Swezy & Agee, 1991; McHugh & Kolb, 2003), as well as beetles that may be attracted to fire-damaged trees (McCullough et al., 1998, Parker et al., 2006.

Existing Condition

Vegetation, Condition Class, and Fire History

For the purpose of analysis of vegetation condition, the area considered is the 10th field Hydrologic Unit Code (HUC), which for the Junction planning area is the Fall River 10th field HUC (watershed), which covers 117,638 acres. The vegetation condition analysis for Junction is part of the analysis conducted by the Upper Deschutes Basin Fire Learning Network (2007).

About 42% (48,046 acres) of the Fall River 10th field HUC is made up of the ponderosa pine Plant Association Groups (PAG). Ponderosa pine PAGs develop over an extremely long period covering centuries and is dominated by ponderosa pine, with a presence of lodgepole pine and white fir in areas ecotonal to the lodgepole pine or mixed conifer plant associations. Historically, in these PAGs, low-severity fires are fires in which less than 25% of the dominant overstory vegetation is replaced. However, mixed severity fires that replace up to 75% of the overstory can occur on occasion. Large stand-replacing events are rare events (200+ years) (NIFTT, 2010). These PAGs are categorized into what is considered Fire Regime I (refer to Fuels Report Appendix Section 1 Definition/description of fire regime and condition class).

The low-severity fires that typify Fire Regime I happen most frequently (0-35 years; see Fuels Report Appendix: Section 1). Many scientists cite similar frequent fire frequencies for Fire Regime I landscapes (Weaver, 1951, Dieterich, 1980, Savage & Swetnam, 1990, Weaver, 1959, Soeriaatmadja, 1966, Morrow, 1985). This short interval fire cycle would indicate that most of the Fire Regime I area would have burned more than three times without human influence and intervention since the early 1900s. An analysis of the historical large fire record that dates back to about 1904 for the Deschutes National Forest indicates that about 9% (11,057 acres) of Fire Regime I within the Fall River 10th field HUC has burned since the beginning of record. This would indicate that more than ninety percent of the area has missed three or more entries of fire over the course of the last century. The 9% of Fire Regime I that has burned has only burned once in that amount of time, and so therefore is either currently missing an interval or more of fire, or had been missing an interval or more of fire before fire entered the regime. Refer to Table 18 for current conditions of Fire Regime I in relation to missed fire cycles. A more detailed discussion with more complete definitions of Fire Regimes may be found in the Appendix of the Fuels Report.

Nineteen percent (22,426 acres) of the Fall River 10th field HUC is made up of the dry and wet mixed conifer PAGs. These stands can be dominated by ponderosa pine, lodgepole pine and white fir. Western white pine, historically, would have been associated with these plant associations though due to the exotic disease, white pine blister rust, this species is now rare. These stands were established and maintained, again assuming no human influence or intervention, with a fire return interval of about 35-100 years. Fire in these areas tends to be of mixed severity which results in heterogeneous landscapes. Within these landscapes a mix of stand ages and size classes are important characteristics; generally the landscape is not dominated by one or two age classes. Large stand replacing fires occur, but are usually rare events. Such stand-replacing fire may “reset” large areas (10,000-100,000 acres) (NIFTT, 2010). These PAGs are categorized into what is considered Fire Regime III.

The 35-100 year fire cycle would indicate that most of the Fire Regime III area would have burned at least once, possibly up to three times, without human influence and intervention since the early 1900s. An analysis of the historical large fire record that dates back to about 1904 for the Deschutes National Forest indicates that about 25% (5563 acres) of Fire Regime III within the Fall River 10th field HUC has burned since the beginning of record. This would indicate that about three quarters of this fire regime has missed one or more entries of fire over the course of the last century. The 25% of Fire Regime III that has burned has only burned once in that amount of time, and presumably is functioning within or near within its historical range of variability. A more detailed discussion with more complete definitions of Fire Regimes may be found in Section 1 of the Appendix of the Fuels Report.

About 39,826 acres (34%) of the Fall River 10th field HUC is typified by the Lodgepole pine PAG. Lodgepole pine PAGs are seral communities that arise from and/or are maintained by stand-replacement fires. Fires are of stand-replacing severity, since Lodgepole pine is not fire resilient, and typical fire return intervals are 35-100+ years (NIFTT, 2010). These PAGs are categorized into what is considered Fire Regime IV.

The 35-100 year fire cycle would indicate that most of the Fire Regime IV area would have burned at least once, possibly up to three times, without human influence and intervention since the early 1900s. An analysis of the historical large fire record that dates back to about 1904 for the Deschutes National Forest indicates that about 19% (7464 acres) of Fire Regime IV within the Fall River 10th field HUC has burned since the beginning of record. This would indicate that more than three quarters of this fire regime has missed one or more entries of fire over the course of the last century. The 19% of Fire Regime IV that has burned has only burned once in that amount of time, and presumably is functioning within or near within its historical range of variability. Refer to Table 18 for current conditions of Fire Regime IV in relation to missed fire cycles.

Table 18: Condition Class Descriptions

Condition Class	Attributes	Example Management Options
Condition Class 1	▪ Fire regimes are within or near an historical range. ▪ The risk of losing key ecosystem components is low. ▪ Fire frequencies have departed from historical frequencies (either increased or decreased) by no more than one return interval. ▪ Vegetation attributes (species composition and structure) are intact and functioning within an historical range.	Where appropriate, these areas can be maintained within the historical fire regime by treatments such as fire use.
Condition Class 2	▪ Fire regimes have been moderately altered from their historical range. ▪ The risk of losing key ecosystem components has increased to moderate. ▪ Fire frequencies have departed (either increased or decreased) from historical frequencies by more than one return interval. This change results in moderate changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns. ▪ Vegetation attributes have been moderately altered from their historical ranges.	Where appropriate, these areas may need moderate levels of restoration treatments, such as fire use and hand or mechanical treatments, to be restored to the historical fire regime.
Condition Class 3	▪ Fire regimes have been significantly altered from their historical range. ▪ The risk of losing key ecosystem components is high. ▪ Fire frequencies have departed (either increased or decreased) by multiple return intervals. This change results in dramatic changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns. ▪ Vegetation attributes have been significantly altered from their historical ranges.	Where appropriate, these areas need high levels of restoration treatments, such as hand or mechanical treatments. These treatments may be necessary before fire is used to restore the historical fire regime.

A more detailed discussion with more complete definitions of Fire Regimes may be found in the Appendix of the Fuels Report report.

About 4,927 acres (4%) of the Fall River 10th field HUC is typified by the Mountain Hemlock PAG. Mountain Hemlock PAGs are communities found at the cold and wet extremes of the environment. Therefore, fires are rare with fire return intervals of over 200 years. When fires do occur they tend to be stand replacing. These PAGs are categorized into what is considered Fire Regime V.

The fire cycle of over 200 years would indicate that this regime is probably still functioning within or near its historical range of variability. An analysis of the historical large fire record for the forest indicates that less than 1% (5 acres) of Fire Regime V within the Fall River 10th field HUC has burned since the beginning of record.

Less than 0.0001% (89 acres) of the Fall River 10th field HUC is made up of grassland. Fire occurs frequently at a fire return interval of 0-35 years and are typically of high severity to this non-forested community. This type of community is categorized into what is considered Fire Regime II. Analysis of the historical large fire record for the forest indicates that none of Fire Regime II within the Fall River 10th field HUC has burned since the beginning of record. These 89 acres are currently missing three or more cycles of fire.

The HRV departure index for each of the fire regimes has been further classified into condition classes to help indicate the amount of departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern and other disturbances. Again, this departure is due to fire exclusion, as well as timber harvesting, introduction and establishment of exotic plant species, insects or disease (introduced or native), or other past management activities. This departure has resulted in alterations of key ecosystem components such as species composition, structural stage and canopy closure.

Some ecologists have questioned use of the HRV concept in planning because pre-EuroAmerican settlement climatic conditions were somewhat cooler than present conditions (Bradley & Jones, 1993, Veblen, 2003, McKenzie et al., 2004). However, fire regimes and associated vegetation for most biophysical settings (BpS) types were relatively stable for at least several centuries before attempted fire exclusion (Agee,1993, Swetnam & Baisan, 1996, Barrett et al., 1997, Frost, 1998, Morgan et al., 1998, Brown & Smith, 2000, Hemstrom et al., 2001, Heyerdahl et al., 2007, Miller, 2007, Heyerdahl et al., 2008, Keane et al., 2008, Nowacki & Abrams, 2008). Therefore, HRV-based reference conditions are acceptable for use in FRCC and other types of ecological assessments (Keane et al., 2007; Morgan et al., 2007).

Condition class 1 represents areas that fall most within their natural or historical regime of characteristics. Condition class 2 and 3 represent areas that have moderate and high departures from the natural or historical regime of characteristics.

In order to simplify the concepts behind condition classes within each fire regime, the three condition classes have been grouped into two descriptive categories of acres; restoration acres and maintenance acres. Restoration acres are those acres that fall into condition class 2 and 3. These acres are at an elevated risk of loss of components that define those systems as unique. It is recognized that there are other management objectives that require some of the restoration areas to remain in or near their current condition, therefore, the attempt is not to treat every acre within restoration areas in order to restore conditions that historically existed. However, the decision to manage fire adapted ecosystems for objectives other than sustainability or resiliency is also a decision to accept some risk of loss in the event of a wildland fire. Maintenance acres are assumed to be functioning within expected parameters with respect to overstory condition. Often, maintenance acres are still in need of treatment due to their surface conditions, i.e. a well-developed shrub layer presenting high flame lengths and the potential for crown fire initiation. Treating these surface fuels, although they are not a factor taken into consideration when determining Condition Classes of areas, is important to decreasing fire suppression resistance and the potential for crown fire initiation. Refer to Table 19 for the summary of acres for each of the PAG/Fire Regimes now specific to the Junction project area and their current condition; maintenance or restoration.

Table 19: Fire Regime/Condition Class Summary for Fall River 10th field HUC

PAG/Fire Regime	Description	Maintenance Condition Acres	% of Regime	Restoration Acres	%of Regime	Total Acres in Regime
Ponderosa Pine/FRI	0-35 yr return, low intensity	16,651	35	31,395	65	48,046
Range/Grass/Shrub/FRII	0-35 yr return, stand replacing severity	89	100	0	0	89
Mixed Conifer/FRIII	35-100+ yr return, mixed severity	9,217	41	13,209	59	22,426
Lodgepole Pine/FRIV	35-100+ yr return, stand replacing severity	28,407	71	11,419	29	39,826
Fir/Mtn Hemlock/FR V	>200 yr return, stand replacing severity	731	15	4,190	85	4,927
TOTAL		55,095	47	60,213	53	115,308*

*The entire Fall River 10th field HUC totals 117,638 acres, 308 acres of analysis are recorded as having no Fire Regime/Condition Class data. The remaining difference of 1,894 acres represents minute pieces of ground that get dropped during GIS analysis and represent an analysis error of less than 2%.

Stand and Fire Suppression History

Within the Junction project area, a number of early 20th century fires occurred. Four thousand five hundred forty seven acres of the project area were burned in the Lost Man fire of 1918, most of which were ponderosa pine dominated stands in the Pistol and Sitkum buttes area. The Edison Ice Cave fire of 1908 burned 1,011 acres of the project area, again, most of which was in ponderosa pine dominated stands. The most recent fire in the project area, the Spring River Butte fire of 1999 burned 84 acres of the project area in ponderosa pine. The only large fire to burn in lodgepole pine dominated stands within Junction was the 356 acre Wake Butte fire of 1990.

Across the Junction planning area, past commercial/non-commercial thinning, mowing and underburn activities since 1968 that may have changed stand/fuel conditions total 19,349 acres. In addition to fire exclusion, the treatments that have occurred within Junction have had a major influence on the stands proximity to HRV.

Pre-Euro-American low elevation dry conifer forests of the western United States were fundamentally shaped by frequent low- or mixed-severity disturbances such as wildfires (Bork, 1984, Agee, 1993, Taylor & Skinner, 1998, Everett et al., 2000, Ottmar & Sandberg, 2001, Wright & Agee, 2004, Youngblood et al., 2004, Hessburg et al., 2005, Arabas et al., 2006) and insect attacks (McCullough et al, 1998, Hayes & Daterman, 2001) mediated by diverse environmental gradients of topography, soils, and weather. Surface fires, ignited predominantly by lightning during the time of year when moisture content of fine fuels was lowest (Agee, 1993, Rorig & Ferguson, 1999), controlled regeneration of fire-intolerant species, reduced density of small-diameter stems consumed litter and down wood, opened the stands to increased sunlight, led to vertical stratification of fuels by eliminating fuel ladders between the forest floor and the overstory canopy, and maintained relatively stable plant associations. Consequently, the structure of these low elevation dry forests generally consisted of open, predominantly widely spaced medium to large and old live trees, scattered dead trees, low levels of surface fuels, and continuous low herbaceous understory vegetation (Wickman, 1992, Agee, 1994, Youngblood et al., 2004, Arabas et al., 2006).

Many of these dry forests today have characteristics that place them at greater risk of uncharacteristic disturbances. These features include an accumulated mass of down woody debris and continuity of the fuels mosaic at landscape scales, more small trees and fewer large trees, greater amounts of young multi-storied forest with fire intolerant conifers in both understory and overstory strata, increased fuel ladders that contribute to greater flame lengths during fires, and new or altered forcing of regional climate on plant community structure and organization (Agee, 1993, Covington & Moore, 1994, Arno et al., 1997, Taylor & Skinner, 1998, Harrod et al., 1999, Youngblood et al., 2004, Fitzgerald, 2005, Hessburg et al, 2005, Stephens & Gill, 2005, Youngblood et al., 2006, McKenney et al., 2007). In many dry forests of the Pacific Northwest, the altered fuelbeds and shifts in forest structure and composition resulted from fire exclusion and suppression, livestock grazing, timber management activities, and changes in climate (Bergoffen, 1976, Steele et al., 1986, Dolph et al., 1995, Arno et al., 1997, Fitzgerald, 2005, Richardson et al., 2007). Increases in overall stand density over the past century have led to increased competition among trees for below-ground nutrients, water, and growing space. Increased competition among trees and reduced tree vigor increases susceptibility to attack from bark beetles and other forest insects and diseases (Mitchell, 1990, Hessburg et al., 1994, Oliver, 1995, Fettig et al., 2007). Mortality in ponderosa pine attributed to mountain pine beetle is positively correlated with high stand density (Sartwell & Dolph, 1976, Fettig et al., 2007). Thinning has been shown to reduce the amount of ponderosa pine caused by mountain pine beetle unless surrounding areas are allowed to develop epidemic population levels (Fettig et al., 2007). The mountain pine beetle often kills extensively when contiguous stands or landscapes become vulnerable. These changes have occurred more recently against a backdrop of natural and human-caused climate change that may first be manifest in the distribution of herbaceous species and woody shrubs, and may eventually result in a redistribution of tree species (McKenney et al., 2007, Richardson et al., 2007). Collectively, these altered structural conditions contribute to increased probability of multiple, interacting stresses and may lead to altered or new disturbance regimes.

Expected Fire Behavior

Potential fire behavior within the Junction 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 20).

Table 20: 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 ft, 4-8 ft, 8-11 ft, and 11 ft 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 firefighters ability to engage. Surface fire types are those where a surface fire potential existing with no potential for either type of crown fire. There are two stages to the crown-fire process: the first is torching, or movement of fire into the crown (passive crown fire), the second is active spread of the crown fire where fire moves from tree crown to tree crown through the canopy (active crown fire) (Fitzgerald, 2005). A passive crown fire is a surface fire with individual tree torching. Passive crown fires, although not as intense as an active crown fire, can make suppression difficult due to high flame lengths and short and long range spotting. An active crown fire is a fire involving the crowns of trees with support from a surface fire.

Potential fire hazard that rates as low generally allows fire suppression resources to safely and efficiently attack the fire at the head with hand tools. 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 manmade. 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 21 shows the predicted wildfire hazard for the existing condition in acres for the Junction Planning area using the hazard matrix shown in Table 20. Figure 13 is a spatial map of the existing condition fire hazard.

Table 21 shows that over 70% of the project area has extreme fire hazard under 97^{th} percentile weather and fuel conditions. The majority of the 4,826 acres of ponderosa pine dominated stands rates as extreme fire hazard (1,972 acres). 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.

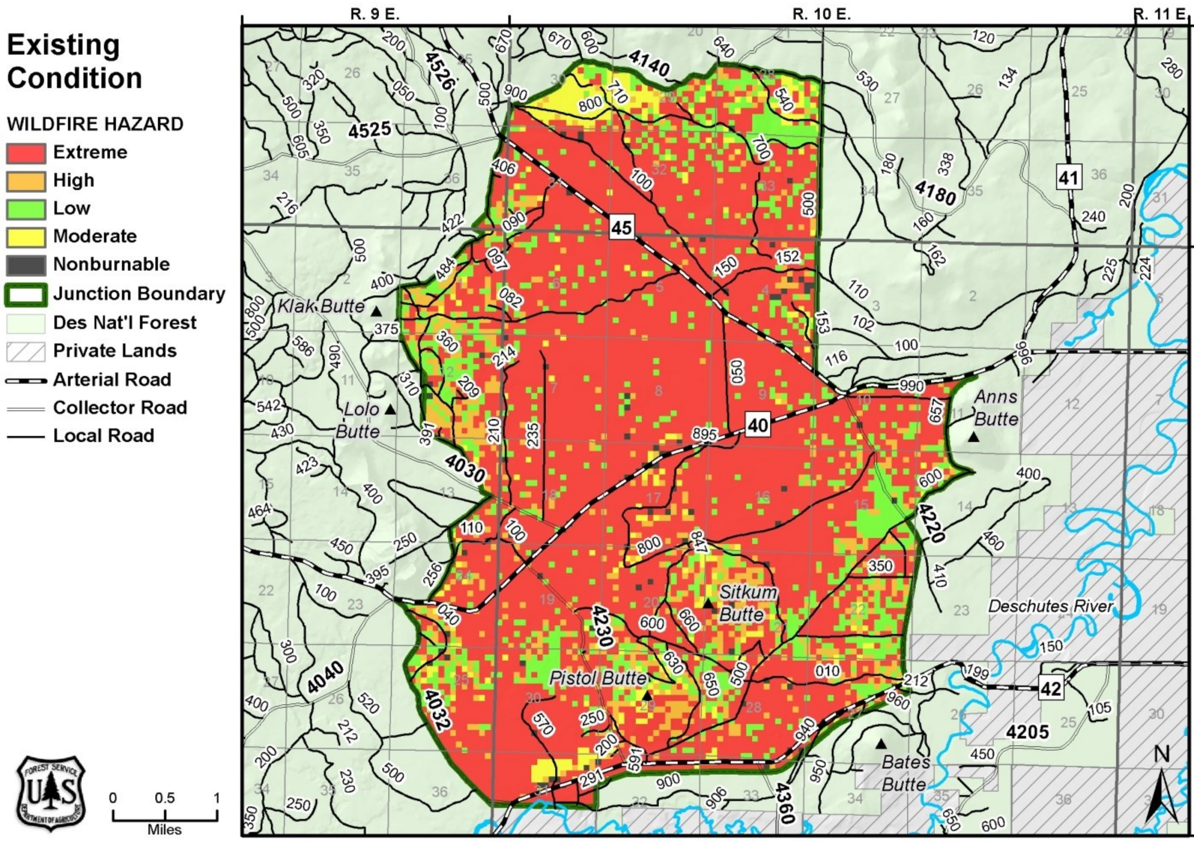
Table 21: Existing Condition/No Action Hazard Ratings and Acreage

HAZARD	ACRES*
Low	2,440
Moderate	821
High	1,523
Extreme	12,570

*200 acres within the project area are coded by the satellite imagery data as a Fuel Model 99, or bare ground, so there is no hazard associated with those acres. There is also a difference of 2 acres between the total acres for the project (17556 acres) and the total analysis acres for existing condition (17554 acres), these acres represent minute pieces of ground that get dropped during GIS analysis and represent an analysis error of less than 0.1%.

About 14% 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 20 and hazard rating explanation) and achieves the best results with regards to fire effects (see General Assumptions). Areas of low hazard may still need treatment in order to maintain their low hazard quality.

Figure 13: Existing condition wildfire hazard



In order to measure fire risk from random ignition, a measure of burn probability is used. Burn probability is an additional output to FlamMap and is a part of the minimum travel time fire growth model. Burn probability is used as an indicator of potential fire spread rates, i.e. landscape attributes, like fuel conditions, that contribute to higher spread rates resulting in a higher burn probability. High burn probabilities can be related to the sizes of fires that occur on a given landscape. So under the same conditions, large fires produce higher probabilities than small fires. Since fire size is a function of the gross spread rate and duration of the fire, treatments or conditions that reduce the spread rate will lower the burn probability (Finney et al., 2006)

Burn probability was calculated within the model using the same 97th percentile weather and fuel conditions from Round Mountain RAWS, as well as with 1,000 random ignitions and an 8 hour burn duration across the entire analysis area, which is approximately a 1 ½ mile buffered area surrounding Junction project area. A larger analysis area for the purpose of burn probability allows the model to consider ignitions from outside the Junction area and model that potential without bias. Burn probability is output as a decimal number between 0 and 1 for every 120 meter pixel within the project area. Those decimals were classified into 5 equal divisions and reclassified into a number from 1 to 5, 1 represents acreage with the lowest burn probability and 5 represents the highest, so that any increases or decreases in burn probability due to proposed treatments could be shown with relative ease. Then, outputs specific to the Junction project area were clipped from the rest of the analysis area. This is done to better show effect of any proposed treatments to burn probability within the project area. Table 22 shows the existing condition's burn probability for the project area. Figure 2 is a map of the burn probability spatially across the existing condition.

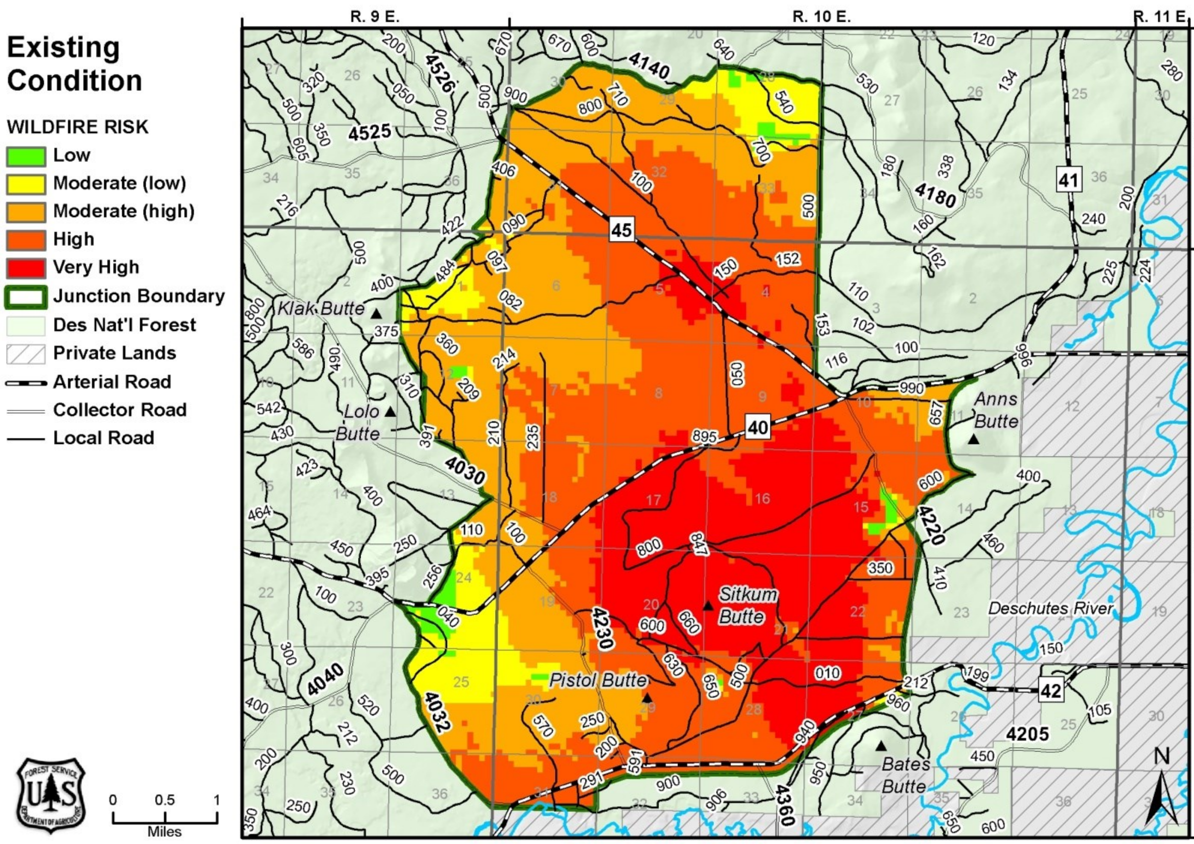
Table 22: Wildfire Risk rating as measured by burn probability within the existing condition of the Junction project area

Wildfire risk rating	Burn probability classification	Amount of Acres*
Low	1	228
Moderate (low)	2	1,243
Moderate (high)	3	5,404
High	4	6,821
Very High	5	3,857

*There is a difference of 2 acres between the total acres for the project (17,556 acres) and the total analysis acres for existing condition (17,554 acres), these acres represent minute pieces of ground that get dropped during GIS analysis and represent an analysis error of less than 0.1%.

Table 22 shows that relative to the entire analysis area (an area that includes approximately a mile and a half around Junction), the project area itself is predicted to have moderate to very high chances (classification of 3 to 5) for large fires across the majority of the area (16,082 acres). The highest amount of acres is predicted to have high to very high wildfire risk. Figure 14 is a map of the wildfire risk from random ignition for the existing condition across the analysis area. Looking at Figure 14, areas exhibiting the highest wildfire risk from random ignition are those areas in the middle to SE portions of the project area. Areas of the highest risk include Sitkum butte, portions of the 40, 42 and 45 road corridors. Areas of high risk also include the area adjacent to Fall River Estates, as well as Pistol Butte.

Figure 14: Existing condition wildfire risk



Overall Stand Condition

Across the Fall River HUC, there are more acres, with regard to stand condition, outside their historic range of variability than within. The majority of acres (about half) outside their HRV are within ponderosa pine PAG/fire regime 1. The other half the acres outside their HRV are in mixed conifer/fire regime III and lodgepole pine/fire regime IV. Acres that currently remain within their HRV need a continued form of disturbance to maintain their current historic condition. Frequency of disturbance for acres within HRV depends on a few variables that include but may not be limited to; fire regime classification, timing of last disturbance, type of previous disturbance and type of introduced disturbance. Disturbances could include but may not be limited to: grazing, wildfire, prescribed fire and vegetation management like thinning and mowing. Very few acres across the Fall River HUC fall within their HRV, due to fire's influence. The past century of fire exclusion has precluded that. Management activities have been a major influence to individual stands and their proximity to HRV.

The history specific to the Junction planning area is really no different from its 10th field HUC. Fire exclusion and management activities have been large influences on the current stand condition. Fire hazard modeling predicts extreme fire hazard for almost three quarters of the area. Fire risk modeling predicts moderate to very high chances for large fires to occur across more than three quarters of the area.

Desired Conditions and Related Strategies

The landscape within the project area should display a mosaic of strategically placed areas that are based on the principles of Fire Resilient Forests as shown in Table 23 (Agee, 2002).

Table 23: Principles of Fire Resilient Forests (Agee, 2002 and Hessburg & Agee, 2003)

Principles	Effects	Advantage	Concerns
Reduce surface fuels	Reduce potential flame length	Control easier, less torching[1]	Surface disturbance, less with fire than other techniques
Increase height to live crown	Requires longer flame length to begin torching	Less torching	Opens understory, may allow surface wind to increase[2]
Decrease crown density	Makes tree-to-tree crown fire less probable	Reduces crown fire potential	Surface wind may increase and surface fuels may be drier[2]
Keep larger trees	Thicker bark and taller crowns	Increases survivability of trees	Removing smaller trees is economically less profitable

[1] Torching is the initiation of crown fire.

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

The principles are designed to reduce fire behavior potential, aide in the suppression of wildland fire (i.e. provide defensible space), and increase protection to valuable resources on forest lands. Following these principles will improve fire-resilience in ponderosa pine ecosystems by (in sequence); reducing surface fuels, removing ladder fuels, leaving large, fire resistant trees and spacing tree crowns. These conditions can be achieved with a variety of methods including prescribed burning, mowing, pruning, and thinning.

Those areas managed for reduced fire behavior potential would include a number of associated desired conditions. The structures of stands desired would be where crown bulk density and the continuity of the forest canopy could not sustain a crown fire occurrence. Trees within stands would have a canopy base height well enough above shrub cover in order to reduce potential for crown fire initiation. The shrub layer would be maintained at a height that would lower flame lengths to below the four foot agency standard for direct attack by handline and reduce the potential for crown fire initiation. Within these areas across the landscape, defensible space of at least 500 feet wide (as per the CWPPs) on either side of critical transportation routes would be a working condition for suppression forces, safe egress for the public, as well as a potential fuel break to the fire. Fuel model 161 is a timbered fuel model that exemplifies the fuel characteristics conducive to low fire behavior and successful suppression by direct attack of hand crews. Fuel model 161 would be considered the desired condition for the area. Fuel model 141, a low fuel loading shrub model also conducive to low fire behavior, would be an acceptable desired condition for areas where underburning is not possible. In addition to lowering fire behavior, to best enhance stand resiliency it is also a desired condition for this area that the Fire Regime Condition Class is returned to a Condition Class 1, where there is a return to a natural or historical range of variability of vegetation characteristics.

Strategies related to the Desired Conditions

Given the existing condition and desired condition contained in the management direction previously mentioned, the following strategies have been developed to move toward the desired future condition and to help direct treatment types and locations:

1) Defensible Space (fuel break/safety corridor) Road systems allow ground suppression forces (engines, crews and equipment) to access wildfires. When fuel conditions allow surface fires to have high intensities and get into the canopies of the trees, contributing to extreme fire behavior (torching, crowning and long range spotting), direct attack by ground forces becomes ineffective. Wildland fires under these conditions will cross any road system with such intensity that suppression forces have little chance of containing the fire from the road. Retardant alone will only slow a wildfire for a short period of time. Suppression forces need to quickly utilize the effect of the retardant to contain a wildfire. Roads provide a good area for retardant to be utilized by suppression forces. During recent wildfires on the forest, rural fire engines have responded to aid in the suppression effort. These large low-grown clearing engines cannot operate on most local forest roads due to narrow road widths and uneven, unpaved road surface conditions. Use of major roads in a defensible space strategy is recommended, especially in the WUI where public safety and evacuation is of high concern. This strategy also allows for safe ingress/egress to and from a fire for firefighters. It is also a strategy that ties in with the E/W Deschutes County CWPP’s goals for Federal lands.

By reducing crown densities through thinning and reducing surface fuels and ladder fuels through either mechanical shrub treatment (mowing), pruning, underburning, piling slash and burning the piles within this 500 foot wide fuel break, fire behavior would be reduced to primarily a surface fire that suppression forces will have better ability to control. Thinning of dense canopies allows retardant to be more effective by getting to surface fuels without being caught in the canopy. Snags should not be retained near the roads (within a tree length) that remain open to the public and down wood or slash piles should not be retained within 200 feet of roads or boundaries with private ownership to limit falling snags, ember production and spotting.

2) Restoration of historical fire regimes in ponderosa pine ecosystems The absence of fire over the last 100 years combined with the development of shrubs and dense thickets of regeneration in the understory has placed the ponderosa pine stands at high risk of stand replacing wildfire. Reintroduction of fire in these ponderosa pine type stands would be used as needed to achieve the desired conditions. Prescriptions would be developed for low intensity prescribed fire to start a return to historic conditions, subsequent prescribed fire entries would be conducted through time to create a fire resistant stand condition that would help defend adjacent private lands and help preserve the ponderosa pine stand type. When prescribed fire is used every 8 to 15 years, depending on fuel accumulations, these areas should regenerate ponderosa pine slowly through time as they did historically (Agee, 1993). Related prescribed burning should keep naturally regenerated lodgepole pine and white fir in low numbers through time. Not only does prescribed fire reduce wildfire severity, but when a wildfire burns through a site previously burned under prescription, fire suppression costs were also less compared to adjacent land where fire had been excluded (Moghaddas, 2006). Mechanical shrub treatments may be used in addition to/or in lieu of burning if the shrub size and densities could cause severe scorch or mortality of residual stands.

3) Fuel reduction and discontinuous surface fuels Areas with existing dead and down material, dense stands of trees, dense shrubs and heavy needlecast can create extremely hazardous conditions. When these conditions exist over large areas a wildfire can be extremely difficult to control. Under unfavorable weather conditions, the fire would burn until it reached an area where fuels were lighter and control tactics are more likely to be achieved. In 2001, Dr. Mark Finney published the paper *Design of Regular Landscapes Fuel Treatment Patterns for Modifying Fire Growth and Behavior*. The paper presents the idea that strategically placed fuel treatments could achieve much greater results at minimizing large fire growth than randomly placed fuel treatments, particularly when only a percentage of the area could be treated. The idea suggests that when treating just a percentage of the total landscape, the juxtaposition of fuel treatment areas in relation to one another was more important than the total amount of area treated. At this time, there is no scientific evidence supporting a conjecture that treating a smaller amount of acres within a landscape, even when the treatments are strategically placed, would provide the same level of protection or restoration benefits as treating a majority of the landscape. According to Finney, treating in a spatially strategic pattern would increase effectiveness in minimizing large fire spread and buy time to complete treatments on additional areas before they burn.

4) Thinning to reduce crown fire susceptibility and long range spotting Crowning fires are some of the most intense wildfires and usually produce long range spotting that hampers the control efforts. Dense stands of timber support independent crown fires allowing fire to burn through the canopy of the trees independent of the surface fire. Torching and crowning with support of the surface fire is also a common problem during wildfires in less dense to dense stands of timber. Breaking up the connectivity of the timber canopy through thinning greatly decreases the chance of an active or passive crown fire, thus reducing long range spotting, resistance to control, and damage to the stand. By maintaining stands at crown bulk densities of <0.10 kg m^3, active or independent crown fire activity can be limited (Agee, 1996). Thinning from below, leaving dominant and co-dominant trees with thick bark and high crowns significantly changes the potential for fire to move from surface up into the tree crowns (Fitzgerald, 2002). Thinning from below most effectively alters fire behavior by reducing crown bulk density, increasing crown base height, and changing species composition to lighter crowned and fire-adapted species (Graham et al., 1999).

Elements used to Describe Effects of the Alternatives

Fire behavior

Fire behavior is the manner in which fire reacts to topography, weather, and fuels (DeBano et al., 1998). These three elements comprise the fire environment, the surrounding conditions, influences and modifying forces that determine fire behavior. Modifying any one of these elements has a direct result on fire behavior, which is basically described by flame length and rate of spread. Favorable conditions for crown fires include heavy accumulations of dead and down wood and litter, conifer reproduction and other ladder fuels like shrubs, and a continuous conifer tree forest (Rothermel, 1991).

The greater the fuel loading, the more intense a fire is likely to burn (DeBano et al., 1998). Conversely, a reduction in fuel loading can limit a fire’s intensity. Fuel characteristics affecting fire behavior are vegetative density, species composition, amount of surface fuel, arrangement of fuels and moisture content (Rothermel, 1983). Fuels contribute to the rate of spread of a fire, the intensity/flame length of the fire, how long a fire is held over in an area, and the size of the burned area (Rothermel, 1983).

Treatments that reduce surface fuel loads have been shown to decrease fire behavior and severity (Graham et al., 1999; Pollet and Omi, 1999). Van Wagtendonk (1996) found in fire simulations that a reduction in fuel loads decreased subsequent fire behavior, increased fireline control possibilities and decreased fire suppression costs.

Intensive forest management that involves the creation of activity fuels (slash) can indeed increase fire behavior conditions such as rate of spread and flame length. However, treatment of slash (i.e. burning, chipping, removal, isolation) will reduce fire behavior and fire intensity (Omi and Martinson, 2002). Graham et al. (1999) reports that thinning from below and intermediate tree harvest can effectively alter fire behavior by reducing crown bulk density and ladder fuels, but will not reduce crown fire potential unless tree densities are substantially reduced. The same scientific document also states that all intermediate treatments should be accompanied by surface fuel modification, and the most success is achieved when using prescribed fire for such treatments.

There are three types of fuels that affect fire behavior; fine fuels such as grass or forbs, small woody fuels less than three inches in diameter and large woody fuels greater than three inches in diameter. Fine fuels are the major contributors to fire spread, carrying the ignition and flaming front of a fire (Rothermel, 1983). They are especially influential to fire's rate of spread and intensity because they lose their moisture faster, therefore igniting easier and burning more readily (Agee, 1993). Without these fine fuels, many fires will not get large, although there are exceptions. However, eliminating fine fuels entirely from the landscape is neither possible nor desirable. Fine fuels are constantly being produced from needlecast or deciduous leaf fall and dying and falling branches. Under a frequent fire regime it will be more possible to maintain fine fuels at lower levels and various patch sizes than under a less frequent fire regime, decreasing fire intensities and decreasing the areas resistance to control.

In order to analyze and compare the effects of alternatives as they relate to fuels management, the fire behavior conditions of flame length and potential fire type have been combined and are represented as the potential wildfire hazard. Burn probability will also be analyzed as an indicator of wildfire risk (potential fire spread rates, i.e. landscape attributes, like fuel conditions, that contribute to higher spread rates result in a higher burn probability).

Smoke

Particulate matter can be hazardous to human health, create poor visibility conditions and, in general, be a nuisance. The health effects of smoke to people can range from irritation of the eyes and respiratory tract to more serious disorders that include asthma, bronchitis, reduced lung function, and premature death. Airborne particles are respiratory irritants, high concentrations can cause persistent cough, phlegm, wheezing, and physical discomfort when breathing. Particulate matter can also alter the body's immune system and affect removal of foreign materials from the lung like pollen and bacteria (NWCG, 2001). Haze caused by wildfire can also add to other sources of haze and affect scenic visibility. Nuisance smoke is defined by the US Environmental Protection Agency as the amount of smoke in the ambient air that interferes with a right or privilege common to members of the public, including the use or enjoyment of public or private resources (US EPA, 1990). Nuisance smoke includes complaints of loss of visibility, odors, collisions on highways due to lack of visibility, and eye and nose irritation. Although the vast majority of prescribed burns occur without negative smoke impact, wildland fire smoke can be a problem anywhere in the country (NWCG, 2001).

In order to analyze and compare the effects of alternatives as they relate to smoke management, potential smoke emissions from pile burning, underburning, and wildfire have been modeled. Smoke emissions from acres of pile burning and underburning for each alternative is compared to smoke emissions from a potential wildfire burning across the largest acreage of treatment proposed.

Effects Analysis

Direct and Indirect Effects of Alternative 1

Measure 1: Acres of project area falling within each fire hazard class. Fire hazard being represented by a matrix of both flame length potential and crown fire potential

With no management activities occurring, more acres would transition from low and moderate fire hazard towards high and extreme fire hazard. Currently an estimated 2,440 acres (14%) (see Table 21 and Figure 13) exhibiting low wildfire hazard would naturally transition over the next 20 years, due to tree and shrub growth to either a moderate or high fire hazard category. The remaining 86% of acres within Junction 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 make while fighting a fire is not always desirable and costs are increased. Flame lengths of over 8 feet (High and Extreme fire behavior) cannot be safely suppressed by direct attack of 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 impacts on wildlife habitat, soils, water, forest health, public and firefighter safety would continue to 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 across the entire project area over time.

Measure 2: Acres of project area falling within each fire risk class. Fire risk being represented by burn probability

With no management activities occurring, wildfire risk would not improve (see Table 22 and Figure 14for current wildfire risk condition). Fuel loadings would continue to increase, as well as shrub heights. Increased fuel loadings and shrub heights translate to higher burn probabilities. Higher burn probabilities predict larger fires on the landscape over time, increasing risk of wildfire. Any fuel reduction that would occur under this alternative would be from a wildfire; a wildfire under these existing conditions would be hazardous to both firefighter and public safety, as well as to valuable stand characteristics. The effect of Alternative 1, the no action alternative, would be an increase in risk of wildfire across the entire project area over time.

Measure 3: Production of Particulate Matter (PM) 10 & 2.5

In order to determine the differences in particulate matter released during wildfire compared to prescribed fire or pile burning for either the existing condition/no action alternative or the two action alternatives, an analysis was done in the computer models FOFEM and Consume 3.0. (see Analysis Methods). The effects on air quality (Table 24) would occur when higher quantities of PM_{10} and $PM_{2.5}$ are released when inevitable wildfire comes through the project area. These quantities of particulate matter are much higher than what would be released under prescribed fire conditions. This can be attributed to the fact that weather conditions are usually, windier, hotter and drier in the summer and in the case of a wildfire a greater amount of surface and canopy fuels are consumed.

Table 24: Estimated smoke emissions from a wildfire under extreme conditions compared to prescribed fire conditions

Fire condition	Pounds PM_{10}/1 Acre Fuel Consumed	Pounds $PM_{2.5}$/1 Acre Fuel Consumed
Wildfire (38% P. pine, 62% L. pine)	793	671
Prescribed Fire	223	189
Pile burning	460	400

Emissions from a wildfire on one acre are approximately 1.1-1.2 times that of the emissions from one acre each of both prescribed fire and pile burning. So even where both pile burning and prescribed underburning were to occur on the same acre, emissions would be less from proposed treatment than what would occur from a wildfire on the same acre. An additional consideration to comparing emissions from treatment versus wildfire is that emissions from multiple treatments occur over a lengthened course of time, compared to a wildfire where emissions are released all at once. Essentially, emissions from treatments would be less and would occur over a longer period of time than a wildfire.

Smoke from wildfires within the project area would impact the communities of Sunriver, LaPine and Bend because the smoke would be a result of a wildfire that most likely would not be occurring under conducive smoke dispersion conditions. It is possible that the air quality within the Three Sisters Wilderness, a Class 1 Airshed would be adversely affected. Recreational sites near and around the Junction area, like Fall River and the Deschutes River could also be adversely impacted by smoke when tourism and recreation are at their highest.

Cumulative Effects of Alternative 1

Since there would be no new proposed activities, there would be no cumulative effects. However, there would be the direct and indirect effects noted above from the continued suppression of fire starts and ongoing vegetative growth and public use, including continuing to place areas outside of Junction at risk from fire.

Direct and Indirect Effects of Alternative 2

Measure 1: Acres of project area falling within each fire hazard class. Fire hazard being represented by a matrix of both flame length potential and crown fire potential

The wildfire hazard for post-Alternative 2 treatment conditions was predicted using the modeling methods 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 25. See also Figure 15 for a map of predicted wildfire hazard for post-Alternative 2 treatment conditions.

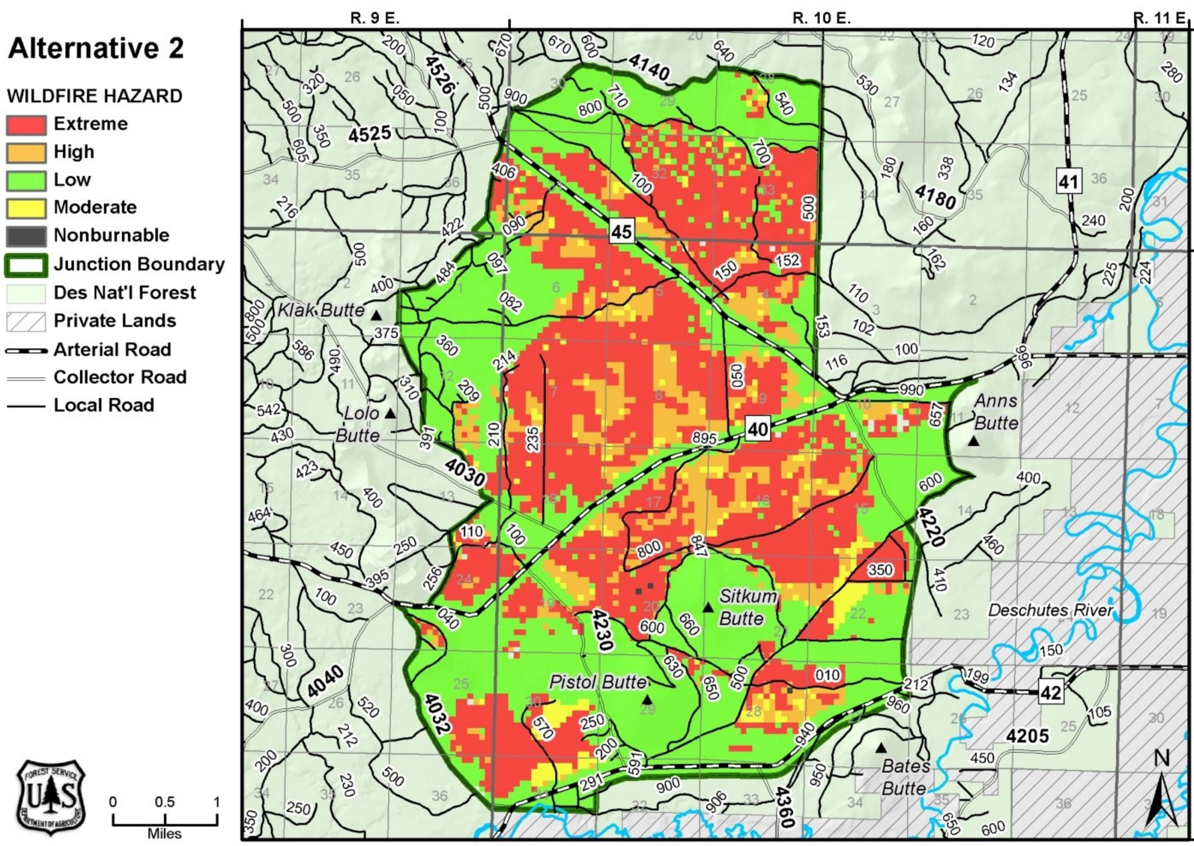
Table 25: Alternative 2 Hazard Ratings and Acreage

HAZARD	Alternative 2 Acres*	Existing Condition Acres*
Low	8,468	2,440
Moderate	536	821
High	1,774	1,523
Extreme	6,569	12,570

*200 acres within the project area are coded by the satellite imagery data as a Fuel Model 99, or bare ground, so there is no hazard associated with those acres. There is also a difference of 9 acres between the total acres for the project (17,556 acres) and the total analysis acres for existing condition (17,547 acres), these acres represent minute pieces of ground that get dropped during GIS analysis and represent an analysis error of less than 0.1%.

Treatments proposed in Alternative 2 would result in 6,001 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 97th percentile conditions on 8,468 acres of the Junction project 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. In addition, 4,222 acres of the total acres rating as low are in the ponderosa pine dominated stands (compared to 1,432 low hazard ponderosa pine acres in the existing condition). In ponderosa pine, a rating of low would allow for safe, efficient firefighting, in the event of wildfire. It would also allow for continued care of these stands with prescribed fire with minimal damage and minimal cost. There are areas of proposed treatment for silvicultural benefit where the treatment of activity-created fuels is to lop and scatter the created fuels and allow them to break down over time. In these areas, the previously extreme hazard remains an extreme hazard in the relative short term. There is no predicted benefit to fuels management, but also no predicted cost to wildfire hazard. These areas where lop and scatter are proposed are in stands of lodgepole pine and are proposed for areas of lower priority for fuels management.

Figure 15: Alternative 2 wildfire hazard



Any proposed thinning where slash is treated, mowing and underburning for Alternative 2 in the scenic view allocation reduce fire hazard to a low hazard rating. Areas within the scenic view allocation have also been defined as priority areas to treat by the E/W Deschutes County CWPP. Reducing fire hazard to a low hazard rating (see table 4) would meet the CWPPs desire for reducing fuel loads to that which can produce flame lengths of less than four feet. Four foot flame lengths generally allows fire suppression resources to safely and efficiently attack the fire at the head with hand tools. There are proposed treatments beyond the 500 feet road corridor identified as priority for fuels hazard treatment under the CWPP guidance that may not reduce the fuels or fire hazard. These areas within scenic views where fire hazard is not reduced are primarily areas where there is a silvicultural benefit to thinning and lop and scatter is the proposed method for handling created slash. In these areas, the previously extreme hazard remains an extreme hazard in the relative short term. There is no predicted benefit to fuels management, but also no predicted cost to wildfire hazard. These areas where lop and scatter are proposed are in stands of lodgepole pine and are proposed for areas of lower priority for fuels management.

Measure 2: Acres of project area falling within each fire risk class. Fire risk being represented by burn probability

Burn probability, as an indicator of wildfire risk, was modeled and calculated for Alternative 2 in the same fashion as the burn probability for the existing condition (no action alternative) and as described in the Analysis Methods section. Table 26 compares the burn probability for Alternative 2 with the burn probability of the existing condition (see also Figure 16 for a spatial depiction).

Table 26: Wildfire Risk rating as measured by burn probability within Alternative 2 of the Junction project area

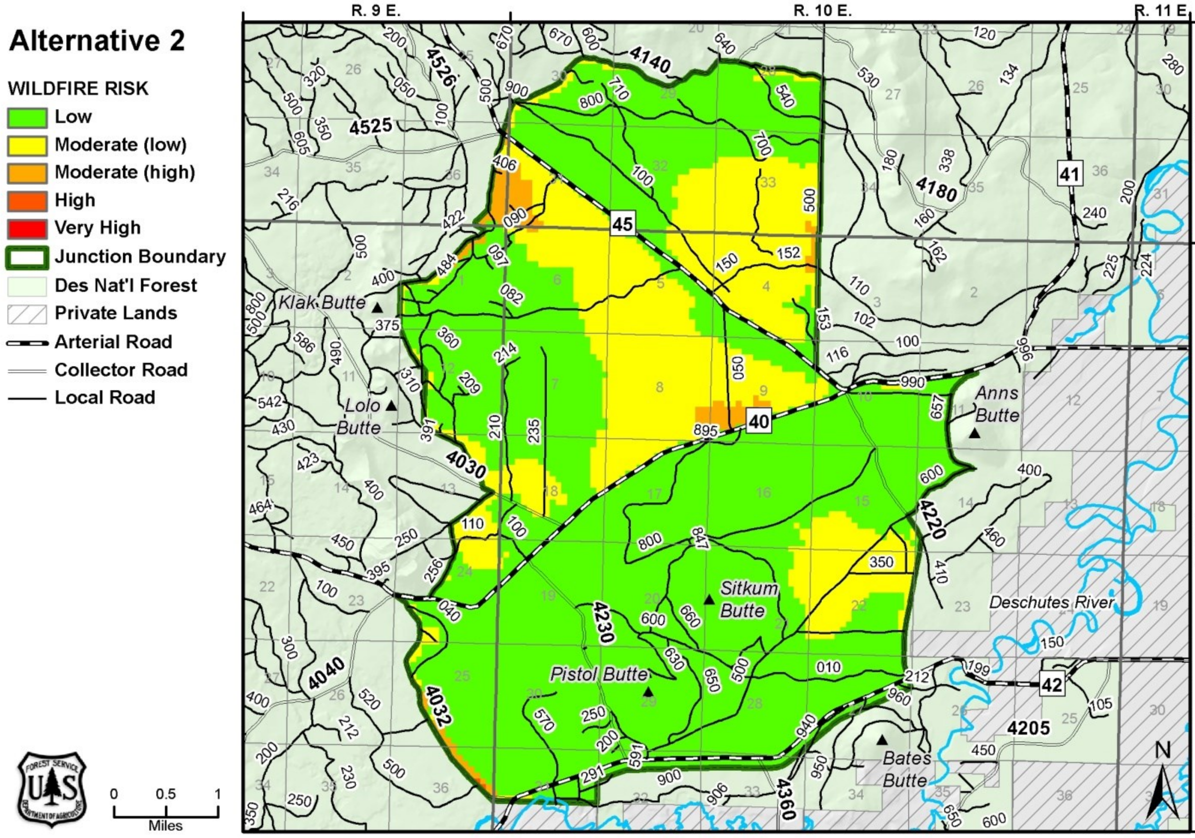
Wildfire risk	Alternative 2 Acres*	Existing Condition Acres*
Low	12,622	228
Moderate (low)	4,540	1,243
Moderate (high)	382	5,404
High	4	6,821
Very High	0	3,857

*There is a difference of 8 acres between the total acres for the project (17,556 acres) and the total analysis acres for existing condition (17,548 acres), these acres represent minute pieces of ground that get dropped during GIS analysis and represent an analysis error of less than 0.1%.

When comparing wildfire risk of Alternative 2 with the wildfire risk for the existing condition, it can be seen that treatments proposed under Alternative 2 would lower the risk substantially across the treatment area. All 3,857 acres of the project area with a risk of ‘Very High’ are reduced to a classification of ‘High’ or lower. The majority of those acres were brought down to at least the ‘Moderate (low)’ level. Still more acres within the project area were reduced from their previous ‘Moderate (high)’ and ‘Moderate (low)’ acres to a ‘Low’ risk.

The reduction of wildfire risk shown in Table 26 is a considerable reduction. This reduction in wildfire risk means that with Alternative 2 actions, a considerable amount of work would be done to slow fire’s forward rate of spread and increase firefighter’s abilities to suppress the fire. Spatially, figure 4 shows that with proposed treatments under Alternative 2, risk to values at the southern end of the project area, like Pistol and Sitkum buttes, Fall River estates and areas surrounding the west side of Ann’s butte and adjacent private lands would be effectively reduced to a low rating. Treatments in dense stands around Wake Butte SIA would reduce the risk of wildfire to a low rating. These treatments would help stop the spread of fire into or out of the unthinned stands upslope. In addition, risk to large portions of the west and north sides of the project area, including ponderosa-pine dominated stands would be effectively reduced to a low rating.

Figure 16: Alternative 2 wildfire risk



Measure 3: Production of Particulate Matter (PM) 10 & 2.5

The amount of particulate matter emitted due to underburning and pile burning within Alternative 2 are shown in Table 27. The total tons of particulate matter shown in Table 27 were calculated by multiplying the smoke emissions (converted from pounds to tons) per acre for a prescribed fire for both PM_{10} and $PM_{2.5}$ (predicted in FOFEM, see p. 24 for description of process) by the number of net acres that would be prescribed underburned (5,756 acres). Then, the fuels consumed during pile burning were estimated as 29.64 total tons per acre in the USFS software Consume 3.0 (see p. 24 for assumptions). The smoke emissions (converted from pounds to tons) from the fuel consumption that Consume estimated for both PM_{10} and $PM_{2.5}$ were then multiplied by the number of net acres that would be piled and burned (9,620 acres). Emissions from prescribed underburning and all pile burning are shown separately in Table 11 since emissions from each would occur as separate events, emitting particulate matter at different times. The emissions from Alternative 2 could be less than what is shown here, if any of the material produced during treatment can be utilized for biomass, as anticipated.

For comparison, to calculate the tons of PM_{10} and $PM_{2.5}$ emitted from a wildfire, the smoke emissions (converted from pounds to tons) per acre for a wildfire in both ponderosa pine and lodgepole pine were multiplied by the largest acreage of treatment proposed in both (4,881 acres of ponderosa, 8,152 acres of lodgepole). Table 27 shows that an average wildfire would produce over one and three quarter times as much emissions for both PM_{10} and $PM_{2.5}$ as the proposed treatments in Alternative 2. Emissions from a wildfire could be even more relative to activity emissions, if any of the material produced during treatment can be utilized for biomass, as anticipated.

Table 27: Estimated smoke emissions from Alternative 2 prescribed fire treatments compared to the same amount of acres consumed under wildfire conditions without treatment

Burn type	Tons PM_{10}	Tons $PM_{2.5}$
Alternative 2- 5,756 ac. prescribed underburn	641	544
Alternative 2- 3,444 handpile burning & 6,176 machine pile burning	2,212	1,924
Wildfire without treatment- 13,033 total acres	5,170	4,399

Burning would be conducted in compliance with National Ambient Air Quality Standards and under the Oregon Smoke Management Plan. Burning would only be conducted when prevailing and predicted wind patterns would result in negligible effects to LaPine, Sunriver, Bend, and the Three Sisters Wilderness Class 1 Airshed. Implementation of the action alternative, based on the measures included to reduce emissions and to disperse smoke during favorable conditions, is expected to protect air quality to adjacent communities while having no visible effects to the Class 1 Airshed (Three Sisters Wilderness). This is because the Three Sisters Wilderness area is higher in elevation and located eight to ten miles west/northwest of the Junction project area. The prevailing wind patterns reflect a northwest to westerly flow and would result in minimal potential for impacts to the airshed.

On burn days, persons responsible for burning operations modify ignitions patterns and mop-up procedures to consider the effects to the Class 1 Airshed and 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 (Lava Butte Lookout) 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.

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. There would be some dust created from the proposed mechanical operations under this alternative, mainly from logging operations within project units. The amount of dust actually created would be minimal due to dust abatement which includes watering dirt roads identified for hauling.

Cumulative Effects of Alternative 2

Measure 1: Acres of project area falling within each fire hazard class. Fire hazard being represented by a matrix of both flame length potential and crown fire potential

Stand and fuel conditions from any past treatments or fires within the Junction planning area were either reflected in the satellite imagery of 2004 or were a part of the update of the satellite imagery, and so therefore the cumulative effects for wildfire hazard of these treatments/fires along with any proposed treatments in the Junction project can be referenced in the Direct and Indirect Effects for Alternative 2.

Across the Junction planning area, past activities since 1968 that may have changed stand/fuel conditions total 19,349 acres. Ongoing activities within the EXF, Katalo, Katalo West, Klak, Dilman, E. Tumbull, Fall and Charlie Brown planned areas total 9,888 acres. The total amount of ongoing and proposed treated acres for the 10th field Fall River watershed including proposed treatments under

Alternative 2 would be 21,388 acres. This total includes any area where there may be pre-commercial thinning, commercial harvest and/or fuels treatment, like mowing or underburning. Experience with fire suppression in Central Oregon shows that unless treated acres are in the immediate vicinity (<1/4 mile) they would have no effect on fire behavior within the project area. Any fire behavior effect from treated acres of these recent activities within a ¼ mile of Junction are accounted for in the simulation modeling of predicted fire behavior for the alternative, and are therefore accounted for in the data analysis and reporting of Direct and Indirect fire hazard effects for Alternative 2. Past and ongoing treatments in the areas outside ¼ mile of the Junction project area may or may not reduce fire behavior to a low rating, but any work that treats/reduces surface fuels will lower the susceptibility across the landscape for uncharacteristic wildfire.

See Table 13 for a listing of past, ongoing and reasonably foreseeable actions.

Measure 2: Acres of project area falling within each fire risk class. Wildfire risk being represented by burn probability

Stand and fuel conditions from any past treatments or fires within the Junction planning area were either reflected in the satellite imagery of 2004 or were a part of the update of the satellite imagery, and so therefore the cumulative effects for wildfire risk of these treatments/fires along with any proposed treatments in the Junction project can be referenced in the Direct and Indirect Effects for Alternative 2.

Across the Junction planning area, past activities since 1968 that may have changed stand/fuel conditions total 19,349 acres. Ongoing activities within the EXF, Katalo, Katalo West, Klak, Dilman, E. Tumbull, Fall and Charlie Brown planned areas total 9,888 acres. The total amount of ongoing and proposed treated acres for the 10th field Fall River watershed including proposed treatments under Alternative 2 would be 21,388 acres. This total includes any area where there may be pre-commercial thinning, commercial harvest and/or fuels treatment, like mowing or underburning. Experience with fire suppression in Central Oregon shows that unless treated acres are in the immediate vicinity (<1/4 mile) they would have no effect on fire behavior within the project area. Any fire behavior effect from treated acres of these recent activities within a ¼ mile of Junction are accounted for in the simulation modeling of predicted fire behavior for the alternative, and are therefore accounted for in the data analysis and reporting of Direct and Indirect fire hazard effects for Alternative 2. Past and ongoing treatments in the areas outside ¼ mile of the Junction project area may or may not reduce fire behavior to a low rating, but any work that treats/reduces surface fuels will lower the susceptibility across the landscape for uncharacteristic wildfire.

See Table 13 for a listing of past, ongoing and reasonably foreseeable actions.

Measure 3: Production of Particulate Matter (PM) 10 and 2.5

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 Junction project area is also subject to the same restrictions, requirements, and regulations, so would not have any additive effect on air quality within Central Oregon.

Direct and Indirect Effects of Alternative 3

Measure 1: Acres of project area falling within each fire hazard class. Fire hazard being represented by a matrix of both flame length potential and crown fire potential

The wildfire hazard for post-Alternative 3 treatment conditions was predicted using the modeling methods described in the Analysis Methods section. The resulting predicted fire hazard for post-Alternative 3 conditions is shown and compared to the existing condition, as well as Alternative 2 in

Table 28. See also Figure 17 for a map of predicted wildfire hazard for post-Alternative 3 treatment conditions.

Table 28: Alternative 3 Hazard Ratings and Acreage

HAZARD	Alternative 3 Acres*	Existing Condition Acres*	Alternative 2 Acres*
Low	8,114	2,440	8,468
Moderate	544	821	536
High	1,895	1,523	1,774
Extreme	6,793	12,570	6,569

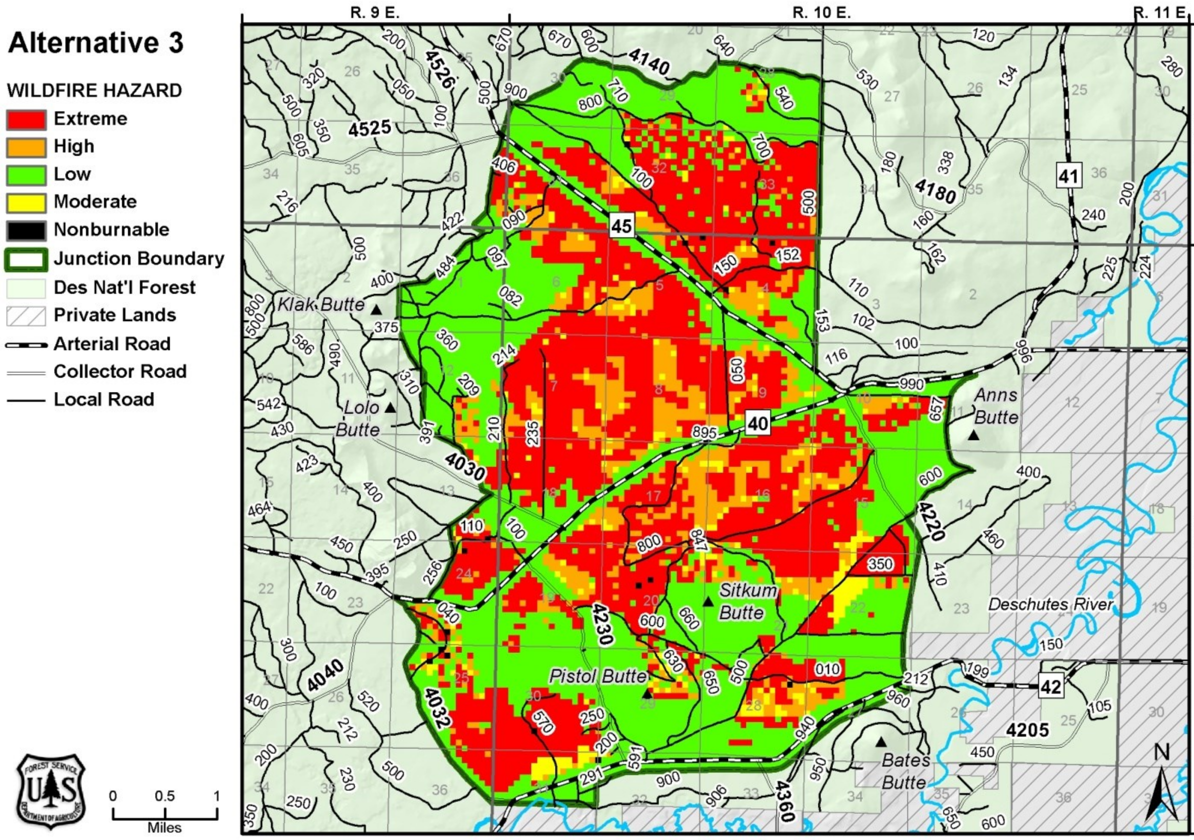
*200 acres within the project area are coded by the satellite imagery data as a Fuel Model 99, or bare ground, so there is no hazard associated with those acres. There is also a difference of 10 acres between the total acres for the project (17,556 acres) and the total analysis acres for existing condition (17,546 acres), these acres represent minute pieces of ground that get dropped during GIS analysis and represent an analysis error of less than 0.1%.

Treatments proposed in Alternative 3 would result in 5,777 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. Relative to Alternative 2, proposed treatments in Alternative 3 reduces 227 acres less of extreme wildfire hazard. The difference in wildfire hazard between the two alternatives is largely due to the proposal not to treat the north sides of Pistol (unit #34) and Sitkum (unit #49/alt. 2, unit #266/alt.3) buttes under Alternative 3. Treatments to unit #76 under Alternative 2 result in a moderate hazard rating. The same unit under alternative 3 is proposed as part of a no treatment area. There is a portion of Wake butte proposed not to be treated under Alternative 3 (22 acres) and when treated under Alternative 2, had been effectively reduced to a low hazard rating. Unit #204, located on Wake Butte, is also proposed to be dropped from treatment under Alternative 3, resulting in no change in its hazard rating. Wake Butte would remain untreated and overtime stand and fuel conditions would become overly dense resulting in increased competition and greater susceptibility to beetle caused mortality and wildfire.

The change from proposed treatments under Alternative 3 would allow direct attack with hand crews of a wildfire under 97th percentile conditions on 8,114 acres of the Junction project 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. In addition, 3,924 acres of the total acres rating as low are in the ponderosa pine dominated stands (compared to 1,432 low hazard ponderosa pine acres in the existing condition). In ponderosa pine, a rating of low would allow for safe, efficient firefighting, in the event of wildfire. It would also allow for continued care of these stands with prescribed fire with minimal damage and minimal cost. There are areas of proposed treatment for silvicultural benefit where the treatment of activity-created fuels is to lop and scatter the created fuels and allow them to break down over time. In these areas, the previously extreme hazard remains an extreme hazard in the relative short term. There is no predicted benefit to fuels management, but also no predicted cost to wildfire hazard. These areas where lop and scatter are proposed are in stands of lodgepole pine and are proposed for areas of lower priority for fuels management.

Any proposed thinning where slash is treated, mowing and underburning for Alternative 3 in the scenic view allocation reduce fire hazard to a low hazard rating. Areas within the scenic view allocation have also been defined as priority areas to treat by the E/W Deschutes County CWPP. Reducing fire hazard to a low hazard rating (see table 4) would meet the CWPPs desire for reducing fuel loads to that which can produce flame lengths of less than four feet. Four foot flame lengths generally allows fire suppression resources to safely and efficiently attack the fire at the head with hand tools. There are proposed treatments beyond the 500 feet road corridor identified as priority for fuels hazard treatment under the CWPP guidance that may not reduce the fuels or fire hazard. These areas within scenic views where fire hazard is not reduced are primarily areas where there is a silvicultural benefit to thinning and lop and scatter is the proposed method for handling created slash. In these areas, the previously extreme hazard remains an extreme hazard in the relative short term. There is no predicted benefit to fuels management, but also no predicted cost to wildfire hazard. These areas where lop and scatter are proposed are in stands of lodgepole pine and are proposed for areas of lower priority for fuels management.

Figure 17: Alternative 3 wildfire hazard



Measure 2: Acres of project area falling within each fire risk class. Fire risk being represented by burn probability

Wildfire risk, measured as burn probability was modeled and calculated for Alternative 3 in the same fashion as the burn probability for the existing condition (no action alternative) and as described in the Analysis Methods section. Table 29 compares the wildfire risk for Alternative 2 with the wildfire risk of the existing condition, as well as the wildfire risk for Alternative 3.

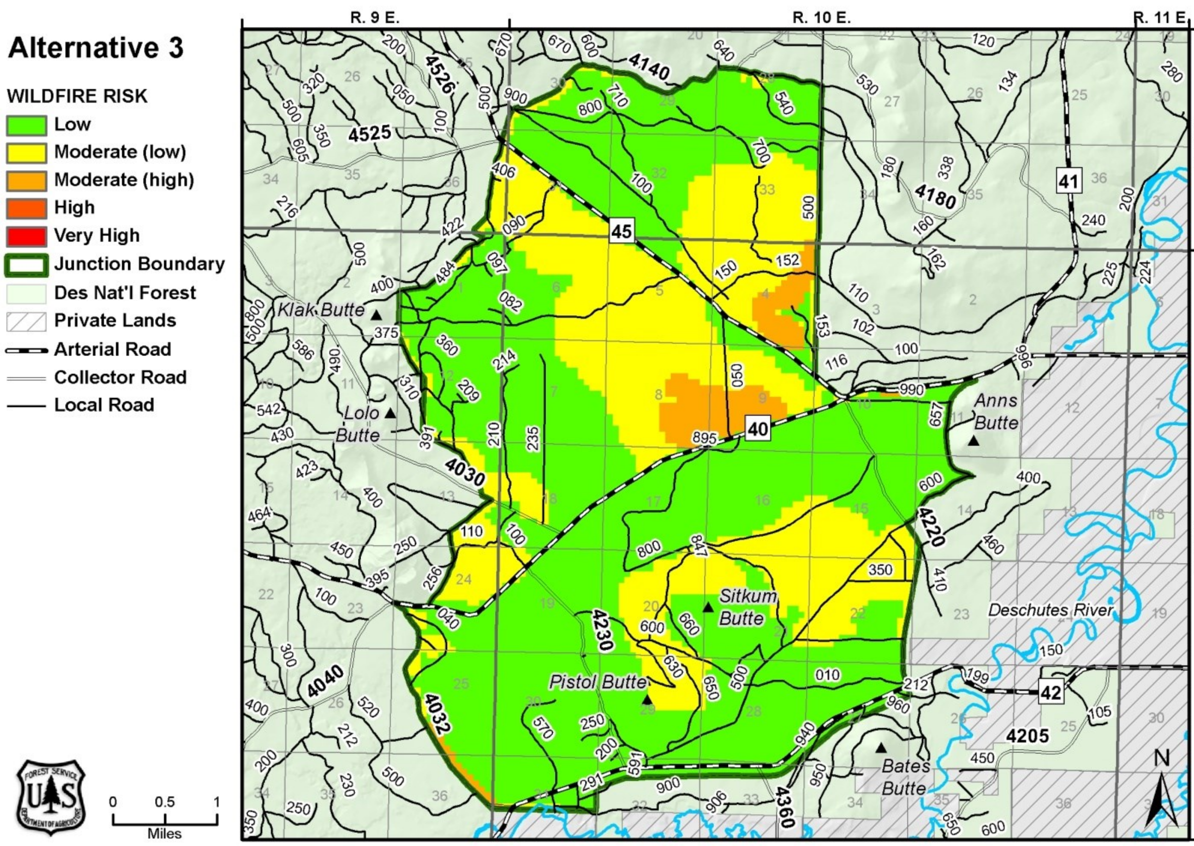
Table 29: Wildfire Risk rating as measured by burn probability within Alternative 3 of the Junction project area

Wildfire risk	Alternative 3 Acres*	Existing Condition Acres*	Alternative 2 Acres*
Low	11,341	228	12,622
Moderate (low)	5,555	1,243	4,540
Moderate (high)	652	5,404	382
High	0	6,821	4
Very High	0	3,857	0

*There is a difference of 8 acres between the total acres for the project (17,556 acres) and the total analysis acres for existing condition (17,548 acres), these acres represent minute pieces of ground that get dropped during GIS analysis and represent an analysis error of less than 0.1%.

When comparing Alternative 3's wildfire risk with the wildfire risk for the existing condition, it can be seen that treatments proposed under Alternative 3 would lower the risk substantially across the treatment area. All 3,857 acres of the project area with a risk of 'Very High' are reduced to a classification of 'High' or lower. The majority of those acres were brought down to at least the 'Moderate (low)' level. Still more acres within the project area were reduced from their previous 'Moderate (high)' and 'Moderate (low)' acres to a 'Low' risk.

Figure 18: Alternative 3 wildfire risk



The reduction of wildfire risk shown in Table 29 is a considerable reduction. This reduction in wildfire risk means that with Alternative 3 actions, a considerable amount of work would be done to slow fire's forward rate of spread and increase firefighter's abilities to suppress the fire. Spatially, Figure 18 shows that with proposed treatments under Alternative 3, much like actions proposed in Alternative 2, risk to values at the southern end of the project area, like Fall River estates and areas surrounding the west side of Ann's butte and adjacent private lands would be effectively reduced to a low rating. In addition, risk to large portions of the west and north sides of the project area, including ponderosa-pine dominated stands would be effectively reduced to a low rating. The most significant difference in wildfire risk potential between the two alternatives is the risk related to Pistol and Sitkum buttes. Wildfire risk is still reduced from a very high and high risk to a moderate risk, but less so than Alternative 2's low potential risk. This is due to proposing not to treat the north side of the two buttes under Alternative 3.

Measure 3: Production of Particulate Matter (PM) 10 & 2.5

The amount of particulate matter emitted due to underburning and pile burning within Alternative 3 are shown in Table 30. The total tons of particulate matter shown in Table 30 were calculated by multiplying the smoke emissions (converted from pounds to tons) per acre for a prescribed fire for both PM_{10} and $PM_{2.5}$ (predicted in FOFEM) by the number of net acres that would be prescribed underburned (5,088 acres). Then, the fuels consumed during pile burning were estimated as 29.64 total tons per acre in the USFS software Consume 3.0 (see assumptions). The smoke emissions (converted from pounds to tons) from the fuel consumption that Consume estimated for both PM_{10} and $PM_{2.5}$ were then multiplied by the number of net acres that would be piled and burned (9,236 acres). Emissions from prescribed underburning and all pile burning are shown separately in Table 14 since emissions from each would occur as separate events, emitting particulate matter at different times. The emissions from Alternative 3 could be less than what is shown here, if any of the material produced during treatment can be utilized for biomass, as anticipated.

For comparison, to calculate the tons of PM_{10} and $PM_{2.5}$ emitted from a wildfire, the smoke emissions (converted from pounds to tons) per acre for a wildfire in both ponderosa pine and lodgepole pine were multiplied by the largest acreage of treatment proposed in both (4,881 acres of ponderosa, 8,152 acres of lodgepole). Table 30 shows that an average wildfire would produce almost twice as much emissions for both PM_{10} and $PM_{2.5}$ as the proposed treatments in Alternative 3. Emissions from a wildfire could be even more relative to activity emissions, if any of the material produced during treatment can be utilized for biomass, as anticipated.

Table 30: Estimated smoke emissions from Alternative 3 prescribed fire treatments compared to the same amount of acres consumed under wildfire conditions without treatment

Burn type	Tons PM_{10}	Tons $PM_{2.5}$
Alternative 3- 5,088 ac. prescribed underburn	567	481
Alternative 3- 3,504 hand pile burning & 5,732 machine pile burning	2,124	1,847
Wildfire- 13,033 total acres	5,170	4,399

Burning would be conducted in compliance with National Ambient Air Quality Standards and under the Oregon Smoke Management Plan. Burning would only be conducted when prevailing and predicted wind patterns would result in negligible effects to LaPine, Sunriver, Bend, and the Three Sisters Wilderness Class 1 Airshed. Implementation of the action alternative, based on the measures included to reduce emissions and to disperse smoke during favorable conditions, is expected to protect air quality to adjacent communities while having no visible effects to the Class 1 Airshed (Three Sisters

Wilderness). This is because the Three Sisters Wilderness area is higher in elevation and located eight to ten miles west/northwest of the Junction project area. The prevailing wind patterns reflect a northwest to westerly flow and would result in minimal potential for impacts to the airshed.

On burn days, persons responsible for burning operations modify ignitions patterns and mop-up procedures to consider the effects to the Class 1 Airshed and 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 (Lava Butte Lookout) 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.

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. There would be some dust created from the proposed mechanical operations under this alternative, mainly from logging operations within project units. The amount of dust actually created would be minimal due to dust abatement which includes watering dirt roads identified for hauling.

Cumulative Effects of Alternative 3

Measure 1: Acres of project area falling within each fire hazard class. Wildfire hazard being represented by a matrix of both flame length potential and crown fire potential

Stand and fuel conditions from any past treatments or fires within the Junction planning area were either reflected in the satellite imagery of 2004 or were a part of the update of the satellite imagery, and so therefore the cumulative effects for wildfire hazard of these treatments/fires along with any proposed treatments in the Junction project can be referenced in the Direct and Indirect Effects for Alternative 3.

See Table 13 for a listing of past, ongoing and reasonably foreseeable actions. Across the Junction planning area, past activities since 1968 that may have changed stand/fuel conditions total 19,349 acres. Ongoing activities within the EXF, Katalo, Katalo West, Klak, Dilman, E. Tumbull, Fall and Charlie Brown planned areas total 9,888 acres. The total amount of ongoing and proposed treated acres for the 10th field Fall River watershed including proposed treatments under Alternative 3 would be 21,409 acres. This total includes any area where there may be pre-commercial thinning, commercial harvest and/or fuels treatment, like mowing or underburning. Experience with fire suppression in Central Oregon shows that unless treated acres are in the immediate vicinity (<1/4 mile) they would have no effect on fire behavior within the project area. Any fire behavior effect from treated acres of these recent activities within a ¼ mile of Junction are accounted for in the simulation modeling of predicted fire behavior for the alternative, and are therefore accounted for in the data analysis and reporting of Direct and Indirect fire hazard effects for Alternative 3. Past and ongoing treatments in the areas outside ¼ mile of the Junction project area may or may not reduce fire behavior to a low rating, but any work that treats/reduces surface fuels will lower the susceptibility across the landscape for uncharacteristic wildfire.

Measure 2: Acres of project area falling within each fire risk class. Wildfire risk being represented by burn probability

Stand and fuel conditions from any past treatments or fires within the Junction planning area were either reflected in the satellite imagery of 2004 or were a part of the update of the satellite imagery, and so therefore the cumulative effects for wildfire risk of these treatments/fires along with any proposed treatments in the Junction project can be referenced in the Direct and Indirect Effects for Alternative 3.

Across the Junction planning area, past activities since 1968 that may have changed stand/fuel conditions total 19,349 acres. Ongoing activities within the EXF, Katalo, Katalo West, Klak, Dilman, E. Tumbull, Fall and Charlie Brown planned areas total 9,888 acres. The total amount of ongoing and proposed treated acres for the 10th field Fall River watershed including proposed treatments under Alternative 3 would be 21,409 acres. This total includes any area where there may be pre-commercial thinning, commercial harvest and/or fuels treatment, like mowing or underburning. Experience with fire suppression in Central Oregon shows that unless treated acres are in the immediate vicinity (<1/4 mile) they would have no effect on fire behavior within the project area. Any fire behavior effect from treated acres of these recent activities within a ¼ mile of Junction are accounted for in the simulation modeling of predicted fire behavior for the alternative, and are therefore accounted for in the data analysis and reporting of Direct and Indirect fire hazard effects for Alternative 3. Past and ongoing treatments in the areas outside ¼ mile of the Junction project area may or may not reduce fire behavior to a low rating, but any work that treats/reduces surface fuels will lower the susceptibility across the landscape for uncharacteristic wildfire.

See Table 13 for a listing of past, ongoing and reasonably foreseeable actions.

Measure 3: Production of Particulate Matter (PM) 10 and 2.5

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 Junction project area is also subject to the same restrictions, requirements, and regulations, so would not have any additive effect on air quality within Central Oregon.

3.3.3 Wildlife – Threatened, Endangered, and Sensitive Species

A Biological Evaluation (BE) has been prepared to evaluate the potential effects from the proposed Junction Environmental Assessment (EA) project on U.S. Fish and Wildlife Service (FWS) federally listed species and United States Forest Service (USFS) Region 6 sensitive species with habitat on the Deschutes National Forest. This section of the EA may summarize some information from the BE. The complete BE is located in the project file at the Bend/Ft. Rock Ranger District.

This BE is intended to ensure that all surface disturbing activities and management actions are in compliance with the Endangered Species Act (ESA) of 1973, National Forest Management Act (NFMA) of 1976 (including FS Manual 2670 direction for threatened, endangered, and sensitive species management), the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C.4321 et seq.) as amended, and the Deschutes National Forest Land and Resource Plan (LRMP) [1990]. Projects proposed that may be within any occupied or potential habitat of any federal candidate, threatened, or endangered species on the Deschutes National Forest must be consistent with the Project Design Criteria (PDC) for the Joint Aquatic and Terrestrial Programmatic Biological Assessment (BA) for Fiscal Years 2010-2013 (US Department of Agriculture et al. 2010), hereafter referred to as the Programmatic BA, in order to require no further consultation. Projects that affect the species addressed by the document, and do not meet the applicable PDCs, must initiate the appropriate level of consultation with the U. S. Fish and Wildlife Service. At this time, no consultation in not required with the U.S. Fish and Wildlife Service for any of these species.

Analysis Methods

The project's wildlife biologist collaborated with the Oregon Department of Fish and Wildlife (ODFW) on project design elements, conducted thorough pre-field review and field reconnaissance of the planning area to determine habitat presence for terrestrial wildlife species, including the broader area outside the planning area for potential cumulative effects. Forest Service wildlife technicians conducted northern goshawk surveys in the Junction planning area in the 2010 and 2011 breeding seasons, but no other wildlife surveys were conducted. Sharp-shinned hawks, Cooper's hawks, northern goshawks, red-tail hawks and a great gray owl were either heard or observed during surveys, but no raptor nests were detected. The survey records are on file at the Bend-Fort Rock Ranger District Office.

Project design elements were developed among the ID team to address project-wide vegetative conditions and/or are designed to reduce environmental effects to the wildlife resource. These project design elements are in addition to LRMP standards and guidelines. The following are some examples of project design elements developed for this project and considered during effects analysis.

- Large continuous areas of woodpecker habitat in the lodgepole pine PAG will be remain untreated; Alternative 2 would retain an 870-acre continuous block, and Alternative 3 would retain two large blocks (870-acre area + a 650-acre area). These areas would be void of any treatment of any kind and would provide an area the size of home ranges for either the black-backed woodpecker or three-toed woodpecker. However, these areas would also provide habitat for other species, such as martens, Cooper's hawk, or solitude for mule deer or elk.
- Areas of no treatment will create a mosaic of habitats across the planning area and conserve wildlife habitat at its present state; these areas would not receive any treatments of any kind.
- While developing or restoring white-headed woodpecker habitat (providing for future large ponderosa pine trees and snags) treatment in ponderosa pine will also enhance habitat for other species, such as pygmy nuthatch and Lewis' woodpecker. Additionally, by treating the ponderosa pine PAG in the northern and western portions of the project area, it will create a buffer or reduce the risk of a stand replacement fire into the northern spotted owl range that lies adjacent to the project boundary.
- Prescribed fire will be returned to the ponderosa pine PAG to raise the crown base height, and improve grasses and forbs for various wildlife species.
- By allowing natural succession to occur within the lodgepole pine PAG OGMA corridors, it would retain high densities of snags for various woodpeckers.
- By retaining a 300' buffer around wildlife guzzlers, the alternatives would maintain habitat and provide security for wildlife.
- By retaining all dbh sizes of ponderosa pine snags, it would provide size class diversity for various wildlife.
- By retaining all ponderosa pine trees and white fir trees less than 21" dbh if they meet old tree characteristics would also provide for a diversity of habitats for various wildlife.
- By providing a seasonal restriction for Unit #169 from March 1st – September 30th, it would decrease potential smoke effects from prescribed burning or noise disturbance to a northern spotted owl NRF patch; by providing a seasonal restriction for Unit #62 from March 1st – August 31st, it would reduce any potential disturbance to riparian dependent species during the breeding season, such as great blue herons.
- By retaining all ponderosa pine trees and white fir trees less than 21" dbh if they meet old tree characteristics would also provide for a diversity of habitats for various wildlife.
- By providing a seasonal restriction for Unit #169 from March 1st – September 30th, it would decrease potential smoke effects from prescribed burning or noise disturbance to a northern spotted owl NRF patch; by providing a seasonal restriction for Unit #62 from March 1st – August 31st, it would reduce any potential disturbance to riparian dependent species during the breeding season, such as great blue herons.

Conclusions as to whether the proposed actions would or would not impact or cause a trend towards federal listing for Region 6 sensitive species were determined by assessing how the alternatives impact the structure and function of the vegetation relative to the current and historic habitat availability, individual territory or home range size (as reported in the literature) in conjunction with state conservation status information and ranking for the species in the Natureserve database (http://www.natureserve.org/explorer). Rankings are given for global, national, and state levels.

Ongoing or reasonably foreseeable projects that would affect structural stage are discussed in the cumulative effects section. Past and ongoing activities have created the existing conditions and are incorporated into the existing condition descriptions.

The temporal scale used in the discussion of direct and indirect effects is from 1-20 years (short-term) and greater than 20 years is long-term.

The cumulative effects area or boundary for the species further analyzed is the Fall River 10^{th} field Watershed with the proposed project area falling within portions of the Deschutes Braid-Deschutes River, Fall River, and Spring River 12^{th} field subwatersheds. The Fall River watershed would provide for a range of habitat conditions that occur on the landscape that generally encompass at least a few home ranges of a species needs.

The following describes the average post-treatment canopy closures from the proposed silvicultural prescriptions. Keep in mind, these are averages and post canopy closures would not occur equally across every acre of habitat.

- Commercial thin only - Canopy Cover = 21%
- Commercial thin and precommercial thin - Canopy Cover = 10%
- Overstory removal only - Canopy Cover = 9%
- Overstory removal and precommercial thin - Canopy Cover = 10%
- Overstory removal & hazardous fuels reduction - Canopy Cover = 9%

Federally Listed Wildlife Species

The following section discloses the wildlife species that are federally listed under the U.S. Fish and Wildlife Service that could potentially occur on the Deschutes National Forest.

The northern spotted owl and designated critical habitat for spotted owl are the two entities that are assessed in detail for the Junction project. No other listed or proposed species have potential to be affected. Species not assessed in detail include the Oregon spotted frog and porposed critical habitat, California wolverine, and Candidate species pacific fisher.

The Oregon spotted frog – Oregon spotted frogs inhabit the margins of lakes, marshes, and pools in streams where there is an abundant growth of vegetation (Csuti et al. 2001). Literature cited in the Conservation Assessment (Cushman and Pearl 2007) describes spotted frog breeding habitat as moderate to large wetlands with extensive emergent marsh coverage that warms substantially during seasons when Oregon spotted frogs are active on the surface (February to May). Sites always include some permanent water juxtaposed to seasonally inundated habitat. In literature cited within USFWS Species Assessment and Listing Priority Assignment Form (October 2005), the Oregon spotted frog inhabits emergent wetland habitats in forested landscapes, although it is not typically found under the forest canopy.

Other than approximately 0.2 miles of Fall River, the project area does not have any streams, wetlands or other riparian areas, but there is a 2-acre meadow. Fall River is within the Upper Deschutes Basin and flows into the Deschutes River approximately 2 ¾ miles downstream. There are known Oregon spotted frogs in the Deschutes River, but there are no known records of spotted frogs occurring in Fall River. Fall River would not likely provide suitable habitat because this river is too cold and does not warm substantially from February to May. Field reconnaissance also did not reveal any frogs in the 2-

acre meadow. Additionally, this area is classified as a Recreational River, therefore human disturbance is frequent, making it unlikely to have occupancy.

The project design features such as having the wildlife biologist monitor Unit 62 prior to implementation, implement the treatment in the 16 acres during the fall season, apply all the applicable Forest Plan standards and guidelines, INFISH design elements, and contacting the biologist if frogs are seen would eliminate potential disturbance or impacts to Oregon spotted frogs. Unlike other frogs, the Oregon spotted frog spends most time in the water rather than on land, therefore the treatment activities would have no impact to egg masses. By the fall season, young will have dispersed or would have better mobility to temporarily flee the area. In conclusion, by applying the standards and guidelines and design elements above, the proposed Junction EA Project would have no effect on Oregon spotted frog.

California wolverine – he wolverine is a holartic species found in high-elevation habitats. Its home range can be very large; at least approximately 30 sq. miles. Threats to wolverine populations include climate change and alteration of alpine habitats, disturbance from recreation and roads (especially during the denning season), and isolation of individuals or small populations.

Denning habitat can vary. The dens in Alaska were usually long, complex snow tunnels with no associated trees or boulders. In contrast, dens in Idaho were always associated with fallen trees or boulders. Dens in both states were covered with at least one meter of snow. With few exceptions, they reported wolverine dens described to date were located in alpine, subalpine, taiga, or tundra habitat and reports of dens in low elevation, densely forested habitats are rare. A GIS denning habitat model developed by Jeff Copeland of the Idaho Department of Fish and Game was used to identify high potential wolverine denning habitat. Maps were generated using the following parameters:

- Areas above 5,500 feet (with flexibility for adjustment up or down by the Forest depending on local conditions and knowledge),
- Slopes with a north aspect (>320 degrees, <120 degrees),
- Large cobble/rubble substrate (rock or snow), and
- Concave curvature (cirque basins).

Denning habitat for the Deschutes National Forest was modeled from the Forest Plant Association Group (PAG) layer including the alpine dry, alpine meadow, glacier and rock, north aspect of 0-22.5 degrees and 337.5-360 degrees. The results from this were clipped using only the acres above 5,500 feet in elevation. This resulted in a total of 1,656 acres of potential denning habitat on the Deschutes National Forest. The potential denning habitat is generally in small disjunct areas adjacent to the peaks of the Cascade crest and Paulina Peak. The greatest amount of potential denning habitat (756 acres) is located within the Headwaters of Whychus Creek (formerly Squaw Creek) subwatershed of the Whychus Creek watershed near Three Sisters. The modeled acreage across the entire forest may overestimate potential acres of wolverine denning habitat due to current levels of disturbance that may be occurring particularly within the Newberry National Volcanic Monument.

Management recommendations include protection of natal denning areas, and limiting disturbance or access to areas of suitable denning habitat and the immediate area around it. Based on modeling, there are only 2 acres of denning habitat within the Fall River watershed, but these acres are not within the Junction project area or within proposed units. The Junction project area does not provide wolverine denning habitat because it is at a lower elevation (4,200 – 4,800 feet) and does not exhibit deep snow. Additionally, the project area is mostly flat and dominated by dense pure lodgepole pine wet and dry and about 4,000 acres of ponderosa pine wet and dry. Since wolverines have an extremely large range, it is reasonable to assume that an individual may travel through the project area if dispersing across Oregon. Since there is no suitable denning habitat within the project area, and only a small probability of dispersing across, the proposed Junction EA Project would have ***no impact*** on California wolverine.

Pacific fisher - Fishers primarily use mature, closed-canopy coniferous forests with some deciduous component, frequently along riparian corridors (Csuti et al. 2001). Weir and Corbould (2010) found that fishers were limited by the openness of the stand; one reason being that escape cover (i.e. trees for climbing) are far apart making fishers further susceptible to terrestrial predators. In Ruggiero et al. (1994), it is suggested fishers prefer closed-canopy (greater than 60%), late-successional forests with large physical structures (live trees, snags, and logs), especially if associated with riparian areas. A 2004 Species Assessment by the US Fish and Wildlife Service documents key aspects of fisher habitat as those associated with late-successional forests (i.e. high canopy closure, large trees and snags, large logs, hardwoods, and multiple canopy layers). Distribution of fishers is limited by elevation and snow depth (Krohn et al. 1997 *in* US Fish and Wildlife Service Species Assessment). Fishers generally avoid areas of high human disturbance, primarily high road density or recreational developments. Fishers are fairly large, weighing 3 to 13 lbs and 29 to 47 inches long. This may suggest a need of larger log sizes for dens than other animals with similar needs (i.e. marten). Aubry and Raley (2006) found in southwestern Oregon, fishers were found denning and resting at 4,000 feet elevation, more than 80% canopy closure, and more than 16 snags and 67 logs at least 20” DBH per acre; supporting the suggestion that this species utilizes large to very large structure. Denning and resting sites were also observed in large live trees (mostly Douglas-fir) with mistletoe brooms, limb clumping, rodent nests, or some other deformity. They also found fishers were preying upon woodpeckers, jays, grouse, quail, squirrels, hare, porcupine, and skunks.

Approximately 303 total acres of mixed conifer are within the planning area with 275 acres located in a narrow band along the northern boundary and the remaining found in the far western end of the planning area (both of these areas are adjacent to pure ponderosa pine stands). Although these stands are composed of a variety of tree species, the predominant species are true firs, ponderosa pine, and lodgepole pine. The mixed conifer areas have nearly all been entered in the past primarily to reduce stand densities through thinning. Although a few scattered large trees may be present, residual stands are composed of smaller, less than 20”dbh trees. These stands are dominated by vegetation structural stage (VSS) 4 with a size class of 5 – 8.9 inch dbh.

Based on habitat descriptions in the literature, these stands are not providing suitable fisher habitat (multi-storied stands; greater than 20” average stand dbh; and greater than 55% canopy closure). Additionally, fishers generally have large territories (a minimum of 10 square km or 2,500 acres).

The only portion of the planning area that contains riparian habitat is the 0.2-mile stretch adjacent to Fall River. This stretch is dominated by lodgepole pine and contains some ponderosa pine. The Oregon Department of Fish and Wildlife operates the Fall River Hatchery, which is adjacent to Fall River and just outside of the project boundary, but the unnumbered access road to the hatchery is within the planning area. According to the 2011 Operations Plan for the Fall River Hatchery, the facility welcomes 20,000 visitors annually. Fish anglers also utilize the Fall River riparian area to the east and west. Given the high degree of human presence and the proximity of the ODFW Fish Hatchery, it is unlikely that this area provides suitable fisher habitat.

Based on the existing conditions discussed and the fact there are no District or Forest records of fisher breeding, it is unlikely fishers would occur in the area. Therefore, the proposed Junction EA Project would have ***no impact*** on fishers.

Northern Spotted Owl

The NatureServe database for the state of Oregon ranks the northern spotted owl as vulnerable (S3). Northern spotted owls generally require mature or old-growth coniferous forest with complex structure including multiple canopy layers, large green trees and snags, heavy canopy habitat, and coarse woody material on the forest floor. These types of forests usually contain the structures and characteristics required for nesting, roosting, foraging (NRF), and dispersal. Forest characteristics associated with northern spotted owls usually develop with increasing forest age, but their occurrence may vary by location, past forest practices, and stand type, history, and condition. Therefore, spotted owls will use younger, managed forests provided that key habitat components are available. These younger forests provide dispersal habitat for owls and foraging habitat if near nesting or roosting areas.

Suitable habitat on the eastside of the Cascade Mountains is naturally confined to a narrow forested band below the high-elevation subalpine forests and above the low-elevation lodgepole/ponderosa pine forests (USDI 1992). Neither of these forest types is considered spotted owl habitat.

NRF habitat for the northern spotted owl on the Deschutes National Forest includes stands of mixed conifer, ponderosa pine with white fir understories, and mountain hemlock with subalpine fir. Nest trees on the Deschutes have been predominantly large Douglas-fir trees.

Existing Conditions

The range of the northern spotted owl lies to the west and north of the Junction planning area boundary, including the Sheridan Mountain late successional reserve (LSR). LSRs are a network of forest reserves under the Northwest Forest Plan that were created to maintain older forest structure as habitat for species such as the northern spotted owl.

There are several patches of NRF habitat that are over ½ mile away from the Junction project area. These patches were field verified and are considered to be quality suitable NRF habitat because of the vast amount of large tree component being true firs, they are multi-layered with high canopy closure and there is a vast amount of large down woody debris. There is one patch of NRF habitat that is ¼ mile away and outside of the project area to the northeast. In the western part of this 59-acre patch, it would be considered potential foraging habitat, but not nesting habitat because it lacks large woody debris, a high canopy closure and the stand is a mix of ponderosa pine, white fir, and some Douglas-fir. There are some large trees in this area that are 26”- 27” dbh with mistletoe and large limbs, but there are several large openings within this area. Habitat quality is better in the northern and eastern part of this patch because it transitions into more consistent quantity of large trees, true firs, it is multi-story, a much higher canopy closure, and contains large woody debris. District records show there are no known nests within 1.2 miles of the Junction project area. No protocol surveys were conducted because there would be no habitat modifications to NRF habitat and there would be a seasonal restriction in place for Unit #169 to avoid potential disturbance.

Direct and Indirect Effects –Alternative 1

As part of the fuels reductions/prescribed burning and white-headed woodpecker restoration objectives in the northern and western flanks of the project area, the ponderosa pine stands in these areas would not be thinned or prescribed burned. By taking no action, there is some level of fire risk and/or potential loss of suitable spotted owl habitat in the adjacent Sheridan LSR if a wildfire spreads from the ponderosa pine stands into the mixed conifer stands, where these stands would be more vulnerable of a stand replacement fire.

Direct and Indirect Effects –Alternatives 2 and 3

Alternatives 2 or 3 would not directly modify suitable NRF spotted owl habitat. Either action alternative may reduce the risk of a stand replacement fire and/or loss of spotted owl habitat that is adjacent or beyond the Junction project area. By opening up the ponderosa pine stands in the northern end and western flanks of the project area, it would create a buffer up against the mixed conifer stands and provide a mosaic across the larger landscape. Under either Alternatives 2 or 3, there would be a seasonal restriction for prescribed burning in Unit #169 in the northeastern section of the project area to prevent smoke drift to the NRF patch that is within ¼ mile. Since the project area is outside the spotted owl range, and there would be a seasonal restriction for prescribed burning, no direct or indirect effects are anticipated.

Cumulative Effects

Since there are no direct or indirect effects to the northern spotted owl and its habitat, there are no cumulative effects as defined by NEPA.

Determination

With application of the seasonal restriction, and the fact that no habitat modification would occur, the proposed Junction EA Project would have ***no effect*** on northern spotted owl.

Designated Critical Habitat Units for Northern spotted owl

Northern spotted owl critical habitat was designated in 1992 based on the identification of large blocks of suitable habitat that are/were well distributed across the range of the owl. Critical habitat units (CHUs) were intended to identify a network of habitats that provide the functions considered important to maintaining stable, self-sustaining, and interconnected populations over the range of the spotted owl, with each CHU having a local, provincial, and a range-wide role in spotted owl conservation. Most CHUs were expected to provide suitable habitat for population support, some were designated primarily for connectivity, and others were designated to provide for both population support and connectivity.

The Northwest Forest Plan (NWFP) was developed using conservation principles similar to those used to designate critical habitat and is considered the Federal contribution to the conservation of spotted owls and its habitat in the United States. Specifically, LSRs were created under the NWFP to provide large blocks of suitable habitat capable of supporting multiple pairs of spotted owls. NWFP standards and guidelines establish that LSRs will be managed to protect and enhance late-successional and old-growth forests ecosystems. Riparian Reserves and other NWFP land use allocations provide for connectivity between reserves. Approximately 70 percent of suitable habitat in CHUs overlaps with NWFP LSRs on a range-wide basis and will therefore be managed to protect and enhance habitat characteristics.

Previously, five CHUs were identified on the Deschutes NF all of which are wholly or partially overlain by LSRs. In 2012, the U.S. Fish and Wildlife Service issued a final rule for designation of revised critical habitat for the northern spotted owl. This rule expanded critical habitat across the northern spotted owl's range, including the Deschutes NF.

Existing Conditions

As previously discussed, the northern spotted owl range is outside the Junction planning area. CHUs exist in the adjacent Sheridan Mountain LSR.

Direct and Indirect Effects – Alternative 1

As disclosed in the spotted owl direct and indirect effects, part of the Junction project objectives is to restore white-headed woodpecker habitat in the northern and western flanks of the project area adjacent to the LSR. Under this alternative the ponderosa pine stands in these areas would not be thinned or prescribed burned. By taking no action, there is some level of fire risk and/or potential loss of spotted owl critical habitat in the adjacent Sheridan LSR if a wildfire spreads from the ponderosa pine stands into the mixed conifer stands, where these stands would be more vulnerable of a stand replacement fire.

Direct and Indirect Effects –Alternatives 2 and 3

Alternatives 2 or 3 would not modify spotted owl critical habitat since it is outside the project area. Either Alternative may reduce the risk of a stand replacement fire and/or loss of critical habitat that is in the Sheridan Mountain LSR. By opening up the ponderosa pine stands in the northern end and western flanks of the project area, it would create a buffer up against the mixed conifer stands and provide a mosaic across the larger landscape. Since the project area is outside the spotted owl range and critical habitat, no direct or indirect effects are anticipated.

Cumulative Effects

Since there are no direct or indirect effects to northern spotted owl critical habitat, there are no cumulative effects as defined by NEPA.

Determination

Since there would be no habitat modification to northern spotted owl critical habitat, the proposed Junction EA Project would have no effect on northern spotted owl critical habitat.

Region 6 Sensitive Wildlife Species

Table 31 shows species from the Region 6 Forester's sensitive species list. It describes each species' current listing status, briefly describes each species' preferred habitat, and whether habitat is present in the planning area. In addition to sensitive listing status, some species also have other listing designations (see note below table). The rationale for those species not brought forward for further analysis is in Appendix C of this EA and Appendix B of the BE.

The key wildlife issues brought forward from scoping were addressed by the ID team by designing the project in mosaic patterns, such as providing larger blocks of habitats as woodpecker, retention areas or leave areas. Project design was not only carefully planned to meet the purpose and need, but to improve the habitats for selected species or those whose populations and/or habitats are in most decline. In addition, project design also serves to reduce the impacts for other species that contain habitat within the project area. If the initial project design did not address or reduce the impact, then mitigation measures were incorporated for those species.

Table 31: Regional Forester's Sensitive Species List

Species	Status*	Habitat	Habitat Presence
Northern Bald Eagle	Region 6 Sensitive, MIS, S4B, S4N	Lakeside or riverside with large trees	Yes, see discussion below
American peregrine falcon	Region 6 Sensitive, BCC, S2B	Riparian, cliffs	Potential foraging habitat, but not brought forward for further analysis (see Appendix B for details).
Greater sage grouse	Region 6 Sensitive, BCC, S3	Sagebrush flats	No, see Appendix C for details.
Lewis' woodpecker	Region 6 Sensitive, MIS, BCC, Landbird focal species, S2, S3B	Open ponderosa pine forests, large diameter dead or dying trees, burned forests	Yes, see discussion below
White-headed woodpecker	Region 6 Sensitive, MIS, BCC, Landbird focal species, S2, S3B	Mature ponderosa pine forests; weak excavator	Yes, see discussion below
Harlequin Duck	Region 6 Sensitive, MIS, S2B, S3N	Rapid streams, large trees	No, see Appendix C for details.
Bufflehead	Region 6 Sensitive, MIS, S2B, S5N	Nests at high elevation forested lakes in the central Cascades using cavities or nest boxes in trees close to water	No, see Appendix C for details.
Horned grebe	Region 6 Sensitive, MIS, S2B, S5N	Lakes, emergent vegetation	No, see Appendix C for details.
Yellow rail	Region 6 Sensitive, BCC,	Marshes	No, see Appendix C for details.

Species	Status*	Habitat	Habitat Presence
	S1B		
Tricolored blackbird	Region 6 Sensitive, BCC, S2B	Lakeside, bulrush	No, see Appendix C for details.
Northern Waterthrush	Region 6 Sensitive, S2B	Dense riparian willows	No, see Appendix C for details.
Pacific fisher	Federal Candidate, Region 6 Sensitive, S2	Mixed conifer forest, complex forest structure	No, see Appendix C for details.
California wolverine	Federal Candidate, Region 6 Sensitive, S1	Cirque basins for denning, mixed conifer habitat, high elevation	No, see Appendix C for details.
Pygmy rabbit	Region 6 Sensitive, S2	Sagebrush flats	No, see Appendix C for details.
Townsend's big-eared bat	Region 6 Sensitive, MIS, S2	Caves and old dwellings	Yes, see discussion below
Crater Lake Tightcoil	Region 6 Sensitive, S1	Wet vegetation zone	Potential habitat, but not brought forward for further analysis (see Appendix C for details).
Silver-Bordered Fritillary	Region 6 Sensitive, S2	Wet meadows, bogs, and marshes	Potential habitat, but not brought forward for further analysis (see Appendix C for details).
Johnson's Hairstreak	Region 6 Sensitive, S2	Coniferous forests with the mistletoe *Arceuthobium* in western hemlock, red fir, & Jeffrey pine	No, see Appendix C for details.

*Regional Forester's Sensitive species come from the Region 6 Threatened, Endangered, & Sensitive species list for the Deschutes National Forest (January 2008); Management Indicator Species come from the Deschutes National Forest Land & Resource Plan (LRMP)[1990]; Birds of Conservation Concern (BCC) come from the US Fish & Wildlife Service BCC – BCR 9 (Great Basin) [2008]; Landbird Focal Species come from the Conservation Strategy for Landbirds of the East-Slope of the Cascade Mountains in Oregon & Washington (Altman 2000); NatureServe rankings for the state of Oregon: S1, critically imperiled, S2 = imperiled, S3 = vulnerable, S4 = apparently secure, S5 = secure, B = breeding, N = non-breeding.

Northern Bald Eagle

The northern bald eagle is both a Region 6 Sensitive Species and a management indicator species (MIS). The bald eagle was originally selected as an MIS in the 1990 Deschutes National Forest Land and Resource Management Plan or Forest Plan because the bald eagle was listed as "threatened" at the time of the plan. It was further considered that certain river and lake locations on the Forest are extremely important as feeding sites during the reproductive, fall, and winter periods and that most bald eagles are sensitive to human disturbance during these times.

Information on habitat needs is contained in the BE and is summarized from the Species Assessment for bald eagle for the Deschutes National Forest (USDA Forest Service 2012).

On the Deschutes National Forest, populations of breeding bald eagles have steadily increased since the first surveys began in the early 1970s. In 1971, there were 12 breeding pairs, while in 2009 the Deschutes National Forest had 49 pairs.

Forest-wide Habitat Modeling

Habitat modeling for bald eagle was assessed at the Forest-wide scale using Forest Plan Standards and Guidelines (S&Gs), and mapped potential reproductive habitat based on Forest nest location data, GIS, and Gradient Nearest Neighbor (GNN), a vegetation predictive model. Using GIS, a one mile buffer around large fish-bearing lakes and reservoirs and/or fish-bearing rivers was used. The one-mile buffer did not include aquatic habitat used for foraging. The GNN vegetation prediction model (Ohmann et al. 2002) was then used to determine availability of nest trees based on criteria utilizing green trees ≥ 20" dbh. Based on the GIS/GNN habitat model, there are 155,006 acres of potential bald eagle nesting habitat on the Forest, with 97,868 acres or 63% of the total acres meeting the size criteria of green trees ≥20" dbh.

Existing Conditions

Based on the GIS/GNN habitat model, there are 20,282 acres of potential bald eagle nesting habitat in the Fall River Watershed with 12,332 acres or 61% meeting the size criteria of green trees ≥20" dbh. Within the Junction Planning area, there is a total of 1,425 total acres of potential nesting habitat all located in the southern end of the planning area due to the proximity of Fall River (i.e. the one mile buffer). With the exception of Sitkum Butte, Pistol Butte and other isolated pockets, the southern end of the project area is dominated by lodgepole pine dry PAG. While there are some large ponderosa pine trees interspersed within these lodgepole pine stands, the total acres of bald eagle habitat are overestimated because lodgepole pine trees are not the preferred bald eagle nest tree. Forest-wide data, District data, and field reconnaissance did not reveal any bald eagle nests within the Junction project area, and the project area is not in a Forest Plan designated Bald Eagle Management Area (BEMA). The Bates Butte BEMA is the nearest BEMA to the Junction planning area, which is approximately ½ mile to the southeast. There are historic bald eagle nest sites located south of Bates Butte.

Direct and Indirect Effects –Alternative 1

Under the no action alternative, there would be no potential disturbance to bald eagles from the proposed management activities. Although, this alternative would forgo the opportunity to improve large diameter ponderosa pine nest trees. Some of the ponderosa pine stands or some of the ponderosa pine trees interspersed within lodgepole pine stands would continue to experience declining growth rates and increasing levels of stress, while increasing the risk of bark beetle infestations. These conditions may also increase the risk of stand-replacement fires and has the potential to eliminate suitable nesting and roosting habitat.

Direct and Indirect Effects –Alternatives 2 and 3

Implementation of Alternatives 2 or 3 may cause potential short-term human disturbance from management activities (i.e. thinning, temporary roads, mowing, and prescribed burning) if there were any bald eagles nesting or foraging in the area. As discussed, there are no known nests in the project area, but if a new nest is discovered within ¼ mile during implementation, a Forest Plan Standard and Guideline timing restriction shall be applied from January 1st – August 31st.

Based on the GIS modeling, Table 32 shows the acres that would be treated within the periphery of bald eagle habitat by the various proposed treatments under both alternatives. These are the total acres of habitat affected based on habitat modeling, while the following rows show the acres affected by activity type. These rows will not add up equally to the total acres affected since certain activities would only occur in certain units or because there are overlapping activities in the same units. Keeping in mind that the model delineated a 1-mile buffer, the southern end of the planning area was included. The southern end is dominated by lodgepole pine, but lodgepole pine trees are not preferred bald eagle nest trees.

Alternatives 2 or 3 would not impact potential or preferred nesting, roosting, or perching structures since either alternative would not harvest any ponderosa pine trees greater than 21" dbh and no ponderosa pine snags would be harvested. Therefore, the acres shown as affected are within the periphery of the one-mile buffer and the affected acres would be from the overstory removal of lodgepole pine and/or pre-commercial thinning of smaller diameter ponderosa pine. Rather, either alternative would maintain and/or contribute towards improving the large tree nesting structure of ponderosa pine.

As shown in the literature, changes in the forest structure may impact foraging habitat for prey species. Since bald eagles rarely hunt on the ground and given the current density of these stands due to lodgepole pine, it is doubtful that bald eagles use this area for “secondary” foraging (other than fish). Therefore, within the short-term Alternatives 2 or 3 may benefit bald eagle foraging by removing or reducing the currently over stocked dense stands of lodgepole pine, while providing more open stands apt for bald eagle ground foraging. Due to the lack of natural fire, the units identified for follow up treatment with prescribed fire would likely improve the vegetative conditions for alternate prey species, therefore potentially providing more optimum future bald eagle foraging habitat.

Table 32: Acres of bald eagle habitat affected by action alternative

Bald eagle	Alternative 2	Alternative 3
Total acres affected	1,120	897
Overstory removal	318	179
Seed tree/Shelterwood	226	210
Commercial thinning	508	440
Total overstory removal	1,051	828
No tree harvest	69	69
Prescribed burning	477	477
Mowing	927	892
Understory treatment	1,120	897

Overall, Alternative 2 would be the most beneficial to bald eagles since this alternative would improve more acres of potential bald eagle nesting and foraging habitat versus Alternative 3.

Cumulative Effects

The cumulative effects bounding area for bald eagle is the entire Fall River-Deschutes River watershed with nearly all the modeled habitat found in the southern part of the watershed due to its proximity to Wickiup Reservoir, the Deschutes, Fall, and Spring Rivers. This area is sufficient because it encompasses three subwatersheds, and District and Forest data shows a fair amount of nest occupancy along these riparian corridors. From an HRV standpoint throughout the Fall River Watershed, Table 2 shows that the distribution of ponderosa pine and mixed conifer in Structural Stage 6 are within limits, but at the lower end in ponderosa pine, while there is a deficit of large trees in Structural Stage 7 for both ponderosa pine and mixed conifer. These lower percentages could be attributed to several factors, such as past management practices, including road building, fire suppression, insects and disease, and due to portions or much of these river systems within the watershed are just west of the towns of La Pine and Sunriver, therefore fuels reductions for reducing fire risks to these communities have occurred.

From a recreation standpoint, since these riparian corridors are fairly close to these communities, moderate to high recreational use varies by area, mostly in the spring thru fall months for fishing, hunting, or hiking. These activities have already caused or may cause future disturbance to nesting bald eagles, while some eagles may tolerate presence to some extent due to habituating to some of these activities.

In view of vegetation management, the action alternatives would not cumulatively reduce nesting habitat within the Fall River watershed, but would enhance the tree diameter and potentially provide more optimum nesting or roosting trees in the long-term. From a cumulative standpoint, the Junction EA would improve 6% of potential bald eagle habitat in the Fall River watershed under Alternative 2 (1,120 acres/ 20,282 acres) and 4% under Alternative 3 (897 acres/20,282 acres).

The ongoing projects, in combination with the proposed Junction EA are not expected to result in negative cumulative effects to individual bald eagles or habitat in the Fall River watershed.

There are no foreseeable actions within the Fall River watershed that have potential to reduce suitable habitat for bald eagles.

Forest Plan Consistency

The Forest Plan standards and guidelines for bald eagle have been reviewed and the action alternatives for the Junction Project would be consistent with the Forest Plan. WL-1 would be met because a biological evaluation has been conducted and reviewed by journey-level wildlife biologists to determine if bald eagle use is incidental or essential; the Junction planning area has been determined not to be essential due to the high recreation use along this stretch of Fall River and the vicinity to the Fall River Fish Hatchery. In addition, there are no designated BEMAs and the Bates Butte BEMA is over ½ mile to the southeast. In accordance with WL-3, active nests should be protected from disturbing activities within ¼ mile of the nest by restricting site disturbing operations from January 1st – August 31st.

Determination

The proposed Junction project would affect <1% of the existing potential suitable bald eagle habitat across the Forest under either Alternative 2 (1,120 acres/155,006 acres) or Alternative 3 (897 acres/155,006 acres). The overall direct, indirect, and cumulative effects would result in beneficial effects in the long-term as the larger trees may provide potential suitable nesting and or roosting sites. Therefore, the action alternatives would have a beneficial impact on bald eagle.

White-headed Woodpecker - Element of Key Issue #1

Information on habitat needs is contained in the BE and is summarized from the Species Assessment for white-headed woodpecker for the Deschutes National Forest (USDA Forest Service, 2012).

The white-headed woodpecker is both a Region 6 sensitive species and a MIS for the Deschutes National Forest. It was chosen as part of the woodpecker group to represent all wildlife species that use cavities for nesting and denning.

The HRV analysis across the forest shows the amount of nesting habitat for the white-headed woodpecker and the percent of the landscape with snags >20" dbh roughly fall within historical estimates. Further analysis using the DecAID tolerance intervals indicates that most nesting habitat on the forest contains low to moderate snag densities with only 7% providing for the majority of individuals.

Use of DecAID Wildlife Data

DecAID is used in this analysis as a reference and resource to display effects. It is not used to set snag or down wood levels for the project area. DecAID is a web-based dataset, but it is not a model. It is a synthesis of all of the best available research on dead wood. DecAID does not provide information on all life needs of a given species. It integrates current research/studies on wildlife use of dead wood (snags, down wood, dead portions of live trees) in various habitat types. Information in DecAID will be used and displayed in addition to current LRMP standards and guidelines where applicable under each species-specific analysis in this report.

"Wildlife data" as used in DecAID refers to the data collected in a variety of wildlife studies conducted in specific vegetation types found in the west. Most of the data collected is for bird species, primarily cavity nesters such as woodpeckers. Most of the data on snag density from wildlife literature were recorded at nest, roost, or den sites. "The wildlife studies, on which the wildlife portion of DecAID is based, were conducted in a variety of landscapes and site conditions. Typically, the studies (a) did not report how the general study areas and specific study sites were chosen relative to others, and (b) did not describe how the vegetation conditions within the general study areas and specific study sites differed from conditions within a broader area, especially within the wildlife habitat and vegetation condition classes used in DecAID. Thus, there is no way to know to what degree the study areas and sites varied from conditions generally present, and thus no way to gauge the bias in study area and site selection. In turn, this means there is no way to estimate the degree of bias in the wildlife data summarized in DecAID (Mellen McLean et al. 2009)".

The wildlife data in DecAID is provided in the form of tolerance levels of 30, 50, or 80 percent. Data is displayed by tolerance level for both wildlife data and inventory data. Tolerance levels are similar to confidence levels with one key difference: "tolerance intervals are estimates of the percent of all individuals in the population that are within some specified range of values" (Mellen McLean et al. 2009).

Snag Density by Tolerance Level

The following tables display tolerance level information for snag density relative to the white-headed woodpecker for snags >10" dbh and snags >20" dbh in Eastside Mixed Conifer, small and large trees (EMC_S/L), Ponderosa Pine/Douglas-fir, small and large trees (PPDF_S/L), and Ponderosa Pine/Douglas-fir, open (PPDF_O) as cited in DecAID.

Table 33: Tolerance levels for snag density >10" dbh for the white-headed woodpecker as reported in DecAID in green stands.

Snag Size	Species*	30% T.L. Snag Density (#/acre)	50% T.L. Snag Density (#/acre)	80% T.L. Snag Density (#/acre)	Number of Studies
≥10" dbh[1]	WHWO	0.3	1.9	4.3	1
≥10" dbh[2]	WHWO	0.5	1.9	4.0	2
≥10" dbh[3]	WHWO	0.3	1.7	3.7	1
From DecAID Version 2.1: Tables EMC_S/L.sp-22[1], PPDF_S/L.sp-22[2], and PPDF_O.sp-22[3]					

*WHWO = White-headed Woodpecker; T.L. = Tolerance Level

Using data from the wildlife species curves for white-headed woodpeckers from the EMC_S/L wildlife habitat types, the table above shows (with 90% certainty) that in this vegetation type:

- 30% tolerance level = 0.3 snags per acre, thus, 30% of the individuals within the population of nesting white-headed woodpeckers utilize areas with a density of snags ≤0.3 snags per acre and 70% of the individuals within the nesting population of white-headed woodpeckers utilize areas with a density of snags >0.3 snags per acre.
- 50% tolerance level = 1.9 snags per acre, thus, 50% of the individuals within the population of nesting white-headed woodpeckers utilize areas with a density of snags ≤1.9 snags per acre and 50% of the individuals within the population of nesting white-headed woodpeckers utilize areas with a density of snags >1.9 snags per acre.
- 80% tolerance level = 4.3 snags per acre, thus, 80% of the individuals within the population of nesting white-headed woodpeckers utilize areas with a density of snags ≤4.3 snags per acre and 20% of the individuals within the population of nesting white-headed woodpeckers utilize areas with a density of snags >4.3 snags per acre.

This would be similar for the other two habitat types listed above by inserting the number of snags per acre documented into each tolerance level.

Table 34: Tolerance levels for snag density >20" dbh for the white-headed woodpecker as reported in DecAID in green stands.

Snag Size	Species*	30% T.L. Snag Density (#/acre)	50% T.L. Snag Density (#/acre)	80% T.L. Snag Density (#/acre)	Number of Studies
≥20" dbh[1]	WHWO	0	1.5	3.8	1
≥20" dbh[2]	WHWO	0.5	1.8	3.8	1
≥20" dbh[3]	WHWO	0.2	1.3	2.8	1
From DecAID Version 2.1: Tables EMC_S/L.sp-22[1], PPDF_S/L.sp-22[2], and PPDF_O.sp-22[3]					

*WHWO = White-headed Woodpecker; T.L. = Tolerance Level

Using data from the wildlife species curves for white-headed woodpeckers from the EMC_S/L wildlife habitat types, the table above shows (with 90% certainty) that in this vegetation type:

- 30% tolerance level = 0 snags per acre, thus, 30% of the individuals within the population of nesting white-headed woodpeckers utilize areas with no snags and 70% of the individuals within the population of nesting white-headed woodpeckers utilize areas with a density of snags over 20" dbh greater than zero per acre.
- 50% tolerance level = 1.5 snags per acre, thus, 50% of the areas individuals within the population of nesting white-headed woodpeckers utilize areas with a density of snags ≤1.5 snags per acre and 50% of the individuals within the population of nesting white-headed woodpeckers utilize areas with a density of snags >1.5 snags per acre.
- 80% tolerance level = 3.8 snags per acre, thus, 80% of the individuals within the population of nesting white-headed woodpeckers utilize areas with a density of snags ≤3.8 snags per acre and 20% of the individuals within the population of nesting white-headed woodpeckers utilize areas with a density of snags >3.8 snags per acre.

Forest-wide Habitat modeling

White-headed woodpecker nesting habitat was mapped using ponderosa pine dominated forests, which include all ponderosa pine PAGs in all seral stages (early, mid, late) in addition to other PAGs (i.e. dry white fir) in the early and mid seral stages where ponderosa pine is dominant. In addition, stand size had to be a minimum diameter of 10"dbh or greater and have open stand characteristics (based on the canopy cover level thresholds for each PAG) to be mapped as potential habitat. Recent fires (less than 5 years old) with stand replacement or mixed severity were also classified as habitat. Recent (since 2002) forest management activities that resulted in conditions other than described above were removed from mapped potential habitat.

Forest-wide Existing Conditions

The following table displays the existing snag distribution for white-headed woodpecker nesting habitat with snags ≥10" dbh and ≥20"dbh in green habitats across the Deschutes National Forest. Based on the Wildhab model, there are approximately 198,330 acres of potential nesting habitat on the Forest. Currently, 51% of potential nesting habitat with snags ≥10"dbh and 74% of potential nesting habitat with snags ≥20"dbh do not contain any snag habitat making it unlikely to be suitable nesting habitat. The remaining 49% of the habitat with snags ≥10"dbh and 7% of the habitat with snags ≥20"dbh provides varying levels of habitat for individuals. Approximately 7% of the nesting habitat provides for the majority of individuals as this habitat contains snags ≥20"dbh which are preferred by this species for nesting according to the literature (Table 35).

The Wildhab model indicates that the 198,330 acres of potential white-headed nesting habitat is distributed across 23 of 25 watersheds on the Deschutes National Forest. Based on population trends, large-scale habitat assessments, risk factors, and snag analysis, white-headed woodpecker populations are highly distributed and dispersed across the forest with low abundances.

Table 35: Existing distribution of snags >10"dbh and > 20" dbh in white-headed woodpecker nesting habitat on the Deschutes NF.

Tolerance Intervals	Snags per acre	Acres	% of Habitat
Snag size: ≥ 10 in dbh			
0	0	101,219	51%
0-30%	0-0.5	2,930	1%
30-50%	0.5-1.9	36,722	19%
50-80%	1.9-4	16,243	8%
80%+	4+	41,215	21%
	Totals	**198,329**	**100%**
Snag size: ≥ 20 in dbh			
0	0	147,469	74%
0-30%	0.5	4,749	2%
30-50%	0.5 – 1.8	24,014	12%
50-80%	1.8 – 3.8	7,545	4%
80%+	3.8+	14,555	7%
	Totals	**198,332**	**100%**
Tolerance intervals based on DecAID Version 2.1: Table PPDF_S/L.sp-22			

Junction Planning Area Existing Conditions

The following table displays the existing snag distribution for white-headed woodpecker nesting habitat with snags ≥10" dbh and ≥20"dbh in green habitats in the Fall River watershed (Table 36). Based on the Wildhab model, there are approximately 8,788 acres of potential nesting habitat in the watershed (4% of the Forest-wide total). Currently, 46% of potential nesting habitat with snags ≥10"dbh and 76% of potential nesting habitat with snags ≥20"dbh do not contain any snag habitat making it unlikely to be suitable nesting habitat. The remaining 54% of the habitat with snags ≥10"dbh and 24% of the habitat with snags ≥20"dbh provides varying levels of habitat for individuals. Approximately 10% of the nesting habitat provides quality habitat, since these acres contain snags ≥20"dbh which are preferred by this species for nesting.

Table 36: Existing distribution of snags >10"dbh and > 20" dbh in white-headed woodpecker nesting habitat in the Fall River Watershed.

Tolerance Intervals	Snags per acre	Acres	% of Habitat
Snag size: ≥ 10 in dbh			
0	0	4,117	46%
0-30%	0-0.5	27	<1%
30-50%	0.5 – 2	1,727	20%
50-80%	2 - 4	1,113	13%
80%+	4+	1,804	21%
	Totals	**8,788**	**100%**
Snag size: ≥ 20 in dbh			
0	0	6,666	76%
0-30%	0.5	193	2%
30-50%	0.5 – 1.8	943	11%
50-80%	1.8 – 3.8	91	1%
80%+	3.8+	896	10%
	Totals	**8,788**	**100%**
Tolerance intervals based on DecAID Version 2.1: table PPDF_S/L.sp-22			

Based on the Wildhab model, there are approximately 2,077 acres of potential nesting habitat in the Junction planning area (24% of the habitat in the Fall River watershed). Currently, 50% of potential nesting habitat with snags ≥10"dbh and 82% of potential nesting habitat with snags ≥20"dbh do not contain any snag habitat making it unlikely to be suitable nesting habitat. The remaining 50% of the habitat with snags ≥10" dbh and 18% of the habitat with snags ≥20"dbh provides varying levels of habitat for individuals. Currently, the model is showing there is 1 acre of nesting habitat containing snags ≥20"dbh. The model is fairly close in comparison to the field data collected for the ponderosa pine snag surveys. There were 4 snags greater than 20" dbh counted in the 10 snag transects. However, based on overall field reconnaissance, the model is slightly underestimated the amount of acres with large trees. Lastly, 1,027 acres or 49% of the planning area is currently meeting the Forest Plan in the 10" dbh, while 155 acres or 7% in the 20" dbh is meeting the Forest Plan (2.25 snags per acre).

Table 37: Existing distribution of snags >10"dbh and > 20" dbh in white-headed woodpecker nesting habitat in the Junction Planning Area.

Tolerance Intervals	Snags per acre	Acres	% of Habitat
Snag size: ≥ 10 in dbh			
0	0	1,039	50%
0-30%	0-0.5	11	1%
30-50%	0.5 – 2	462	22%
50-80%	2 - 4	209	10%
80%+	4+	356	17%
	Totals	**2,077**	**100%**
Snag size: ≥ 20 in dbh			
0	0	1,696	82%
0-30%	0.5	36	2%
30-50%	0.5 – 1.8	189	9%
50-80%	1.8 – 3.8	154	7%
80%+	3.8+	1	0%
	Totals	**2,077**	**100%**
Tolerance intervals based on DecAID table PPDF_S/L.sp-22			

As previously discussed, there has been no recent stand replacement or natural fires within the Junction planning area. The Lost Man Fire of 1918 burned 4,547 acres most of which were ponderosa pine dominated stands in the Pistol and Sitkum Butte areas. The most recent fires that occurred in the planning area include the 1990 Wake Butte fire (365 acres) and the 1999 Spring River Butte fire (84 acres).

The Hollenbeck et al. (2010) white-headed woodpecker habitat suitability modeling identified suitable habitat as ponderosa pine habitat with patches of open and closed canopy, low slopes, and low elevations. Most literature shows white-headed woodpecker's habitat preference is old-growth ponderosa pine, including large snags. Other literature shows that white-headed woodpeckers will also utilize lodgepole pine habitats.

Since the Junction planning area has very similar features to these components, the main focus for treating the ponderosa pine PAG in the Junction planning area is to enhance currently suitable white-headed woodpecker habitat by developing larger quantities of old growth ponderosa pine trees into late old structure (LOS), which eventually become large snags and down wood in the long-term.

Additionally, the other objective is to treat most of the remaining acres of ponderosa pine PAG or currently unsuitable habitat to begin developing these stands for future white-headed woodpecker habitat which also serves as habitat for other species such as pygmy nuthatches and brown creepers. There are a few patches of large ponderosa pine trees in the project area, mainly along the western flank, the northern flank, and at the base of Pistol Butte. Most of the ponderosa pine PAG is linear along the perimeter of the planning area, providing an opportunity to have continuous healthy stands of ponderosa pine. These stands surround a cool pocket of lodgepole pine, which accounts for 70% of the vegetation in the planning area. Not all the ponderosa pine PAG would be treated since project design elements designated acres in a mosaic landscape pattern in the no treatment areas, leave areas, and 10% retention areas.

Other objectives for treating within the ponderosa pine PAG are:

- Promote structural stage 7. Structural stage 7 (single story with large trees) is currently lacking in the Fall River watershed (<1% compared to 20-30% HRV). Since SS6 (multistory with large trees) in the watershed is currently 13% and within the 10-20% of HRV, the existing conditions would lend itself to focus on opening up the current stands and promoting large tree open structure.
- Increase the size of snags in the future. The area currently lacks ponderosa pine snags >20" dbh in the higher snag density categories in the watershed (i.e. 4-8 or 8-12 snags per acre), and the transect data reveals there may be a lack of ponderosa pine snags >20"dbh in the Junction planning area.
- Create conditions where fire can be reintroduced. The lack of fire in the planning area for many years has resulted in the currently high fuel loadings.
- Address conservation strategies in *A Conservation strategy for landbirds of the east-slope of the Cascade Mountains in Oregon and Washington (Altman 2000).* There are patches of predominantly old-growth and old growth in the western flank and between or adjacent to Pistol and Sitkum buttes. By treating these areas, it would provide contiguous acres of habitat.

Desired future conditions for ponderosa pine include:

- Large ponderosa pine trees with a mean of 10 trees >21"dbh per acre with at least 2 of the trees >31" dbh,
- >50% of snags at 25"dbh in a moderate to advanced state of decay,
- Ponderosa pine stands exhibiting 10-40% canopy closures (Structure Stages 6 & 7),
- Prescribed fire reintroduced to maintain stands.

Direct and Indirect Effects –Alternative 1

Under the no action alternative, white-headed woodpecker habitat in the planning area would continue to remain marginal and limited. In the short and long-term, tree growth would remain slow and ponderosa pine black-bark stands would remain dense and would grow increasingly susceptible to stand-replacement disturbances such as wildfire. Lodgepole pine encroachment would continue due to the lack of disturbance. White-headed woodpecker's preference for open forests with large diameter trees and an open understory would not develop under Alternative 1, nor would the reintroduction of fire occur through prescribed burning. In the short-term these stands would remain low quality habitat, and in the long-term what habitat there is would continue to degrade due to increased tree density, high canopy closure, and threat of insects and disease. By taking no action, this species habitat would decline within the planning area.

Direct and Indirect Effects –Alternatives 2 and 3

Habitat modeling described above was overlaid with proposed treatments for Alternatives 2 and 3. Table 38 shows that Alternative 2 would treat 1,621 acres and Alternative 3 would treat 1,543 acres of the 2,077 total acres of potential suitable habitat. The table also shows the breakdown of acres where there may be overlapping treatments by the proposed management activities.

Table 38: Acres of white-headed woodpecker treated.

Activity	Alternative 2	Alternative 3
Total acres treated	**1621***	**1543***
Overstory removal	143	143
Seed tree/Shelterwood	27	27
Commercial thinning	764	686
Total overstory removal	934	856
No tree harvest	687	687
Prescribed burning	1408	1336
Mowing	1602	1528
Understory treatments	1621	1543

*These are the total acres of habitat affected based on habitat modeling, while the rows below show the acres affected by activity type. These rows will not add up equally to the total acres affected since certain activities would only occur in certain units or because there are overlapping activities in the same units.

While either alternative would address the purpose and need and Issue #1, they would also address the wildlife objective to enhance and develop white-headed woodpecker habitat. Since both alternatives would retain all sizes of ponderosa pine snags (except hazard trees), all ponderosa pine trees greater than 21" dbh, and trees under 21" dbh that exhibit old growth characteristics, neither alternative is expected to reduce the amount of acres of potential habitat to an unsuitable condition. The acres treated may exhibit a short-term impact due to removing smaller diameter green trees in the mid-story that may have otherwise become snags within the short-term, but these treatments would enhance the quality of habitat in the long-term by accelerating the growth of the large tree component and later providing large snags for nesting.

Post-treatment canopy closures will range between 9% - 21% depending on the treatment proposed. Based on the literature, this range would provide suitable white-headed woodpecker habitat. Alternative 2 would commercially thin 764 acres of ponderosa pine to 70 square feet of basal area, while Alternative 3 would thin 686 acres to 50 square feet of basal area. Habitat would be improved by removing the smaller diameter ponderosa pine trees (overstory and mid-story) and removing all lodgepole pine trees. This would promote healthier and larger ponderosa pine trees in decades to come. Either alternative would treat 143 acres in overstory removal units. These overstory removal units are dominated by lodgepole pine, but have a ponderosa pine component. All lodgepole pine overstory trees no longer needed as a seed source would be removed, while favoring ponderosa pine for retention.

Neither alternative includes commercial thinning on 687 acres in the no tree harvest units; the acres in these units would receive understory treatment, such as pre-commercial thinning or ladder fuel reduction. The intent is to retain the existing overstory on these acres throughout the landscape. Therefore, these acres would begin developing into larger trees and developing into quality habitat in the long-term. Alternative 2 would mow 1,602 acres, while Alternative 3 would mow 1,528 acres within currently suitable habitat. Mowing is proposed to reduce the amount of fuel loadings and would be conducted in a mosaic pattern. By reducing shrub cover, it should improve habitat to deter mammalian nest predation from predators. Since there has been a long absence of fire in the planning area (since 1999), prescribed burning in a mosaic pattern would also improve habitat by reducing shrub cover, potentially create natural snags, and improve the vegetation for foraging areas.

Implementation from overstory treatments, including other management activities, such as temporary roads and the understory treatments, could have short-term impacts to foraging or nesting habitat. Ponderosa pine snags may be felled for safety reasons, or the management activities may either temporarily displace individuals or cause nest failure if white-headed woodpeckers are in the project area.

Future maintenance such as mowing and prescribed burning could have short-term impacts to foraging or nesting habitat, such as loss of snags during prescribed burning or snag removal for safety reasons, or by displacing individuals (disturbance). In contrast, these activities could have positive impacts to nesting and foraging habitat within the short-term by creating new snags, reducing the amount of shrub cover and therefore predators, and by reducing the tree competition of lodgepole pine with ponderosa pine. In the long-term, the ponderosa pine PAG would accelerate tree growth and continue the trajectory of developing quality habitat by providing larger trees in a more open condition.

Overall, Alternative 2 would be most beneficial to white-headed woodpecker versus Alternative 3 due to the higher basal area proposed and more acres treated.

While the habitat model only showed 2,077 total acres of potential suitable habitat in the planning area, there is an opportunity to develop additional suitable habitat within the remaining acres of ponderosa pine PAG. By treating these acres of currently unsuitable habitat, it would increase the amount of acres of suitable habitat, and provide a more continuous band or larger patches of habitat. These stands are currently either even-aged black-bark stands, have high tree densities and canopy closures, or experiencing lodgepole pine encroachment. Alternative 2 would treat 4,219 acres of the 4,824 total acres (minus 1,621 acres of modeled habitat) of ponderosa pine PAG in the planning area, while Alternative 3 would treat 3,804 acres (minus 1,543 acres of modeled habitat) of the 4,824 total acres. Most of these acres would be commercially thinned, therefore reducing the density and canopy closure, but would have a beneficial impact in the long-term by developing larger trees and providing this species preferred habitat. In addition to silvicultural treatments, Alternative 2 would implement prescribed burning on 5,551 total acres and 7,764 acres of mowing, while Alternative 3 would prescribed burn 5,088 acres and mow on 7,259 acres. Note that not all acres proposed for mowing or prescribed burning are currently suitable habitat or within ponderosa pine PAG, but after mowing and burning occur, these stands would begin to develop into future suitable habitat in decades to come.

Cumulative Effects

As shown in the table of past activities (Table 13) the most influential activities to contribute to the existing conditions for white-headed woodpecker habitat and late old structure (LOS) in the Fall River Watershed, (specifically Structure Stage 7) has occurred from timber harvest activities from the 1970s – 1980s. Since the early 1900s, fire suppression has likely been the second most influential activity, which has limited stand replacement fires or natural fires from creating suitable habitat for white-headed woodpeckers. The past actions that have occurred are included in the existing conditions. From the 1990s to present, the transition to conserving and promoting LOS occurred, reducing the rate of loss of habitat.

Ongoing activities within the Fall River Watershed that may have short-term impacts to white-headed woodpeckers due to disturbance include pile burning and/or prescribed burning in the Klak, Katalo, Fall, Pit, Nut, and Charlie Brown project areas; the tree harvest activities within these project areas have already been completed. Ongoing activities when combine with proposed treatments should provide a beneficial impact in the long-term due to promoting and contributing to the development of LOS.

The EXF project is another recent vegetation management project in the watershed. Commercial and non-commercial timber cutting and removal with hand and machine piling of slash prior to burning the piles and prescribed burning on 2,500 acres has recently been completed. Under the EXF project the effects of thinning in 7 acres of the ponderosa pine PAG classified as LOS within the watershed were disclosed in the EXF analysis; thinning would result in the 7 acres no longer meeting the criteria for LOS. This would be a small reduction of habitat and potential disturbance in the watershed, but thinning may increase habitat by promoting more large tree structure.

From a cumulative standpoint, the Junction EA would treat 18% of suitable white-headed woodpecker habitat in the Fall River watershed under Alternative 2 (1,621 acres/8,788 acres) and 17% under

Alternative 3 (1,543 acres/8,788 acres). This project would cumulatively enhance habitat within the watershed by treating and promoting more acres towards LOS and currently below HRV levels of Structural Stage 7 in the long-term. The ongoing activities described above in combination with the proposed Junction EA are expected to result in small negative short-term cumulative effects, such as disturbance to individual white-headed woodpeckers or habitat in the Fall River watershed from treatment activities for the life of the project.

There are no foreseeable actions within the Fall River watershed that have potential to reduce suitable habitat for white-headed woodpecker.

Forest Plan Consistency

The Forest Plan standards and guidelines have been reviewed for the white-headed woodpecker. Both action alternatives would be consistent with the Forest Plan because no ponderosa pine snags of any size are proposed for removal. This would well be above the 2.25 snags per acre for ponderosa pine >15"dbh. Additionally, as per the Eastside Screens direction, all sale activities will maintain snags and green trees >21"dbh. Post-treatment snag densities would remain the same on 6,940 acres in areas having no overstory treatments; as stand densities increase over time, additional snags would occur on these acres.

The Junction Project would also be consistent with the Landbird Strategy by initiating actions in ponderosa pine stands to provide for late seral conditions, the mean canopy closure would be from 9-21%, manage for large diameter trees through wide tree spacing and longer rotation periods, and retaining all ponderosa pine snags.

Determination

This project will improve conditions for the white-headed woodpecker in the project area. Therefore, the Junction Project will have a beneficial impact on the white-headed woodpecker on the Deschutes National Forest.

Lewis' woodpecker

The Lewis' woodpecker is both a Region 6 sensitive species and a MIS for the Deschutes National Forest. It was chosen as part of the woodpecker group to represent all wildlife species that use cavities for nesting and denning. Information on habitat needs and data is contained in the BE and is summarized from the Species Assessment for Lewis' woodpecker for the Deschutes National Forest (USDA Forest Service, 2012). The Lewis' woodpecker is highly reliant on post-fire habitats, so DecAID provides information only on snag density tolerance levels for post-fire mixed conifer and post-fire Douglas fir.

Table 39: Tolerance levels for the Lewis' woodpecker as reported in DecAID for post-fire habitats.

Snag Size	Species*	30% T.L. Snag Density (#/acre)	50% T.L. Snag Density (#/acre)	80% T.L. Snag Density (#/acre)	Number of Studies
≥10" dbh EMC	LEWO	24.8	43.0	71.0	1
≥10" dbh PPDF	LEWO	24.7	42.7	70.6	2
≥20" dbh	LEWO	0	6.2	16.1	1
From DecAID Version 2.1: Tables EMC_PF.sp-22 and PPDF_PF.sp-22					

*LEWO = Lewis' Woodpecker; T.L. = Tolerance Level

For example, looking at the table above and using data from the wildlife species curves for Lewis' woodpeckers from the EMC_PF wildlife habitat types, we can say (with 90% certainty) that in this vegetation type:

- 30% tolerance level = 24.8 snags per acre, thus, 30% of the individuals within the population of nesting Lewis' woodpeckers utilize areas with a density of snags ≤24.8 snags per acre and 70% of the individuals within the nesting population of Lewis' woodpeckers utilize areas with a density of snags >24.8 snags per acre
- 50% tolerance level = 43.0 snags per acre, thus, 50% of the individuals within the population of nesting Lewis' woodpeckers utilize areas with a density of snags ≤43.0 snags per acre and 50% of the individuals within the population of nesting Lewis' woodpeckers utilize areas with a density of snags >43.0 snags per acre
- 80% tolerance level = 71.0 snags per acre, thus, 80% of the individuals within the population of nesting Lewis' woodpeckers utilize areas with a density of snags ≤71.0 snags per acre and 20% of the individuals within the population of nesting Lewis' woodpeckers utilize areas with a density of snags >71.0 snags per acre.

Forest-wide Habitat Modeling

Habitat modeling for Lewis' woodpecker nesting habitat on the Deschutes NF was mapped using the drier ponderosa pine forests in the early, mid and late seral stages. In addition, other plant association groups where ponderosa pine is the dominant species in the early and mid seral stages was mapped as habitat. Stand size had to be a minimum diameter of 15"dbh or greater and have open stand characteristics (based on the canopy cover level thresholds for each PAG) to be mapped as potential habitat. Older fires (greater than 5 years old) were added as habitat. Recent (since 2002) forest management activities that resulted in conditions other than described above were removed from mapped potential habitat. Acres of potential nesting habitat were then mapped by watershed and subwatershed. Habitat was not quantified by applying the DecAID tolerance levels as there was no information regarding snag densities in green stands for this species and snag densities in post-fire habitat were not modeled.

Forest-wide Existing Conditions

Based on the Wildhab model, there are approximately 84,978 acres of potential Lewis' woodpecker nesting habitat on the Forest. Four sub-watersheds on forest contain 40% habitat or greater (Canyon Creek, Abbot Creek, First Creek, and Spring Creek). The B&B fire of 2003 occurred within these four watersheds providing post-fire habitat. These watersheds account for 26% of the total potentially suitable habitat on forest. An additional five sub-watersheds (Candle Creek, Jack Creek, Upper Lake Creek, Lower Odell Creek, and Pine Lake) contain between 20-40% habitat. Most of these sub-watersheds occur within fire areas (B&B and Davis Fires of 2003) while the remaining watershed (Pine Lake) occurs on the forest fringe. These five sub-watersheds account for approximately 19% of the total potentially suitable habitat and combined, these 9 watersheds account for approximately 45% of the total potentially suitable habitat on forest.

Junction Planning Area Existing Conditions

In Central Oregon, Lewis' woodpeckers are an uncommon to locally common summer resident, primarily occurring in burned forests and open juniper woodlands of central Deschutes County. Breeding has been confirmed in the Aubrey Hall Fire above Shevlin Park, the Skeleton Fire southeast of Bend, and in north-central Jefferson County.

Based on habitat modeling, there are only 518 acres of potential Lewis' woodpecker nesting habitat in the Fall River Watershed. Approximately 52 acres of the Junction analysis area may provide suitable habitat, but this habitat is scattered in very small patches throughout the planning area. Many of these patches are also exhibiting encroaching lodgepole pine and/or are competing with regenerating ponderosa pine, reducing this woodpecker's habitat quality. There are a total of 3,694 acres of ponderosa pine dry and 1,130 acres of ponderosa pine wet in the planning area, but there is no juniper woodland. The most recent fires that occurred in the Junction planning area include the 1990 Wake

Butte fire (365 acres) and the 1999 Spring River Butte fire (84 acres), but they were not stand replacement fires.

Overall, habitat in the planning area is considered marginal and limited due to the lack of old growth single-storied ponderosa pine trees, lack of burned old forest, absence of juniper woodland, and the absence of riparian woodlands with cottonwoods. While there are some small patches of old growth ponderosa pine, 70% of the project area is comprised of lodgepole pine forest.

Direct and Indirect Effects –– Alternative 1

Under the no action alternative, the current suitable habitat conditions would continue to remain marginal and degrade in quality due to the increased competition with lodgepole pine. Overall, habitat would remain limited due to small amount of old growth ponderosa pine and the ponderosa pine black-bark stands would remain dense with a high canopy closure, not providing habitat. Under the no action alternative, there would be no opportunity to develop acres of quality habitat within the long-term through overstory treatments followed by prescribed burning.

Direct and Indirect Effects –Alternatives 2 and 3

Habitat modeling described above was overlaid with proposed treatments for Alternatives 2 and 3. Table 14 shows that Alternative 2 would treat 48 acres and Alternative 3 would treat 45 acres of the 52 total acres of potential suitable habitat. The table also shows the breakdown of acres where there may be overlapping treatments by the proposed management activities.

Table 40: Acres of Lewis' woodpecker habitat treated.

Lewis' woodpecker	Alternative 2	Alternative 3
Total acres treated	48	45
Overstory removal	11	11
Seed tree/Shelterwood	0.44	0.44
Commercial thinning	36	33
Total overstory removal	47	44
No tree harvest	1	1
Prescribed burning	38	35
Mowing	47	44
Understory treatments	48	45

With the exception of treatments to the shrub component, treatments and impacts to Lewis' woodpecker habitat would be similar to white-headed woodpecker habitat due to the same treatments in the ponderosa pine PAG. Post-treatment canopy closures will range between 9% - 21% depending on the treatment proposed. Based on the literature, this range would provide suitable Lewis' woodpecker habitat. Since both alternatives would retain all ponderosa pine snags, all ponderosa pine trees greater than 21" dbh, and trees under 21" dbh that exhibit old growth characteristics, either alternative is not expected to reduce the amount of acres of potential habitat to an unsuitable condition.

Contrary to white-headed woodpeckers, Lewis' woodpecker prefers shrubby understories. While the fuels objective to mow would benefit white-headed woodpecker, this would impact foraging habitat for Lewis' woodpecker. However, not every acre would be mowed since mowing would be done in a mosaic pattern, and as part of project design, shrubs would be mowed down to 8-9 inches in height. This would still allow the shrubs to produce flowers, thus habitat for the insect prey base. By mowing in a mosaic pattern, it should still provide sufficient shrub cover for foraging areas and within potential nesting habitat. As described in the literature, Lewis' woodpecker would definitely benefit from reintroducing fire into the ponderosa pine stands. Lewis' woodpecker would benefit most from

Alternative 2 because it proposes more acres to be treated, plus more acres proposed for prescribed burning, such as in the Pistol Butte OGMA area.

Implementation from either management activities, including temporary roads and the understory treatments would have short-term impacts to Lewis' woodpecker habitat due to the reduction in habitat or potential disturbance, but would have long-term beneficial impacts. The literature shows that Lewis' woodpecker is not as tolerable to human disturbance as the white-headed woodpecker, therefore management activities may cause a human disturbance impact for the life of the project. This may either temporarily displace individuals or cause nest failure if in the project area.

Overall, Alternative 2 would be the most beneficial alternative to Lewis' woodpecker due to the higher basal area proposed, more acres treated, and most acres proposed for prescribed burning.

As discussed in the white-headed woodpecker section, this project has the opportunity to expand and enhance the current amount of ponderosa pine PAG in the planning area. Alternative 2 would treat 4,219 acres of the 4,824 total acres (minus 48 acres of modeled habitat) of ponderosa pine PAG in the planning area, while Alternative 3 would treat 3,804 acres (minus 45 acres of modeled habitat) of the 4,824 total acres. By treating these stands, it could improve the current marginal habitat conditions and further entice Lewis' woodpecker occupancy into this area.

Cumulative Effects

As shown in the past actions table in Appendix A, the most influential activities that have contributed to the existing conditions and lack of Lewis' woodpecker habitat and late old structure (LOS) in the Fall River Watershed, (specifically Structure Stage 7) has occurred from timber harvest activities from the 1970s – 1980s. The past actions are no longer cumulatively influencing Lewis' woodpecker or overlapping in time and space in the Fall River watershed. Therefore, the past actions that have occurred are included in the existing conditions. From the 1990's to present, the transition to conserving and promoting LOS occurred, reducing the rate of loss of habitat. Since the early 1900s, fire suppression has likely been the second most influential activity, which has limited stand replacement fires or natural fires from creating suitable habitat for Lewis' woodpeckers.

Ongoing activities within the Fall River Watershed that may have short-term impacts to Lewis' woodpeckers due to disturbance include pile burning and/or prescribed burning in the Klak, Katalo, Fall, Pit, Nut, and Charlie Brown project areas; the tree harvest activities within these project areas have already been completed. Although these projects may have had or are having short-term disturbance impacts to Lewis's woodpeckers, there should be a beneficial impact in the long-term due to promoting and contributing to the development of LOS.

The EXF project is another ongoing vegetation management project in the watershed and commercial and non-commercial timber cutting and removal with hand and machine piling of slash prior to burning the piles and prescribed burning on 2,500 acres is proposed. Under the EXF project the effects of removing 7 acres of the ponderosa pine PAG classified as LOS within the watershed were disclosed in the EXF analysis. This would be a small reduction of habitat and potential disturbance in the watershed.

From a cumulative standpoint, the Junction EA would treat 9% of suitable Lewis' woodpecker habitat in the Fall River watershed under Alternative 2 (48 acres/518 acres) and 8% under Alternative 3 (45 acres/518 acres). This project would cumulatively enhance habitat within the watershed by treating and promoting more acres towards LOS and currently below HRV levels of Structural Stage 7 in the long-term. This would include the additional acres of ponderosa pine PAG that would be treated that are currently unsuitable habitat.

There are no foreseeable actions within the Fall River watershed that have potential to reduce suitable habitat for Lewis' woodpecker.

Forest Plan Consistency

The Forest Plan standards and guidelines have been reviewed for Lewis' woodpecker. Either alternative for the Junction Project would be consistent with the Forest Plan since no ponderosa pine snags of any dbh are proposed for removal. This would well be above the 2.25 snags per acre for ponderosa pine >15"dbh. Additionally, as per the Eastside Screens direction, all sale activities will maintain snags and green trees >21"dbh. Post-treatment snag densities would remain the same on 6,940 acres in areas having no overstory treatments; as stand densities increase over time, additional snags would occur on these acres.

Determination

This project will improve conditions for the Lewis' woodpecker in the project area. Therefore, the Junction Project will have a beneficial impact on the Lewis' woodpecker on the Deschutes National Forest.

Townsend's Big-eared Bat

Townsend's big-eared bat is both an R6 Sensitive Species a MIS. It was chosen as an MIS in the Forest Plan due to its year-round dependence on caves (USDA FS 1990). Information on habitat needs and data is contained in the BE and is summarized from the Species Assessment for Townsend's big-eared bat for the Deschutes National Forest (USDA Forest Service, 2012).

Existing Conditions

There are no known caves, mines, or structures, nor is there any known roosting habitat in the Junction planning area. Based on the literature, the planning area may provide suitable roosting habitat in ponderosa pine stands during spring or fall in in the rock crevices on Pistol Butte or the rock outcrops within the Wake Butte Special Interest Area (there are a total of 3,694 acres of ponderosa pine dry PAG and 1,130 acres of ponderosa pine wet in these areas). Since there is a known cave in the Fall River watershed within approximately 4-5 miles from the planning area, it could be assumed that the entire 17,556 planning area may provide foraging habitat. However, the higher quality foraging areas would be along the Fall River riparian corridor and the multiple wildlife guzzlers across the planning area may also provide foraging habitat and/or drinking water.

Direct and Indirect Effects –Alternative 1

There would be no direct impacts to potential Townsend's roosting or foraging habitat. The current trajectory of black-bark stands would remain dense with high canopy closure and limit the amount of tree growth and amount of understory shrubs or plants for insects, which may provide a prey base. These stands would grow increasingly susceptible to stand-replacement disturbances such as fire or insect and disease. A stand replacement fire may cause displacement due to smoke and due to the temporary loss of an insect prey base because of the reduction of shrubs and tree foliage.

Direct and Indirect Effects –Alternatives 2 and 3

As discussed, since there are no caves or buildings within the planning area, management activities under Alternatives 2 or 3 would not have a human disturbance impact to Townsend's. Although, if there are unknown roosts sites within crevices or rock outcrops, there may be potential for disturbance or temporary displacement due to timber, mowing, prescribed burning, or temporary roads activities. Another potential impact to Townsend's big-eared bats from the mentioned management activities could be a temporary reduction in foraging habitat.

Alternative 2 proposes overstory treatments (commercial thinning, overwood removal, shelterwood) across 10,619 acres, 5,551 acres of prescribed burning, 7,764 acres of mowing, and 18.6 miles of new temporary roads. Alternative 3 proposes overstory treatments (commercial thinning, overwood removal, shelterwood) across 10,175 acres, 5,088 acres of prescribed burning, 7,259 acres of mowing, 3.3 miles of existing temporary roads, and 14.3 miles of new temporary roads.

From an overstory treatment standpoint, Alternative 2 would have the potential to impact more acres of foraging habitat than Alternative 3 due to more acres treated. The overstory treatments may reduce foraging habitat or a decrease in insects due to the decrease in tree foliage. Within a few years, these stands would begin providing foraging habitat or there would be a shift in insect prey base because there would be an increased shrub source. Shrubs, such as bitterbrush or other grasses and forbs would begin to establish or respond well due to the decreased tree canopy and an increase in sunlight.

From a prescribed burning standpoint, Alternative 2 may impact more foraging habitat than Alternative 3. While some negative direct effects could occur from prescribed burning such as injury or mortality from skin burns, gas and smoke inhalation, temporary loss of insect prey, and displacement from roost and foraging habitat, there should be positive effects overall by reestablishing new shrub and/or plant species within a few years, thereby providing a diversity of insect prey base for bat foraging habitat.

Mowing and temporary road building under Alternative 2 may temporarily reduce more acres of potential foraging habitat than Alternative 3. Although, not every acre in the planning area would be mowed due to the project design element of mowing in a mosaic pattern and retaining shrubs by at least 8-9 inches tall should still provide bat foraging habitat. While mowing may temporarily reduce foraging habitat, new shrub sprouts should begin to provide insect habitat within a couple of years. There may be some reduction in shrub or plant matter due to temporary road building for a few years, until the roads are rehabilitated.

Since not all acres in the planning area would be treated and considering Townsend's big-eared bats are foraging habitat generalists and can forage from 5 – 14 miles, either alternative would likely have a minor impact to foraging habitat. Overall, Alternative 3 would have less of an impact than Alternative 2 because this alternative would not treat the Wake Butte Special Interest Area, the Pistol Butte Old Growth Area, and the north side of Sitkum Butte, which are areas that may provide the higher quality habitat or potential for roosting. In addition, Alternative 3 proposes two conservation blocks totaling 1,520 acres versus one conservation block of 870 acres under Alternative 2.

Either alternative would be consistent with the Forest Plan because there are no standards and guidelines that would be applicable to the Junction Project since there are no caves in the planning area. By applying the Forest Plan Standards and Guidelines for Management Area 17a (see Appendix B), and the following project design features, it should minimize any potential impacts to roosting and/or foraging habitat:

The following project design features are incorporated into the alternatives:

- Management activities shall cease if a bat roost is discovered during implementation and notify a BFR wildlife biologist. If during the course of prescribed burning, quit lighting within a 250-foot radius to minimize smoke inhalation to bats.
- Mowing would occur in a mosaic pattern and shrubs would be mowed down to 8-9 inches tall in designated mowing units.
- Seasonal restriction to Unit 62 along Fall River—this restriction is for riparian species not analyzed in detail (see Appendix B), but would be beneficial to bat foraging.
- Maintain wildlife guzzlers

Cumulative Effects

The past actions as shown in Appendix A are no longer cumulatively influencing bat foraging habitat or are overlapping in time and space in the Fall River watershed because shrub and/or plant recovery has occurred. Therefore, the past actions that have occurred are included in the existing conditions.

Ongoing activities within the Fall River Watershed that may have potential short-term impacts to Townsend's big-eared bats due to disturbance or temporary decrease in foraging habitat include pile burning and/or prescribed burning in the Klak, Katalo, Fall, Pit, Nut, Charlie Brown and EXF project areas; the tree harvest activities within these project areas have already been completed. Although these projects may have had or are having short-term impacts, shrub and/or plant recovery is expected within a few years.

The ongoing activities described above, in combination with the proposed Junction EA may result in small negative cumulative effects to Townsend's big-eared bat foraging habitat in the Fall River watershed due to treatment activities. The impact to foraging habitat would be limited due to this specie's wide-range ability to forage and the impact would only be within the short-term. While some additive cumulative effects may be anticipated in the short-term, the Junction EA is consistent with the Forest Plan because the Forest Plan focuses on cave protection and there are no caves in the planning area. There are no foreseeable treatment activities within the Fall River watershed that have potential to reduce roosting or foraging habitat for Townsend's big-eared bat.

Determination

Basin wide, there has been a decrease of 8.08% in source habitats for Townsend's, with a 35.35% increase for the Southern Cascades Ecological Reporting Unit (ERU) and a decrease of 24.50% for the Columbia Plateau ERU. The current extent of habitat is similar to the historical distribution, although the abundance of habitat has changed in some areas.

Currently, acres of Townsend's big-eared habitat or home range across the Deschutes National Forest are unknown. A home range for Townsend's includes different types of roosting habitat year-round (hibernacula, maternity, day and night roosts, interim roosts), foraging habitat, and water sources. Townsend's hibernacula and maternity caves on the Forest are mostly discrete locations. Day, night, and/or interim roosts may overlap some hibernacula and maternity sites. Foraging habitat may overlap travel corridors and some water sources, with additional intermittent streams and non-aquatic habitat also providing foraging habitat (edge habitat and forest canopy). There is an estimated minimum of 350 caves on the Forest with 99% of the caves occurring on the Bend-Ft. Rock Ranger District (BFR RD).

Caves with Townsend's detections on Forest occur on seven 5th field (HUC 10) watersheds. Of the 350 caves, 27 have documented records of Townsend's since 1986. It is likely that the number of caves with Townsend's summer roost use (day and/or night) is underreported. It is possible that the number of caves with hibernacula and maternity colonies is also underreported, although to a lesser degree. Townsend's on the Forest may also be using other non-cave sites including lava flows or rock outcrops.

Two statistical tests were completed by the Forest Service Area 4 Ecology Program to analyze the population trend of Townsend's for the BFR RD. This analysis included winter counts from 1986-2010 for 12 hibernacula south of Bend and east of Highway 97. Nine of these caves are on the Forest and 3 are on adjacent BLM land. These 12 caves are assumed to comprise one population based on the short distances between these caves and movements of radio-tagged Townsend's in 1992 (Dobkin et al. 1995).

Analysis on the Townsend big-eared bat population between 1986 and 2010 indicate both increasing and decreasing colonies. No statistically significant trend was detected in 7 out of 12 caves (58%), 4 out of 12 caves (33%) had decreasing trends, and 1 out of 12 caves (8%) had an increasing trend. The caves with decreasing colonies had larger numbers of bats than the single cave with an increasing colony population. All four of the cave colonies with a decreasing trend are on Forestland. Overall, there is no sufficient evidence of a decreasing or increasing trend in the Townsend big-eared bat population (which includes 3 BLM caves) over time and bats may be merely moving between caves.

Based on this information, and the direct, indirect, and cumulative effects, and with application of the project design elements (mosaic mowing & mowing down to only to 8-9 inches in height and seasonal restriction to Unit 62 along Fall River) and mitigation measure above, the proposed action under either action alternatives may impact individual Townsend's big-eared bats or foraging habitat, but would not likely contribute to a trend toward federal listing or loss of viability to the population or species. Note: This species would benefit most from Alternative 2; since there are no caves in the project area and a restriction would be in place if a roost were found, the Junction Project would be in compliance with the Forest Plan.

3.3.4 Wildlife – Management Indicator Species and Other Species of Concern

This section of the EA covers a number of wildlife topics: Old Growth Management Areas and connectivity corridors; snag and downed wood-associated species; management indicator species (MIS). Where species are MIS in addition to being R6 Sensitive, they have been addressed in the previous section on R6 Sensitive species (bald eagle, white-headed woodpecker, Lewis' woodpecker, and Townsend's big-eared bat). Information on analysis methods and modeling is the same as provided earlier under 3.4.3.

OGMAs and Connectivity

Connectivity corridors were established under the Eastside Screens direction to connect between Late Old Structure (LOS) stands and all Forest Plan designated OGMAs. The purpose of these corridors is to provide connectivity for wildlife species associated with LOS conditions, especially those sensitive to "edge", and to allow free movement and interaction of adults and dispersal of young. In general, OMGAs are to be connected in a network pattern in at least two different directions; a corridor should be at least 400 feet wide, made up of stands in which medium to large diameter trees are common (or the next best stands if these type of stands are not available), and canopy closures are within the top 1/3 of site potential. Harvest activities are allowed inside the connectivity corridors if large trees remain common and the canopy closure is within the upper 1/3 of the site potential.

The Junction Project has only one OGMA. It is the Pistol Butte OGMA located in the south central portion of the planning area, totaling approximately 384 acres (See Figure 3). The Pistol Butte OGMA is dominated by ponderosa pine and lodgepole pine, with a very small patch of white fir. The upper half of the OGMA consists of 234 acres of pure lodgepole pine PAG and located just north of Pistol Butte on flat ground. The lower half of the OGMA consists of 150 total acres of ponderosa pine PAG occurring on the north-facing slope of the butte. There are several large white fir trees in the small patch on the northeastern slope of the butte, which is associated with cooler, moister sites making this unique to the landscape. The south-facing slope of Pistol Butte is outside the OGMA. It is also dominated by ponderosa pine, it is a very dry site, and is dominated by a very high density of mostly even-aged medium size trees with high canopy closure.

Table 41 shows the amount of acres of ponderosa pine and lodgepole pine within the Pistol Butte OGMA, including the acres in size class and canopy closure. Since no alternative would treat the lodgepole pine component, the focus is on ponderosa pine. As shown, a large percentage of ponderosa pine consists of smaller size class trees (<15" average dbh) and on the lower end of medium and large trees. While these conditions would provide suitable goshawk habitat, the preference would be to provide more acres of the larger tree component for nesting. Therefore, the objective for treating the ponderosa pine component on the OGMA is twofold: To improve the large tree component, while reducing the fuels components to reduce the risk of a stand replacement fire.

Table 41: Size Class and Canopy Closure within the Pistol Butte OGMA.

	Ponderosa Pine	Lodgepole Pine
Total (acres)	150	234
Acres in Size Class:		
Large (20”- 30”+ dbh)	23	20
Medium (15”- 20”dbh)	9	5
Small (10” – 15” dbh)	63	24
Pole (5”-10” dbh)	50	97
Seed/Sap (<5” dbh)	5	88
Canopy Closure Acres:		
<25%	61	63
25-40%	21	142
40-55%	46	0
55-70%	22	29

There has been no recent stand replacement or natural fires within the Junction planning area, including the Pistol Butte OGMA. The last known fire that occurred in portions of the OGMA was the Lost Man Fire in 1918. This fire burned 4,547 acres of the Junction planning area, most of which were ponderosa pine dominated stands in the Pistol and Sitkum Butte areas. The most recent fires that occurred in the planning area include the 1990 Wake Butte fire (365 acres) and the 1999 Spring River Butte fire (84 acres).

The absence of fire over the last 100 years combined with the development of shrubs and dense thickets of regeneration in the understory has placed the ponderosa pine and lodgepole pine stands at high risk of a stand replacing wildfire. While wildfires may be beneficial to some wildlife, there is also risk of a stand replacement fire, which may eliminate the current habitat conditions.

Currently, over 70% of the planning area has extreme fire hazard under the 97th percentile weather and fuel conditions (data from the fire/fuels specialist report). The lodgepole pine stands in the OGMA rate as extreme fire hazard, while the ponderosa pine stands in the OGMA on the north-facing slope of Pistol Butte varies from low, moderate, high, and extreme ratings. The south-facing slope of Pistol Butte is mostly rated as extreme fire hazard with some patches rated as high fire hazard. Extreme fire hazard equates to high flame lengths and varying degrees of crown fire. Given assumptions made from best available science, extreme and even moderate and high fire hazard would be damaging to valued stand characteristics.

In order to measure fire risk from random ignition, a measure of burn probability is used. Burn probability is used as an indicator of potential fire spread rates (i.e. landscape attributes like fuel conditions) that contribute to higher spread rates resulting in a higher burn probability. High burn probabilities can be related to the sizes of fires that occur on a given landscape. So under the same conditions, large fires produce higher probabilities than small fires. Since fire size is a function of the gross spread rate and duration of the fire, treatments or conditions that reduce the spread rate will lower the burn probability (Finney et al. 2006). The entire Pistol Butte OGMA is rated as a very high wildfire risk.

There is moderate amount of dispersed recreation occurring within the OGMA, including on top of Pistol Butte. Resource damage to soils and vegetation are occurring from activities such as dispersed camping and OHV use on the west flank of the butte. These activities may also incidentally cause a wildfire by a neglected campfire or by sparking from ATVs. The 630 road (0.98 miles) that goes to the top of the butte is in poor condition. There is currently a gate at the base of the butte and/or at the beginning of the 630, but it is mainly left open year-round.

The Pistol Butte OGMA is connected by five wildlife connectivity corridors in all directions. These corridors were established by the Klak and Fall projects that previously occurred in the planning area. There are approximately 2,108 total acres within these corridors, with 1,324 acres consisting of lodgepole pine, 756 acres of ponderosa pine, and 28 acres in the mixed conifer habitat type. Based on field reconnaissance, the corridors that consist of lodgepole pine have a high density of live green trees, a high canopy closure, and an abundance of snags and down wood. Natural regeneration is occurring within these lodgepole pine corridors, and overall would provide quality cover or would provide for movement. These corridors were left intact from the previous projects, but most of the adjacent stands on opposite sides have been treated. Some areas within the ponderosa pine corridors have been treated, but many areas are still exhibiting high tree density and canopy closure. Most of these trees are medium sized trees and lacking some of the larger tree component, including large snags and down wood.

Given the existing conditions of the Pistol Butte OGMA, it would meet the habitat needs for northern goshawk due to high canopy closures and tree densities. Although, there is a lack of the large tree component in the ponderosa pine habitat type on the butte since much of the tree size classes are between 5”- 9”dbh. The OGMA may also provide movement thru the connectivity corridors in all cardinal directions, but the connections to the north or west would be optimum since they enter into larger or more continuous stands of mixed conifer. These corridors connect with stands that are designated Late Structure Reserves (LSRs) within the northern spotted owl range. In summary, the habitat quality of the Pistol Butte OGMA for goshawks has a high concentration of tree density, canopy closure, snags, and down wood, however this comes with a risk of a stand replacement fire since the stands are rated from a moderate to an extreme fire hazard.

Direct and Indirect Effects –Alternative 1

This alternative would not have any direct or indirect effects to the OGMA or on habitat for goshawk. The ponderosa pine stands would continue to grow at a slower pace due to the high tree densities and increase the risk of insects and disease. The areas identified as moderate fire hazard would likely increase to extreme fire hazard within the short-term, increasing the entire OGMA to an extreme fire hazard and the likelihood of a stand-replacing. The OGMA would also remain as a very high wildfire risk. This alternative forgoes the opportunity of closing the 630 road, which would reduce some resource damage and would provide more solitude for wildlife species utilizing the butte. This alternative also forgoes the opportunity to treat the wildlife connectivity corridors consisting of ponderosa pine to accelerate the development of the large tree component. The large tree structure and recruitment of future large snags and down wood would occur at a less accelerated rate.

Direct and Indirect Effects –Alternative 2

Alternative 2 does not propose to treat any of the lodgepole pine stands in the upper half of the OGMA. These 234 acres would be left as they are and continue to provide suitable habitat for the three-toed woodpecker. However, this alternative proposes to treat approximately 150 acres in the lower half of the OGMA or the north-facing slope of Pistol Butte in the ponderosa pine habitat type (Note: the south-facing slope of Pistol Butte is not within the OGMA, but would be treated with this alternative). The treatments would include commercial thinning followed by prescribed burning. Both of these actions would have a short-term reduction of goshawk habitat due to reduced tree densities, and canopy closure. Within the long-term, it would provide beneficial effects such as providing better quality nest tree structures as the tree size class increases, including future large snags and down wood for prey species.

Within the ponderosa pine habitat type, these treatments would reduce the areas with moderate to extreme fire hazard ratings in the OGMA down to low fire hazard ratings. The areas with a very high wildfire risk rating would also be reduced to a low wildfire risk rating. By treating the ponderosa pine stands, it should also reduce the risk of a wildfire creeping into the lodgepole pine stands in the OGMA.

As part of the project design elements, Alternative 2 would maintain the OGMA wildlife connectivity corridors that consist of the lodgepole pine PAG as they are and allow natural succession to occur. They would continue to provide suitable habitat for various wildlife species or provide for wildlife movement. The 28 acres of mixed conifer within a corridor would also not be treated since it is part of the 59-acre no treatment area (Unit #168). Approximately 784 acres of the corridors that consist of the ponderosa pine PAG would be treated under this alternative. The treatments within the ponderosa pine corridors would be based on the Eastside Screens direction: stands in which medium diameter or larger trees are common, and canopy closures are within the top 1/3 of site potential can be treated. Stand widths should be at least 400 feet wide at their narrowest point. Although this is within the upper 1/3 of the site potential, it would likely have short-term impacts on species that use dense multi-layered stands with a high canopy closure. The fuels reduction treatments within these units would also reduce the suitability of the corridor for species that utilize down wood and/or shrub cover. While these treatments would have short-term impacts on species that use dense multi-layered stands, there would be beneficial effects in the long-term since these treatments would favor ponderosa pine growth. In the long-term, stands would have a large tree component with a multi-layered canopy closure.

Alternative 2 would close the 630 road within the OGMA. This would reduce 0.57 miles of road density within the OGMA and will provide more security for wildlife on the butte.

In summary, Alternative 2 would reduce goshawk habitat within the OGMA, but also largely reduce the risk of a stand replacing fire and loss of this habitat. In the long-term, there would be beneficial impacts by providing a larger tree component, thus higher quality nesting structure.

Direct and Indirect Effects –Alternative 3

Alternative 3 would treat 550 acres of ponderosa pine OGMA stands and connectivity corridors (Alternative 2 treats 934 acres). Acres treated would have the same effects as described in Alternative 2. Alternative 3 basically would have no treatment on zero acres. Alternative 3 would not treat any of the 384 acres in the Pistol Butte OGMA nor within any of the five wildlife connectivity corridors (totaling 2,108 acres). The habitat conditions, fire hazard ratings, and wildfire risk rating would be similar to the effects as described under Alternative 1.

Cumulative Effects

Since Alternative 3 will not treat the OGMA or corridors, this alternative will not have cumulative effects to other OGMAs or corridors in the Fall River while Alternative 2 would have short-term cumulative effects to the ponderosa pine habitat due to the reduction in tree density and canopy closure, it would reintroduce fire back into the Pistol Butte OGMA.

Alternative 2 would also cumulatively enhance the corridors containing ponderosa pine to provide better wildlife movement to the adjacent LSRs within the watershed for wide-ranging species. There would be no cumulative effects to the corridors containing lodgepole pine since there are no treatments proposed within this habitat type. Alternative 2 would also contribute towards reducing the overall road density within the Fall River watershed by 0.98 miles.

The Klak and Fall projects (inside the Junction planning area) have ongoing pile burning occurring. This work will be completed prior to the implementation of the Junction EA. There were no timber harvest activities in the Pistol Butte OGMA as a result of the Klak or Fall projects. The pile burning will likely be done with by the time Junction gets implemented. Other ongoing pile burning activities are occurring within the Fall River watershed in the Pit, Nut, and Charlie Brown project areas. While pile burning will not have a direct impact to habitat, the ongoing road use and vehicle traffic may have a human disturbance effect to wildlife utilizing the corridors or adjacent to the OGMA. The ongoing projects, in combination with the proposed Junction EA may result in potential human disturbance to wildlife going to or from the OGMA, including the corridors. These potential effects would be for the life of the project (up to 10 years).

There are no designated snowmobile, biking or hiking trails in the project area, but some of the roads are moderately utilized for these activities. Snowmobile, biking, or hiking adjacent or across corridors may incrementally contribute to a reduction in the functioning of the corridor to provide movement or dispersal habitat for wide-ranging wildlife species (human disturbance).

Other than the current recreational activities described, there are no other foreseeable management actions within the Fall River watershed that have potential to affect OGMAs and wildlife connectivity corridors.

Consistency with Eastside Screens

The Forest Plan, including the Eastside Screens direction has been reviewed for consistency. While there would be removal some loss of ponderosa pine snags and down wood from the proposed prescribed burning, the transect data shown in the tables in the Down wood Section indicate the project area is above the snags and down wood required by direction and above levels under best available science. In addition, no ponderosa pine snags of any diameter are proposed for harvest or mechanical removal and new snags and down wood would be recruited through prescribed burning. Given the project area may be deficit for larger snags and down wood, the Eastside screens direction to maintain all remnant late and old seral and/or structural live trees >21"dbh would recruit this size class in the long-term. Treatments in the corridors would also be consistent with the screens, by removing the smaller diameter trees and maintaining the larger tree component. M15-19 would also be met since the proposed action does not propose prescribed burning in lodgepole pine stands within the OGMA, but proposed within the ponderosa pine stands.

The following project design elements are incorporated into both alternatives and were considered in the effects analysis:

- Prepare an individual burn plan specific to the OGMA, including wildlife review.
- Maintain all diameter size of ponderosa pine snags as possible, unless for OSHA safety reasons. Ponderosa pine down wood shall be maintained at 3-6 pieces per acre, with 12" diameter at the small end, at least 6 feet long, and the total pieces should be 20-40 feet in length.
- No felling of any live green trees ≥21" dbh.
- Do not put any fire into the small patch of white fir on the northeast slope of Unit 34 on Pistol Butte (below the 630 road) in order to preserve this habitat type for a variety of wildlife species.
- Leave the vegetation on the upslope and down slope near the gate or at the base of the 630 road to minimize illegal ATV use going around the gate. This road is recommended to be closed following post-treatment. The gate closure would need to be better fortified and patrolled to make it more difficult to get to this site by motorized use. Monitoring should occur to determine illegal ATV use.

Table 42 shows the MIS list for the Deschutes National Forest, their status ranking in the state of Oregon, a brief habitat description for each species and habitat presence in the planning area. For some species, the status column will also indicate if the species is a U.S. Fish and Wildlife Service Bird of Conservation Concern (BCC) and/or if the species is on the migratory bird list. More detailed descriptions of habitat needs, ecological requirements, and risk factors are contained in individual Forest-wide MIS Assessments on file at the Bend Fort Rock Ranger District Office. The species in bold (including snags and down wood) were carried forward for further analysis because there is suitable habitat and there would be impacts to habitat from the proposed activities. The species not in bold were not further analyzed due to absence of habitat and/or there would be no impact to the species with project design elements and/or Forest Plan Standards and Guidelines. Further rationale for species not carried forward for further analysis is disclosed in Appendix B of the Wildlife Report.

Table 42: Deschutes NF Management Indicator Species List

Species	Status	Habitat	Habitat Presence in the planning area?
Northern goshawk	MIS S3 Vulnerable	Mature and old-growth forests; especially high canopy closure and large trees	Yes, foraging & nesting
Cooper's hawk	MIS S4 Apparently secure	Similar to goshawk, can also use mature forests with high canopy closure/tree density	Yes, foraging & nesting
Sharp-shinned hawk	MIS S4 Apparently secure	Similar to goshawk in addition to young, dense, even-aged stands	Yes, foraging & nesting
Great gray owl	MIS S3 Vulnerable	Mature and old growth forests associated with openings and meadows	Yes, foraging & nesting
Great blue heron	MIS S4 Apparently secure	Riparian edge habitats including lakes, streams, marshes and estuaries	Yes, foraging & nesting
Golden eagle	MIS, BCC S4 Apparently secure	Large open areas with cliffs and rock outcrops	No suitable habitat
Red-tailed hawk	MIS S5 Secure	Large snags, open country interspersed with forests	Yes, foraging & nesting
Osprey	MIS S4 Apparently secure	Large snags associated with fish bearing water bodies	Yes, foraging & nesting
Elk	MIS S5 Secure	Mixed habitats	Yes, foraging & hiding cover
American marten	MIS S3 Vulnerable	Mixed conifer or high elevation late-successional forests with abundant down woody material	Yes, foraging & denning
Mule deer	MIS S5 Secure	Mixed habitats	Yes, foraging & hiding cover
Snags & Down Wood associated species & habitat	MIS	Snags and down woody material	Yes, snags & down wood habitat in proposed treatment areas
MIS Woodpecker Species			
Lewis' woodpecker	Region 6 Sensitive, MIS, BCC, Landbird focal species, S2, S3B	Ponderosa pine forest, burned forests	Yes, foraging & nesting
White-headed woodpecker	Region 6 Sensitive, MIS, BCC, Landbird focal species, S2,	Large mature & open ponderosa pine forests; weak excavator	Yes, foraging & nesting
Williamson's sapsucker	MIS, Landbird Focal species,	Mature or old growth conifer forests with open canopy cover;	Yes, foraging & nesting

Species	Status	Habitat	Habitat Presence in the planning area?
	BCC	weak excavator	
Red-naped sapsucker	MIS S4 Apparently Secure	Riparian hardwood forests	No suitable habitat
Downy woodpecker	MIS S4 Apparently Secure	Riparian hardwood forest	No suitable habitat
Hairy woodpecker	MIS S4 Apparently Secure	Mixed conifer and ponderosa pine forests	Yes, foraging & nesting
Three-toed woodpecker	MIS S3 Vulnerable	High elevation and lodgepole pine forests	Yes, foraging & nesting
Black-backed woodpecker	MIS, Landbird focal species S3 Vulnerable	Lodgepole pine forests, burned forests	Yes, foraging & nesting
Northern flicker	MIS S5 Secure	Variety of forest types but more associated with forest edges	Yes, foraging & nesting
Pileated woodpecker	MIS S4 Apparently Secure	Mature to old-growth mixed conifer forests	No suitable habitat
MIS Waterfowl Species			
Canada goose	B, M, R; MIS S5 Secure	Wetlands, rivers, lake/reservoirs, agricultural & urban areas	Very common, increasing trends in many areas. Potential migratory habitat adjacent to project area (Fall River).
Wood duck	B, M; MIS S4 Apparently secure	Small water bodies, slow streams, wooded swamps, sloughs, marshes, agricultural areas (orchards, flooded fields); utilize tree cavities & nest boxes	Perching duck species; increasing population & range expansion; most common in western Oregon; records of breeding on the upper Deschutes river. Potential migratory habitat adjacent to project area (Fall River).
Gadwall	B (?), M; MIS S5 Secure	Flooded meadows, canals, ponds in summer; larger lakes in the fall; marshes & reservoirs in migration.	Dabbling or puddle duck species (i.e. primarily use surface of water for foraging); common at Malheur National Wildlife Refuge & other large “tule marshes”; noted to breed on the Fremont NF; use more open ponds for nesting than other ducks. No suitable nesting habitat in the project area.
American widgeon	M; MIS S5 Secure	Small seasonal & semi-permanent wetlands in prairie, parkland, &	Dabbling species; breed at Malheur NWR; No suitable

Species	Status	Habitat	Habitat Presence in the planning area?
		river deltas for breeding; dense willows along small streams used for nesting on Malheur NWR; lakes, reservoirs & fields in migration.	nesting habitat in the project area.
Mallard	B, M, R; MIS S5 Secure	Temporary & seasonal wetlands early in year followed by permanent water bodies with good aquatic insects & emergent vegetation; highly variable nesting sites; during molt use large shallow marshes; may forage in fields.	Dabbling species; highly adaptable; most abundant game species of duck in North America. Potential migratory habitat adjacent to project area (Fall River).
Blue-winged teal	M; MIS; S4 Apparently secure	Uses the moist ecotone between marshes & uplands for nesting; emergent plants important.	Dabbling species; rare species in Oregon; only present from late spring to early fall; breeds in Malheur NWR & Summer Lake. No suitable nesting habitat in the project area.
Cinnamon teal	B, M; MIS S5 Secure	Nests in marshes, irrigated meadows, & grass/forb habitats; grassy nest sites near water; use low vegetation height habitats; wet meadows on the Malheur NWR with broods; feeds in estuaries, marshes, meadows, shallow waters for seeds & midges.	Dabbling species; fairly common breeder in eastern Oregon; Malheur NWR, Summer Lake, Warner Basin are best areas; breeds in both North & South America; one of the earliest spring arrivals at Malheur NWR. 85% of state's population in eastern Oregon. No suitable nesting habitat in the project area.
Green-winged teal	B (?), M; MIS S5 Secure	Nests in dense meadow grasses on the Malheur NWR; uses shallow wetlands & ponds mudflats & flooded fields in migration.	Dabbling species; breed in eastern Oregon, but uncommon; confirmed in Deschutes County. Wide-spread breeding range, with an upward population trend. No suitable nesting habitat in the project area.
Northern shoveler	B?, M; MIS S5 Secure	Breed in open, shallow wetlands; use a wide range of habitats in migration & winter (marshes, lagoons, sewage ponds, shallow lakes); forage primarily on small swimming crustaceans; do not forage on land.	Dabbling species; possible breeding in Deschutes County but much more common to the southeast. No suitable nesting habitat in the project area.
Northern pintail	B?, M; MIS S5 Secure	Prefer open country but use a variety of habitats; short, open vegetation on the Malheur NWR; use flooded meadows, shallow lake waters & fields during migration;	Dabbling species; breeding possible in Deschutes County but mostly in southeastern Oregon. No suitable nesting habitat in the project area.

Species	Status	Habitat	Habitat Presence in the planning area?
		forage on marsh plant seeds, waste grain & rice; invertebrates important during breeding season.	
Canvasback	B (?), M; MIS S4 Apparently secure	Breeds in large marsh habitats in emergent vegetation over water; migration habitats include large marshes, lakes, reservoirs, rivers, estuaries, & bays; forage on seeds & tubers of pond weed & other plants; use animal diet readily (mollusks, crabs, fish eggs); uses deeper water for foraging (i.e. "diver" duck).	Bay duck species; nesting record in Deschutes County but mostly in south central & southeastern Oregon; habitat losses due to vegetation impacts by carp in western Oregon. No suitable nesting habitat in the project area.
Redhead	B (?), M; MIS S4 Apparently secure	Nests in potholes, sloughs, large marshes & ponds; use emergent vegetation over water & sometimes on land close to water; migration & winter habitats include large marshes, lakes, reservoirs, estuaries, inlets & ocean bays	Bay duck species; confirmed nesting in Deschutes County & on the Fremont NF; common breeder at Malheur NWR & Summer Lake. No suitable nesting habitat in the project area.
Ring-necked duck	M; MIS S3 vulnerable	Nests in shallow but stable wetlands with abundant submerged & emergent vegetation; migration & winter on larger lakes, ponds & occasionally use canals, ditches, & smaller ponds; heavily forages on vegetation.	Bay duck species; uncommon breeder in Oregon; rare at Summer Lake & some nesting at Malheur NWR. No suitable nesting habitat in the project area.
Lesser scaup	M; MIS S3B, S4N	Breed in seasonal & semi-permanent shallow wetlands & lakes; nest in upland habitats near water; use large wetlands, lakes, reservoirs, rivers & estuaries during migration & winter. Also sloughs, backwaters of rivers, quarry borrow pits, log ponds & sewage ponds; use "broad waters" in winter; heavy foraging on invertebrates in the spring; also herring eggs, mollusks, crustaceans, & aquatic insects with some vegetation.	Bay duck species; one of the most abundant & widespread North American ducks; nest at Malheur NWR; migrate later than any another duck species. No suitable nesting habitat in the project area.
Harlequin duck	B(?), M; Region 6 Sensitive, MIS, S2B, S3N	Rocky headlands on the coast or mountain streams; use 1st to 5th order streams with 1-7% gradients including pools, chutes & backwaters; heavy boulder, cobble & bedrock common to streams; nest on exposed shelves of logs or rootwads & on the ground in floodplains, ledges of slopes or cliffs; overhead cover for the nest is	Sea duck species; no breeding records in Deschutes County; nearest record on the McKenzie River; broods observed on the Middle Fork of the Willamette river & the N. & S. Santiam Rivers; local reports from the Metolius, Klamath & White Rivers but

Species	Status	Habitat	Habitat Presence in the planning area?
		common; feed almost exclusively on benthic invertebrates & rarely on fish; winter diets on the coast are more diverse.	very rare; rarely seen in migration; winter primarily on the coast; (documented on the DNF). No suitable nesting habitat in the project area.
Common goldeneye	B(?), M; MIS S4 Apparently Secure	Uses the cavities of trees for nests near high elevation lakes; in migration use lakes, reservoirs, rivers, ponds, estuaries, coastal bays, & flooded fields; heavy diet of animal foods with some use of vegetation.	Bucephala duck species; no documented breeding in Oregon; documented on Cascade Mountains lakes, Black Butte Ranch ponds, & Paulina Lake in late fall. No suitable nesting habitat in the project area.
Barrow's goldeneye	B, M; MIS S3B, S3N	Breeds on cold inland waters including alpine & subalpine lakes, reservoirs, & rivers. Nests in the cavities of trees (unproven in Oregon) or rank stands of bulrush or cattails; winters primarily on the coast; forage primarily on aquatic invertebrates & buds & tubers of wild celery & pondweed seeds; feed on mollusks, salmon eggs & fingerlings in winter.	Bucephala duck species; 90% of the world population breeds west of the Rocky Mountains; nearest breeding records are at Lost & Diamond Lakes. Brood observed at Crane Prairie Reservoir in 2010. No suitable nesting habitat in the project area.
Bufflehead	B, M; Region 6 Sensitive, MIS, S2B, S5N	Nests at high elevation forested lakes in the central Cascades using cavities or nest boxes in trees close to water; may use old woodpecker holes; use sheltered freshwater lakes, ponds, sewage ponds, slow-moving rivers, estuaries, bays, & backwaters during migration & winter; forage primarily on animal matter, especially midge larva; also water boatmen, physid snails, & seeds of smartweed, alkali bulrush, & sago pondweed; may eat herring eggs & rotten salmon.	Bucephala duck species; documented nest cavities at Wickiup reservoir & Davis Lake; common at Malheur NWR on the larger, deeper waters. No suitable nesting habitat in the project area.
Hooded merganser	B(?), M; MIS S4 Apparently Secure	Nest in cavities near undisturbed bodies of water; use nest boxes; other times found on woodland ponds, lakes, & wooded wetlands; most common in western Oregon in winter but anywhere on open waters; forages primarily on invertebrates, small fish, crustaceans, & amphibians.	Mergus duck species; probable nesting in Deschutes County; slightly increasing trend; 11% of the population winters in the Pacific states. No suitable nesting habitat in the project area.
Common merganser	B(?), M; MIS S4 Apparently	Prefer hollow trees near water but may use loose boulders, brush,	Mergus duck species; concentrate west of the

Species	Status	Habitat	Habitat Presence in the planning area?
	Secure	stream bank hollows, rocky ledges, cliff holes, nest boxes, & sometimes buildings; common breeder in the mountains; migration &winter prefer deeper, open waters with fish; forage on fish (including salmon & sculpins), shrimp, clams, nematodes, mayfly larva, fly larva, moss & conifer needles; prefer fish <8" in length.	Cascades in winter; known to have concentrations on Wickiup Reservoir in migration; increasing trend in Oregon possibly linked to available reservoirs; not considered a serious threat to sport fish. No suitable nesting habitat in the project area.
Ruddy duck	B(?), M; MIS S4 Apparently Secure	Nest in dense stands of hard stem bulrush or cattail on a platform in lakes & marsh complexes; migration & winter on deep sloughs, estuaries, borrow pits, lakes & ponds with enough room for long running take-offs; forage on midge larva, mollusks, sees & vegetative parts of pondweed, bulrushes, & wigeon grass.	Stiff-tailed duck species; potential breeding in Deschutes County with the closest record at Diamond lake; winter primarily in western Oregon & on the coast; also in the Klamath Basin & Jackson County. No suitable nesting habitat in the project area.
Common loon	M; MIS SHB, S5N	Lacks information to define breeding habitat in Oregon. Cascades lakes are the most likely sites. Elsewhere breed on lakes, sloughs, marshes, lagoons, and rivers with abundant fish in clear water. Nest is on the ground near water. Orient to islands in lakes. Forage 80% fish. Remainder on crustaceans including shrimp, crabs and amphipods. At times crayfish, annelids, fish eggs, sea stars, snails, and squid.	No Deschutes County nesting records. Very sensitive to human disturbance & only nests at remote sites. Spring concentrations have been noted on Wickiup reservoir. No suitable nesting habitat in the project area.
Pied-billed grebe	B(?), M; MIS S5 Secure	Nests on lakes, ponds, channels, & sloughs with emergent vegetation; uses floating mass of hardstem bulrush, spikerush stems or algae in Malheur NWR; may use small stock ponds; migration & winter uses lakes, ponds, slow-moving rivers, & backwaters. Also warm springs. Forages on a variety of fish and invertebrates. Also amphibians, toads and salamanders.	Primarily breeds in south central and south eastern Oregon. Potential nesting in Deschutes County. Stable population trend. No suitable nesting habitat in the project area.
Horned grebe	B(?), M; MIS S2B, S5N	Nests in semi-permanent ponds in rush or sedge stands. Forages on fish, crayfish and aquatic insects. Winter food dominated by shrimp, prawn and fish.	Possible breeding in Deschutes County. Primarily in S.E. Oregon on Malheur NWR, Harney, Malheur and Lake Counties. No suitable nesting habitat in the project

Species	Status	Habitat	Habitat Presence in the planning area?
			area.
Red-necked grebe	B?, M; MIS S1B, S4N	Inland breeding habitat is extensive clear, deep water marshy lakes and ponds in timbered regions. In winter occupy lower parts of estuaries and protected waters such as the lee side of islands, sheltered coves of the open coast, as well as the open ocean. Forage fish, crustaceans, vegetation, aquatic insects, and mollusks.	Most documented nesting at Klamath lake with some at Diamond lake and Malheur NWR. One record from Deschutes County at Big Lava lake. No suitable nesting habitat in the project area.
Eared grebe	M; MIS S4 Apparently secure	Nests near shore on small freshwater lakes and reservoirs where open water is intermixed with emergents such as hardstem bulrush and cattails. In winter uses coastal saltwater estuaries. Mix of salt and fresh water bodies during migration. Forage on invertebrates such as shrimp, brine flies, long-legged flies, amphipods, water fleas and beetles. Mostly insects overall across range.	Most abundant grebe in the world. Common nester in SE Oregon including Malheur NWR. Closest documented nesting in our area at Summer lake. Vulnerable to recreational disturbance such as boating and fishing. Seasonal water fluctuations strongly affect breeding success. No suitable nesting habitat in the project area.
Western grebe	M; MIS S3B, S2S3N	Breeds in marshes having open water and on lakes and reservoirs supporting emergent vegetation along the shorelines. Use floating mats of vegetation to support nests. Migration and winter habitats add lakes, large rivers, estuaries, and open ocean. Most common on the coast in winter. Forage mostly on fish (80% +). Also arthropods, crustaceans, salamanders, and worms.	Primarily breed east of our area, but concentrations in spring and fall on Wickiup reservoir and other Cascades water bodies. Surveys often include the related Clark's grebe. Population cycle is closely linked to high water cycles (i.e. more forage fish). Vulnerable to wind waves (nest colonies), botulism, pesticides, oil spills, gill nets, etc. No suitable nesting habitat in the project area.
Notes for waterfowl species: Habitat descriptions from Marshall et al. 2006, Bellrose 1916, and Csuti et al. 2001; B= breeding on the DNF, B (?) = no documented breeding on the DNF but noted in other areas of central OR; M = migratory through DNF, R= resident, year-round presence.			
Notes for all MIS: **rankings were determined from the NatureServe database for the state of Oregon: S1, critically imperiled, S2 = imperiled, S3 = vulnerable, S4 = apparently secure, S5 = secure; B = breeding, N = non-breeding, SNA – status not applicable, SHB – possibly extirpated.**			

Snags, Down Wood, and Green Tree Replacements

Snags and down wood are a component of the MIS analysis because dead wood (standing or down) plays an important role in overall ecosystem health, soil productivity and numerous species' habitat. It is crucial in the continuation of species that depend on snags for all or parts of their life cycle (Laudenslayer 2002). Bird and mammal species rely on the structure for dens, nests, resting, roosting, and/or feeding on the animals and organisms that use dead wood for all or parts of their life cycle. Snags come in all sizes and go through breakdown and decay processes that change them from standing hard to standing soft, then on the ground to continue decaying into soil nutrients. Not every stage of the snag's demise is utilized by the same species, but rather a whole array of species at various stages or conditions (Rose et al 2001).

The Deschutes Forest Plan, as amended, specifies standards and guidelines for snags and down wood. The forest determined guidelines for meeting this standard and documented them in the Deschutes National Forest Wildlife Tree and Log Implementation Strategy (WLTL) (USDA 1994). This strategy estimates the number of hard snags (snags are classified based on their decay (Class 1, 2, or 3) per acre by vegetative series and species. The following tables display Forest Plan Standards and Guidelines for snag and down wood levels and outside the range of the spotted owl (Eastside Screens).

This direction equates to approximately 2.25 snags per acre for the ponderosa pine and mixed conifer vegetation types and 1.80 snags per acre in lodgepole pine. More specifically, the direction for snags, including down woody material are as follows: 1) maintain snags and green tree replacements (GTRs) >15"dbh at 100% maximum potential population (MPP) levels for all vegetation types except lodgepole pine; 2) for lodgepole pine, maintain snags and GTRs >10"dbh at 100% MPP; and 3) maintain down logs ranging between 3 and 20 pieces per acre depending upon vegetative series (Table 43). Currently, the Deschutes NF manages snags and down logs under this decision document.

Table 43: Deschutes LRMP down wood requirements

Tree Species	Pieces per acre	Diameter Small End	Piece Length	Total Lineal Length
Ponderosa pine	3-6	12 inches	>6 feet	20-40 feet
Mixed conifer	15-20	12 inches	>6 feet	100-140 feet
Lodgepole pine	15-20	8 inches	>8 feet	120-160 feet

The WLTL was prepared as described in the Forest Plan for Wildlife Standard and Guideline WL-38. It is a strategy that provides guidance and options for meeting snags, GTRs, and down log objectives across the Forest. It states, "Snags, GTRs, and down logs will not be provided on every acre in the forested ecosystem. A mosaic distribution of WLTL resources across the landscape maintaining viable populations and ecological functions is the desired condition. Current literature and research at the time, as well as incorporating the Northwest Forest Plan (NWFP) and Eastside Screen requirements were used to develop the number of hard snags needed by each species to support various percentages of their population. These were developed for each vegetative series and for areas west and east of the NWFP line. Since the Junction EA project area is not within the NWFP, Table 44 shows the number of snags and snag sizes required east of the NWFP line.

Table 44: Required snag numbers by vegetative series and snag size for areas east of the NWFP line on the Deschutes NF (WLTL).

Vegetative Series	Minimum Snag Diameter (inches dbh)	Snags/100 acres to support 100% maximum potential population for cavity nesting wildlife species
Ponderosa Pine	>20" dbh	14
	>15" dbh	211
Total		**225**
Mixed Conifer	>20"dbh	14
	>15"dbh	211
Total		**225**

Vegetative Series	Minimum Snag Diameter (inches dbh)	Snags/100 acres to support 100% maximum potential population for cavity nesting wildlife species
Lodgepole Pine	>12” dbh	59
	>10”dbh	121
Total		**180**

DecAid

Information on DecAID is provided earlier under the Lewis’ woodpecker analysis section. DecAID is used in this analysis as a reference and resource to display effects. It is not used to set snag or down wood levels for the project area.

Vegetation Modeling Using Viable and Wildhab (2012)

The Ochoco and Deschutes Viable Ecosystems Management Guide were developed to classify vegetation on a landscape basis. “The Viable Ecosystem model provides a process to apply ecosystem management concepts to project level planning. This system compares existing vegetation with site potential. The model focuses on relationships between combinations of vegetation structure and species composition, and habitat requirements for animals, insects, and plants. Viable Ecosystems is a useful tool for cumulative effects analysis of broad-scale changes in vegetation at a subwatershed to Forest-wide scale and subsequent changes in animal, insect, or plant communities.”

Viable stratifies the environment along a gradient of size, structure, species composition, and relative tree density. The various classifications are then linked to wildlife habitat requirements. The 2004 satellite imagery layer was used to develop the Viable map. Data is mapped on a 25-meter pixel grid and assigned a value relating to size, structure, tree species, and tree density for the animal species. The resulting layer was then updated by removing stand replacement and mixed mortality fires and recent (within 5 years) forest management activities.

Forest-wide Existing Snag Conditions

The following sections display the existing conditions for snags and down wood at the Forest-wide scale, Fall River Watershed (cumulative effects bounding area), and the Junction Planning Area. The analysis utilizes the habitat types as described in DecAid. The habitat types that apply to the Junction planning area and cumulative effects area include: lodgepole pine, eastside mixed conifer, and ponderosa pine/Douglas-fir.

Table 45 and Table 46 show the Forest-wide acres with snags ≥10” dbh and ≥20” dbh within the Eastside mixed conifer (EMC), lodgepole pine (LPP), montane mixed conifer (MMC), and in the ponderosa pine/Douglas fir (PP/DF) habitat/vegetation types. The tables also show the acres with various levels of snag densities. Presumably there are no snags within the acres of the “0” category, based on modeling, there are presumably that many acres that contain no snags but this is likely an under representation of modeling. As shown, the PP/DF is the dominant habitat type, followed by LPP, EMC, and MMC.

Table 45: Forest-wide acres with snags ≥ 10” dbh by habitat type.

Forest-Wide	Acres with snags ≥ 10" dbh snag density (snags/acre)						
Habitat Type	0	0 - 6	6 - 12	12 - 24	24 - 36	36+	Total Acres
EMC	50,293	100,335	79,614	53,685	27,688	25,418	337,034

LPP	157,253	117,618	39,977	15,652	6,807	5,063	342,370
MMC	6,502	12,931	41,507	64,192	30,033	21,268	176,434
Habitat Type	**Snag Density**	**0**	**0 - 4**	**4 - 12**	**12 - 24**	**24 - 36**	**36+**
PP/DF	258,587	167,405	46,295	10,894	2,052	914	486,148
						Grand Total	**1,341,986**

Table 46: Forest-wide acres with snags > 20" dbh by habitat type.

Forest-Wide	**Acres with snags ≥ 20" dbh snag density (snags/acre)**						
Habitat Type	**0**	**0-4**	**4-8**	**8-12**	**12- 16**	**16+**	**Total Acres**
EMC	126,158	162,298	36,404	9,054	2,539	581	337,034
LPP	278,128	58,236	4,893	686	99	328	342,370
MMC	36,954	57,678	51,872	19,090	6,778	4,062	176,434
PPDF	373,171	109,068	3,870	31	5	2	486,148
						Grand Total	**1,341,986**

A historical range of variability (HRV) analysis for snag densities was also completed at the Forest-wide scale using information from DecAID and the Viable Ecosystems model. HRV was based on the existing condition for snag densities and not the reference conditions. Table 47 and Table 48 display the Forest-wide percent of the landscape with snags >10" dbh and >20" dbh compared to HRV for all four habitat types.

As shown for snags greater than 10" dbh, 15% of the existing landscape in the EMC type has no snags and slightly below HRV, but above HRV in the 6-12 and 36+ categories, while the remaining categories are within HRV. For the LPP habitat type, 46% of the landscape has no snags and well above HRV, but below HRV in the 0 and 12-24 thru the 36+ snag categories. For MMC, the 6-12 thru the 36+ snag categories are all above HRV, but below HRV in the 0-6 category. For PP/DF, only the 19-27 category is above HRV, while the remaining categories are within or below HRV.

For snags greater than 20" dbh, 37% of the existing landscape in the EMC habitat type has no snags and is above HRV, while the 0-4 category is above HRV, but below HRV in the remaining categories. For the LPP habitat type, 81% of the landscape has no snags, but all the categories are within HRV. For MMC, the 0-4 and 4-8 categories are above HRV, but the remaining ones are within HRV. For PP/DF, 77% of the landscape has no snags, while all the remaining categories are below HRV.

These conditions are likely due to a combination of factors. Snag loss or reductions have likely occurred due to past vegetation management activities such as clear-cut harvesting where lower snag levels were retained, thinning, prescribed fire, firewood collection, as well as illegal cutting of large snags. Another likely factor is a loss of snags in green forests due to wildfires and fire suppression.

Table 47: Forest-wide percent of the Landscape with snags >10"dbh compared to HRV.

Forest-Wide	**% of Landscape with snags ≥10" dbh**						
Habitat Type	Snag Density	0	0 - 6	6 - 12	12 - 24	24 - 36	36+
EMC	HRV	18-25	28-31	15-16	16-22	6-10	5-7

	Existing	15%	30%	24%	16%	8%	8%
LPP	HRV	23-32	12-17	12-20	11-15	5-11	5-9
	Existing	46%	34%	12%	5%	2%	1%
MMC	HRV	3-22	15-23	16-23	21-34	8-14	6-11
	Existing	4%	7%	24%	36%	17%	12%
Habitat Type	Snag Density	0	0 - 4	4 - 12	12 - 24	24 - 36	36+
PP/DF	HRV	55-61	19-27	13-15	3-5	0-1	0-1
	Existing	53%	34%	10%	2%	0%	0%
Information from DecAID tables (unharvested plots for snags ≥10" dbh) PP/DF_O.Inv-14, PP/DF_S.Inv-14, PP/DF_L.Inv-14, EMC_ECB_O.Inv-14., EMC_ECB_S.Inv-14, EMC_ECB_L.Inv-14, LP_O.Inv-14, LP_S.Inv-14, MMC_O.Inv-14, MMC_S.Inv-14, MMC_L.Inv-14 and modified with HRV information from Viable							

Table 48: Forest-wide percent of the Landscape with snags >20"dbh compared to HRV.

Forest-Wide	**% of Landscape with snags ≥20" dbh**						
Habitat Type	**Snag Density**	**0**	**0-4**	**4-8**	**8-12**	**12- 16**	**16+**
EMC	HRV	32-44	29-35	14-22	7-10	2-3	1-2
	Existing	37%	48%	11%	3%	1.0%	0.2%
LPP	HRV	72-83	15-20	1-7	0-2	0	0
	Existing	81%	17%	1.0%	0.2%	0.0%	0.1%
MMC	HRV	14-47	16-30	9-25	6-18	2-7	2-7
	Existing	21%	33%	29%	11%	4.0%	2.0%
PP/DF	HRV	66-75	23-30	2-3	0-1	0-1	0
	Existing	77%	22%	1.0%	0.0%	0.0%	0.0%
Information from DecAID tables (unharvested plots for snags ≥20" dbh) PP/DF_O.Inv-15, PP/DF_S.Inv-15, PP/DF_L.Inv-15, EMC_ECB_O.Inv-15., EMC_ECB_S.Inv-15, EMC_ECB_L.Inv-15, LP_O.Inv-15, LP_S.Inv-15, MMC_O.Inv-15, MMC_S.Inv-15, MMC_L.Inv-15, and modified with HRV information from Viable							

Fall River Watershed Existing Snag Conditions

Table 49 and Table 50show the Fall River watershed acres with snags >10" dbh and >20" dbh within EMC, LPP, and in the PP/DF habitat vegetation types. Since the Junction Planning Area does not have any acres of MMC, it was not included in this analysis and therefore the Junction Project would have no impact to snags or GTRs to this vegetation type.

Table 49: Fall River Watershed acres with snags > 10" dbh by habitat type.

Fall River Watershed	**Acres with snags ≥ 10" dbh snag density (snags/acre)**						
Habitat Type	**0**	**0 - 6**	**6 - 12**	**12 - 24**	**24 - 36**	**36+**	**Total Acres**
EMC	6,103	10,998	10,673	2,714	1,432	560	32,480

LPP	13,289	10,499	5,422	1,041	223	49	30,522
Habitat Type	**0**	**0 - 4**	**4 - 12**	**12 - 24**	**24 - 36**	**36+**	**Total Acres**
PP/DF	11,254	12,825	5,736	372	224	2	30,413

Table 50: Fall River Watershed acres with snags ≥ 20" dbh by habitat type.

Fall River Watershed	**Acres with snags ≥ 20" dbh snag density (snags/acre)**						
Habitat Type	**0**	**0-4**	**4-8**	**8-12**	**12- 16**	**16+**	**Total Acres**
EMC	18,244	14,078	157	1	0	0	32,480
LPP	26,487	4,030	6	0	0	0	30,522
PPDF	20,423	9,985	5	0	0	0	30,413

An HRV analysis for snag densities was also completed at the watershed scale using information from DecAID and the Viable Ecosystems model. HRV was based on the existing condition for snag densities and not the reference conditions. Tables 15 and 16 display the Fall River percent of the landscape with snags ≥10" dbh and ≥20" dbh compared to HRV for the three habitat types.

As shown for snags greater than 10" dbh, 19% of the watershed in the EMC type has no snags and within HRV, but above HRV in the 0-6 and 6-12, while below in the remaining categories. For the LPP habitat type, 44% of the watershed has no snags and well above HRV, but below HRV in the 12-24 thru the 36+ snag categories, while above HRV in the 0-6 category and within HRV in the 6-12 category. For PP/DF, 37% of the watershed has no snags and below HRV, above HRV in the 0-4 and 4-12 categories, below in the 12-24 category and within in the 24-36 and 36+ categories.

For snags greater than 20" dbh, 56% of the watershed in the EMC habitat type has no snags and is above HRV, while the 0-4 category is above HRV, but below HRV in the remaining categories. For the LPP habitat type, 87% of the watershed has no snags and above HRV, but all the remaining categories are below HRV. For PP/DF, 77% of the watershed has no snags and within HRV, while the 0-4 category is above HRV, the 4-8 category is below HRV, and the remaining categories are within HRV.

These conditions are likely due to a combination of factors. Snag loss or reductions have likely occurred due to past vegetation management activities such as clear-cut harvesting where lower snag levels were retained, thinning, prescribed fire, firewood collection, as well as illegal cutting of large snags. Another likely factor is a loss of snags in green forests due to wildfires and fire suppression.

Table 51: Percent of the Landscape with snags ≥10"dbh compared to HRV in the Fall River Watershed.

Fall River Watershed	**% of Landscape with snags ≥10" dbh**						
Habitat Type	Snag Density	0	0 - 6	6 - 12	12 - 24	24 - 36	36+
EMC	HRV	18-25	28-31	15-16	16-22	6-10	5-7
	Existing	19%	34%	33%	8%	4%	2%
LPP	HRV	23-32	12-17	12-20	11-15	5-11	5-9
	Existing	44%	34%	18%	3%	1%	0%

Fall River Watershed	% of Landscape with snags ≥10" dbh						
Habitat Type	**Snag Density**	**0**	**0 - 4**	**4 - 12**	**12 - 24**	**24 - 36**	**36+**
PP/DF	HRV	55-61	19-27	13-15	3-5	0-1	0-1
	Existing	37%	42%	19%	1%	1%	0%
Information from DecAID tables (unharvested plots for snags ≥10" dbh) PP/DF_O.Inv-14, PP/DF_S.Inv-14, PP/DF_L.Inv-14, EMC_ECB_O.Inv-14., EMC_ECB_S.Inv-14, EMC_ECB_L.Inv-14, LP_O.Inv-14, LP_S.Inv-14, and modified with HRV information from Viable.							

Table 52: Percent of the Landscape with snags >20"dbh compared to HRV in the Fall River Watershed.

Fall River Watershed	% of Landscape with snags ≥20" dbh						
Habitat Type	**Snag Density**	**0**	**0-4**	**4-8**	**8-12**	**12- 16**	**16+**
EMC	HRV	32-44	29-35	14-22	7-10	2-3	1-2
	Existing	56%	43%	0%	0%	0%	0%
LPP	HRV	72-83	15-20	1-7	0-2	0	0
	Existing	87%	13%	0%	0%	0%	0%
PP/DF	HRV	66-75	23-30	2-3	0-1	0-1	0
	Existing	67%	33%	0%	0%	0%	0%
Information from DecAID tables (unharvested plots for snags ≥20" dbh) PP/DF_O.Inv-15, PP/DF_S.Inv-15, PP/DF_L.Inv-15, EMC_ECB_O.Inv-15., EMC_ECB_S.Inv-15, EMC_ECB_L.Inv-15, LP_O.Inv-15, LP_S.Inv-15, and modified with HRV information from Viable.							

Junction Planning Area Existing Snag Conditions

Dead wood (snags and logs) surveys were conducted within the Junction planning area during the 2010 field season using the methods outlined in Bate et al. (2008). These surveys were conducted in response to the action alternatives to remove dead wood in the lodgepole pine habitat type and to assist in determining if the project area was meeting LRMP standards and guidelines. Results are displayed in Table 53 and below. Either action alternative does not propose to remove ponderosa pine snags of any dbh size, but down wood may be lost during prescribed burning and/or felled for safety reasons.

Since lodgepole pine and ponderosa pine habitat types are the dominant PAGs in the project area, 10 transects for each habitat type were stratified in treated and non-treated areas throughout the project area. The following tables show the results of the data including the total number of snags detected, total number that would fall with LRMP requirements, dbh range, height range, and snag class. The SnagPRO software calculated an average of 8.55 snags per acre in the lodgepole pine habitat type and an average of 9.87 snags per acre in the ponderosa pine type. These conditions are well above the LRMP requirements of 2.25 snags p/acre for ponderosa pine and 1.80 snags p/acre for lodgepole pine per the Eastside Screens. However, the number of ponderosa pine snags >20" dbh are likely slightly below the required 14 snags of this size per 100 acres (based on field reconnaissance and the data).

Table 53: Ponderosa pine snags in the Junction Project Area.

Ponderosa pine Snags		Eastside Screens Requirements				
	Total # of snags	**Total # of snags >15" dbh**	**Total # of snags >20" dbh**	**dbh range & (averages) in inches**	**Height range (in feet)**	**Dominant Condition Class(s)**
Transect 1	14	4	2	10-24 (15")	9	2
Transect 2	1	0	0	8"	12	1
Transect 3	7	0	0	8-11 (10")	10-60	2
Transect 4	2	0	1	10-35 (23")	20-85	1 & 2
Transect 5	4	0	0	8-12 (11")	20-70	2
Transect 6	31	0	0	8-13 (9")	10-75	2
Transect 7	7	1	1	8-22 (13")	5-80	1,2, & 3
Transect 8	6	1	0	8-15 (12")	10-50	1 & 2
Transect 9	6	0	0	8-14 (12")	8-70	2
Transect 10	11	1	0	8-17 (11")	22-90	2

Table 54: Lodgepole pine snags in the Junction Project Area.

Lodgepole pine Snags		Eastside Screens Requirements				
	Total # of snags	**Total # of snags >10" dbh**	**Total # of snags >12" dbh**	**dbh range & (averages) in inches**	**Height range (in feet)**	**Dominant Condition Class(s)**
Transect 1	6	1	3	8-15 (11")	15-65	1&2
Transect 2	6	2	4	12-20 (13")	10-45	2
Transect 3	0	0	0	-	-	-
Transect 4	0	0	0	-	-	-
Transect 5	42	10	23	8-20 (14")	12-80	2
Transect 6	23	6	12	8-20 (14")	9-70	2
Transect 7	4	1	2	9-16 (12")	15-70	2
Transect 8	6	2	3	8-12 (11")	12-50	2
Transect 9	2	1	1	11-14 (13")	40-50	2
Transect 10	1	1	0	11	40	2

Forest-wide Existing Down Wood Conditions

Table 55 and Table 56 show the Forest-wide acres with down wood >5" diameter and >20" diameter within the EMC, LPP, MMC, and in the PP/DF habitat/vegetation types. The tables also show the acres within the various levels of percent down wood cover. Presumably there is no down wood within the acres of the "0" category, but this is likely an under representation of modeling. As shown, the PP/DF is the dominant habitat type, followed by LPP, EMC, and MMC.

Table 55: Forest-wide acres with down wood > 5"diameter by habitat type.

Forest-Wide	Acres with down wood ≥ 5" diameter percent down wood cover						
Habitat Type	0	0-4	4-8	8-10	10-16	>16	Total Acres
EMC	8,532	191,592	102,178	18,714	14,640	1,378	337,034
LPP	31,308	216,185	62,713	13,243	17,355	1,565	342,370
MMC	10,199	99,061	46,646	11,402	8,507	620	176,434
PP/DF	132,295	311,206	34,935	3,728	3,622	362	486,148
						Grand Total	**1,341,986**

Table 56: Forest-wide acres with down wood > 20"diameter by habitat type.

Forest-Wide	Acres with down wood ≥ 20" diameter percent down wood cover				
Habitat Type	0	0-4	4-10	>10	Total Acres
EMC	183,705	143,188	8,431	1,710	337,034
LPP	274,256	67,555	465	94	342,370
MMC	89,960	76,313	10,129	32	176,434
PP/DF	359,324	126,204	614	6	486,148
		Grand Total			**1,341,986**

An HRV analysis for down wood was also completed at the Forest-wide scale using information from DecAID and the Viable Ecosystems model. Table 57 and Table 58 display the Forest-wide percent of the landscape with down wood >5" diameter and >20" diameter compared to HRV for all four habitat types.

As shown for down wood greater than 5"diameter, only 3% of the existing landscape in the EMC type has no down wood; within the exception of the >16 category, all the other remaining categories are above HRV. For the LPP habitat type, the 0-4 category is above HRV and the 8-10 category is below HRV, but the remaining categories are within HRV. For MMC, there is 6% with no down wood, and the 10-16 and >16 categories are within HRV, but the remaining categories are well above HRV. For PP/DF, 27% of the landscape has no down wood and below HRV, but all the remaining categories are above HRV.

For down wood greater than 20"diameter, 55% of the existing landscape in the EMC habitat type has no down wood and below HRV, but the 0-4 and >10 categories are above HRV, and at the upper end in the 4-10 category. For the LPP habitat type, 80% of the landscape has no down wood, but within HRV, but the 0-4 category is above HRV, while the 4-10 and >10 categories are below HRV. For MMC, 51% of the landscape has no down wood and above HRV, while the 0-4 is well above HRV, and 4-10 and >10 categories are below HRV. For PP/DF, 74% of the landscape has no down wood and within HRV, while all the remaining categories are also within HRV.

These conditions are likely due to a combination of factors. Down wood loss or reductions have likely occurred due to past timber vegetation management activities, prescribed fire, and firewood collection. Another likely factor for above or below HRV down wood levels is due to wildfires and/or fire suppression.

Table 57: Forest-wide percent of the Landscape with down wood >5" diameter compared to HRV.

Forest-Wide	% of Landscape with down wood ≥5" diameter						
Habitat Type	**% Cover**	**0**	**0-4**	**4-8**	**8-10**	**10-16**	**>16**
EMC	HRV	22-30	53-54	13-19	2-3	1-3	0
	Existing	3%	57%	30%	6%	4%	0%
LP	HRV	5-16	46-59	17-23	5-7	4-8	0
	Existing	9%	63%	18%	4%	5%	0%
MMC	HRV	34-71	26-41	3-17	0-3	0-6	0-1
	Existing	6%	56%	26%	6%	5%	0%
PPDF	HRV	37-46	51-60	2-3	0	0	
	Existing	27%	64%	7%	1%	1%	
Information from DecAID tables (unharvested plots for down wood ≥5" dbh) PP/DF_O.Inv-16, PP/DF_S.Inv-16, PP/DF_L.Inv-16, EMC_ECB_O.Inv-16., EMC_ECB_S.Inv-16, EMC_ECB_L.Inv-16, LP_O.Inv-16, LP_S.Inv-16, MMC_O.Inv-16, MMC_S.Inv-16, MMC_L.Inv-16 and weighted by structure and HRV information from Viable							

Table 58: Forest-wide percent of the Landscape with down wood >20" diameter compared to HRV.

Forest-Wide	% of Landscape with down wood ≥20" diameter percent down wood cover				
Habitat Type	% Cover	**0**	**0-4**	**4-10**	**>10**
EMC	HRV	61-72	27-36	1-3	0
	Existing	55%	42%	3%	1%
LP	HRV	63-84	10-16	1-2	0
	Existing	80%	20%	0%	0%
MMC	HRV	14-49	11-15	13-19	7-13
	Existing	51%	43%	6%	0.0%
PPDF	HRV	70-79	21-31	0-1	0
	Existing	74%	26%	0%	0%
Information from DecAID tables (unharvested plots for down wood ≥20" dbh) PP/DF_O.Inv-17, PP/DF_S.Inv-17, PP/DF_L.Inv-17, EMC_ECB_O.Inv-17, EMC_ECB_S.Inv-17, EMC_ECB_L.Inv-17, LP_O.Inv-17, LP_S.Inv-17, MMC_O.Inv-17, MMC_S.Inv-17, MMC_L.Inv-17 and weighted by structure and HRV information from Viable.					

Fall River Existing Down Wood Conditions

Table 59 and Table 60show the acres with down wood >5” diameter and >20” diameter within the EMC, LPP, and in the PP/DF habitat/vegetation types in the Fall River Watershed. The tables also show the acres within the various levels of percent down wood cover.

Table 59: Acres of down wood >5”diameter in the Fall River Watershed.

Fall River Watershed	Acres with down wood ≥ 5" diameter						
Habitat Type	**0**	**0-4**	**4-8**	**8-10**	**10-16**	**>16**	**Total Acres**
EMC	531	20,553	7,492	2,779	1,108	16	32,480
LPP	1,822	24,476	3,380	471	338	36	30,522
PP/DF	2,995	23,005	4,162	113	135	3	30,413

Table 60: Acres of down wood >20”diameter in the Fall River Watershed.

Fall River Watershed	Acres with down wood ≥ 20" diameter				
Habitat Type	**0**	**0-4**	**4-10**	**>10**	**Total Acres**
EMC	22,729	9,189	24	537	32,480
LPP	23,131	7,380	0	11	30,522
PP/DF	19,311	11,102	0	0	30,413

An HRV analysis for down wood was also completed at the watershed scale using information from DecAID and the Viable Ecosystems model. Tables 25 and 26 display the Fall River Watershed percent of the landscape with down wood >5” diameter and >20” diameter compared to HRV for EMC, LPP, and PP/DF habitat types.

As shown for down wood ≥ 5”diameter, only 2% of the existing landscape in the EMC type has no down wood and is well below HRV; while the 0-4 thru 8-10 categories are above HRV, and the 10-16 and >16 categories are within HRV. For the LPP habitat type, 6% has no down wood and within HRV, while the 0-4 category is above HRV, and the 4-8 thru 10-16 categories are below HRV. For PP/DF, 10% of the landscape has no down wood and well below HRV, but the 0-4 and 4-8 categories are above HRV, while the remaining two are within HRV at 0%.

Table 61: Percent of Fall River watershed with down wood >5”diameter compared to HRV in the Fall River Watershed.

Fall River Watershed	% of Fall River watershed with down wood ≥5"diameter						
Habitat Type	**% Cover**	**0**	**0-4**	**4-8**	**8-10**	**10-16**	**>16**
EMC	HRV	22-30	53-54	13-19	2-3	1-3	0
	Existing	2%	63%	23%	9%	3%	0%
LP	HRV	5-16	46-59	17-23	5-7	4-8	0
	Existing	6%	80%	11%	2%	1%	0%

PPDF	HRV	37-46	51-60	2-3	0	0	
	Existing	10%	76%	14%	0%	0%	0%
Information from DecAID tables (unharvested plots for down wood ≥5" dbh) PP/DF_O.Inv-16, PP/DF_S.Inv-16, PP/DF_L.Inv-16, EMC_ECB_O.Inv-16., EMC_ECB_S.Inv-16, EMC_ECB_L.Inv-16, LP_O.Inv-16, LP_S.Inv-16, and weighted by structure and HRV information from Viable.							

For down wood greater than 20"diameter, 70% of the existing landscape in the EMC habitat type has no down wood and within HRV, the 0-4 is within HRV, the 4-10 is below HRV, and the >10 category is above HRV. For the LPP habitat type, 76% of the landscape has no down wood and within HRV, the 0-4 category is above HRV, while the 4-10 category is below and the >10 category is within HRV. For PP/DF, 63% of the landscape has no down wood and below HRV, while the 0-4 category is above HRV, the 4-10 and >10 categories are within HRV.

These conditions are likely due to a combination of factors. Down wood loss or reductions have likely occurred due to past timber vegetation management activities, prescribed fire, and firewood collection. Another likely factor for above or below HRV down wood levels is due to wildfires and/or fire suppression.

Table 62: Percent of the Landscape with down wood >20"diameter compared to HRV in the Fall River Watershed.

Fall River Watershed	**% of Landscape with down wood ≥20" diameter percent down wood cover**				
Habitat Type	% Cover	**0**	**0-4**	**4-10**	**>10**
EMC	HRV	61-72	27-36	1-3	0
	Existing	70%	28%	0%	2%
LP	HRV	63-84	10-16	1-2	0
	Existing	76%	24%	0%	0%
PPDF	HRV	70-79	21-31	0-1	0
	Existing	63%	37%	0%	0%
Information from DecAID tables (unharvested plots for down wood ≥20" dbh) PP/DF_O.Inv-17, PP/DF_S.Inv-17, PP/DF_L.Inv-17, EMC_ECB_O.Inv-17, EMC_ECB_S.Inv-17, EMC_ECB_L.Inv-17, LP_O.Inv-17, LP_S.Inv-17, and weighted by structure and HRV information from Viable.					

Junction Planning Area Existing Down Wood Conditions

Tables 27 and 28 shows the transect data for down wood in the Junction Planning area, including the LRMP requirements, total number of pieces within the transects, and overall total lineal length. As shown for the down wood in the ponderosa pine habitat type, these conditions would meet or exceed the LRMP requirements of 3-6 pieces with 12" diameter at the small end, and >6' in length. Based on field data, the down wood in the lodgepole pine habitat type would meet the LRMP requirements on a per acre basis. Additionally, while the direction is to provide for 15-20 pieces per acre with 8" diameter at the small end and >8' in length, the table shows that most of the transects are exceeding the requirements for pieces per acre and overall total lineal length. While the average diameter at the large end is 11"-12" (the numbers in parenthesis) and not the small end, this down wood would still provide habitat for various insects and/or for prey species.

Table 63: Ponderosa pine down wood in the Junction Planning Area.

LRMP for down wood in ponderosa pine	3-6 Pieces per acre	12" diameter small end	Piece length > 6'	20-40' Total Lineal Length
Existing conditions for down wood in the Project area	**Total Pieces in the transect**	**Overall Total lineal length in the transect & (diameter large end averages)**	**# of Pieces 12" diameter small end w/6' in length**	**Total length meeting the LRMP parameters**
Transect 1	30	207' (12")	4	51'
Transect 2	10	109 (12")	0	0
Transect 3	14	169' (12")	2	50'
Transect 4	5	42' (11")	1	10'
Transect 5	20	303' (13")	0	0
Transect 6	57	901' (11")	1	90'
Transect 7	18	146' (10"	0	0
Transect 8	12	111' (12")	1	8'
Transect 9	10	152' (12")	2	45'
Transect 10	17	228' (11")	0	0

Table 64: Lodgepole pine down wood in the Junction Planning Area.

LRMP for down wood in lodgepole pine	15-20 Pieces per acre	8" diameter small end	Piece length > 8'	120-160' Total Lineal Length
Existing conditions for down wood in the Project area	**Total Pieces in the transect**	**Overall Total lineal length in the transect & (diameter large end averages)**	**# of Pieces 12" diameter small end w/8' in length**	**Total length meeting the LRMP parameters**
Transect 1	22	226' (10")	3	47'
Transect 2	19	224' (12")	4	132'
Transect 3	5	37' (9")	0	0
Transect 4	0	0	0	0
Transect 5	71	1,012' (12")	5	101
Transect 6	48	658' (11")	1	16
Transect 7	24	306' (11")	4	70
Transect 8	22	339' (11")	4	83
Transect 9	10	139' (13")	1	15
Transect 10	7	43' (12")	3	39

Approximately 6,050 acres (34% of the project area) have not been previously entered with vegetation management activities. These acres were identified using the FACTS database, aerial photos, and on-the-ground examinations by the silviculturist. These stands have not been treated in the past; therefore they often have a large amount of snags and down wood lodgepole component.

Green Tree Replacements

Green tree replacements (GTRs) are trees retained, or managed through time, to provide for future snag or down wood habitat. The treatment unit is the area of accountability for meeting GTR objectives (Deschutes National Forest Wildlife Tree and Log Implementation Strategy [WLTL], 1994). The objective for treatment units is to provide patches of habitat, or GTRs in a distribution pattern suitable for home range needs of primary cavity excavators (WLTL 1994). According to the WLTL, GTRs do not need to be provided on every acre in the forested ecosystem. A mosaic distribution across the landscape maintaining viable populations and ecological functions is the desired condition. The desired condition is based on the assumptions that: 1) deficits or surpluses, whether natural or related to past management activities, will continue to be part of the landscape; 2) treatment units will be designed to meet WLTL objectives each entry or treatment; and 3) that some treatment units will not provide WLTLs due to preference given to other resource issues.

The Eastside Screens direction requires all sale activities (including intermediate in both even-age and uneven-age systems) to maintain GTRs of >21 inches dbh, or the representative dbh of the overstory layer if less than 21 inches, at 100 percent maximum potential population levels (MPP) of primary cavity excavators using the best available science. As shown in Table 65, in order to reach 100% MPP using the best available science, approximately 4 snags/acre would be required in the ponderosa pine and mixed conifer habitat types, and 6 snags/acre for the lodgepole pine habitat type. The table also illustrates the number of GTRs per acre that would be needed to meet this direction assuming the average diameter of the stands thereafter is at least 13 inches. Currently, the GTRs between 8" and 18" dbh in the Junction planning area are approximately at 23 trees per acre. For the direct and indirect effects on GTRs, refer to the vegetation (silviculture) section.

Table 65: Estimated GTRs (trees per acre) required to meet best available science.

	Habitat Type		
	Ponderosa Pine	**Mixed Conifer**	**Lodgepole Pine**
100% MPP based on best available science	4 snags/acre	4 snags/acre	6 snags/acre
GTRs @ 13-19" residual stand	8 tpa	8 tpa	6 tpa

Direct and Indirect Effects – Dead Wood Habitat – Alternative 1

Snags would remain at existing levels and are expected to increase over time as insects and disease in overly dense stands continue to cause additional tree mortality at natural levels consistent with increasing levels of inter-tree competition. Down wood levels would not change immediately, but large amounts would be expected to increase as snags continue to fall in the future. Although a steady recruitment of new snags and logs are expected, they would generally be less than 20" dbh size classes since it is the predominant size class represented in the stands.

Wildfires may create additional snags and logs beneficial to wildlife, but there is also risk of a stand replacement fire, which may eliminate the current habitat conditions. Table 30 shows that over 70% of the planning area has extreme fire hazard under the 97th percentile weather and fuel conditions (data from the fire/fuels specialist report). This includes the majority of the 4,826 acres of ponderosa pine dominated stands, where 1,972 acres rate as extreme fire hazard. Extreme fire hazard equates to high flame lengths and varying degrees of crown fire. Given assumptions made from best available science, extreme and even moderate and high fire hazard would be damaging to valued stand characteristics.

Table 66: Current Hazard Ratings and Acreage in the Junction Planning Area.

Hazard	Acres
Low	2,440
Moderate	821
High	1,523
Extreme	12,570

Direct and Indirect Effects – Dead Wood Habitat - Alternative 2

Under Alternative 2, lodgepole pine snag numbers would be reduced from current levels due to harvesting of standing dead lodgepole pine within predominantly green stands on units proposed for overstory treatments. Current snag densities would remain the same on approximately 6,940 acres (40% of the project area) in areas having no overstory treatments, or within the no treatment areas, wildlife leave areas, 10% retention areas, the woodpecker habitat block in the northeast corner, and within the OGMA corridors that are lodgepole pine PAG. The highest quality or highest density patches of lodgepole pine snags (based on field reconnaissance and transect data) would be maintained, the upper half of the Pistol Butte OGMA and within the OGMA corridors.

Prescribed burning is not proposed in lodgepole pine or mixed conifer PAGS, however, approximately 1%-2% lodgepole pine mortality is expected from prescribed burning creeping into lodgepole pine stands when prescribed fire is applied in adjacent ponderosa pine dominated areas. These trees may provide future suitable foraging and nesting wildlife habitat.

Ponderosa pine or mixed conifer snags are not proposed for removal under any silvicultural prescriptions, but several may be felled for safety reasons. Prescribed burning is proposed in ponderosa pine stands, including the Sitkum Butte and Wake Butte Management Area. While it is expected that several snags and down wood would be impacted from prescribed burning, it is expected that these would be replaced with new ones from burning.

Alternative 2 proposes understory treatments, such as non-commercial thinning (2,416 acres) and whip falling (2,338 acres) across all habitat types (ponderosa pine, mixed conifer, lodgepole pine). This type of thinning would not have impacts to snags in the short-term, but may have some beneficial impacts to these habitat components in the long-term. This type of thinning would create stand conditions that accelerate and develop larger tree structure and future snags and logs, than if these small trees were not thinned.

Mowing on 7,764 acres and biomass removal on 13,035 acres has the potential to impact the availability of snags and down wood. Mowing can impact younger trees by cutting seedlings or small diameter trees up to 8” dbh, preventing future recruitment of snags and down wood, while biomass removal would reduce the smaller diameters of down wood. Essentially, mowing and biomass removal would contribute to the ability to control a wildfire thereby reducing the potential for widespread snag and down wood recruitment. Controlling the extent and severity of wildfires can subsequently limit the amount of snags and down wood habitat for some species that capitalize on burned forests, such as three-toed or black-backed woodpeckers. Conversely, mowing and biomass removal can limit or reduce the severity of a wildfire, therefore maintaining habitat for some species.

Treatments proposed in Alternative 2 would substantially change the fire behavior. The wildfire hazard results in 6,001 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.’

Table 67: Alternative 2 Hazard Ratings and Acreage

HAZARD	Existing Condition Acres	Alternative 2 Acres
Low	2,440	8,468
Moderate	821	536
High	1,523	1,774
Extreme	12,570	6,569

Direct and Indirect Effects – Dead Wood Habitat - Alternative 3

The impacts to down wood and snags would be similar to those described under Alternative 2. The major difference between the two alternatives is that Alternative 3 does not propose treatments within the Wake Butte Special Interest Area, nor on the north facing slopes of the Pistol Butte OGMA and Sitkum Butte. Alternative 3 proposes no treatment in two blocks of woodpecker habitat versus one under Alternative 2. Under Alternative 3, lodgepole pine snag numbers would also be reduced from current levels due to harvesting of standing dead lodgepole pine on approximately 9,826 acres. Current snag densities would remain the same or provided on approximately 7,730 acres (44% of the project area) in areas having no overstory treatments, or within the no treatment areas, wildlife leave areas, 10% retention areas, two blocks of woodpecker habitat (one in the northwest corner and one in the southwest corner) and within the OGMA corridors that are lodgepole pine PAG.

The effects from understory treatments, mowing and biomass removal under Alternative 3 would be similar to those discussed under Alternative 3. Alternative 3 understory treatments include: non-commercial thinning (2,412 acres) and whip falling (2,322 acres) across all habitat types (ponderosa pine, mixed conifer, lodgepole pine). Mowing is proposed on 7,259 acres and biomass removal is proposed on 12,276 acres.

Treatments proposed in Alternative 3 would result in 5,777 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. Relative to Alternative 2, proposed treatments in Alternative 3 reduces 227 acres less of extreme wildfire hazard.

Table 68: Alternative 3 Hazard Ratings and Acreage

HAZARD	Existing Condition Acres	Alternative 3 Acres
Low	2,440	8,114
Moderate	821	544
High	1,523	1,895
Extreme	12,570	6,793

Alternative 3 would have the least impacts to snags and down wood compared to Alternative 2 due to fewer acres treated from overstory removal, understory treatments, mowing, prescribed burning, and biomass removal, thus more acres of habitat left in the no treatment and leave areas. Additionally, Alternative 3 would provide two blocks of woodpecker habitat untreated and not treat the Wake Butte area, the north facing slope of the OGMA or Sitkum Butte, thus retaining higher densities of snags and down wood. However, Alternative 3 does pose a higher risk to these habitats in the event of a stand replacement fire.

Cumulative Effects – Dead Wood Habitat

Alternative 1

Since there would be no new proposed activities, there would be no cumulative effects. However, similar to direct and indirect effects noted above, the continued vegetative growth would from the Junction Planning area would contribute to the Fall River watershed fire risk.

Alternatives 2 and 3

The cumulative effects boundary area for the dead wood habitat analyzed is the Fall River Watershed with the proposed planning area falling within portions of the Deschutes Braid-Deschutes River, Fall River, and Spring River subwatersheds. The Fall River watershed would provide for a range of habitat conditions that occur on the landscape that generally encompass at least a few home ranges for various wildlife species, which are discussed later in this section.

The list of past actions in Table 13 has been reviewed. Past timber harvest, including salvage have likely been the most influential activities contributing to the lack of higher snag density patches of >10" dbh in the east side mixed conifer, lodgepole pine and ponderosa pine habitat types in the Fall River watershed. Referring back to the previous tables, the watershed is currently below HRV in snags >10"dbh in the 12-24, 24-36, and 36+ snag categories for lodgepole pine and eastside mixed conifer, and below in the 12-24 category for ponderosa pine habitat types. For snags >20"dbh, the watershed is also below HRV levels for high snag density patches for eastside mixed conifer and ponderosa pine in the 4-8 thru the 16+ categories, and below HRV in the 4-8 category for lodgepole pine. Although, this data may be somewhat erroneous for two reasons: the data is from 2002 and because the insect and disease layer is not included in the modeling. To support this rationale, the snag data collected for the Junction planning area is showing high snag density patches within some of the transects.

From the 1990s to present, management practices have transitioned to conserving snags, reducing the rate of loss of snag habitat. Conversely, down wood in the watershed are within or above HRV levels for down wood ≥5"dbh and ≥20"dbh for eastside mixed conifer, lodgepole pine, and ponderosa pine. Since the early 1900's, fire suppression has likely been the second most influential activity that has limited the creation of snags and has restrained the consumption of down wood habitat.

The ongoing pile burning and/or prescribed burning activities within the Fall River Watershed in the Klak, Katalo, Fall, Pit, Nut, and Charlie Brown project areas have the potential to remove hazard trees as the result of these management activities. The tree harvest activities within these project areas have already been completed, and therefore are part of the existing snag and down wood habitat within the Fall River watershed. Although these projects may have impact on snags and down wood, there should be a beneficial impact in the long-term due to promoting and contributing to the development of larger trees and down wood, which become quality snags and down wood habitat in the long-term.

The EXF project is an ongoing vegetation management project on 2,500 acres in the watershed. Commercial timber cutting is complete but some post-sale activities are not. In EXF units, some snags were felled for safety reasons within units or along roads, while down wood was damaged or displaced in other areas (i.e. landing areas). The post-treatment activities such as prescribed burning are expected to reduce snags and down wood, but new snags would also be created, and improve the overall habitat. The EXF project would treat 7 acres of LOS ponderosa pine habitat, therefore potentially reducing large snags within the watershed. These activities contribute to effects at the watershed scale.

From a cumulative standpoint, the Junction EA would impact snag habitat in the Fall River watershed, mostly in the lodgepole pine since the project area consists of 70% lodgepole pine and no ponderosa pine or mixed conifer snags are proposed for removal. While there will be lodgepole pine snag removal, there are no salvage units and removal would occur in dominate green stands. Therefore, the removal of snags would occur individually and not in high-density patches where the watershed is lacking in. By reducing the snags in the lower patch densities, it will move the vegetation closer to HRV where currently it is above HRV in the watershed. Alternatives 2 (12,298 acres) or 3 (12,253 acres) would overall treat 11% of the 112,045 acres of Forest Service lands in the watershed. While this project would cumulatively affect lodgepole pine snags and down wood habitat, it would enhance ponderosa pine and mixed conifer habitat within the watershed in the long-term by providing larger trees, which become quality future snags and down wood and more sustainable to minimizing a stand replacement wildfire. As noted in the fuels section, past and ongoing treatments in the areas outside ¼ mile of the Junction project area may or may not reduce fire behavior to a low rating, but any work that treats/reduces surface fuels will lower the susceptibility across the landscape for uncharacteristic wildfire.

The ongoing projects, in combination with the proposed Junction EA are expected to result in small negative cumulative effects to snags and down wood habitat in the Fall River watershed due to treatment activities. These effects are considered small given the watershed is currently providing above HRV levels in the lower density snag patches and generally above HRV levels across all categories for down wood.

There are no foreseeable actions within the Fall River watershed that have potential to further reduce snag and down wood habitat.

Consistency with Eastside Screens

The Forest Plan, including the Eastside Screens direction has been reviewed for consistency. While there would be removal of lodgepole pine snags and down wood in ponderosa pine and lodgepole pine, the transect data shown in the tables above indicate the project area is above the snags and down wood required by direction and above levels under best available science. In addition, no ponderosa pine snags are proposed for removal. Given the project area may be deficit for larger snags and down wood, the Eastside screens direction to maintain all remnant late and old seral and/or structural live trees >21"dbh would recruit this size class in the long-term. Overall, either action alternative would be consistent.

Determination for Down Wood Habitat

Both action alternatives would impact snag and down wood habitat on the Forest. The combined direct, indirect, and cumulative effects would result in a small negative trend of habitat, but this reduction of habitat would be negligible at the Forest-wide scale. Since the Junction project is consistent with the Forest Plan, continued viability of snag and down wood habitat is expected on the Deschutes National Forest.

Williamson's sapsucker

Information on habitat needs is contained in the Wildlife Report and is summarized from the Species Assessment for Williamson's sapsucker for the Deschutes National Forest (USDA Forest Service, 2012). The Williamson's sapsucker is included in the woodpecker group that was chosen as a terrestrial MIS on the DNF. Forest-wide data indicates that there are approximately 243,364 acres of potential Williamson's sapsucker nesting habitat on the Forest.

Existing Condition in Junction Project Area

Table 69 shows there are approximately 16,653 acres of potential nesting habitat in the Fall River watershed. Approximately 26% of the landscape does not contain snags of >10" dbh, while 58% of the landscape does not contain snags of >20" dbh, making it unlikely to be potential suitable nesting habitat. The remaining 74% of the landscape contains snags >10"dbh, while 42% of the landscape contains snags >20"dbh, providing varying levels of habitat for individuals. There is no nesting habitat with snags >20" dbh at the 80%+ tolerance level and there are only 12 acres at the 50-80% tolerance level in the watershed. According to the literature, this type of habitat would normally provide quality habitat for the majority of individuals since this habitat is preferred by this species for nesting.

Table 69: Snag Distribution by Tolerance Levels for Williamson's sapsucker for snags ≥10"dbh and 20"dbh in the Fall River Watershed.

Tolerance Intervals	Snags per acre	Acres	% of Habitat
Snag size: ≥ 10 in dbh			
0	0	4,385	26%
0-30%	0-0.5	10,768	65%
30-50%	0.5 – 2	1,369	8%
50-80%	2 - 4	53	<1%
80%+	4+	78	<1%
	Totals	**16,653**	**100%**

Snag size: ≥ 20 in dbh			
0	0	9,681	58%
0-30%	0.5	5,666	34%
30-50%	0.5 – 1.8	1,294	8%
50-80%	1.8 – 3.8	12	0%
80%+	3.8+	0	0%
	Totals	**16,653**	**100%**
Tolerance Levels based on DecAID EMC_S/L.sp-22 table			

Table 70 shows the HRV in the Fall River watershed and the percent of the landscape with snags ≥20"dbh in the Eastside mixed conifer habitat type. This is the dominant habitat type and size used by this species. As shown, 56% of the existing landscape has no snags and is above HRV levels of 32-44%. However, the existing conditions for the low-density snag category (0-4 snags per acre) is above HRV at 43% while the moderate to high snag density categories are all below HRV. This is likely due to a combination of factors. Snag loss or reductions have likely occurred due to past vegetation management activities such as clear-cut harvesting, salvage harvesting, thinning, prescribed fire, and firewood collection, as well as illegal cutting of large snags and loss of snags in green forests due to wildfire.

Table 70: HRV levels for the Fall River watershed with ≥20"dbh snags in the Eastside Mixed Conifer habitat type.

Habitat Type	**% of Landscape for Snags ≥20"dbh Snags/Acre**						
	Snag Density	**0**	**0-4**	**4-8**	**8-12**	**12-16**	**16+**
EMC	**HRV**	32-44	29-35	14-22	7-10	2-3	1-2
	Existing	56%	43%	0%	0%	0%	0%

Table 71 shows when considering potential Williamson sapsucker nesting habitat (species specific data) and comparing to HRV levels in the watershed, approximately 58% of the potential nesting habitat contains no snags >20"dbh. The existing condition is higher than the percent of the watershed with no snags >20"dbh (32-44%) displayed for HRV for eastside mixed conifer habitat type. When comparing the 0-8.6 snags per acre category to the corresponding 0-8 snags per acre HRV category, the existing condition (42%) is slightly below the HRV values of 43-57%. The opposite is true for percent of the landscape with higher snag densities. The existing condition for percent of the landscape with 8.6+ snags per acre is well below that of the corresponding HRV values of 8+ snags per acre (10-15%), which has negative impacts to the Williamson's sapsucker.

Table 71: Comparison of existing Williamson's sapsucker nesting habitat to the Fall River watershed HRV (snags ≥20" dbh).

	Snag Density (snags/acre)		
	0	**0-8.6 (DecAID) 0-8 (HRV)**	**8.6+ (DecAID) 8.0+ (HRV)**
HRV	32-44%	43-57%	10-15%
Existing Nesting Habitat	58%	42%	0%

Table 72 shows there are approximately 1,855 acres of potential Williamson's sapsucker nesting habitat in the Junction planning area. Approximately 51% of the landscape does not contain snags ≥10" dbh, while 82% of the landscape does not contain snags ≥20" dbh, making it unlikely to be potential suitable nesting habitat. The remaining 49% of the planning area contains snags ≥10"dbh, while 18% of the planning area contains snags ≥20"dbh, providing varying levels of habitat for individuals. There is no nesting habitat with snags ≥20" dbh at the 50-80% and 80%+ tolerance level. According to the literature, this type of habitat would normally provide quality habitat for the majority of individuals since this habitat is preferred by this species for nesting.

Habitat modeling shows that Williamson's habitat in the planning area is distributed in small to moderate size patches in the ponderosa pine PAG.

Table 72: Existing distribution of snags ≥10"dbh and ≥ 20" dbh in Williams's sapsucker nesting habitat in the Junction Planning Area.

Tolerance Intervals*	Snags per acre	Acres	% of Habitat
Snag size: ≥ 10 in dbh			
0	0	939	51%
0-30%	0-0.5	902	49%
30-50%	0.5 – 2	12	0%
50-80%	2 - 4	2	0%
80%+	4+	0	0%
	Totals	**1,855**	**100%**
*Tolerance intervals based on DecAID table EMC_S/L.sp-22 and PPDF_S/L.sp-22, EMC_S/L.sp-22			
Snag size: ≥ 20 in dbh			
0	0	1,521	82%
0-30%	0.5	331	18%
30-50%	0.5 – 1.8	1	0%
50-80%	1.8 – 3.8	1	0%
80%+	3.8+	0	0%
	Totals	**1,855**	**100%**
*Tolerance intervals based on DecAID tableEMC_S/L.sp-22.*PPDF was not used due to similar but slightly higher standards in EMC			

Williamson's sapsucker – Direct and Indirect Effects – Alternative 1

While ponderosa pine snag levels may increase in areas not treated, the majority of tree sizes in these areas are still below the large size utilized by this species, and it may take considerable time in the more dense stands. Ponderosa pine stands, especially those that have not been entered in the recent past, would continue to be overly dense and affect healthy tree vigor. Over time, increased canopy layering and tree density would subject these stands to increased levels of risk of loss due to fire, insect, and disease. An event of a large magnitude would alter habitat and would not contribute to suitable nesting habitat conditions over the long-term.

Williamson's sapsucker – Direct and Indirect Effects – Alternatives 2 and 3

Habitat modeling described above was overlaid with proposed treatments for Alternatives 2 and 3. Table 73 shows the total acres of Williamson's sapsucker habitat that would be affected by the proposed management activities from Alternatives 2 and 3.

Table 73: Acres of Williamson's sapsucker habitat affected by alternative.

Activity	Alt. 2	Alt. 3
Total acres affected	1403*	1357*
Overstory removal	156	155
Seed tree/Shelterwood	27	27
Commercial thinning	534	488
Total overstory removal	716	670

No tree harvest	687	687
Prescribed burning	1169	1129
Mowing Understory treatment (includes PCT, LFR, SPC, & whip falling)	1,383 1,403	1,341 1,357

*These are the total acres of habitat affected based on habitat modeling, while the following rows show the acres affected by activity type. These rows will not add up equally to the total acres affected since certain activities would only occur in certain units or because there are overlapping activities in the same units.

Under Alternative 2, the residual basal area in commercial thinning units in the ponderosa pine PAG would be 70 ft^2, and 50 ft^2 under Alternative 3, therefore the canopy closure in Williamson's habitat would be reduced and eventually becoming more quality habitat due to the accelerated tree growth of the remaining trees and providing a more open stand component. Under Alternative 2, most of the commercial thinning would occur in two units: Unit #206 (313 acres) and Unit # 204 (178 acres). Unit #206 is located in the northwest corner of the project area, while Unit # 204 is in the Wake Butte Special Interest area in the southwest corner of the project area. Both of these units would be followed up with slash removal, mowing, pile burning, and prescribed burning. As part of project design, one of the objectives in these areas is to increase the large tree component or move toward LOS. Under Alternative 3, commercial thinning would also occur in Unit #206, but not Unit #204, while the remaining treatment acres are scattered in smaller units. Commercial thinning of live trees would likely affect future snag recruitment on those acres since trees would have succumbed to competition from stress-related mortality (i.e. competition for scarce site resources). However, the increased tree growth of residual trees as a result of thinning would accelerate attainment of large diameter trees, which would be available as larger diameter snags and quality habitat in the long-term. Modeling shows that there are only 3 very small patches of potential habitat within the mixed conifer PAG. Since treatments in the mixed conifer PAG would also promote the large tree component, the effects as described to ponderosa pine would be similar.

The overstory removal and shelterwood treatments are expected to have minimal impacts to habitat since lodgepole pine trees are the targeted tree species, while favoring ponderosa pine. Since these units are adjacent to ponderosa pine PAGs, the vegetation is transitional.

While there may be some loss of snags due to prescribed burning, other snags may be created and overall it would be beneficial to reintroduce fire into these stands and for pruning some of the limbs, raising the crown base height. The other project activities described above, such as slash removal, mowing, and pile burning may incidentally remove snags or due to safety reasons, in addition to potentially causing disturbance to habitat and the species if in the areas of treatments.

Several of the project design elements that were developed would minimize some of the impacts to Williamson's sapsucker habitat. For example, the no tree harvest areas and retention areas adjacent or within the ponderosa pine PAG units would provide a diversity of habitat by maintaining these areas with a higher tree density and canopy closure and snags would be available. Alternatives 2 and 3 would retain all ponderosa pine snags, unless for safety reasons, and retain all live ponderosa pine trees greater than 21" dbh. Alternative 3 would retain all ponderosa pine trees less than 21" dbh if they meet old tree characteristics.

Since ponderosa pine is currently at the lower end of HRV for structural stage 6, and below HRV for structural stage 7, Alternative 2 would be the most beneficial to Williamson's sapsucker due to more acres treated for promoting LOS ponderosa pine thus more desirable habitat for this species in the future. And while the current structural stages 2 - 5 are all well above HRV, the proposed treatments would lend itself well toward structural stages 6 and 7 and to bring stages 2 – 5 more towards HRV conditions. While either alternative would reduce LOS lodgepole pine, structural stages 5-7 would remain above HRV levels, thus continue to provide habitat in these stands. There would be no change to the mixed conifer in any of the structural changes.

Williamson's sapsucker – Cumulative Effects

The list of past actions in Appendix A has been reviewed. The past timber harvest have likely been the most influential activities that have likely contributed to the lack of higher snag densities >20" dbh for Williamson's sapsuckers. From the 1990's to present, the transition to conserving and promoting LOS and snags has occurred, reducing the rate of loss of habitat. Since the early 1900's, fire suppression has likely been the second most influential activity that has limited the creation of snags.

Ongoing activities within the Fall River Watershed may have short-term impacts to Williamson's sapsucker due to disturbance. These activities include pile burning and/or prescribed burning in the Klak, Katalo, Fall, Pit, Nut, and Charlie Brown project areas; the tree harvest activities within these project areas have already been completed. Although these projects may have had or are having short-term disturbance impacts, there should be a beneficial impact in the long-term due to promoting and contributing to the development of large trees, which become quality snags and habitat.

The EXF project is another ongoing vegetation management project in the watershed and commercial and non-commercial timber cutting and removal with hand and machine piling of slash prior to burning the piles and prescribed burning on 2,500 acres is proposed. Under the EXF project the effects of removing 7 acres of the ponderosa pine PAG classified as LOS within the watershed were disclosed in the EXF analysis. This would be a small reduction of habitat and potential disturbance in the watershed.

From a cumulative standpoint, the Junction EA would treat 8% of Williamson's sapsucker habitat in the Fall River watershed under Alternative 2 (1,403 acres/16,653 acres) and Alternative 3 (1,357 acres/16,653 acres). This project would cumulatively enhance habitat within the watershed by treating and promoting more acres towards LOS. The ongoing projects, in combination with the proposed Junction EA are expected to result in small negative cumulative effects to individual Williamson's sapsucker or habitat in the Fall River watershed due to potential human disturbance from treatment activities for the life of the project.

Forest Plan Consistency

The Forest Plan standards and guidelines have been reviewed for the Williamson's sapsucker. Either alternative for the Junction Project would be consistent with the Forest Plan since no ponderosa pine snags of any dbh would be removed (except for safety reasons). This would well be above the 2.25 snags per acre for ponderosa pine >15"dbh. As shown in Table 21, while the Junction planning area is not currently meeting 2.25 snags per acre for mixed conifer >15"dbh, there would not be any mixed conifer snags proposed for removal. As per the Eastside Screens direction, all sale activities will maintain snags and green trees >21"dbh.

On 4,432 acres of overstory tree removal in the lodgepole pine PAG, 100-300 residual trees/acre would be available as GTRs, averaging up to 4" dbh, exceeding the 27-115 required trees. The amount of trees for GTRs between 8" and 18" dbh would be 13.5 trees per acre. Post-treatment snag densities would remain the same on 6,940 acres in areas having no overstory treatments; as stand densities increase over time, additional snags would occur on these acres.

Williamson's sapsucker – Determination

Because this project impacts less than 1% of suitable habitat across the Forest, the overall direct, indirect and cumulative effects will result in a small negative trend of habitat (increase in disturbance). The loss of habitat (increase in disturbance) will be insignificant at the scale of the Forest. The Junction

Project is consistent with the Forest Plan, and thus continued viability of Williamson's sapsucker is expected on the Deschutes National Forest.

Hairy woodpecker

Information on habitat needs is located in the Wildlife Report is summarized from the Species Assessment for hairy woodpecker for the Deschutes National Forest (USDA Forest Service, 2012). The hairy woodpecker is included in the woodpecker group that was chosen as a terrestrial MIS on the DNF. Based on the Wildhab model, there are approximately 507,920 acres of potential hairy woodpecker nesting habitat across the Forest. About 51% of the landscape does not contain snags ≥ 10" dbh, making it unlikely to be suitable nesting habitat. Approximately 30% of the landscape contains snags ≥10"dbh, providing varying levels of nesting habitat for individuals. Approximately 19% of the landscape provides optimal nesting habitat for the majority of individuals as this habitat contains snags ≥10"dbh which are preferred by this species for nesting.

Existing Conditions Junction Project Area

Table 74 shows the snag distribution by nesting parameter for snags ≥10" dbh for hairy woodpeckers in the Fall River watershed and the Junction Planning area. There are approximately 32,953 total acres of potential hairy woodpecker nesting habitat in the Fall River watershed and 6,717 acres in the Junction Planning Area. Within the watershed, presumably 12,780 acres does not provide nesting habitat, while 11,846 acres provides good nesting habitat, and 8,327 acres provides optimal nesting habitat. In the planning area, 3,218 acres does not provide nesting habitat, while 2,233 acres provides minimal habitat, 1,266 acres provides good habitat, and there are no acres that would provide optimal habitat.

Table 74: Snag Distribution by nesting parameter for snags ≥10"dbh for the hairy woodpecker in the Fall River Watershed and Junction Planning Area.

Nesting Parameters	No Nesting Habitat	Provides Minimal Nesting Habitat	Provides Good Nesting Habitat	Provides Optimal Nesting Habitat	Total Acres
Snags/Acre	**0**	**0-0.1**	**0.1-3.7**	**3.7+**	
Fall River Watershed	12,780 acres (39%)	No data to fit this category	11,846 acres (36%)	8,327 acres (25%)	32,953 acres
Junction Planning Area	3,218 acres (48%)	2,233 acres (33%)	1,266 acres (19%)	0 acres (0%)	6,717 acres
Based on Bates 1995 as reported in DecAID 2.1					

Table 75 shows the HRV in the Fall River watershed and the percent of the landscape with snags ≥10"dbh in the Eastside mixed conifer habitat type. As shown, 19% of the existing landscape has no snags, but is within HRV levels of 18-25%. However, the existing conditions for the low-density snag category (0-4 and 4-8 snags per acre) is above HRV at 34% and 33%, while the remaining moderate to high snag density categories are all below HRV. This is likely due to a combination of factors. Snag loss or reductions have likely occurred due to past vegetation management activities such as clear-cut harvesting, salvage harvesting, thinning, prescribed fire, and fire suppression.

Table 75: HRV levels for the Fall River watershed with >10"dbh snags in the Eastside Mixed Conifer habitat type.

Habitat Type	% of Landscape for Snags >10"dbh Snags/Acre						
	Snag Density	**0**	**0-4**	**4-8**	**8-12**	**12-16**	**16+**
EMC	**HRV**	18-25	28-31	15-16	16-22	6-10	5-7
	Existing	19%	34%	33%	8%	4%	2%

There has been no recent stand replacement or natural fires within the planning area providing the type of post-fire habitat discussed earlier. The most recent fires that occurred in the planning area include the 1990 Wake Butte fire (365 acres) and the 1999 Spring River Butte fire (84 acres).

Overall, hairy woodpecker habitat in the Fall River watershed is providing 61% of good and optimal habitat, but lacks snags in higher densities, while the Junction planning area is providing 52% of minimal and good habitat. The available habitat in the Junction planning area is well distributed in either small to large patch sizes, but lacks snags in higher densities to provide optimal habitat.

Hairy woodpecker – Direct and Indirect Effects – Alternative 1

Within the short-term, habitat would likely increase in ponderosa pine, mixed conifer, and lodgepole pine due to the increase of snag levels that would be created from insects and/or disease, however, these conditions would suppress the ability to provide old-growth snags in the long-term. Additionally, the insect and disease and fire disturbance in mixed conifer and lodgepole pine would remain at moderate disturbance regimes. While some ponderosa pine stands would remain at low disturbance regimes, there are many stands that are overstocked. An event of a large magnitude or high severity fire would alter habitat and would not contribute to suitable nesting habitat conditions over the long-term.

Hairy woodpecker – Direct and Indirect Effects – Alternatives 2 and 3

Habitat modeling described above was overlaid with proposed treatments for Alternatives 2 and 3. Table 76 shows the total acres of potential hairy woodpecker habitat that would be affected by the proposed management activities from Alternatives 2 and 3.

Table 76: Acres of potential hairy woodpecker habitat affected by alternative.

Hairy woodpecker	Alt. 2	Alt. 3
Total acres affected	5266*	4930*
Overstory removal	1521	1407
Seed tree/Shelterwood	925	920
Commercial thinning	1777	1561
Total overstory removal	4223	3887
No tree harvest	1043	1043
Prescribed burning	2709	2524
Mowing	3430	3226
Understory treatment	5266	4930

*These are the total acres of habitat affected based on habitat modeling, while the following rows show the acres affected by activity type. These rows will not add up equally to the total acres affected since certain activities would only occur in certain units or because there are overlapping activities in the same units.

Under Alternative 2, commercial thinning in ponderosa pine stands would maintain hairy woodpecker habitat to a marginally suitable condition since the basal area would be reduced to 70 ft^2, therefore the canopy closure in hairy woodpecker habitat would be reduced and eventually becoming more quality habitat due to the accelerated tree growth of the remaining trees and providing a more open stand component. Alternative 3 would reduce habitat to an unsuitable condition since the basal area would be reduced to 50 ft^2. In the long-term, restoration treatments under either alternative would result in larger tree growth leading to larger diameter snags and snag replacements, thus providing a quality component of habitat for hairy woodpeckers during winter. Treatments in the mixed conifer stands are not expected to reduce habitat to an unsuitable condition since pre-commercial thinning is proposed in these areas, thus not changing the structural stage or the upper canopy closure. These treatments will accelerate the growth of these trees and make them more resilient to insects and diseases.

Overstory removal and seed tree/shelterwood are expected to reduce hairy woodpecker habitat in the lodgepole pine PAG for the long-term due to the removal of live green trees, including snags. In order to meet the purpose and need, lodgepole pine stands that are experiencing insects and disease or dwarf mistletoe, would salvage lodgepole pine snags.

Suitable habitat, including snags are expected to be maintained across 1,043 acres under either alternative within the No Tree Harvest units since there would be no overstory tree removal. These units are only proposed to receive some form of understory treatment.

Equal amount of understory treatments would occur in the total acres affected for hairy woodpecker under both alternatives. Understory treatments could result from a combination of pre-commercial thinning, ladder fuels reductions, prescribed burning, mowing, machine piling/burning, whip falling, or biomass removal. In overstory removal units, these treatments would reduce habitat since the overstory trees would be removed. Other than overstory removal units, understory treatment activities are not expected to appreciably impact hairy woodpecker habitat since smaller diameter trees (<7"dbh for lodgepole pine and <9"dbh for ponderosa pine) would be targeted for removal, thus not changing the upper canopy closure. Mowing in ladder fuel reduction units are not expected to appreciably impact habitat since the brush component is targeted.

As discussed in the influential activities and/or risks section, fire suppression has reduced habitat or the quality of habitat for hairy woodpeckers. Therefore, prescribed burning is expected to improve habitat conditions by reintroducing fire in the project area and would only occur in the ponderosa pine PAG. While there may be some loss of snags by prescribed burning, some will be created individually or in small pockets. Some lodgepole pine mortality is expected from fire creeping into lodgepole pine stands when prescribed fire is applied in adjacent ponderosa pine dominated areas.

Lodgepole pine snags will be removed under either alternative, while ponderosa pine snags of all dbh sizes would be maintained as per project design. Although ponderosa pine snags are not targeted for removal, some may be incidentally impacted during implementation, or felled for safety reasons. Under Alternative 2, the amount of trees for GTRs between 8" to 18" dbh would retain 13.5 trees per acre across the project area, while Alternative 3 would retain 12.8 trees per acre. This would meet the Eastside Screens direction and the Wildlife Tree and Log Implementation Strategy to manage across the landscape.

Other project design elements that would minimize impacts to hairy woodpecker habitat include: retaining all ponderosa pine and white-fir trees >21" dbh, retain ponderosa pine and white-fir trees less than 21" dbh if they meet old tree characteristics (Alternative 3 only), and allow natural succession to occur within the lodgepole pine OGMA corridors to provide snags. Based on field reconnaissance, these corridors have an abundance of lodgepole pine snags that well exceed the LRMP requirements of 1.8 snags per acre.

Overall, Alternative 3 would have less impact to hairy woodpecker habitat than Alternative 2 due to fewer acres impacted from overstory tree removal and because 1,520 acres of pure lodgepole pine would be left untreated versus one 870-acre area under Alt. 2.

Hairy woodpecker – Cumulative Effects

The list of past actions in Appendix A has been reviewed. Past timber harvest, including salvage has been the most influential activity that has likely contributed to the lack of higher snag densities >10" dbh for hairy woodpecker. From the 1990's to present, the transition to conserving snags has occurred, reducing the rate of loss of habitat. Since the early 1900's, fire suppression has likely been the second most influential activity that has limited the creation of snags.

Ongoing activities within the Fall River Watershed may have short-term impacts to hairy woodpeckers due to disturbance. These activities include pile burning and/or prescribed burning in the Klak, Katalo, Fall, Pit, Nut, and Charlie Brown project areas. The tree harvest activities within these project areas have already been completed, and therefore are part of the existing hairy woodpecker habitat within the Fall River watershed. Although these projects are having short-term disturbance impacts, there should be a beneficial impact in the long-term due to promoting and contributing to the development of large trees, which become quality snags and habitat in the long-term.

The EXF project is an ongoing vegetation management project on 2,500 acres in the watershed, but commercial and non-commercial timber cutting is not complete. Commercial thinning may impact habitat to unsuitable conditions, but non-commercial would maintain habitat. The post-treatment activities such as prescribed burning are expected to improve habitat, while machine piling may cause disturbance for the duration of the project. The EXF project would affect 7 acres of hairy woodpecker habitat by removing the ponderosa pine PAG classified as LOS within the watershed. This was disclosed in the EXF analysis. This would be a small reduction of habitat in the watershed.

From a cumulative standpoint, the Junction EA would affect 16% of hairy woodpecker habitat in the Fall River watershed under Alternative 2 (5,266 acres/32,953 acres) and 15% under Alternative 3 (4,930 acres/32,953 acres). While this project would cumulatively affect lodgepole pine habitat, it would enhance ponderosa pine and mixed conifer habitat within the watershed in the long-term by providing large future snags.

The ongoing projects, in combination with the proposed Junction EA are expected to result in small negative cumulative effects to individual hairy woodpeckers or habitat in the Fall River watershed due to potential human disturbance and from treatment activities. These effects would be considered small given the watershed is currently providing 61% of good and optimal nesting habitat while the, the current snag densities within the 0-8 categories are above HRV, therefore providing more snags in this category than historically.

There are no foreseeable actions within the Fall River watershed that have potential to reduce suitable habitat for hairy woodpecker.

Forest Plan Consistency

The Forest Plan standards and guidelines have been reviewed for the hairy woodpecker and either alternative for the Junction Project would be consistent with the Forest Plan. The direction for providing 2.25 snags per acre of ponderosa pine snags would be met since no ponderosa pine snags of any dbh would be removed (except for safety reasons). Additionally, as per the Eastside Screens direction, all sale activities will maintain snags and green trees ≥21"dbh.

The direction for providing 1.8 snags per acre of lodgepole pine would be met in the no harvest areas, no treatment areas, leave areas, OGMA corridors, the northern portion of the Pistol Butte OGMA (pure lodgepole pine), and the woodpecker untreated habitat areas. While there will be snags removed within lodgepole pine stands, the Eastside Screens direction is to maintain snags and green trees ≥21”dbh. On 4,432 total acres of overstory tree removal in the lodgepole pine PAG, 100-300 residual trees/acre would be available as GTR’s, averaging up to 4” dbh, exceeding the 27-115 required trees. The amount of trees for GTR’s between 8” and 18” dbh would be 13.5 trees per acre under Alternative 2 and 12.8 trees per acre under Alternative 3. Overall, post-treatment snag densities would remain the same on 6,940 acres in areas having no overstory treatments; as stand densities increase over time, additional snags would occur on these acres.

Hairy woodpecker Determination

The hairy woodpecker is not listed as federally threatened or endangered nor is it a candidate species and is listed as apparently secure for the state of Oregon. In addition, it is not listed as a sensitive species for Region 6 or for the State of Oregon. This species is not listed as focal species for the Partners in Flight Conservation Strategy for Landbirds on the East Slope of the Cascades Mountains in Oregon and Washington and is not a priority species on the USFWS Birds of Conservation Concern.

Population trend data from the North American Breeding Bird Surveys indicate the hairy woodpecker shows an increasing population trend in both the Great Basin and Oregon. The Partners in Flight species assessment database indicates this is not a Regional Species of Concern.

Because this project impacts less than 1% of suitable habitat across the Forest, the overall direct, indirect and cumulative effects will result in a small negative trend of habitat (increase in disturbance). The loss of habitat (increase in disturbance) will be insignificant at the scale of the Forest. The Junction Project is consistent with the Forest Plan, and thus continued viability of hairy woodpecker is expected on the Deschutes National Forest.

Three-toed Woodpecker

Information on habitat needs is contained in the Wildlife Report and is summarized from the Species Assessment for three-toed woodpecker for the Deschutes National Forest (USDA Forest Service, 2012). The three-toed woodpecker was chosen as a MIS on the DNF to represent other species found in the mature and old-growth lodgepole pine forest type. In addition, three-toed woodpeckers are included with the woodpecker group, which was also chosen as MIS for the DNF.

Forest-wide habitat modeling shows that there are approximately 367,499 acres of potential three-toed woodpecker nesting habitat on the Forest. Currently, 39% of potential nesting habitat does not contain any snag habitat ≥10” dbh making it unlikely to be suitable nesting habitat. The remaining 61% of the habitat with snags ≥10”dbh provides varying levels of habitat for individuals. Approximately 4% of the nesting habitat provides for the majority of individuals as this habitat contains snags ≥10”dbh at densities which are preferred by this species for nesting according to the literature. (Note: 2.25 snags per acre for mixed conifer, and 1.8 snags per acre of lodgepole pine is the density for Standard and Guidelines.)

Snag Habitat in the Fall River Watershed

Table 77 shows there are approximately 29,596 acres of potential three-toed nesting habitat in the Fall River watershed. Approximately 35% of the landscape does not contain snags ≥10” dbh. The remaining 65% of the landscape contains snags ≥10”dbh, providing varying levels of habitat for individuals. Approximately 1% of the nesting habitat provides for the majority of individuals as this habitat contains snags ≥10”dbh at densities which are preferred by this species for nesting according to the literature.

Table 77: Existing Snag Distribution in the Fall River Watershed by Tolerance Levels for three-toed woodpeckers for snags ≥10”dbh.

Tolerance Level	Snags/Acre	Total Watershed Potential Nesting Habitat Acres	% of Habitat
0	0	10,384	35%
0-30%	0-2.5	6,761	23%
30-50%	2.5-13.6	10,722	36%
50-80%	13.6-29.2	1,394	5%
80%+	29.2+	336	1%
Total		**29,596**	**100%**
Based on DecAID Version 2.1: Table EMC_S/L.sp-22			

Table 78 displays the existing snag density ≥10" dbh in comparison to HRV levels within the Fall River watershed in the Eastside Mixed Conifer habitat type. The existing condition (19%) for the percentage of the landscape with no snags is within historic levels (18-25%). The existing conditions for the 0-6 and the 6-12 snags per acre categories are above HRV, while the 12-24, 24-36, and 36+ snags per acre categories are below HRV. These conditions are likely due to a combination of factors, such as past timber harvest activities, including salvage of snags, and mountain pine beetle epidemic. Additionally, increased stand densities often lead to higher mortality in the smaller sized snags due to competition for resources.

Table 78: HRV analysis of the Fall River watershed with ≥10"dbh snags in the Eastside Mixed Conifer habitat type.

Habitat Type	% of Landscape for Snags ≥10"dbh Snags/Acre						
	Snag Density	0	0-6	6-12	12-24	24-36	36+
EMC	HRV	18-25	28-31	15-16	16-22	6-10	5-7
	Existing	19%	34%	33%	8%	4%	2%
Information from DecAID 2.1 tables (unharvested plots for snags ≥10" dbh) EMC_ECB_O.Inv-14., EMC_ECB_S.Inv-14, EMC_ECB_L.Inv-14, and modified with HRV information from Viable							

Down Wood Habitat in the Fall River Watershed

Down wood distribution was also analyzed on the 29,596 acres of potential three-toed nesting habitat in the Fall River watershed. Table 66 shows that 7% of potential nesting habitat does not contain down wood habitat ≥5"diameter, making it unlikely to be suitable nesting habitat, while the remaining 93% of the habitat with down wood ≥5"diameter provides varying levels of habitat for individuals.

Table 79: Down Wood Distribution in the Fall River Watershed by Tolerance Levels for three-toed woodpeckers for down wood ≥5"diameter.

Tolerance Intervals*	Down Wood/Acre	Acres	% of Habitat
0	0	1,795	7%
0-30%	0-6.5	24,116	81%
30-50%	6.5-17	3,686	12%
50-80%	17-32	0	0
80%+	32+	0	0
	Totals	**29,596**	**100%**
Based on DecAID Version 2.1: Table EMC_S/L.sp-22			

Table 80 shows the existing percentages of down wood ≥5"diameter in comparison to HRV within the Fall River watershed in the Eastside Mixed Conifer habitat type. As shown, the existing condition (2%)

for the percentage of the landscape with no down wood is well less than documented for historic levels (22-30%). With the exception of the 10-16 and 16+ categories, the existing conditions for the remaining down wood percent cover categories are above HRV, indicating there is more existing down wood than there was historically. This is likely due to a combination of factors. Fire suppression, in addition to insect and disease events, has resulted in high mortality in the smaller size class trees. These smaller sized trees have high fall down rates, thus end up as down wood material.

Table 80: HRV analysis in the Fall River Watershed with down wood >5"diameter in the Eastside Mixed Conifer habitat type.

Habitat Type	% of Landscape with Down Wood >5" diameter Down Wood Percent Cover						
	Down Wood % Cover	0	0-4	4-8	8-10	10-16	16+
EMC	HRV	22-30	53-54	13-19	2-3	1-3	0
	Existing	2%	63%	23%	9%	3%	0%

Snag Habitat in the Junction Planning Area

Table 81 shows there are approximately 5,807 acres of potential three-toed woodpecker nesting habitat in the Junction Planning Area. Approximately 49% of the landscape does not contain snags >10" dbh. The remaining 51% of the landscape contains snags >10"dbh, providing varying levels of habitat for individuals. Approximately only 1% of the nesting habitat would provide for the majority of individuals as this habitat contains snags >10"dbh at densities which are preferred by this species for nesting according to the literature. Since the Junction planning area consists of approximately 70% lodgepole pine, habitat is well distributed throughout.

Table 81: Existing Snag Distribution in the Junction Planning Area by Tolerance Levels for three-toed woodpeckers for snags >10"dbh.

Tolerance Level	Snags/Acre	Total Watershed Potential Nesting Habitat Acres	% of Habitat
0	0	2866	49%
0-30%	0-2.5	1234	21%
30-50%	2.5-13.6	1662	29%
50-80%	13.6-29.2	43	1%
80%+	29.2+	2	0%
Total		**5807**	**100%**
Based on DecAID Version 2.1: Table EMC_S/L.sp-22			

Down Wood Habitat in the Junction Planning Area

Down wood distribution was also analyzed on the 5,807 acres of potential three-toed woodpecker nesting habitat in the Junction Planning area. Table 82 shows that 5% of potential nesting habitat does not contain down wood habitat >5"diameter, making it unlikely to be suitable nesting habitat, while the remaining 95% of the habitat with down wood >5"diameter provides varying levels of habitat for individuals.

Table 82: Down Wood Distribution in the Junction Planning Area by Tolerance Levels for three-toed woodpeckers for down wood >5"diameter.

Down wood size: ≥ 5 inches diameter			
Tolerance Intervals*	**Down Wood/Acre**	**Acres**	**% of Habitat**
0	0	269	5%
0-30%	0-6.5	5426	93%
30-50%	6.5-17	112	2%
50-80%	17-32	0	0%
80%+	32+	0	0%
	Totals	**5807**	**100%**
Based on DecAID Version 2.1: Table EMC_S/L.sp-22			

Three-toed woodpecker – Direct and Indirect Effects – Alternative 1

The selection of this alternative would have no immediate effect on three-toed woodpeckers or their habitat. Because stands without treatment continue to provide habitat over a longer time than treated stands, thus there is a shorter period when old growth lodgepole pine is absent or scarce on the Deschutes or other National Forests (Goggans et al. 1999). It is assumed that suitable habitat in the Junction planning area would continue its current trajectory and in certain areas expand due to the expected increase in snags due to insects and disease, which in turn become down wood habitat. However, this alternative has the greatest level of risk from a disturbance event. In an event of a large fire, habitat would be altered or lost for several decades and would not contribute to suitable habitat conditions over the long-term. Although three-toed woodpeckers utilize and selectively seek fire-killed lodgepole and mixed conifer stands to feed on insects, this would only provide a short-term foraging boom lasting 5-7 years. Thereafter, the snag falling rates would intensify, particularly in lodgepole pine forests, eventually diminishing the quality of habitat.

Three-toed woodpecker – Direct and Indirect Effects – Alternatives 2 and 3

Habitat modeling described above was overlaid with proposed treatments for Alternatives 2 and 3. Table 83 shows the total acres of potential three-toed woodpecker habitat that would be affected by the proposed management activities from Alternatives 2 and 3.

Table 83: Acres of potential three-toed woodpecker habitat affected by alternative.

Three-toed woodpecker	Alt. 2	Alt. 3
Total acres affected	4651*	4172*
Overstory removal	1792	1633
Seed tree/Shelterwood	1272	1264
Commercial thinning	1173	861
Total overstory removal	4238	3759
No tree harvest	413	413
Prescribed burning	1421	1162
Mowing	2135	1849
Understory treatment	4651	4172

*These are the total acres of habitat affected based on habitat modeling, while the following rows show the acres affected by activity type. These rows will not add up equally to the total acres affected since certain activities would only occur in certain units or because there are overlapping activities in the same units.

Conversion to and maintenance of lodgepole pine and lodgepole pine dominated mixed conifer stands to a young, vigorous condition and may eliminate or severely restrict incidence of wood-boring insects and heart rot, leading to declines in populations of three-toed woodpeckers (Goggans et al. 1999).

Treating these stands by logging, immediately converts them to a vigorous condition where incidence of death and decay is severely restricted, thus potential nesting and foraging substrate is drastically reduced. Although, they will still nest in cut stands with an 18% canopy closure. Three-toed woodpeckers avoid logged areas and younger stands for roosting and foraging.

Alternative 2 would affect 4,651 total acres of the 5,807 potential existing nesting habitat in the Junction project area, while Alternative 3 would affect 4,172 total acres. Some snags within green stands are proposed for removal under either alternative, but there are no continuous stands proposed for salvage. Since thinning activities lessen the risk of future large-scale bark beetle outbreak, it also reduces levels of future tree mortality and suitable habitat. However, endemic levels of insects and disease would remain and may provide marginal future nesting habitat. The results would be distributed in individual trees or clumpy patches. Since three-toed woodpeckers avoid harvested areas for foraging or roosting, this habitat use would be avoided on the 4,651 acres and 4,172 acres proposed under Alternatives 2 and 3.

Goggans et al. (1999) estimated home ranges under conditions of abundant food supply and the amount of mature or over-mature stands. As the mountain pine beetle epidemic runs its course, and prey abundance declines, it is likely that the amount of area required to support a pair of three-toed woodpecker will increase. Goggans et al. 1989 believe the most effective method of insuring habitat for three-toed woodpeckers is to exempt areas from commercial or salvage timber management and place these areas under a special management strategy, which retains the characteristics of mature or over-mature lodgepole pine habitat as long as possible, without treatment. Management Areas for each pair of three-toed woodpecker should be 528 acres of lodgepole pine or mixed conifer forest in mature or over-mature condition and at an elevation of 4,500 feet or higher.

Alternative 2 would provide an 870-acre continuous patch of untreated woodpecker habitat in the northwest corner of the project area, where no management activities would occur. This management area is dominated by pure lodgepole pine PAG, with a small component of intermixed ponderosa pine in the northern end. This area is dominated by structural stages 4, 5, 6, and 7. While the entirety of this area is not all mature or over-mature lodgepole pine (structural stage 6 and 7), the remaining stages will accelerate in growth within the next two decades. This management area also has minimal road density and it contains a functional wildlife guzzler that would provide a watering source. This management area would potentially provide a three-toed woodpecker home range for approximately 1 – 6 pairs, based on Goggans (1999).

Alternative 3 would provide two patches of contiguous untreated woodpecker habitat. It includes the one described above under Alternative 2, and it includes a 640-acre continuous area in the southwest corner of the project area, just north of Fall River. No management activities would occur in this area either. This management area is also pure lodgepole pine PAG and is highly dominated by structural stage 6, and also contains structural stages 4, 5, and 7. This area also has minimal road density. The management area would potentially provide a three-toed woodpecker home range for approximately 1 – 4 pairs, based on Goggans (1999).

Another design element that would maintain suitable habitat, including high snag densities would be within the OGMA corridors that are comprised of pure lodgepole pine PAG. Based on field reconnaissance, these 400’ wide corridors contain a large density of snags, down wood, and a diversity of live green tree age classes. The intent of this design is to allow natural succession to occur, providing levels of insects and disease, thus potential nesting and foraging habitat. There would be no management activities in these areas under either alternative. Potential suitable habitat and snag densities would also be maintained in the northern half of the Pistol Butte OGMA since there are no proposed treatments in this area under either alternative.

Both alternatives maintain three-toed woodpecker habitat within the no treatment areas and leave areas. There would be no management activities within these areas, therefore high densities of lodgepole pine are expected to provide potential nesting and foraging habitat. Alternatives 2 and 3 propose a combination of understory treatments such as non-commercial thinning, mowing, piling of slash, whip falling, biomass removal, pile burning and reintroduction of prescribed fire in ponderosa pine dominated PAGs. Marginal suitable habitat may remain within the non-commercial thinning units since these actions may reduce canopy cover and lessen vertical vegetation diversity. While the remaining activities may reduce the down wood densities, it should not further impact three-toed woodpeckers since the overstory would already be removed and this species usually avoids these areas for foraging and roosting. Snags are not proposed for removal from these activities, but some incidental loss may occur. Snag loss may also occur due to safety reasons during the construction of temporary roads, and placement of landings where the logs are stacked and processed. Additionally, some lodgepole pine mortality is expected from prescribed burning creeping into lodgepole pine stands when prescribed fire is applied in adjacent ponderosa pine dominated areas, although these trees may provide suitable foraging and nesting habitat.

Alternative 3 would have fewer impacts to three-toed woodpecker habitat than Alternative 2 due to less acres impacted from overstory tree removal and because more habitat of pure lodgepole pine (1,520 total acres) would be left untreated, versus 870 acres under Alternative 2.

Three-toed Woodpecker – Cumulative Effects

The list of past actions in Appendix A has been reviewed. The past timber harvest, including salvage has likely been the most influential activity that has contributed to the lack of high-density patches of snags >10” dbh for three-toed woodpecker. From the 1990’s to present, the transition to conserving snags has occurred, reducing the rate of loss of habitat. Since the early 1900’s, fire suppression has likely been the second most influential activity that has limited the creation of snags, creating the existing conditions of today.

Ongoing activities within the Fall River Watershed such as pile burning and/or prescribed burning in the Klak, Katalo, Fall, Pit, Nut, and Charlie Brown project areas should not have an impact to three-toed woodpeckers, since they generally avoid logged areas for foraging and roosting. The tree harvest activities within these project areas have already been completed, and therefore are part of the existing three-toed woodpecker habitat within the Fall River watershed.

The EXF project is another ongoing vegetation management project on 2,500 acres in the watershed, but commercial and non-commercial timber cutting is not complete. Commercial and non-commercial thinning would likely impact three-toed woodpecker habitat to unsuitable conditions due to overstory removal.

From a cumulative standpoint, the Junction EA would affect 16% of potential suitable three-toed woodpecker habitat in the Fall River watershed under Alternative 2 (4,651 acres/ 29,596 acres) and 14% under Alternative 3 (4,172 acres/29,596 acres).

Within the Fall River watershed the current structural stages 5-7 (mid, late, and old structure seral stages) in the lodgepole pine PAG are at 39% (16,569 acres) compared to 15-35% of HRV. Alternative 2 would convert 1,317 acres and Alternative 3 would convert 1,305 acres of structural stages 5-7 to structural stage 1 (stand initiation). These reductions would move the mid to old structure stands within the Fall River watershed to within the upper end of HRV levels. There would be no shift or conversion in acres of LOS (structural stages 6 and 7) within the watershed for the ponderosa pine and mixed conifer PAGS. When looking at snag levels in the watershed (Table 39) the existing snags in the 0-6 and 6-12 categories are above HRV levels, while the down wood levels (Table 41) are also above HRV levels in the 0-4, 8-10, and 10-16 categories. Therefore the proposed treatments would move more towards HRV vegetation levels.

The ongoing projects, in combination with the proposed Junction EA are expected to result in small negative cumulative effects to individual three-toed woodpeckers or habitat in the Fall River watershed due to treatment activities.

There are no foreseeable actions within the Fall River watershed that have potential to reduce suitable habitat for three-toed woodpecker.

Forest Plan Consistency

The Forest Plan standards and guidelines have been reviewed for the three-toed woodpecker and either action alternative for the Junction Project would be consistent with the Forest Plan. The direction for providing 2.25 snags per acre of mixed conifer would be met within the 275 acres of mixed conifer. Additionally, as per the Eastside Screens direction, all sale activities will maintain snags and green trees >21"dbh.

The direction for providing 1.8 snags per acre of lodgepole pine would be met in the no harvest areas, no treatment areas, leave areas, OGMA corridors, the northern portion of the Pistol Butte OGMA (pure lodgepole pine), and the block of woodpecker habitat left untreated. While there will be snags removed within lodgepole pine stands, the Eastside Screens direction is to maintain snags and green trees ≥21"dbh. On 4,432 total acres of overstory tree removal in the lodgepole pine PAG, 100-300 residual trees/acre would be available as GTR's, averaging up to 4" dbh, exceeding the 27-115 required trees. The amount of trees for GTR's between 8" and 18" dbh would be 13.5 trees per acre under Alternative 2 and 12.8 trees per acre under Alternative 3. Overall, post-treatment snag densities would remain the same on 6,940 acres in areas having no overstory treatments; as stand densities increase over time, additional snags would occur on these acres.

Three-toed Woodpecker – Determination

Because this project impacts 1% of suitable habitat across the Forest, the overall direct, indirect and cumulative effects will result in a small negative trend of habitat (increase in disturbance). The loss of habitat (increase in disturbance) will be insignificant at the scale of the Forest. The Junction Project is consistent with the Forest Plan, and thus continued viability of three-toed woodpecker is expected on the Deschutes National Forest.

Black-backed Woodpecker - Key Issue

Information on habitat needs is contained in the Wildlife Report and is summarized from the Species Assessment for black-backed woodpecker for the Deschutes National Forest (USDA Forest Service, 2012)._The black-backed woodpecker was chosen as a terrestrial MIS on the Deschutes National Forest to represent other species found in the mature and old-growth lodgepole pine forest type.

There are approximately 446,003 acres of potential black-backed woodpecker nesting habitat on the Forest. Currently, 42% of potential nesting habitat does not contain any snag habitat ≥10" dbh making it unlikely to be suitable nesting habitat. The remaining 58% of the habitat with snags ≥10"dbh provides varying levels of habitat for individuals. Approximately 3% of the nesting habitat provides for the majority of individuals as this habitat contains snags >10"dbh at densities which are preferred by this species for nesting according to the literature.

Snag Habitat in the Fall River Watershed

Table 84 shows there are approximately 36,852 acres of potential black-backed woodpecker nesting habitat in the Fall River watershed. Approximately 36% of the landscape does not contain snags of

≥10" dbh. The remaining 64% of the landscape contains snags ≥10"dbh, providing varying levels of habitat for individuals. Only <1% of the nesting habitat provides for the majority of individuals as this habitat contains snags ≥10"dbh at densities which are preferred by this species for nesting according to the literature.

Table 84: Existing Snag Distribution in the Fall River Watershed by Tolerance Levels for black-backed woodpeckers for snags ≥10"dbh.

Tolerance Level	Snags/Acre	Total Watershed Potential Nesting Habitat Acres	% of Habitat
0	0	13,098	36%
0-30%	0-2.5	9,049	25%
30-50%	2.5-13.6	12,699	34%
50-80%	13.6-29.2	1,673	5%
80%+	29.2+	332	<1%
Total		36,852	**100%**
Based on DecAID Version 2.1: Table EMC_S/L.sp-22			

Table 85 displays the existing snag density ≥10" dbh in comparison to HRV levels within the Fall River watershed in the Eastside Mixed Conifer habitat type. The existing condition (19%) for the percentage of the landscape with no snags is within historic levels (18-25%). The existing conditions for the 0-6 and the 6-12 snags per acre categories are above HRV, while the 12-24, 24-36, and 36+ snags per acre categories are below HRV. These conditions are likely due to a combination of factors, such as past timber harvest activities, including salvage of snags, and mountain pine beetle epidemic. Additionally, increased stand densities often lead to higher mortality in the smaller sized snags due to competition for resources.

Table 85: HRV analysis of the Fall River watershed with ≥10"dbh snags in the Eastside Mixed Conifer habitat type.

Habitat Type	% of Landscape for Snags ≥10"dbh Snags/Acre						
	Snag Density	**0**	**0-6**	**6-12**	**12-24**	**24-36**	**36+**
EMC	**HRV**	18-25	28-31	15-16	16-22	6-10	5-7
	Existing	19%	34%	33%	8%	4%	2%
Information from DecAID 2.1 tables (unharvested plots for snags ≥10" (24.5cm) dbh) EMC_ECB_O.Inv-14., EMC_ECB_S.Inv-14, EMC_ECB_L.Inv-14, and modified with HRV information from Viable							

Down Wood Habitat in the Fall River Watershed

Down wood distribution was also analyzed on the 36,852 acres of potential black-backed woodpecker nesting habitat in the Fall River watershed. Table 86 shows that 7% of potential nesting habitat does not contain down wood habitat ≥5"diameter, making it unlikely to be suitable nesting habitat, while the remaining 93% of the habitat with down wood ≥5"diameter provides varying levels of habitat for individuals.

Table 86: Down Wood Distribution in the Fall River Watershed by Tolerance Levels for black-backed woodpeckers for down wood >5"diameter.

Down wood size: ≥ 5 inches diameter			
Tolerance Intervals*	**Down Wood/Acre**	**Acres**	**% of Habitat**
0	0	2,467	7%
0-30%	0-4.7	28,013	76%
30-50%	4.7-13	6,099	17%
50-80%	13-25.1	273	<1%
80%+	25.1+	0	0%
	Totals	**36,852**	**100%**
Based on DecAID Version 2.1: Table EMC_S/L.sp-22			

Table 87 shows the existing percentages of down wood ≥5"diameter in comparison to HRV in the Fall River watershed in the Eastside Mixed Conifer habitat type. As shown, the existing condition (2%) for the percentage of the landscape with no down wood is well less than documented for historic levels (22-30%). With the exception of the 10-16 and 16+ categories, the existing conditions for the remaining down wood percent cover categories are above HRV, indicating there is more existing down wood than there was historically. This is likely due to a combination of factors. Fire suppression, in addition to insect and disease events, has resulted in high mortality in the smaller size class trees. These smaller sized trees have high fall down rates, thus end up as down wood material.

Table 87: HRV analysis in the Fall River Watershed with down wood >5"diameter in the Eastside Mixed Conifer habitat type.

Habitat Type	**% of Landscape with Down Wood >5"diameter Down Wood Percent Cover**						
	Down Wood % Cover	**0**	**0-4**	**4-8**	**8-10**	**10-16**	**16+**
EMC	**HRV**	22-30	53-54	13-19	2-3	1-3	0
	Existing	2%	63%	23%	9%	3%	0%

Snag Habitat in the Junction Planning Area

Table 88 shows there are approximately 6,798 acres of potential black-backed woodpecker nesting habitat in the Junction Planning Area. Approximately 48% of the landscape does not contain snags of ≥10" dbh. The remaining 52% of the landscape contains snags ≥10"dbh, providing varying levels of habitat for individuals.

Table 88: Existing Snag Distribution in the Junction Planning Area by Tolerance Levels for black-backed woodpeckers for snags >10"dbh.

Tolerance Level	**Snags/Acre**	**Total Watershed Potential Nesting Habitat Acres**	**% of Habitat**
0	0	3230	48%
0-30%	0-2.5	1551	23%
30-50%	2.5-13.6	1966	29%
50-80%	13.6-29.2	49	1%
80%+	29.2+	2	0%
Total		**6798**	**100%**
Based on DecAID Version 2.1: Table EMC_S/L.sp-22			

Down Wood Habitat in the Junction Planning Area

Down wood distribution was also analyzed on the 6,798 acres of potential black-backed woodpecker nesting habitat in the Junction Planning area. Table 89 shows that 5% of potential nesting habitat does not contain down wood habitat ≥5”diameter, making it unlikely to be suitable nesting habitat, while the remaining 95% of the habitat with down wood ≥5”diameter provides varying levels of habitat for individuals.

Table 89: Down Wood Distribution in the Junction Planning Area by Tolerance Levels for black-backed woodpeckers for down wood ≥5”diameter.

Down wood size: ≥ 5 inches diameter			
Tolerance Intervals*	**Down Wood/Acre**	**Acres**	**% of Habitat**
0	0	344	5%
0-30%	0-4.7	5797	85%
30-50%	4.7-13	631	9%
50-80%	13-25.1	26	<1%
80%+	25.1+	0	0%
	Totals	**6798**	**100%**
Based on DecAID Version 2.1: Table EMC_S/L.sp-22			

Black-backed woodpecker – Direct and Indirect Effects – Alternative 1

Similar to three-toed woodpecker, the selection of this alternative would have no immediate effect on black-backed woodpeckers or their habitat. It is assumed that suitable habitat would continue its current trajectory and in certain areas expand due to the expected increase in snags due to insects and disease. However, this alternative has the greatest level of risk from a disturbance event. In an event of a large fire, habitat would be altered or lost for many decades and would not contribute to suitable habitat conditions over the long-term. Although black-backed woodpeckers will utilize and selectively seek fire-killed lodgepole and mixed conifer stands to feed on insects, this would only provide a short-term foraging boom lasting for 5-7 years. Thereafter, the snag falling rates would intensify, particularly in lodgepole pine forests.

Black-backed woodpecker – Direct and Indirect Effects – Alternatives 2 and 3

Habitat modeling described above was overlaid with proposed treatments for Alternatives 2 and 3. Table 90 shows the total acres of potential black-backed woodpecker habitat that would be affected by the proposed management activities from Alternatives 2 and 3.

Table 90: Acres of potential black-backed woodpecker habitat affected by alternative.

Black-backed Woodpecker	Alt. 2	Alt. 3
Total acres affected	5444*	4904*
Overstory removal	2061	1901
Seed tree/Shelterwood	1334	1325
Commercial thinning	1560	1189
Total overstory removal	4955	4415
No tree harvest	489	489
Prescribed burning	1935	1617
Mowing	2773	2427
Understory treatment	5444	4904

*These are the total acres of habitat affected based on habitat modeling, while the following rows show the acres affected by activity type. These rows will not add up equally to the total acres affected since certain activities would only occur in certain units or because there are overlapping activities in the same units.

Conversion to and maintenance of lodgepole pine and lodgepole pine dominated mixed conifer stands to a young, vigorous condition may eliminate or severely restrict incidence of wood-boring insects and heart rot, leading to declines in populations of black-backed woodpeckers (Goggans et al. 1999). Treating these stands by logging, immediately converts them to a vigorous condition where incidence of death and decay is severely restricted, thus potential nesting and foraging substrate is drastically reduced. For black-backed woodpeckers, the Goggans study found this species is more tolerant in using harvested stands for nesting with half of the nests located within stands disturbed by harvesting with a mean canopy closure of 11%. Black-backed woodpeckers avoid logged areas and younger stands for roosting and foraging. The telemetry data confirmed black-backed woodpeckers avoid harvested stands for roosting and foraging, causing home range size to increase as the amount of passively managed areas and mature forest decrease.

Alternative 2 would affect 5,444 total acres of the 6,798 potential black-backed woodpecker nesting habitat in the Junction project area, while Alternative 3 would affect 4,904 total acres. Some snags within green stands are proposed for removal under either alternative, but there are no continuous stands proposed for salvage. Since thinning activities lessen the risk of future large-scale bark beetle outbreak, it also reduces levels of future tree mortality and suitable habitat. However, endemic levels of insects and disease would remain and may provide marginal future nesting habitat within the short-term. The results would be distributed in individual trees or clumpy patches. Since black-backed woodpeckers avoid harvested areas for foraging or roosting, this habitat use would be avoided on the 5,444 total acres and 4,904 acres proposed under Alternatives 2 and 3.

(Goggans et al. 1999) study estimated home ranges under conditions of abundant food supply and the amount of mature or overmature stands. As the mountain pine beetle epidemic runs its course, and prey abundance declines, it is likely that the amount of area required to support a pair of black-backed woodpecker will increase. Goggans et al. 1989 believe the most effective method of insuring habitat for black-backed woodpeckers is to exempt areas from commercial or salvage timber management and place these areas under a special management strategy, which retains the characteristics of mature or overmature lodgepole pine habitat as long as possible, without treatment. Management areas for each pair of black-backed woodpecker should be 956 acres of lodgepole pine or mixed conifer forest in mature or overmature condition and at an elevation of 4,500 feet or higher. However, black-backed woodpeckers should not be restricted to elevations greater than 4,500 feet because this species may use lower elevations as well.

Alternative 2 would provide an 870-acre continuous patch of untreated woodpecker habitat in the northwest corner of the project area. This management area may potentially provide a black-backed woodpecker home range for approximately 1 – 4 pairs, based on Goggans literature (home ranges varied from 178, 303, and 810 acres). Alternative 3 would include a 640-acre continuous area in the southwest corner of the project area, just north of Fall River. The management area would potentially provide a black-backed woodpecker home range for approximately 1 to 3 pairs.

Another design element that would maintain suitable habitat, including high snag densities would be within the OGMA corridors that are comprised of pure lodgepole pine PAG. Based on field reconnaissance, these 400' wide corridors contain a large density of snags, down wood, and a diversity of live green tree age classes. The intent of this design is to let natural succession occur, providing levels of insects and disease, thus potential nesting and foraging habitat. The upper half of the Pistol Butte OGMA is pure lodgepole pine and the lower half is pure ponderosa pine. Alternative 2 proposes to treat and then reintroduce prescribed burning within the lower half of the OGMA in ponderosa pine, but no treatment would occur in the upper half in lodgepole pine. Alternative 3 does not propose treatment within any portion of the OGMA. Thus, high quality habitat and high snag densities would remain in the upper half of the OGMA under either alternative. Under Alternative 2, prescribed burning within the pure ponderosa pine may provide potential foraging and/or nesting habitat since black-backed woodpeckers are known to use ponderosa pine habitats.

Both alternatives would also maintain black-backed woodpecker habitat within the 10% retention areas, no treatment areas and leave areas. There would be no management activities within these areas, therefore high densities of lodgepole pine snags are expected to provide potential nesting and foraging habitat.

Alternatives 2 and 3 propose a combination of understory treatments such as non-commercial thinning, mowing, piling of slash, whip falling, biomass removal, pile burning and reintroduction of prescribed fire in ponderosa pine dominated PAGs. Marginal suitable habitat may remain within the non-commercial thinning units since these actions may reduce canopy cover and lessen vertical vegetation diversity. While the remaining activities may reduce the down wood densities, it should not further impact black-backed woodpeckers since the overstory would already be removed and this species usually avoids these areas for foraging and roosting. Snags are not proposed for removal from these activities, but some incidental loss may occur. Snag loss may also occur due to OSHA safety reasons during the construction of temporary roads, and placement of landings where the logs are stacked and processed. Additionally, some lodgepole pine mortality is expected from prescribed burning creeping into lodgepole pine stands when prescribed fire is applied in adjacent ponderosa pine dominated areas, although these trees may provide suitable foraging and nesting habitat.

Overall, Alternative 3 would have the least impacts to black-backed woodpecker habitat than Alternative 2 due to less acres impacted from overstory tree removal and because two contiguous patches of pure lodgepole pine (1,520 total acres) would be provided versus one 870-acre area.

Black-backed Woodpecker – Cumulative Effects

The list of past actions in Table 13 has been reviewed. The past timber harvest, including salvage have likely been the most influential activities that have likely contributed to the lack of high-density patches of snags >10" dbh (i.e. 12-24, 24-36, and 36+) for black-backed woodpecker. From the 1990's to present, the transition to conserving snags has occurred, reducing the rate of loss of habitat. Since the early 1900s, fire suppression has likely been the second most influential activity that has limited the creation of snags, creating the existing conditions of today.

Ongoing activities within the Fall River Watershed such as pile burning and/or prescribed burning in the Klak, Katalo, Fall, Pit, Nut, and Charlie Brown project areas should not have an impact to black-backed woodpeckers, since they generally avoid logged areas for foraging and roosting. The tree harvest activities within these project areas have already been completed, and therefore are part of the existing three-toed woodpecker habitat within the Fall River watershed.

The EXF project is another ongoing vegetation management project on 2,500 acres in the watershed, but commercial and non-commercial timber cutting is not complete. Commercial and non-commercial thinning would likely impact black-backed woodpecker habitat to unsuitable conditions.

From a cumulative standpoint, the Junction EA would affect 15% of potential suitable three-toed woodpecker habitat in the Fall River watershed under Alternative 2 (5,444 acres/36,852 acres) and 13% under Alternative 3 (4,904 acres/36,852 acres).

When looking at just the vegetation standpoint within the Fall River watershed (not modeled habitat), the data shows that current structural stages 5-7 (mid, late, and old structure seral stages) in the lodgepole pine PAG are at 39% (16,569 acres) compared to 15-35% of HRV. Alternative 2 would convert 1,317 acres and Alternative 3 would convert 1,305 acres of structural stages 5-7 to structural stage 1 (stand initiation). These reductions would reduce the mid to old structure stands within the Fall

River watershed to within the upper end of HRV levels. There would be no shift or conversion in acres of LOS (structural stages 6 and 7) within the watershed for the ponderosa pine and mixed conifer PAGS. When looking at just snag levels in the watershed the existing snags in the 0-6 and 6-12 categories are above HRV levels, while the down wood levels are also above HRV levels in the 0-4, 8-10, and 10-16 categories. Therefore the proposed treatments would move more towards HRV vegetation levels.

The ongoing projects, in combination with the proposed Junction EA are expected to result in small negative cumulative effects to individual black-backed woodpeckers or habitat in the Fall River watershed due to treatment activities.

There are no foreseeable actions within the Fall River watershed that have potential to reduce suitable habitat for black-backed woodpecker.

Forest Plan Consistency

The Forest Plan standards and guidelines have been reviewed for the black-backed woodpecker and either alternative for the Junction Project would be consistent with the Forest Plan. The direction for providing 2.25 snags per acre of mixed conifer would be met within the 275 acres of mixed conifer and 2.25 snags per acre of ponderosa pine would be met since no snags of any dbh size would be removed. Additionally, as per the Eastside Screens direction, all sale activities will maintain snags and green trees >21”dbh.

The direction for providing 1.8 snags per acre of lodgepole pine would be met in the no harvest areas, no treatment areas, leave areas, OGMA corridors, the northern portion of the Pistol Butte OGMA (pure lodgepole pine), and the untreated blocks of woodpecker habitat. While there will be snags removed within lodgepole pine stands, the Eastside Screens direction is to maintain snags and green trees >21”dbh. On 4,432 total acres of overstory tree removal in the lodgepole pine PAG, 100-300 residual trees/acre would be available as GTR’s, averaging up to 4” dbh, exceeding the 27-115 required trees. The amount of trees for GTR’s between 8” and 18” dbh would be 13.5 trees per acre under Alternative 2 and 12.8 trees per acre under Alternative 3. Overall, post-treatment snag densities would remain the same on 6,940 acres in areas having no overstory treatments; as stand densities increase over time, additional snags would occur on these acres.

Black-backed Woodpecker – Determination

Because this project impacts 1% of suitable habitat across the Forest, the overall direct, indirect and cumulative effects will result in a small negative trend of habitat (increase in disturbance). The loss of habitat (increase in disturbance) will be insignificant at the scale of the Forest. The Junction Project is consistent with the Forest Plan, and thus continued viability of black-backed woodpecker is expected on the Deschutes National Forest.

Northern flicker

Information on habitat needs is contained in the wildlife report and is summarized from the Species Assessment for northern flicker for the Deschutes National Forest (USDA Forest Service, 2012). The northern flicker is included with the woodpecker group that was chosen as a MIS for the DNF. This group was chosen to represent all wildlife species that use cavities for nesting and denning.

Based on the Wildhab model, there are approximately 219,576 acres of potential northern flicker nesting habitat on the Forest. Habitat is fairly evenly distributed across the watersheds on forest ranging from 0-13%. Four sub-watersheds on forest contain 40% habitat or greater (Lower Trout Creek, Pine Lake, Sixteen Butte, and Town of LaPine – Little Deschutes River). An additional eight sub-watersheds (Town of Gilchrist – Little Deschutes River, Lower Tumalo Creek, Middle Squaw

Creek, Upper Indian Ford, Dorrance Meadow – Little Deschutes River, Sugar Pine Butte – Little Deschutes River, Antelope Butte, and Deschutes Braid – Deschutes River) contain between 30-40% habitat.

Existing Conditions

Based on the Wildhab model, there are approximately 10,048 acres of potential northern flicker nesting habitat within the Fall River watershed, but 95% of these acres are without nesting habitat containing larger ponderosa pine snags and the lack of lodgepole pine patches with snags in higher densities (Table 91 and Table 92). There are approximately 2,484 acres of potential northern flicker nesting habitat within the Junction Planning area. There is no juniper in the planning area, and many of the ponderosa pine stands are over stocked, not providing the preferred open stands for this species. Northern flickers were often observed in the planning area during field reconnaissance.

Table 91: HRV levels for the Fall River watershed with >10"dbh snags in the lodgepole pine habitat type.

Habitat Type	% of Landscape for Snags >10"dbh Snags/Acre						
	Snag Density	0	0 - 6	6 - 12	12 - 24	24 - 36	36+
LPP	HRV	23-32	12-17	12-20	11-15	5-11	5-9
	Existing	44%	34%	18%	3%	1%	0%

Table 92: HRV levels for the Fall River watershed with >20"dbh snags in the ponderosa pine habitat type.

Habitat Type	% of Landscape for Snags >20"dbh Snags/Acre						
	Snag Density	0	0-4	4-8	8-12	12-16	16+
Ponderosa pine	HRV	66-75	23-30	2-3	0-1	0-1	0
	Existing	67%	33%	0%	0%	0%	0%

Northern flicker – Direct and Indirect Effects – Alternative 1

While ponderosa pine snag levels may increase in areas not treated, the majority of tree sizes in these areas are still below the large size utilized by this species, and it may take considerable time in the more dense stands. Ponderosa pine stands, especially those that have not been entered in the recent past, would continue to be overly dense and affect healthy tree vigor. Over time, increased canopy layering and tree density would subject these stands to increased risk of loss due to fire, insect, and disease. An event of a large magnitude would alter habitat and would not contribute to suitable nesting habitat conditions over the long-term. Additionally, overstocked stands reduce the amount of foraging habitat, since flickers often forage on the ground.

Northern flicker – Direct and Indirect Effects – Alternatives 2 and 3

Habitat modeling described above was overlaid with proposed treatments for Alternatives 2 and 3. Table 93 shows the total acres of potential black-backed woodpecker habitat that would be affected by the proposed management activities from Alternatives 2 and 3.

Table 93: Acres of potential northern habitat affected by alternative.

Northern Flicker	Alt. 2	Alt. 3
Total acres affected	1944*	1854*
Overstory removal	287	287
Seed tree/Shelterwood	126	126
Commercial thinning	818	728
Total overstory removal	1231	1141
No tree harvest	713	713
Prescribed burning	1474	1393
Mowing	1718	1633
Understory treatment	1944	1854

*These are the total acres of habitat affected based on habitat modeling, while the following rows show the acres affected by activity type. These rows will not add up equally to the total acres affected since certain activities would only occur in certain units or because there are overlapping activities in the same units.

Under Alternative 2, the residual basal area in commercial thinning units in the ponderosa pine PAG would be 70 ft2, and 50 ft2 under Alternative 3. This tree reduction would provide the more open spaces as preferred by northern flickers. Under Alternative 2, most of the commercial thinning would occur in two units: Unit #206 (313 acres) and Unit # 204 (178 acres). Unit #206 is located in the northwest corner of the project area, while Unit # 204 is in the Wake Butte Special Interest area in the southwest corner of the project area. Both of these units would be followed up with prescribed burning. As part of project design, one of the objectives in these areas is to increase the large tree component or move toward LOS.

Under Alternative 3, commercial thinning would also occur in Unit #206, but not Unit #204, while the remaining treatment acres are scattered in smaller units. Commercial thinning of live trees would likely affect future snag recruitment on those acres since trees would have succumbed to competition from stress-related mortality (i.e. competition for scarce site resources). However, the increased tree growth of residual trees as a result of thinning would facilitate/accelerate attainment of large diameter trees, which would be available as larger diameter snags and quality northern flicker habitat in the long-term. Modeling shows that there are only 3 very small patches of potential habitat within the mixed conifer PAG. Since treatments in the mixed conifer PAG would also promote the large tree component, the effects as described to ponderosa pine would be similar.

The overstory removal and shelterwood treatments are expected to affect flicker habitat due to the removal of trees. While lodgepole pine trees are used as habitat, these treatments would retain any ponderosa pine trees present, which are a preferred tree species. These trees in turn would be allowed to grow at an accelerated pace, providing future quality nest trees.

While there may be some loss of snags due to prescribed burning, other snags may be created and overall it would be beneficial to reintroduce fire into these stands and for pruning some of the limbs, raising the crown base height. Prescribed burning and mowing would also likely improve foraging habitat since the brush component would be reduced.

The following project design elements that were developed would minimize some of the temporary impacts to northern flicker habitat: the no tree harvest areas, 10% retention areas, no treatment areas, and leave areas would provide a diversity of habitat and would maintain the current snags levels. Alternatives 2 and 3 would retain all ponderosa pine snags (unless for safety reasons), and would retain all live ponderosa pine trees greater than or equal to 21” dbh. Alternative 3 would retain all ponderosa pine trees less than 21” dbh if they meet old tree characteristics.

Overall, Alternative 2 would be the most beneficial to northern flicker due to more acres treated for promoting LOS ponderosa pine thus more desirable habitat for this species in the long-term. This includes treating the lower half of the Pistol Butte OGMA, which is dense ponderosa pine, while Alternative 3 does not treat the OGMA.

Northern flicker – Cumulative Effects

The list of past actions in Appendix A has been reviewed. The past timber harvest activities have likely been the most influential activities that have contributed to the lack of ponderosa pine snags >20" dbh and the lack of lodgepole pine patches with snags in higher densities. From the 1990s to present, the transition to conserving and promoting LOS and snags has occurred, reducing the rate of loss of habitat. Since the early 1900s, fire suppression has likely been the second most influential activity that has limited the more open stands preferred by flickers.

Ongoing activities within the Fall River Watershed may have short-term impacts to northern flickers due to disturbance. These activities include pile burning and/or prescribed burning in the Klak, Katalo, Fall, Pit, Nut, and Charlie Brown project areas; the tree harvest activities within these project areas have already been completed. Although these projects may have had or are having short-term disturbance impacts, there should be a beneficial impact in the long-term due to promoting and contributing to the development of large trees, which become quality snags and provide more open conditions for foraging habitat.

The EXF project is another ongoing vegetation management project in the watershed and commercial and non-commercial timber cutting and removal with hand and machine piling of slash prior to burning the piles and prescribed burning on 2,500 acres is proposed. Under the EXF project the effects of removing 7 acres of the ponderosa pine PAG classified as LOS within the watershed were disclosed in the EXF analysis. This would be a small reduction of flicker habitat and potential disturbance in the watershed.

From a cumulative standpoint, the Junction EA would treat 19% of northern flicker habitat in the Fall River watershed under Alternative 2 (1,944 acres/ acres) and 18% under Alternative 3 (1,854 acres/10,047 acres). This project would cumulatively enhance habitat within the watershed by treating and promoting more acres towards LOS. Currently, structural stage 6 for ponderosa pine is at the lower end of HRV, and below HRV for structural stage 7. And the ponderosa pine structural stages 2-5 are all well above HRV. While either alternative would reduce LOS lodgepole pine, structural stages 5-7 would still remain above HRV levels, thus continue to provide habitat in these stands. There would be no change to the mixed conifer in any of the structural changes.

The ongoing projects, in combination with the proposed Junction EA are expected to result in small negative cumulative effects to individual northern flickers or habitat in the Fall River watershed due to potential human disturbance from treatment activities for the life of the project.

Forest Plan Consistency

The Forest Plan standards and guidelines have been reviewed for the northern flicker. Either alternative for the Junction Project would be consistent with the Forest Plan since no ponderosa pine snags of any dbh would be removed (except for safety reasons). This would well be above the 2.25 snags per acre for ponderosa pine >15"dbh. As per the Eastside Screens direction, all sale activities will maintain snags and green trees >21"dbh.

On 4,432 acres of overstory tree removal in the lodgepole pine PAG, 100-300 residual trees/acre would be available as GTR's, averaging up to 4" dbh, exceeding the 27-115 required trees. The amount of trees for GTR's between 8" and 18" dbh would be 13.5 trees per acre. Post-treatment snag densities would remain the same on 6,940 acres in areas having no overstory treatments; as stand densities increase over time, additional snags would occur on these acres.

Northern Flicker – Determination

Because this project impacts less than 1% of suitable habitat across the Forest, the overall direct, indirect and cumulative effects will result in a small negative trend of habitat (increase in disturbance). The loss of habitat (increase in disturbance) will be insignificant at the scale of the Forest. The Junction Project is consistent with the Forest Plan, and thus continued viability of northern flicker is expected on the Deschutes National Forest.

American Marten

Information on habitat needs is contained in the Wildlife Report and is summarized from the Species Assessment for American marten for the Deschutes National Forest (USDA Forest Service, 2012). American marten was chosen as a terrestrial MIS in the Forest Plan to maintain landscape ecology needs, preserve aesthetic or social old growth values, and provide old-growth habitats for wildlife. The Forest Plan states the target population level for marten is 450-1285 pairs (LRMP, Table 4-13, pp. 4-19).

There are approximately 433,973 acres of potential marten denning habitat on the Deschutes National Forest (the acres of modeled denning habitat used only green tree data). Habitat connectivity is fairly well connected, particularly on the Crescent and Bend/Ft. Rock Ranger Districts. The Sisters Ranger District on the northern end of the Forest has been heavily impacted by beetle outbreaks in the 1980s followed by wildfires between 2000 and 2009. The B&B and Eyerly fires resulted in reduced marten habitat, including connectivity to the National Forest lands to the south as well as northward onto the Warm Springs Tribal Lands. When viewing the Forest-wide distribution of snags ≥20”dbh on the 433,973 acres of modeled marten denning habitat, 22% of this acreage does not have the presence of snags and therefore, may be less likely used for denning purposes. Approximately 7% of denning habitat is capable of providing lower quality denning habitat. Approximately 70% of denning habitat would provide moderate to high quality habitat, while only 1% of denning habitat would provide very high quality marten habitat.

Fall River Watershed Existing Conditions

Snag Component

Table 94 shows there are approximately 30,424 acres of potential marten denning habitat in the Fall River watershed with distribution of existing snags in lodgepole pine, eastside mixed conifer, and montane mixed conifer. When viewing the distribution of snags on the 30,424 acres of modeled marten denning habitat, 22% of this acreage does not have the presence of snags and therefore, may be less likely used for denning purposes. Approximately 1% of denning habitat is capable of providing lower quality denning habitat. Approximately 77% of denning habitat would provide moderate to high quality habitat.

Table 94: Existing snag distribution >20”dbh in marten denning habitat in the Fall River Watershed.

Tolerance Interval	Snags/Acre	Acres of Denning Habitat in the Fall River Watershed	% of Habitat
0	0	6,640	22%
0-30%	0-3.7	397	1%
30-50%	3.7-4	2,649	9%
50-80%	4-4.5	20,738	68%
80%+	4.5+	0	0%

Tolerance Interval	Snags/Acre	Acres of Denning Habitat in the Fall River Watershed	% of Habitat
Total		**30,424**	**100%**
Based on DecAID Version 2.1: Tables EMC_S/L.sp-22, MMC_S/L.sp-22 and LPP_S.sp-22.			

Table 95 shows the existing distribution of snags within the EMC and LPP in comparison to HRV. There are only 4,737 acres of montane mixed conifer within the Fall River watershed. Since the Junction Planning area does not contain any montane mixed conifer, this vegetation type was not analyzed.

As shown, 56% of the landscape in the EMC does not have the presence of snags and therefore, may be less likely used for denning purposes, while 43% of the landscape has snags above HRV and the remaining categories are below HRV levels. For the LPP, 87% also does not have the presence of snags and above HRV and the remaining categories are all below HRV.

Table 95: Existing snags >20"dbh in the Fall River watershed when compared to HRV.

Fall River Watershed	% of Landscape for snags ≥20" dbh snag per acre						
Habitat Type	**Snag Density**	**0**	**0-4**	**4-8**	**8-12**	**12- 16**	**16+**
EMC (32,480 acres)	HRV	32-44	29-35	14-22	7-10	2-3	1-2
	Existing	56%	43%	0%	0%	0%	0%
LPP (30,522 acres)	HRV	72-83	15-20	1-7	0-2	0	0
	Existing	87%	13%	0%	0%	0%	0%
				30-50% tolerance interval	50-80% tolerance interval		80%+ tolerance interval
Information from DecAID 2.0 tables (unharvested plots for snags ≥20" dbh) EMC_ECB_O.Inv-15., EMC_ECB_S.Inv-15, EMC_ECB_L.Inv-15, LP_O.Inv-15, LP_S.Inv-15, and modified with HRV information from Viable							

Down Wood Component

Table 96 shows the distribution of log densities >5"diameter in the Fall River watershed compared to HRV. The logs greater than 5" diameter within the EMC are primarily above HRV. For LPP, the 0-4 range is above HRV, but below HRV within the 4-16 range.

Table 96: Percent of down wood cover with logs >5" diameter compared to HRV in the Fall River Watershed.

Fall River watershed	% of Landscape for down wood ≥5" diameter in % down wood cover						
Habitat Type	**% Cover**	**0**	**0-4**	**4-8**	**8-10**	**10-16**	**>16**
EMC	HRV	22-30	53-54	13-19	2-3	1-3	0
	Existing	2%	63%	23%	9%	3%	0%
LPP	HRV	5-16	46-59	17-23	5-7	4-8	0
	Existing	6%	80%	11%	2%	1%	0%

Information from DecAID tables (unharvested plots for down wood ≥5" dbh) EMC_ECB_O.Inv-16., EMC_ECB_S.Inv-16, EMC_ECB_L.Inv-16, LP_O.Inv-16, LP_S.Inv-16, and weighted by structure and HRV information from Viable

Table 97 shows the distribution of log densities >20” diameter in the Fall River watershed compared to HRV. The logs ≥20”diameter in the EMC are within HRV on 0-4 percent of the landscape, below on 4-10 percent, but above on greater than 10 percent of the landscape. For the LPP, log densities are above HRV on 0-4 percent of the landscape, below in the 4-10 percent range, and within in the greater than 10 percent range.

Table 97: Percent of down wood cover with logs >20” diameter compared to HRV in the Fall River Watershed.

Fall River watershed	% of Landscape for down wood ≥20" diameter % down wood cover				
Habitat Type	**% Cover**	**0**	**0-4**	**4-10**	**>10**
EMC	HRV	61-72	27-36	1-3	0
	Existing	70%	28%	0%	2%
LPP	HRV	63-84	10-16	1-2	0
	Existing	76%	24%	0%	0%
Information from DecAID tables (unharvested plots for down wood ≥20" dbh) EMC_ECB_O.Inv-17, EMC_ECB_S.Inv-17, EMC_ECB_L.Inv-17, LP_O.Inv-17, LP_S.Inv-17, and weighted by structure and HRV information from Viable.					

Junction Project Area Existing Conditions

Snag Component

Table 98 shows there are approximately 6,587 acres of potential suitable marten denning habitat within the Junction planning area. As shown, 12% of the planning area provides habitat at the 30% tolerance level, while modeling shows that 88% of the planning area does not provide snags. The model is likely well underestimating based on the number of snags observed during field reconnaissance. Modeled denning habitat is distributed almost entirely across the Junction planning area, given the planning area consists of 70% lodgepole pine. Based on the literature and field reconnaissance, the planning area is better suited for summer rest sites due to the lack of late-successional forest. District records indicate that martens have been incidentally observed in the planning area, but no denning has been documented. The highest quality marten habitat in the planning area occurs in the upper half of the Pistol Butte OGMA, and the Fall River riparian area.

Table 98: Existing potential marten denning habitat in the Junction Planning Area with snags distribution >20”dbh.

Tolerance Interval	Snags/Acre	Acres of Potential Denning habitat	% of Habitat
0	0	5,807	88%
0-30%	0-3.7	762	12%
30-50%	3.7-4	20	0%
50-80%	4-4.5	1	0%
80%+	4.5+	0	0%
Total		**6,587**	**100%**
Based on DecAID Version 2.1: Tables EMC_S/L.sp-22 and LPP_S.sp-22.			

Down Wood Component

Table 99 shows the distribution of down wood in the Junction planning area to determine occupancy for American marten across the landscape. As shown, 12% of the planning area provides habitat between the 0 – 50% % tolerance level. While modeling shows that 88% of the planning area does not provide logs. The model is likely well underestimating based on the number of logs observed during field reconnaissance.

Table 99: Percent of down wood cover with logs >5" diameter in potential marten denning habitat in the Junction Planning area.

Tolerance Interval	logs/Acre	Acres of Potential Denning habitat	% of Habitat
0	0	5,805	88%
0-50%	0-20	762	12%
50%+	20+	20	0%
Total		**6,587**	**100%**
Based on DecAID Version 2.1: Tables EMC_S/L.sp-22, MMC_S/L.sp-22, and LPP_S.sp-22.			
GNN Attributes down wood cover categories are 12, 25, 50, 75 or 100% this may under estimate as the study from which tolerance levels were developed only measured down wood greater than 5 inches.			

American marten – Direct and Indirect Effects – Alternative 1

This alternative would have no immediate direct effects on American marten habitat within mixed conifer and lodgepole pine stands. However, since martens tend to select forested stands that have a high canopy closure, this characteristic would also indicate a greater susceptibility to insect and disease outbreaks and competition related mortality. Over time, there is a greater potential for some of these forested areas to lose their desired denning and resting character from reduced canopy cover due to dead trees losing their needles. These stand conditions would thereafter be more susceptible to high intensity stand replacement fire, affecting marten habitat to a greater extent. Conversely, younger-aged stands that have resulted from past management such as regeneration harvest or those that were thinned have the future capability to develop into suitable denning and resting habitat.

American marten – Direct and Indirect Effects – Alternatives 2 and 3

Habitat modeling described above was overlaid with proposed treatments for Alternatives 2 and 3. Table 100 shows the total acres of potential marten denning habitat that would be affected by the proposed management activities from Alternatives 2 and 3 of the 6,587 existing habitat.

Table 100: Acres of American marten habitat affected by alternative.

American marten	Alt. 2	Alt. 3
Total acres affected	5069*	4763*
Overstory removal	2288	2105
Seed tree/Shelterwood	1756	1744
Commercial thinning	431	321
Total overstory removal	4475	4169
No tree harvest	594	594
Prescribed burning	724	679
Mowing	1601	1525
Understory treatment	5069	4763

*These are the total acres of habitat affected based on habitat modeling, while the following rows show the acres affected by activity type. These rows will not add up equally to the total acres affected since certain activities would only occur in certain units or because there are overlapping activities in the same units.

The selection and implementation of either action alternative would result in a long-term reduction of potential denning habitat due to a reduction in tree density and canopy closure. Alternatives 2 and 3 propose a combination of commercial thinning harvest, seed tree/shelterwood, overstory removal of lodgepole pine, non-commercial thinning and post-sale activities that would include grapple piling of slash, whip falling and biomass removal within stands currently defined as marten denning habitat. Burning of some slash piles is proposed under both action alternatives, but no broadcast prescribed burning would occur in marten habitat. It is assumed that following completion of timber harvest and associated post-sale work, canopy cover would probably be below the levels described as denning habitat for this species within the lodgepole pine PAG. Raphael and Jones (1997) study in lodgepole pine forests concluded that denning sites averaged 30 percent canopy cover. This level of canopy cover is not expected to be achieved post-harvest in lodgepole pine for approximately 2-3 decades.

Potential denning habitat within the mixed conifer PAG is expected to remain as suitable habitat since treatments would focus on removing the mid-story canopy, while the overstory canopy closure would be maintained. In the long-term, reduction of the mid-story tree competition would accelerate the growth within the mixed conifer stands and allow multiple canopies to become fuller, providing structure that would benefit marten.

Regardless of the Plant Association Group being affected, there would be a reduction in ground cover or down wood from the post-treatment activities, resulting in less physical structure near the ground that contributes to protection from raptor predation. Additionally, either alternative may degrade marten foraging habitat since these actions reduce the quantity of cover habitat for marten prey species, thus a corresponding decrease in prey densities. Bull and Blumton (1999) conducted a fuels reduction study in the Blue Mountains of Oregon on martens and their prey base within lodgepole pine and mixed conifer stands. With the prescriptions that were applied for harvest and retention of live trees, standing dead, and down wood removal, they concluded it resulted in a reduction in densities of red-backed voles and snowshoe hares. Although it increases chipmunk populations, chipmunks hibernate during winter and represent less than 3 percent of the marten's diet.

Alternative 2 proposes 18.6 miles of temporary roads while Alternative 3 proposes 14.3 miles of temporary roads in order to provide access to harvest units. Until these temporary roads are rehabilitated, they may potentially facilitate an increase in marten trapping in the project area. Post treatment, solitude or security for martens may increase since either alternative would close 0.57 miles and decommission 2.62 miles of roads. The post road density in the project area would be reduced down to 2.01 miles per square miles.

The project design elements that would maintain suitable marten denning habitat, including high log densities would be within the OGMA corridors that are comprised of pure lodgepole pine PAG. Based on field reconnaissance, these 400' wide corridors contain a large density of snags, down wood, and a diversity of live green tree age classes and canopy closures. The intent of this design is to allow natural succession to occur, thus providing denning and foraging habitat. There would be no management activities in these areas under either alternative. The upper half of the Pistol Butte OGMA is pure lodgepole pine (approximately 288 continuous acres) and the lower half is pure ponderosa pine. Quality suitable marten habitat would also be maintained in the northern half of the Pistol Butte OGMA since there are no proposed treatments in this area under either alternative.

Both alternatives would also maintain marten habitat within the no treatment areas and leave areas. There would be no management activities within these areas, therefore high densities of lodgepole pine are expected to provide potential marten habitat.

The best quality and continuous marten habitat would be provided in the large blocks of untreated lodgepole pine (woodpecker habitat). Alternative 2 proposes an 870-acre continuous block to be left untreated, while Alternative 3 proposes one 648-acre and one 870-acre block totaling 1,518 acres. Both areas are dominated by lodgepole pine and have varying structural stages, including high canopy closures. Either of these lodgepole pine areas would at least provide a home range for a female marten. Either management area is ideal for martens since both are adjacent to high quality mixed conifer stands that are outside the project boundary. Additionally, the 648-acre block proposed in the southwest corner of the project area would provide better quality habitat since it is only 1 mile north of Fall River.

Overall, Alternative 3 would have the least impacts to marten habitat than Alternative 2 due to fewer acres impacted from overstory tree removal, less temporary roads, and because two blocks of untreated woodpecker habitat area left in pure lodgepole pine (1,520 total acres).

American marten – Cumulative Effects

The list of past actions in Appendix A has been reviewed. The past timber harvest, including salvage have likely been the most influential activities that have likely contributed to the lack of high-density patches of snags ≥20" dbh and down wood ≥5" and ≥20" for martens. Regardless of these past treatments, habitat modeling shows that the Fall River watershed potentially provides 78% of marten habitat. From the 1990s to present, the transition to conserving snags and down wood has occurred, reducing the rate of loss of habitat. Since the early 1900s, fire suppression has likely played a role by prohibiting the larger trees, which eventually provide the large down wood.

Ongoing activities within the Fall River Watershed such as pile burning and/or prescribed burning in the Klak, Katalo, Fall, Pit, Nut, and Charlie Brown project areas may have an impact on marten foraging habitat if sufficient down wood was not left and piles designated for marten prey habitat is consumed. The tree harvest activities within these project areas have already been completed, and therefore are part of the existing marten habitat within the Fall River watershed.

The EXF project is another ongoing vegetation management project on 2,500 acres in the watershed, but commercial and non-commercial timber cutting is not complete. Commercial and non-commercial thinning would likely impact marten habitat to unsuitable conditions due to the reduction in canopy closure and down wood.

From a cumulative standpoint, the Junction EA would affect 16% of potential marten denning habitat in the Fall River watershed under Alternative 2 (5,069 acres/ 30,424 acres) and 15% under Alternative 3 (4,763 acres/30,424 acres).

When looking at just the vegetation standpoint within the Fall River watershed (not modeled habitat), the data shows that current structural stages 5-7 (mid, late, and old structure seral stages) in the lodgepole pine PAG are at 39% (16,569 acres) compared to 15-35% of HRV. Alternative 2 would convert 1,317 acres and Alternative 3 would convert 1,305 acres of structural stages 5-7 to structural stage 1 (stand initiation). These reductions would reduce the mid to old structure stands within the Fall River watershed to within the upper end of HRV levels. There would be no shift or conversion in acres of LOS (structural stages 6 and 7) within the watershed for the ponderosa pine and mixed conifer PAGS. When looking at just snag levels in the watershed the existing snags in the 0-6 and 6-12 categories are above HRV levels, while the down wood levels are also above HRV levels in the 0-4, 8-10, and 10-16 categories. Therefore the proposed treatments would move more towards HRV vegetation levels.

The ongoing projects, in combination with the proposed Junction EA are expected to result in negative cumulative effects to individual martens or habitat in the Fall River watershed due to treatment activities.

There are no foreseeable actions within the Fall River watershed that have potential to reduce suitable habitat for martens.

Forest Plan Consistency

The Forest Plan standards and guidelines have been reviewed for martens and either alternative for the Junction Project would be consistent with the Forest Plan. The direction for providing 2.25 snags per acre of mixed conifer would be met within the 275 acres of mixed conifer. Additionally, as per the Eastside Screens direction, all sale activities will maintain snags and green trees >21"dbh. The direction for providing 1.8 snags per acre of lodgepole pine and 15-20 pieces per acre of down wood in lodgepole pine and mixed conifer would be met in the no harvest areas, no treatment areas, leave areas, OGMA corridors, the northern portion of the Pistol Butte OGMA (pure lodgepole pine), and the untreated woodpecker habitat blocks. While there will be snags removed within lodgepole pine stands, the Eastside Screens direction is to maintain snags and green trees >21"dbh.

WL-61 would be met by leaving extensive stands of dense lodgepole pine areas untreated (for woodpecker habitat) and the OGMA corridors that are lodgepole pine PAG. The direction in the OGMA (M15-9) would also be met by providing snags and down wood at 100% maximum potential in the upper half of the Pistol Butte OGMA since no treatments are proposed.

Additionally, WL-73 states where logs of the recommended size and density are not available, an average of one slash pile per acre will be retained.

American marten – Determination

Because this project impacts 1% of suitable habitat across the Forest, the overall direct, indirect and cumulative effects will result in a small negative trend of habitat (increase in disturbance). The loss of habitat (increase in disturbance) will be insignificant at the scale of the Forest. The Junction Project is consistent with the Forest Plan, and thus continued viability of American marten is expected on the Deschutes National Forest.

Northern goshawk

Information on habitat needs is contained in the Wildlife Report and is summarized from the Species Assessment for northern goshawk for the Deschutes National Forest (USDA Forest Service, 2012). The intent for selecting northern goshawk as a terrestrial MIS was for providing stand diversity and blocks of preferred habitats for 100 year-old (or greater) conifer stands with a canopy cover of 60% or greater.

Based on the parameters built into the Wildhab model, there are approximately 446,402 acres or 28% of potential suitable goshawk nesting habitat on NFS lands on the Deschutes N.F.

Existing Conditions

There are approximately 30,314 acres of potential goshawk nesting habitat in the Fall River watershed and 1,971 acres of potential nesting habitat within the Junction planning area, including the OGMA. The literature from eastern Oregon found the overall goshawk home range size varies from 4,119 acres to 5,812 acres (USDA Forest Service, Goshawk Species Assessment 2012). Based on this, the planning area would not support a home range. Potential goshawk habitat is well distributed across the planning area in lodgepole pine, mixed conifer, and ponderosa pine. High quality habitat occurs within the entire OGMA. Ponderosa pine is the dominant vegetation on the north aspect of Pistol Butte, while lodgepole pine dominates the rest of the OGMA north of the butte on level ground.

Two years of goshawks surveys did not reveal any nests, but goshawks were incidentally observed flying through the planning area. There is a nest area adjacent to the planning area that has been active the last two years, but is beyond ¼ mile from the project boundary.

Northern goshawk –Direct and Indirect Effects – Alternative 1

In the Junction planning area in ponderosa pine stands, habitat quality and capability would remain stable shifting to negative as stand structure continues the present trend of increasing canopy closures, stand density, shrub density, fuel loading, and lodgepole pine encroachment over the next 20 years. Shrub understory would continue to dominate where it currently exists, increasing in average size and age and would negatively impact foraging habitat. Reynolds et al. (1992) found that a high density of small diameter understory trees may be detrimental to foraging and nesting aspects of goshawk ecology in at least three ways: 1) by obstructing flight corridors used by goshawks to obtain forest-associated prey; 2) by suppressing tree growth needed to produce large-diameter trees for nest sites; and 3) by reducing the growth of an herbaceous understory that supports potential prey species.

While quality suitable habitat exists within the OGMA in the ponderosa PAG, it would be prone to a stand replacement fire due to the high tree and log density. Fire suppression may lead to increased susceptibility of stand-replacing fire and insect and disease outbreaks, which can result in the deterioration or loss of nesting habitat (Graham et al. 1999). Therefore, as habitat conditions decline in the Junction planning area, there is a higher risk of insect and disease activity and wildfire.

Northern goshawk –Direct and Indirect Effects – Alternatives 2 and 3

Habitat modeling described above was overlaid with proposed treatments for Alternatives 2 and 3. As shown in Table 101, Alternative 2 would affect approximately 1,731 total acres and Alternative 3 would affect 1,539 total acres of suitable goshawk habitat in the project area. The selection and implementation of Alternative 2 would result in a short-term reduction of nesting habitat on 1,577 acres thru overstory removal, shelterwood, and commercial thinning (no harvest would occur on 154 acres of the 1,731 acres, but would receive some form of understory treatment). The selection and implementation of Alternative 3 would result in a short-term reduction of nesting habitat on 1,384 acres thru overstory removal, shelterwood, and commercial thinning (no harvest would occur on 154 acres of the 1,539 acres, but would receive some form of understory treatment).

Table 101: Acres of potential goshawk habitat affected by alternative.

Northern goshawk	Alt. 2	Alt. 3
Total acres affected	1731*	1539*
Overstory removal	512	479
Seed tree/Shelterwood	123	122
Commercial thinning	942	784
Total overstory removal	1577	1384
No tree harvest	154	154
Prescribed burning	1124	980
Mowing	1,249	1,102
Understory treatment	1731	1539

*These are the total acres of habitat affected based on habitat modeling, while the following rows show the acres affected by activity type. These rows will not add up equally to the total acres affected since certain activities would only occur in certain units or because there are overlapping activities in the same units.

Commercial thinning in ponderosa pine stands in either alternative may have a short-term reduction in nesting habitat due to the reduction in canopy closure and tree density, but would have long-term habitat benefits by accelerating the tree growth of the upper canopy and providing larger trees and quality habitat over time. In the short-term, treated areas will begin resembling forest conditions described by Reynolds et al. (1992) with stand characteristics continually improving. In the long-term, post-fledging habitat will continue improving and reach many of the desired characteristics and forest conditions described by Reynolds et al. (1992). These forest conditions include openings, and the presence of young trees, mid-aged trees, and larger trees found in mature and older forests. Additionally, foraging habitat would be enhanced through prescribed burning in ponderosa pine stands, enhancing habitat for goshawk prey species in the short-term.

As discussed above, while the commercial thinning may have short-term reductions in habitat, there would be long-term beneficial impacts. The remaining management activities under either alternative (i.e. temporary roads, prescribed burning, mowing, slash removal, or biomass) could have short-term impacts due to the reduction to foraging habitat and/or cause human disturbance to any unknown nesting goshawks. Although any goshawk nests that are discovered during implementation would be mitigated by a seasonal restriction in accordance with the Forest Plan.

Overall, Alternative 3 would have less impact to potential goshawk habitat than Alternative 2 for the following reasons: fewer acres would be impacted, blocks of lodgepole pine left untreated (woodpecker habitat) would be provided versus one under Alternative 2 (these areas would also provide goshawk habitat), and Alternative 3 would not treat the Wake Butte Special Interest Area, the Pistol Butte OGMA, and the north side of Sitkum Butte, although the risk of wildfire or insects in these untreated areas remains higher under Alternative 3. Alternative 2 would also require 4.2 extra miles of temporary roads than does Alternative 3, causing more disturbance or temporary loss of prey habitat. The design elements, such as no treatment areas, leave areas, retention areas, retaining trees greater than 21” dbh, and maintaining a 300’ buffer within wildlife guzzlers would offset some of the impacts by providing habitat.

Northern goshawk – Cumulative Effects

Overall, habitat reduction under Alternatives 2 and 3 would occur on 5% of potential suitable goshawk habitat within the Fall River Watershed.

The list of past, present, and foreseeable actions was reviewed to determine potential effects to goshawks. Similar to the Junction project, the actions that would contribute to potential cumulative effects include overstory removal and shelterwood of lodgepole pine and commercial thinning in ponderosa pine. Pre-commercial thinning to promote and accelerate tree growth rates should promote quality habitat in the long-term. As shown in the past actions table in the Appendix, perhaps the most influential activities that has contributed to the existing conditions and the lack of LOS in the Fall River Watershed, (specifically Structure Stage 6 and 7) has occurred from timber harvest activities from the 1970s – 1980s. From the 1990s to present, the transition to conserving and promoting LOS occurred, reducing the rate of loss of habitat. Since the early 1900s, fire suppression has likely been the second most influential activity, which has limited natural fires from creating suitable habitat for goshawks.

Ongoing activities within the Fall River Watershed that may have short-term impacts include pile burning and/or prescribed burning in the Klak, Katalo, Fall, Pit, Nut, and Charlie Brown project areas; the harvest activities within these project areas have already been completed. Although these projects may have had or are having short-term disturbance impacts, they should benefit in the long-term due to promoting and contributing to the development of LOS. The EXF project is another ongoing vegetation management project in the watershed and commercial and non-commercial timber cutting and removal with hand and machine piling of slash prior to burning the piles and prescribed burning on 2,500 acres is proposed. Similar to the Junction project, this will be a short-term impact to goshawk habitat in the watershed, but beneficial in the long-term. These projects in combination of the Junction project would have less than 1% cumulative reduction in goshawk habitat in the Fall River watershed.

Other ongoing and future activities within the watershed include recreational use. Recreational use in the Fall River watershed includes fishing, hunting, snowmobiling, and bike riding and use is heavier along riparian areas (i.e. Fall River) or designated trails. These all could have short-term disturbances to nesting or foraging goshawks.

Consistency with Eastside Screens

The Forest Plan S&Gs for goshawk have been reviewed. Since there are no known active goshawk nest sites, the Junction project is consistent with the S&Gs. If a nest is discovered, the Eastside Screens (USDA 1994) would provide the following standards and guidelines for goshawks: (1) protect every known active and historical nest-site from March 1st –August 31st (previous 5 years) from disturbance; (2) protect 30 acres of the most suitable nesting habitat surrounding all active and historical nest tree(s) and defer from harvest; and (3) a 400 acre "post-fledgling" (PFA) will be established around every known active nest site. While harvest activities can occur within this area, retain the LOS stands and enhance younger aged stands towards LOS conditions, as possible. There would also be no activity conducted within newly discovered goshawk nest stands or post-fledgling areas.

Goshawk Determination

Because this project impacts less than 1% of suitable habitat across the Forest, the overall direct, indirect and cumulative effects will result in a small negative trend of habitat (increase in disturbance). The loss of habitat (increase in disturbance) will be insignificant at the scale of the Forest. The Junction Project is consistent with the Forest Plan, and thus continued viability of northern goshawk is expected on the Deschutes National Forest.

Cooper's hawk

Information on habitat needs is contained in the Wildlife Report and is summarized from the Species Assessment for Cooper's hawk for the Deschutes National Forest (USDA Forest Service, 2012). The intent for selecting Cooper's hawk as a terrestrial MIS was for providing stand diversity and blocks of preferred habitats within 50 – 80 year old conifer stands with a closed canopy (S&G WL-14).

Based on the parameters built into the Wildhab model, there are approximately 275,340 acres of potential suitable Cooper's hawk nesting habitat on NFS lands on the Deschutes N.F.

Existing Conditions

There are approximately 17,310 acres of potential suitable Cooper's hawk nesting habitat in the Fall River watershed and 1,257 acres of potential nesting habitat within the Junction planning area. Based on the literature from eastern Oregon, the overall home range size varies from 1,657 acres to 5,745 acres, therefore the planning area would not support a home range. Although specific surveys were not conducted for Cooper's hawk, two years of goshawks surveys did not reveal any nests in the project area, but they were observed flying through the project area. Suitable nesting and foraging habitat occurs throughout the planning area in small pockets, with most of the habitat occurring in the ponderosa pine PAG, while fewer acres occur within the lodgepole pine PAG and mixed conifer PAG.

The current existing conditions within the planning area and the Fall River watershed for ponderosa pine structural stages 4 and 5 (equivalent to Cooper's hawk habitat) are at 78% when compared to the historic range of variability (HRV) at 30-40%. The current conditions for structural stages 4 and 5 in the mixed conifer are at 77% when compared to 40-50% HRV. Conversely, the current existing conditions for lodgepole pine structural stages 3 and 4 are at 33% when compared to 50-60% HRV, and structural stage 5 is currently at 39% and above the 15-35% HRV. The conditions above HRV levels reflect that there is more Cooper's hawk habitat today, when compared to historic levels.

Cooper's hawk –Direct and Indirect Effects – Alternative 1

In the Junction planning area in ponderosa pine and mixed conifer stands, habitat quality and capability would remain stable shifting to negative as stand structures continue the present trends of increasing canopy closures, stand density, shrub density, fuel loading, and lodgepole pine encroachment over the next 20 years. Shrub understory would continue to dominate where it currently exists, increasing in average size and age. In lodgepole pine stands, Cooper's hawk habitat would remain stable shifting to negative due to the present trends of increasing stand density, increasing fuel loading, and increases in insects and diseases would continue over the next 20 years. By taking no action, there is a higher risk of insect and disease activity and wildfire.

Cooper's hawk –Direct and Indirect Effects – Alternatives 2 and 3

Habitat modeling described above was overlaid with proposed treatments for Alternatives 2 and 3. As shown in Table 102, Alternative 2 would affect approximately 1,138 total acres and Alternative 3 would affect 1,043 total acres of suitable Cooper's hawk habitat in the project area. The selection and implementation of Alternative 2 would result in a reduction of nesting habitat on 1,073 acres thru overstory removal, shelterwood, and commercial thinning (no harvest would occur on 66 acres of the 1,138 acres, but would receive some form of understory treatment). The selection and implementation of Alternative 3 would result in a reduction of nesting habitat on 979 acres thru overstory removal, shelterwood, and commercial thinning (no harvest would occur on 66 acres of the 1,043 acres, but would receive some form of understory treatment). Proposed treatments to increase white-headed woodpecker habitat through commercial thinning in ponderosa pine stands would decrease Cooper's hawk nesting habitat due to reduced stand densities. Although the acres affected in lodgepole pine stands would be moving toward the above HRV levels towards its historic range, there would be a reduction in habitat within this PAG. While this project would move lodgepole pine stands that are currently above HRV levels toward its historic conditions, it would also reduce Cooper's hawk habitat within this PAG due to reduced tree and canopy densities

Any of the management activities under either alternative (i.e. temporary roads, prescribed burning, mowing, slash removal, or biomass) could have short-term impacts to foraging habitat and/or cause human disturbance to Cooper's hawks for the life of the project. These activities would reduce the habitat for some prey species such as the shrub component and/or removal of down wood.

Table 102: Acres of potential Cooper's hawk habitat affected by alternative.

Cooper's hawk	Alt. 2	Alt. 3
Total acres affected	1138*	1043*
Overstory removal	242	238
Seed tree/Shelterwood	56	56
Commercial thinning	775	685
Total overstory removal	1073	979
No tree harvest	66	66
Prescribed burning	903	759
Mowing	946	802
Understory treatment	1138	994

*These are the total acres of habitat affected based on habitat modeling, while the following rows show the acres affected by activity type. These rows will not add up equally to the total acres affected since certain activities would only occur in certain units or because there are overlapping activities in the same units.

Alternative 3 would have less impact to potential Cooper's hawk habitat than Alternative 2 for the following reasons: fewer acres would be impacted, the blcoks of untreated lodgepole pine (woodpecker habitat) also provides Cooper's hawk habitat, Alternative 3 would not treat the Wake Butte Special Interest Area, the Pistol Butte OGMA, and the north side of Sitkum Butte. Although the risk of wildfire or insects in these untreated areas remains higher under Alternative 3. Alternative 2 would also require 4.2 extra miles of temporary roads than does Alternative 3, causing more disturbance or temporary loss of prey habitat.

Application of the design elements, such as no treatment areas, leave areas, retention areas, retain trees greater than 21” dbh, and maintaining a 300’ buffer within wildlife guzzlers would offset some of the impacts by retaining habitat.

Cooper’s hawk – Cumulative Effects

Habitat reduction under Alternatives 2 and 3 would occur on 6% of suitable habitat within the Fall River Watershed. Conversely, either alternative would contribute additional acres of ponderosa pine PAG towards desirable late old structure (LOS) within the watershed in the long-term.

The list of past, present, and foreseeable actions was reviewed to determine potential effects to Cooper’s hawk. Actions that would contribute to potential cumulative effects include overstory removal and shelterwood of lodgepole pine and commercial thinning in ponderosa pine. Pre-commercial thinning to promote and accelerate tree growth rates should promote quality habitat in the long-term.

Ongoing activities within the Fall River Watershed that may have short-term impacts include pile burning and/or prescribed burning in the Klak, Katalo, Fall, Pit, Nut, and Charlie Brown project areas; the harvest activities within these project areas have already been completed. Although these projects may have had or are having short-term disturbance impacts, they should benefit in the long-term due to promoting and contributing to the development of LOS. The EXF project is another ongoing vegetation management project in the watershed and commercial and non-commercial timber cutting and removal with hand and machine piling of slash prior to burning the piles and prescribed burning on 2,500 acres is proposed. Under the EXF project the effects of removing 7 acres of the ponderosa pine PAG classified as LOS within the watershed were disclosed in the EXF analysis. This would be a small reduction of habitat in the watershed. These projects in combination of the Junction project would have a slight cumulative reduction in Cooper’s hawk habitat in the Fall River watershed.

Other ongoing and future activities within the watershed include recreational use, such as in the Intensive Recreation Management Area. Recreational use in the Fall River watershed includes fishing, hunting, snowmobiling, and bike riding and use is heavier along riparian areas or designated trails. These activities all could have short-term disturbances to nesting Cooper’s hawks.

Forest Plan Consistency

The Forest Plan Standards and Guidelines for Cooper’s hawk have been reviewed. Since there are no known active nest sites, the Junction project is consistent with the S&Gs. In the event a Cooper’s hawk nest is discovered, Forest Plan direction includes the protection of Cooper’s nests through seasonal timing restrictions from April 15th – August 31st.

Cooper’s hawk Determination

Because this project impacts less than 1% of suitable habitat across the Forest, the overall direct, indirect and cumulative effects will result in a small negative trend of habitat (increase in disturbance). The loss of habitat (increase in disturbance) will be insignificant at the scale of the Forest. The Junction Project is consistent with the Forest Plan, and thus continued viability of Cooper’s hawk is expected on the Deschutes National Forest

Sharp-shinned hawk

Information on habitat needs is contained in the Wildlife Report and is summarized from the Species Assessment for sharp-shinned hawk for the Deschutes National Forest (USDA Forest Service, 2012). The intent for selecting sharp-shinned hawk as a terrestrial MIS was for providing stand diversity and retention of small blocks of habitats within 40 – 60 year old ponderosa pine stands and mixed conifer stands with a dense canopy. Based on the parameters built into the Wildhab model, there are approximately 426,138 acres of potential suitable sharp-shinned hawk nesting habitat on NFS lands on the Deschutes N.F.

Existing Conditions

There are approximately 32,370 acres of potential suitable sharp-shinned hawk nesting habitat in the Fall River watershed and 2,499 acres of potential nesting habitat within the Junction planning area. Based on the literature from eastern Oregon, the overall home range size varies from 679 acres to 1,136 acres. Based on this, the planning area would support 2-4 home ranges. Two years of goshawks surveys did not reveal any sharp-shinned hawk nests in the project area, but they were observed flying through the project area. Suitable nesting and foraging habitat occurs throughout the project area, with most habitat occurring in the ponderosa pine PAG, while fewer acres occur within the lodgepole pine PAG and mixed conifer PAG.

The structural stages equivalent to sharp-shinned hawk habitat is 3, 4, and 5 within all PAGs. As previously discussed in the goshawk and Cooper's hawk sections, these stages are above HRV in ponderosa pine, mixed conifer, and lodgepole pine (only stage 5), but below HRV for stages 3 and 4 in lodgepole. The conditions above HRV levels reflect that there is more sharp-shinned hawk habitat today when compared to historic levels, but less habitat occurring in stages 3 and 4 in lodgepole pine.

Sharp-shinned hawk –Direct and Indirect Effects – Alternative 1

Under the no action alternative, currently suitable habitat within structural stages 3, 4, and 5 in the Junction planning area would begin transitioning to later seral stages within the next 20 years, becoming unsuitable habitat.

Sharp-shinned hawk –Direct and Indirect Effects – Alternatives 2 and 3

Due to the reduction in tree density in the lower structural stages, it could be assumed that all the proposed management activities would have a short to long-term impact to nesting habitat from the Junction project. These stands would become unsuitable because both the reduction in canopy closure and tree density.

Habitat modeling described above was overlaid with proposed treatments for Alternatives 2 and 3. As shown in Table 103: Acres of sharp-shinned hawk habitat affected by alternative.Table 103, Alternative 2 would affect approximately 2,192 total acres and Alternative 3 would affect 1,977 total acres of suitable sharp-shinned hawk habitat in the project area. The selection and implementation of Alternative 2 would result in a reduction of nesting habitat on 2,070 acres thru overstory removal, shelterwood, and commercial thinning (no harvest would occur on 122 acres of the 2,192 acres, but would receive some form of understory treatment, making the stand potentially unsuitable). The selection and implementation of Alternative 3 would result in a reduction of nesting habitat on 1,855 acres thru overstory removal, shelterwood, and commercial thinning (no harvest would occur on 122 acres of the 1,977 acres, but would receive some form of understory treatment).

Table 103: Acres of sharp-shinned hawk habitat affected by alternative.

Sharp-shinned hawk	Alt. 2	Alt. 3
Total acres affected	2192*	1977*
Overstory removal	442	438
Seed tree/Shelterwood	75	75
Commercial thinning	1552	1341
Total overstory removal	2070	1855

No tree harvest	123	122
Prescribed burning	1815	1611
Mowing	1939	1732
Understory treatment	2193	1977

*These are the total acres of habitat affected based on habitat modeling, while the following rows show the acres affected by activity type. These rows will not add up equally to the total acres affected since certain activities would only occur in certain units or because there are overlapping activities in the same units.

All management activities under either alternative (i.e. temporary roads, prescribed burning, mowing, slash removal, or biomass) could also have short-term impacts to foraging or nesting habitat for the life of the project. These activities would reduce the habitat for some prey species such as the shrub component and/or removal of down wood.

Alternative 3 would have less impacts to potential sharp-shinned hawk habitat than Alternative 2 for the following reasons: fewer acres would be impacted, two blocks of untreated lodgepole pine (woodpecker habitat) also provide sharp-shinned hawk habitat), Alternative 3 would not treat the Wake Butte Special Interest Area, the Pistol Butte OGMA, and the north side of Sitkum Butte. Although the risk of wildfire or insects in these untreated areas remains higher under Alternative 3. Alternative 2 would also require 4.2 extra miles of temporary roads than does Alternative 3, causing more disturbance or temporary loss of prey habitat.

Application of the design elements, such as no treatment areas, leave areas, retention areas, and maintaining a 300’ buffer within wildlife guzzlers would offset some of the impacts by retaining habitat.

Sharp-shinned hawk – Cumulative Effects

A reduction of 7% and 6% of suitable sharp-shinned hawk habitat under Alternatives 2 and 3 would occur within the Fall River Watershed.

The lists of past, present, and foreseeable actions were reviewed to determine potential effects to sharp-shinned hawk. Similar to the Junction project, most timber management activities would contribute to potential cumulative effects due to habitat reductions. Past harvest actions has most likely been the biggest reason to the currently below HRV conditions in structural stages 3 and 4 in lodgepole pine.

Although recent harvest activities in the Klak, Katalo, Fall, Pit, Nut, and Charlie Brown project areas within the Fall River watershed have already been completed, short-term impacts to sharp-shinned hawks are anticipated because ongoing activities are still occurring such as pile burning and/or prescribed burning. The EXF project is another ongoing vegetation management project in the watershed and commercial and non-commercial timber cutting and removal with hand and machine piling of slash prior to burning the piles and prescribed burning on 2,500 acres is proposed. These projects in combination of the Junction project would have a slight cumulative reduction in sharp-shinned hawk habitat in the Fall River watershed.

Other ongoing and future activities within the watershed include recreational use. Recreational use in the Fall River watershed includes fishing, hunting, snowmobiling, and bike riding and use is heavier along riparian areas or designated trails. These all could have short-term disturbances to nesting sharp-shinned hawks.

Forest Plan Consistency

The Forest Plan Standards and Guidelines for sharp-shinned hawks have been reviewed. Since there are no known active nest sites, the Junction project is consistent with the S&Gs. In the event a sharp-shinned hawk nest is discovered, Forest Plan direction includes the protection of sharp-shinned hawk nests through seasonal timing restrictions from April 15th – August 31st.

Sharp-shinned hawk Determination

Because this project impacts less than 1% of suitable habitat across the Forest, the overall direct, indirect and cumulative effects will result in a small negative trend of habitat (increase in disturbance). The loss of habitat (increase in disturbance) will be insignificant at the scale of the Forest. The Junction Project is consistent with the Forest Plan, and thus continued viability of sharp-shinned hawk is expected on the Deschutes National Forest.

Great gray owl

Information on habitat needs is contained in the wildlife report and is summarized from the Species Assessment for great gray owl for the Deschutes National Forest (USDA Forest Service, 2012). Great gray owls were chosen as a terrestrial MIS to monitor habitat comprised of forests 30 acres and larger adjacent to riparian and meadow ecosystems.

Based on the parameters built into the Wildhab model, there are approximately 197,847 acres of potential suitable great gray owl nesting habitat on NFS lands on the Deschutes N.F.

Existing Conditions

There are approximately 5,280 acres of potential suitable great gray owl nesting habitat in the Fall River watershed and 221 acres of potential nesting habitat within the Junction planning area. Suitable nesting and foraging habitat occurs in the southeastern portion of the project area, just north of Fall River with most habitat occurring in the lodgepole pine PAG. The structural stages present within the 221 acres of modeled habitat are 4, 5, and 6.

Based on the home range information, the planning area would not support a great gray owl home range. Great gray owls have historically been seen in the planning area, but there are no known nests. A great gray owl was incidentally observed flying through the project area while conducting goshawk surveys. The highest quality habitat in the planning area occurs along the Fall River riparian corridor.

Great gray owl –Direct and Indirect Effects – Alternative 1

Under the no action alternative current great gray owl habitat would continue to increase in early seral stages, an increase in canopy closure, and conifer encroachment would continue to occur within the Fall River riparian area.

Great gray owl –Direct and Indirect Effects – Alternatives 2 and 3

Habitat modeling described above was overlaid with proposed treatments for Alternatives 2 and 3. As shown in Table 104 Alternatives 2 and 3 would affect approximately 160 total acres of suitable great gray owl habitat in the project area. Part of an objective of the purpose and need is to reduce some of the fuel loadings just north of the Fall River Hatchery for protection, particularly in Units #62 and #64 where great gray owl habitat exists. The selection and implementation of Alternatives 2 or 3 would result in a reduction of nesting habitat on 76 acres thru overstory removal of lodgepole pine, while either alternative would alter nesting habitat on 83 acres to a marginally suitable condition via commercial thinning. Since the objective for commercial thinning units is to retain, promote and accelerate the growth of ponderosa pine, there would be a short-term impact to nesting habitat due to lodgepole pine removal with a long-term benefit due to the more fire tolerant ponderosa pine species. While there may be a reduction in nesting habitat, these treatments may increase foraging habitat due to larger openings. All other management activities under either alternative (i.e. temporary roads, prescribed burning, mowing, slash, or biomass removal) could have short-term impacts to foraging or nesting habitat.

Table 104: Acres of potential great gray owl habitat affected by alternative.

Great gray owl	Alt. 2	Alt. 3
Total acres affected	160	160
Overstory removal	76	76
Seed tree/Shelterwood	N/A	N/A
Commercial thinning	83	83
Total overstory removal	160	160
No tree harvest	1	1
Prescribed burning	160	160
Mowing	160	160
Understory treatment	160	160

*These are the total acres of habitat affected based on habitat modeling, while the following rows show the acres affected by activity type. These rows will not add up equally to the total acres affected since certain activities would only occur in certain units or because there are overlapping activities in the same units.

Alternative 2 would have a slightly higher impact than Alternative 3 due to requiring 4.2 extra miles of temporary roads than does Alternative 3, causing more disturbance or temporary loss of prey habitat. With application of the design elements, such as no treatment areas, leave areas, retention areas, and maintaining a 300' buffer within wildlife guzzlers would offset some of the impacts by providing habitat. Additionally, by applying the standards and Guidelines under the fisheries resource specific to Unit #62 and a wildlife seasonal restriction for this unit, it would minimize impacts to great gray owl.

Great gray owl – Cumulative Effects

Habitat reduction under Alternatives 2 and 3 would occur on 1% of suitable habitat within the Fall River Watershed. Conversely, either alternative would contribute additional acres of ponderosa pine PAG towards desirable late old structure (LOS) habitat within the watershed in the long-term.

The list of past, present, and foreseeable actions was reviewed to determine potential effects to great gray owls. Similar to the Junction project, the actions that would contribute to potential cumulative effects include overstory removal and shelterwood of lodgepole pine and commercial thinning in ponderosa pine. Pre-commercial thinning to accelerate tree growth rates should promote quality habitat over the long-term. As shown in the past actions table in the Appendix, perhaps the most influential activities that has contributed to the existing conditions and the lack of LOS in the Fall River Watershed, (specifically Structure Stage 6 and 7) has occurred from timber harvest activities from the 1970's – 1980's. From the 1990's to present, the transition to conserving and promoting LOS occurred, reducing the rate of loss of habitat. Since the early 1900's, fire suppression has likely been the second most influential activity, which has limited natural fires from creating suitable foraging habitat for great gray owls.

Ongoing activities within the Fall River Watershed that may have short-term impacts include pile burning and/or prescribed burning in the Klak, Katalo, Fall, Pit, Nut, and Charlie Brown project areas; the harvest activities within these project areas have already been completed. Although these projects may have had or are having short-term disturbance impacts, great gray owls should benefit in the long-term due to promoting and contributing to the development of LOS and should increase foraging habitat. The EXF project is another ongoing vegetation management project in the watershed and commercial and non-commercial timber cutting and removal with hand and machine piling of slash prior to burning the piles and prescribed burning on 2,500 acres is proposed. These projects in combination of the Junction project would have a slight cumulative reduction in great gray owl nesting habitat in the Fall River watershed.

Other ongoing and future activities within the watershed include recreational use including fishing, hunting, snowmobiling, and bike riding. Use is heavier along riparian areas (i.e. Fall River) or designated trails. These all could have short-term disturbances to nesting or foraging great gray owls.

Forest Plan Consistency

The Forest Plan Standards and Guidelines for great gray owls have been reviewed. Since there are no known active nest sites, the Junction project is consistent with the S&Gs. In the event a great gray owl nest is discovered, Forest Plan direction includes the protection of nests through seasonal timing restrictions from March 1st – June 30th. Additionally, WL-31 and WL-32 would be applied.

Great gray owl Determination

Because this project impacts less than 1% of suitable habitat across the Forest, the overall direct, indirect and cumulative effects will result in a small negative trend of habitat (increase in disturbance). The loss of habitat (increase in disturbance) will be insignificant at the scale of the Forest. The Junction Project is consistent with the Forest Plan, and thus continued viability of great gray owl is expected on the Deschutes National Forest.

Red-tailed Hawk

Information on habitat needs is contained in the Wildlife Report and is summarized from the Species Assessment for red-tailed hawk for the Deschutes National Forest (USDA Forest Service, 2012). The Forest Plan determined the red-tailed hawk to be a non-game species of special interest and was chosen as a MIS for large trees in mixed structural habitat.

Based on the parameters built into the Wildhab model, there are approximately 192,492 acres of potential suitable red-tailed hawk nesting habitat on NFS lands on the Deschutes N.F.

Existing Conditions

There are approximately 12,446 acres of potential suitable red-tailed hawk nesting habitat in the Fall River watershed and 658 acres of potential nesting habitat within the Junction planning area.

Suitable nesting and foraging habitat occurs scattered across the project area with most habitat occurring in ponderosa pine PAG and some in the lodgepole pine and mixed conifer PAGs. Red-tail hawks were commonly seen in the planning area, but no nests were discovered. Based on the home range information, the planning area would support 1-3 home ranges.

Red-tailed hawk –Direct and Indirect Effects – Alternative 1

In ponderosa pine stands, habitat quality and capability would remain stable shifting to negative as stand structures continue the present trends of increasing canopy closures, stand density, shrub density, fuel loading, and lodgepole pine encroachment over the next 20 years. Additionally, the shrub understory would continue to dominate where it currently exists in the understory, increasing in average size and age and would have an impact to foraging habitat. In lodgepole pine and mixed conifer stands, red-tail hawk habitat would remain stable shifting to negative due to the present trends of increasing stand density, increasing fuel loading, and increases in insects and diseases would continue over the next 20 years.

Red-tailed hawk –Direct and Indirect Effects – Alternatives 2 and 3

Habitat modeling described above was overlaid with proposed treatments for Alternatives 2 and 3. As shown in Table 105, Alternative 2 would affect approximately 473 total acres and Alternative 3 would affect 424 total acres of suitable red-tail hawk habitat in the project area. The selection and implementation of Alternative 2 would result in a reduction of nesting habitat on 344 acres thru overstory removal, shelterwood, and commercial thinning (no harvest would occur on 129 acres of the 473 acres, but would receive some form of understory treatment). The selection and implementation of Alternative 3 would result in a reduction of nesting habitat on 295 acres thru overstory removal, shelterwood, and commercial thinning (no harvest would occur on 129 acres of the 424 acres, but would receive some form of understory treatment). Although there would be a short-term impact to ponderosa pine stands via commercial thinning, either alternative would create quality habitat in the long-term by providing larger trees. All other management activities under either alternative (i.e. temporary roads, prescribed burning, mowing, slash, or biomass removal) could have short-term impacts to foraging or nesting habitat.

Table 105: Acres of red-tailed hawk habitat affected by alternative.

Red-tailed hawk	Alt. 2	Alt. 3
Total acres affected	473*	424*
Overstory removal	97	97
Seed tree/Shelterwood	79	79
Commercial thinning	168	119
Total overstory removal	344	295
No tree harvest	129	129
Prescribed burning	212	162
Mowing	326	276
Understory treatment	473	424

*These are the total acres of habitat affected based on habitat modeling, while the following rows show the acres affected by activity type. These rows will not add up equally to the total acres affected since certain activities would only occur in certain units or because there are overlapping activities in the same units.

Alternative 3 would have less impacts to red-tailed hawk habitat when compared with Alternative 2 for the following reasons: fewer acres would be impacted, two blocks of untreated lodgepole pine (woodpecker habitat) would also provide red-tailed hawk foraging or nesting habitat, Alternative 3 would not treat the Wake Butte Special Interest Area, the Pistol Butte OGMA, and the north side of Sitkum Butte. Although the risk of wildfire or insects in these untreated areas remains higher under Alternative 3. Alternative 2 would also require 4.2 extra miles of temporary roads than does Alternative 3, causing more disturbance or temporary loss of prey habitat.

With application of the design elements, such as no treatment areas, leave areas, retention areas, and maintaining a 300' buffer within wildlife guzzlers would offset some of the impacts by retaining habitat.

Red-tailed hawk – Cumulative Effects

Habitat reduction under Alternatives 2 and 3 would occur on 3% and 2% of suitable habitat within the Fall River Watershed. Conversely, either alternative would contribute additional acres of ponderosa pine PAG towards desirable late old structure (LOS) within the watershed in the long-term.

The list of past, present, and foreseeable actions was reviewed to determine potential effects to red-tailed hawk. Similar to the Junction project, the actions that would contribute to potential cumulative effects include overstory removal and shelterwood of lodgepole pine and commercial thinning in ponderosa pine. Pre-commercial thinning to accelerate tree growth rates should promote quality habitat in the long-term.

Ongoing activities within the Fall River Watershed that may have short-term impacts include pile burning and/or prescribed burning in the Klak, Katalo, Fall, Pit, Nut, and Charlie Brown project areas; the harvest activities within these project areas have already been completed. Although these projects may have had or are having short-term disturbance impacts, they should benefit in the long-term due to promoting and contributing to the development of LOS. The EXF project is an ongoing vegetation management project in the watershed and commercial and non-commercial timber cutting and removal with hand and machine piling of slash prior to burning the piles and prescribed burning on 2,500 acres is proposed. Under the EXF project the effects of removing 7 acres of the ponderosa pine PAG classified as LOS within the watershed were disclosed in the EXF analysis. This would be a small reduction of habitat in the watershed. These projects in combination of the Junction project would have a slight cumulative reduction in red-tailed hawk habitat in the Fall River watershed.

Other ongoing and future activities within the watershed include recreational use such as fishing, hunting, snowmobiling, and bike riding. Use is heavier along riparian areas or designated trails. These all could have short-term disturbances to nesting red-tailed hawks.

Forest Plan Consistency

The Forest Plan Standards and Guidelines for red-tailed hawks have been reviewed. Since there are no known active nest sites, the Junction project is consistent with the S&Gs. In the event a red-tailed hawk nest is discovered, Forest Plan direction includes the protection of nests through seasonal timing restrictions from March 1st – August 31st. Additionally, WL-2 would be applied.

Red-tailed hawk – Determination

Because this project impacts less than 1% of suitable habitat across the Forest, the overall direct, indirect and cumulative effects will result in a small negative trend of habitat (increase in disturbance). The loss of habitat (increase in disturbance) will be insignificant at the scale of the Forest. The Junction Project is consistent with the Forest Plan, and thus continued viability of red-tailed hawk is expected on the Deschutes National Forest.

Osprey

Information on habitat needs is contained in the Wildlife Report and is summarized from the Species Assessment for osprey for the Deschutes National Forest (USDA Forest Service, 2012). Osprey was chosen as a terrestrial MIS in the Forest Plan due to its dependence on fish species and use of snags and trees surrounding large lakes. Key habitat components for management include retaining large-diameter snags and dead-topped live or dead trees in or near clear, unobstructed fish-bearing large lakes and rivers.

Based on the parameters built into the model, there are approximately 496,233 acres of potential suitable osprey nesting habitat on NFS lands on the Deschutes N.F.

Existing Conditions

There are approximately 24,232 acres of potential suitable osprey nesting habitat in the Fall River watershed and 2,013 acres of potential nesting habitat within the Junction planning area. Suitable nesting and foraging habitat occurs throughout the southern end of the planning area due to the proximity of Fall River. Most osprey habitat occurs in lodgepole pine stands with some minor component of ponderosa pine. Historic nests occurred along the Fall River riparian area, but none of these nests were found when conducting nest monitoring during the 2010 breeding season. Ospreys can be commonly seen within the vicinity of the Fall River fish hatchery.

Osprey –Direct and Indirect Effects – Alternative 1

This alternative would have no direct effects to osprey because of the lack of proposed actions. This alternative does forego the opportunity to treat within the RHCA, reducing the fuels and promoting the development of the type of tree structure used by this species for nesting. In the event of a wildfire, the osprey habitat that currently exists in the RHCA would be at risk.

This alternative would also preclude the need to fall hazard trees along haul routes and where activity units border the road system which would retain existing osprey habitat.

Osprey –Direct and Indirect Effects – Alternatives 2 and 3

Habitat modeling described above was overlaid with proposed treatments for Alternatives 2 and 3. As shown in Table 106, Alternative 2 would affect approximately 1,528 acres and Alternative 3 would affect 1,288 total acres of suitable osprey habitat in the project area. Part of the objectives for treatments within the RHCA is to promote the development of large structure, while reducing fuel loadings and protecting the Fall River fish hatchery. This would promote the creation of future osprey nest trees. A wildfire within the RHCA would put osprey habitat at risk. Reducing the fuel loadings would help create conditions whereby a fire may be able to be stopped before it reaches osprey habitat. Either alternative could necessitate the falling of hazard trees along haul routes and where activity units border the road system, therefore potentially impacting osprey nest trees. In the event an osprey nest is discovered during implementation, there would be a seasonal restriction as per the Forest Plan.

The selection and implementation of Alternative 2 would result in a short-term reduction of nesting habitat on 1,211 acres thru overstory removal, shelterwood, and commercial thinning (no harvest would occur on 314 acres of the 1,528 acres, but would receive some form of understory treatment). The selection and implementation of Alternative 3 would result in a short-term reduction of nesting habitat on 971 acres thru overstory removal, shelterwood, and commercial thinning (no harvest would occur on 317 acres of the 1,288 acres, but would receive some form of understory treatment). Although there would be a short-term impact to ponderosa pine stands via commercial thinning, either alternative would create quality habitat in the long-term by providing larger trees. All other management activities under either alternative (i.e. temporary roads, prescribed burning, mowing, slash, or biomass removal) could have short-term impacts to nesting habitat.

Table 106: Acres of potential osprey habitat affected by alternative.

Osprey	Alt. 2	Alt. 3
Total acres affected	1528*	1288*
Overstory removal	355	205
Seed tree/Shelterwood	228	213
Commercial thinning	628	553
Total overstory removal	1211	971
No tree harvest	317	317
Prescribed burning	758	758
Mowing	1322	1282
Understory treatment	1528	1288

*These are the total acres of habitat affected based on habitat modeling, while the following rows show the acres affected by activity type. These rows will not add up equally to the total acres affected since certain activities would only occur in certain units or because there are overlapping activities in the same units.

Alternative 3 would have less impact to osprey habitat than Alternative 2 for the following reasons: fewer acres would be impacted, a large block of untreated lodgepole pine (woodpecker habitat) would be provided in the southern portion of the project area which would also provide osprey nesting habitat, Alternative 3 would not treat the Pistol Butte OGMA, and the north side of Sitkum Butte (also within range for nesting). Although the risk of wildfire or insects in these untreated areas remains higher under Alternative 3.

With application of some of the design elements, such as retaining all dbh sizes of ponderosa pine snags, no treatment areas, leave areas, or no harvest areas in the southern portion of the project area, would offset some of the impacts by providing habitat. Additionally, the RHCA project design features by the fisheries resource specific to Unit #62 (where suitable habitat occurs), would minimize impacts to ospreys.

Osprey – Cumulative Effects

The list of past, present, and foreseeable actions was reviewed to determine potential effects to ospreys. The cumulative effects to ospreys are similar to those disclosed for great gray owl. These projects in combination of the Junction project would have a slight cumulative reduction in osprey nesting habitat in the Fall River watershed.

Habitat reduction under Alternatives 2 and 3 would occur on 5% and 4% of suitable habitat within the Fall River Watershed. Conversely, either alternative would contribute additional acres of ponderosa pine PAG towards desirable late old structure (LOS) habitat within the watershed in the long-term.

Forest Plan Consistency

The Forest Plan Standards and Guidelines for osprey have been reviewed. Since there are no known active nest sites, the Junction project is consistent with the S&Gs. In the event of an osprey nest is discovered, Forest Plan direction includes the protection of nests through seasonal timing restrictions from April 1st – August 31st. Additionally, WL-2 would be applied.

Osprey – Determination

Because this project impacts less than 1% of suitable habitat across the Forest, the overall direct, indirect and cumulative effects will result in a small negative trend of habitat (increase in disturbance). The loss of habitat (increase in disturbance) will be insignificant at the scale of the Forest. The Junction Project is consistent with the Forest Plan, and thus continued viability of osprey is expected on the Deschutes National Forest.

Elk

Information on habitat needs is contained in the Wildlife Report and is summarized from the Species Assessment for elk for the Deschutes National Forest (USDA Forest Service, 2012). Elk were chosen as a terrestrial species in the Forest Plan for its socio-economic importance to the hunting community within Central Oregon as well as other neighboring communities.

Existing Conditions

The southern portion of the Junction project boundary slightly overlaps the northern portion of the 11,501-acre Fall River KEA. Highway 42 is the northern boundary of the KEA. The project overlap is just south of the 42 Highway and mostly linear and adjacent to the highway. Modeling currently approximates there are 2,939 acres (26%) of hiding cover, 38 acres (0%) of thermal cover, and there is 1.94 miles per square mile of open road density in the Fall River KEA. Recreational activities, such as hunting are popular within this KEA. The Fall River Fish Hatchery is just south of the Forest Service boundary and Fall River is adjacent to the south of the hatchery. According to the 2011 Operations Plan for the Fall River Hatchery, the facility welcomes 20,000 visitors annually. Fish anglers also utilize the Fall River riparian area to the east and west. This entire area is also classified as intensive recreation in the Forest Plan. Given the high degree of human presence and the proximity of the hatchery, it does not provide much solitude for elk. Elk use in this part of the project area is used for transitioning across the 42 Highway. Elk congregation and solitude is much more apparent further south/southwest into the KEA, given there are gate closures.

Since a couple of the project's objectives are to improve the egress or human safety on the 42 Highway and for protection of the fish hatchery in the event of a wildfire, it incorporates approximately 50 acres of hiding cover and 0.68 acre of thermal cover. All the acres of modeled hiding cover are in the southwest corner of the project area or in the northwest corner of the KEA, and are situated just north/northwest of the fish hatchery and Fall River. Lodgepole pine is very dense in this area and is the dominant vegetation for the available hiding cover. The 0.68-acre of thermal cover is scattered in two patches further east and along the highway.

While past treatments have occurred along the highway to improve egress, it has also reduced hiding and thermal cover. However, the model is underestimating acres of hiding cover because there are still many areas that were not treated and are currently providing hiding and thermal cover along much of the 42 Highway. In areas that were treated, the regenerating ponderosa pine and/or lodgepole pine is currently providing hiding cover. However, these dense patches of hiding cover also can pose a risk to human safety due to vehicle collisions with elk because of the lack of visibility along the highway.

Due to past silvicultural and prescribed burn treatments, and wildlife guzzlers in the remaining planning area, the area provides quality foraging habitat. Small groups of elk were frequently observed throughout the Junction planning area during the 2010 field season. A larger herd of approximately 40 cows and yearling calves were observed crossing the 42 Highway and heading north into the Junction planning area.

Elk – Direct and Indirect Effects – Alternative 1

This alternative would not further reduce hiding or thermal cover in the KEA. In the short-term, both hiding and thermal cover would continue to expand along Highway 42, but this alternative foregoes the opportunity to reduce the risk of vehicle collisions with elk.

Elk – Direct and Indirect Effects – Alternatives 2 and 3

Alternatives 2 or 3 would treat approximately 44 total acres within hiding cover and 0.44 acre of thermal cover in the Fall River KEA. However, not all proposed treatments are anticipated to impact hiding cover equally. Overstory removal on 39 acres of lodgepole pine would not remove hiding cover directly since the remaining regenerating trees are scattered throughout the unit and will continue to provide hiding cover. In order to remove the more mature overstory trees, some of these smaller trees will be trampled during implementation. This treatment will open the canopy to further enhance dense regeneration and would provide additional hiding cover within a few years. Shelterwood treatment on 5 acres would not directly reduce hiding cover, but the follow-up treatment such as whip falling may reduce hiding cover in the short-term. While there may be a reduction of 0.44 acre of thermal cover, the ponderosa pine trees that would be retained in this unit would provide thermal cover in the long-term.

Mowing is proposed across 44 acres following the above treatments described. Mowing is proposed to reduce the fuel loadings, but mostly targeted to reduce the shrub density. While mowing may reduce some hiding cover by mowing some of the smaller diameter trees, mowing would occur in a mosaic pattern to retain some shrub cover. Pile burning is proposed across the 44 treated acres and would be the last treatment, but it is not expected to reduce hiding cover. There are no temporary or new roads proposed within these units, so there would be no impact or increase contributing to an increase in road density to the Fall River KEA. However, elk would benefit from a reduction and decommissioning of roads in the remaining planning area. Alternatives 2 and 3 would close 0.57 miles and decommission 2.62 miles of roads.

As previously stated, the model is underestimating the amount of hiding and thermal cover and distribution of cover is much higher. Overall, in order to meet the purpose and need and reduce the fire risk to the fish hatchery and increase egress along the 42 Highway, either alternative would have equal short-term impact to elk hiding cover. Although, the reduction in hiding cover would increase the visibility for vehicle traffic and reduce potential for collisions and/or mortality to elk.

Elk – Cumulative Effects

As shown in the past actions table in Appendix A, the most influential activities that has contributed to the existing road density in the Fall River KEA are from timber harvest activities. However, these past activities are no longer cumulatively impacting hiding cover nor are they overlapping in time and space since regeneration usually occurs within 10 years or less. The more recent past actions are still likely having an effect on thermal cover since harvest activities included shelterwood, overstory removal, and commercial treatments. Although the model is only estimating 38 acres of thermal cover, it is likely under representing. The eastern portion of the KEA has also received treatments for fuels reduction purposes to increase spacing since this area is next to residential homes and/or private land. The Forest Service lands within the KEA are also adjacent to the La Pine State Park and some BLM and State parcels.

The only ongoing vegetation project in the KEA is the Fall project. This project is still likely having an impact due to the reduction of hiding and thermal cover, but as part of mitigation, gate closures were put into effect to provide more solitude for elk. Other ongoing activities in the KEA include elk hunting and fishing along Fall River, while a large portion of the KEA is within the La Pine State Park.

From a cumulative standpoint, the Junction EA would treat less than 1% of hiding cover and 0% of thermal cover in the Fall River KEA under either alternative. Additionally, no new roads or temporary roads are proposed. The ongoing projects, in combination with the proposed Junction EA are expected to result in small negative short-term cumulative effects due to the reduction in hiding cover. While some additive cumulative effects may be anticipated in the short-term, the Junction EA is consistent with the Forest Plan. There are no foreseeable actions within the Fall River KEA that have potential to further reduce hiding or thermal cover.

Forest Plan Consistency

Either action alternatives would be consistent with the Forest Plan. Forest Plan M9-82 states: When managing vegetation along major highways which have migration routes crossing them, consideration will be given to minimizing risks of vehicular collisions.

Elk – Determination

Because this project impacts less than 1% of suitable habitat across the Forest, the overall direct, indirect and cumulative effects will result in a small negative trend of habitat (increase in disturbance). The loss of habitat (increase in disturbance) will be insignificant at the scale of the Forest. The Junction Project is consistent with the Forest Plan, and thus continued viability of elk is expected on the Deschutes National Forest.

Mule deer

Information on habitat needs is contained in the Wildlife Report and is summarized from the Species Assessment for mule deer for the Deschutes National Forest (USDA Forest Service, 2012).

Similar to elk, mule deer were chosen as an MIS identified in the Forest Plan for its socio-economic importance to the hunting community within Central Oregon as well as other neighboring communities (USDA 1990). The Forest Plan addresses forest management practices that assist ODFW in achieving their management objectives (MO) for mule deer populations by providing adequate habitat. ODFW maintains the responsibility of assessing mule deer population viability for deer herds associated with the Deschutes National Forest.

Deer summer range includes the entire Deschutes National Forest outside MA 7, although some use during summer takes place in transition/winter range areas. Management of deer habitat outside of MA7 is designed to provide adequate habitat quantity and quality to meet MO's. This requires a mosaic of forested conditions incorporating the concepts of security and thermal cover, travel corridors, visual screens, and harassment reduction from other activities, e.g. roads, hunting pressure, and other recreation use.

Hiding cover must be present over 30% of National Forest Land in each implementation unit, resulting in 70% of each implementation unit existing as a hiding area or within 600 feet of a hiding area. Summer range habitat was quantified by 10^{th} and 12^{th} field sub-watershed to correlate habitat to a similar scale as a Forest vegetation management project. To assist in limiting disturbance to mule deer in summer range, the road densities objective should not exceed 2.5 miles per square mile.

Existing Conditions

At the Forest-wide scale, the majority of each watershed and sub-watershed exceeds Forest Plan hiding cover standards for deer summer range. Of the NFS lands totaling 1,592,631 acres, hiding cover on summer range exceeds the 30% Forest standard, averaging 45% or 742,882 acres of hiding cover. The habitat analysis for MA-7 (winter range) identified hiding cover objectives to be consistent for the entire area, with 12% of MA-7 existing as hiding cover. However, thermal cover is far below the 30% objective with only 12% existing.

Road Densities for both the Metolius and North Paulina winter range sub-units are within the road density range and meet Forest Plan objectives. Tumalo and South Paulina exceed the road density objectives. Due to the insignificant size of the Ft. Rock portion of the winter range, and to truly assess road densities in the southern portion of MA-7, road densities were combined with South Paulina. Road densities for summer range vary drastically by watershed. Some sub-watersheds that are highly associated with wilderness areas, such as the Jefferson Creek sub-watershed, have very low road densities. Approximately 49% of all 12^{th} field sub-watersheds meet Forest Plan objectives for open road densities.

Junction Project Area Existing Conditions

The entire Junction Planning Area is within deer summer range, but there is no winter range. Habitat modeling approximates 64,938 acres or 59% of hiding cover in the Fall River watershed or 9% of the Forest-wide total, while there is approximately 8,227 acres or 47% of hiding cover in the Junction Planning Area. The watershed is exceeding the 30% hiding cover Forest Plan standard.

The current average open road density in the Fall River watershed is 3.1 miles per square mile, while the road density in the Junction Planning Area is 2.16 miles per square mile. The watershed is currently above the Forest Plan standard of 2.5 miles per square mile.

There are no developed recreation areas, summer use trails or facilities within the planning area. The majority of the area receives light dispersed recreation use. The dispersed recreation use includes activities such as camping, hunting, snowmobiling, biking, and driving for pleasure. Hunting for deer and elk in the fall is the major recreational use of the planning area. During the winter seasons, the 4140 road located along the planning area's northern boundary is a groomed snowmobile trail which receives heavy traffic. Portions of roads 40, 42, and 45 are major access routes to recreation areas on the Deschutes National Forest for most of the year.

Due to past silvicultural and some prescribed burn treatments and the wildlife guzzlers in the planning area, the area provides foraging habitat, but due to the density of regenerating lodgepole pine, foraging areas are reducing in quality. Since the planning area consists of 70% lodgepole pine and below in road density, it provides quality hiding cover. Small groups and/or individual mule deer were frequently observed throughout the planning area during the 2010 field season.

Mule deer – Direct and Indirect Effects – Alternative 1

This alternative would not reduce hiding cover in the planning area. Although, hiding cover would continue to increase above desired conditions in the short-term and reduce foraging habitat. Due to the density of trees and as trees gain height, they will begin shading out the shrub component. This alternative also foregoes the opportunity to reduce the risk of vehicle collisions with deer along the major roadways, improve foraging habitat with prescribed burning, and further reduce the open road density.

Mule deer – Direct and Indirect Effects – Alternatives 2 and 3

Implementation of Alternatives 2 or 3 is anticipated to reduce the overall amount of hiding cover in the project area and in the Fall River watershed, although levels would remain above Forest Plan Standards and Guidelines. Habitat modeling described above was overlaid with proposed treatments for Alternatives 2 and 3. Table 107 shows the total acres of hiding cover that would be affected by Alternatives 2 and 3 by the proposed management activities.

Table 107: Acres of potential mule deer habitat affected by alternative.

Mule deer	Alt. 2	Alt. 3
Total acres affected	6230*	5825*
Overstory removal	2421	2330
Seed tree/Shelterwood	1488	1478
Commercial thinning	1732	1428
Total overstory removal	5640	5236
No tree harvest	590	589
Prescribed burning	2209	1952
Mowing	3167	5825
Understory treatment	6230	5825

*These are the total acres of habitat affected based on habitat modeling, while the following rows show the acres affected by activity type. These rows will not add up equally to the total acres affected since certain activities would only occur in certain units or because there are overlapping activities in the same units.

Not all proposed treatments are anticipated to impact hiding cover equally. Overstory removal of lodgepole pine would not remove hiding cover directly since the remaining regenerating trees are scattered throughout the unit and are providing the hiding cover. In order to remove the more mature overstory trees, some of these smaller trees will be trampled during implementation. This treatment will open the canopy to further enhance dense regeneration and would provide additional hiding cover within a few years. Seed tree/shelterwood treatments would not directly reduce hiding cover, but the follow-up treatment such as whip falling and machine piling may reduce hiding cover in the short-term. Commercial thinning would reduce hiding cover where understory fir, lodgepole pine, or ponderosa pine is impacted through sale activity or fuels treatments. Understory treatments (pre-commercial thinning) may also remove hiding cover if the unit contains young trees that have not self-pruned. While Alternative 2 would impact more acres of hiding cover than Alternative 3 thru overstory and understory treatments, it would also increase more forage within the short-term due to the anticipated increase in the shrub component and grasses/forbs.

Mowing under Alternative 3 may impact more acres of foraging habitat and hiding cover than Alternative 2. Mowing is proposed to reduce the fuel loadings, but mostly targeted to reduce the shrub density. Mowing is also proposed along some of the major highways in the planning area to reduce the fire risk and increase egress. This would be consistent with Forest Plan M9-82 which states: When managing vegetation along major highways which have deer migration routes crossing them, consideration will be given to minimizing risks of vehicular-deer collisions. While mowing may reduce some hiding cover by mowing some of the smaller diameter trees or tall shrubs, mowing would occur in a mosaic pattern to retain some shrub cover. Conversely, mowing would provide more palatable browse since shrubs would only be mowed down to 8-9 inches in height. Pile burning is proposed across treated acres and would be the last treatment, but it is not expected to reduce hiding cover.

Prescribed burning would only occur in ponderosa pine stands. While Alternative 2 may impact more acres of hiding cover than Alternative 3, it would also be more beneficial due to the expected increase in forage. High quality forage is provided by the development of nutrient rich early seral forbs and shrubs and is produced by prescribed fire, wildfires, and tree thinning which opens stands, enhancing shrub and forb production by reduced shading.

No new roads are proposed under either alternative, but approximately 18.6 miles of temporary roads are proposed under Alternative 2 and 14.3 miles under Alternative 3. Alternative 2 would have more of an impact than Alternative 3 due to more temporary roads and decrease in forage. Either alternative may cause disturbance to deer for the life of the project. Post treatment, solitude or security for mule deer may increase since either alternative would close 0.57 miles and decommission 2.62 miles of roads. The post road density in the planning area would be reduced down to 2.01 miles per square miles.

Overall, Alternative 3 would have less short-term impacts to hiding cover. Impacts to hiding cover would be reduced with several project design elements, such as the large conservation areas, no harvest areas, no treatment areas, leave and retention areas. Alternative 3 would have the least impacts to hiding cover, while Alternative 2 would increase more foraging habitat. Overall, Alternative 3 would be the most beneficial to mule deer.

Mule deer – Cumulative Effects

As shown in the past actions table in Appendix A, the most influential activities that has contributed to the existing road density and hiding cover in the Fall River watershed are from timber harvest activities. However, these past activities are no longer cumulatively impacting hiding cover nor are they overlapping in time and space since regeneration usually occurs within 10 years or less.

The ongoing vegetation projects in the watershed may have an impact to hiding cover. The other ongoing activities in the watershed, such as recreational activities are expected to continue. Given the amount of existing hiding cover in the watershed, it should offset disturbance impacts.

From a cumulative standpoint, the Junction EA would affect 10% of hiding cover in the Fall River watershed under Alternative 2, while Alternative 3 would affect 9%. This would bring down the current hiding cover percentage in the watershed from 59% to 49%-50% and still well above the Forest Plan objective of 30% by watershed. The total road density in the Fall River watershed would also be reduced by a total of 3.19 miles.

The ongoing projects, in combination with the proposed Junction EA are expected to result in small negative short-term cumulative effects due to the reduction in hiding cover. While some additive cumulative effects may be anticipated in the short-term, the Junction EA is consistent with the Forest Plan. There are no foreseeable actions within the Fall River watershed that have potential to further reduce hiding cover.

Forest Plan Consistency

The Forest Plan Standards and Guidelines for mule have been reviewed. Either action alternative under the Junction project would be consistent with the S&Gs. Hiding cover would still remain well above the 30% objective, while the road density would be reduced, moving towards the 2.5 miles per square mile objective.

Mule deer – Determination

Because this project impacts less than 1% of suitable habitat across the Forest, the overall direct, indirect and cumulative effects will result in a small negative trend of habitat (increase in disturbance). The loss of habitat (increase in disturbance) will be insignificant at the scale of the Forest. The Junction Project is consistent with the Forest Plan, and thus continued viability of is mule deer expected on the Deschutes National Forest.

Migratory Birds

The following section shows the lists for migratory birds such as focal bird species and birds of conservation concern in their respective lists from their conservation plans. Several of these species are also included in other lists, such as the Regional Forester's sensitive species list, or as MIS in the Deschutes Forest Plan. These species that are on these lists have already been discussed and were not further analyzed. The species in bold letters have potential habitat within or adjacent to the project area, while the remaining species have no habitat presence.

Conservation Strategy for Eastslope of the Cascade Mountains

The Conservation Strategy for Landbirds of the East-Slope of the Cascade Mountains in Oregon and Washington (*Landbird Conservation Strategy*) outlines conservation measures, goals and objectives for specific habitat types found on the east-slope of the Cascades and the focal species associated with each habitat type (Altman 2000). The Deschutes National Forest is in the Central Oregon sub-province. Conservation issues for ponderosa pine include loss of large diameter ponderosa pine trees from timber harvest, grazing, understory fir encroachment from previous fire suppression, and habitat fragmentation. Some of the conservation issues for mixed conifer include loss of older forest and large diameter trees and snags from timber harvest, and high risk of loss of remaining mixed conifer over stories from stand-replacing fires due to high fuel loads in densely stocked understories

There are approximately 4,824 acres of ponderosa pine habitat in the Junction planning area that may provide suitable habitat for the pygmy nuthatch and chipping sparrow, while there is 303 acres of mixed conifer habitat that may provide suitable habitat for the brown creeper, flammulated owl, hermit thrush, and olive-sided flycatcher.

Table 108: Landbirds of the East-Slope of the Cascade Mountains in Oregon &Washington.

Habitat	Habitat Feature	Focal Species for Central Oregon	Habitat Presence in project area?
Ponderosa Pine	Large patches of old forest with large snags	**White-headed woodpecker**	Addressed in the MIS section
	Large trees	**Pygmy nuthatch**	Yes
	Open understory with regenerating pines	**Chipping sparrow**	Yes
	Patches of burned old forest	**Lewis' woodpecker**	Addressed in the MIS section

Mixed Conifer (Late-Successional)	Large trees	**Brown creeper**	Yes
	Large snags	**Williamson's sapsucker**	Addressed in the MIS section
	Interspersion grassy openings and dense thickets	**Flammulated owl**	Yes
	Multi-layered/dense canopy	**Hermit thrush**	Yes
	Edges and openings created by wildfire	**Olive-sided flycatcher**	Yes
Lodgepole Pine	Old growth	**Black-backed woodpecker**	Addressed in the MIS section
Whitebark Pine	Old-growth	Clark's nutcracker	There is no whitebark pine in or adjacent to the project area, therefore there is no suitable habitat.
Meadows	Wet/dry	Sandhill Crane	There are no meadows that would support sandhill cranes in the project area, therefore there is no suitable habitat.
Aspen	Large trees with regeneration	Red-naped sapsucker	Addressed in the MIS section
Subalpine fir	Patchy presence	Blue Grouse	There is no subalpine fir habitat within or adjacent to the project area, therefore there is no suitable habitat.

Birds of Conservation Concern and High Priority Shorebirds

The Birds of Conservation Concern (*BCC*, USDI FWS 2008) identifies species, subspecies, and populations of all migratory non-game birds that, without additional conservation actions, may become candidates for listing under the ESA. The goal is to prevent or remove the need for additional ESA bird listings by implementing proactive management and conservations actions. Bird Conservation Regions (BCRs) were developed based on similar geographic parameters. BCR 9 (Great Basin) encompasses the BFR District. The U.S. Shorebird Conservation Plan (USDI FWS 2004) identifies the conservation status of U.S. and Canadian shorebird populations.

As shown in Table 109, many of these species have been discussed in either the sensitive species or MIS sections, while there is no suitable habitat for the remaining species in the project area.

Table 109: Birds of Conservation Concern.

Species	Status*	Habitat	Habitat Presence
Birds			
Eared Grebe	BCC, M; MIS S4 Apparently secure	Open water with emergent vegetation	Addressed in the MIS section.
Bald eagle	BCC, R6 Sensitive, MIS	Lakeside or riverside with large trees	Addressed in the sensitive species section.

Species	Status*	Habitat	Habitat Presence
Golden eagle	MIS, BCC, S4	Large open areas with cliffs and rock outcrops	Addressed in the MIS section.
Ferruginous hawk	BCC, Landbird focal species, S3B	Open sagebrush flats	No, there is no open sagebrush habitat in the project area, therefore no suitable habitat and no impact.
Peregrine falcon	BCC, R6 Sensitive	Riparian, cliffs	Addressed in the sensitive species section.
Greater Sage Grouse – Columbia Basin population	BCC; R6 Sensitive	Sagebrush flats	Addressed in the sensitive species section.
Yellow Rail	BCC, R6 Sensitive	Marshes	Addressed in the sensitive species section.
Snowy plover	BCC, Shorebird, S2	Sandy beaches	No, there is no sandy beach habitat in the project area, therefore no suitable habitat and no impact.
Long-billed curlew	BCC, Shorebird, S3B	Dry grasslands	No, there is no dry grasslands habitat in the project area, therefore no suitable habitat and no impact.
Marbled godwit	BCC, Shorebird, SNA	Expansive mudflats and sandflats on beaches	No expansive mudflats habitat in the project area, therefore no suitable habitat or no impact.
Yellow-billed cuckoo	BCC, SHB	Riparian hardwoods	No, there are no cottonwoods along this stretch of Fall River providing large diverse patches; therefore there is no suitable habitat and no impact.
Flammulated owl	BCC, Landbird focal species, S3B	Interspersed grassy openings and dense thickets in late successional mixed conifer forests	Yes (addressed in the Landbird Strategy section above).
Black swift	BCC, S2B	Damp coastal cliffs	No damp cliff habitat in the project area, therefore no suitable habitat and no impact.
Calliope Hummingbird	BCC	Open montane forest, mountain meadows, & willow & alder thickets	Common spring and fall migrant. There is no montane forest or meadows in the project area, while Fall River is present, there are no willow & alder thickets that would provide this habitat; therefore no suitable habitat and no impact.
Lewis' Woodpecker	BCC, R6 Sensitive, MIS	Open ponderosa pine forests, large diameter dead or dying trees, burned forests	Addressed in the MIS section.
Williamson's	MIS, BCC, Landbird	Mature or old growth	Addressed in the MIS section.

Species	Status*	Habitat	Habitat Presence
sapsucker	focal species, S4B, S3N	conifer forests with open canopy cover; weak excavator	
White-headed Woodpecker	Region 6 Sensitive, MIS, BCC, Landbird focal species, S2, S3B	Large mature & open ponderosa pine forests; weak excavator	Addressed in the MIS section.
Loggerhead shrike	BCC, S3B, S2N	Open habitat with scattered trees and shrubs	In Deschutes County, uncommon to locally common summer resident, uncommon spring and fall migrant, and rare winter visitor. There is no habitat in the project area, therefore no impact.
Pinyon Jay	BCC	Pinyon-juniper woodlands and also open ponderosa pine forests where the soil is dry and trees are small and scattered	There is no pinyon juniper habitat; therefore no suitable habitat and no impact.
Sage Thrasher	BCC	Nests in sagebrush steppe and big sagebrush shrubland.	Occurs on eastern edge of Forest. There is no sagebrush steppe and big sagebrush shrubland habitat in the project area, therefore no suitable habitat and no impact.
Virginia's warbler	BCC, S4	Mountain mahogany	There is no mountain mahogany habitat in the project area, therefore no suitable habitat and no impact.
Green-tailed Towhee	BCC	Arid and brushy foothills with shrubs including ponderosa pine-western juniper woodland	Occurs on the Forest. Not likely to occur in the project area due to the absence of arid foothills & juniper woodland; therefore no suitable habitat and no impact.
Brewer's sparrow	BCC, S4	Sagebrush habitats	There is no sagebrush habitat in the project area, therefore no suitable habitat and no impact.
Black-chinned Sparrow	BCC	Arid brushlands. Nests in sagebrush steppe and big sagebrush shrubland.	Not documented on Forest. There is no arid brushlands, including sagebrush steppe and big sagebrush shrubland, therefore there is no suitable habitat and no impact.
Sage sparrow	BCC, S4	Sagebrush habitats	There is no sagebrush habitat in the project area, therefore no suitable habitat and no impact.
Tricolored Blackbird	Region 6 Sensitive, BCC, S2B	Lakeside, bulrush	Addressed in the sensitive species section.
Black-crowned Rosy Finch	BCC	Rock outcroppings, cliffs, talus for breeding and snowfields/open ground for feedings	Closest occurrence in Steen Mountains in eastern Oregon. Not documented on the Forest. This habitat does not exist in the project area, therefore no suitable habitat and no impact.

Oregon Sensitive Species determined from the Natureserve database for Oregon: S1, critically imperiled, S2 = imperiled, S3 = vulnerable, S4 = apparently secure, S5 = secure, B = breeding, N = non-breeding, SNA – status not applicable, SHB – possibly extirpated.

The following section is the direct and indirect and cumulative effects for the migratory bird species brought forward for this analysis: pygmy nuthatch, chipping sparrow, brown creeper, flammulated owl, hermit thrush, and olive-sided flycatcher. The species are grouped within their main habitat type similar to the Landbird Strategies.

Existing Conditions for Species Associated with Ponderosa Pine Habitat

There is a total of approximately 4,824 acres of ponderosa pine in the Junction planning area scattered mainly along the outer perimeter. However, not all these acres may necessarily provide suitable habitat for the pygmy nuthatch and chipping sparrow (the white-headed and Lewis' woodpeckers were addressed in the Biological Evaluation).

The Landbird Conservation Strategy for ponderosa pine forest emphasizes maintaining healthy ecosystems through representative focal species for three habitat conditions mentioned above (i.e. large trees, large snags, and open understory). Conservation strategies for management of this habitat include: 1) use of prescribed burning and/or thinning when and where appropriate to reduce fuel loads and accelerate development of late-seral conditions; 2) retain all large trees, especially ponderosa pine >20" dbh; 3) initiate snag creation and recruitment where necessary; 4) retain all existing snags and broken-topped trees in units; 5) implement road closures (obliteration); 6) and minimize invasion of exotic and noxious weeds and soil erosion.

Based on the analysis, modeling, and field reconnaissance, ponderosa pine trees of all sizes are present. In some stands, seedling/sapling or pole-sized trees dominate. Other stands have an abundance of medium diameter trees and varying levels of large trees. Ponderosa pine dwarf mistletoe is present in varying amounts throughout the planning area. Some stands, especially those that have not been entered in the recent past are generally over stocked for healthy tree vigor. A large number of understory trees compete with the older trees for moisture and nutrients. In many areas, a 1' to 4' tall brush component covers up to 100% of the ground. This component of snowbrush Ceanothus, bitterbrush, and greenleaf manzanita also competes with the trees for moisture and nutrients. Pine grass and sedge occupy sites where brush provides less than 100% cover. With the exception of the stands on Pistol Butte nearly all ponderosa pine stands within the planning area have been previously entered. Based on the snag transects, there is also a lack of very large ponderosa pine trees >25" dbh.

The objectives for managing ponderosa pine for this project is to reduce both the overstory and understory densities to promote healthy, vigorous residual trees and to retain the larger healthier trees, while removing the smaller and less fire tolerant trees. Dwarf mistletoe would be reduced, while the stands would be more open with fewer ground fuels due to mowing of the brush and/or by prescribed burning. This would allow wildfires to occur at a low intensity and cause minimal tree mortality. Healthier stand transitions to late seral stages would continue at an increased rate. A specific wildlife objective for treating the ponderosa pine is to create and enhance quality suitable habitat for the white-headed woodpecker. By doing so, it should create and provide suitable habitat for the pygmy nuthatch and chipping sparrow as well.

There has been no recent stand replacement or natural fires within the Junction planning area. The most recent fires that occurred in the planning area include the 1990 Wake Butte fire (365 acres) and the 1999 Spring River Butte fire (84 acres). There are a few patches of large ponderosa pine in the planning area, mainly along the western flank, the northern portion and at the northern end and base of Pistol Butte. Therefore, there are opportunities to expand and develop continuous habitat for pygmy nuthatch and chipping sparrow.

Pygmy Nuthatch

Pygmy nuthatches can be found at densities of 4-19 pairs per 99 acres in suitable habitat and are ranked as ‘apparently Secure” in Oregon (Natureserve, 2011). Suitable habitat is open ponderosa pine forest with a mean of 10 trees per acre > 21” dbh, and at least two trees > 31” dbh, and a mean of 1.4 snags per acre > 8” dbh. Landbird Conservation Strategies specific to pygmy nuthatch include: 1) manage for large diameter trees through wider tree spacing and longer rotation periods; 2) eliminate or restrict fuelwood cutting in suitable or potential habitat; 3) retain all snags greater than 10” dbh and all ponderosa pine trees greater than 17” dbh.

Chipping Sparrow

Chipping sparrows are apparently secure within the state of Oregon (Natureserve, 2011). Chipping sparrows are a focal species of more open ponderosa pine stands with regenerating pine patches. They inhabit relatively open overstory with a heterogeneous understory of herbaceous openings and patches of shrubs and/or seedling/sapling trees, especially pines. Landbird Conservation habitat objectives specific to chipping sparrow include: 1) interspersion of herbaceous ground cover with shrub and regenerating pine patches; 2) 20% - 60% cover in the shrub layer in regenerating sapling conifers; 3) mean tree canopy cover 10% - 30%.

Direct and Indirect Effects for Species Associated with Ponderosa Pine Habitat

Alternative 1

Under the no action alternative, pygmy nuthatch and chipping sparrow habitat in the planning area would continue to remain marginal and limited due to the high tree densities and lack of large trees. In the short and long-term, tree growth would remain slow and ponderosa pine black-bark stands would remain dense and would grow increasingly susceptible to stand-replacement disturbances such as wildfire or insects and diseases. Lodgepole pine encroachment would continue due to the lack of disturbance. These species’ preference for open forests with large diameter trees and an open understory would not develop under Alternative 1, nor would the reintroduction of fire occur through prescribed burning. By taking no action, this species’ habitat would continue to decline within the planning area.

Alternatives 2 and 3

While either alternative would address the purpose and need, Alternatives 2 or 3 would also address the wildlife objective to maintain and develop habitat for the white-headed woodpecker. This objective should also improve habitat conditions for pygmy nuthatch and chipping sparrow in the long-term as trees move to late seral conditions.

Alternative 2 would treat 4,219 acres and Alternative 3 would treat 3,804 of the 4,824 total acres of ponderosa pine PAG in the planning area. Most of these acres would be commercially thinned, therefore reducing the tree density and canopy closure. The pygmy nuthatch would benefit from these treatments by developing larger trees, while the openings would benefit the chipping sparrow. The acres of habitat treated may exhibit a short-term impact on these species due to disturbance.

In addition to silvicultural treatments, Alternative 2 would implement prescribed burning on 5,551 total acres and 7,764 acres of mowing, while Alternative 3 would prescribed burn 5,088 acres and mow on 7,259 acres. Note that not all acres proposed for mowing or prescribed burning are currently suitable habitat or within solely the ponderosa pine PAG. Some of these acres are exhibiting a mix of ponderosa pine and lodgepole pine, where the lodgepole pine overstory would be removed, while favoring ponderosa pine. This may create additional acres of habitat for pygmy nuthatch and chipping sparrow, since the overall total of the ponderosa pine PAG is 4,824 acres. While mowing and prescribed burning may also have a short-term impact on individuals or habitat, these stands would begin to develop into the more desirable late seral and open habitat in decades to come.

No new roads are proposed under either alternative, but approximately 18.6 miles of temporary roads are proposed under Alternative 2 and 14.3 miles under Alternative 3. Alternative 2 may have more of an impact than Alternative 3 due to more temporary roads. This may decrease foraging or nesting areas or cause disturbance to these species. Post treatment, solitude or security for these species may increase since either alternative would close 0.57 miles and decommission 2.62 miles of roads. The post road density in the planning area would be reduced down to 2.01 miles per square miles.

Overall, Alternative 2 would be the most beneficial to pygmy nuthatch and chipping sparrow due to more acres treated for promoting LOS ponderosa pine thus more desirable habitat for these species in the future.

Cumulative Effects for Species Associated with Ponderosa Pine Habitat

As shown in the past actions table in Appendix A, the most influential activities that have likely contributed to the lack of LOS ponderosa pine in the Fall River Watershed has occurred from timber harvest activities from the 1970s – 1980s. The past actions are no longer cumulatively influencing this habitat type or are overlapping in time and space in the Fall River watershed. Therefore, the past actions that have occurred are included in the existing conditions. From the 1990’s to present, the transition to conserving and promoting LOS occurred, reducing the rate of loss of habitat. Since the early 1900’s, fire suppression has likely been the second most influential activity, which has limited stand replacement fires or natural fires from creating more desirable late structure habitat for pygmy nuthatch and chipping sparrow.

Ongoing activities within the Fall River Watershed that may have short-term impacts to these two species due to disturbance or decrease in foraging or nesting habitat include pile burning and/or prescribed burning in the Klak, Katalo, Fall, Pit, Nut, and Charlie Brown project areas; the tree harvest activities within these project areas have already been completed. Although these projects may have had or are having short-term disturbance impacts to habitat, there should be a beneficial impact in the long-term due to promoting and contributing to the development of LOS.

The EXF project is another ongoing vegetation management project in the watershed and commercial and non-commercial timber cutting and removal with hand and machine piling of slash prior to burning the piles and prescribed burning on 2,500 acres is proposed. The harvest activities are still occurring. Under this project the effects of removing 7 acres of the ponderosa pine PAG classified as LOS within the watershed were disclosed in the EXF analysis. This would be a small reduction of habitat and potential disturbance in the watershed.

From a cumulative standpoint, the Junction project would treat 13% of ponderosa pine habitat in the Fall River watershed under Alternative 2 (4,219 acres/31,500 acres) and 12% under Alternative 3 (3,804 acres/31,500 acres). This project would cumulatively enhance ponderosa pine habitat within the watershed by treating and promoting more acres towards LOS in the long-term (currently the LOS structural stage 7 is below HRV levels).

The ongoing projects, in combination with the proposed Junction project are expected to result in small negative short-term cumulative effects to individual pygmy nuthatches and chipping sparrows or habitat in the Fall River watershed, but with long-term beneficial effects.

There are no foreseeable actions within the Fall River watershed that have potential to reduce suitable habitat for pygmy nuthatches and chipping sparrows.

Landbird Conservation Strategy Consistency

The Landbird Conservation strategies and guidelines have been reviewed for pygmy nuthatch and chipping sparrow. Either action alternative for the Junction Project would be consistent with these strategies, including the use of prescribed burning and/or thinning when and where appropriate to reduce fuel loads and accelerate development of late-seral conditions while providing a herbaceous layer; manage for large trees through wider tree spacing and longer rotation periods, especially ponderosa pine >20" dbh; no ponderosa pine snags would be felled except for safety reasons; implement road closures; there are no fuelwood units proposed, minimize invasion of exotic and noxious weeds and soil erosion. Additionally, by retaining several of the wildlife guzzlers in the area would also provide a watering source and habitat in those areas.

Determination for Species Associated with Ponderosa Pine Habitat

Since the proposed Junction project would affect <1% of the existing ponderosa pine habitat across the Forest under either Alternative 2 (4,219 acres/ 486,148 acres) or Alternative 3 (3,804 acres/ 486,148 acres), the overall direct, indirect, and cumulative effects may result in a small negative trend of habitat in the short-term and beneficial in the long-term. However, these effects would be insignificant at the Forest-wide scale and since the Junction project is consistent with the Forest Plan and Landbird Strategies continued viability of pygmy nuthatch and chipping sparrow is expected on the Deschutes National Forest.

Existing Conditions for Species Associated with Mixed Conifer Habitat

There is a total of approximately 303 acres of mixed conifer (138 acres of mixed conifer dry and 114 acres of mixed conifer wet) in the Junction planning area with 275 acres occurring in a narrow band along the northern boundary of the planning area and the remaining 28 acres are in the far western end. Structure Class 4 (understory re-initiation stage) dominates approximately 80% of these stands, while the remaining acres are in Structure Class 5 (multi-stratum without large trees). These two classes are also referred as mid-seral stages. Within the Fall River Watershed, the acres of mixed conifer in Structure Class 4 and 5 (mid-seral habitat) are currently at 77% compared to 40-50% HRV, meaning there is a lack of late seral acres. This is consistent with the data showing the Structure Class 7 is currently <1% compared to 5-10% HRV.

Not all these acres may necessarily provide suitable habitat for the **brown creeper, flammulated owl, hermit thrush,** and **olive-sided flycatcher**. Based on the analysis, modeling, and field reconnaissance, the mixed conifer stands have nearly all been entered in the past primarily to reduce stand densities through thinning. Although a few scattered large trees may occur, the residual stands are composed of smaller trees less than 20" dbh. These stands are composed of a variety of tree species, with the predominant species as true firs, ponderosa pine, and lodgepole pine. The moist growing conditions favor Ceanothus as the primary brush species. The brush is often so dense that other ground vegetation is shaded out.

The main objective in mixed conifer stands is to provide a mix of tree species, while meeting objectives for long-term health and vigor, and transitioning to later seral stages. Smaller, less fire tolerant trees would be removed favoring larger, more tolerant fire resistant trees. The stands would be more open with fewer ground fuels due to mowing of the brush.

There has been no recent stand replacement or natural fires within the Junction planning area. The most recent fires that occurred in the planning area include the 1990 Wake Butte fire (365 acres) and the 1999 Spring River Butte fire (84 acres).

Brown Creeper

Brown creepers are a focal species for large trees within mixed conifer (i.e. white fir or Douglas-fir) plant association. Marshall et al. (2003) cites literature that suggests brown creeper numbers are reduced by clear cutting and thinning, but will utilize closed canopied stands. Information in Mellen-McLean et al. (2009) suggests that brown creepers will utilize snags from 9" to 20" dbh, but there was no information in regards to densities.

According to Altman (2000), conservation issues for this species include: loss of large diameter trees (especially Douglas-fir) to logging; and indications that it may be a forest interior species (i.e. avoids edges and openings). Conservation strategies in Altman (2000) include: maintain stands in the largest tracts possible to reduce the amount of edge and fragmentation; designate areas of unmanaged late-successional forest to provide the most suitable nesting habitat; managing for large diameter trees through longer rotation periods; and in harvest units retained trees should be clumped together rather than dispersed and should be primarily Douglas-fir.

Flammulated Owl

Flammulated owls are a focal species of grassy openings and dense thickets within late-successional mixed conifer plant associations. Based on District Records, flammulated owls are not known to occur in the project area. Literature cited within NatureServe (2011) report for Oregon, flammulated owl nest densities of 1 nest per 247 acres. Therefore, the project area may support one flammulated owl nesting pair.

According to Altman (2000), conservation issues for this species include: loss of mature and old-growth trees and snags for nest and roost sites; loss of open understory because of invasion of exotics and fire intolerant species; requires small patches of dense thickets for roosting; creation of large areas of even-aged stands is detrimental; fuelwood collection reduces the densities of snags.

Some of the conservation strategies include: target conservation efforts near grassland or dry meadow openings; leave patches of dense sapling thickets to function as roost sites; retain large snags (greater than 12” dbh); create snags or use nest boxes as a short-term supplement; and maintain grassy openings.

Hermit Thrush

The hermit thrush is a focal species of multi-layered, dense mixed conifer stands. They occur in open humid coniferous and mixed forest and forest edge, dry sandy and sparse jackpine, and less frequently in deciduous forest and thickets (NatureServe 2011).

Conservation issues associated with this species include the loss or alteration of habitats (loss of understory and structural complexity) from fire, grazing, and winter recreational activities.

The conservation strategy to address the issues for this species is to retain tracts of forest as unmanaged or lightly managed to ensure structural diversity.

Olive-sided Flycatcher

The olive-sided flycatcher will perch and hunt from dead trees within an open area and usually nest within the forest surrounding the opening (Natureserve, 2011). Olive-sided flycatchers are a focal species of edges and openings created by wildfires (Altman, 2000).

Conservation issues associated with this species include: changes in fire regimes that have resulted in fewer but larger fires that reduce the amount of edge between early and late seral forest; and brush control limits understory growth that provides insect productivity.

Some of the Conservation Strategies in Altman (2000) for this focal species include: 1) using prescribed fire with manual understory clearing where appropriate to create a patchy mosaic of burned forest; 2) increase the level of acceptable opportunities to allow wildfires to burn or ignite fires when conditions and opportunities exist; 3) where possible, prohibit salvage logging to occur in post-fire habitat; 4) for protection of snags, close roads or restrict fuelwood permits in areas where large snags are present; 5) retain standing dead or diseased trees where they occur; 6) If snags are limiting, create suitable snags through girdling, topping, etc.;7) minimize brush control; 8) selective logging can be used to increase suitability of habitat as long as sufficient large living and dead trees are retained; and 9) eliminate or minimize pesticide spraying near nesting pairs which may reduce insect prey base.

Direct and Indirect Effects for Species Associated with Mixed Conifer Habitat

Alternative 1

Although this alternative would not impact snags or brushy components for these species, these stands would likely decline in health and vigor within the later short-term due to the high tree density and continued competition of the shrub component. Additionally, this alternative would not address the lack of late seral mixed conifer habitat, and would not reintroduce fire to improve habitat conditions for brown creeper, flammulated owl, hermit thrush, or olive-sided flycatcher.

Alternatives 2 and 3

Alternatives 2 or 3 would treat approximately 252 total acres (138 acres of wet mixed conifer and 114 acres of dry mixed conifer) of the 303 existing acres of mixed conifer through commercial thinning followed with mowing, and then prescribed burning. The objective is to provide a mix of tree species, while meeting objectives for long-term health and vigor, and transitioning to later seral stages. The smaller, less fire tolerant trees would be removed favoring larger, more tolerant fire resistant trees such as ponderosa pine. Post-treatment, these stands would be more open with fewer ground fuels and less brush component.

No new roads are proposed under either alternative, but Alternative 2 would require more temporary roads than Alternative 3. This may decrease foraging or nesting areas such as loss of snags for safety reasons, reduces the amount of shrub component or cause displacement to these species.

These treatments would have a short-term impact to all four of these species due to the reduction in trees, canopy closure, snags, and brush component, but should have a beneficial impact in the long-term by providing late seral trees and a multi canopy layer.

Several of the project design elements that were developed would minimize some of the impacts to brown creeper, flammulated owl, hermit thrush, and olive-side flycatcher habitat. For example, Alternatives 2 and 3 would retain all ponderosa pine snags regardless of dbh size, unless for safety reasons, and retain all live ponderosa pine and white fir trees greater than, equal to 21” dbh. Alternative 3 would retain all ponderosa pine trees less than 21” dbh if they meet old tree characteristics. Approximately 51 acres of mixed conifer would remain as is, which is within a Late Old Structure (LOS) wildlife connectivity corridor. Lastly, mowing would occur in a mosaic pattern and would only be mowed down between 8-9 inches in height, which would continue to provide foraging habitat within the short-term.

Overall, either alternative would be about equally beneficial to these four species due to promoting LOS mixed conifer thus more desirable habitat for these species in the future.

Cumulative Effects for Species Associated with Mixed Conifer Habitat

As shown in the past actions table in Appendix A, the most influential activities that have likely contributed to the lack of late seral mixed conifer (Structure Class 7) in the Fall River Watershed has occurred from timber harvest activities from the 1970’s – 1980’s. The past actions are no longer cumulatively influencing this habitat type or are overlapping in time and space in the Fall River watershed. Since the early 1900’s, fire suppression has likely been the second most influential activity, which has limited stand replacement fires or natural fires from creating more desirable late structure habitat with openings and edges for brown creeper, flammulated owls, hermit thrush, and olive-sided flycatchers.

Ongoing activities within the Fall River Watershed such as Klak, Katalo, Fall, Pit, Nut, and Charlie Brown project areas are not likely having an impact on these four species because these projects primarily occurred in lodgepole pine and ponderosa pine forests, which is not preferred habitat.

From a cumulative standpoint, the Junction project would treat <1% of mixed conifer habitat in the Fall River watershed under either Alternatives 2 or 3 (252 acres/30,578 acres). This project would cumulatively enhance mixed conifer habitat within the watershed by treating and promoting more acres towards LOS in the long-term since structure class 7 is currently below HRV levels.

The ongoing projects, in combination with the proposed Junction project are expected to result in small negative short-term cumulative effects to individual brown creepers, flammulated owls, hermit thrushes or olive-side flycatchers or habitat in the Fall River watershed, but with long-term beneficial effects.

There are no foreseeable actions within the Fall River watershed that have potential to reduce suitable habitat for these four species.

Landbird Conservation Strategy Consistency

The Landbird Conservation strategies and guidelines have been reviewed for brown creeper, flammulated owl, hermit thrush, and olive-sided flycatcher. While not every specific aspect of these strategies for each species would be met under either action alternative, the Junction Project would overall improve the mixed conifer habitat type. This would be accomplished by including the use of prescribed burning and/or thinning when and where appropriate to reduce fuel loads and accelerate development of late-seral conditions; retain all large trees >21" dbh, retain all existing ponderosa pine snags, no salvage units are proposed, mowing and prescribed burning would occur in a mosaic pattern, no firewood units are proposed, 51 acres would remain unmanaged in the adjacent connectivity corridor, and implementing road closures.

Determination for Species Associated with Mixed Conifer Habitat

Since the proposed Junction project would affect <1% of the existing eastside mixed conifer habitat across the Forest under either Alternatives 2 or 3 (252 acres/ 337,034 acres), the overall direct, indirect, and cumulative effects may result in a small negative trend of habitat in the short-term and beneficial in the long-term. However, these effects would be insignificant at the Forest-wide scale and since the Junction project is consistent with the Forest Plan and most aspects of the Landbird Strategies continued viability of brown creeper, flammulated owl, hermit thrush, and olive-sided flycatcher is expected on the Deschutes National Forest.

Conclusion

Overall, the Junction project would have short-term impacts, but beneficial effects in the long-term for the white-headed woodpecker and Lewis' woodpeckers. Other species such as goshawks, red-tailed hawks, ospreys, hairy woodpeckers, pygmy nuthatch, and brown creepers would also benefit from ponderosa pine restoration. While there would be a reduction in habitat for the three-toed and black-backed woodpecker, this project would maintain habitat by providing large blocks of untreated habitat, including other areas such as the OGMA corridors, and in leave and retention areas. While meeting fuels objectives along the scenic corridors, the risks of vehicle collision with deer and elk would also be reduced. By meeting fuels objectives near the Fall River hatchery would also improve habitat along the riparian area for species such as the great blue heron and ospreys. The Junction project would be consistent with the forest plan standards and guidelines, therefore no forest plan amendments would be needed for the wildlife resource.

3.3.5 Scenery

Introduction

The Visual Quality System (VQS) of 1974, which was used in the Forest Plan, and the Scenery Management System (SMS), which is the most current system for evaluating scenic resources, were both used to evaluate the existing condition in the Junction project area. This section would only reference the SMS, refer to the Scenic Resources Report located in the project file to see the crosswalk between the VQS and SMS.

Scenic integrity (the degree to which the landscape is free from visible disturbances that detract from the natural and socially valued appearance) levels for Scenic Views management areas are divided into three categories of acceptable landscape alteration. The categories are:

High Scenic Integrity – Natural appearing landscape (management activities should not be evident the casual Forest visitor)

Moderate Scenic Integrity – Slightly altered landscape (management activities remain visually subordinate to the characteristic landscape)

Low Scenic Integrity – Altered landscape (management activities may dominate the characteristic landscape but must, at the same time, follow naturally established form. It should appear as a natural occurrence when viewed in the foreground and middleground)

Foreground describes the portion of a view between the observer and up to ¼ to ½ mile distances while middleground describes the portions of a view extending from the foreground zone out to 3 to 5 miles from the observer. Background refers to the visible terrain beyond the foreground and middleground where individual trees are not visible, but are blended into the stand. The view beyond 3 to 5 miles from the observer and as far as the eye can detect objects.

Existing Condition

There are approximately 3,292 acres of Scenic Views (MA9) which is classified as Moderate Scenic Integrity in both Foreground and Middleground areas. Foreground management areas are scenic travel routes along Forest Service roads 40 and 45. Predominant buttes within the project area are Wake, Anne, Lolo, Klak, Sitkum and Pistol Butte. Pistol Butte is within an old growth management area (OGMA).

Lodgepole pine stands within Scenic Views management areas are so dense with uniform smaller trees growing that large trees are difficult or nearly impossible to see from scenic travel routes. These stands lack species and size class diversity. These scenic travel routes (FS roads 40 and 45) have also been identified in the Upper Deschutes CWPP as critical transportation corridors making it important to provide safe ingress/egress for local residents, visiting public and firefighters.

Enhancing the monotonous wall-like corridors along scenic routes by providing views through the forest to landscape features is a long-term scenic resource goal.

Effects Analysis

The analysis area for effects documentation for scenic resources is the Scenic Management corridors within the Junction project area boundary.

Direct and Indirect Effects Alternative 1 – No Action

Overstocked and unmanaged stands would remain and continue to worsen as stand density increases resulting in a lack of visual diversity in species and size class in moderate scenic integrity foreground landscapes. These negative impacts would also apply to middleground landscapes which would be visible from scenic travel routes (FS roads 40 and 45) and on the slopes of more predominant buttes, such as Wake Butte and Pistol Butte. Without management scenic quality would continue to deteriorate and Forest Plan standards and guides for maintaining scenic views would not be met.

This alternative would not address overstocked stands which would continue to provide conditions ideal for high intensity fires or insect and disease epidemics or increasing fuel loadings. These conditions would pose an increasing risk to scenic attributes and would not move stands toward the desired condition.

Alternative 2 and Alternative 3

Alternative 2 treatments propose to open stands, decrease densities, and create opportunities for visual diversity in species and size class in moderate scenic integrity foreground and middleground landscapes therefore there would be no negative direct or indirect effects. Treatments would create mosaics similar to natural landscape patters that would be more visible from scenic travel routes. Foreground landscapes would be more visible with a more open character and middleground landscapes would be less visible when the topography is flatter. Middleground landscapes with predominant buttes would be considered highly visible from viewpoints or along travel routes.

Overstory treatments along FS roads 40 and 45 in units 106, 107, 154, 247, and 259 combined with no harvest and no treatment activities in units 226, 244, 245, 246, 248, 268, 269, 270, and 275 would all together provide for more visual diversity for the visitor traveling along this scenic travel route because it will break up the current condition of a monotonous stand, provide more openings into the stand, and more scattered clumps where trees/patches are retained. Whip falling treatments in units 25, 28, 30, and 102 as well as no harvest and no treatment activities in units 29, 66, 79, 117, 219, 250, 252, 254, 255, 258, and 264 along FS road 40 would also provide long-term visual diversity.

Immediate impacts from logging would be visible in the short-term (0 to 5 years), such as lighter colored stumps and disturbed soil. Slash cleanup would take place as soon aspossible, but because of the amount of treatment to be conducted, an amendment is described to allow up to five years to complete slash piling and burning. Over the long-term impacts would lessen due to growth of vegetation and through the efforts of site recovery during cleanup.

Smoke from prescribed and pile burning would have short-term visual impacts during the time of burning. Underburning operations are proposed on about 60 acres of scenic corridor. Blackened bark or scorched branches and needs may result. Project design measures are in place to minimize those impacts. After logging and burning activities are complete stands would be more open and clean.

Cumulative Effects

Alternative 1 – No Action

Past projects within and surrounding the project area have not provided large enough vegetation and fuels treatments to enhance scenic views. The lack of any treatments insurroudning areas combined no treatments under Alternative 1 in moderate scenic integrity foreground landscapes would negatively affect visual diversity of the landscape. These negative impacts would be sustained overtime and would provide wall-like appearances in middleground landscapes when viewed from scenic travel routes. This alternative would also increase the likelihood of heightened danger and risk of wildfire affecting ingress/egress along scenic travel corridors.

Alternative 2 and Alternative 3

Cumulative effects bounding is based on a viewshed, which can be a particular stretch of road that has a particular focus such as a butte in the distance, or a certain type of vegetation directly adjacent to the road. As viewsheds change, the potential for cumulative effects from this project combined with other projects changes.

Past projects within and surrounding the Junction project area have not provided large enough vegetation and fuels treatments to enhance scenic views. However, when these past projects are combined with proposed treatments in Alternative 2 scenic views would be enhanced in foreground and middleground landscapes. Thinning of overstocked, high density forested areas would open up views providing enhanced visual diversity which would meet Forest Plan standards and guidelines for Scenic Views in Foreground areas.

Overall, treatments would enhance scenic views from the foreground landscape. Also improve scenic quality in scenic views middleground landscapes by opening up stands and reducing a wall-like appearance when viewed from foreground areas. Also treatments would decrease the likelihood of heightened fire danger and risks to public, firefighters and protect scenic quality.

Scenic Views Forest Plan Amendments

Alternative 2 and Alternative 3 propose to amend the Forest Plan through a non-significant Forest Plan Amendment in Scenic Views management areas. This management area (MA9) restricts visual impacts from project activities to last for an extended period of time and underburning of more than 5 acres. Amendments are described in Chapter 2.

Effects to Scenic Views due to Forest Plan Amendments

The objectives for providing high quality scenery (open or lower density stands within scenic view corridors) would be met in the long-term (5 plus years). Overall, reducing fuels within foreground areas would help meet the desired future vegetation condition to provide a mosaic of structural stages and species across the landscape while reducing the stands susceptibility of loss to natural causes (i.e. wildfire, insects and disease). This would also be consistent with the goal, general theme and objectives, and standard and guidelines of Scenic Views Foreground landscapes (LRMP 121-126). Scorching would likely remain below 30% crown scorch, meeting Standard and Guideline M9-90 (LRMP 131), although some mortality could occur to smaller trees. Some larger trees might experience mortality from burning but those trees would remain on-site and provide snag habitat. Prescribed burning would occur during the cooler months (fall and spring) to keep burn intensity and scorch heights down.

The amendment to allow prescribed fire on areas larger than 5 acres complies with Eastside Screens direction. This amendment (in both Alternative 2 and Alternative 3) would reduce ground and ladder fuels within foreground scenic views to reduce the risk of losing large trees (≥21 inches dbh) and those with old growth characteristics from wildfire and insect and disease outbreaks; and using fire in ponderosa pine would assist in moving towards HRV. Assuming all acres proposed for prescribed burning are initiated at the same time, the maximum amount of scenic corridor in the project area that would be showing evidence of fire (scorching, etc.) at any one time is about 60 acres.

The alternative to allowing more time to remove or burn all slash would be to break the area up and treat only so much as could be cleaned up within two years. This would have the effect of extending the amount of time that treatments would be occurring along the travel corridors, so although one area may be cleaned up quickly, there would be more areas coming on line. With this amendment the amount of time that activities are present would actually be shorter and work would be more efficient.

The Plan Amendments were initiated before May 9, 2012 and therefore are being completed in conformance with the provisions of the 1982 plannng regulation. In accordance with Forest Service

Manual 1926.51, the following items describe why the Junction Forest Plan Amendments are not significant:

1. *Actions that do not significantly alter the multiple-use goals and objectives for long-term land and resource management.*

   By reintroducing fire and removing excess fuels this would reduce the consequence of losing stands to natural causes (i.e. wildfire, insects and disease) while improving the visual quality for the long-term. The amendments in Junction are needed because of the proximity of the projct area to communities such as Sunriver and because the community-baased Wildfire Protecton Plan specifically states that the travel corridors as Wildland-Urban Interface that are a priority for hazardous fuels treatments.

2. *Adjustments of management area boundaries or management prescriptions resulting from further on-site analysis when the adjustments do not cause significant changes in multiple-use goals and objectives for long-term land and resource management.*

   Adjusting the Standard and Guideline M9-90 would allow for long-term land and resource management by reducing the risk of high intensity, stand replacement wildfire that would likely cause widespread tree mortality. Maintaining stands in Scenic Views to avoid their loss to natural causes is essential to being consistent with the goals and objectives of this management area.

3. *Minor changes in standards and guidelines*

   These amendments are a minor change in two Standard and Guidelines. This change would contribute to the long-term protection, enhancement, and meeting of the goals and objectives of Scenic Views.

4. *Opportunities for additional projects or activities that would contribute to achievement of the management prescription.*

   By reducing stand densities and ladder fuels and reintroducing fire, fire could be used periodically to manage Scenic Views Management Areas as needed.

3.3.6 Soils

Introduction

Interpretations and descriptions for this analysis rely on local information derived from the Deschutes National Forest's Soil Resource Inventory (SRI, Larson, 1976) and digital spatial data in the Forest Service's corporate Geographic Information System (GIS). These information sources were used along with topographic maps, aerial photographs, silvicultural reports, field-based reconnaissance, various related project reports, and agency directives to characterize local conditions and support analysis used to analyze the environmental consequences of the alternatives. Actions addressed here include those associated with proposed timber harvest activities, silvicultural and forest health treatments, road use, mechanical fuels reduction, and prescribed fire.

Existing Condition

General Distribution and Characteristics of Soils

The Deschutes National Forest's Soil Resource Inventory (Larson, 1976) sufficiently depicts the location, extent, and distribution of different soils mapped in the project area. Soils have developed in relatively young volcanic materials, mostly coarse ash and pumice. Because they are young soils, they have undergone little biogeochemical weathering and development. Parent materials and buried soils that underlie the ash and pumice are mostly associated with basaltic lava.

Ash and pumice materials are mostly air-born tephra that was ejected from Mt. Mazama (now Crater Lake) eruptions and deposited over a vast area in the Pacific Northwest beginning around 7,700 years ago. Known locally as Mazama ash, it's the principle constituent of the mineral soil across the majority (91%) of the project area. Depth of the ash and pumice varies from about 3 to 5 feet, although shallower phases are abundant where bedrock is at or near the surface. Consisting primarily of loose, sandy textures, these are highly permeable and well drained. The moisture regime of these soils is dry in the summer, moist in the spring and fall and is typically frozen during the winter.

Topsoil depth in the Mazama ash averages 4 inches in lodgepole pine dominated sites and 4 to 6 inches in ponderosa pine sites. Depth of litter and duff depends on the type of vegetation and topography of a site. Ponderosa pine sites typically have greater duff and litter accumulations than lodgepole pine sites.

The organic and topsoil layers experience wide fluctuations in there temperature regimes heating up during the daytime and quickly cooling off after sundown. In the Junction project area soil tends to be cooler and experience less drastic fluctuations at lodgepole pine sites than ponderosa pine sites. This is attributed to the cold air drainage and low lying frost pockets that dominate the central portion of the project area which is also lodgepole pine dominated.

Ash and pumice at lodgepole pine sites exhibit moderate productivity whereas ponderosa pine sites have high productivity because these soils are at greater depth and have a greater water holding capacity due to their finer texture. Shallow sites have lower productivity. Mazama ash is capable of supporting and producing fully stocked forested stands of timber. Lower gentler ground is well suited for lodgepole pine dominated plant communities, and the somewhat higher gentle and moderately sloped terrain is well suited for ponderosa pine dominated communities.

Because of the sandy texture, rock content, high infiltration rate, and the gentle terrain surface erosion potential of the ash and pumice soils is low. Due in part to low bulk density, the susceptibility to compaction is low to moderate, and the degree of natural recovery over time due to freeze-thaw action, root penetration, macrobiota activity, and good drainage can be considerable. Susceptibility to displacement is moderate to high depending on moisture status and slope. Soil resilience to disturbance on the lodgepole sites is moderate and on the ponderosa pine sites is high. Capability of the lodgepole sites to fully recover their inherent productivity after disturbance is somewhat lower than ponderosa pine due to the colder soil temperature and thinner organic and surface horizons.

Buttes in the project area are moderately steep and consist of colluvium of basalt, coarse cinder materials, or mixed cinders and ash. Soils on Pistol Butte for example consist of about 20 to 24 inches of fine ash over lava. Sitkum Butte on the other hand is comprised of coarse ash over lava on the lower slopes, while the upper half is mostly a thin layer of ash over cinders. Generally more shallow at the top and deeper at the bottom, soils on the buttes are also non-cohesive and well-drained. In places, soils are shallow, particularly around rock outcrops. Subsoils are very gravelly or rocky. Soils on the buttes make up about 4 percent of the project area. Topsoil depth on buttes ranges from 3 to 4 inches and tend to be deeper and more productive on northern aspects. Pistol, Sitkum and Wake Buttes are not capable of supporting or producing fully stocked stands of timber on their southern aspects but their northern aspects are capable of support fully stocked stands of mixed conifer.

Permeability of soils on the buttes is very high, thus surface erosion potential is only moderate despite the severity of slope. Soils are very susceptible to displacement on the butte sideslopes, and ground disturbance from heavy equipment can truncate topsoil and organic horizons easily. Soils on the buttes are considered to be somewhat resilient although it is moderately higher on the northern aspects. Recovery of inherent productivity after disturbance could potentially be prolonged and southerly aspects are particularly susceptible to brush invasion.

Forested lavas comprise about 5 to 8% of the project area and are highly variable. Primarily supporting stands of ponderosa or mixed pine, some forested lavas are capable of supporting and producing fully stocked stands, while on others trees only grow in small patches or singly and are widely spaced. Capability, productivity, sensitivity, and resilience are highly variable on a site by site basis in forested lavas. In many cases they are inaccessible for forest management. But where their topography is relatively unbroken, accessible, fully stocked, and covered with a sufficient mantle of Mazama ash forest management is sometimes considered. These conditions prevail in certain areas of the west and north portion of the project area. They typically are very rocky soils that have a low to moderate surface erosion potential depending on slope and depth, are moderately susceptible to compaction and displacement, and highly susceptible to brush invasion after disturbance. Although somewhat resilient, recovery after disturbance can be deterred.

Soil Conditions

Soil quality is the capacity of a specific kind of soil to function, within natural or managed ecosystem boundaries, to sustain plant and animal productivity, maintain or enhance water and air quality, and support human health and habitation (USDA 2012). Soil quality can be dynamic. Soil properties can change depending on how it is managed. Management choices can affect soil organic matter, soil structure, soil depth, and water and nutrient holding capacity. Soils respond differently to management depending on the inherent properties of the soil and the surrounding landscape.

Ground disturbing activities such as roads, log landings, ski trails, user created OHV trails, or repeated passes by heavy equipment, have the potential to cause detrimental soil conditions (DSC) which can affect the long-term productivity of a site. Approximately 15 percent of soils across the project area are considered to be sensitive to disturbance, the extent of which at least half are mapped (Figure 19 below). Sensitive soils occur on butte ridges and steep slopes, lava ridges and some forested lavas, and frost pockets. Sensitive soils lack resilience, which limits their capability to fully function and recover after disturbance. Maintaining or enhancing their productivity necessitates conservation or restorative actions.

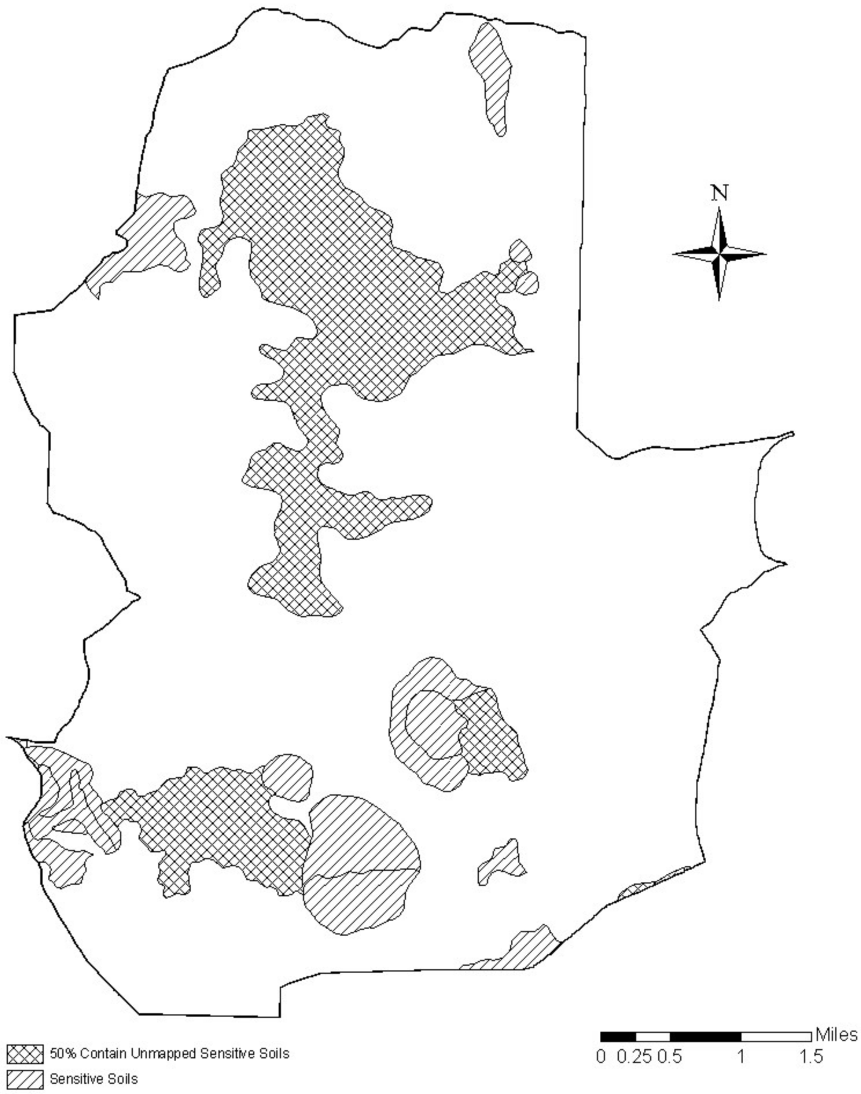


Figure 19: Sensitive soils within the Junction project area

Ground-based logging, construction and continued use of roads, and related forest management activities have occurred across about 88% of the project area. Several wildfires, prescribed fire, and slash pile burning have also resulted in a measure of ground disturbance, as has woodcutting, and off-highway vehicle use. Combined these activities have resulted in a degree of ground disturbance of which a portion is considered to be detrimental.

Soil erosion occurring by either wind or water is low in the project area, except some of the upper slopes of Sitkum and Wake Buttes. Activities that have occurred in the area have not caused an increase in erosion rates. Although soil erosion is low within the area, hardened surfaces such as roads have seen a minor increase in accelerated erosion. There is no delivery of sediment from any of these roads segments within the project area to a surface water body.

It is estimated that of the previously treated stands about 28% has been subject to three or more entries using ground-based equipment, 29% has been entered twice, and 31% entered once. Sampling data in the project area indicate that the extent of DSC in intensively managed stands is at least 15 and in some cases >20%, depending upon the amount of time rested and degree of recovery. Stands entered fewer times tend to exhibit a lesser extent of DSC. Restoration efforts such as road decommissioning and subsoiling have taken place to offset some of the detrimental ground disturbance. Mostly on decommissioned roads, as well as old landings and primary skid trails. Old landings and primary skid trails have been subsoiled across about 1,370 acres of previously harvested units over the past 15 years to ameliorate the effects of heavy compaction. The following table displays estimates of the extent of detrimental soil conditions within individual stands. Soil condition class is the range of estimated DSC within a forested stand.

Table 110: Extent of detrimental soil conditions in the Junction Project area

Soil Condition Class	Range of Detrimental Soil Conditions	Percent of Project area with Stands in a Designated Soil Condition Class
1	0 to 5%	46
2	5 to 10%	24
3	10 to 15%	18
4	15 to 20%	7
5	>20%	6

Sites with the greatest extent of DSC (soil condition class 4 and 5) are those areas were either repeated entries have occurred, or where there has been ground-based operations on certain sensitive soil types.

Prior to the mid-1980s soil quality standards, best management practices, and mitigation measures were less rigorous and effective at limiting detrimental soil impacts. The degree of ground disturbance was often greater than what is encountered today. Natural recovery has occurred to some degree depending on the inherent productivity of a site however residual impacts remain and are detectable in many of the intensively managed stands. Most notable are older stands that were initially clearcut or a shelterwood/seed tree cut, older managed stands in frost pockets where slash was piled using a bulldozer (i.e. dozer piled), older plantations where site preparation included mechanical scarification, and wildfire scars in frost-prone soils.

Woodcutters, hunters, and OHV users have created narrow driving paths and trails that have caused a minor extent of detrimental ground disturbance. In the lodgepole flats nearest FSR 45 woodcutters have driven repeatedly short distances into unroaded sites to cut firewood. There are also OHV trails, primarily created by motorcycle riders that extend to the top of Pistol and Sitkum Buttes, and that cross through the forest in the northern portion of the project area. Closed and decommissioned roads are also often breeched and used. They account for a very small degree (<0.5%) of the overall detrimental soil conditions. Some of the impacts they create however would be long-lasting, particularly on sensitive soils like the upper south and east sides of Sitkum Butte.

The amount and distribution of downed coarse woody debris (CWD) has also been affected by all of the forest management activities that have occurred. CWD functions to retain moisture and moderate soil temperature. Temporally and at the landscape-scale however, the amount of CWD is not lacking. Densely stocked stands have an over-abundance of CWD, and many of the recently managed stands have sufficient amounts too. Attempts to retain sufficient quantities in managed stands have been a standard BMP implemented to varying degrees over the last several decades. Overall, there are sufficient quantities of existing and future CWD to contribute to soil function and quality across most of the project area.

In summary, soil quality has been degraded in areas where detrimental soil conditions persist, and long-term site productivity is diminished on those sites. The consequence of which, is a lack of or a greatly reduced rate of tree growth. Roads that are part of the travel network have been semi-permanently converted to a non-forest status. Other sites such as little used non-system roads, un-restored landings, and primary skid trails would remain heavily compacted and recovery would be prolonged. Detrimental impacts are also long lasting where they have been incurred on sensitive soil types.

It is estimated that of the nearly 2,700 acres of sensitive soil types in the project area, the extent of detrimental soil conditions on those that have been previously managed (approximately 1,600 acres) is >15%. Those affected most are the frost pockets where there has been intensive forest management or wildfire. Detrimental soil disturbance on the buttes, steep slopes, and rough forested lavas and lava ridges are not as extensive because of difficulties related to equipment operability.

Frost pockets, both mapped and unmapped, amount to roughly 1,030 acres. About 80% have been subject to forest management and disturbance from heavy equipment. Of notable concern are lodgepole pine stands where older mechanical slash piling methods used bulldozers or where site preparation to establish plantations included dozer scarification. On these sites, organic layers were scraped into piles along with downed coarse woody debris, displacing or removing protective ground cover and exposing bare soil. Thin topsoil layers were displaced and truncated. Not all ground disturbances in frost pockets is detrimental but their resilience to disturbance is poor because of their low inherent productivity, which is linked to a lack of organics, relative mean high summer soil temperatures, mean low winter temperatures, and poor moisture holding capacity. Nutrient capital is almost entirely in the organic horizons and topsoil. Because of low inherent productivity, detrimental soil disturbance in frost pockets would persist for the long-term.

Other than the extent of detrimental soil disturbance, soil quality across the majority of the project area is still in good condition. Soils are functioning to support and maintain long-term site productivity. If they have been subject to disturbance or if they support densely stocked stands where growth has slowed they are in a status of either recovery or stasis. Due to their productive capability and resilience they retain their function and capability despite the high level of disturbance, serving as a growing medium, storing and cycling nutrients and water, producing biomass, and supporting or regenerating a contiguous forest cover of variable age classes.

Analysis Methods and Assumptions

The quantitative extent of detrimental soil conditions was estimated using sampling data, field reconnaissance, GIS analysis, and aerial photographic interpretation; which also served as the basis for deriving and validating assumptions and inferences. Effects to soil quality were determined qualitatively based upon select physical and biological properties fundamental to the sensitivity and resilience of soils to certain types of disturbances. Factoring both the quantitative extent of detrimental soil conditions with the qualitative assessment of response to disturbance served as the method for predicting the potential effects to soil quality.

Due to the variability of ground disturbance in the Junction project area, the quantitative extent of detrimental soil conditions was characterized for this analysis by categorizing them into five condition classes. Soil condition classes represent a range of the aerial extent of detrimental soil conditions. Soil condition classes are defined as:

- 0 to 5% detrimental soil conditions
- 5 to 10% detrimental soil conditions
- 10 to 15% detrimental soil conditions
- 15 to 20% detrimental soil conditions
- >20% detrimental soil conditions

The upper limit of soil condition classes were based on LRMP direction relative to maintaining 80% of an activity area in a condition of acceptable productivity. Further stratifications were based upon the sensitivity of data to be able to estimate the gradations of DSCs and their extent. These gradations then became a method for assessing the relative risk of a particular treatment or activity to increase the extent of DSC to a level that compromises soil quality and long-term site productivity. Units estimated to have a high proportion of their acreage in the uppermost condition classes were identified as having the greatest potential for incurring a level of detrimental soil impacts that put at risk the productivity standards set forth in the LRMP.

Soil condition classes convey an estimate of the range of DSC that extend across an activity area; they also passively imply the extent of soil conditions that are not detrimental. If for example an activity area is designated to be in soil condition class 4, meaning detrimental soil conditions comprise 15 to 20% of its area, then this implies that soil conditions across at least 80% of that activity area are in good condition. This reflects the variability of effects that is typical after ground disturbance, whereby detrimental impacts are associated with the intensity of the perturbation. For ground-based operations detrimental soil impacts are related to the routes and repetitiveness of travel by heavy equipment such as the network of roads, landings, and skid trails needed for logging. For fire detrimental soil impacts are associated with the areas where burn severity and duration were the greatest. Thus there is a proportion of an activity unit that after perturbation was not intensively disturbed so impacts were light or absent.

Estimates of the extent of DSC constitute direct effects, which primarily include heavy compaction, detrimental displacement, and excess removal of organic material. Sites where these impacts most commonly occur are roads, landings, and primary skid trails. Sensitive soils are the most prone to ground disturbance. In the project area sensitive soils are associated with frost pockets, steep slopes, and rocky shallow sites.

Direct effects such as detrimental soil conditions can indirectly affect soil quality further. For the Junction project indirect effects were assessed qualitatively. Indirect impacts to soil quality were assessed by evaluating the cause-and-effect relationships between ground-disturbing activities and alterations to physical and biological soil characteristics that can then result in on-site temporal losses to productivity; or off-site impacts such as sedimentation to water quality. This is a simplistic approach, it serves as a first approximation of potential indirect effects useful for comparing alternatives.

For proposed activities in Junction, indirect effects are primarily associated with a decline of site productivity that persists into the future. This is an indirect effect in that it emerges substantially after the direct impact. Indirect effects relative to soils that are translated off-site as a consequence of a concentrated disturbance are often associated with erosion and sedimentation. But for the Junction project area accelerated erosion is not considered to be an issue of concern because soils are very porous and infiltration rates are rapid, and there is no drainage network, surface waters, or water body to affect. Surface erosion potential across the project area is low. Exceptions include some unique slopes on Sitkum and Wake Buttes, which are addressed specifically on a site basis.

Cumulative effects were analyzed qualitatively. They were assessed by evaluating existing detrimental soil conditions in relation to where proposed activities would occur. Detrimental soil conditions exist in previously managed stands, some of which are proposed to treat again. Not all ground disturbances in previously managed stands however are detrimental. But where re-entry treatments are proposed a proportion of the existing low level disturbance would be exacerbated to some degree. Cumulatively the past, present, and reasonably foreseeable actions in the project area where ground-disturbing activities have overlapped one another constitute the breadth of analysis. Factors such as avoidance, mitigation (i.e., subsoiling or amendments), and recovery were then factored in. Simplistically, the cumulative assessment can be represented as the following qualitative sequence: (existing + predicted effects) – (avoidance + minimization + mitigation + natural recovery)

A basic assumption to the approach was the use of a recovery factor. Based upon sampling and field reconnaissance, units where management had occurred more than 20 years ago it is inferred that the degree of moderately heavy compaction and especially detrimental displacement has been alleviated somewhat depending upon the treatment that had occurred and the soil type. Recovery from compaction and displacement occurs by the combined processes of water movement, wetting and drying, frost action, daily temperature fluctuations, root growth, the actions of soil biota and biogeochemical processes, organic inputs, windthrow, burrowing animals, and time. While the assumption cannot be strictly applied across all the acreage treated 20 years prior, field evidence suggests that in some stands where older, ground intensive logging methods had occurred the extent of detrimental soil conditions was <5%. But exceptions to the recovery factor assumption are common, particularly on sensitive soils in frost pockets with very low organics and thin topsoil horizons, or in older clearcut and seed tree harvest units where dozer scarification or dozer slash piling had occurred. Old landings, primary skid trails, and abandoned spurs also tend to remain heavily compacted. Spatial data of past activities from the corporate database were vital to determinations of previously managed sites.

Analysis of the direct and indirect effects was conducted at the unit scale. Units can be individual stands of trees or larger delineations of multiple stands where similar treatments are proposed. Units are the areas where ground impacting activities would occur. Cumulative effects were analyzed at the unit scale. They were also considered qualitatively at the project level, particularly in relation to soil function to discern potential effects to ecosystem services across the landscape.

Direct and Indirect Effects

Alternative 1 – No Action

Under the no action alternative, ground-disturbing activities related to the project would not occur as a result detrimental soils conditions would not happen. Soil quality would not be expected to diminish further, but would remain compromised where detrimental soil conditions do exist (i.e. roads, previously used landings, former skid trails). Soil quality across the majority of the project area would remain in good condition. Natural recovery from past impacts would slowly continue. The following table displays the proportion of soil condition classes in the project area.

Table 111: Percent of project area in a soil condition class

Soil Condition Class	Range of Detrimental Soil Conditions	Percent of Project Area with Stands in a Designated Soil Condition Class
1	0 to 5%	46
2	5 to 10%	24
3	10 to 15%	18
4	15 to 20%	7
5	>20%	6

Roads that are part of the travel network (i.e. system roads) have been semi-permanently converted to a non-forest status. Other sites such as little used non-system roads, un-restored landings, and primary skid trails would remain heavily compacted and recovery would be prolonged.

It is estimated that of the nearly 2,700 acres of sensitive soil types in the project area, the extent of detrimental soil disturbance in previously managed stands is >15%. Those affected most are some of the frost pockets where there has been intensive forest management or wildfire. Recovery from detrimental impacts in frost pockets would be long-term, and impacted soils would not be able to fully function, diminishing their capability to support and maintain a fully stocked, healthy diverse forest community.

Opportunities to improve detrimental soil compaction as a result of proposed activities on existing landings and skid trails that would have been designated for reuse, would not happen. Funding for soil restoration projects would not be readily available through harvest-generated revenue. Existing detrimental conditions from past ground disturbance would remain in a status of lengthy natural recovery for several decades. Sites where subsoiling previously occurred to alleviate detrimental compaction would continue to recover at a faster rate as the ability for rooting is enhanced and soil function restored.

In the absence of thinning and underburning, densely stocked stands would characterize more than 60% of the project area. These stands would continue to be at risk of uncharacteristic disturbances including competition-induced stress and mortality, high potential for bark-beetle invasion, and extreme wildfire. In the dense overstocked stands that have high severity fire a wildfire could result in intense heating, resulting directly in detrimentally burned soil conditions.

Soil organic matter, essential nutrients, and biota could be volatilized from a wildfire; indirectly leading to a long-term decline in site productivity. The accumulation of organic biomass could remain diminished over the long-term, especially in frost pockets. Recovery of soil quality from existing detrimental soil conditions could be set-back for decades. An extreme wildfire event could potentially expose bare soils over large areas, subjecting them to accelerated erosion.

Severe fire effects could necessitate costly rehabilitation efforts and decrease future options for maintaining and enhancing soil quality. Soil ecological diversity could be severely compromised; diminishing soil function, truncating well-established nutrient cycling pathways; and leading to eventual site occupancy by single pioneer species that are slower to develop symbiotic relationships with beneficial soil organisms. Sites of marginal productivity could be converted to a non-forest status over the long-term as competing vegetation, and possibly invasive plants colonized burned ground; particularly sensitive soils (i.e., dry, shallow rocky soils, steep south-facing slopes, and frost-prone soils). Local examples of past wildfires are present in the project area, and sensitive soils are slow to recover when a sever fire burns over the area.

There would be no new temporary roads created or closed temporary roads re-opened. Road maintenance and repair would continue at the current level and improvements to primary haul routes or problem sites would only be pursued on a site-by-site basis as needed. Some problem sites on segments of secondary road slopes on Pistol Butte would remain unrepaired. Accelerated erosion would continue during periodic runoff events from these segments. Since there is no stream network or waterbody in the project area, there would not be an indirect impact to water quality or aquatic habitat from sedimentation.

Off-road traveling by woodcutters, hunters, and OHV users would continue to occur in the area, including illegal use on closed and decommissioned roads. Most of this is expected to occur along routes where use is already occurring. But it can be expected that a small measure of new user created routes would occur. Woodcutters would continue to focus on dense lodgepole stands near FSR 45. Motorcycle riders would continue using created trails in thinned ponderosa pine stands that have been underburned in the northern portion of the project area, as well as several trails and decommissioned or closed roads to the top of Pistol and Sitkum Buttes. Although this use would contribute to a small degree of the overall existing detrimental soil disturbance, OHV impacts to sensitive soils particularly the southern and eastern slopes of Sitkum Butte would be long-lasting.

Soils across the majority of the project area would continue functioning to support and maintain long-term site productivity. Previously disturbed sites or those that support densely stocked stands where growth has slowed would remain in a status of either recovery or as is. Due to their productivity and resilience most soils would retain their capability, serving as a growing medium, storing and cycling nutrients and water, producing biomass, and supporting or regenerating a contiguous forest cover of diverse age groups.

Effective ground cover would persist and protect soils from erosive forces, and slowly continue to develop in areas of previous disturbance. Needle-fall, seed, and detritus from live trees would contribute to the recruitment and maintenance of litter and duff. Trees, brush, forbs, fungi, and algae would gradually begin reoccupying bare sites except on surfaces occupied by roads and once-used landings. Fine and coarse woody debris would accumulate. Organic inputs and biological processes that maintain and cycle soil nutrients essential for plant growth would continue to function at current levels. Frost pockets that are highly disturbed would continue to recover very slowly, and lack a fully functional effective ground cover.

Effects Common to Alternative 2 and Alternative 3

The action alternatives are similar in their extent and type of treatments proposed. Identical overstory and understory treatments are proposed on 9,860 acres and understory treatments on 2,260 acres for both action alternatives. Both propose to treat approximately 90% of the project area and approximately 80% of those treatments would enter stands that have been previously treated. The potential for increasing DSC is high for both action alternatives. The following table compares the amount of area within Junction where the risk is increasing detrimental soil conditions beyond desirable levels is high (soil condition classes 3, 4, and 5).

Table 112: Percent of project area where activities common to the action alternatives are planned and the extent of detrimental soil conditions is high.

Alternative 2 and Alternative 3 Treatments	Percent of Project Area
Overstory and Understory Treatments	31
Non-mechanical Treatments	8
Sensitive Soils	32

As a direct result of conducting overstory and understory treatments on previously treated areas, the extent of detrimental soil conditions on about 31% (5,500 acres) of the project area could be expected but with project design features and mitigation measures impacts would remain at acceptable levels (Chapter 2.5). This includes 50 units or portions of units where the extent of detrimental soil conditions is already high or sensitive soils are present. Within this subset there are nearly 2,700 acres where existing DSC are estimated to potentially exceed 20% as a result of proposed treatments, these are the units where the risk of direct effects diminishing soil quality is the greatest, potentially jeopardizing long-term site productivity and the capability of the soil to support a fully stocked healthy forest. Best management practices and project design features would restore soil quality to pre-treatment conditions therefore keeping impacts at acceptable levels. A portion of treatments would also occur across 25% (675 acres) of the sensitive soil types in the project area, primarily in frost pockets and on steep slopes.

Underburning occurs in previously treated areas where the extent of detrimental soil impacts is high. There is potential that underburning could maintain or benefit site productivity there is also a risk of the fire burning too hot and hurting soil productivity. Best management practices, project design features and prescribed fire burn plan parameters would ensure that these areas received a light intensity burn.

Mechanical treatments would occur on another 14% (2,500 acres) of areas with a low detrimental soil conditions (soil class 1, 2 and 3). These are areas where there has been little past management or it has been many years. It is expected that ground-based operations in these units would increase DSC but these soils would not exceed BMPs or LRMP standards are guides (LRMP SL-3 pg. 4-70). A portion of these activities would occur on sensitive soils (14% or 365 acres) but BMPs and project design features should help to maintain soil quality.

The action alternatives proposed identical non-mechanized understory treatments on 13% of the project area. There would be no overstory treatments in these areas. These units have high DSC (soil condition class 4 and 5) amounting to 8% (1,400 acres) of the project area and include 5% (135 acres) of sensitive soils. DSC is not expected to increase because of proposed treatments because these are hand treatments where ground disturbance would be negligible. Restoration of compacted soils at landings and on primary skid trails would help to enhance soil quality and seedling establishment.

The action alternatives propose identical mechanical treatments across 60% (1,700 acres) of sensitive soil types in the project area. Approximately 32% of these sensitive soils are estimated to have high DSC. The extent of DSC is expected to increase so that an estimated 43% of sensitive soils could be in soil condition class 4 or 5 as a result of mechanized treatments. Frost pockets and forested lavas are most at risk. The following table displays the amount of mechanized treatments on sensitive soils where the risk of increasing the extent of detrimental soil conditions and diminishing soil quality is the greatest.

Table 113: Activities on Sensitive Soils Common to the Action Alternatives

<table>
<tr><th>Sensitive Soil Type</th><th>Amount of Sensitive Soil Type with Mechanical Activities</th><th>Miles of New Temporary Road Construction</th><th>Leave Areas (no treatments)</th></tr>
<tr><td>Frost Pockets</td><td>682 acres (70% of this type)</td><td>1.3</td><td rowspan="3">26% of total sensitive soils</td></tr>
<tr><td>Forested Lava</td><td>(66% of this type)</td><td>0</td></tr>
<tr><td>Steep Slopes</td><td>504 acres (44% of this type)</td><td>0.4</td></tr>
</table>

Mechanical treatments would occur on approximately 70% (682 acres) of frost pockets in the project area. More than half of these acres include a post-harvest mechanical slash treatment. Frost pocket sensitivity to ground disturbance varies depending upon the season. In winter frost pockets can be fairly resilient if the ground is frozen or covered in snow, which is optimal for minimizing ground disturbance. BMP and project design criteria would keep impacts at acceptable levels (Chapter 2.5).

The majority of the project area is underlain by various lava flows of different ages. Forested lavas are considered to be sensitive to ground disturbing activities because they are shallow, rocky, have a thin topsoil layer, and are difficult to restore. Approximately 19% of forested lava in the project area is considered sensitive. Mechanical treatments are proposed on 66% of this area and nearly all of this area has received treatments. Detrimental soil conditions would be expected to increase from proposed treatments to an undesirable level. BMPs and project design (Chapter 2.5) would keep impacts at acceptable levels. The most effective practices would be to avoid extremely rocky area, re-use existing landings and skid trails, and operate when the ground is frozen. These measures would help to contain the extent of DSC so that treatments would benefit site productivity.

Slopes ≥30% are sensitive to disturbance from ground-based logging systems. Steep slopes that would be treated are located on Pistol and Sitkum Buttes. Mechanical treatments are proposed on 44% (504 acres) of these areas and include previously treated stands. Skid trails are particularly susceptible to soil displacement and unauthorized OHV use. Detrimental soil conditions would be expected to increase but with BMPs and project design features (Chapter 2.5) impacts would be kept at acceptable levels.

Indirectly, thinning on steep slopes could benefit site productivity by releasing the overstory from competition and increasing growth rates. Treatments would reduce the build-up of fuels in the dense stands. In combination with controlled low intensity underburning the slopes would be less prone to uncharacteristic severe wildfire and potential detrimental soil burning.

Post-harvest underburning would be conducted on three sides of both Pistol and Sitkum Buttes. Due to the steep slopes it would be difficult to mechanically treat prior to underburning. Without pre-treatments there is the potential that the underburn or a wildlfire could burn more intensely removing all ground cover. Exposed soils are at risk for erosion that could further degrade soil quality.

All existing open and closed roads in the project area are considered a semi-permanent conversion to a non-forest status, where soils have been committed to a non-productive use. The road system would remain as the infrastructure providing access for the variety of forest users. It is estimated that the road system accounts for about 5% of the total DSC within the project area. No new roads would be needed to facilitate project activities but closed roads would need to be temporarily reopened and some temporary roads would be built to access units.

Approximately 3.3 miles of temporary roads would be built. Nearly half of these roads would be located on old abandoned spur roads or skid trails this would minimize new disturbance. Soils there that were in a status of recovery would revert to a detrimental condition while the spurs are in use. The other half would be new temporary roads to access five units (53, 64, 70, 78, and 166). This would contribute to an increase in the extent of detrimental soil conditions within units, two units (70 and 166) already have high detrimental soil conditions.

Temporary roads convert soils to a non-productive status until they are restored, this would amount to <0.1% of the project area. New temporary roads would be minimally constructed where feasible and would be obliterated and restored within 5 years of project completion.

Approximately 0.8 miles of temporary roads would be located on slopes exceeding 10%; one on the south side of Pistol Butte located on an old non-system road and the other two small sections in unit 166 which would be new construction. To minimize erosion potential these road segments would be constructed following BMPs such as waterbars or outsloping would be used to provide for adequate drainage. Potential impacts from erosion is expected to insignificant since these segments are so short in length and since there are no surface waters in the project area.

Approximately 1.3 miles (<0.1% of sensitive soils) of temporary roads would be built in sensitive frost pockets (units 41, 53, 61, 64, 70, and 78). Construction and use of these segments would contribute to detrimental soil conditions until they are restored.

OHV and motorcycle use of closed and temporary roads and skid trails could impact soils. Units opened by thinning are also at risk of increase in user-created trails. Woodcutter trails is not expected to increase since treatments would reduce the amount of dead and dying timber available as firewood.

Most soils across the planning area would retain their productivity and resiliency. Areas of sensitive soils most at risk from proposed treatments are from frost pockets, steep slopes, and areas where DSC are already high from previous treatments.

Alternative 2 – Proposed Action

Alternative 2 proposed to treat approximately 74% of the project area, greater than Alternative 3. Approximately 775 acres is exclusive to this alternative and approximately 18 of those acres are located in sensitive soils with a soil condition class of 4 or 5.

Table 114: Soil Disturbance Indicators Specific to Alternative 2

Alternative 2 Specifics for Detrimental Soil Conditions and Sensitive Soils	Acres	Explanation
Acres treated	775	Highest footprint acres of the Action Alternatives
Acres where detrimental soil conditions are high	18	Nominal, both Action alternatives nearly the same

Acres of sensitive soils treated	585	Steep slopes, OGMA, Wake Butte SIA
Temporary road miles on sensitive soils	0.3	Located over an abandoned spur on north side of Sitkum Butte
Leave blocks and undisturbed ground	0	Base amount of leave area, none exclusive

Approximately 585 acres of sensitive soils (either soil condition class 1, 2, 3, 4, or 5) would be treated and most are located on steep slopes. The majority of these acres are associated with the north side of Pistol and Sitkum Buttes, and Wake Butte. The north portion of Pistol Butte that would be treated is within an Old Growth Management Allocation (OGMA), and Wake Butte is in a Special Interest Area (SIA) allocation. Soils on the north aspects of the two buttes are moderately deep, relatively resilient and exhibit some of the highest levels of inherent productivity due to a greater measure of local precipitation and available soil moisture that lingers longer into the growing season. The ability of soils on the north steep slopes to recover from impacts is moderately good, but they can be susceptible to disturbance. Because there have been few prior treatments on them, the extent of detrimental soil conditions is currently low.

A short temporary road would be constructed to access the north slope of Sitkum Butte. It would be about 0.3 miles long and located over an old abandoned spur road and a skid trail; this would minimize new disturbance elsewhere on the slope. Soils there that were in a status of recovery would revert to a direct detrimental condition while the spur road is in use. It would remain in a non-productive status until it is restored. Its total impact to sensitive soil resources is considered to be low. It would be minimally re-constructed as is feasible and scheduled to be obliterated and restored within 5 years of project completion.

The extent of detrimental soil conditions would be expected to increase as a direct result of mechanical treatments on the north slopes of the two buttes. Areas most prone to detrimental soil displacement are slopes that exceed 30%, which includes most of Pistol Butte's north side and the upper-third to Sitkum's north flank. Skid trails are particularly susceptible and could become long lasting features from surface erosion and unauthorized OHV use. Since soils conditions are good on the north slopes and BMPs would be followed, the extent of detrimental soil impacts would remain at acceptable levels.

Thinning of the north slopes could indirectly benefit site productivity by releasing the overstory from competition and increasing growth rates. The north slope of Pistol Butte is within the OGMA, so thinning there could also help to hasten the development of older forest structure. Treatments would reduce the build-up of fuels in the dense stands. In combination with controlled low intensity underburning the north slopes would be less prone to uncharacteristic severe wildfire and potential detrimental soil burning. A sufficient cover of surface organics could be retained to prevent unwanted surface erosion and contribute to the short-term recovery of beneficial soil biota and a productive nutrient status. Steepness of slopes and the brushy understory, fire intensity could burn hotter than planned but with BMPs and project design criteria to help maintain light underburn intensities soils should be protected and impacts would remain at acceptable levels.

Alternative 2 proposes to treat a portion of the Wake Butte Special Interest Area (SIA). The Forest Plan (4-91) identifies Wake Butte as an SIA where protection of the vegetation is important, and provides guidance for management activities that are appropriate to achieving that goal. Treatments proposed include commercial overstory harvest followed by understory thinning, a slash treatment, and final maintenance of understory fuels in out-years.

The steep middle and some of the lower slopes of Wake Butte would be very susceptible to direct impacts from mechanical operations in the form of detrimental displacement, excessive loss of organic material, and accelerated soil creep, particularly if followed by mechanical slash piling. Although the extent of detrimental soil conditions could be contained using BMPs and project design criteria, the skid trail network on the slopes would unavoidably become semi-permanent paths where vegetation would have difficulty re-establishing. Soil quality and function would indirectly be diminished and long-term site productivity compromised.

Any fire on the middle and upper slopes of Wake Butte could have long-term consequences. Low intensity underburning would be very difficult to implement in dense, brushy stands without prior thinning. Any form of thinning on these slopes would be challenging due to the terrain and soils. High intensity fire on the sensitive steep slopes would have a high likelihood of denuding a substantial amount of the effective ground cover, indirectly exposing the highly erosive soils and exacerbating soil creep. If intense and severe enough, the litter and duff and the limited nutrient capital could be easily volatilized. The chances of converting forest stands to competing pioneer brush species would be high. Dense stands on the mid slopes of the butte would be at risk of detrimental soil impacts with either wildfire or prescribed burning. Due to low inherent resilience, recovery and re-growth could be lengthy, indirectly diminishing soil quality and long-term site productivity.

Thinning dense stands around the base of the butte could indirectly serve to diminish the risk of intense wildfire from spreading into or out of the un-thinned stands up-slope, serving as a type of buffer to extreme fire behavior. Thinning could also help to release the overstory and enhance site productivity and growth. The lowest toe slopes of the butte where soils are deepest are better suited for ground-based treatments due to greater productivity and more favorable terrain. Soils on slopes <30% have better resiliency to direct ground disturbance than those upslope. The extent of detrimental soil conditions are low and additional impacts could be contained using BMPs and project design criteria. Low intensity underburning could be effective at maintaining lower accumulations of fuel. Effects to soil quality could be minimized so that function and long-term site productivity would be assured.

Overall, Alternative 2 proposes to treat the most ground; therefore, the challenge of containing the extent of detrimental soil conditions while implementing forest treatments is somewhat greater. Principally due to the treatments that would be planned on sensitive soils on the north slopes of Pistol, Sitkum, Wake Butte. But with a greater amount of acres planned for treatment, there is also a somewhat greater potential for indirectly enhancing site productivity and growth through release. The one area in Alternative 2 where soil quality would be at the greatest risk of proposed treatments is Wake Butte. Its middle and upper slopes are very sensitive to ground-based mechanical operations.

Alternative 3

Alternative 3 has more leave areas proposed therefore the acreage of overstory and understory treatments would be less than Alternative 2.

Table 115: Soil Disturbance Indicators Specific to Alternative 3

Alternative 3 Specifics for Detrimental Soil Conditions and Sensitive Soils	Acres	Explanation
Acres treated	0	Lowest footprint acres of the Action Alternatives, none exclusive
Acres where detrimental soil conditions are high	0	Fewest of the Action Alternatives, but by very little, both alternatives nearly the same
Acres of sensitive soils treated	0	Base amount of treatments on sensitive soils, none exclusive
Temporary road miles on sensitive soils	0	Base amount of temporary road miles, none exclusive
Leave blocks and undisturbed ground	775	Base plus additional leave blocks, highest of Action Alternatives, steep slopes, OGMA, SIA

Alternative 3 proposes to treat approximately 69% of the project area. This alternative would affect the least amount of sensitive soils. Leave blocks occur on 775 acres of sensitive soil types.

Alternative 3 proposes to treat the least ground, and so therefore the challenge of containing the extent of detrimental soil conditions while implementing forest treatments is somewhat less. In particular, treatments would be deferred from sensitive soils on the north slopes of Pistol, Sitkum, and Wake Butte. However, with fewer acres planned for treatment, there is somewhat less potential to indirectly enhance site productivity and growth through release in those stands.

Cumulative Effects

Cumulative effects to soil resources were analyzed qualitatively by evaluating the past, present, and reasonably foreseeable actions in the project area where ground-disturbing activities would overlap one another. Effects were assessed at two scales, the unit and the project area. At the unit scale these would be sites where there are existing detrimental soil conditions from previous management and re-entry is planned. Equally to be factored are sites where restoration and mitigation activities such as subsoiling or soil amendments have occurred to ameliorate detrimental conditions.

At the project level, cumulative effects were also considered relative to whether or not soils were functioning to their capability and providing ecosystem services across the landscape, because soil types can differ markedly in their response to management. More broad-scale in context it is a look at how the capability to produce biomass and maintain a contiguous forest of diverse complexity has been affected. Inherent soil productivity, regulation of nutrient cycling and availability, and water storage are some important ecosystem services that in turn indirectly support beneficial uses such as habitat for a variety of wildlife species, recreational opportunities, and wood products for human use.

Alternative 1 – No Action

Alternative 3 proposes to treat the least ground, and so therefore the challenge of containing the extent of detrimental soil conditions while implementing forest treatments is somewhat less. In particular, treatments would be deferred from sensitive soils on the north slopes of Pistol and Sitkum Buttes, and Wake Butte. But with fewer acres planned for treatment, there is somewhat less potential to indirectly enhance site productivity and growth through release in those stands.

Alternative 2 and Alternative 3

If either action alternatives were to be implemented then more than 90% of the project area would have undergone some form of forest management at least once since the 1960s. About 80% of the proposed treatments would enter stands that have been treated previously. For this reason, the potential for cumulatively accruing detrimental soil conditions in many of the units planned for treatment is high.

Not all ground disturbances in previously managed stands is detrimental, a proportion is low level disturbance. Light and moderate levels of disturbance are detectable where ground-based operations have occurred in the past. Entering these sites again can exacerbate lower-level disturbance so that it is transformed to a detrimental soil condition. Units where the detrimental soil conditions are currently high or where there are sensitive soils are especially at risk of cumulative effects that could diminish their inherent quality and productivity.

As a result of intensive management in the past the extent of detrimental soil conditions is high (soil condition classes 4 and 5) on about 13% of the project area where treatments are planned. On another 42%, the extent of detrimental soil conditions is moderate. The extent of detrimental soil conditions could be expected to increase in these units as a result of re-entering them, as the cumulative impact of recurring ground disturbance over the same area would be realized. Minimizing the cumulative effect through BMPs and project design criteria would be necessary to maintain a condition of acceptable productivity across 80% of each of the affected activity units where the current extent of detrimental soil conditions is high.

New units that would be treated and where detrimental soil conditions are very low or non-existent would account for about 45% of the project area. Project design features and BMPs could contain and minimize the extent of detrimental soil conditions, but there would nonetheless be impacts from ground disturbance that would be detrimental where it was non-existent before. A new skid trail network would be created, including some new landings and primary skid routes. These would be sites where new detrimental soil conditions would be added to the project area, remaining until mitigated, such as subsoiling to pre-disturbance conditions.

On about 31% of the sensitive soils in the project area the extent of detrimental soil conditions is also high. Re-entry by proposed treatments would occur on the majority of them. Sensitive soils most at risk are frost pockets, particularly those that have been harvested previously where dozer slash-piling, dozer scarification, or intense wildfire had occurred. Additionally there are about 1.3 miles of temporary roads that would be built in sensitive frost pockets. Although they would be constructed on old abandoned spurs to minimize new disturbance, their status would revert from that of recovery to a detrimental condition for the period of use. The risk of diminishing soil quality as a result of recurring mechanical treatments and construction of temporary roads would be high and cumulative effects potentially long lasting. Thus implementing project design features, BMPs, and mitigation would be paramount to maintaining soil quality on sensitive soils and minimizing cumulative effects.

Prescribed underburning would typically occur 2 to 10 years after treatments are completed. The intent of underburning is to maintain low surface fuel densities. Often there has been a period of recovery after a treatment prior to the re-introduction of fire. In-growth and re-growth of the understory that has occurred during that time, along with an accumulation of detritus, litter, and effective ground cover contributes to the recovery of soil disturbance. Underburning could reset that recovery back to a post-disturbance condition, and above-ground biomass could be substantially reduced if low burn intensity were not achieved. Units where the extent of detrimental soil conditions was high or where sensitive soils occurred would be most prone to a cumulative impact that slows the recovery of nutrient status and inherent site productivity for the short-term.

The presence and use of the road system would continue, where soils have been converted to a non-forest condition. Improvements (road widening) to FSR 45 several years ago committed a little more ground to a non-forest status, as did a few repairs to FSR 42. But the road system accounts for <1 percent of the project area where soil productivity has been altered semi-permanently. New temporary roads would add another 3.3 miles, which is inconsequential in relation to the percentage of new area affected (<0.5%). Most of them would be located on old abandoned spurs, minimizing new disturbance. Temporary roads would remain in a detrimental status until restored and converted to a status of recovery.

Firewood cutting and OHV use have contributed a small percentage to the accrual of detrimental soil impacts too. Off-road firewood use could be curtailed some since many of the source stands would be treated and the wood removed, but a slight amount of use would be expected to continue. On the other hand OHV use could increase because dense forested stands would be opened up, giving sight to new opportunities for user created trails. Although a very small component of cumulative effects, both of these uses contribute to affected sites that are identifiable. Some of the woodcutting has affected sensitive frost pockets, while the OHV use has affected sensitive slopes.

Combined, all these site impacts over the past 50 years have affected soils across the project area, and are indicative of an area that is heavily used by a variety of users. There have been however a substantial amount of improvements and restoration to the landscape. Thinning and removal of diseased or bark-beetle infested timber has occurred across at least 30% of the project area, and thinning in young stands has occurred across another 35% or more. These activities have served to enhance site productivity by alleviating competition and improving growth rates, and they have reduced high fuel loading lowering the risk of loss to wildfire. Tree planting has also occurred on about 5% of the area to help stand establishment.

Road improvements and on-going maintenance continue to minimize effects of runoff on primary travel routes. Erosion attributed to road-concentrated runoff is not a notable problem within the project area. Approximately 16 miles of road segments have been decommissioned, in these areas soils have been de-compacted. Currently soils are in a status of recovery to eventually convert them back to a productive status. Additionally, landings and primary skid trails have been subsoiled on about 1,370 acres, ameliorating heavy compaction, restoring natural infiltration, and enhancing rooting capability. Roadside eradication of noxious and invasive weeds along FSR 40 has also occurred to help maintain health of native vegetation.

Despite all of the intensive management in the project area soils across the majority of the project area would continue functioning to support and maintain long-term site productivity, except where there are detrimental conditions. The extent of detrimental soil conditions would remain moderate to moderately high (soil condition classes 3 and 4) across about 14% of the project area where impacts were low prior to planned treatments. In another 13% the extent would be low to moderate (soil condition classes 1, 2, and 3) because only understory hand treatments would occur. Another 26% of the area would be in leave areas where the extent of detrimental impacts would not increase. Additive to these are the portions of units where, despite the condition class, soils are intact. Because even if the soil condition class is estimated to be five (the extent of detrimental soil conditions >20% of an activity area), the converse is that the majority of soils in the unit are not in a detrimental condition. Due to their productivity and resilience most soils would retain their capability, serving as a growing medium, storing and cycling nutrients and water, producing biomass, and supporting or regenerating a contiguous forest cover of diverse age groups.

3.3.7 Fish and Water Resources

The 17,556 acre project area is within the 117,638 acre Fall River–Deschutes River 10th field watershed. Portions of three sub-watersheds (12th field) are found within the project area; Spring River, Fall River, and Deschutes Braid-Deschutes River (Figure 10).

Management Direction

Management direction included in the Inland Native Fish Strategy (INFISH, USDA 1995), which amended the Deschutes National Forest Land and Resource Management Plan (LRMP – USDA, 1990) applies within this area. The project area includes approximately 0.2 miles of Fall River that is eligible for inclusion as a Wild and Scenic River. A suitability analysis has yet to be undertaken for inclusion into the Wild and Scenic Rivers System. The Junction Project area also includes a portion of Segment 3B of the Upper Deschutes Wild and Scenic River and State Scenic Waterway corridor. A Final Environmental Impact Statement (FEIS) and Comprehensive Management Plan (River Plan) were completed for the corridor in 1996 (USDA 1996a, 1996b) that amended the LRMP and became Management Area 17a. The River Plan includes specific management Standards and Guidelines for Management Area 17a that supplement the Standards and Guidelines included in Management Area 17 of the LRMP.

Management direction within INFISH requires Riparian Habitat Conservation Areas (RHCAs) to be delineated for watersheds. They are portions of watersheds where riparian-dependent resources receive primary emphasis, and management activities are subject to specific standards and guidelines. The standard widths for RHCAs from INFISH that are applicable to this project will be adopted. See below for RHCA widths, which are listed on pages A-5 and 6 of the Decision Notice of the INFISH Environmental Assessment.

- Category 1 – fish-bearing streams. Fall River is the major waterbody within the project area, and is designated under Category 1 – Fish-bearing stream. By definition found in INFISH, the RHCA will consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100 year floodplain, or to the outer edges of the riparian vegetation, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet, including both sides of the stream channel), whichever is greatest. For the Junction Project area, the RHCAs of Fall River will have a width of 300 feet upslope from the edge of the river on both sides. Although the project area extends into the Upper Deschutes Wild and Scenic River corridor, the project area boundary is approximately 2000 feet from the river, and is well outside the RHCA.
- Category 4 areas (seasonally flowing or intermittent streams, wetlands less than one acre, landslides, and landslide-prone areas). At a minimum the RHCA will consist of the extent of landslides and landslide-prone areas, or the intermittent stream channel and the area to the top of the inner gorge, or the intermittent stream channel or wetland and the area to the outer edges of the riparian vegetation, or the area from the edges of the stream channel, wetland, landslide, or landslide-prone area to a distance equal to the height of one-half site-potential tree, or 50 feet slope distance, whichever is greatest.

Management of RHCAs are intended to achieve Riparian Management Objectives (RMOs), described by habitat features indicating "good" watershed health and inland native fish habitat. The habitat features applicable to this project (forested system) are pool frequency, water temperature, large woody debris, and width/depth ratio (See below under Environmental Effects for RMO compliance).

RMOs for forested systems are as follows:

Table 116: Interim Riparian Management Objectives (RMOs)

Habitat Feature	Interim Objectives
Pool Frequency	Varies by channel width (See Table below)
Water Temperatures	No measurable increase in maximum water temperature (7-day moving average of daily maximum temperature measured as the average of the maximum daily temperature of the warmest consecutive 7-day period.) Maximum water temperatures below 59° F within adult holding habitat and below 48° F within spawning and rearing habitats.
Large Woody Debris (forested systems)	East of Cascade Crest in Oregon, Washington, Idaho, Nevada, and western Montana: >20 pieces/mile; >12" diameter; >35' length.
Width/Depth Ratio	<10, mean wetted width divided by mean depth

Table 117: Interim objectives for pool frequency

Wetted width (feet)	10	20	25	50	75	100	125	150	200
Pools per mile	96	56	47	26	23	18	14	12	9

Standards and Guidelines (S&G) from the LRMP and included by reference include RP-2, RP-4, RP-7, RP-8, RP- 12-16, and WT-1. These S&Gs provide for protection of riparian vegetation, water quality, and require Best Management Practices and cumulative effects analysis on water and fisheries resources. Standards and Guidelines (S&G) from INFISH incorporated by reference that apply to the Junction Project are TM-1, RF-2(b), FM-1, and RA-4. These S&Gs allow vegetation and fuels management activities in RHCAs, minimize roads and landings in RHCAs, and prohibit refueling and storage of toxicants in RHCAs.

Wild and Scenic Rivers Direction

Fall River

Fall River is identified in the LRMP as eligible for inclusion in the National Wild and Scenic River System. As an eligible river, lands within ¼ mile wide corridor on both sides are to be managed in accordance with Management Area 17 of the LRMP (Figure 20). Values for which Fall River was considered eligible include the fishery and geological/hydrological values. More information is available in Appendix D of the LRMP.

Rivers or sections of rivers in the National Wild and Scenic River System are classified as Wild, Scenic, or Recreational depending on the degree of development, appropriate types of land use, and ease of accessibility of roads and trails. Fall River is classified as a Recreational River. Standards for Vegetation Management under Management Area 17 include harvest of trees will be oriented toward the enhancement of scenic, hydrologic, fisheries, recreational and/or wildlife values. Over the long term, the appearance of the river corridor should remain near natural with impacts from project activities subordinate to the natural character of the landscape (LRMP, 1990).

Deschutes River

Management will be guided by the Upper Deschutes Wild and Scenic River Plan. River Segment 3B that is intersected by the Junction Project is classified as a Recreational River. Outstandingly Remarkable Values (ORVs) for Segment 3B that are to be protected or enhanced by resource management activities are Geologic, Fishery, Vegetation, Cultural, and Recreation.

Standards and Guidelines for vegetation management from the River Plan that are applicable to the proposed project are listed below:

Standard: Riparian areas will be managed to support riparian dependent species. Upland forests will be characterized by disturbances which mimic the effects of periodic occurrence of small, low intensity fires, to perpetuate a mosaic of stand structures and ages and reduce the risk of high intensity fires.

Guidelines, incorporated by reference, include G-4, V-5, and V-9 through V-18. These include the use of Best Management Practices to protect water quality and provisions for fuels and silvicultural treatments.

The Junction project area includes 29 acres within Management Area 17a and 109 acres within Management Area 17. Vegetation and fuels management activities are proposed on 130 of these acres under both action alternatives. The table below summarizes the activities.

Table 118: Activities within Wild and Scenic River Corridors

Unit	Corridor	Acres within corridor	Silvicultural prescription*	Fuels treatments*
194	Deschutes R.	29	HTH	LFR/Mow/PB/UB
62	Fall River	61	HOR	LFR/Mow/PB
64	Fall River	9	HTH	LFR/Mow/PB
241	Fall River	31	HTH	LFR/Mow/PB

*HTH = commercial thin, HOR = overstory removal, LFR = ladder fuels reduction, PB = pile burning, UB = underburning

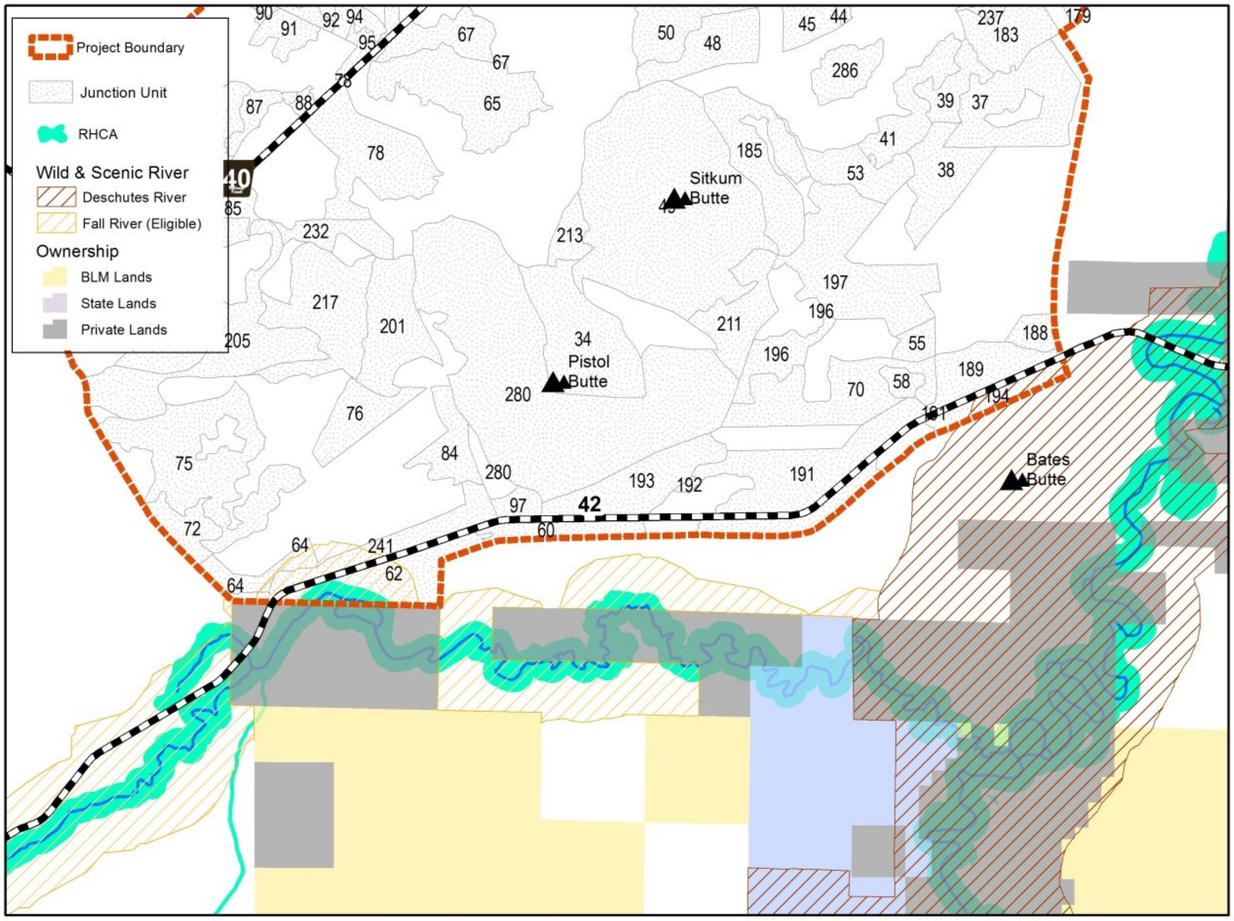


Figure 20: Units that fall within the Fall River RHCA and the Fall River and Deschutes River W&S corridors.

Existing Conditions

Water and Fisheries Resources

The project area is within portions of three 12th field sub-watersheds of the Fall River 10th field watershed; Spring River, Fall River, and Deschutes Braid-Deschutes River. The table below demonstrates the acreage of each sub-watershed within the project area boundary.

Table 119: Sub-watershed Acres within Junction Project

Sub-watershed	Hydrologic Unit Code	Sub-watershed Acres	Acres within Project Area Boundary
Deschutes Braid-Deschutes River	170703010306	11,829	1122
Fall River	170703010302	39,965	10,766
Spring River	170703010305	16,406	5668

The drainage area for Fall River has been calculated at 39.9 square miles, but is difficult to determine due to the very gentle slopes of the watershed and the complex nature of the strata. Fall River is within the Upper Deschutes Basin. Groundwater flow direction in the basin is influenced by complex, underlying geology, and is not closely associated with the surface topography in some areas. Generally, groundwater flow direction in the basin is in a southerly to southeasterly direction from the Cascade Range toward the Deschutes River, then becoming generally northeast approaching Bend (Gannett et al, 2001).

Fall River has a very stable flow regime due to its spring-fed, groundwater driven nature. The average flow for Fall River for the flow period of record 1939 to 2007 was 140 cubic feet/second (cfs), with a minimum flow of 77 cfs in 1942 and a maximum flow of 244 cfs in 1951 for the period of record (Oregon Water Resources Department website at www.wrd.state.or.us). Fall River loses flow to the surrounding strata, recharging the groundwater in its lower reach downstream of the gaging station near river mile 5 (Gannett et al, 2001).

A large proportion of the precipitation in the Upper Deschutes Basin falls in the Cascade Range, making it the principal groundwater recharge area for the basin. East of the Cascade Range, there is little or no recharge from precipitation (Gannett et al, 2001). Precipitation in the Junction project area, primarily snowfall, averages 15-20 inches annually, while in the Cascade Range recharge area, approximately 20 miles west of the project area, annual precipitation may exceed 200 inches in localized areas. Evapotranspiration of groundwater is rare in the Upper Deschutes Basin (Gannett et al, 2001). Groundwater level fluctuations in the basin are driven primarily by decadal climatic cycles. Individual peak flow periods for Fall River are roughly 5 to 14 years apart (Gannett et al, 2001). The range in mean monthly flows for Fall River is only 11 % of the mean annual flow, while surface water dominated streams exhibit a range of over 200% (Gannett et al, 2001).

A comparison of the groundwater discharge variations in the Cascade Range with precipitation levels at Crater Lake showed that periods of high groundwater discharge generally corresponds with periods of high precipitation (Gannett et al, 2001). Runoff is a relatively small component of the total water budget in the basin due to the high infiltration rates of the highly permeable volcanic soils (Gannett et al, 2001). Ground water constitutes virtually the entire flow of Fall River (Gannett, 2001), the majority of which discharges from springs near the headwaters. The source of the discharge is thought to be from snowmelt that originated from the Cascade Range to the west (Gannett, et al 2001). Aquifers in the Cascade Range consist primarily of quatenary basaltic andesites, and are probably composed of many interbedded flows (Manga, 1999). Groundwater that has moved through the highly permeable Cascade Range comes in contact with the low permeability sedimentary deposits of the La Pine sub-basin, forcing discharge to the surface (Gannett et al, 2001).

Manga (1999) studied discharge at Fall River for 3 different timescales. The hydraulic timescale related long term changes in discharge to long term changes in recharge. This describes the effect of, and the recovery from, droughts. The hydraulic time scale for Fall River was calculated at 6.3 years. The time lag, which measures the time lag between groundwater recharge (springtime snowmelt) and the time of peak discharge at the spring, was calculated at 112 days. Lastly, Manga estimated that the age of groundwater discharged in the Upper Deschutes Basin springs, including Fall River, to be approximately 10-30 years.

Manga (1999) also studied water temperatures at Fall River and other Upper Deschutes Basin springs. Little variation in temperature over a 2 year period reflected that the aquifers are large in volume and reinforced the age estimate of the groundwater.

Fall River has populations of native Columbia River basin redband trout, native mountain whitefish, introduced brown and eastern brook trout. Different stocks of rainbow trout have been stocked for decades in Fall River. Presently, legal-sized "cranebows", derived from naturally spawning redband from Crane Prairie Reservoir, are stocked annually. The rainbow stocks may have hybridized with the native redband, but the genetic status is unknown. The Deschutes River has a similar fish community.

There are no bull trout populations within Fall River (Figure 21 below). They were suspected to have once been present but spawning was never documented (Buchanan, et al 1997, USFWS, 2002). Fall

River is included on the Oregon Department of Environmental Quality (ODEQ) 2010 Water Quality Integrated Report with a Category 5 status of inclusion on 303(d) list, Total Maximum Daily Load needed. The ODEQ 2010 Integrated Report is found at www.deq.or.us/wq/assessment/rpt2010/search.asp.

The criteria lists bull trout spawning and juvenile rearing. This was based on recommendations of the Bull Trout Technical Work Group, composed of bull trout experts and fisheries biologists (ODEQ, 2003a), and the U.S. Fish and Wildlife Service (USFWS) proposed critical habitat for bull trout juvenile rearing and spawning (ODEQ, 2003b). The work group designated 4 bull trout use designation: BTHD1; BTHD2; BTHD3; and BTHD4. The first two designations pertain to waters where bull trout populations are known to be present while the latter two refer to habitats not known to be occupied but have potential to support bull trout spawning, rearing, and resident life stages (BTHD3) or bull trout migration (BTHD4). These two designations may have little to no current or historical data showing bull trout presence. Fall River was assigned BTHD3 from above Fall River Falls upstream to the headwaters (all year) and BTHD4 from the mouth upstream to Fall River Falls (October – May). The Final USFWS Bull Trout Critical Habitat designation in 2010 did not include Fall River, with Big Falls on the Deschutes River at river mile 132 being the upsriver extent of the final critical habitat designation. ODEQ may revise the bull trout use designations in the future to be consistent with the final critical habitat designations (ODEQ, 2003b). There is potential for this to occur on Fall River since it was not included in the Final Bull Trout Critical Habitat Designation.

A draft recovery plan (USFWS, 2002) has been developed for the Deschutes River and tributaries (Deschutes Recovery Unit) that is available on the U.S. Fish and Wildlife Service website at http://www.fws.gov/endangered/species/recovery-plans.html. This plan states a feasibility analysis is needed to assess the potential for reestablishment of bull trout into the upper Deschutes core habitat. This has not been undertaken to date.

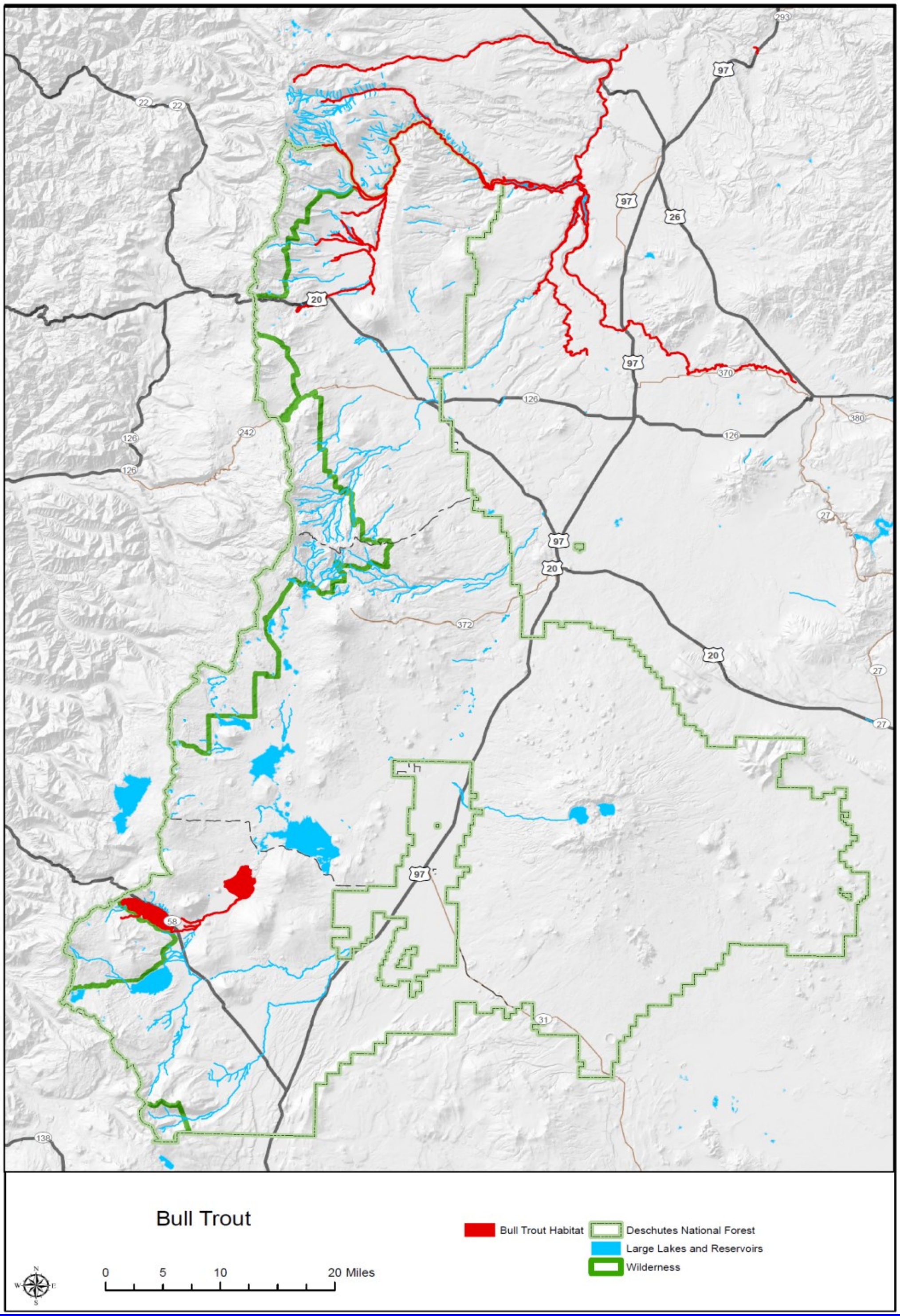


Figure 21: Deschutes Basin Biological Bull Trout Habitat from USDA/USDI Deschutes Basin Biological Assessment 2014-2017.

Direct and Indirect Effects

Alternative 1 – No Action

Direct and Indirect Effects: There would be no direct effects to water resources or aquatic species as no treatments would occur. There is potential for indirect effects as resiliency to uncharacteristic wildfire across the landscape is reduced. Wildfire can result in effects that reduce shade, increase water temperatures, and increase overland flow of sediments should it enter RHCAs. For redband trout, wildfire in the RHCA of Fall River May Impact Individuals or Habitat **(MIIH)**. The RHCAs of Fall River and the Deschutes River are located to the south of the project area. Winds from a northerly direction could drive wildfire toward the two rivers, but prevailing winds in the project area are westerly.

Alternative 2 and Alternative 3

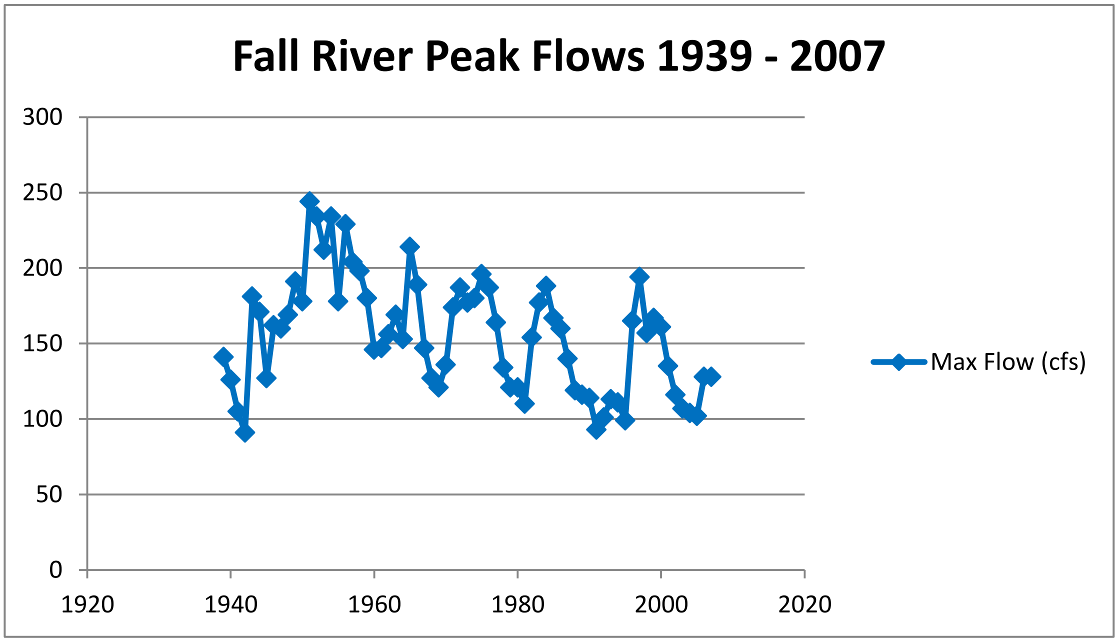
Water quality and fisheries habitat would be protected under either alternative by the use of National Best Management Practices (USDA, 2012) and other project design features. These are listed in Chapter 2, p. 35

Water Quantity

Reducing net evapotranspiration by harvest of vegetation, in areas with soils that have high infiltrations rates, can lead to increased water yield in ground water systems (Manga, 1997). The increased yield in groundwater generally takes days to months to "surface" in springs or stream systems, if not stored subsurface. Water yield increase due to groundwater flow generally is not a concern as some water is either or both stored and redistributed subsurface (Manga, 1997). Hibbert, (1967 in Meehan 1991) found that when stands are thinned, the residual stand may increase its use of water, therefore the net increase in the contribution to groundwater within the Junction area may be less than anticipated. An increase in the stream network can occur from timber harvesting by channeling surface water on roads, skid trails, and landings, leading to increases in peak flows of streams. There are no stream channels within the project area other than approximately 0.2 mile of Fall River; therefore there is minimal potential for an increase in the stream network.

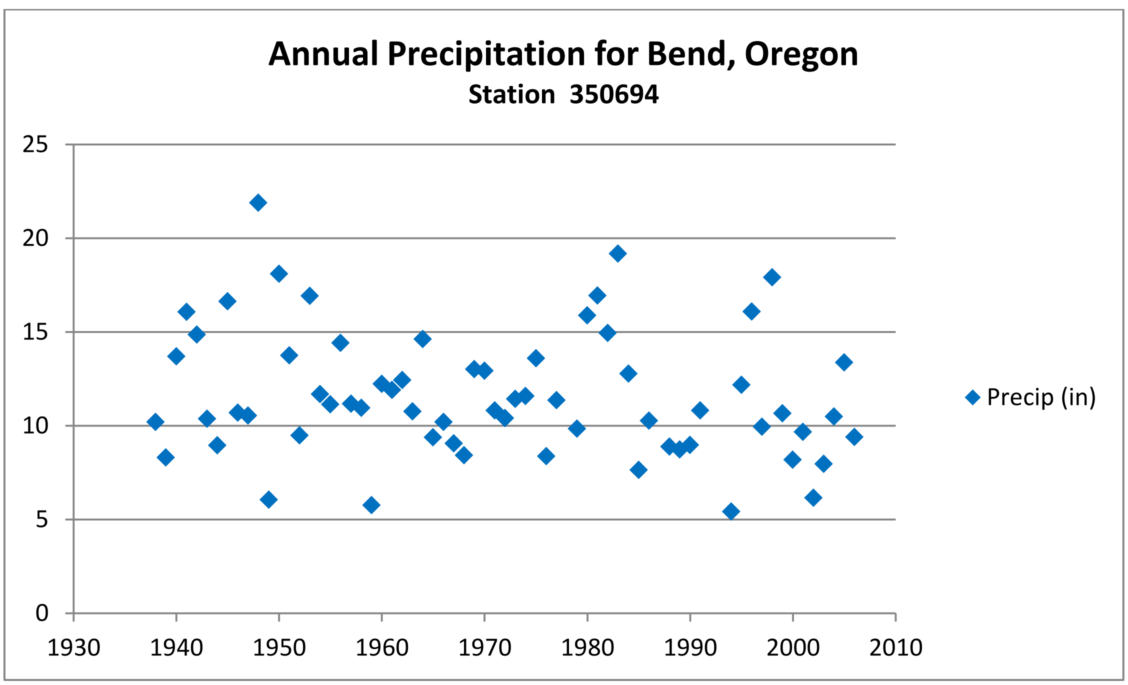
Fall River is groundwater driven, with nearly the entire flow fed by springs at the headwaters. An analysis of the hydrograph for Fall River shows that it is very stable despite active road building and vegetation management in the Fall River watershed over the past several decades. Flows in Fall River decreased in the late 1970s and early 1990s, which corresponds with the drought conditions of the time, despite active vegetation management in the Fall River-Deschutes River watershed. Flows increased in the mid 1980s with the corresponding increase in precipitation in the early 1980's (See Figures 22 and 23). Comparing the two figures, there appears to be a lag between changes in precipitation and the corresponding change in flows in Fall River, as the aquifer adjusted. As was discussed earlier, Manga determined a hydraulic timescale of 6.3 years. The two figures below demonstrate the relatively stable flows of Fall River and allow comparison of discharge to precipitation (see Figure 22 and Figure 23).

Figure 22: Fall River Peak Flows



Source: Oregon Water Resources Department website @
http://apps2.wrd.state.or.us/apps/sw/hydro_report/gage_data_request.aspx?station_nbr=14057500

Figure 23: Annual Precipitation for Bend, Oregon



Source: Western Regional Climate Center website @www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?orbend

There would be no measurable changes in the flow regime of Fall River, including peak flows, for the reasons listed below:

- Source of discharge for springs in the Upper Deschutes River basin, including Fall River, is from the Cascades Range recharge area located approximately 20 miles to the west. There is little recharge to groundwater from within the project area. There is little precipitation in the area compared to the recharge area of the Cascade Range.
- Lack of runoff and surface water in the project area. Highly permeable volcanic soils, allowing high infiltration of precipitation to underlying aquifers.
- Long term recorded stable flow regime of Fall River due to its groundwater nature. Past management in the project area and adjacent lands has not increased the stream drainage network, nor resulted in changes to the flow regime of Fall River.
- Aquifer feeding Fall River is large and changes in recharge are attenuated in the discharge. Changes in flows in the Upper Deschutes basin have been shown to correlate to changes in precipitation driven by decadal climatic cycles.
- Changes in evapotranspiration would have limited hydrologic effect since evapotranspiration from groundwater is rare in the Upper Deschutes basin. High infiltration limits volume of precipitation that can be evapo-transpired as it moves through the soil to the groundwater.

There would be no changes to the flow regime of the Deschutes River. River flows are controlled upriver at Wickiup Dam and are managed for irrigation needs.

Water Quality

The RHCA to be treated is on the north side of Fall River and the canal (Unit 62), which have primarily west to east flow direction. Therefore trees on the north side would have limited benefit to stream shading. No activities would occur on the south side of the stream or canal where there is a greater benefit to shade from the overstory. In addition, there will be very little overstory removed within the RHCA between >50 feet and 100 feet from Fall River because of the restriction of equipment being able to operate in this area. Effective stream shade would be maintained, therefore not adversely affecting water temperature. Effective stream shade is defined as the total solar radiation blocked over a twenty-four hour period (USFS, BLM 2012). Stream shading is broken down into two zones, primary and secondary. The period of greatest solar radiation occurs between 10:00 am and 2:00 pm (USFS, BLM 2012). Trees located in the primary shade zone nearest the stream provide shade all day and are the only trees providing shade during this critical 4 hour period. Based on the gentle slopes near Fall River and the canal, the primary shading zone is approximately 50 feet.

Trees in the secondary shading zone (beyond the primary zone) can provide some shading when the sun is lower in its arc. The amount of shading in the secondary zone will depend on stand density. Within this zone, there is no added benefit to shade from over stocked stands because of the "tree behind a tree" concept, where one tree can cancel any shade benefit from another tree (USFS, BLM 2012).

The primary shading zone (first 50 feet from the river) would not be affected and the secondary shading zone (beyond 50 feet) would be minimally affected, with the south facing aspect limiting any effects from removing any overstory.

There will be no effect to water temperatures of Fall River due to the retention of shade trees and the small area treated within the RHCA of Fall River and the hatchery canal (approximately 12 acres).

There will be no measurable effects to riparian vegetation, turbidity and sedimentation of Fall River from management activities. Only one unit (62) is located within the RHCA, and is adjacent to Fall River for a distance of 0.2 mile and along the hatchery canal for 0.15 mile. Project design features including BMPs would protect water quality and riparian vegetation. Rashin and others (2006) studied effects of timber harvesting on sedimentation of streams in Washington state. Sediment routing surveys found that 19 of 22 sites had no sediment delivery by the 2nd year following harvest by heavy equipment when a stream buffer was used. The only three sites that exhibited any chronic sediment input were where streams were crossed by timber yarding practices. This practice would not occur under any alternative in the Junction Project. The authors concluded from their study that a 33 foot setback of ground disturbance from streams prevented sediment delivery to streams from about 95% of harvest related erosion features. Lakel and others (2010) concluded from a study of streams in Virginia that stream buffers as little as 25 feet were effective in limiting sedimentation after timber harvest but recommended a minimum of 50 feet. For unit 62, the stream and canal setback for heavy equipment is 100 feet.

Fisheries

It is Forest Service policy to avoid all adverse impacts to threatened and endangered species and their habitats, except when it is possible to compensate adverse effects through alternatives identified in a biological opinion rendered by the U.S. Fish and Wildlife Service. Measures are to be identified and prescribed to prevent adverse modification or destruction of critical habitat and other habitats essential for the conservation of endangered, threatened, and proposed species (FSM 2670.31). Through the biological evaluation process (FSM 2672.4), actions and programs authorized, funded, or carried out by the Forest Service are to be reviewed to determine their potential for effects on threatened and endangered species and species proposed for listing (FSM 2670.31). Species classified as sensitive by the Forest Service are to be considered in the National Environmental Policy Act process by conducting biological evaluations to determine their potential effect of all programs and activities on these species (FSM 2670.32). Management direction regarding sensitive species is that actions would benefit, have no impact, or minimize impacts so that there is no loss of population viability or creation of a significant trend toward federal listing. The findings of biological evaluations are to be documented in a decision notice, or if applicable, in official files.

Since there would be no measurable effects to water quantity or water quality of Fall River from either action alternative, there would be **No Impact (NI)** to redband trout and its habitat from either alternative. There is no habitat for two aquatic invertebrate sensitive species found in other areas on the Deschutes National Forest; a caddisfly (*Rhyacophila chandleri*) or Indian Ford juga (*Juga hemphilli ssp.*) These species are associated with small spring habitats. There would be No Impact (NI) to these species. There would be no adverse effects to other fish species or their habitat.

The following table displays the species considered in the analysis of the Junction Project. **There are no threatened or endangered aquatic species or habitat present within the project area.**

Summary of Findings for Proposed, Threatened, Endangered, and Sensitive Species (2011 USFS Region 6 Regional Forester's Sensitive Species List):

Sensitive Species: Interior Columbia River Basin redband trout, A Caddisfly, Indian Ford Juga

Table 120: Aquatic species and effects for this project.

Species	Scientific Name	Status	Occurrence	Effects Determination
Interior Columbia River Basin redband trout	*Oncorhynchus mykiss gairdnerii*	S	D	**NI**
Indian Ford Juga	*Juga hemphilli ssp.*	S	N	**NI**
A Caddisfly	*Rhyacophila chandleri*	S	N	**NI**
Chinook Salmon EFH	*Oncorhynchus tshawytscha*	MS	HN	**NAE**

Status

E	Federally Endangered
T	Federally Threatened

S	Sensitive species from Regional Forester's list
C	Candidate species under Endangered Species Act
MS	Magnuson-Stevens Act designated Essential Fish Habitat

Occurrence

HD	**Habitat Documented** or suspected within the project area or near enough to be impacted by project activities
HN	**Habitat Not** within the project area or affected by its activities
D	Species **Documented** in general vicinity of project activities
S	Species **Suspected** in general vicinity of project activities
N	Species **Not documented** and not suspected in general vicinity of project activities

Effects Determinations

Sensitive Species

NI	No Impact
MIIH	May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species
WIFV	Will Impact Individuals or Habitat with a Consequence that the Action May Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species
BI	Beneficial Impact

Chinook Salmon Essential Fish Habitat (Magnuson-Stevens Act)

NAE	No Adverse Effect
AE	Adverse Effect on Essential Fish Habitat

The Upper Deschutes River basin has been mapped by the National Marine Fisheries Service as Essential Fisheries Habitat for Chinook salmon. However, anadromous fisheries habitat was limited to below Big Falls on the Deschutes River over 80 miles downriver from the project area. There will be no effect to Essential Fish Habitat from either action alternative.

INFISH Compliance (Alternatives 2 and 3)

Unit 62 along Fall River is the only unit within an RHCA (overlapping 12 acres of RHCA), therefore the only unit with potential to affect the RMOs.

- Pool frequency would not be affected as there would be no modifications to the channel, and peak flows are not affected.
- Water temperature would not be affected due to the small length of treatments adjacent to Fall River and the height-based thinning restrictions.
- Large woody debris would not be affected as no instream wood is removed or added, and the height- based thinning restrictions would allow future large wood recruitment to the river.
- The width/depth ration would not be affected as there would be no modifications to the channel, and peak flows are not affected.

In summary, the INFISH RMOs would be maintained. Both action alternatives meet INFISH Standards and Guidelines.

Wild and Scenic River

Fall River (Eligible)

Vegetation and fuels management activities would occur on 101 acres out of a total of 1630 acres (6.2%) included in the corridor (federal land portion only) under both Alternatives 2 and 3. The proposed activities within the Fall River corridor are consistent with LRMP Standards and Guidelines for Management Area 17 and would not affect the eligibility of Fall River to be included in the National Wild and Scenic River System.

Deschutes River

Alternatives 2 and 3 would both treat 29 acres out of 6,997 acres total within Segment 3 of the corridor (0.4%). The relatively small number of acres treated, the consistency of the proposed activities with the Standards and Guidelines of Management Area 17a, and project design features and mitigation measures would protect the ORVs of Geologic, Fishery, Vegetation, Cultural, and Recreation within Segment 3.

Cumulative Effects on Fisheries and Water Resources

Cumulative effects for fisheries and watershed resources are bound in space by the Fall River-Deschutes River watershed and in time by a 50 year hydrologic recovery period.

Water Quantity

The Equivalent Clearcut Area (ECA) methodology is a tool used to determine where cumulative watershed effects might occur at the 10th field watershed scale. Using the ECA methodology, each particular land use area is assigned a "clearcut equivalent factor" (CEF), which is multiplied by the area disturbed to arrive at an ECA value (Bettinger et al., 1998). For example, clearcuts and roads are generally given a CEF value of 1.0, and partial cuts are given a CEF from 0.0 to 1.0, depending on the density of residual vegetation. The more open the unit is, the more it emulates the snowmelt and evapotranspiration rates of a similar stand that is clearcut.

More than one activity (i.e. commercial thinning and mowing may occur on the same acre in the Junction Project area. The ECA value for Alternatives 2 and 3 were calculated to be 6849 and 6359 acres respectively, therefore the hydrologic disturbance to the Fall River-Deschutes River watershed is 5.8% for Alternative 2 and 5.4 % for Alternative 3. An ECA value was not determined for the existing conditions[1]. The watershed has received extensive vegetation management activity and road building, but available vegetation management records only date back to 1968. Temporary road construction and road obliteration were not included in the ECA calculations due to minimal acres involved.

Table 121: ECA Value for Alternative 2

Action	Acres	ECA Coefficient	ECA Acres
HTH	3849	0.3	1155
HOR	4452	0.6	2671
HST	2335	0.6	1401
LPBG	4682	0.3	1405
PCT	4519	0.02	90
LFR	6198	0.02	124
Total ECA acres			6846

[1] Some research has shown that ECA's of 25-40% within a watershed have demonstrated effects on flows, as mentioned above. However, this research was on west side watersheds that have much different soil types, slopes and high precipitation. The watersheds in the Junction project are extremely permeable thus the lack of surface water. It would probably take an extremely high ECA within these watersheds to have any effects to flow regimes

Table 122: Alternative 3 ECA

Action	Acres	ECA Coefficient	ECA Acres
HTH	3307	0.3	992
HOR	4235	0.6	2541
HST	2322	0.6	1393
LPBG	4113	0.3	1234
PCT	4213	0.02	84
LFR	5741	0.02	115
Total ECA acres			6359

Research by Troendle and Olson (1993), Troendle and King (1985, 1987), and Troendle (1983) found that there is no one specific threshold as to how much a watershed can be clearcut before a change in peak flow can be documented. ECA thresholds, in relation to changes in peak flow, have been documented as low as 25 percent and as high as 40 percent. However, this threshold is highly dependent upon the physical characteristics of the watershed. The threshold for Fall River is unknown, but is presumed to be very high because of the groundwater nature of the watershed.

Despite ground disturbing activities conducted in the past several decades within the watershed, the hydrograph exhibits there has been none to minimal hydrologic effect to Fall River. Many of the timber stands have regenerated and achieved varying degrees of hydrologic recovery. There is little correlation between activity on the surface and hydrologic effects, because of the highly permeable volcanic landscape providing for groundwater dominated hydrology as described previously. Streambank instability may indicate changes in peak flows. Stream surveys of Fall River have documented low rates of streambank erosion. The calculated ECA values for the two action alternatives are not expected to cumulatively add to existing conditions within the Fall River-Deschutes River watershed that would exceed a threshold where peak flows would change. Alternatives 2 and 3 are consistent with LRMP S&G RP-8 as cumulative effects analysis on runoff was completed.

Water Quality

There are no direct or indirect effects to water quality, therefore there would be no cumulative effects. Alternatives 2 and 3 are consistent with LRMP S&Gs RP-2, RP-4, RP-7, RP-8, and RP-12-16 as riparian areas and riparian dependent resources are protected, Best Management Practices were applied, cumulative effects were evaluated on water quality, and near stream ground cover, shade, large woody material, and streambanks were protected.

Fisheries

There are no direct or indirect effects to fish populations or fisheries habitat, therefore there would be no cumulative effects. Alternatives 2 and 3 are consistent with RP-8 as cumulative effects on fish habitat was evaluated.

3.3.8 Botany

Threatened, Endangered, and Sensitive (TES) plant species were evaluated through site-specific field surveys in 2010 and by reviewing historical surveys conducted in 1991 and 1998. No threatened or endangered plant species or habitat appears to exist within the project area. Based on past survey information Region 6 sensitive species green-tinged paintbrush (*Castilleja chlorotica*) has been known to occur within the project area.

Existing Conditions

Field surveys in 2010 located 33 new sites of green-tinged paintbrush in addition to the 284 previously documented sites or populations for a total of 317 sites in the Junction area. These sites contain an estimated 2,600 plants which is roughly 8% of the total population on the Deschutes National Forest. Green-tinged paintbrush populations within the project area are primarily located in localized sites associated with remnant lava flow edges or "lava domes." These sites are topographic rises in the landscape, rocky, and usually have less canopy cover than the surrounding habitat (Milano 1993).

Effects Analysis

The analysis area for effects documentation for plant species is the 17,556 acre Junction project area because potential for effects to the plants occurs where activities overlap plant sites.

Direct and Indirect Effects on Plant Species and Habitat

Alternative 1 – No Action

In the absence of treatments there are no expected direct effects to green-tinged paintbrush individuals or populations. There is the possibility of negative indirect effects on this species and populations from no action, by not removing trees that may eventually shade populations to the point where there would be extirpated from an area. A continuation of the current trends in vegetation can be positive and negative. Years of fire exclusion in the project area have allowed shrubs to grow and proliferate, a situation which *Castilleja chlorotica* prefers; it is found in mid- to late-seral stage shrubs in this portion of its range and therefore would benefit from fire exclusion. *Castilleja chlorotica* is considered a hemiparasite meaning it obtains secondary compounds from a host plant, most often the established late-seral shrubs and sometimes grasses or forbs. Should a catastrophic wildfire get started, it would most likely kill the CACH present by killing its host plant; this has been observed both on Forest Service administered land and Bureau of Land Management lands where prescribed fire has escaped and run through CACH populations, also in management treatment monitoring of prescribed fire within CACH populations. In the absence of fuel-reduction treatments such as mowing and prescribed fire, a fire could conceivably rip through CACH populations and habitat. This would likely eliminate any CACH plants that may exist there.

The Junction planning area has received treatment in the past ten years through the implementation of the Klak Timber Sale, which is in the same area as Junction. The Klak project has utilized pre-commercial thinning and commercial timber harvesting to reduce fuel loading and restore healthy forest conditions. The CACH populations which exist within these treatment sites have shown an improvement with the alteration of their habitat by opening the forest canopy. Informal monitoring of several populations within these treatment sites show high numbers of healthy, vigorous CACH plants present.

Alternative 2 and Alternative 3

Alternative 2 and Alternative 3 were evaluated together for direct and indirect effects because the two alternatives did not vary greatly on acres being treated and this variance is minimal from a botany resource standpoint.

Across the landscape of CACH within the Junction project, there are likely to be few direct effects by implementation of this alternative, if the listed mitigations are followed. However, there is always the possibility that individual plants that were overlooked during survey or colonized an area between survey and project implementation could be inadvertently lost. (CACH has been observed to "wink out" from some areas and colonize new ones in the space of about five years). These losses, if any, would represent a minor fraction of the local and overall populations and would not move the species toward Federal listing status.

Overstory treatments, log removal, ladder fuel reductions, precommercial thinning, pile burning and underburning have the potential to result in habitat disturbance; however, with design elements, best management practices, and mitigation measures impacts would be reduced or avoided all together. There are no expected effects with the proposed road closures. The following is a discussion of mitigation for the units with plants present.

For overstory treatments (seed tree harvest, commercial thinning, and overstory removal):

- There are 53 implementation units that have interior CACH populations (refer to Table 1 for a list of implementation units with CACH populations). To avoid ground disturbance and damage to these populations, winter logging will be employed for all overstory treatments such as: seed tree harvest, commercial thinning, and overstory removal. Winter logging will only be executed when conditions are cold enough such that the ground is consistently frozen throughout the day and the operations are cleared by the Timber Sale Administrator.
- If conditions do not allow for proper winter logging in units with CACH or if there are road hauling constraints upon which winter logging is not appropriate then:
    - The District Botanist will be notified promptly to permit ample time for site preparations which may include the hiring of seasonal help, map making, locating populations on the ground, and thoroughly flagging the site.
    - CACH sites will be flagged by a botany representative for avoidance in such a manner that they will be clearly visible to equipment operators
    - Sites will need to be flagged during summer months when the plants are visible
    - Heavy machinery will need to remain outside of the flagged area, but if operating with a boom, harvesters may reach into the area to retrieve materials
    - Refrain from laying slash in the flagged sites
- Temp roads will be constructed after consultation with the District Botanist to prevent construction on known CACH populations.
- Log landings will not be established on known populations of CACH. Timber Sale Administrators will consult with the District Botanist about the placement of landings.
- During unit layout, the unit boundaries will be marked so as to ensure that any adjacent CACH sites remain outside of the unit. The botanist(s) will be available to assist in the layout of these units.

For understory treatments (10% retention, Whip, Precommercial Thinning, Ladder Fuel Reduction, Slash Treatments, Mowing, and Prescribed Fire):

- CACH sites within the understory and slash treatment units will be flagged by a botany representative during the summer when plants are visible (refer to Chapter 2 Resource Protection Measures for a list of units with CACH and the proposed treatments). Therefore, all understory project work (10% retention, whip falling, precommercial thinning, ladder fuel reduction, mowing, and slash treatments) occurring in units with CACH populations must be cleared with the District Botanist prior to implementation.
- Heavy machine operators (including mowers) must avoid traveling through a flagged boundary, but if the machine/harvester operates with a boom, it may reach into the site to retrieve materials.

- Ensure that all slash and understory materials are removed from the flagged sites and not piled inside area.
- Understory and slash treatment operations that do not require heavy machinery may treat inside flagged areas. However, trees felled within the flagged areas must be removed, also piles will not be built within the flagged area.
- In order to maintain healthy, vigorous CACH populations, fire must be kept out of documented populatins. Fire management officers must confer with the District Botanist over the implementation of fire treatments in the units with CACH populations. There are six units which contain populations, these are: 175, 176, 183, 185, 202, 236. It would be advantageous for a district botany representative to be present during treatment to assist with the protection of the populations.

Implementation of either Action Alternative could improve habitat for green-tinged paintbrush populations. Ideal habitat is grassy forest openings and thinning treatments (nearby known populations) would reduce shading of sites and open up forested stands thus providing ideal habitat and improved vigor for this species.

Treatments would also help reduce the chance of a high intensity fire occurring within the project area which would reduce potential harm to green-tinged paintbrush populations. Fuels reduction treatments (in particular mowing) and burning could negatively affect uninhabited green-tinged paintbrush habitat by reducing the mid- to late-seral shrub layers that this species prefers.

Cumulative Effects on Plant Species and Habitat

Alternative 1 – No Action

Decades of fire exclusion when combine with doing nothing (no action) could affect green-tinged paintbrush. Fire exclusion and the no action alternative would allow continued shrub growth and proliferate into mid to late-seral stages, which this species prefers and would benefit from continued fire exclusion and no action. However, should a wildfire start within or near green-tinged paintbrush populations, it would most likely kill those populations.

Alternative 2 and Alternative 3

The scale of effects is the project boundary, so chosen because it offers a landscape of reasonable size in which to determine effects. Habitat for CACH in the Junction project has been affected by previous activities, including the recent Klak Timber Sale, which has more than likely impacted the populations in a positive manner through careful management planning regarding the known CACH populations. Mechanical operations opened the forest canopy and avoided all known and flagged populations which enhanced and encouraged the proliferation of the species. As far as the Junction area and general vicinity in the past, the CACH populations may have suffered negative impacts through activities which occurred before knowledge that the plants were there. These activities include railroad logging, thinning, and extensive personal-use woodcutting, all with inevitable soil and habitat disturbance. Since then, careful forest management has been designed to help ensure the maintenance of this species.

Green-tinged paintbrush populations that exist within the previous treatment sites of Klak have shown an improvement with their habitat as forested stands become more open. Informal monitoring of several green-tinged paintbrush populations have shown high numbers of healthy, vigorous plants within these sites.

Effects Determination

There would be no effect to any Proposed, Endangered, or Threatened plant species. Region-6 sensitive species green-tinged paintbrush is known to occur (317 documented sites) within the Junction project area. Project activities have the potential to impact individual plants or habitat; however, with design elements, best management practices, and mitigation measures this project may impact habitat or individuals but would not cause a trend towards a Federal listing.

The Junction project is consistent with the Deschutes LRMP for TES plant species management. Records were checked for previously known TES plant populations (TE-1); suitable habitat was located (TE-2); and a field reconnaissance was performed to try to locate populations within the project area, and at the proper time of year when TES plant species in question would be found (TE-3).

3.3.9 Noxious Weeds

Invasive plant species were evaluated through site-specific field surveys in 2010 and by reviewing past surveys. Nine previously-known weed sites were located. No new infestations were discovered.

Existing Condition

Nine known sites, containing invasive species common mullein, spotted knapweed, and dalmation toadflax are known to occur within the Junction project area, mainly long Forest Service roads 40 and 42.

Noxious Weed Assessment Risk Ranking

A Noxious Weed Assessment was prepared to evaluate the risk of this project introducing or spreading noxious weeds. The action alternatives for the Junction project have a high risk of introducing noxious weeds into the project area. A risk ranking of HIGH is appropriate for this project because heavy equipment would be brought into the area, which brings a risk of importing weed seeds or parts with it, and because there are known weed sites present.

Effects Analysis

The analysis area for effects documentation for plant species is the 17,556 acre Junction project area and the cumulative effects analysis area includes the project area boundaries.

Direct and Indirect Effects on Noxious Weeds

Alternative 1 – No Action

Since no actions would occur, there would be no identifiable direct or indirect effects from this alternative.

The threat of weed establishment would still remain as Forest recreationists and visitors enter the area. Treatment of weeds, in the form of hand pulling, would continue which aids in the prevention of weeds spreading. Hand pulling is not the most effective method for weed eradication but since there is only a limited amount of herbicide use allowed this is the next available treatment method. Herbicide use is permitted along Forest Service road 40.

Deferring treatments to improve forest stand health and reduce ladder fuels could potentially promote weed spread. If a wildfire were to burn through the area it would pose a serious threat to native habitat as invasive weeds could readily establish on disturbed grounds. Vehicles and personnel associated with suppression activities could bring in additional or new invasive plant species since there might not be time to stop and inspect vehicles prior to entering the area.

Alternative 2 and Alternative 3

Weed parts or seeds may be brought into the project area via equipment used for project implementation. All ground disturbing activities, such as logging, logging removal, precommercial thinning, and burning increase the threat of rural invasive species spread or introductions. A number of weed prevention practices are incorporated into the project design (see Section 2.5 Resource Protection Measures). Standard practices for weed prevention include requiring that equipment be cleaned before entering National Forest System lands and before moving on to other projects. This has the effect of preventing weed seeds from entering areas on the Forest on the tires and undercarriages of equipment that could otherwise be deposited in disturbed soil during project activities. Mitigations include treating known existing weed sites prior to entering a unit. This has the effect of limiting seed distribution within the project area, or carrying seed to other parts of the Forest.

Cumulative Effects on Noxious Weeds

Alternative 1 – No Action

No cumulative effects to noxious weeds are expected from this alternative.

Alternative 2 and Alternative 3

The scale of analysis for this section is the project boundary, so chosen because it offers a landscape of reasonable size in which to determine effects. Over the last 15 years invasive plant populations have exponentially increased in central Oregon. Bend, La Pine, and Sunriver, the nearest large communities from which harvest-related vehicles and other recreational vehicles would pass through the project area helped introduce weeds.

Previous timber harvests and fuels treatments have occurred within the project area; however, it is difficult to determine whether any of the documented weed sites are a result of these activities since sites are predominately roadside and are not linked to log landings or skid roads. The continuous disruption of the land from past, ongoing, and present projects causes the area to be more susceptible to non-native and invasive plant introduction. Ongoing use by the public, such as hunting and recreational use, coupled with land disturbing activities proposed create a situation for increased risk of introduction and spread of non-native plants.

The Forest-wide Invasive Plant Treatment project was authorized in May 2012. Implementation includes herbicide treatment of weeds along Roads 40 and 42, which bisects the project area. Treating invasive plant sites within the Junction project area reduces the seed source available for spread throughout the treatment units.

3.3.10 Recreation

Recreation opportunities available on the Deschutes National Forest broadly benefits public users. For many recreationalists, public lands provide the only means of experiencing outdoor recreation.

Forest roads 40, 42, and 45 are the major access routes to the project area. Within the project area there are no developed recreation areas, summer use trails or facilities. The majority of this area receives only light recreation in the form of hunting, dispersed camping, snowmobiling, biking, and driving for pleasure. A portion of FR 4140 is located along the northern boundary of the project area and is groomed during the winter for snowmobile use. This groomed trail receives moderate to heavy use depending on the winter snowpack. Hunting in the fall for deer and elk is the major recreational use in this area.

Fall River Fish Hatchery is located southwest of the project area boundary. The access road (FR 42) to this hatchery is within the project area.

Existing Condition

Forest Roads 40, 42, and 45: These roads are main arterial paved roads that lead to the Cascade Lakes Scenic Byway. Since they are access routes to the byway they receive heavy use year round. All three roads (or portions of them) are plowed during winter months while other portions for these roads are groomed for snowmobiles. FR 45 is also the main access route to Mt. Bachelor Ski Resort.

Fall River Hatchery: This hatchery is operated by Oregon Department of Fish and Wildlife and the access road to the hatchery is within the project area. The beautiful forested setting and the interest to see fish production activities draws thousands of visitors each year. According to the 2011 Operations Plan for Fall River Hatchery, the facility welcomes 20,000 visitors annually.

Oregon Department of Fish and Wildlife Helispot: Located northeast of Fall River Hatchery and north of FR 42 this helispot is for administrative use only. However, during winter months the helispot receives snowmobile use.

OHV Outfitter and OHV Users: Currently an OHV outfitter occasionally uses this area for guided tours. Roads within the project area receive light use from OHV users. Due to terrain and vegetation, unauthorized cross country travel is not a problem.

Dispersed Recreation and Hunting: Some dispersed camping occurs within the project area. Camping occurs mainly in the fall and is associated with hunting. Majority of dispersed sites are located in the interior of the planning area off of collector and local roads. Some dispersed sites have sanitation problems (pit toilets), soil compaction (user-created roads/trails) and a loss of vegetation (road clearing and firewood).

Driving for pleasure usually occurs when roads are free of snow and take place primarily on main arterial roads. Collector and local roads have very light use.

Winter Recreation: FR 4140 received the most snowmobile use during the winter. Other roads within the project area, while not groomed, also receive some snowmobile use.

Effects Analysis

The analysis area for effects documentation for recreation is the 17,556 acre Junction project area and the cumulative effects analysis area includes the project area boundaries.

Direct and Indirect Effects to Recreation

Alternative 1 – No Action

The No Action Alternative would perpetuate existing management and dispersed recreation would remain the same. This alternative would defer treatments increasing the risk of insect and disease infestations and the potential for a high severity fire in fuel models that normally do not have high severity fire. No Action could put the recreational setting at risk.

Forest Roads 40, 42, and 45: Roads would be maintained in the same manner as previous years.

Fall River Hatchery: The No Action Alternative would not affect the access road to this hatchery.

Oregon Department of Fish and Wildlife Helispot: Under this alternative no actions would alter this facility, therefore would be no effects to this helispot.

OHV Outfitter and OHV Use: The existing outfitter operating plan would not be affected. OHV tours would continue as normal and not vegetation management activities would affect tours. OHV use would continue using roads in the same manner as previous years.

Dispersed Recreation and Hunting: Existing campsites and roads (including user-created) would continue to be utilized and/or developed. Impacts such as soil compaction from user-created roads or trails, sanitation issues, and vegetation removal would continue.

Winter Use: Vegetation management activities (log haul) would not occur under this alternative therefore, snowmobile access would not be affected. Snowmobile routs would be maintained in the same manner as previous years.

Alternative 2 and Alternative 3

Alternative 2 and Alternative 3 were evaluated together for direct and indirect effects because the two alternatives did not vary greatly on acres being treated and this variance is minimal from a recreational standpoint.

Forest Roads 40, 42, and 45: Mechanical treatments and prescribe fire activities would occur along these roads. FR 45 remains open all year to automobile traffic and is a high use route for access to Mt. Bachelor. Burning of slash piles would occur when burning conditions are optimal usually during the fall and winter months. Cut trees, ladder fuel reduction activities, slash piles, and blacken ground from activities along travel routes would likely have a short-term (3 to 10 year) effect to visual quality. Forest users would experience short-term negative effects such as increased traffic, dust, noise, and smoke from project activities.

If harvest activities are conducted during the winter months FR 40 and 42 would need to be plowed limiting snowmobile use on portions of these roads. If snowmobile access is limited users could potential drive further up the road and park where the plowing stops to unload snow machines. Users might use different roads and parking areas to access snowmobile areas or users could snowmobile in locations that have not had snowmobiling in the past.

Fall River Hatchery: Equipment used for vegetation fuels management activities would use a portion (approximately ¼ mile) of the access road to this hatchery. Treatment activities could potentially cause road delays while machinery is working on or near the access road. Road delays would be minimal for visitors and staff accessing the hatchery. Majority of visitors visit the hatchery during spring and summer months, it is recommended that work to be completed along this segment would be done during the fall, winter, and spring months to mitigate potential conflict.

Visual quality effects discussed under dispersed recreation and hunting.

Oregon Department of Fish and Wildlife Helispot: Vegetation management activities taking place directly around the helispot may affect helicopter landing and take-off for a short period of time (during treatment activities only). Air traffic is light at this helispot and Oregon Department of Fish and Wildlife would be notified when work would occur around this helispot.

OHV Outfitter and OHV Use: Increased traffic, dust, noise, and smoke from vegetation treatments would have a short-term impact on the OHV outfitter and general OHV use. During activities OHV tours would be re-routed to alternative routes approved by the Forest Service Special Use Administrator. Other OHV users would be relocated to other roads within the project area during treatment activities. Travel Management Plan would still allow OHV use along the majority of the roads within the project area.

Visual quality effects discussed under dispersed recreation and hunting.

Dispersed Recreation and Hunting: Mechanical treatments, pile burning, and prescribe fire activities would likely have a short-term (3 to 10 years) effect to visual quality and recreationalists. Recreationalist would see treatment areas as they pass through the area or while users are camping or hunting. Burning (piles and prescribed) would occur during optimal burn conditions usually during the fall, winter, and spring months. Cut trees, mowing, slash piles, and blackened ground from activities would cause short-term effects to recreationist. While activities are implemented dispersed campers and hunters would be pushed to other areas. Visual effects would become less evident each growing season.

Alternative 2 proposes to close 0.57 miles of road to motor vehicle traffic. Roads to be closed are not regularly used for recreation or for administrative activities. These closures could impact access to dispersed sights, sightseeing and other activities. Since road closures are minimal most dispersed campsites would not be impacted, some recreationists would be inconvenienced from closures. For dispersed campers that would be displaced from specific sites they would likely unitize campsites that remain accessible, develop new sites and access roads, or breach road closures to access campsites. The Travel Management Plan limits dispersed camping to 300 feet along open roads.

Winter Use: Winter logging operations require that roads remain plowed to reach the worksite, this could affect areas used by snowmobiles. The 4140 road could need to be plowed for equipment to reach sale areas this is a popular road for snowmobiles. If operations occur during winter months and plowing is needed to access areas than alternative routes should be posted and marked. Plowing FR 4140 could allow snowmobilers to drive further up the road to off load snowmobiles and allow them to access areas that could normally be inaccessible.

Cumulative Effects

Alternative 1 – No Action

No cumulative effects to recreational resources are expected from this alternative.

Alternative 2 and Alternative 3

The variance between Alternative 2 and Alternative 3 are minimal from a recreation standpoint; therefore, the two action alternatives were analyzed for cumulative effects together.

Past activities such as timber removal, prescribed burning and hazard tree removal combine with proposed activities could lead to illegal motorized intrusion within the project area. Stands along travel routes would continue to be opened up which could cause an increase in illegal OHV cross-country travel and trail development. Also new dispersed camping sites could be created. Soil compaction from user created trails and campsites would continue along with vegetation removal to create trails and campsites. While the open forest may encourage off road travel and camping, the Travel Management Plan would legally limit motorized access and camping.

3.3.11 Transportation System

Introduction

Road maintenance levels are defined by FSH 7709.58 as the level of service provided and maintenance required for a specific road. Maintenance levels are divided into the following five categories:

Maintenance Level 5 – These roads provide a high degree of use comfort and convenience. These roads are normally paved double lane, some maybe aggregate surfaced. The management strategy is to encourage use.

Maintenance Level 4 – These roads provide moderate degree of user comfort and convenience at moderate travel speeds. Most roads are double lane aggregate surfaced, some may be single land and some may be paved. Traffic management strategy is to encourage use.

Maintenance Level 3 – These roads are open and maintained for travel by careful drivers in passenger cars. Use comfort and convenience are low priorities. Roads are single lane native or aggregate surfaced with low travel speeds. Management strategies are to either encourage or discourage use for certain classes of vehicles or uses

Maintenance Level 2 – These roads are open for use by high-clearance vehicles. Traffic volumes are usually low. Log haul may occur. Management strategies are either to 1) discourage or prohibit passenger cars or 2) accept or discourage high-clearance vehicles.

Maintenance Level 1 – These roads are used to facilitate management activities but are closed to vehicular traffic when not in use. Planned road deterioration may occur at this level. Management strategies are to prohibit and eliminate use.

Existing Condition

Forest Service Highway Safety Act System and other Agency Roads

The Junction project area is located in the central portion of the Bend-Fort Rock Ranger District. For access to the project area, one must travel over portions of Forest Service Highway Safety Act (HAS) roads, county and state highways. Primary routes from Bend to this area include Forest Service Road (FSR) 42 (South Century Drive), FRS 40 and 45 (River-Summit Drive). The table below identifies arterial (primary) roads that access and are within the project area.

Table 123: State and County Highways and Forest Service Highway Safety Act Roads

Road	Jurisdiction	Maintenance Level	From	Mile	To	Mile	Total Miles
FSR 40/Three Trappers	Deschutes County	5	FSR 4000101	4.96	River-Summit Drive	6.26	1.3
FSR 40/Three Trappers	Forest Service	5	River-Summit Drive	6.26	FSR 4040	11.26	5.00
FSR 45/River Summit	Deschutes County	5	FSR 40/Three Trappers	0.00	FSR 4525	4.16	4.16
FSR 42/South Century Drive	Deschutes County	5	FSR 4220	8.53	FSR 4232	12.31	3.78
FSR 4200290	Deschutes County	5	Deschutes County 42	0.00	FS Boundary	3.00	3.00
FSR 4200300	Forest Service	3	Deschutes County 42	0.00	Fall River Fish Hatchery	0.15	0.15

There is a small amount of arterial (HAS) roads within the project area that are deficient in surfacing. To support the project the following road should be resurfaced prior to implementation. In addition, general maintenance would also need to be performed on these routes during use.

Table 124: Arterial Roads Identified Road Work Needed

Road	Maintenance Level	From Mile	To Mile	Total Miles	Work Needed
FSR 40	5	6.26	11.26	5.00	Chip seal, restore drainage, remove danger trees and brush

FS Collector System Roads

The project area has 12.9 miles of FS collector roads (Table 125). These roads were analyzed in the Forest wide roads analysis.

Collector roads have not received the same degree of general maintenance as arterial (HAS) roads; therefore the need and degree of general maintenance to accommodate use is more extensive. Surface types for these roads range from native material, cinder, and crushed aggregate surfacing. The condition of these roads have deteriorated over the years from factors such as lack of maintenance due to budgetary downward trends, workforce reduction, and the impact of increased use. The prescribed road work needed to support and meet project objectives, also needs to meet the long term of leaving these roads in a self-maintaining condition to sustain these roads for the future. FSR 4020 surface is worn-out, unmaintainable, is considered unsuitable for anticipated use, and would need significant maintenance prior to project implementation. This work would consist of reshaping the subgrade and drainage with a 6 inch lays of compacted dense graded crushed aggregate for road leveling and surfacing.

Road maintenance along all collector roads would consist of resurfacing, spot surfacing, drainage restoration, roadside brushing, reclaiming of clearing limits to restore sight distance, felling of danger trees along traveled routes bordering and within the project area. Danger trees which are felled shall be removed to avoid significant fuel loading and help reduce the potential of intensifying fire effects, in addition to providing defensible space along these main travel routes. These trees would be available for fish and wildlife habitat improvement. Danger tree reduction would be in accordance to FSM 7733 and Region 6 Danger Tree Policy.

Table 125: Forest Service Collector Road Work Needed

Forest Service Road	Maintenance Level	From Mile	To Mile	Total Miles	Work Needed
4020000	2	0.00	2.98	2.98	Restore road prism and drainage, resurface with 6 inches of compacted dense ¾ inch crushed aggregate
4030000	2	0.00	0.73	0.73	Roadside brushing, drainage restoration, blade and shape the road surface
4032000	2	0.00	2.65	2.65	Roadside brushing, spot surfacing, drainage restoration, blade and shape the road surface
4140000	2	0.00	2.81	2.81	Roadside brushing, spot surfacing, drainage restoration, blade and shape the road surface
4220000	2	0.00	3.1	3.1	Resurface the road with ¾ inch dense graded aggregate
4230000	2	0.00	2.24	2.24	Roadside brushing, spot surfacing, drainage restoration, blade and shape the

Forest Service Road	Maintenance Level	From Mile	To Mile	Total Miles	Work Needed
					road surface
4360000	2	6.50	6.60	0.10	Resurface the road with ¾ inch dense graded aggregate

FS Local Roads

Local roads in general are routes that are mostly native surfaced and receive very limited maintenance. Within the project area there are 78.75 miles of open local roads. Local roads needed to support implementation activities would need a very limited amount of additional work. Maintenance items would consist of that work necessary to sustain the road during project activities. As the activities near completion, these roads would receive maintenance necessary to sustain a self-maintaining status. Construction and restoration of drainage and drainage structures (rolling dips, waterbars, and lead outs) are critical elements for the desired effects. Other associated maintenance on these roads would include limited brushing, pre and post haul blade and shaping of the roadway. Danger tree reduction would be in accordance of FSM 7733.

Summary

Maintenance level 1 roads would be utilized to the extent necessary to support project needs. Upon project completion these roads would be returned to level 1 status and maintenance performed to return the road to a self-sustaining condition for future administrative needs.

Temporary, un-inventoried, unauthorized user created roads would be subject to full removal and restored to a condition suitable for a productive return to the land base.

Direct and Indirect Effects

Alternative 1 – No Action

Limited road maintenance would continue to occur where and when necessary to support routine road activity. Nothing beyond routine would occur except in the event of an emergency. Danger trees would continue to be felled when they are identified as a hazard.

Alternative 2 and Alternative 3

There would be little change in the present maintenance level 1 to 5 Forest system roads as a result of this project. Use would most likely remain the same, with any change associated with changes in central Oregon's population or visitor use. With rising maintenance costs and declining budgets it is expected that the extent of annual road maintenance would continue to decline except for priority segments.

Project activities such as hauling timber with log trucks can create impacts to the road system. During harvest activities, where necessary, road maintenance activities would be conducted on roads designated for use. As a direct effect, some roads that do not receive recurring maintenance, primarily low standard roads in the Maintenance Level 2 category, would see a higher degree in maintenance to the necessary extent for the project and for long-term effectiveness. This would result in both safe drivability and in the ability to handle surface runoff.

The type of work that would be expected as maintenance in timber sale contract provisions include: brushing for improved sight distances, removal of danger trees, blading and shaping of travel ways, cleaning culverts and ditches, restoring existing surface drainage features such as water bars and rolling dips. The drainage features would be constructed with armoring to ensure longevity.

Dust can be an issue when native-surface roads are used for haul. Dust abatement, primarily using water as the dust palliative, would be performed as necessary to maintain a relatively well-bonded road surface free of the highly erosive pulverized ash “flour” that can occur on native surface roads under heavy use conditions. This would have a secondary effect of providing safer driving conditions.

Where ground-based yarding systems are used to remove logs to landings, temporary roads are customarily constructed to provide access to the landings that are not immediately adjacent to existing portions of the transportation system. Temporary roads would be constructed primarily on flat ground (slopes < 10%) and excavation and construction of embankments would be negligible. Temporary roads would be built to low construction standards, with constraints of grade, curve radius, compaction, surfacing, and width being tailored to the minimum capabilities of the intended user vehicles. The temporary roads would subsequently be restored.

Roads that fall within maintenance level 1 (closed) would be re-closed following project activities, and existing closures would be maintained or improved where closure failures are occurring. Public access within the Junction area would continue to be provided.

Cumulative Effects

Alternative 1 – No Action

There would be no direct, indirect, or cumulative effects from this project since under this alternative there would be no action.

Alternative 2 and Alternative 3

Road system effects were analyzed at the project area scale. Past, present and reasonably foreseeable future activities were reviewed for potential cumulative effects. The present activity that may affect vehicle travel and access is the new Travel Management Rule and Motor Vehicle Use Map (MVUM). The MVUM and the associated rules would make enforcement of road closures and off-road prohibitions more straightforward. When combined with attention to closing unauthorized roads, these activities would result in a reduction in user-created roads and natural resource impacts from cross-country travel.

3.3.12 Cultural Resources

Management direction for heritage resources is found in the Deschutes National Forest LMRP (CR-2, CR-3, CR-4), FSM 2360, 36 CFR 64 and 36 CFR 800 (as amended in December 2000), NEPA, and National Forest Management Act.

The goal for cultural resources is “To provide for the protection and preservation of prehistoric and historic sites, buildings, objects, and antiquities of local, Regional, or National significance” (LRMP Cultural Resources, page 4-34).

Existing Condition

Prior to field surveys a review of the District/Forest Mast Survey Map(s), references in the District cultural resource library, and Historic Inventory Map(s) were reviewed to identify and evaluate existing surveys, known cultural resources, and area sensitivities. During the summer of 2010, heritage surveys were conducted for the Junction project area using 20 to 30 meters spaced pedestrian transects. Spacing was based off on probability models for high or low occurrence of heritage resources.

Previous heritage resources surveyed approximately 4,380 of the proposed treatment acres and recorded a total of 11 cultural resources. New surveys, conducted on 1,624 acres, found 11 new cultural resources. In total, the3re are six prehistoric sites that represent open-air lithic scatters found both on modern ground surface and deeply buried by ash and pumice and 16 historic sites that represent both railroad logging and settlement. Ten of the heritage sites have been evaluated for eligibility of inclusion to the National Register of Historic Places and were found not to be eligible. Another nine sites remain unevaluated.

Direct and Indirect Effects

Alternative 1 – No Action

Under this alternative no action would occur, therefore, there would no direct or indirect effect to cultural resources.

Alternative 2 and Alternative 3

Potential for direct effects to known cultural resources would be avoided through project design criteria and mitigation measures. Known sites will be flagged as areas to protect during ground-disturbing project activities. The areas to avoid include a buffer around sites. Damage from roadside danger tree falling would be avoided by directionally falling them towards the associated access route. Work is required to stop and the archaeologist notified if a new site is discovered, which reduced potential to affect currently unknown sites.

Due to the large size and treatment locations, surveys were a sample rather than the entire area; therefore it’s possible that discovery of new cultural resource sites during project implementation could result in site destruction or damage because the site was not identified in advance and protected. Indirect effects could occur following surface duff and soil disturbance, because artifacts could be uncovered, resulting in theft and destruction. Often, by the time that such a site is discovered, some physical damage has already occurred, since increased visibility through mechanical disturbances can lead to discovery.

Cumulative Effects

Alternative 1 – No Action

Under this alternative, no treatments activities would be undertaken. Therefore, there would be no cumulative effects on heritage resources.

Alternative 2 and Alternative 3

Implementation of site avoidance and project design features would reduce or eliminate the effects on heritage resources. Therefore, the action alternatives and protection measures, when combined with impacts from other sources, would not contribute to any measurable cumulative effects to this resource.

3.3.13 Economics

This section discloses socio-economic effects in terms of wood products and jobs and also discusses the economic viability of the project. Supplying wood products is part of the purpose and need for entering the Junction project area. Economic viability is dependent on costs and revenues associated with a particular timber sale. Timber sales, fuel treatments, and associated resource work can generate employment and stimulate the local economy. This section has been updated since the 30-day comment period to incorporate additional data.

Existing Condition

The Forest Plan identified agriculture, wood products manufacturing, and recreation and tourism as the three most important basic industries in the local area. The Bend-Fort Rock Ranger District provides timber and non-timber forest products through vegetation management projects such as Junction. Forest products include timber, firewood, and biomass. In Deschutes County 84% of the land base is federally owned, managed by the Bureau of Land Management or Forest Service. The proportion of timber harvest from National Forest System lands in Deschutes County was about 74% in 2010.

Forest sector employment has far more impact in central Oregon than for the State of Oregon as a whole. According to Gebert et al. (2002), a 10% decrease in total forest sector jobs between 1990 and 2000 meant a loss of approximately 9,600 jobs statewide. However, the industry is still an important contributor to the local economies of central Oregon. According to the Oregon Employment Department in central Oregon counties in 2004 there were 1,100 wood products manufacturing jobs in Crook County, 1,810 jobs in Deschutes County, 1,120 jobs in Jefferson County, and 1,430 jobs in Klamath County.[2] Jobs in counties where there are no saw mills are in logging and secondary manufacturing. In Klamath County, Interfor Gilchrist sawmill directly employs 160 people and they estimate the operation supports about 450 jobs in central Oregon indirectly.

Over the last 10 years, the Deschutes National Forest has sold an average of 60 MMBF of timber per year. Average volume for the Deschutes for 2013 was approximately 55.6 MMBF. The Forest is expected to continue offering timber for sale and is expected to continue making contributions to the local economy as a result of timber harvest activities. No major changes in volume production are expected at the forest level.

Summary of Analysis Methods

The economic analysis compares present net revenues and present net costs. Present net value and present net cost were calculated using TEA.ECON (USDA Forest Service 2011) which is an economic analysis tool. The program uses the most recent product log values and appraisal costs to evaluate timber sale and project economics. A 4% discount rate is used to value all costs and benefits to present value. The analysis can be used to compare alternatives, but no to give any absolute numbers for the outputs.

Jobs maintained or created was calculated using the statewide average of 3.5 jobs per million board feet (MMFB) in the logging sector and 4 jobs per MMBF in the timber products manufacturing sector (Gebert et.al. 2002).

Central Oregon sales typically include acres of fuel reduction and precommercial thinning which can be expensive and skew the net value. Funds to carry out these treatments often comes from other funding sources. The following table displays costs for fuels reduction and precommercial thinning treatments. When considering treatments as a whole (timber, fuels and precommercial treatments) the project would appear deficit. When only the timber sale is considered, the cost to operate the sale usually is

[2] There has been a decline in wood product manufacturing employment reported for Crook, Jefferson, and Klamath Counties since 2004; Deschutes County has not reported since 2004. Oregon Labor Market Information System (www.qualityinfo.org).

less than the product value being removed. Biomass removal is optional and highly dependent on volatile market conditions; therefore, it was not included in this analysis.

Table 126: Cost per acres for fuels and precommercial treatments

Activity	Cost per Acre
Ladder Fuel Reduction (LFR)	$65
Pre-commercial Thinning (PCT)	$85
Whip Falling (WHIP)	$67
Machine Pile and Burn (MPB)	$110
Hand Pile and Burn (HPB)	$400
Lop and Scatter (L&S)	$100
Underburn (UB)	$168
Mowing (MOW)	$65

Effects Analysis

Direct and Indirect Effects

Alternative 1 – No Action

This alternative would not harvest any timber and therefore would not support employment in logging or wood product manufacturing, or increased income to local economies. Current downward trends in timber harvesting from National Forests lands would likely continue into the future. Current employment in the wood products sector of the local economy would remain unchanged.

Alternative 2 and Alternative 3

Economic Viability:

The following table displays a summary of costs for timber and fuels treatments and jobs created per action alternatives.

Table 127: Financial summary for timber fuels treatments

Description	Alternative 2 ($)	Alternative 3 ($)
Net Value for Timber and Fuels Treatments	-4,893,222	-4,808,320
Net Value for Timber Treatments	-68,769	-246,110
Cost to Benefit Ration (gross value to associated costs)	0.89	0.59
Timber Volume (millions board feet)	19.5	18
Jobs Maintained or Created	197	193

The benefit to cost ratio indicates the amount of present value revenues per unit of present value of cost. This is an index of the relative productivity of dollars spent. A benefit to cost ratio greater than one indicates that revenues would exceed the invested costs. Ratios less than one indicate that costs would exceed revenues. Traditional timber sales were typically planned to have ratios exceeding one. Restoration and forest health project commonly are unable to produce benefit to cost ratio greater than one.

Alternative 2 produces the greatest amount of volume and therefore creates or maintains the largest amount of jobs. Alternative 2 would produce 19.5 million board feet of timber. The current estimated cost of the timber sale, including timber value and Forest Service costs to plan, design and administer the sale is -$68,769. Fuels treatments would cost an additional $4,824,453 if all proposed treatments were implemented.

Alternative 3 would produce slightly less volume and slightly fewer jobs. Alternative 3 would produce 18 million board feet of timber. The current estimated cost of the timber sale, including timber value and Forest Service costs to plan, design and administer the sale is -$246,110. Fuels treatments would cost an additional $4,562,210 if all proposed treatments were implemented.

Project work identified that is not associated with a timber sale, would be accomplished through appropriated funds and would provide work via service contracts. Cost estimates for non-timber sale activities are listed in the table below.

Table 128: Cost per acres for fuels and precommercial treatments

Activity	Cost per Acre ($)	Alternative 2 Costs ($)	Alternative 3 Costs ($)
Ladder Fuel Reduction (LFR)	65	866,880	803,740
Pre-commercial Thinning (PCT)	85	290,646	282,271
Whip Falling (WHIP)	67	156,646	155,574
Machine Pile and Burn (MPB)	110	1,024,296	962,976
Hand Pile and Burn (HPB)	400	1,433,152	1,373,568
Lop and Scatter (L&S)	100	314,413	307,040
Underburn (UB)	168	928,200	854,784
Mowing (MOW)	65	518,446	486,353

Local Economy and Employment:

Alternative 2 produces the greatest amount of volume and therefore creates or maintains the largest amount of jobs. Alternative 2 is estimated to create or maintain four more jobs than Alternative 3.

The action alternatives would provide employment for preparation, implementation and administration of thinning and fuels reduction activities. The level of benefit to local community would depend on the capacity of local contractors to successful bid on and execute contracts that would result from this project. The level of funding the Forest Service received from Congress could affect the amount of planned activities carried forward into contracts.

Another benefit of this project would come in the form of wood products supplied to local mills in the area. Logs, chips, and other products could produce secondary jobs if they are milled and processed in the local area.

Cumulative Effects

Alternative 1 – No Action

This project would create no local jobs or provide economic benefits to central Oregon. There would be no overlap from project activities in time and space with past, present or future activities therefore there would be no cumulative effects as a result of this alternative.

Alternative 2 and Alternative 3

The primary effect on timber harvest related to employment would result from commercial harvest activities. Financially viable sales would be necessary to provide opportunities for timber harvest related employment. Levels of harvest volume by action alternative would affect employment and income in the following ways:

1) Directly – effects attributable to employment associated with harvesting, logging, mills and processing plants for sawtimber, pulp, chips, veneer and plywood
2) Indirectly – effects attributable to industries that supply materials, equipment, and services to these businesses
3) Induced – effect attributable to personal spending by business owners, employees, and related industries

The action alternatives would provide the county with limited receipts, which would reflect current market conditions. It would also provide a number of jobs related to harvesting transporting, processing, marketing, and distributing a valuable product. Fire related work would also create additional jobs and revenue. Ongoing, other employment opportunities would continue from other timber sales, recreation activities, and other special use receipts across the Forest. Commercial collection of non-timber forest products, such as mushrooms, would continue to occur, although the quantity of harvest is unknown.

Summary of Economic Effects

This is not a project designed to support itself, but rather to meet resource objectives through other funding avenues supplemented with product values. Acres that would be treated would provide seasonal work/benefits for a projected 8 to 10 year period. The income generated by this project contributes to a family wage earners and local industries, which in turn would support other local businesses, hospitals, and services contributing to the overall economic vitality of the county. Products produced from this project would not support local mills long but when added to wood products from other private and corporate lands, it contributes to the overall sustainability of local mills and businesses more so in Alternative 2 than Alternative 3.

3.3.14 Potential Wilderness and Undeveloped Lands

There are no wilderness or inventoried roadless areas within or adjacent to the Junction project boundary; therefore, there would be no effect to any wilderness or inventoried roadless area from any of the alternatives. This section of the EA addresses Potential Wilderness Areas and other undeveloped lands. Mapping was completed with Deschutes National Forest's Geographic Information System, using corporate data sources. Databases for the existing road system and past harvest were combined with examination of aerial photography to determine areas that might meet the inventory criteria for potential wilderness. According to FSH 1909.12, Chapter 71, the inventory criteria for potential wilderness is 1) More than 5,000 acres in size; 2) If less than 5,000 acres the area can meet one or more of the following: a) Area can be preserved due to physical terrain and natural conditions or is a self-contained ecosystem, such as an island, that can be managed as a separate unit of the National

Wilderness Preservation System; b) Area is contiguous to existing wilderness, inventoried roadless area, primitive area, etc. regardless of size.

Through the mapping process, numerous patches of forest that fall in between roads and harvest units were reviewed for potential wilderness criteria (Figure 24). The largest patch inside the Junction boundary is 308 acres in size; most patches are less than 30 acres. These stands are not situated where they can be preserved due to physical terrain or natural conditions, nor are they self-contained ecosystems such as islands that could be managed as separate units of the National Wilderness Preservation System. Rather, they are lodgepole pine stands that are part of the larger contiguous area of lodgepole pine that forms most of the Junction project area (see Figure 10 and Figure 11) where active management, including regeneration harvest and road building has been occurring for several decades. None of the areas that Oregon Wild considers "roadless" are located within the Junction project area. The patches that resulted from the GIS exercise (Figure 24) can be considered "undeveloped" lands because of a lack of history of any management activities.

Alternative 1

There would no direct, indirect, or cumulative effects to Potential Wilderness Areas or other undeveloped lands. No timber harvest or temporary road construction would take place, and the current condition of values associated with these areas would not change. Ecological trends would continue as described under No Action for all of the resources in this EA.

Alternative 2

Proposed activities in Alternative 2 would have no direct, indirect, or cumulative effect on Potential Wilderness Areas. For patches of forest that have not been previously harvested, Alternative 2 would enter many of the smaller patches. One of the largest patches (265 acres) of previously unharvested lodgepole pine is retained in Alternative 2 to provide habitat diversity particularly serving the black-backed woodpecker.

Alternative 3

Proposed activities in Alternative 3 would have no direct, indirect, or cumulative effect on Potential Wilderness Areas. For patches of forest that have not been previously harvested, Alternative 2 would enter many of the smaller patches. One of the largest patches (265 acres) as well as an area that includes several patches totaling about 250 acres of previously unharvested lodgepole pine are retained in Alternative 3 to provide habitat diversity particularly serving the black-backed woodpecker.

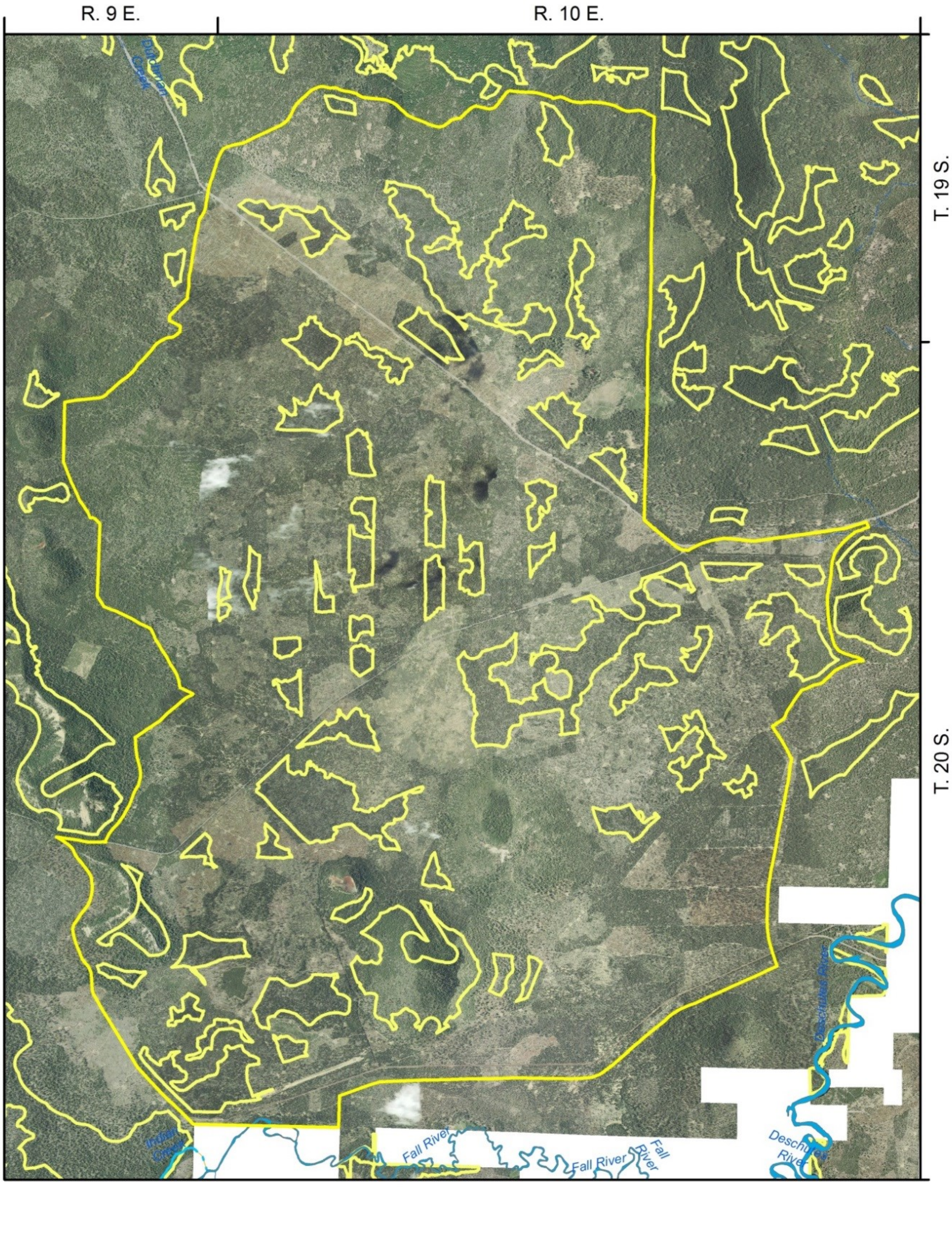


Figure 24: Aerial photo image of the Junction project area.

3.3.15 Public Health and Safety

Under each action alternative, danger trees would be felled along all haul routes. The signing of project activity areas, in addition to notification of additional project-related traffic, would promote a safe environment for forest visitors during project implementation. Implementation of action alternatives would increase the potential for encounters on roadways between forest visitors and equipment associated with harvest. This elevated level of risk would be present for the short-term (approximately 5 years). Safety measures such as informational signing, flaggers, and road maintenance activities, such as brushing roads for increased visibility, would be enforced in the timber sale contract.

The work environment during all phases of logging operations would be physically demanding and potentially hazardous; effects to worker health and safety would be possible. Activities with the highest potential for serious injury would include tree felling and helicopter operations (helicopter may be used for prescribed fire ignition). All project activities carried out by Forest Service and Forest Service contract employees would comply with State and Federal Occupational Safety and Health Administration (OSHA) standards. All Forest Service project operations would be consistent with Forest Service Handbook 6709.11 (Health and Safety Code).

The Clean Air Act lists 189 hazardous air pollutants to be regulated. Some components of smoke, such as polycyclic aromic hydrocarbons (PAH) are known to be carcinogenic. Probably the most carcinogenic component is benzo-a-pyrene (BaP). Other components, such as aldehydes, are acute irritants. In 1994 and 1997[3], air toxins were assessed relative to the exposure of humans to smoke from prescribed and wildfires. The five toxins most commonly found in prescribed fire smoke were:

Particulate matter - Particulates are the most prevalent air pollutant from fires, and are of the most concern to regulators. Research indicates a correlation between hospitalizations for respiratory problems and high concentrations of fine particulates (PM2.5, fine particles that are 2.5 microns in diameter or less). Particulates can carry carcinogens and other toxic compounds. Overexposure to particulates can cause irritation of mucous membranes, decreased lung capacity, and impaired lung function. Particulate matter is analyzed for each alternative in the Air Quality section, page 75.

Acrolein - An aldehyde with a piercing, choking odor. Exposure severely irritates the eyes and upper respiratory tract.

Formaldehyde - Low-level exposure can cause irritation of the eyes, nose and throat. Long-term exposure is associated with nasal cancer.

Carbon Monoxide - CO reduces the oxygen carrying capacity of the blood, a reversible effect. Low exposures can cause loss of time awareness, motor skills, and mental acuity. Also, exposure can lead to heart attack, especially for persons with heart disease. High exposures can lead to death due to lack of oxygen.

Benzene - Benzene causes headache, dizziness, nausea and breathing difficulties, as well as being a potent carcinogen. Long-term exposure can cause anemia, liver and kidney damage, and cancer. The closest Smoke Sensitive Receptor Area (SSRA) to the analysis area is the city of Bend, Oregon; the communities of Sunriver and La Pine are also near the analysis area but are not as highly populated.

[3] Results of an April 1997 conference to review the results of health studies and develop a risk management plan for the protection of fire crews were published by Missoula Technology Development Center in Health Hazards of Smoke, Technical Report 9751-2836-MTDC.

The greatest risk of exposure to airborne toxins from prescribed fires or wildfires would be to firefighters and forest workers implementing the prescribed burning. It is unlikely the general public would be exposed to toxic levels adverse to human health during implementation of prescribed burning operations in the Junction analysis area because of the application of prescriptions designed to lessen the release of particulate matter. People who suffer from breathing ailments may experience some difficulty during periods of prescribed burning, especially during atmospheric conditions that do not favor dispersion of smoke. The Forest Service voluntarily follows the guidelines assigned by Oregon Smoke Management to limit state-wide exposure on a cumulative basis, in compliance with the Clean Air Act.

Forest workers and firefighters can face unhealthy levels of smoke when patrolling or holding fire lines on the downward edge of a wildfire or prescribed fire, or while mopping intense hot spots. In most cases, measures such as education on the effects of short and long term exposure, rotation out of the smoke, and the use of respirators can reduce exposure levels. OSHA regulates exposure to hazardous materials in the workplace. All project activities carried out by Forest Service and Forest Service contract employees would comply with State and Federal OSHA standards.

3.3.16 Prime Farmland, Rangeland, and Forestland

All alternatives are consistent with the Secretary of Agriculture memorandum 1827 for the management of prime farmland. The Junction project area does not contain any prime farmland or rangelands. Prime forestland, as defined in the memorandum, is not applicable to lands within the National Forest System.

3.3.17 Executive Order 12898 Environmental Justice in Minority Populations and Low-income Populations

Executive Order 12898 (February 11, 1994) directs the agency to identify and address, "...as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations...." The intent of the order is to assure the fair treatment and meaningful involvement and consideration of all people. Fair treatment means that no group of people, including racial, ethnic, or socioeconomic group should bear a disproportionate share of the negative environmental consequences resulting from the execution of a federal actions.

In order to identify and address environmental justice concerns, the EO states that each agency shall analyze the environmental effects, including human health, economic, and social effects of Federal actions, including effects on minority populations, low-income populations, and native Americans as part of the NEPA process.

There would be no discernible impacts among the alternative in the effects on Native Americans, women, other minorities, or the Civil Rights of any American citizen.

The alternatives do not appear to have a disproportionately high or adverse effect on minority or low-income populations. Scoping did not reveal any issues or concerns associated with the principles of Environmental Justice. No mitigation measures to offset or improve adverse effects to these populations have been identified. All interested and affected parties would continue to be involved with the public involvement and decision process.

3.3.18 Irreversible and Irretrievable Commitment of Resources

Irreversible commitments of resources are actions that disturb either a non-renewable resource (e.g. cultural resources) or other resources to the point that they can only be renewed over 100 years or not at all. The resource protection measures along with LRMP standards and guidelines are intended to reduce these commitments, but adverse effects cannot be completely eliminated. For example, the continued use of existing roads that access the forest is an irreversible commitment of the soil resource. An irretrievable commitment is the loss of opportunities for producing or using a renewable resource for a period of time. Almost all activities produce varying degrees of irretrievable resource commitments. They parallel the effects for each resource discussed earlier in the EA. They are not irreversible because they could be reversed by changing management direction. Irretrievable commitments associated with the action alternatives include loss of soil productivity due to temporary roads and landings and loss of vehicle access due to road closures.

3.3.19 Climate Change

The impacts on forests from climate change and the effects on climate change from forest management are complex and sometimes negated by the different factors involved. The most expected condition in Central Oregon is a warming trend and potentially less snowfall. The best comparison to the average condition is the drought cycles experienced in this area due to the pacific decadal oscillation (also known as El Nino and La Nina) (Hessl et al. 2004).

According to the Climate Impacts Group[4], based out of the University of Washington, climate modeling for the Pacific Northwest predicts a future rate of warming of approximately 0.5 degrees Fahrenheit per decade for the Pacific Northwest through at least 2050, relative to the 1970-1999 average temperature. Temperatures are projected to increase across all seasons, although most models project the largest temperature increases in summer (June – August), and the average temperatures could increase beyond the year-to-year variability observed in the Pacific Northwest during the 20th century as early as the 2020s.

With climate change, increases in drought, fires, and greater vulnerability to insects and diseases can be expected (Brown 2008). Thinning of stands to reduce competition for resources and favoring drought-tolerant species (such as ponderosa pine) will reduce the impacts of drought cycles on tree mortality, and increase resistance to insect and fire mortality (Ritchie 2008).

The Forest Service does not have a national policy or guidance for managing carbon, and the tools for estimating carbon and sequestration are not fully developed. Current direction for addressing climate change issues in project planning and the NEPA process is provided in the document *Climate Change Considerations in Project Level NEPA Analysis* (USFS 2009). This document outlines the basic considerations for assessing climate change in relation to project-level planning.

The trajectory of treated stands in the Junction project area should lead to more resilience should the climate become warmer and drier as predicted. Thinning of stands under all alternatives will reduce competition for resources. Favoring drought-tolerant species such as ponderosa pine would reduce the impacts of future drought cycles on tree mortality, and increase resistance to insect and fire mortality (Ritchie 2008). Also, if a crown fire burns through a forest that was thinned to a low density, the fire may change from a crown fire to a surface fire, where many trees can often survive. In contrast, many or all of the trees in an unthinned stand would be killed by a crown fire.

[4] Intergovernmental Panel on Climate Change (IPCC). Their reports (2007) provide the authoritative scientific basis for subsequent Forest Service analysis of this phenomenon. Information specific to the Forest Service can be found in the latest Synthesis and Assessment Product 4.4.24.

The scope and degree of change from any action alternative is minor relative to the amount of forested land available as a whole. A project of this magnitude would have such minimal contributions of greenhouse gasses that its impact on global climate change would be infinitesimal. Therefore, at the global scale, the proposed action's direct and indirect contribution to greenhouse gasses and climate change would be negligible, and therefore the project's cumulative effects on greenhouse gasses and climate change would also be negligible.

The Intergovernmental Panel on Climate Change has summarized the contributions to climate change of global human activity sectors in its Fourth Assessment Report (IPCC 2007). 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).

This vegetation management 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, forest stands are being retained and thinned to maintain a vigorous forested condition that can continue to support trees and sequester carbon long-term.

The net carbon balance is extremely difficult to quantify for a forest project. Adaptation and Mitigation can have positive and negative influences on each other's effectiveness (Klein et. al. 2007 in Joyce et. al. 2008). 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 three action alternatives are consistent with these recommendations.

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). Projects that create forests or improve forest conditions and capacity to grow trees are positive factors in carbon sequestration. The action alternatives fall into this category.

Chapter 4 – Consultation and Coordination

4.1 Agencies and Persons Consulted

State Historic Preservation Office

Consultation has occurred with the Oregon State Historic Preservation Office (SHPO) following guidelines in the Regional Programmatic Agreement among USDA-Forest Service, the Advisory Council on Historic Preservation, and the Oregon SHPO. In a letter dated April 18, 2012 SHPO concurred with the Forest's recommended protection procedures and the monitoring program outlined in the report submitted to them. The SHPO agreed that the project would have no adverse effect on any known cultural resources.

Consultation with the Burns Paiute Tribe, The Klamath Tribe, and Confederated Tribes of the Warm Springs has occurred and coordination is ongoing.

Oregon Department of Fish and Wildlife

The Forest scoped with Oregon Department of Fish and Wildlife (ODFW) when developing the proposed action. The focus of the discussions was on unit development and treatments, the road density of the project area and our analysis on hiding cover and stragies for developing hiding cover.

Public and Tribal Mailing List

The following individuals, agencies, and Tribes have been included in direct mailings of project information including the scoping notice and notice of availability of the EA.

Scott Odgers
Vera Riser
Chuck Tolboe
Craig Vaage, Bigfoot Guide Service
Wally Buckman
Arlie Holm
Ed Duffy, Deschutes County 4-Wheelers
Larry McGlocklin
Lee Fischer
Pat Schatz, Mickey Finn Guide Service
Central Oregon Flyfishers
Larry Ulrich
Susan Jane Brown
Glen Ardt
David H. Tjomsland
Karen Coulter, Blue Mountains Biodiversity Project
Doug Heiken Oregon Wild
Mike Morris
Robert Speik
Matt Kern
Brad Chalfant, Deschutes Basin Land Trust
Jim King
Sunriver Owners Association
Josh Laughlin, Cascadia Wildlands Project
Senator Ron Wyden Attn: Wayne Kinney
Dick Artley
John Pindar
Gerald Keck, D.R. Johnson Lumber Co.
Fred Tanis
Shawn Gerdes, Arnold Irrigation District
Patti Gentiluomo
Wade N. Foss
Bruce Cunningham, Moon Country Snowmobilers
Scott O'Neill
June Ramey
John McKenzie, Sunriver Owners Association
Scott McCaulou, Deschutes River Conservancy
Dyarle Sharkey
Lynne Breese, Eastern Oregon Forest Protection Association
Greg McClarren
Rick Williams, ODOT Region 4
Kate Lighthall, Project Wildfire
SROA Public Affairs Committee Chair
Northwest Environmental Defense Center
Vicki McConnell, Department of Geology and Mineral Industries
Andy Ingram

Dean Richardson
Peggy Spieger, Oregon State Snowmobile Association
Jim Wilson, JTS Animal Bedding
Patricia Moore
L. Ulven
Bend Metro Parks & Recreation
Dylan Darling, The Bulletin
Jim Anderson
Rick Bozarth, Bozarth's Offroad Service Specialties
Stuart Otto, Oregon Department of Forestry
Margie Gregory
Jim Larson, Upper Deschutes River Coalition
Oregon Chapter, Sierra Club
Central Oregon Climate Alliance Attn: Mike Riley
David Pitts
Lowell Franks
Matt Bales, Mule Deer Foundation
Peter Geiser
Senator Jeff Merkley Attn: Susanna Julber
Don Franks
Larry Pennington, Oregon Chapter, Sierra Club
Judy Meredith, East Cascades Audubon Society
Paul Bannick, Conservation Northwest
John Zachem
George Wuethner
Lisa Clark, Central Oregon Fire Management Service
Congressman Greg Walden Attn: Justin Rainey
Jon Cain
Deborah Norton, USDI Bureau of Land Management
Chris Ketchum, Warm Springs Forest Products
Keith Nash
Stephen Roth
Ray Miao, Woodside Ranch Homeowners Assoc.
Stan Summers
KLE Enterprises, Inc.
Randy J. Zustiak
James Reeves, Century Tel
Donald Kerr
Mike Supkis, La Pine Rural Fire Protection District
Ken Copeland
Rod Bjorvik
Chris Kerber
Larry Langston, City of Bend
Debbie Roberson
Glenn Burleigh
Ron Paden, Woodland Rehab & Restoration
Claude Smith, Warm Springs Forest Products
Euguen A. Greene, Confederated Tribes of the Warm Springs
Charlotte Rodrique, Burns Paiute Tribe
Don Gentry, The Klamath Tribes
Sally Bird, Confederated Tribes of the Warm Springs
Perry Chocktoot, The Klamath Tribes
Jennifer O'Reilly, USDI Fish & Wildlife Service
Billy Toman
Bodie Dowding, Interfor, Operations Forester
Chuck Burley, Interfor, Timber Manager
Dave Lynn
David Nissen, Wanderlust Tours
Dennis Krakow
Doug Heiken - Oregon Wild
Ed Keith, Deschutes County, Forester
Flip Houston, Scott Logging Inc.
Gail Carbiener
Gary Pankey
Corey Heath, Oregon Department of Fish and Wildlife
Gordon K. Baker
Jeff Trant
Jim Lowrie
Kreg Lindberg
Libby Johnson, Bonneville Power Administration
Loren Smith
Marilyn Miller
Mark Dunaway, University of Oregon, Pine Mountain Observatory
Matt Mahoney
Meriel Darzen - Sierra Club - Oregon Chapter, Juniper Group
Nancy Gilbert, US Fish and Wildlife Service
Paul Dewey - Central Oregon Landwatch
Pieter and Diane Van Gelderen
Rod Adams, Oregon Hunters Association, Bend Chapter
Ryan Houston, Upper Deschutes Watershed Council
Scott Silver, Wild Wilderness
Scott Walley
Steve Bigby

Steve Johnson, Central Oregon Irrigation District
Steve McNulty, Gas Transmission NW Corporation
Stu Garrett
Vic Russell
Michael Krochta
Christine Jacobe
David Jones, East Lake Resort
Franklin Engel
Joani Dufourd, RecConnect LLC
Ken Wienke, Boise Cascade
Steve Fitzgerald, Oregon State University Extension Service
Irene Jerome, AFRC Representative

4.2 Interdisciplinary Participation

Below are the members of the interdisciplinary team responsible for coordination, conducting and contributing to the environmental analysis for this project

ID Team Member	Title
Alicia Underhill	NEPA Team Leader
Christy Merritt	Previous Team Leader
Deana Wall/Trevor Miller	Fire/Fuels
Paul Brna/Joe Bowles	Silviculture
Ben Hernandez	Wildlife
Todd Reinwald/Sarah Hash	Soils
Charmane Powers	Botany/Weeds
Jason Fisher	Recreation
Steve Bigby	Transportation
Chris Lipscomb/Erin Woodard	Heritage
Tom Walker	Fisheries
Robin Gyorgyfalvy	Scenery

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Appendix A – Units and Prescriptions

HTH – Commercial Thin
HST – Shelterwood Creation
HOR – Overstory Removal
MPB – Machine Pile & Burn Piles
LFR – Ladder Fuel Reduction
L&S – Lop and Scatter Material
MOW– Mow (Mechanical Shrub Treatment)
HPB – Handpile & Burn Piles
UB – Underburn
SPC – Pre-Commercial Thin
WHIP – Falling of trees less than 4.5'
L – Low Biomass Utilization Potential
M – Moderate Biomass Utilization Potential
H – High Biomass Utilization Potential

Alternative 2

Unit	Acres	Harvest	Under-story	RX Fire	Slash	Bio-mass	Mow
1	760	HTH	LFR	UB	MPB	M	MOW
2	116		LFR	UB	HPB	L	MOW
3	38		LFR	UB	HPB	L	MOW
4	92		LFR	UB	HPB	L	MOW
5	20		LFR	UB	HPB	L	MOW
6	34	HST	WHIP		MPB	M	
7	62	HST	WHIP		MPB	M	
9	33	HOR	SPC		L&S	H	
10	45	HOR	SPC		L&S	M	
12	52	HOR	SPC		L&S	L	
13	11	HST	WHIP		MPB	H	
14	63		SPC		L&S	L	
20	140	HST	WHIP		MPB	H	
21	13	HOR	LFR		HPB	H	MOW
22	44	HST	WHIP		MPB	H	
23	9	HST	WHIP		MPB	H	
25	78	HST	WHIP		MPB	H	
28	23	HST	WHIP		MPB	H	
30	55	HST	WHIP		MPB	H	
31	32	HOR	SPC		HPB	M	
32	14		LFR		HPB	L	MOW
33	8		LFR	UB	HPB	M	MOW
34	150	HTH	LFR	UB	HPB	M	MOW

Unit	Acres	Harvest	Under-story	RX Fire	Slash	Bio-mass	Mow
37	127	HOR	SPC		MPB	L	
38	78	HTH	SPC		MPB	M	
39	38	HST	WHIP		MPB	H	
41	68	HOR	SPC		L&S	L	
43	64	HOR	SPC		L&S	L	
44	70	HST	WHIP		MPB	H	
45	74	HOR	SPC		L&S	L	
47	37	HST	WHIP		MPB	H	
48	70	HOR	SPC		L&S	L	
49	483	HTH	LFR	UB	MPB	M	MOW
50	224	HST	WHIP		MPB	H	
51	42	HOR	SPC		L&S	L	
52	25	HOR	LFR		HPB	L	MOW
53	59	HST	WHIP		MPB	H	
55	20	HOR	SPC		L&S	M	
57	20		LFR		HPB	L	MOW
58	14	HOR	SPC		HPB	L	
60	48	HTH	LFR		MPB	M	MOW
62	103	HOR	LFR		MPB	H	MOW
64	34	HTH	LFR		HPB	M	MOW
65	150	HOR	SPC		L&S	L	
66	288		SPC		L&S	L	
67	54	HST	WHIP		MPB	H	
70	130	HST	WHIP		MPB	H	
72	38	HST	WHIP		MPB	H	MOW
75	207	HOR	SPC		L&S	L	
76	57	HTH	SPC		MPB	M	
77	33	HOR	SPC		L&S	L	MOW
78	136	HST	WHIP		MPB	H	
84	49	HTH	SPC		L&S	M	MOW
85	19	HOR	LFR		HPB	H	MOW
87	23	HOR	SPC		L&S	L	
88	7	HST	WHIP		MPB	H	
90	10	HOR	LFR		HPB	M	MOW
91	28	HOR	SPC		HPB	H	MOW
92	28	HST	WHIP		MPB	H	MOW
94	25	HST	WHIP		MPB	M	MOW

Unit	Acres	Harvest	Under-story	RX Fire	Slash	Bio-mass	Mow
95	35	HST	WHIP		MPB	H	MOW
97	19	HTH	SPC	UB	MPB	H	MOW
99	121	HOR	SPC		L&S	L	
100	26	HST	WHIP		MPB	H	
101	26	HOR	SPC		L&S	M	
102	46	HST	WHIP		MPB	H	
103	28		SPC		L&S	M	
104	37	HOR	SPC		L&S	L	
105	55	HOR	SPC		L&S	M	MOW
106	12	HST	WHIP		MPB	H	
107	6	HST	WHIP		MPB	H	
108	34	HOR	SPC		L&S	L	
109	34	HOR	SPC		L&S	M	
111	102		SPC		L&S	M	
112	26		SPC		L&S	M	
114	24		SPC		L&S	M	
115	226	HST	WHIP		MPB	H	
116	25	HOR	SPC		L&S	M	
117	24		SPC		L&S	M	
119	20	HST	WHIP		MPB	H	
120	25		SPC		L&S	L	
121	26	HST	WHIP		MPB	H	
122	250	HOR	SPC		L&S	L	
125	97	HST	WHIP		MPB	H	
126	68	HOR	SPC		L&S	M	
127	83	HOR	SPC		L&S	L	
130	31	HST	WHIP		MPB	H	
131	188	HOR	SPC		L&S	L	
132	74	HOR	SPC		L&S	L	
135	31	HOR	SPC		L&S	L	
136	17	HOR	SPC		HPB	L	
138	20		SPC		L&S	L	
139	25	HST	WHIP		MPB	H	
141	32	HOR	SPC		HPB	H	MOW
142	20	HST	WHIP		MPB	H	
143	21	HST	WHIP		MPB	H	
144	80	HOR	SPC		L&S	M	

Unit	Acres	Harvest	Under-story	RX Fire	Slash	Bio-mass	Mow
145	27	HST	WHIP		MPB	H	
146	71	HST	WHIP		MPB	H	
147	38	HST	WHIP		MPB	H	
148	47	HST	WHIP		MPB	H	
150	140	HOR	SPC		L&S	L	
151	35	HOR	SPC		L&S	M	
152	99	HOR	SPC		L&S	M	
154	19	HTH	LFR	UB	MPB	M	MOW
155	13	HTH	LFR	UB	HPB	M	MOW
156	7		LFR		HPB	L	MOW
157	58	HTH	LFR	UB	HPB	M	MOW
158	6		LFR		L&S	L	MOW
159	53		LFR	UB	HPB	M	MOW
160	34	HST	WHIP	UB	MPB	H	MOW
162	11	HTH	LFR	UB	MPB	H	MOW
163	22	HTH	LFR	UB	MPB	H	MOW
164	10	HTH	LFR	UB	HPB	L	MOW
165	14	HTH	LFR	UB	HPB	L	MOW
166	273	HTH	LFR	UB	HPB	M	MOW
167	7	HTH	LFR	UB	HPB	M	MOW
169	159	HTH	LFR	UB	HPB	M	MOW
171	61	HOR	SPC		L&S	L	
173	9		LFR	UB	HPB	L	MOW
174	14	HTH	LFR	UB	HPB	M	MOW
175	91	HTH	LFR	UB	HPB	M	MOW
176	24	HTH	LFR	UB	HPB	M	MOW
177	27	HTH	LFR	UB	MPB	H	MOW
178	92		LFR	UB	HPB	M	MOW
179	20	HTH	LFR	UB	HPB	M	MOW
180	52		LFR	UB	HPB	L	MOW
183	100	HOR	LFR	UB	HPB	M	MOW
185	120	HOR	SPC	UB	L&S	L	MOW
186	253		LFR	UB	HPB	L	MOW
187	34		LFR	UB	MPB	M	MOW
188	22	HTH	LFR	UB	MPB	M	MOW
189	71	HTH	LFR	UB	HPB	L	MOW
191	205	HST	WHIP		MPB	H	MOW

Unit	Acres	Harvest	Under-story	RX Fire	Slash	Bio-mass	Mow
192	4	HTH	LFR	UB	MPB	M	MOW
193	101	HOR	LFR	UB	MPB	M	MOW
194	43	HTH	LFR	UB	MPB	L	MOW
196	44	HOR	SPC		L&S	L	
197	181	HOR	SPC	UB	MPB	L	MOW
199	25		LFR		MPB	M	MOW
201	101	HOR	SPC	UB	HPB	L	MOW
202	28	HOR	LFR	UB	HPB	M	MOW
204	178	HTH	LFR	UB	MPB	M	MOW
205	163	HOR	LFR	UB	MPB	M	MOW
206	313	HTH	LFR	UB	HPB	L	MOW
209	5		LFR	UB	HPB	L	MOW
210	18		LFR	UB	HPB	L	MOW
211	74	HTH	LFR	UB	HPB	L	MOW
212	10		LFR	UB	HPB	L	MOW
213	27	HTH	LFR	UB	MPB	H	MOW
216	46		LFR	UB	L&S	L	MOW
217	141	HOR	LFR	UB	HPB	M	MOW
218	48		LFR	UB	HPB	L	MOW
219	27		LFR	UB	HPB	L	MOW
221	25		LFR	UB	MPB	L	MOW
224	26		SPC		HPB	L	
225	23	HST	WHIP		MPB	H	
228	35		SPC		MPB	M	MOW
229	124	HOR	SPC		MPB	M	MOW
230	6	HOR	SPC		MPB	H	MOW
231	76	HOR	LFR		HPB	H	MOW
232	40	HOR	SPC		MPB	M	MOW
233	29		SPC	UB	MPB	L	MOW
234	321	HOR	SPC		MPB	M	MOW
235	18		LFR	UB	HPB	L	MOW
236	41	HOR	LFR	UB	MPB	M	MOW
237	8	HOR	SPC	UB	MPB	M	MOW
238	22		LFR	UB	HPB	L	MOW
241	84	HTH	LFR		HPB	M	MOW
243	19		LFR	UB	HPB	L	MOW
244	35		LFR		HPB	L	MOW

Unit	Acres	Harvest	Under-story	RX Fire	Slash	Bio-mass	Mow
245	179		LFR		HPB	L	MOW
247	31	HOR	LFR		MPB	M	MOW
248	33		LFR		HPB	L	MOW
250	34		LFR		HPB	L	MOW
252	58		LFR		HPB	L	MOW
253	25		SPC		L&S	L	
254	27		LFR		HPB	L	MOW
258	76		LFR		HPB	L	MOW
259	20	HOR	LFR		HPB	M	MOW
264	30		LFR		HPB	L	MOW
268	41		LFR		HPB	L	MOW
280	586	HTH	LFR	UB	MPB	M	MOW
286	44	HOR	SPC		L&S	L	
287	111		LFR		HPB	L	MOW
288	7	HTH	SPC	UB	HPB	M	MOW

Alternative 3

Unit	Acre	Harvest	Under-story	Rx Fire	Slash	Bio-mass	Mow
1	760	HTH	LFR	UB	MPB	M	MOW
2	116		LFR	UB	HPB	L	MOW
3	38		LFR	UB	HPB	L	MOW
4	92		LFR	UB	HPB	L	MOW
5	20		LFR	UB	HPB	L	MOW
6	34	HST	WHIP		MPB	M	
7	62	HST	WHIP		MPB	M	
9	33	HOR	SPC		L&S	H	
10	45	HOR	SPC		L&S	M	
12	52	HOR	SPC		L&S	L	
13	11	HST	WHIP		MPB	H	
14	63		SPC		L&S	L	
20	140	HST	WHIP		MPB	H	
21	13	HOR	LFR		HPB	H	MOW
22	44	HST	WHIP		MPB	H	
23	9	HST	WHIP		MPB	H	
25	78	HST	WHIP		MPB	H	

Unit	Acre	Harvest	Under-story	Rx Fire	Slash	Bio-mass	Mow
28	23	HST	WHIP		MPB	H	
30	55	HST	WHIP		MPB	H	
31	32	HOR	SPC		HPB	M	
32	14		LFR		HPB	L	MOW
33	8		LFR	UB	HPB	M	MOW
37	127	HOR	SPC		MPB	L	
38	78	HTH	SPC		MPB	M	
39	38	HST	WHIP		MPB	H	
41	68	HOR	SPC		L&S	L	
43	64	HOR	SPC		L&S	L	
44	70	HST	WHIP		MPB	H	
45	74	HOR	SPC		L&S	L	
47	37	HST	WHIP		MPB	H	
48	70	HOR	SPC		L&S	L	
49	350	HTH	LFR	UB	MPB	M	MOW
50	224	HST	WHIP		MPB	H	
51	42	HOR	SPC		L&S	L	
52	25	HOR	LFR		HPB	L	MOW
53	59	HST	WHIP		MPB	H	
55	20	HOR	SPC		L&S	M	
57	20		LFR		HPB	L	MOW
58	14	HOR	SPC		HPB	L	
60	48	HTH	LFR		MPB	M	MOW
62	103	HOR	LFR		MPB	H	MOW
64	34	HTH	LFR		HPB	M	MOW
65	150	HOR	SPC		L&S	L	
66	288		SPC		L&S	L	
67	54	HST	WHIP		MPB	H	
70	130	HST	WHIP		MPB	H	
72	22	HST	WHIP		MPB	H	MOW
77	33	HOR	SPC		L&S	L	MOW
78	136	HST	WHIP		MPB	H	
84	30	HTH	SPC		L&S	M	MOW
85	19	HOR	LFR		HPB	H	MOW
87	23	HOR	SPC		L&S	L	
88	7	HST	WHIP		MPB	H	
90	10	HOR	LFR		HPB	M	MOW

Unit	Acre	Harvest	Under-story	Rx Fire	Slash	Bio-mass	Mow
91	28	HOR	SPC		HPB	H	MOW
92	28	HST	WHIP		MPB	H	MOW
94	25	HST	WHIP		MPB	M	MOW
95	35	HST	WHIP		MPB	H	MOW
97	19	HTH	SPC	UB	MPB	H	MOW
99	121	HOR	SPC		L&S	L	
100	26	HST	WHIP		MPB	H	
101	26	HOR	SPC		L&S	M	
102	46	HST	WHIP		MPB	H	
103	28		SPC		L&S	M	
104	37	HOR	SPC		L&S	L	
105	55	HOR	SPC		L&S	M	MOW
106	12	HST	WHIP		MPB	H	
107	6	HST	WHIP		MPB	H	
108	34	HOR	SPC		L&S	L	
109	34	HOR	SPC		L&S	M	
111	102		SPC		L&S	M	
112	26		SPC		L&S	M	
114	24		SPC		L&S	M	
115	226	HST	WHIP		MPB	H	
116	25	HOR	SPC		L&S	M	
117	24		SPC		L&S	M	
119	20	HST	WHIP		MPB	H	
120	25		SPC		L&S	L	
121	26	HST	WHIP		MPB	H	
122	250	HOR	SPC		L&S	L	
125	97	HST	WHIP		MPB	H	
126	68	HOR	SPC		L&S	M	
127	83	HOR	SPC		L&S	L	
130	31	HST	WHIP		MPB	H	
131	188	HOR	SPC		L&S	L	
132	74	HOR	SPC		L&S	L	
135	31	HOR	SPC		L&S	L	
136	17	HOR	SPC		HPB	L	
138	20		SPC		L&S	L	
139	25	HST	WHIP		MPB	H	
141	32	HOR	SPC		HPB	H	MOW

Unit	Acre	Harvest	Under-story	Rx Fire	Slash	Bio-mass	Mow
142	20	HST	WHIP		MPB	H	
143	21	HST	WHIP		MPB	H	
144	80	HOR	SPC		L&S	M	
145	27	HST	WHIP		MPB	H	
146	71	HST	WHIP		MPB	H	
147	38	HST	WHIP		MPB	H	
148	47	HST	WHIP		MPB	H	
150	140	HOR	SPC		L&S	L	
151	35	HOR	SPC		L&S	M	
152	99	HOR	SPC		L&S	M	
154	19	HTH	LFR	UB	MPB	M	MOW
155	13	HTH	LFR	UB	HPB	M	MOW
156	7		LFR		HPB	L	MOW
157	58	HTH	LFR	UB	HPB	M	MOW
158	6		LFR		L&S	L	MOW
159	53		LFR	UB	HPB	M	MOW
160	34	HST	WHIP	UB	MPB	H	MOW
162	11	HTH	LFR	UB	MPB	H	MOW
163	22	HTH	LFR	UB	MPB	H	MOW
164	10	HTH	LFR	UB	HPB	L	MOW
165	14	HTH	LFR	UB	HPB	L	MOW
166	165	HTH	LFR	UB	HPB	M	MOW
167	7	HTH	LFR	UB	HPB	M	MOW
169	159	HTH	LFR	UB	HPB	M	MOW
171	61	HOR	SPC		L&S	L	
173	9		LFR	UB	HPB	L	MOW
174	14	HTH	LFR	UB	HPB	M	MOW
175	91	HTH	LFR	UB	HPB	M	MOW
176	24	HTH	LFR	UB	HPB	M	MOW
177	27	HTH	LFR	UB	MPB	H	MOW
178	92		LFR	UB	HPB	M	MOW
179	20	HTH	LFR	UB	HPB	M	MOW
180	52		LFR	UB	HPB	L	MOW
183	100	HOR	LFR	UB	HPB	M	MOW
185	120	HOR	SPC	UB	L&S	L	MOW
186	253		LFR	UB	HPB	L	MOW
187	34		LFR	UB	MPB	M	MOW

Unit	Acre	Harvest	Under-story	Rx Fire	Slash	Bio-mass	Mow
188	22	HTH	LFR	UB	MPB	M	MOW
189	71	HTH	LFR	UB	HPB	L	MOW
191	205	HST	WHIP		MPB	H	MOW
192	4	HTH	LFR	UB	MPB	M	MOW
193	101	HOR	LFR	UB	MPB	M	MOW
194	43	HTH	LFR	UB	MPB	L	MOW
196	44	HOR	SPC		L&S	L	
197	181	HOR	SPC	UB	MPB	L	MOW
199	25		LFR		MPB	M	MOW
201	101	HOR	SPC	UB	HPB	L	MOW
202	28	HOR	LFR	UB	HPB	M	MOW
205	163	HOR	LFR	UB	MPB	M	MOW
206	313	HTH	LFR	UB	HPB	L	MOW
209	5		LFR	UB	HPB	L	MOW
210	18		LFR	UB	HPB	L	MOW
211	74	HTH	LFR	UB	HPB	L	MOW
212	10		LFR	UB	HPB	L	MOW
213	27	HTH	LFR	UB	MPB	H	MOW
216	46		LFR	UB	L&S	L	MOW
217	141	HOR	LFR	UB	HPB	M	MOW
218	48		LFR	UB	HPB	L	MOW
219	27		LFR	UB	HPB	L	MOW
221	25		LFR	UB	MPB	L	MOW
224	26		SPC		HPB	L	
225	23	HST	WHIP		MPB	H	
228	35		SPC		MPB	M	MOW
229	124	HOR	SPC		MPB	M	MOW
230	6	HOR	SPC		MPB	H	MOW
231	76	HOR	LFR		HPB	H	MOW
232	40	HOR	SPC		MPB	M	MOW
233	29		SPC	UB	MPB	L	MOW
234	321	HOR	SPC		MPB	M	MOW
235	18		LFR	UB	HPB	L	MOW
236	41	HOR	LFR	UB	MPB	M	MOW
237	8	HOR	SPC	UB	MPB	M	MOW
238	22		LFR	UB	HPB	L	MOW
241	79	HTH	LFR		HPB	M	MOW

Unit	Acre	Harvest	Under-story	Rx Fire	Slash	Bio-mass	Mow
243	19		LFR	UB	HPB	L	MOW
244	35		LFR		HPB	L	MOW
245	179		LFR		HPB	L	MOW
247	31	HOR	LFR		MPB	M	MOW
248	33		LFR		HPB	L	MOW
250	34		LFR		HPB	L	MOW
252	58		LFR		HPB	L	MOW
253	25		SPC		L&S	L	
254	27		LFR		HPB	L	MOW
258	76		LFR		HPB	L	MOW
259	20	HOR	LFR		HPB	M	MOW
264	30		LFR		HPB	L	MOW
268	41		LFR		HPB	L	MOW
280	586	HTH	LFR	UB	MPB	M	MOW
286	44	HOR	SPC		L&S	L	
287	111		LFR		HPB	L	MOW
288	7	HTH	SPC	UB	HPB	M	MOW
289	2	HOR	SPC		L&S	L	
290	8	HOR	SPC		L&S	L	
291	648			UB	MPB	M	MOW

Appendix B – Units with Required Subsoiling

Alternative 2 Units	Acres	Alternative 3 Units	Acres
1	760	1	760
13	11	13	11
20	140	20	140
21	13	21	13
23	9	23	9
37	127	37	127
38	78	38	78
41	68	41	68
43	64	43	64
45	74	45	74
48	70	48	70
49	483	49	483
52	25	52	25
55	20	55	20
62	103	62	103
70	130	70	130
84	49	84	30
90	10	90	10
94	25	94	25
97	19	97	19
109	34	109	34
116	25	116	25
131	188	131	188
135	31	135	31
141	32	141	32
146	71	146	71
148	47	148	47

Alternative 2 Units	Acres		Alternative 3 Units	Acres
152	99		152	99
166	273		166	274
167	7		167	7
174	14		174	14
179	20		179	20
185	120		185	120
187	34		187	34
189	71		189	71
191	205		191	205
193	101		193	101
194	43		194	43
196	44		196	44
197	181		197	181
199	25		199	25
201	101		201	101
205	163		205	163
206	313		206	313
211	74		211	74
217	141		217	141
221	25		221	25
229	124		229	124
233	29		233	29
280	586		280	586
Total Units: 50	Total Acres: 5,499		Total Units: 50	Total Acres: 5,481

Appendix C - Rationale for Wildlife Species not considered for Detailed Analysis

The following section provides the rationale for the Region 6 sensitive species not further analyzed in detail. The conclusions were made based on the absence of suitable habitat for these species, potential impacts would be mitigated or avoided thru Forest Plan Standards and Guidelines, and/or thru the project design elements.

Approximately 109 acres of the project area are within the Fall River corridor boundary. There would be no impact to riparian dependent species within the 109 acres in the Fall River corridor because there are no proposed treatments within ½ mile of Fall River. The project area also includes 29 acres of Segment 3B of the Upper Deschutes Wild and Scenic River. Segment 3B is classified as a Recreational River. These acres are within the lower half of Unit #62 (this unit is 102 total acres).

The Fall River Hatchery is just south of the Junction project area. The acres in 3B closer to Fall River are currently exhibiting an abundance of lodgepole pine encroachment. As part of an objective of the purpose and need is to reduce some of the fuel loadings just north of the Fall River Hatchery for fire protection, the objective would also restore 16 acres of riparian area. Either alternative would not alter the structure of the stand or change current habitat to unsuitable conditions for species dependent on riparian habitat. These treatments would only occur by the use of hand tools and only small diameter stems would be removed (see below).

Habitat modeling and field reconnaissance did not reveal any wetlands in the project area, but there is a 2-acre meadow. Due to the proximity of Fall River, the 29 acres in 3B may potentially provide migratory or potential suitable habitat for some riparian dependent species. Prefield review identified several historic osprey nests in the NRIS database along the general riparian area (not necessarily all within the 29 acres), but did not reveal any nests or occupancy for sensitive species. These nests were visited in the field, but most of the nests were gone or inactive as of the 2010 breeding season.

In addition to Forest Plan S&Gs, the Inland Native Fish Strategy (INFISH)*,* as signed in 1995, provides additional riparian standards and guidelines. INFISH delineated Riparian Habitat Conservation Areas (RHCAs) for riparian-dependent resources receive primary emphasis. These RHCAs include traditional riparian corridors, wetlands, intermittent streams, and other areas that help maintain the integrity of aquatic ecosystems. These areas are to be managed to maintain or restore water quality, stream channel integrity, channel processes, sediment regimes, instream flows, diversity and productivity of plan communities in riparian zones, and riparian and aquatic habitat to foster unique genetic fish stocks that evolved within the specific region. The standard widths for RHCAs from INFISH that are applicable to this project will be adopted.

The following project design features/S&Gs are from the fisheries resource and are specific to Unit 62, which is the only unit in the project area within an RHCA:

- Heavy equipment is restricted to the top of slope break, or 100 feet from stream where no defined slope break exists. Adjacent to the hatchery canal, heavy equipment would be restricted to 50 feet from the canal.
- Thinning of trees less than 4 inches diameter allowed within 12 feet of Fall River and canal. Thinning of trees less than 60 feet tall is allowed 30 feet or greater from Fall River and canal. Thinning of trees greater than 60 feet tall is allowed 50 feet or greater from Fall River and canal.
- Handpiling is allowed 50 feet or greater from Fall River and canal. Placement of handpiles would focus on upslope areas and avoid areas of washes and depressions that may facilitate water run-off toward Fall River. Burning would occur under conditions that do not allow excessive creeping from the pile, generally 10 feet or less. Handpiles should not exceed 6 feet by 8 feet.

- Retain all snags in RHCA of Fall River within 100 feet of riparian vegetation. For hazard trees that must be felled within 100 feet of stream, fall toward stream and leave on-site.

Wildlife Project Design Elements

The following project design elements were developed to minimize or avoid any potential impacts to wildlife species.

- Seasonal restriction in the lower half of Unit #62 along the Fall River corridor from March 1st – August 31st – this date would accommodate most species and would eliminate human disturbance to potential nest sites during implementation. Also within this unit, conduct the treatments during the fall season rather than the spring season to avoid ruts in the soil and/or avoid impacts to ground nesting birds or other invertebrates.
- There are no known active nests along the portion of Fall River that is proposed for treatment, however prior to implementation; the wildlife biologist shall monitor the proposed treatment area for any potential nests for that year.
- During implementation, the wildlife biologist will be contacted if any new nests or frogs are discovered.
- Retain all ponderosa pine snags
- Retain all ponderosa pine trees and white fir trees greater than 21" dbh
- Retain all ponderosa pine trees and white fir trees less than 21" dbh if they meet old tree characteristics.

Oregon spotted frog: Oregon spotted frogs inhabit the margins of lakes, marshes, and pools in streams where there is an abundant growth of vegetation (Csuti et al. 2001). Literature cited in the Conservation Assessment (Cushman and Pearl 2007) describes spotted frog breeding habitat as moderate to large wetlands with extensive emergent marsh coverage that warms substantially during seasons when Oregon spotted frogs are active on the surface (February to May). Sites always include some permanent water juxtaposed to seasonally inundated habitat. In literature cited within USFWS Species Assessment and Listing Priority Assignment Form (October 2005), the Oregon spotted frog inhabits emergent wetland habitats in forested landscapes, although it is not typically found under the forest canopy.

Other than approximately 0.2 miles of Fall River, the project area does not have any streams, wetlands or other riparian areas, but there is a 2-acre meadow. Fall River is within the Upper Deschutes Basin and flows into the Deschutes River approximately 2 ¾ miles downstream. There are known Oregon spotted frogs in the Deschutes River, but there are no known records of spotted frogs occurring in Fall River. Fall River would not likely provide suitable habitat because this river is too cold and does not warm substantially from February to May. Field reconnaissance also did not reveal any frogs in the 2-acre meadow. Additionally, this area is classified as a Recreational River, therefore human disturbance is frequent, making it unlikely to have occupancy.

The project design features such as having the wildlife biologist monitor Unit 62 prior to implementation, implement the treatment in the 16 acres during the fall season, apply all the applicable Forest Plan standards and guidelines, INFISH design elements, and contacting the biologist if frogs are seen would eliminate potential disturbance or impacts to Oregon spotted frogs. Unlike other frogs, the Oregon spotted frog spends most time in the water rather than on land, therefore the treatment activities would have no impact to egg masses. By the fall season, young will have dispersed or would have better mobility to temporarily flee the area. In conclusion, by applying the standards and guidelines and design elements above, the proposed Junction EA Project would have ***no impact*** on Oregon spotted frog.

California wolverine: The wolverine is a holartic species found in high-elevation habitats. Its home range can be very large; at least approximately 30 sq. miles. Threats to wolverine populations include climate change and alteration of alpine habitats, disturbance from recreation and roads (especially during the denning season), and isolation of individuals or small populations.

Denning habitat can vary. The dens in Alaska were usually long, complex snow tunnels with no associated trees or boulders. In contrast, dens in Idaho were always associated with fallen trees or boulders. Dens in both states were covered with at least one meter of snow. With few exceptions, they reported wolverine dens described to date were located in alpine, subalpine, taiga, or tundra habitat and reports of dens in low elevation, densely forested habitats are rare.

A GIS denning habitat model developed by Jeff Copeland of the Idaho Department of Fish and Game was used to identify high potential wolverine denning habitat. Maps were generated using the following parameters:

- Areas above 5,500 feet (with flexibility for adjustment up or down by the Forest depending on local conditions and knowledge),
- Slopes with a north aspect (>320 degrees, <120 degrees),
- Large cobble/rubble substrate (rock or snow), and
- Concave curvature (cirque basins).

Denning habitat for the Deschutes National Forest was modeled from the Forest Plant Association Group (PAG) layer including the alpine dry, alpine meadow, glacier and rock, north aspect of 0-22.5 degrees and 337.5-360 degrees. The results from this were clipped using only the acres above 5,500 feet in elevation. This resulted in a total of 1,656 acres of potential denning habitat on the Deschutes National Forest. The potential denning habitat is generally in small disjunct areas adjacent to the peaks of the Cascade crest and Paulina Peak. The greatest amount of potential denning habitat (756 acres) is located within the Headwaters of Whychus Creek (formerly Squaw Creek) subwatershed of the Whychus Creek watershed near Three Sisters. The modeled acreage across the entire forest may overestimate potential acres of wolverine denning habitat due to current levels of disturbance that may be occurring particularly within the Newberry National Volcanic Monument.

Management recommendations include protection of natal denning areas, and limiting disturbance or access to areas of suitable denning habitat and the immediate area around it.

Based on modeling, there are only 2 acres of denning habitat within the Fall River watershed, but these acres are not within the Junction project area or within proposed units. The Junction project area does not provide wolverine denning habitat because it is at a lower elevation (4,200 – 4,800 feet) and does not exhibit deep snow. Additionally, the project area is mostly flat and dominated by dense pure lodgepole pine wet and dry and about 4,000 acres of ponderosa pine wet and dry. Since wolverines have an extremely large range, it is reasonable to assume that an individual may travel through the project area if dispersing across Oregon.

Since there is no suitable denning habitat within the project area, and only a small probability of dispersing across, the proposed Junction EA Project would have ***no impact*** on California wolverine.

Pacific fisher: Fishers primarily use mature, closed-canopy coniferous forests with some deciduous component, frequently along riparian corridors (Csuti et al. 2001). Weir and Corbould (2010) found that fishers were limited by the openness of the stand; one reason being that escape cover (i.e. trees for climbing) are far apart making fishers further susceptible to terrestrial predators. In Ruggiero et al. (1994), it is suggested fishers prefer closed-canopy (greater than 60%), late-successional forests with large physical structures (live trees, snags, and logs), especially if associated with riparian areas. A

2004 Species Assessment by the US Fish and Wildlife Service documents key aspects of fisher habitat as those associated with late-successional forests (i.e. high canopy closure, large trees and snags, large logs, hardwoods, and multiple canopy layers). Distribution of fishers is limited by elevation and snow depth (Krohn et al. 1997 *in* US Fish and Wildlife Service Species Assessment). Fishers generally avoid areas of high human disturbance, primarily high road density or recreational developments. Fishers are fairly large, weighing 3 to 13 lbs. and 29 to 47 inches long. This may suggest a need of larger log sizes for dens than other animals with similar needs (i.e. marten). Aubry and Raley (2006) found in southwestern Oregon, fishers were found denning and resting at 4,000 feet elevation, more than 80% canopy closure, and more than 16 snags and 67 logs at least 20" DBH per acre; supporting the suggestion that this species utilizes large to very large structure. Denning and resting sites were also observed in large live trees (mostly Douglas-fir) with mistletoe brooms, limb clumping, rodent nests, or some other deformity. They also found fishers were preying upon woodpeckers, jays, grouse, quail, squirrels, hare, porcupine, and skunks.

Approximately 303 total acres of mixed conifer are within the planning area with 275 acres located in a narrow band along the northern boundary and the remaining found in the far western end of the planning area (both of these areas are adjacent to pure ponderosa pine stands). Although these stands are composed of a variety of tree species, the predominant species are true firs, ponderosa pine, and lodgepole pine. The mixed conifer areas have nearly all been entered in the past primarily to reduce stand densities through thinning. Although a few scattered large trees may be present, residual stands are composed of smaller, less than 20"dbh trees. These stands are dominated by vegetation structural stage (VSS) 4 with a size class of 5 – 8.9 inch dbh.

Based on habitat descriptions in the literature, these stands are not providing suitable fisher habitat (multi-storied stands; greater than 20" average stand dbh; and greater than 55% canopy closure). Additionally, fishers generally have large territories (a minimum of 10 square km or 2,500 acres).

The only portion of the planning area that contains riparian habitat is the 0.2-mile stretch adjacent to Fall River. This stretch is dominated by lodgepole pine and contains some ponderosa pine. The Oregon Department of Fish and Wildlife operates the Fall River Hatchery, which is adjacent to Fall River and just outside of the project boundary, but the unnumbered access road to the hatchery is within the planning area. According to the 2011 Operations Plan for the Fall River Hatchery, the facility welcomes 20,000 visitors annually. Fish anglers also utilize the Fall River riparian area to the east and west. Given the high degree of human presence and the proximity of the ODFW Fish Hatchery, it is unlikely that this area provides suitable fisher habitat.

Based on the existing conditions discussed and the fact there are no District or Forest records of fisher breeding, it is unlikely fishers would occur in the area. Therefore, the proposed Junction EA Project would have ***no impact*** on fishers.

American peregrine falcon: In Oregon, the peregrine falcon nests on cliffs ranging in height from a 75-foot escarpment at a reclaimed quarry to monolithic 1,500-foot high cliffs, as well as structural features of bridges (Joel E. Pagel *in* Marshall et al. 2006). There are no high escarpments, cliffs, or tall bridges within the proposed project area. Pistol Butte has some rock component, but does not provide the cliff habitat where eyries are often found. Parts of the project area along the Fall River corridor could provide potential foraging habitat, however District and Forest records do not indicate any history of peregrines along Fall River, or any other part of the project area. With application of the above standards and guidelines and project design (seasonal restrictions), the proposed Junction EA Project would have ***no impact*** on peregrine falcons.

Buffleheads: Typically nests at high-elevation forested lakes in the central Cascades, using cavities or artificial nest boxes in trees close to water, with most nests within 75 feet of water, but sometimes as far as 650 feet away (Eadie and Gauthier 1985, Ehrlich et al. 1988, Gilligan et al. 1994, Marshall 1996, Zeiner et al. 1988-1990). The birds nest in natural cavities or abandoned northern flicker holes in mixed coniferous-deciduous woodlands near lakes and ponds. The bufflehead is a "diving" duck, foraging mostly on aquatic insects, but also aquatic plants and small fish. During the breeding season, aquatic insects and larvae are the most important item in their diet. Buffleheads winter on sheltered bays and estuaries as well as freshwater environments (Natureserve, 2010). Bufflehead population numbers are generally low in Oregon and a shortage of natural cavities has brought attention to the breeding segment of the population (Csuti et al. 1997 p. 100). Buffleheads have been observed on Wickiup Reservoir and have nested in former flicker cavities in the past (Marshall et al. 2006). This specific habitat does not occur within the project area, but may be used for emigrational use. With application of the above standards and guidelines and project design (seasonal restriction), the proposed Junction EA Project would have ***no impact*** on buffleheads.

Harlequin duck: They nest along fast-moving rivers and mountain streams on rocky islands or banks. Streams are braided to reticulate with many riffles and rapids (Cassirer et al. 1993). Requires relatively undisturbed, low gradient, meandering mountain streams with dense shrubby riparian areas (greater than 50% streamside shrub cover), and woody debris for nesting and brood rearing; also needs mid-stream boulders or log jams and overhanging vegetation for cover and loafing; indicator of high water quality (Spahr et al. 1991). They sometimes nest beside mountain lakes and lake outlets.

They nest in a hollow, usually under the cover of bushes within about 30 m (98 feet) of water. They are also known to nest in a rock crevice among boulders, a rock cavity in cliff face, a tree cavity (Cassirer et al. 1993), a puffin burrow, or similar hidden sites (Ehrlich et al. 1992). They tend to breed in the same area in successive years. Breeding mostly occurs west of the Cascades along low to moderate gradient (1-7%) third to fifth order streams with simple channels and abundant in-stream rocks for "loaf sites" (Marshall et al. 2006). Since there are no breeding records in Deschutes County, and habitat would be considered marginal due to the lack of these specific habitats, harlequin duck is given a very low probability of occurrence. With application of the above standards and guidelines and project design (seasonal restrictions), the proposed Junction EA Project would have ***no impact*** on harlequin duck.

Greater sage grouse: Sage grouse are found in foothills, plains, and mountain slopes where sagebrush is present and the habitat contains a mixture of sagebrush, meadows, and aspen in close proximity. Winter habitat (palatable sagebrush) is probably the most limited seasonal habitat in some areas (Natureserve, 2010). Sagebrush habitat within or adjacent to the project area does not exist. This habitat type only occurs on the Ft. Rock side of the District east of Bend. Implementation of any of the alternatives would have ***no impact*** on Greater sage grouse.

Horned grebes: Rare breeders east of the Cascades, horned grebes favor semi-permanent ponds (Marshall et al. 2006). They nest among tall vegetation in shallow water on small and large lakes and ponds (approximately ¼ acre or larger), in calm waters of marshes, along rivers and streams. The highest breeding densities occur in pothole marshes of aspen woodlands. Outside the breeding season, horned grebes are found on bays, estuaries and seacoasts, and in migration commonly in inland freshwater habitats, especially lakes and rivers (Natureserve, 2010). Habitat for the horned grebe in the project area would be considered marginal, and presence would be unlikely. With application of the above standards and guidelines and project design (seasonal restrictions), the proposed Junction EA Project would have ***no impact*** on horned grebes.

Yellow rail: Nesting habitat of the yellow rail in Oregon has been described as marshes or wet meadows which have an abundance of thin-leaved sedges, a layer of senescent (old) vegetation to conceal their nests, and an average water depth of 7 cm (Popper, 2001). There is potential habitat in the project area along the Fall River riparian area due to a 2-acre meadow. Since there are no proposed treatment activities within this area and with application of all the above standards and guidelines and project design, **no impacts** to yellow rail from the proposed activities are anticipated.

Tricolored blackbird: In Oregon, this species is restricted to breeding in southern Oregon and prefers to breed in freshwater marshes with emergent vegetation (cattails) or in thickets of willows or other shrubs (Csuti et al. 2001). In migration and winter they are found in open cultivated lands and pastures (Natureserve, 2010). Nesting habitat does not occur on the Bend-Fort Rock Ranger District due to the lack of cattails and tules in large quantities. Since there are no cattails, willow thickets, or marshes in the project area, it is unlikely there is suitable habitat. Therefore implementation of any of the alternatives would have ***no impact*** on tri-colored blackbirds.

Northern waterthrush: The northern waterthrush inhabits riparian habitat, often with willow and alder (Natureserve, 2010). Due to the dense and small diameter lodgepole pine in the project area along the Fall River corridor and lack of willow and alder, it is unlikely the project area is providing suitable habitat. With application of all the above standards and guidelines and project design, ***no impact*** to northern waterthrush from the proposed activities is anticipated.

Pygmy rabbits typically occur in dense stands of big sagebrush growing in deep loose soils (Natureserve, 2010). There are no sagebrush flats within or adjacent to the project area. This habitat type only occurs on the Ft. Rock side of the District east of Bend. Implementation of any of the alternatives would have ***no impact*** on pygmy rabbits.

Crater Lake tightcoil: This snail can be found in suitable wet habitat on the undersides of woody debris, among wet mosses, rushes, and other low vegetation at the edges of wetlands, springs, seeps, and streams in perennially damp forest floor litter, especially where it has accumulated at the bases of shrubs and against logs (Duncan et al. 2003). Suitable wet habitat would be considered as almost exclusively very stable, perennially wet riparian edges around wetlands, springs, seeps, streams, and damp forest floor. Areas that are temporarily wet habitat such as stream borders that may change location (up and down the stream bank) or are seasonally underwater of dry, are not suitable habitat for this species. Only areas with constant water levels that create perennially saturated habitat year-round are suitable and may be occupied. There is potential habitat in the project area along the Fall River riparian area due to a 2-acre meadow. Since there are no proposed treatment activities within this area and with application of all the above standards and guidelines and project design, ***no impact*** to Crater Lake tightcoil from the proposed activities are anticipated.

The **silver-bordered fritillary** ranges from Central Washington south along the Rocky Mountains to northern New Mexico and east to Illinois, Virginia and Maryland. They inhabit wet meadows, bogs, and marshes as well as forest openings in mountainous areas, and spring-fed meadows in dry prairies (Natureserve, 2010). Two primary colonies exist in Oregon: one at Big Summit Prairie on the Ochoco National Forest and one in the Strawberry Mountains in the Malheur National Forest (Miller and Hammond, 2007). Threats to this species include livestock overgrazing, wetland loss, and woody vegetation encroachment of willows and hawthorns from fire suppression (Miller and Hammond, 2007). Adults lay eggs singly near host plants of the violet family including *Viola glabella* and *V. nephrophylla*. Caterpillars that develop from the eggs feed on these host plants and overwinter by hibernating, emerging as adults in the spring. Favored nectar sources for adults are composite flowers including goldenrod and black-eyed susans. Adults fly May to July with a second generation flying from August into September. There is potential habitat in the project area along the Fall River riparian area due to a 2-acre meadow. Since there are no proposed treatment activities within this area and with application of all the above standards and guidelines and project design, ***no impact*** to silver-bordered fritillary from the proposed activities are anticipated.

The **Johnson's hairstreak** is small, three-quarter inch uncommon butterfly that ranges from southern British Columbia, south through eastern and western Washington, and western Oregon, to central and south California. Isolated populations exist in northeastern Oregon to central Idaho. In Oregon, it has been found sparsely in the Cascades, Coast Range, Siskiyou Mountains, Blue Mountains and Wallowa Mountains (Pyle, 2002). Elevations range from sea level to 6,000 feet. Most of the 52 records for Oregon are above 2,000 feet (Hinchliff, 1994). This butterfly species depends on coniferous forests that contain dwarf mistletoes (genus *Arceuthobium*) found in western hemlock, red fir, and Jeffrey pine (Natureserve, 2010). Miller and Hammond (2007) reports this species as utilizing moist old-growth stands in the Pacific Northwest on the westslope of the Cascades Mountains. There is no habitat within the project area because there is no old growth western hemlock, red fir, gray or digger pine and the project area consists of 70% lodgepole pine. Implementation of any of the alternatives would have ***no impact*** on Johnson's hairstreak.

Appendix D – Roads and Recommendations

Definition	**Travel Analysis**
General Maintenance: Brushing, spot surface, restore drainage, blade and shape roadway, fell danger trees, clean-leadouts	A. Maintain at Current Level
Resurface: Current road condition cannot support use.	B. Upgrade Maintenance Level
Limited Maintenance: Maintain as needed to accomplish project objectives without damaging roadway. At the end of this project perform maintenance to the extent that roads may self-sustain.	C. Decrease Maintenance Level
Restore Closure:	D. Restrict Travel/Seasonal Closure
Sub Soil/Camouflage	E. Close
	F. Decommission
	G. Convert to Other Uses

Summary Road Type Miles		**Pre Travel Analysis**	
Miles	*Pre Analysis*	*Miles*	*Post Analysis Density*
14.240	FS,Cnty,State Hwys	83.37	Proposed Open Miles
12.870	Collector	0.57	Proposed to Close
62.326	Local	6.13	Currently Closed
16.42	Closed	2.62	Decommission
89.44	Open Miles	2.16	Pre Analysis Density
16.42	Currently Closed	2.01	Post Analysis Density
41.44	Junction Sq. Miles		
2.16	Current Density		

Junction Planning Area Road Recommendations

Arterial Roads

Road #	Mtc. Level	Termini From	Mile	To	Mile	Miles	Jurisdiction	Road-Travelway Recommendations	Travel Analysis Recommendation
4000000	5	FS 4000101	4.96	River-Summit Dr	6.26	1.30	Deschutes County	N/A	A. Maintain at Current Level
		River-Summit Dr	6.26	FS road 4040	11.26	5.00	Forest Service	Chip Seal, Brush, Restore Drainage, Remove Danger Trees	A. Maintain at Current Level
4200000	5	Three Trappers/FS 40	0.00	FS road 4525	4.16	4.16	Deschutes County	N/A	A. Maintain at Current Level
4500000	5	FS road 4220	8.53	FS road 4232	12.31	3.78	Deschutes County	N/A	A. Maintain at Current Level
4200290	5	Deschutes Cnty 42	0.00	Subdivision	0.30	0.30	Deschutes County	N/A	A. Maintain at Current Level
4200300	3	Deschutes Cnty 42	0.00	Hatchery	0.15	0.15	Forest Service	Recently reconstructed	A. Maintain at Current Level

Collector Roads

Road #	Mtc. Level	Termini From	Mile	To	Mile	Total Miles	Jurisdiction	Road-Travelway Recommendations	Travel Analysis Recommendation
4030000	2	FS 40	0.00	FS 4030250	2.98	2.98	Forest Service	General Maintenance	A. Maintain at Current Level
4032000	2	FS 40	0.00	FS 42	0.73	0.73	Forest Service	General Maintenance	A. Maintain at Current Level
4140000	2	FS 40	0.00	FS 4032	2.65	2.65	Forest Service	General Maintenance	A. Maintain at Current Level
4220000	2	FS 42	0.00	FS 40	2.81	2.81	Forest Service	Restore road prism/Resurface w/compacted 6" 3/4" agg	A. Maintain at Current Level
4230000	2	FS 42	0.00	Deschutes Cnty 42	3.10	3.10	Forest Service	General Maintenance	A. Maintain at Current Level

4360000	2	FS BDRY	5.80	FS 42	6.40	0.60	Forest Service	General Maintenance	A. Maintain at Current Level

Local Roads

Road #	Mtc. Level	Miles	Road-Travelway Recommendations	Travel Analysis Recommendation
4030100	2 - HIGH CLEARANCE VEHICLES	0.752	Limited Maintenance	A. Maintain at Current Level
4030110	2 - HIGH CLEARANCE VEHICLES	0.550	Limited Maintenance	A. Maintain at Current Level
4030205	2 - HIGH CLEARANCE VEHICLES	0.396	Limited Maintenance	A. Maintain at Current Level
4030209	2 - HIGH CLEARANCE VEHICLES	0.112	Limited Maintenance	A. Maintain at Current Level
4030210	2 - HIGH CLEARANCE VEHICLES	1.470	Limited Maintenance	A. Maintain at Current Level
4030214	2 - HIGH CLEARANCE VEHICLES	0.181	Limited Maintenance	A. Maintain at Current Level
4030235	2 - HIGH CLEARANCE VEHICLES	1.649	Limited Maintenance	A. Maintain at Current Level
4030250	2 - HIGH CLEARANCE VEHICLES	0.502	Limited Maintenance	A. Maintain at Current Level
4030256	2 - HIGH CLEARANCE VEHICLES	0.754	Limited Maintenance	A. Maintain at Current Level
4030300	2 - HIGH CLEARANCE VEHICLES	1.172	Limited Maintenance	A. Maintain at Current Level
4030310	2 - HIGH CLEARANCE VEHICLES	0.106	Limited Maintenance	A. Maintain at Current Level
4030310	2 - HIGH CLEARANCE VEHICLES	0.190	Limited Maintenance	A. Maintain at Current Level
4030315	2 - HIGH CLEARANCE VEHICLES	0.202	Limited Maintenance	A. Maintain at Current Level
4030360	2 - HIGH CLEARANCE VEHICLES	0.615	Limited Maintenance	A. Maintain at Current Level
4030370	2 - HIGH CLEARANCE	0.544	Limited	A. Maintain at Current Level

	VEHICLES		Maintenance	
4030375	2 - HIGH CLEARANCE VEHICLES	0.287	Limited Maintenance	A. Maintain at Current Level
4030391	2 - HIGH CLEARANCE VEHICLES	0.113	Limited Maintenance	A. Maintain at Current Level
4032040	2 - HIGH CLEARANCE VEHICLES	1.073	Limited Maintenance	A. Maintain at Current Level
4032050	2 - HIGH CLEARANCE VEHICLES	0.212	Limited Maintenance	A. Maintain at Current Level
4140690	2 - HIGH CLEARANCE VEHICLES	0.349	Limited Maintenance	A. Maintain at Current Level
4140700	2 - HIGH CLEARANCE VEHICLES	1.932	Limited Maintenance	A. Maintain at Current Level
4140710	2 - HIGH CLEARANCE VEHICLES	0.285	Limited Maintenance	A. Maintain at Current Level
4140800	2 - HIGH CLEARANCE VEHICLES	1.818	Limited Maintenance	A. Maintain at Current Level
4180500	2 - HIGH CLEARANCE VEHICLES	2.722	Limited Maintenance	A. Maintain at Current Level
4180520	2 - HIGH CLEARANCE VEHICLES	0.727	Limited Maintenance	A. Maintain at Current Level
4180540	2 - HIGH CLEARANCE VEHICLES	1.107	Limited Maintenance	A. Maintain at Current Level
4200212	2 - HIGH CLEARANCE VEHICLES	0.127	Limited Maintenance	A. Maintain at Current Level
4200291	2 - HIGH CLEARANCE VEHICLES	0.188	Limited Maintenance	A. Maintain at Current Level
4200295	2 - HIGH CLEARANCE VEHICLES	0.226	Limited Maintenance	A. Maintain at Current Level
4220010	2 - HIGH CLEARANCE VEHICLES	1.560	Limited Maintenance	A. Maintain at Current Level
4220150	2 - HIGH CLEARANCE VEHICLES	1.045	Limited Maintenance	A. Maintain at Current Level
4220350	2 - HIGH CLEARANCE VEHICLES	0.649	Limited Maintenance	A. Maintain at Current Level
4220500	2 - HIGH CLEARANCE VEHICLES	0.234	Limited Maintenance	A. Maintain at Current Level

4220500	2 - HIGH CLEARANCE VEHICLES	3.275	Limited Maintenance	A. Maintain at Current Level
4220510	2 - HIGH CLEARANCE VEHICLES	0.500	Limited Maintenance	A. Maintain at Current Level
4220540	2 - HIGH CLEARANCE VEHICLES	0.194	Limited Maintenance	A. Maintain at Current Level
4220591	2 - HIGH CLEARANCE VEHICLES	0.078	Limited Maintenance	A. Maintain at Current Level
4220592	2 - HIGH CLEARANCE VEHICLES	0.355	Limited Maintenance	A. Maintain at Current Level
4220594	2 - HIGH CLEARANCE VEHICLES	0.294	Limited Maintenance	A. Maintain at Current Level
4220600	2 - HIGH CLEARANCE VEHICLES	0.810	Limited Maintenance	A. Maintain at Current Level
4220650	2 - HIGH CLEARANCE VEHICLES	0.555	Limited Maintenance	A. Maintain at Current Level
4220657	2 - HIGH CLEARANCE VEHICLES	0.307	Limited Maintenance	A. Maintain at Current Level
4220800	2 - HIGH CLEARANCE VEHICLES	4.945	Limited Maintenance	A. Maintain at Current Level
4220847	2 - HIGH CLEARANCE VEHICLES	0.063	Limited Maintenance	A. Maintain at Current Level
4220895	2 - HIGH CLEARANCE VEHICLES	0.070	Limited Maintenance	A. Maintain at Current Level
4230200	2 - HIGH CLEARANCE VEHICLES	0.109	Limited Maintenance	A. Maintain at Current Level
4230250	2 - HIGH CLEARANCE VEHICLES	0.326	Limited Maintenance	A. Maintain at Current Level
4230450	2 - HIGH CLEARANCE VEHICLES	0.040	Limited Maintenance	A. Maintain at Current Level
4230570	2 - HIGH CLEARANCE VEHICLES	1.246	Limited Maintenance	A. Maintain at Current Level
4230600	2 - HIGH CLEARANCE VEHICLES	1.931	Limited Maintenance	A. Maintain at Current Level
4230630	2 - HIGH CLEARANCE VEHICLES	0.983	Limited Maintenance	A. Maintain at Current Level
4230640	2 - HIGH CLEARANCE VEHICLES	2.583	Limited Maintenance	A. Maintain at Current Level

4230650	2 - HIGH CLEARANCE VEHICLES	1.291	Limited Maintenance	A. Maintain at Current Level
4230660	2 - HIGH CLEARANCE VEHICLES	0.626	Limited Maintenance	A. Maintain at Current Level
4360935	2 - HIGH CLEARANCE VEHICLES	0.071	Limited Maintenance	A. Maintain at Current Level
4360940	2 - HIGH CLEARANCE VEHICLES	0.505	Limited Maintenance	A. Maintain at Current Level
4360950	2 - HIGH CLEARANCE VEHICLES	0.194	Limited Maintenance	A. Maintain at Current Level
4360960	2 - HIGH CLEARANCE VEHICLES	0.028	Limited Maintenance	A. Maintain at Current Level
4500050	2 - HIGH CLEARANCE VEHICLES	1.207	Limited Maintenance	A. Maintain at Current Level
4500070	2 - HIGH CLEARANCE VEHICLES	2.893	Limited Maintenance	A. Maintain at Current Level
4500082	2 - HIGH CLEARANCE VEHICLES	0.296	Limited Maintenance	A. Maintain at Current Level
4500090	2 - HIGH CLEARANCE VEHICLES	1.341	Limited Maintenance	A. Maintain at Current Level
4500093	2 - HIGH CLEARANCE VEHICLES	0.390	Limited Maintenance	A. Maintain at Current Level
4500097	2 - HIGH CLEARANCE VEHICLES	0.150	Limited Maintenance	A. Maintain at Current Level
4500100	2 - HIGH CLEARANCE VEHICLES	2.823	Limited Maintenance	A. Maintain at Current Level
4500150	2 - HIGH CLEARANCE VEHICLES	0.580	Limited Maintenance	A. Maintain at Current Level
4500150	2 - HIGH CLEARANCE VEHICLES	0.745	Limited Maintenance	A. Maintain at Current Level
4500152	2 - HIGH CLEARANCE VEHICLES	0.565	Limited Maintenance	A. Maintain at Current Level
4500190	2 - HIGH CLEARANCE VEHICLES	1.002	Limited Maintenance	A. Maintain at Current Level
4500400	2 - HIGH CLEARANCE VEHICLES	2.031	Limited Maintenance	A. Maintain at Current Level
4500406	2 - HIGH CLEARANCE VEHICLES	0.091	Limited Maintenance	A. Maintain at Current Level

4500480	2 - HIGH CLEARANCE VEHICLES	0.384	Limited Maintenance	A. Maintain at Current Level
4500484	2 - HIGH CLEARANCE VEHICLES	1.078	Limited Maintenance	A. Maintain at Current Level
4500485	2 - HIGH CLEARANCE VEHICLES	0.181	Limited Maintenance	A. Maintain at Current Level
4500487	2 - HIGH CLEARANCE VEHICLES	0.116	Limited Maintenance	A. Maintain at Current Level
4525000	2 - HIGH CLEARANCE VEHICLES	0.024	Limited Maintenance	A. Maintain at Current Level
4230690	1 - BASIC CUSTODIAL CARE (CLOSED)	0.436	Limited Maintenance	B. Upgrade Maintenance Level
4500153	1 - BASIC CUSTODIAL CARE (CLOSED)	0.566	Limited Maintenance	B. Upgrade Maintenance Level
4032350	2 - HIGH CLEARANCE VEHICLES	0.233	Limited Maintenance	E. Close
4220910	2 - HIGH CLEARANCE VEHICLES	0.340	Limited Maintenance	E. Close
4000140	1 - BASIC CUSTODIAL CARE (CLOSED)	0.272	Restore Closure/Limited Maintenance	E. Close
4030208	1 - BASIC CUSTODIAL CARE (CLOSED)	0.633	Restore Closure/Limited Maintenance	E. Close
4030362	1 - BASIC CUSTODIAL CARE (CLOSED)	0.258	Restore Closure/Limited Maintenance	E. Close
4030368	1 - BASIC CUSTODIAL CARE (CLOSED)	0.118	Restore Closure/Limited Maintenance	E. Close
4140750	1 - BASIC CUSTODIAL CARE (CLOSED)	0.122	Restore Closure/Limited Maintenance	E. Close
4220500	1 - BASIC CUSTODIAL CARE (CLOSED)	0.224	Restore Closure/Limited Maintenance	E. Close
4220520	1 - BASIC CUSTODIAL CARE (CLOSED)	0.829	Restore Closure/Limited Maintenance	E. Close
4220610	1 - BASIC CUSTODIAL CARE (CLOSED)	0.979	Restore Closure/Limited Maintenance	E. Close
4220611	1 - BASIC CUSTODIAL CARE (CLOSED)	0.229	Restore Closure/Limited Maintenance	E. Close
4220618	1 - BASIC CUSTODIAL CARE (CLOSED)	0.141	Restore Closure/Limited Maintenance	E. Close

4220620	1 - BASIC CUSTODIAL CARE (CLOSED)	0.126	Restore Closure/Limited Maintenance	E. Close
4220845	1 - BASIC CUSTODIAL CARE (CLOSED)	0.095	Restore Closure/Limited Maintenance	E. Close
4220896	1 - BASIC CUSTODIAL CARE (CLOSED)	0.307	Restore Closure/Limited Maintenance	E. Close
4220900	1 - BASIC CUSTODIAL CARE (CLOSED)	1.420	Restore Closure/Limited Maintenance	E. Close
4220920	1 - BASIC CUSTODIAL CARE (CLOSED)	0.564	Restore Closure/Limited Maintenance	E. Close
4220960	1 - BASIC CUSTODIAL CARE (CLOSED)	0.101	Restore Closure/Limited Maintenance	E. Close
4230240	1 - BASIC CUSTODIAL CARE (CLOSED)	0.629	Restore Closure/Limited Maintenance	E. Close
4230400	1 - BASIC CUSTODIAL CARE (CLOSED)	0.334	Restore Closure/Limited Maintenance	E. Close
4230402	1 - BASIC CUSTODIAL CARE (CLOSED)	0.565	Restore Closure/Limited Maintenance	E. Close
4230405	1 - BASIC CUSTODIAL CARE (CLOSED)	0.103	Restore Closure/Limited Maintenance	E. Close
4230450	1 - BASIC CUSTODIAL CARE (CLOSED)	0.850	Restore Closure/Limited Maintenance	E. Close
4500076	1 - BASIC CUSTODIAL CARE (CLOSED)	0.394	Restore Closure/Limited Maintenance	E. Close
4500077	1 - BASIC CUSTODIAL CARE (CLOSED)	0.572	Restore Closure/Limited Maintenance	E. Close
4500100	1 - BASIC CUSTODIAL CARE (CLOSED)	0.973	Restore Closure/Limited Maintenance	E. Close
4500120	1 - BASIC CUSTODIAL CARE (CLOSED)	0.055	Restore Closure/Limited Maintenance	E. Close
4500153	1 - BASIC CUSTODIAL CARE (CLOSED)	0.340	Restore Closure/Limited Maintenance	E. Close
4500154	1 - BASIC CUSTODIAL CARE (CLOSED)	0.184	Restore Closure/Limited Maintenance	E. Close
4500155	1 - BASIC CUSTODIAL CARE (CLOSED)	1.107	Restore Closure/Limited Maintenance	E. Close
4500162	1 - BASIC CUSTODIAL CARE (CLOSED)	0.556	Restore Closure/Limited Maintenance	E. Close

4500180	1 - BASIC CUSTODIAL CARE (CLOSED)	0.353	Restore Closure/Limited Maintenance	E. Close
4360900	2 - HIGH CLEARANCE VEHICLES	0.106	Subsoil/Camouflage	F. Decommission
4230530	2 - BASIC CUSTODIAL CARE (CLOSED)	0.525	Subsoil/Camouflage	F. Decommission
4032400	1 - BASIC CUSTODIAL CARE (CLOSED)	0.325	Subsoil/Camouflage	F. Decommission
4140700	1 - BASIC CUSTODIAL CARE (CLOSED)	1.138	Subsoil/Camouflage	F. Decommission
4230403	1 - BASIC CUSTODIAL CARE (CLOSED)	0.110	Subsoil/Camouflage	F. Decommission
4230655	1 - BASIC CUSTODIAL CARE (CLOSED)	0.413	Subsoil/Camouflage	F. Decommission

Appendix E – Consideration of Public Comment

Consideration of Public Comment

During the public comment period (August 15, 2014 – September 15, 2014), 7 responses were received from individuals, agencies or organizations listed in the table below. Full text of the comment letters are on file at the Bend/Ft. Rock Ranger District.

Individuals, agencies, and organizations that submitted comments during the 30-day comment period:

Dick Artley

Dean Richardson

Chuck Burley, Interfor Gilchrist

Irene Jerome, American Forest Resource Council

Jim Larsen

Doug Heiken, Oregon Wild

Paula Hood, Blue Mountains Biodiversity Project

All comments have been considered during the decision-making process for the Junction Vegetation Management Project. Although not a requirement for environmental assessments, the responses provided here are intended to briefly discuss all major points of view and to document if comments resulted in any changes to the environmental assessment. Similar comments are grouped together by topic or resource. Statements may have been summarized or paraphrased to reduce paperwork.

Purpose and Need

Comment: *This project will further alter vegetation away from historic conditions by simplifying canopy structure, reducing vegetative diversity and impacting soils. (P. Hood)*

Landscape-level vegetation conditions that reflect historic vegetation and disturbance patterns and scales will not be met by the Junction project. (P. Hood)

Consideration: Lodgepole pine is the dominant stand type (70%) in the project area. Treatment in these stands would not reduce species diversity, as they tend to be a single-species stand type. Within the lodgepole pine biophysical environment, the structural stages that are above HRV will be moved into the structural stage that is currently below HRV (EA p. 60).

Where ponderosa pine stands occur, the absence of fire or recent thinning has resulted in ingrowth of lodgepole pine. Ponderosa pine trees are a more fire-resilient species that can become large and old but are at risk of beetles when tree density is too high. The EA states that within the Junction area, many ponderosa pine stands consist of all tree sizes but are overly dense and therefore lacking in tree vigor. (EA pp. 3, 52)

The HRV analysis shows that LOS stages in ponderosa pine and mixed conifer are below historic range due to past harvest practices where all large trees were removed. Large trees are the limiting factor for moving towards HRV; thinning can reduce beetle risk so that health and vigor of medium sized trees and fuels reduction reduces fire risk so that stands will continue towards LOS. (EA pp. 49-50, 59). Thinning has been shown to reduce ponderosa pine mortality by mountain pine beetle and can reduce suppression mortality and allow trees to develop into larger size classes. This will move the area towards more historic vegetation conditions.

Comment: *Attempting to remove historically common and necessary agents of disturbance such as mistletoe, bark beetles, and wildfire effects, as outlined in the harvest prescriptions, will not meet the stated objectives. (P. Hood)*

Consideration: The project does not propose to remove agents of disturbance but intends to create conditions where disturbance is at more historic scales and doesn't create large-scale loss of forest and habitat.

Comment: *The EA fails to use best available science or disclose scientific controversy in analyzing project impacts and outcomes in relation to forest health, mistletoe, insects, and wildfire. Old Growth forests, unique plant and wildlife habitats, and scenic corridors are not in danger from fire, as fire is an integral part of natural and scenic landscapes. (P. Hood)*

Consideration: Over 70% of the project area is currently rated at extreme for fire hazard (EA pp. 3, 70-73). This equates to high flame lengths and varying degrees of crown fire where suppression efforts become ineffective during 97th percentile weather conditions. One of the goals in the General Forest Management Area is to protect stands from insects, disease, and damage. This goal cannot be met by allowing wildfire to burn under current conditions. The extreme fire hazard condition leads to serious control issues related to torching, crowning, and spotting (EA p. 71). Allowing a fire to burn under those conditions puts forest and wildlife habitat within and adjacent to the project area at risk, and puts private property and communities to the east and south of the project area at risk. The burn probability is moderate, high, or very high across the area which is an indicator of potential fire spread rates.

Comment: *We support the stated purpose and need for this project and note the importance of contributing forest products for local and regional economies. On page 3 of the EA it states "due to the economic climate forest sector jobs have declined over the years". It is true that forest sector jobs have declined and particularly since 1990. However we don't agree with your assessment this is due to the economic climate. Around 1990 two major forest policy initiatives were implemented: the Northwest Forest Plan and the Eastside Screens. These two policies collectively have led to the significant job loss in the forest sector.*

Along with the job loss is the commensurate loss in the infrastructure itself—particularly the saw mills. Our mill in Gilchrist is the last mill in Central Oregon and maintaining this facility is critical to maintaining the overall industry infrastructure including contractors. If this infrastructure were to close the ability to do the work on the ground and achieve the resource objectives we all agree to would disappear. (C. Burley)

Consideration: The Forest Service recognizes the importance of the wood products industry infrastructure in our ability to accomplish vegetation treatment objectives.

Ponderosa Pine Treatments

Comment: *In many ponderosa stands, logging will not serve to fulfill the overall objective, nor will it increase vigor or resilience to insects, disease, or wildfire. Mistletoe and bark beetles are native to these forests, were historically common disturbances that were influential to vegetation conditions, and they provide essential forage and habitat for wildlife. Mistletoe and bark beetles are not effectively controlled through logging. (P. Hood)*

Consideration: Efficacy of thinning in ponderosa pine to increase vigor and resilience to insects and disease is well established (EA p. 49-50, 56). Although insects and disease may be native, the ponderosa pine stands in the Junction project area are in a condition that is the result of historic logging practices, fire suppression, and previous management; the existing condition is not the result of natural processes. Thinning the ponderosa pine stands to favor the healthiest trees creates stands that are more resilient to fire and at less risk to bark beetle mortality.

Comment: *Let's build on the success of the Glaze Project. Thinning more than 4000 acres to 50 ft2/acre basal area (EA p 42) is too heavy. A conservative portion of the Ppine PAG can be thinned like that, but such heavy thinning should be a small part of a more variable prescription, and the average across the unit should be much higher. Please retain at least 60 ft2/acre of basal area in areas dominated by small small trees, and >100 ft2/acre in areas with relatively numerous large trees. This is consistent with Tim Lillebo's Ppine restoration vision outlined below. (D. Heiken)*

Consideration: The Glaze project is located in the Metolius Conservation Area which calls for a different management approach. Within the Junction project, ponderosa pine stands are limited to the buttes and elevated areas where cold air drainage down slope moderates air temperatures (EA pp. 50-52). It accounts for 27% of the project area. The HRV analysis shows that of 31,804 acres of ponderosa pine PAG, 24,682 acres (78%) are above HRV; i.e. there are nearly double the acres of mid seral structural stages than would have been sustained historically under a natural fire regime and absent logging practices that removed the large trees. Considering the proportion of the analysis area that is out of HRV, the two action alternatives make a modest contribution to restoration of the ponderosa pine PAG.

Thinning in ponderosa pine is from below with a range of residual basal areas to be retained. The two alternatives look at different ranges and compare the tradeoffs. The ranges of basal area are based on lower and upper management zones (which are based on Stand Density Index), and these differ based on site productivity; therefore, a prescribed basal area from one part of the forest is not necessarily appropriate in another area of the forest. In the Junction project area, for certain sensitive wildlife species, such as white-headed woodpecker, the more open ponderosa pine stands would improve habitat conditions for a longer period of time (EA p. 12, 106-108). Thinning under Alternative 3 to an average basal area of 50 $ft.^2$ is intended to provide for a longer period of time where the trees are free to grow promoting healthier and larger ponderosa pine trees for decades. There is no thinning within ponderosa pine stands that are dominated by large trees.

In addition to thinning to a lower average basal area in ponderosa pine, Alternative 3 also drops the ponderosa pine treatment within the Wake Butte Special Interest Area and the Pistol Butte OGMA. This leaves 384 more acres of ponderosa pine OGMA unthinned than Alternative 2; these acres will provide denser conditions for certain wildlife species such as goshawk (EA p. 119).

Lodgepole Treatments

Comment: *Overstory and seed tree removal of lodgepole will result in future stands of dense lodgepole – as has been shown repeatedly from previous clearcutting in this project area. Dense LP will grow back into exactly the same thickets it has previously. Succession must be allowed to proceed naturally, and should include mistletoe, beetles, and wildfire. (P. Hood)*

Consideration: In General Forest, the objective is to continue to convert unmanaged stands to managed stands. Current conditions observed in this planning area are that "stands treated more recently are adequately stocked and appear to be more open in the understory with a sometimes patchy distribution of trees (EA p. 50). Precommercial thinning is used to control stocking. The project does provide for a variety of size classes and retains areas in untreated condition to provide a variety of wildlife habitats, such as connectivity corridors containing lodgepole pine.

Comment: *This commenter would like to see the Forest manage lodgepole pine regrowth better. In units where lodgepole pine will be removed, need to manage the regrowth, before letting the saplings get* *big should go in with loppers and thin them out. (D. Richardson)*

Consideration: Both of the action alternatives include precommercial thinning to control small tree stocking.

Comment: *Overstory removal and regen harvest does not retain LOS components or move toward HRV as required by the Eastside Screens. The Eastside Screens were adopted to reverse the troubling decline of large and old trees on National Forest lands in eastern Oregon and Washington. Overstory trees represent the last best large tree structure within a stand. Removing overstory trees is inconsistent with the Eastside Screens requirements to retain LOS components and move toward historic range of variability when treating stands that are not currently LOS. (D. Heiken)*

The Eastside Screens say "2) Outside of LOS, many types of timber sale activities are allowed. The intent is still to maintain and/or enhance LOS components in stands subject to timber harvest … Manipulate vegetative structure that does not meet late and old structural (LOS) conditions, … in a manner that moves it towards these conditions as appropriate to meet HRV. … Manipulate vegetation in a manner to encourage the development and maintenance of large diameter, open canopy structure." 1995 Regional Forester's Forest Plan Amendment #2. (D. Heiken)

EA (p 50) indicates that the stand initiation structural stage for lodgepole pine is "within HRV." And the EA shows that "Multi-story [lodgepole] without Large Trees" is above HRV. Regen logging some of the stands will prevent stands from moving into this category, which they would do more readily if left to develop on their own. Regen harvest of lodgepole is therefore not moving toward HRV. [Note: In tables such as 15 and 17, it does not seem proper to lump "multi-story with large trees" and "multi-story without large trees," especially when compliance with the Eastside Screens focuses on LOS component like large tree structure.]

Consideration: In the Junction landscape, a lack of large old trees is a concern for ponderosa pine where the LOS stage for single story with large trees is nearly absent in the watershed (EA p. 53). The purpose of the 1995 Environmental Assessment for the Continuation of Management Direction for Establishing Riparian, Ecosystem, and Wildlife Standards for Timber Sales was to conserve late and old structural stages *in relation to the larger ecosystem* and to promote the vigor and health of the forests. The 1995 Screens EA acknowledged a need to provide a balance between timber harvest for forest health and fuels reduction with the need to maintain old forest structure. Conducting the HRV analysis provides guidance on what old forest structures are in need of conservation or enhancement.

Lodgepole pine LOS is above HRV in the watershed and is common in the project area. Overstory treatments in lodgepole pine stands are allowed under the Screens because the LOS stages in that biophysical environment are currently above HRV. Unlike other tree species, lodgepole pine trees are considered "large" at just 12" dbh. Treatments will still maintain the lodgepole pine LOS stages above HRV (EA p. 54, 60).

Comment: *Furthermore, logging will remove LOS components. Old growth is defined by ICBEMP as:*

1. Large trees for species and site.

2. Wide variation in tree sizes and spacing.

3. Accumulations of large-size dead standing and fallen trees that are high relative to earlier stages.

4. Decadence in the form of broken or deformed tops or bole and root decay.

5. Multiple canopy layers.

6. Canopy gaps and understory patchiness.

Considering this definition it is clear that LOS "components" such as overstory trees, abundant snags must be retained and recruited, and many small and medium sized trees are needed grow into large trees. Even removal of large lodgepole is not allowed because the definition includes "large trees for species." Lodgepole don't get very large so fully grown lodgepole need to be conserved even if they are decadent. Management actions that remove snags or reduce recruitment of medium trees into large tree classes would likely not be consistent with the Eastside Screens. (D. Heiken)

Consideration: The Eastside Screens requires the HRV analysis to identify "*where large trees are common"* (this is not the same as the old growth definition from ICBEMP). The Forest Service has determined that "where large trees are common" is different for different forest types and site productivity. For the Junction analysis, large trees are common in structural stages 5, 6, and 7 for lodgepole pine, and structural stages 6 and 7 for ponderosa pine (EA pp. 53-55). The EA displays stands where large trees are common in the project area (EA p. 55 Figure 12). Snag and green tree replacements, old character trees, and down wood are retained across the project area for both alternatives.

Comment: *Retaining only 7-12 overstory trees per acre as proposed in this project does not mimic natural processes. A fire would leave abundant standing wood structure. Thus such dramatic biomass removal and structure removal proposed across thousands of acres of this project area would remove LOS components and push these stands away from the historic range of variability (thus violating the Eastside Screens). Even if overstory trees are dead or in decline, they represent important components of the LOS habitat. (D. Heiken)*

Consideration: The EA does not claim that regeneration harvest is mimicking natural processes. Seed tree harvest is an initial regeneration harvest of lodgepole pine stands. A range of 7 to 12 overstory trees are retained in order to provide a seed source for the next stand of trees. Eastside Screens provide direction on Green Tree Retention (GTRs) in regeneration harvest and the Junction project is consistent with that direction. As shown previously, the project does move the area towards HRV in some structural stages, and maintains others within HRV.

Comment: *Another concern with regen logging of lodgepole stands (followed by activity fuel treatments) is that it will result in dense conifer regeneration which is a very hazardous fuel condition (continuous, dense fuels close to the ground) in the near future and continuing for 3-4 decades. Allowing natural processes to proliferate will result in a more heterogeneous and less hazardous fuel profile. (D. Heiken)*

Consideration: Lodgepole pine is a prolific seed producer with viable seed crops produced every few years. Current conditions observed in this planning area are that "stands treated more recently are adequately stocked and appear to be more open in the understory with a sometimes patchy distribution of trees." EA p. 52. Precommercial thinning is used to reduce stocking in understories. Current fire hazard is extreme across much of the area. The effect to fire hazard from the project are focused around the ponderosa pine stands, and along the major travel corridors. In these areas, fuel reduction reduces fire hazard to a "low" rating.

Comment: *The Eastside Screens also state "To reduce fragmentation of LOS stands, or at least not increase it from current levels, stands that do not currently meet LOS that are located within, or surrounded by, blocks of LOS stands should not be considered for even-aged regeneration, or group selection at this time." Any action that would build roads or establish young even-aged stands would* *not meet the Eastside Screens. Heavy thinning for fuel reduction should also be evaluated under this connectivity standard. (D. Heiken)*

Consideration: The EA addresses connectivity (pp. 116-120). Connectivity corridors have been established and provide movement for wildlife through the project area and to the adjacent Late Successional Reserve. Additionally, large blocks of lodgepole pine habitat are retained under both alternatives. The Eastside Screens provide standards and guidelines for even-aged stand management and regeneration harvests, so use of those silvicultural techniques is allowed under the Eastside Screens.

Comment: *Provide data and text demonstrating that soil, slope, or other watershed conditions will not be irreversibly damaged by seedtree and shelterwood silvicultural prescriptions. Provide data and text demonstrating that seedtree and shelterwood silvicultural prescriptions are appropriate to meet the objectives and requirements of the relevant land management plan. (D. Artley)*

Consideration: The EA describes environmental effects of timber harvest activities, including seed tree and shelterwood prescriptions. The Forest Plan states that "uneven-aged management is not appropriate in the lodgepole pine community types. Lodgepole pine should be managed using even-aged systems, and where possible, should be regenerated using seed trees and natural regeneration." (LRMP TM-21).

Comment: *1) Mountain pine beetle activity in Lodgepole Pine is a natural disturbance event that benefits certain species of wildlife. 2) Mountain pine beetle activity in Lodgepole Pine kills the trees, which starts the natural regeneration process for the tree species … opens serotinous cones. 3) Without mountain pine beetle activity and fire the Lodgepole Pine trees would be gone and the species would become rare. (D. Artley)*

Consideration: Mountain pine beetle activity will not be eliminated from the lodgepole pine forest. The lodgepole pine forests of central Oregon have a low occurrence of serotinous cones and do not require fire or mountain pine beetle activity to release viable seed. Experience with previous projects within the Junction area have shown that natural regeneration using a seed tree technique in lodgepole pine is very effective.

Best Science

Comment: *The EA does not use best science in relation to fire regimes, fuels reduction practices, and stand condition modeling, and in some cases does not disclose scientific controversy on these issues. (P. Hood)*

- *Restoration can have unintended and damaging consequences including negative cumulative effects. Junction's "restoration" prescriptions include heavy thinning, thinning to below desired stocking levels, and activities that threaten other resources such as soil and wildlife habitat.*
- *The EA needs to take into account ICBEMP and other science showing that these projects are sometimes ineffective and have harmful consequences.*
- *Attempting to restore historic fire regime or structure can be difficult if the historic fire cycle of the forest is complex or unclear (Reeves et al. 2006). Fire regime condition class is an inappropriate indicator of fire hazard.*
- *Studies have shown that trees in east side forests are filled with clumps, gaps, and patches, and areas of natural density – conditions that will not be created by silvicultural prescriptions in the majority of the Junction project (Rose 2001).*

Consideration: The EA does not characterize the purpose and need or proposed action as "restoration." The EA analyzes and discloses all potential impacts from the actions and uses the best available science doing so. Fire regimes and scientific sources are described in the EA pp. 65-69. Most of the project area is lodgepole pine with a fire regime that we are not intending to restore. Fire hazard reduction is a purpose of the project, however.

General Recommendations

Comment: *Previously un-logged areas and mixed conifer stands should not be logged. (P. Hood)*

Consideration: Alternative 2 does not enter 1,581 acres of previously unlogged areas. Alternative 3 does not enter 2,297 acres of previously unlogged areas. There are very few stands in the mixed conifer plant associations within the project area, but nearly all have been entered in the past (Figure 11, p. 451-52).

Comment: *Sensitive areas (OGMA, Pistol Butte, Sitkum Butte, SIAs, Eagle MA, intensive recreation, scenic viewsheds, and Wild and Scenic Rivers) should not be logged. Particularly areas with overlapping issues such as steep slopes and sensitive soils. (P. Hood)*

Consideration: Impacts to all of those areas are disclosed in the EA. Some areas such as OGMAs and SIA are not included in Alternative 3 because treatment within them was a key issue. Resource protection measures and best management practices are required for areas of steeper slopes or other categories of sensitive soils (EA pp. 35-38, 116-120, 209-225).

Comment: *One of the key considerations is to find the optimal mix of treated and untreated patches within and between stands. This is because thinning benefits some aspects of late successional forest conditions such as large trees and vegetation diversity, but thinning also has adverse effects on other aspects of late successional forests such as dead wood recruitment, biomass accumulation, wildlife cover, soil quality, and microclimate conditions.*

It is useful to apply the concept of "habitat complementation" based on proximity of different life stages and life needs. Recognize that the thoughtful juxtaposition of thinned and unthinned areas can provide habitat benefits greater than large homogeneous areas of either thinned or unthinned. There is a synergy to creation of a mosaic of thinned and unthinned sands that is greater than the sum of its parts. With this recognition, an important purpose of the NEPA document and the ultimate decision is to seek and find the most optimal mix of treated and untreated areas. Instead of an 80/20 mix of treated/untreated areas, consider a variety of combinations such as 60/40, 50/50, 40/60, and 20/80. Note that both the absolute proportion and the spatial pattern of treated and untreated must be considered. (D. Heiken)

Consideration: The Forest conducted an HRV analysis which provides landscape level information on where structural stages of each biophysical environmental are over- or under-represented. The alternatives for Junction each treat approximately 50% of the project area. The arrangement of treatments is based on current conditions and the locations of travel corridors. Determining which areas not to treat was based on recent treatments, retention of corridors, providing areas of higher density in large blocks, and avoiding sensitive areas.

Comment: *Determining the appropriate scale of thinned and unthinned areas is a critical decision which requires clear objectives and quantitative analysis. One necessary component of such an analysis is to determine how many green trees are needed at what density in order to recruit sufficient snags over time (both short and long-term) to achieve 50-80% DecAID tolerance levels across the project area.*

Big game cover and forage requirements, and dead wood habitat recruitment represent good tools to help optimize the mix of treated and untreated stands and the scale and extent of untreated skips and heavily-thinned "gaps" within treated stands.

Consideration: Wildlife habitat needs are incorporated into the design of the alternatives. Green tree retention guidelines are provided by the Eastside Screens and the Deschutes Wildlife Log and Tree Implementation Guide. A DecAID analysis was completed to display the current conditions by tolerance levels (EA pp. 101-102). The tolerance level varies depending on species and forest type because not all species depend on the same type of habitat. High tolerance levels cannot be provided for all species everywhere. Big game cover and forage ratio are provided in the EA (pp.189-190, 192-193). The watershed currently is at 59% hiding cover for mule deer. Large areas that are left untreated help retain a sufficient amount of the cover in the project area. The alternatives leave 49 to 50% untreated which will remain above Forest Plan standard of 30% hiding cover (EA p. 194).

Invasive Plants

Comment: *Not only does the high risk of noxious weeds associated with this project run counter to the stated objectives, it also warrants an EIS instead of an EA. (P. Hood)*

Thinning can increase the abundance and diversity of non-natives (Keeley 2006, Nelson et al. 2008). (P. Hood)

Consideration: The EA discloses that there are nine known invasive plant sites in the project area. And there is potential for introducing or spreading invasive plants from project activities. A number of weed prevention practices are incorporated into the project design (EA pp. 41, 243).

Comment: *Herbicides containing glyphosate must never (emphasis added) be used on public land for any reason. (D. Artley)*

Consideration: The Junction project does not authorize the use of herbicides. The weed treatments are authorized in the 2005 Invasive Plan ROD; the resource protection measures in the Junction EA require that weed treatments occur prior to project activities to reduce or eliminate the risk of spreading weeds.

Wildlife: MIS / Woodpeckers

Comment: *Chapter 3 contains a section describing the effects to wildlife from implementing the Junction timber sale, yet there is no wildlife listed as an IDT member. (D. Artley)*

Consideration: The inadvertent omission has been corrected in the final EA.

Comment: *Black-backed, three-toed, and Lewis' woodpeckers in particular will be negatively affected by this project. (P. Hood)*

Consideration: The EA addressed the effects for these species. Lewis' woodpecker is a Region 6 Sensitive species that would benefit from treatments in the ponderosa pine (EA pp. 109-113). Black-backed and three-toed woodpeckers are MIS species which are also addressed in the EA. Both alternatives are consistent with MIS direction in the Forest Plan by leaving snags, GTRs, and untreated areas (EA pp. 153-165).

Comment: *It is unclear if the viability of all MIS species within the project area has been monitored or protected as required by NFMA. While the EA mentions that a couple of the MIS species have been surveyed for (e.g. goshawk), it is not clear that other species have been surveyed for or adequately monitored for effects from management. (P. Hood)*

Consideration: Surveys are specifically conducted for northern spotted owl and northern goshawk. Other species that are encountered during surveys are noted and included in natural resource databases. Years of field experience shows that goshawk surveys often reveal other closely related accipiters such as sharp-shinned hawks and Cooper's hawks. Other species such as great gray owls and red-tailed hawk were also incidentally observed. During project planning the Forest-wide Natural Resource Information System database was reviewed for species occurrences. The Forest-wide MIS Assessments referenced in the Wildlife Report and EA also assist the Forest in managing for the viability of MIS species. Loss of viability is not a concern for any of the MIS as described in the EA.

Comment: *Habitat as a surrogate for population data is a risky and unacceptable strategy. (P. Hood)*

Consideration: Where population monitoring data are not available, the amount and quality of habitat can be used as a proxy for determining viability effects of projects on MIS (Lands Council v. McNair, 2010 537 F.3d 981, 67 ERC 1001, 08 Cal. Daily Op. Serv. 8500, 2008 Daily Journal D.A.R. 10,244 (Cite as: 537 F.3d 981)). For project level planning and environmental analysis, the use of habitat abundance and quality and the distribution of habitat have been used to estimate project effects on MIS. In order to use habitat as a proxy, the analysis includes at a minimum: 1) a clear relationship between the species and its habitat based on habitat relationship models that utilize the best available science; 2) the amount of habitat available at the Forest scale; 3) species presence in the project area; 4) the amount of habitat being impacted at the project level in terms of quality and quantity; and 5) a determination of the project impact on viability at the Forest scale.

Analysis methods are described in the EA pp. 90-92 and each species section includes a description of habitat based on best available science. Additional information on habitat modeling is included in the Wildlife Report and Species Assessments for the Deschutes National Forest. The existing condition sections describe what attributes were used in the model to capture the habitat, the amount of habitat available across the Deschutes National Forest and species presence in the project area. The effects analysis shows the amount of habitat being impacted and the conclusion provides the determination.

Comment: *The 870 acre wildlife block (< 5% of the project area) set aside to not be logged is not sufficiently large to provide for numerous species to mitigate habitat loss throughout project; single block will be unlikely to provide habitat needs degraded from logging the rest of the area. (P. Hood)*

Consideration: The retention area is specifically intended to provide a continuous patch of woodpecker habitat. It is large enough to provide a black-backed woodpecker home range for one to four pairs based on Goggans et al. (1989) (EA p. 163). Other untreated areas in the project and outside the project provide habitat requirements for various wildlife species. Treated stands also provide wildlife habitat. Vegetation management and fuels reduction do not make those stands devoid of wildlife; some prefer the conditions created by management.

Comment: *Recognizing the fact that past logging practices have greatly reduced the abundance of large trees and snags, the Eastside Screens also require that projects use the best available science to meet the intent of 100% potential populations of primary cavity excavators. While the potential population methodology has been discredited the Forest Service must still meet the intent by not taking any action that could reduce population of primary cavity excavators.*

The NEPA analysis must take a hard look at the habitat needs of primary cavity excavators over the long term. It is not enough to meet the needs of woodpeckers for a few years after harvest. Maintaining viable populations of primary cavity excavators will require retention of virtually all the overstory trees so that there is a long-term supply of snags and dead wood. (D. Heiken)

Consideration: The EA addresses MIS woodpecker species that have habitat in the project area. Past logging practices were acknowledged for the Junction EA project and informed the retention of large leave blocks. The best available science and recommendations were based on Goggans et al. (1999) of leaving larger blocks of habitat for three-toed and black-backed woodpeckers that would provide suitable habitat for these species' home ranges. Additionally, DecAid was used to access the logs and snags analysis as best available science and was the basis to leave all of the logs and snags intact within the lodgepole pine corridors, including retention areas, leave areas, and large blocks. Per project design, no ponderosa pine snags would be removed either.

Wildlife: Corridors

Make sure that any treatments in wildlife corridors comply with the expectations of the Eastside Screens, i.e. "medium diameter or larger trees are common, and canopy closures are within the top one-third of site potential. Stand widths should be at least 400 ft. wide at their narrowest point.... some amount of understory (if any occurs) is left in patches or scattered to assist in supporting stand density and cover." (D. Heiken)

Consideration: Wildlife connectivity corridors were identified for the Junction project area where they provide connection between LOS stands and LRMP designated OGMAs (EA p. 116-117). Five connectivity corridors connect to the single OGMA in the project area. Corridors are maintained under either action alternative (EA p, 118-120).

Wildlife: Elk and Deer

Comment: *The effects of logging on cover quality were not adequately addressed. Big game cover is defined as a certain average percentage of canopy cover but the quality of big game cover may not be met when a large percentage of the landscape is at or near the minimum canopy cover percentage. (P. Hood)*

Consideration: The EA concludes that the action alternatives would reduce deer hiding cover from 59% of the watershed to 49-50% of the watershed. This is consistent with the Forest Plan's goal of providing 30% hiding cover. Thermal cover for deer in this area is not an issue because it is within summer range rather than winter range (EA p. 192).

Comment: *Effects of existing road density should be considered for elk and deer and other wildlife sensitive to disturbance from roads (reference to Gaines et al. 2003). (P. Hood)*

Consideration: The EA discusses impacts of roads to big game. Effects are primarily from disturbance. The project area is at 2.16 miles per square mile of open roads and the watershed is at 3.1 miles of open road per square mile.

Each action alternative includes road closures and decommissioning, although the project area already has a high proportion of the roads in the maintenance level 1 category (closed) (Figure 4, p. 25)

Comment: *Junction violates elk cover requirements. It's unclear if claim that cumulative impacts from timber sales to cover cease to exist in 10 years or less accounts for east side growth rates in areas with detrimental soil conditions. (P. Hood).*

Consideration: The analysis found the effects of the alternatives to be consistent with Forest Plan requirements (EA P. 191). Treatment of < 1 acre of thermal cover (of which there are 38 acres in the Key Elk Habitat Area which is a conservative estimate from the model) will have the effect of reducing potential for collisions along Highway 42 by increasing visibility. The Forest Plan directs such consideration when managing vegetation along highways.

Comment: *Model shows 38 acres thermal cover. The FS does not take impacts to elk seriously, even though decreases in cover and quality of cover will occur in the Fall River KEA, throughout project area, and from cumulative impacts in watershed. (references UDR Basin Assessment and West Bend EIS to* *show importance of the Fall River KEA). (P. Hood)*

Consideration: Impacts to elk and their habitat are described in the EA pp. 190-191. The EA states that the project area "slightly overlaps the 11,501-acre Fall River KEA." The location of the KEA has been added to Figure 3 (LRMP Management Direction) to display the context of the KEA in the project area. The EA explains that the area within Junction is adjacent to road 42, where elk use is for transitioning across the highway. Impacts from the West Bend project do not occur within the Fall River KEA and are therefore not considered in the cumulative effects analysis.

Wildlife: Oregon Spotted Frog

Comment: *Spotted frog may occur in the Fall River RHCA. The FS failed to analyze possible impacts to the frog. USFWS includes Fall River watershed as historic and extant habitat (USFWS 2014) and defines habitat to include riverine wetlands of up to 5,000 feet. The Fall River RHCA in the project area is about 4,000 feet. Logging will negatively affect potential habitat and it should be analyzed. (P. Hood)*

Consideration: Fall River is not considered suitable habitat for Oregon spotted frog (EA pp. 92-93). The BE states that there are no records of spotted frogs occurring in Fall River. Fall River would not likely provide suitable habitat because the river is too cold and does not warm substantially from February to May. Field reconnaissance also did not reveal any frogs in the 2-acre meadow. Additionally, project design prevents direct effects to the riparian areas and stream.

Wildlife: Roads and road density

Comment: *Only 1% of black-backed woodpecker habitat on Deschutes is listed as undisturbed. Why then did the FS select white-headed woodpeckers to manage for, even though the lodgepole pine habitat in the project area is more suited to black-backed woodpeckers? (P. Hood)*

Consideration: The Forest manages for all species across the larger landscape. White headed woodpeckers are an R6 Sensitive species. The kind of habitat they rely on is limited on the landscape, but thinning and returning fire to the area can help to promote and enhance it. These treatments are focused in the ponderosa pine forests in the project area (which account for only 27% of the project area).

Comment: *The EA in other sections states that 2.4 miles of new temp road would be built; however, the actual new temp road mileage is 18.6 miles. (P. Hood)*

Consideration: The EA distinguishes between total temporary roads (18.6 miles) and new ground disturbance (3.4 miles).

Comment: *The EA claims that road densities would be reduced; however creating 18.6 miles of temp roads and then closing 3.19 miles of roads does not equal a true road density reduction. In reality temporary roads cannot be instantly returned to pre-project conditions. Provide clear timelines and funding sources for remediation. (P. Hood)*

Consideration: All temporary roads would be restored; 3.19 miles of system road would be closed. System road closures reduce open road density. Restoration of temporary roads would occur following project activities but it is not expected that vegetation would return instantly.

Comment: *Large data gaps exist in relation to roads on the DNF and they affect aquatic and other resources. The EA should include forest-wide road density in cumulative effects analysis. (References excerpts from Upper Deschutes River Subbasin Assessment (2003)). (P. Hood)*

Consideration: Road density analysis is conducted on a landscape scale, which is typically the watershed, and Forest Plan goals and objectives are also on a landscape scale. The Forest has data on roads for all watersheds.

Comment: *It is important to integrate the analysis of road access and the optimal mix of treated and untreated areas. Since road construction has serious adverse impacts on soil, water, weeds, and wildlife, and because some areas will contribute to ecological goals while not being thinned, the agency should just allocate inaccessible areas to the untreated portion of the mix. This will lead to complementary benefits - avoided road impacts, and ecological benefits associated with dense forest and long-term dead wood recruitment. (D. Heiken)*

Consideration: Stands to be treated are based on existing condition and wildlife habitat needs. Access to stands in the Junction area is primarily available with the existing road system. Temporary roads would be restored following project activities and maintenance level 1 roads would be re-closed.

Comment: *Logging Road Construction causes Significant Ecological Harm. Please Analyze an Alternative in Detail that Builds No New Roads. (D. Artley)*

Consideration: The No Action alternative does not involve any logging or road building. The two action alternatives do not include any new system roads.

Aquatic and Riparian Resources

Comment: *Although the project only overlaps with 0.2 miles of Fall River and 0.15 miles of hatchery canal, the project and associated road activities may have unintended and far-reaching negative effects on the riparian area, water quality and aquatic resources. It is unrealistic and contrary to best available science to conclude that logging 17,556 acres would not have a significant impact on water quality in downstream reaches, especially considering other large project in the watershed.*

Unit 62 overlaps the RHCA for Fall River. The EA failed to consider the likely and documented impacts to nearby aquatic and riparian resources or acknowledge negative impacts could occur. A high percentage of watershed has been subject to logging, historically and recently. The FS needs to analyze potential impacts in an EIS. (P. Hood)

Consideration: The project proposes up to 10,619 acres of commercial harvest. Activities are guided by direction in the Deschutes LRMP, INFISH, the Upper Deschutes Wild and Scenic River Plan, and current Best Management Practices. Resource protection measures include a no-machinery buffer of 100 feet from Fall River and 50 feet from the hatchery canal; thinning is limited to trees less than 60 feet tall 30 feet or more from the river and canal (unless < 4" dbh), and greater than 50 feet from Fall River and the canal for trees over 60 feet tall to preserve shade (EA p. 38-39).

The analysis concludes that there would be no measurable changes in the flow regime of Fall River because of it is a ground-water fed system, there is little recharge to the groundwater from within the project area, there is a lack of runoff in the area, past management has not increased the stream drainage network, nor resulted in changes to the flow regime, and changes in evapotranspiration would have limited hydrologic effect (EA p. 232-234). There would also be no changes to the flow regime of the Deschutes River, downstream. The lack of effects means there would be no cumulative effects. The Equivalent Clearcut Acres calculation for the Fall River-Deschutes River 10th field watershed totaled 5.4% hydrologic disturbance, and would not result in measureable changes in the flow regime of Fall River (EA p. 237-238).

Water temperature will not be affected because of height-based thinning requirement in Unit 62 and the small area treated within the RHCA (about 12 acres). There would be no measurable effect to riparian vegetation, turbidity, or sedimentation (EA p. 234) to Fall River; therefore, there would be no downstream effects.

Comment: *Fall River is a class 1 fish bearing stream. We are concerned that the PDCs and BMPs do not go far enough in protecting the aquatic and riparian resources, especially given that the Deschutes has not adequately monitored or validated BMP effectiveness in protecting water quality standards. (references USFWS 2010 Final Rule on bull trout essential habitat). (P. Hood)*

Consideration: There are no bull trout populations in Fall River. Concerning BMP monitoring, the Deschutes National Forest has been actively monitoring BMPs listed in the 2012 National Best Management Practices for Water Quality Management. In July 2013, commercial logging (ground-based skidding and harvesting) along the Upper Deschutes River was monitored for potential impacts to riparian areas and water quality. The heavy equipment restriction was 60 feet from riparian vegetation along the streambank. Monitoring was performed for both implementation and effectiveness. The assessment concluded that the buffer was effective in preventing effects to wetlands, banks, erosion, and sedimentation.

Comment: *No skid trails should be allowed within the RHCA. Since Unit 62 is proposed for overstory removal, tree density adjacent to the river may be high and thinning may be heavy, plus fuel reduction, brushing, and pile burning. Many scientific studies show these activities within a riparian area can cause excess fine sediment loading into streams, possible temperature increases, and other water quality problems. (P. Hood)*

Consideration: Research has shown stream buffers as little as 25 feet have been effective in limiting sedimentation after timber harvest (Lakel et al. 2010; Rashin et al. 2006). With the Junction project, a machinery set back of 100 feet is required on Fall River and no equipment would operate in riparian vegetation (pp. 38-39). Only 12 acres of RHCA are included in the unit. This will adequately prevent sedimentation. Shade is maintained because thinning trees over 60 feet tall is only allowed 50 feet or greater from Fall River (p. 234). There are no threatened or endangered aquatic species in the project area, including bull trout (EA p. 235).

Lakel III, W.A., W.M. Aust, M.C. Bolding, C.A. Dollof, P. Keyser, and R. Feldt. 2010. Sediment Trapping by Streamside Management Zones of Various Widths after Forest Harvest and Site Preparation. Forest Science 56(6), PP. 541-551.

Rashin, E.B., C. Clishe, A.T. Loch, and J.M. Bell, 2006. Effectiveness of Timber Harvest Practice for Controlling Sediment Related Water Quality Impacts. Journal of the American Water Resources Association (JAWRA) 42(5):1307-1327.

Comment: *Potential negative impacts to stream temperature variability due to the junction project need to be analyzed; both in relation to the logging in the RHCA and also in relation to heavy logging and high road density throughout the project area and the subwatersheds. BMPs should be reevaluated and modified to ensure that stream temperature variability is not altered beyond thresholds for bull trout or other at-risk aquatic species (references Steele and Beckman 2014). (P. Hood)*

Consideration: There will be no negative impacts to stream temperature variability due to the height-based thinning requirement and the small area treated within the RHCA (EA p. 234). The primary shading zone would be protected and the secondary shading zone would be affected minimally (EA p. 234). The 0.2 miles of Fall River (north bank only) is the only stream channel located in the entire project area, and represents less than 1% of the total stream banks on the 11 mile Fall River. There are no bull trout populations within Fall River.

Comment: *Combined with chronic issues for past cumulative effects and high road densities in the watershed and project area, an EIS should be prepared to adequately analyze potential effects on water quality. Road densities should be disclosed for Spring River and the Deschutes-Braid Deschutes River subwatersheds, as well as Upper Deschutes watershed. (P. Hood)*

Consideration: The road density is assessed for the larger Fall River Watershed (10th field) which includes Spring River, Fall River, and Deschutes-Braid-Deschutes River subwatersheds (12th field). This has been clarified in the EA. Road density is not contributing to an increase in the stream network in this highly permeable landscape (EA p. 232). There are no road crossings of Fall River within the project area. An analysis of potential effects to water quality was conducted using best available science.

Comment: *New road construction near units 75 and 76 may be hydrologically connected to Fall River (references Deschutes Subbasin plan 2004). (P. Hood)*

Frissel et al. (2014) suggest that road construction should be prohibited unless other more damaging segments are decommissioned. Temp roads and landings should be considered in road density calculations; and bull trout populations suffered in watersheds where road densities exceed 0.6 miles per square mile, recommending 0.5 miles per square mile.

Consideration: There would be no impact to Fall River from activities in the area of units 75 and 76. It is not a bull trout stream. Fall River is groundwater driven, with nearly the entire flow fed by springs at the headwaters. Despite decades of active road building and vegetation management, Fall River has been very stable with variability related to drought or high precipitation (EA p. 232). Temporary roads and landings are not allowed within the RHCA of Fall River. Units 75 and 76 are located 0.42 and 0.6 miles from Fall River, respectively, separated by highly permeable soils, gentle slopes, and Deschutes County Road 42 (Figure 20, p. 228).

Comment: *Fall River is designated as bull trout spawning and rearing habitat (ODEQ 303(d) map), but the EA does not mention bull trout, or analyze the potential impacts of the project on bull trout. Is consultation planned with NOAA and/or ODFW to determine possible impacts to bull trout and other fish species? (P. Hood)*

Consideration: There are no bull trout populations in Fall River. The nearest population is located in the Deschutes River below Big Falls at river mile 132, which is over 72 miles downstream of the mouth of Fall River. Big Falls is considered an upstream barrier, and is also the upstream extent of bull trout critical habitat set by the USFWS (EA p. 230).

Fall River is included on the Oregon Department of Environmental Quality water quality impaired 303(d) list for year round temperature (2010 Integrated Report). The criteria is bull trout spawning and juvenile rearing. Bull trout area suspected to have historically populated Fall River but spawning was never documented (Buchanan, et al 1997, USFWS 2002 at EA pp. 229-230). The 2002 USFWS Draft Bull Trout Recover Plan states a feasibility analysis is needed to assess the potential for reestablishment of bull trout into the upper Deschutes core habitat. This has not been undertaken to date.

The height based thinning setbacks and the small area treated along Fall River and the hatchery canal would prevent measurable increases in Fall River water temperatures from occurring (EA p. 234)

Comment: *Fall River is not meeting temperature standards; upslope logging can impact temperature through groundwater and overland flow inputs that have higher than normal temperatures. (P. Hood)*

Consideration: See above for temperature standard discussion. Commercial harvest activities would not increase the stream network that could increase overland flow to Fall River. Fall River is a groundwater-driven system with much of the discharge considered to be sourced from the Cascade Range recharge area (EA p. 229), which is outside of the project area. In the Upper Deschutes basin, little recharge to groundwater is thought to come from east of the Cascade Range, which includes the Fall River watershed.

Comment: *The EA does not adequately analyze impacts to fine sediment loading in Fall River; nor does* *it examine the potential of ground water delivery having increased temperature to increases of solar radiation on much more open ground across thousands of acres in the project area, or other research that have shown these issues to be problems in Fall River and in the Deschutes. (see Upper Deschutes Subbasin Assessment 2003). (P. Hood)*

Consideration: The 100-foot heavy equipment setback along Fall River, and the relatively small area treated along Fall River (about 1000 lineal feet) would prevent measurable changes in sedimentation and turbidity from occurring (EA p. 234). The commenter does not cite research showing that increasing open ground (through harvest) increases the temperature of groundwater (the Upper Deschutes Subbasin Assessment does not discuss that or show it to be a problem for Fall or Deschutes River).

EA page 37 describes resource protection measures for the RHCA in unit 62. The measures are expressed in terms of what is allowed but no limitations are expressed. The language needs to say "all activities prohibited except the following …" or something to that effect. (D. Heiken)

Consideration: It is assumed that the only activities that will be authorized are those listed in Appendix B for Unit 62. The resource protection measures clearly describe how implementation should be designed. Additional clarifying text has been added to the section as well.

Soils

Comment: *This project will not retain enough down woody debris or healthy soil condition to maintain site productivity. Loss of down wood and soil damage caused by heavy equipment, new temp roads and reopening roads, and machine piling, will not promote forest health or old growth structure because an important aspect of old growth structure is comprised of down wood on the forest floor. (P. Hood)*

Consideration: The soils analysis addresses potential impacts to site productivity from proposed activities. The project area is not lacking coarse woody debris (EA p. 213) but it is disclosed that some areas have incurred detrimental soil conditions. Soils are currently functioning to support and maintain long-term site productivity (EA p. 214). Treatments can increase detrimental soil conditions but some treatments may increase productivity. BMPs and project design can contain or minimize the extent of detrimental soil conditions, which are higher under Alternative 2 than Alternative 3. The analysis concludes that the majority of the area would continue functioning to support and maintain long-term site productivity (EA p. 225).

Comment: *The cumulative effects of harvesting on ash soils should be studies in depth. The EA needs to consider the very slow or absent recovery of these soils (Geist et al, Ferrari et al. 2013, Picarelli et al. 2008, Bulmer and Curran 2011).*

We are concerned that mitigation measures measured used to justify violations of detrimental soil impacts may be ineffective or may not take place due to lack of funding. Please include timelines and funding sources.

Consideration: The types of soils present in the project area are described in the EA pp. 210-211. Cumulative effects to soils are considered in the EA. The analysis methods and assumptions are disclosed on pp. 214-216, and cumulative effects are discussed on pp. 223-224. Where soil restoration is included as mitigation, it received first priority for funding. Subsoiling typically occurs after harvest and post-harvest activities. Where it's a required mitigation it is highest priority for K-V funding; otherwise, appropriated funds are used to complete the work.

Comment: *Logging and road building should not take place on sensitive soils, especially not on steep slopes such as Sitkum and Pistol Buttes, in frost pockets, or other particularly sensitive areas.*

Consideration: More sensitive areas such as frost pockets, slopes, or where there is existing detrimental disturbance are addressed with additional resource protection measures and options, such as restricting operations to winter only (EA pp. 35-38). Effects to sensitive soil types are disclosed on pp. 218-219.

Livestock grazing within and/or adjacent to the project area

Comment: *Cumulative effect of grazing in the watershed should be analyzed at appropriate scales in conjunction with the project. It's unclear if grazing is present. (P. Hood)*

Consideration: There are no grazing allotments present in the Junction project area.

Wild and Scenic River Corridor

Comment: *The EA fails to meet goals, objectives, and requirements associated with W&S River corridors or with Scenic Viewsheds. Logging is not appropriate and is not a natural representation of the ecology of the area. (P. Hood)*

Consideration: Wild and Scenic corridor overlap is limited to 29 acres of non-riparian forest. Activities within the Wild and Scenic River corridors are consistent with direction in the Forest Plan and the Upper Deschutes Wild and Scenic River Comprehensive Management Plan (EA p. 237). Logging is not prohibited in these corridors.

Comment: *W&S corridors have disproportionally high species diversity and their protection serves to protect important wildlife. They also serve as connectivity corridors. Riparian logging is scientifically controversial and doesn't always have desired effects. 130 acres of logging in these areas is inappropriate, will not protect or restore the areas and should be dropped. (P. Hood)*

Consideration: Approximately 12 acres of the RHCA of Fall River are included in vegetation management activities. No activities occur within riparian vegetation.

Up to 29 acres out of 6,997 acres (0.4%) with Segment 3 would be commercially thinned within the Upper Deschutes W&S corridor. For Fall River, which has not been included in the Wild and Scenic Rivers systems but is considered eligible, up to 101 acres would be commercially thinned or receive overstory removal (6.2% of 1,630 acres). This use is not inappropriate according to the LRMP and Upper Deschutes Comprehensive Management Plan. Wildlife connectivity corridors are maintained across the project area.

Scenic Views

Comment: *The FS should not be amending the Forest Plan in order to go contrary to the intent and direction of Scenic viewsheds management areas. We object to the two amendments and are concerned about negative effects to scenic views in the project area. What are cumulative impacts to Forest Plan objectives from repeated amendments on the DNF? (P. Hood)*

Consideration: Negative effects to the environment are not expected, but in the short term, there will be evidence of the use of prescribed fire, which would not look different from a natural fire under the type of fuel conditions that would have occurred in the area historically. Prescribed fire within the foreground is limited to about 60 acres. The amendment to the standard and guide requiring cleanup within one year is being amended to allow more time because the lodgepole pine along these travelways is very dense and extends along most of the road length. The thinning and hazardous fuels reduction that will occur there is expected to generate enough slash that would likely not be possible to complete all of the piling and burning within one year. This area is identified as WUI in the Community Wildfire Protection Plan. The fact that these travel corridors have been designated as WUI by the local Community Wildfire Protection

Plan makes them unique. Due to their use as ingress/egress and proximity to communities and recreation areas, these roadways are being treated with the Junction Project to reduce hazardous fuels within the WUI. Prescribed underburning is limited to about 60 acres.

The amendments do not contradict the goals and objectives of the Scenic Views management allocation. The intent of Scenic Views MA is to provide Forest visitors with high quality scenery that represents the natural character of central Oregon. In the scenic corridors of the Junction project where the amendments are applied (about 60 acres), the forest type is ponderosa pine (most of the scenic corridors in the project area are lodgepole pine and will not be underburned). Reintroduction of fire in the ponderosa pine areas will create a more natural landscape because these forests are fire-dependent and thinning will promote large tree development. Increasing long-term resilience will also reduce the risk that scenic view corridors are affected by mortality from insects, disease, or wildfire.

Comment: *I'm not a landscape architect and I am positive "treatment activities" (a.k.a. logging) never, ever improve visual quality. I also know the recreating public will not stand for the scenery to be trashed by logging for 1 second. Inferring that a trashing the scenery for 5 years is insane! Abide by your current forest plan and delete Amendment #1. (D. Artley)*

Consideration: Short-term visual impacts include evidence of vegetation management such as newly created stumps and blackened vegetation from burning. It is expected that long-term visual quality will be enhanced because stands will be healthy and more resilient to impacts.

Range of Alternatives

Comment: *The range of area treated is 60% to 54%. That is not much range. If you were to include another action alternative that treated 75-80% of the area, we would likely see a significantly different outcome on social and economics.*

Examples of how action alternatives may vary to address social and economics may include treating more of the lodgepole plant association group (PAG) or allowing the harvest of trees over 21" dbh where appropriate. Unfortunately, the opportunity to explore these options and show the tradeoffs and benefits to the local economies of different treatments is lost by not making one of the Purpose and Needs a Key Issue.

Consideration: When fuels treatments are factored in, the footprint of Alternative 2 is about 74% of the area and Alternative 3 is 69% of the area. In developing the proposed action, the interdisciplinary team did not see a need for harvesting trees over 21" dbh. Desired stocking levels could be reached by thinning up to 21" dbh in ponderosa pine, and trees > 21" dbh in lodgepole pine are rare. The alternative to the proposed action was developed to address the key issues raised during scoping. Treating more of the area was not considered a key issue.

Comment: *The EA included an inadequate range of alternatives. The EA should have included at least one alternative that proposed only commercial thinning with variable density. Overstory removal and seed tree harvest (clearcutting) does not reflect improved forest practices or new science, and is very ecologically damaging. Alternatives that include less extreme options than simply no action or thousands of acres of seed tree harvest and overstory removal need to be considered. (P. Hood)*

Consideration: The Deschutes LRMP states that lodgepole pine should be managed using even-aged systems, and where possible, should be regenerated using seed trees and natural regeneration (TM-21); whereas commercial and precommercial thinning is conducted in ponderosa pine stands. Under all prescriptions, best management practices and project design are used to protect soils and other resources.

Comment: *An EIS is the appropriate means of analysis for this project. A FONSI for this project is* *arbitrary and capricious and lacks professional integrity. Clearcutting is publically controversial. (P. Hood)*

Consideration: The analysis of effects has not revealed any effects that would be considered significant. Even-aged management in the lodgepole pine forest type is consistent with the Deschutes LRMP and although some commenters may not approve, there is not a scientific controversy over the effects.

Comment: *The EA should have disclosed impacts and analyzed conditions at the Spring River, Deschutes Brain-Deschutes River, and Fall River subwatershed (6th field, ~39,000 acres) as well as at the larger Upper Deschutes River Watersheds.*

If the FS is analyzing cumulative effects at a non-standardized scale, then significant negative impacts are likely to be overlooked. The FS is selecting scale of analysis in order to fall within LRMP standards, without looking at appropriate fine and large scale units of analyses.

Consideration: Most cumulative effects are assessed at the 10th field watershed scale, which includes Spring River, Deschutes Braid-Deschutes River, and Fall River subwatersheds. Utilizing the watershed scale is not uncommon. Not all LRMP standards are applicable at the landscape scale; many are assessed at the project or unit scale (e.g. GTRs). The comment does not indicate which effects may not be adequately analyzed at the scales provided in the EA.

Economics and Employment

Comment: *Please further explain how the mostly smaller diameter lodgepole pine described for harvest in this project will produce 19.5 million board feet. (P. Hood)*

Consideration: The volume estimate assumes about 2,500 board feet per acre for lodgepole pine seed tree harvest units, and 500 board feet per acre for lodgepole pine overstory removal. Commercial thinning in ponderosa pine units assumes about 3,000 board feet per acre for Alternative 2 and 3,300 per acre for Alternative 3.

Comment: *Interfor strongly believes that social and economics should be a Key Issue. There is a clear link between the Key Issues in the EA and Purpose and Need for the project except for social and economics; it is relegated to simply one of the measures of effects. (C. Burley)*

Consideration: The economic measures (volume produced and jobs maintained or created) provide a comparison of how each alternative would meet that element of the purpose and need for action. The EA states that the responsible official will consider how well the alternatives meet the purpose and need, and respond to issues when making a decision. The decision will also factor in the environmental effects and the public comments received (EA p. 13).

Comment: *The EA states "In stands where overstory lodgepole pine trees are not commercially viable, the overstory trees would be girdled to create snags." There is no explanation of what "not commercially viable" means in this case. Does it mean trees over 21" dbh? If so, we are adamantly opposed to this. If you can girdle a tree that aside from an arbitrary diameter limit is commercially viable, then you should be amending the plan and utilizing those trees. This has a direct impact on the social and economics of the project. (C. Burley)*

Consideration: A lodgepole pine overstory removal was assumed to support a commercial timber sale at 500 board feet per acre. Four units totaling 354 acres were identified that have less than 500 board feet per acre in the overstory (Units 43, 51, 65, 152) (Silviculture Report p. 51). The EA includes overstory removal on these units in the effects analysis; tree girdling would be an option available. This has been clarified in the EA p. 16.

Comment: *Under Existing Conditions Economic Viability, the EA states that the Oregon Employment Department did not report jobs in the wood products manufacturing sector for Deschutes County though they were reported for Jefferson and Crook Counties. This seems odd but also begs the question did the agency follow up with the Employment Department or seek other sources for the data? In addition, why was Klamath County not included? This project area is closer to and the forest products would more likely flow to the south than north to Jefferson County.*

I have attached reports from the Oregon Employment Department for the four counties. Note Bend MSA (Deschutes County) last reported in 2004. Your analysis could have used 2004 for all counties to be consistent and inclusive. (C Burley)

Consideration: The economic analysis section has been updated to incorporate employment information from Jefferson, Crook, and Klamath Counties.

Comment: *Under Existing Conditions Local Economy and Employment, there is very little discussion of what is currently in place. Interfor's mill, in northern Klamath County, which was excluded from the jobs data search, directly employs 145 hourly and about 15 salaried employees. When we include the indirect jobs, logging, truck drivers, etc., we believe our mill supports about 450 jobs in Central Oregon.*

Crook County has no saw mill remaining. Their job numbers are coming from logging and secondary or remanufacturing mills primarily. These secondary mills depend upon mills such as ours to survive. Likewise in Jefferson County those jobs are primarily associated with a secondary manufacturer to whom Interfor sells product. None of this is discussed and leads one to suspect the agency has no idea of the interrelated nature of our industry. (C. Burley)

Consideration: The EA has been updated to include some of this information.

Comment: *Under Summary of Analysis Methods, when I looked for the reference for the multiplier figure, Gebert et.al. 2002, there is no listing of this in the Literature Cited section of the EA.*

In the next paragraph it says timber values were calculated using current Product Quality Adjustment for delivered logs in western Oregon saw mills. Why not use the data from eastern Oregon saw mills? Isn't that the likely destination for products from this project? (C. Burley)

Consideration: The reference for Gebert et al. has been added to the literature cited and data for eastern Oregon is not used in the calculation.

Comment: *The EA says that job data for Deschutes County was not available. Oregon Employment Department has provided the data for Deschutes County. I respectfully request that his be incorporated along with Klamath County job data in the EA. (C. Burley)*

Consideration: That information has been included in the final EA.

Comment: *The Purpose and Need identifies a "need" to "Contribute forest products, including commercial and small tree material to local and regional economies." What precipitated the inclusion of "small tree material" in this statement? Small tree material is not defined and in general is abundant in the area on private as well as federal lands. Indeed, disposing of "small tree" material can be a significant problem as is noted throughout the Junction EA under the discussions on biomass. (I. Jerome)*

Consideration: The Bend-Fort Rock Ranger District provides timber and non-timber forest products through vegetation management projects such as Junction. Other than saw timber, products could include personal-use or commercial firewood, posts and poles, and chips.

Comment: *There is no meaningful analysis of the economic and social effects of Junction. The social and economic (S/E) analysis is an element of most Forest Service NEPA documents that has been generally overlooked or deficient in content to truly be analyzed along with the environmental elements that are discussed in detail in all NEPA decisions. In the Junction EA, for the Wildlife analysis section there are 113 pages dedicated to the wildlife species. For the Human Element analysis required by Council on Environmental Quality (CEQ)* ***Sec. 1508.14 Human environment*** *the Forest Service Manual, section 1920 Land Management Planning, you have provided a minimal analysis that takes only 3 pages. (I. Jerome).*

Consideration: Certain analyses, such as wildlife, are more extensive because they require the Forest to address numerous species. The Deschutes has dozens of management indicator species that are analyzed for effects from vegetation management. On the social side, the EA includes an analysis of how the project meets the purpose and need for providing wood products and jobs, how recreationists and travelers may be impacted, how scenery and aesthetics are impacted, and the potential for health and safety impacts. Scoping did not reveal any other social issues that would need to be analyzed in the EA.

Comment: *When reviewing the CEQ and Manual direction and information needs for this meaningful analysis between species and the human element, the Junction EA is lacking in many areas. Junction EA is lacking an adequate S/E Purpose and Need statement that would add emphasis and need for addressing the Human Element. The Junction EA does not provide such a balanced analysis or a S/E Purpose and Need. Specifics that are lacking or missing in the Lava EA are:*

- *There is no analysis or comment that provides information on where the historic forest management outputs compare to current and what the S/E affects have been. This would require collaborating and coordinating with the Counties to provide information on impacts to schools, i.e., decline in enrollment, increase in school lunch program; impacts to the County roads, change in demographics that may indicate loss of young families due to loss of jobs vs increase in the age of current vs past demographics. The County should have and should be a major contributor to the S/E Purpose and Need so that your analysis provides a meaningful comparison between the ecological and human environment.*
- *What have been the social and economic impacts on the loss of infrastructure in this region over the past 50 years? Has the loss of infrastructure affected the agency's ability to implement projects in an economic and timely manner? How is this associated with the agency's ability to restore watersheds and forests back to historic balance?*

Consideration: These elements are outside the scope of the environmental effects associated with the proposed actions described in the Junction EA and are more appropriate for Forest planning at the Forest level.

- *What are the S/E benefits or losses to recreation within the project area if objectives for reducing fuels and restoring the area to historic conditions are met or not met? If the project is not implemented, what are the recreational losses and S/E impacts?*

Consideration: The potential impacts to recreation uses, including under the No Action are addressed in the EA (pp. 233-235).

- *What are the health risks associated with doing nothing versus providing a project that restores the area? This should compare the health impacts if the area burns due to no treatment versus* *treatment. What are the S/E benefits of treating stands and returning them to historic levels that allow in-prescription underburns versus the cost and impacts of wildland fire? There are numerous studies and articles related to the S/E impacts to health associated with wildfire. Recent articles that I am providing can provide a quick glimpse of why and how the smoke impacts should be a part of your analysis; http://www.lagrandeobserver.com/News/Local-News/Wildfire-smoke-brings-unhealthy-air-to-Enterprise-and-other-communities*

http://www.rgj.com/story/tech/environment/2014/07/18/dri-study-might-link-wildfire-soot-climate-change/12865807/

Consideration: The EA addresses the likely output in particulate matter from a wildfire under No Action. Potential impacts to health from smoke is disclosed in the EA pp. 247.

- *In Chapter 1. Purpose and Need for Action, it could be beneficial to make a statement that the PN should also restore stands to historic levels that allow the planned or unplanned underburning on the landscape instead of the catastrophic events that now occur because of the reasons stated (suppression and overstocking). (I. Jerome)*

Consideration: The EA discusses the impacts of fire hazard reduction on flame length, which is a key indicator of how a wildfire could be suppressed.

Comment: *There is no shortage of raw materials for paper and wood products in the United States. Therefore, there is no reason to have commercial timber sales in the national forests. (D. Artley)*

Consideration: The Deschutes LRMP specifically allocates sections of the forest to be a focus for timber production. Commercial timber products are an expected product from National Forest System lands.

Comment: *Increases in logging on the national forests do not stabilize or enhance the economy of small communities located near national forests. Dr. Power conducted research to validate or disprove whether increased timber harvest will enhance and strengthen the economic stability of communities located near national forests in Washington state. His research shows that logging levels are inversely proportional to community stability. Your pre-decisional EA fails to tell the public why Dr. Powers' research conclusions are not applicable to the communities near the Deschutes National Forest. (D. Artley)*

1) remove the following statement from the P&N: "Contribute forest products, including commercial and small tree material to local and regional economies." OR 2) offer the sale as an SBA sale, OR 3) include the following papers (referenced above) in their entirety in an Appendix to the NEPA document: "The Economic Impact of Trails-Forest Recreation's Growing Impact" "Seeing Forests for their Green: Economic Benefits of Forest Protection, Recreation, and Restoration"," The Economic Impact of Preserving Washington's Roadless National Forests" (D. Artley)

Consideration: The referenced paper "The Economic Impact of Preserving Washington's Roadless National Forests," considers the non-commercial value of "intact natural forests" such as Inventoried Roadless Areas and promotes continued protection of such roadless forests into the future for economic benefit. The Junction project does not involve any Inventoried Roadless Area. The economic analysis in the EA describes the value of the timber industry to local counties (EA pp. 252). The Forest Service recognizes the benefit of having healthy forests in central Oregon because it plays a great role in the quality of life for residents and in attracting visitors and tourists. The forest health treatments and fuels reduction are not expected to have any negative impacts to the recreational value of the forests in the Junction project area.

Snags and Downed Wood

Comment: *The EA's HRV analysis for snag densities "was based on existing conditions for snag densities and not the reference conditions." It would be much more appropriate to base a HRV analysis on reference conditions. Present conditions are drastically altered from historic conditions and so it makes no sense to include present conditions rather than representative of more natural and historic snag densities in order to inform the model assumptions. (P. Hood)*

Consideration: As part of the MIS assessments, existing snag and log densities were based on HRV analysis (see snag and log analysis, EA pp. 127-139). The existing conditions were displayed in conjunction with what was HRV within the Fall River watershed. Some of the existing condition information was local data gathered by wildlife technicians in the project area. The LOS analysis shows that there was a lag of large snags compared to historic ranges.

Comment: *The EA failed to adequately consider the effect of canopy removal and loss of snags and of complex forest structure and dense forest structure on numerous species within the project area including MIS such as black-backed, three-toed, and Lewis' woodpeckers, and deer and elk (hiding and thermal cover). (P. Hood)*

Consideration: Effects to these species was assessed and are disclosed in the EA (black-backed woodpecker –pp. 159-165; three-toed woodpecker –pp. 153-159; Lewis' woodpecker –pp. 109-113; deer and elk –pp. 189-195).

Comment: *The NSO recovery plan contains studies and recommendations for east side forests that are relevant to the Junction planning area. (P. Hood)*

Consideration: The Junction planning area is outside the range of the northern spotted owl (EA p. 87). Nevertheless, some elements from the Recovery Plan can be applied in this area such as dry forest restoration strategies.

Comment: *The EXF DEIS suggests that for LSR or OGMA areas within Fall River watershed, "these are areas where it may be more prudent to manage for high dead wood levels. Of these areas a majority are within habitat types used by fishers." This is not what the Junction EA is proposing, though it should be. (P. Hood)*

Consideration: The Junction project does not include any LSRs. The OGMAs are in the ponderosa pine forest type. Alternative 3 forgoes treatment with the OGMAs.

Comment: *The EA does not know if snag densities are within even the inadequate LRMP guidelines due to the wide variability that was modeled for the Junction EA. The Forest Service has provided no credible link between DecAID tolerance levels, potential population levels, and/or viable populations. The FS has also failed to reliably quantify existing and projected habitat for snag associated species. (P. Hood)*

Consideration: Existing snag habitat is provided at the Forest, watershed, and project level. Snag transects were completed for the project area. Species dependent on dead wood habitat are also individually assessed, and habitat preferences described.

Comment: *Old snag habitat standards are outdated. New standards have not been developed that are consistent with the latest scientific information. (P. Hood).*

Consideration: DecAid is a synthesis of the best available science and is used to compare modifications to the habitat in the project area by alternative for numerous species. Both the standards from the LRMP and the tolerance levels from DecAid are used to compare alternatives.

Comment: *This project calls for an approximate 870 acre continuous patch of untreated lodgepole pine for woodpecker habitat. This is great as far as it goes but is it enough? What analysis has been done to show that this area will meet the needs of wildlife given all the other activities going on across the landscape. (D. Heiken)*

Consideration: Based on the literature, the EA shows that for Alternative 2, 870 acres could provide habitat for 1 to 3 pairs and Alternative 3 could provide habitat for an additional 1 to 3 pairs. (EA p. 156). The project area is part of a larger landscape and is not intended to meet the needs of all wildlife but the project is designed to be consistent with Forest Plan direction and to minimize negative impacts to wildlife and other resources.

Comment: *A properly functioning forest contains some decadent, dying, unhealthy trees. A logged forest differs dramatically from a natural forest. A healthy, natural forest has an abundance of dead trees. All healthy groups of living things have unhealthy and dying individuals.*

Consideration: The project area is primarily in the General Forest management allocation, where a goal is to continue to convert unmanaged stands to managed stands. Even so, the forest is not devoid of dead trees and project design requires the retention of coarse woody material and snags.

Mistletoe

Comment: *Healthy forests include native diseases, and dying and dead trees. Mistletoe is a natural part of the ecosystem and provides ecological benefits such as nesting and wildlife habitat, food, and cover....The Forest needs to recognize that stand-replacing fire is the only way that mistletoe is likely to be removed. (P. Hood)*

Consideration: This project seeks to reduce but not eliminate dwarf mistletoe (EA p. 56).

Comment: *Please tell the public why you believe pheromone treatment to control Mountain Pine Beetles will be ineffective and cite references supporting your conclusion. (D. Artley)*

Consideration: Using pheromone treatments instead of harvesting trees was not considered in the alternatives because it would not contribute to the attainment of purpose and need #2 – contribute forest products.

Resource Protection Measures

Comment: *Retaining trees regardless of size that exhibit old tree characteristics is not in the LRMP. This measure is indicated to apply to all units. The LRMP does include Screens and 21" diameter limit. This arbitrary diameter limit, which we oppose, is the current direction. The "primary purpose [of the Eastside Screens] it to conserve those components of the landscape—old forest abundance, wildlife habitat in Late and Old Structural stages—in relation to larger ecosystem management to protect habitat for certain species of wildlife and to promote the vigor and health of the forests."*

Using Van Pelt guidelines as proposed is not consistent with the implementation of the LRMP. In addition it violates the NEPA process in that it would be adding an S&G without properly amending the LRMP.

We urge you to remove this from the Resource Protection Measures. It has a direct effect on treating the landscape, will adversely affect social and economics, and it is clearly not consistent with the LRMP. (C. Burley)

Comment: *Why are all ponderosa pine and white fir with "old" characteristics being retained? There is no rationale nor is there any analysis of that requirement. The Deschutes LRMP does not require that all* *"old" trees be left. The Van Pelt guidelines were created for eastern Washington and have never been through the public process. There is no cumulative effects analysis for leaving all "old" ponderosa pine and white fir, nor is there any narrative explaining how these "old" trees will be determined on the ground. (I. Jerome)*

Consideration: Retaining trees with old growth characteristics was included in Alternative 3 to look at an alternative way to meet the purpose and need and respond to the key issues of wildlife habitat and landscape diversity. This project design is applicable to ponderosa pine and white fir trees although there is a very minimal amount of white fir. Because of the second-growth nature of the stands being entered, old trees (> 150 years) are expected to be rare and therefore retaining them does not impact the ability to meet the desired condition. Some clarification has been added to the resource protection measure. The target basal area range would still be met and the volume estimate of 3,000 board feet per acre in Alternative 2 commercial thinning units and 3,300 board feet per acre in Alternative 3 commercial thinning units would not change due to this retention. These trees are not common but provide some diversity within the project area where retained. Many times these trees exhibit abnormal growth or limbs which provide optimum nesting opportunities for raptors or small mammals.

Comment: *The EA says "Retain trees regardless of size that exhibit old tree characteristics (from Van Pelt) except where they are either 1) ladder fuels which pose a threat to larger diam. Trees …" We hope that this exception will be dropped or used very sparingly. Another important goal should be to retain clumps of old trees. Also, the goal should NOT be to remove ALL ladder fuels, so the rare old tree that happens to be growing under another old tree can be probably retained with minimal risk. (D. Heiken)*

Comment: *We are generally comfortable with the use of the Van Pelt guidelines to identify tree age, but as science improves, we urge the agency to use the best available information and err on the side of caution to ensure that trees older than 150 years (regardless of size) are not inadvertently cut. A recent study supports the retention of slow growing old trees because they are relatively more resilient. The study found that slower-growing older trees tend to channel their energy into structural support and defense compounds to "maximize durability while minimizing … damage". Black, Colbert, & Pederson. 2008. Relationship between radial growth rates and lifespan within North American tree species. Ecoscience 15(3), 349-357 (2008). http://fate.nmfs.noaa.gov/documents/Publications/Black_et_al_2008_Ecoscience.pdf.. See also. Tobias Züst, Bindu Joseph, Kentaro K. Shimizu, Daniel J. Kliebenstein and Lindsay A. Turnbull, Using knockout mutants to reveal the growth costs of defensive traits, in: Proceedings of the Royal Society B, 2011, Jan. 26, doi:10.1098/rspb.2010.2475. (D. Heiken)*

Consideration: Ladder fuel reduction is focused in areas along the major travel corridors (see Figures 5 and 8 in the EA). Slow-growing old trees may be more resilient but they are not common across the area. Large trees are also not common, whether young or old. Thinning and fuels reduction are expected to increase resilience and vigor and reduce fire hazard across a large area so that old and large trees will remain on the landscape.

Comment: *Identify and retain all trees with old-growth characteristics even if they are less than 21" dbh. Some refer to these small-old trees as "Tillebo trees" because the late Tim Lillebo was a big advocate for protection of old trees regardless of size. Old growth characteristics include thick bark, colored bark, flat top, asymmetric crown, broken top, forked top, relatively large branches, etc. These trees have important habitat value and human values regardless whether they are 21" dbh. Allow natural processes of succession and mortality turn some of these medium and large trees into ecologically valuable snags and down wood. The agencies often use this technique to identify and retain old-growth juniper trees and the same can be used to protect old growth pine, larch, Douglas fir and other species.*

Van Pelt, R. 2008. Identifying Old Trees and Forests In Eastern Washington. Washington DNR. http://www.dnr.wa.gov/Publications/lm_hcp_east_old_growth_hires_part01.pdf.

Consideration: The Van Pelt publication is referenced in the EA as a method for identifying old trees to retain; the EA provides for exceptions (EA p. 32).

Comment: *Use diameter limits as a management tool because it provides a useful means to prevent economic values from trumping ecological values. The public supports the use of diameter limits because it provides a means to prevent economic values from trumping ecological values. It is often appropriate to use smaller diameter limits for fire tolerant species like Ponderosa pine and Douglas fir, while using somewhat larger limits for fire intolerant species like grand fir/white fir. The exceptional circumstances in which diameter limits allegedly don't work, are more rare than the circumstances in which refusing to use diameter limits will lead to unintended consequences, including removal of ecologically valuable trees and lack of public trust.*

Consideration: A diameter limit is currently imposed on the Junction project area. Trees greater than 21" dbh cannot be included in a timber sale. The majority of the project area is within the General Forest management allocation where the primary goal is "to emphasize timber production while providing forage production, visual quality, wildlife habitat and recreational opportunities for public use and enjoyment." EA p. 6. Ecological values are not trumped, rather the purpose of the project is to improve the health and resilience of the forest while utilizing project design and standards and guidelines to minimize any unwanted effects.

Comment: *If the entire planning area lies east of the spotted owl range (EA page 4) why are there resource protection measures for the Northern Spotted Owl (NSO)? (C. Burley)*

Comment: *Page 4 of the EA makes it very clear that Junction is not located in areas that are covered by the Northwest Forest Plan, yet there is a provision under resource protections on page 32 that states "To reduce disturbance within northern spotted owl habitat adjacent to project area: Do not conduct project activities between March 1 and Sept. 30". Why is there a resource protection for spotted owls in an area that is not covered by the Northwest Forest Plan? Please remove this requirement from the EA and from the project. (I. Jerome)*

Consideration: The west side of the project area coincides with the boundary for the range of the spotted owl. This boundary has been identified on Figure 3 in the final EA. Habitat for the spotted owl exists within ¼ mile of Unit 169. In order to avoid disturbance to the adjacent habitat, a seasonal restriction on activities is in place for that unit and it applies to heavy equipment and burning. The alternative would have been conducting surveys in the area every year until implementation was complete.

Comment: *We also urge you to be cautious and take a close look at the cumulative effect of the various seasonal restrictions outlined in section 2.5. These include March 1 to September 30 for NSO, March 1 to August 31 for great blue herons, March 1 to June 30 for great gray owl, March 1 through August 31 for goshawk, winter logging only for some areas, avoiding operating late in the dry season (overstory treatments), etc. Again, these collectively have direct and significant effects on the social and economics of the project. (C. Burley)*

Consideration: Some of the dates are listed in the event an occupied nest is discovered. There currently are no known occupied nests. The seasonal restriction on Unit 169 is due to adjacent spotted owl habitat. The seasonal restriction on Unit 62 can be waived if monitoring shows no potential nests. All other requirements on timing are based on presence of certain sensitive soil types and presence of a Region Sensitive plant species. Operating during times of frozen ground or adequate snow cover would protect sensitive soil so that ground-based operations could take place and would prevent damage to sensitive plant species. Winter operations are recommended for xxx% of the units.

Comment: *The resource protection measures for this sensitive plant need to be clarified. It is not clear whether the location of populations have been adequately surveyed, mapped and documented to ensure that roads and landings will not affect this species. This is needed regardless of whether winter logging is employed. (D. Heiken)*

Consideration: The EA states that surveys were conducted for the green-tinged paintbrush in 1991, 1998, 2010, and again in 2012. All sites are documented and mapped. Efficacy of resource protection measures are described in the EA.

Comment: *The EA relies heavily on PDCs and BMPs in order to rationalize determinations of "no significant impact", "no impact", and claim that there will not be a significant trend towards listing or to loss of species viability. However, many of the BMPs and PDCs used to make these determinations have little or no effectiveness data associated with them. In addition, many of them are highly flexible, subject to change, formatted as suggestions, subject to human error and misinterpretation, and may not be implemented as planned or at all. Without validation of effectiveness or certainty that many mitigation measures will even take place, many of these species and resources are at risk of significant impacts. (P. Hood)*

Consideration: Effects analysis assumes implementation of applicable PDCs and BMPs. These are sourced from the Forest Plan, published BMP, and scientific research.

Fire and Fuels

Comment: *The Junction project has the potential to significantly reduce the wildfire hazard to communities within the Upper Deschutes River Coalition CWPP area. The project includes thinning along forest roads 40 and 42 which are critical wildfire evacuation routes. I support Alternative 2 which would reduce wildfire hazard and risk more than Alternative 3. (J. Larsen)*

Consideration: Wildfire hazard is reduced considerably along roads 40, 42, and 45 under either alternative. Alternative 2 reduces more acres from extreme wildfire hazard than Alternative 3.

Comment: *There are numerous references in this section to the Appendix. See for example on page 59, "Section 3 of the Appendix" and "Appendix Section 4". Where is this Appendix and what is it part of? It's not one of the EA's appendices. (C. Burley)*

Consideration: The section has been edited to refer to the reader to the appendix of the Fuels Report.

Comment: *Under Analysis Methods for Existing Condition and Action alternatives Smoke Management Measure #3, the first assumption is that prescribed burning in Interior Ponderosa Pine and wildfires in both Interior Ponderosa Pine and Lodgepole Pine occur "under natural fuel conditions." This assumption does not seem reasonable. The fuel loads in these forests today are the result of human intervention including past management activities and fire suppression. The duff layer alone is going to be greater than would be expected under natural conditions of frequent low intensity fires.*

Given the recent problems with smoke management vis-à-vis the prescribed fires in the spring of 2014, perhaps this assumption warrants revisiting. (C. Burley)

Consideration: Modeling applications (FOFEM and Consume) and associated inputs are discussed in the EA p. 59. "Natural fuel conditions" could be better defined as "default conditions" tied to SAF cover types Interior Ponderosa Pine and Lodgepole Pine. Information related to underlying predictive algorithms and fuelbed development is found within the application's documentation at www.firelab.org.

Comment: *Pages 73 and 74 discuss the PM2.5 and PM10 Measure 3. It attempts to make the case that prescribed burning with pile burning produces less PMs than wildfire. Table 23 indicates that the prescribed burning/pile burning is 86% to 88% of the wildfire. This in and of itself does not justify the broad application of prescribed burning and pile burning. This analysis compares these management activities to wildfire. What should be done is compare the prescribed burning/pile burning to other management activities that will accomplish the same end results without the smoke and thus health and visual quality impacts. (C. Burley)*

Consideration: The basis for utilization of prescribed fire and pile burning treatments is not based on a reduction of potential wildfire smoke, but rather wildfire hazard and risk, stand health, and social/economic considerations (EA p. Section 1.2). Treatment of residual slash (i.e. pile burning) is guided in part by the Deschutes National Forest LRMP as well as cost effectiveness. Biomass utilization is discussed in depth in Section 2.3 of the EA.

Comment: *On page 77 there are references to Tables 9 and 11 for tons of particulate matter and emissions respectively. These tables on pages 41 and 42 of the EA do not show this information. Are these references to the wrong tables or to another document? Likewise, same page, there are references to page 24 which in the EA is a map. (C. Burley)*

Consideration: The table references have been corrected to refer to Tables 26 and 29.

Comment: *Table 26 on page 78 makes no sense. The first problem with Table 26 is that it's comparing 15,376 acres of prescribed burning and pile burning combined to 13,033 acres of wildfire. The 13,033 acres of wildfire is assuming the maximum area proposed to be treated (page 77) is burned by wildfire. It does not state to what intensity this wildfire burns. Nor is it a safe assumption to say all the area to be treated will be burned by wildfire.*

Consideration: Wildfire conditions, as related to smoke production, are identified on pp. 63-64 of the EA. The Forest Service is charged with analyzing the environmental and social consequences of our actions compared to No Action. Smoke production is a result of either unplanned or planned actions. The extent and/or severity of future wildfire is an unknown, however assuming that the area will burn into the future provides the baseline from which to compare the effects of the alternatives. Given the fire history on the Deschutes National Forest, this assumption is no unmerited.

More importantly though, there is a gross inconsistency between Tables 26 and 23. On a per acre basis, the difference in Table 23 is 86% to 88%. Table 26 shows a difference of 55% to 56%. That is the prescribed burning and pile burning combined ON MORE ACRES than the wildfire is significantly less than the wildfire.

If you use the same tons per acre from Table 23 and made the wildfire acres 15,376 (the same as the prescribed burning/pile burning in Table 26) the difference is 47% and 48%. The same inconsistency exists between Table 29 and Table 23.

Granted Table 23 is under the effects analysis for Alternative 1. But page 73 says this table is applicable to prescribed fire or pile burning for either the existing condition/no action alternative or the two action alternatives. So the tons per acre in Table 23 should be the same used in Tables 26 and 29 but they don't appear to be. (C. Burley)

Consideration: The 13,033 acres are the baseline acres proposed for treatment utilizing some form of planned ignition, some of these acres will receive in essence two fire treatments (underburn and pile burn) equating to 15,376 acres. As discussed in the EA prescribed burning treatments are limited to ponderosa pine ecotypes where as wildfire across the 13,033 acres would influence both ponderosa pine and lodgepole pine (38 and 62 percent, respectively). The pounds per acre emitted in Table 23 are directly tied to treatment type and associated acres in both Tables 26 and 29.

Comment: *The last comment on Fire and Fuels is there is no indication of the existing fuel loads in the planning area and what the resulting loads would be under the different management treatments. Clearly this is something the agency must estimate prior to prescribe burning and thus it should be disclosed in the EA. Again, given the recent problems encountered with adhering to National Ambient Air Quality Standards and the Oregon Smoke Management Plan, it is incumbent on the agency to do a better job estimating and disclosing fuel loads as well as alternative means to treat fuels without burning. (C. Burley)*

Consideration: It is important to clarify the National Ambient Air Quality Standards (NAAQS) from the Oregon Smoke Management Plan. The Deschutes National Forest has never violated NAAQS. Intrusions of ground level smoke into the city limits of Bend do occur but the Forest works with the Oregon Department of Forestry Smoke Management to implement burning with their consent. Particulate outputs under all alternatives are modeled using the existing fuel vegetation profile, as produced by FOFEM. Using the existing fuel profile and pile emission calculations, rather than the treated fuel profile, allows for the most conservative comparisons of emissions between no action and proposed smoke inducing treatments, also accounting for temporal variability associated with treatments across the project area.

Comment: *The fuels analysis clearly displays the extreme risk of wildfire associated with current conditions in the Junction project area. Is the amount of underburning associated with Alternatives 2 and 3 realistic? That is can the forest accomplish this work in the timeframes necessary? Does the Deschutes National Forest have a backlog of prescribed burn acres? What are the cumulative effects to the various resources if these acres don't get burned as planned? While the positive effects of low intensity fire are well documented what are the effects if the burning isn't accomplished? Would additional mechanical treatments provide a better and more feasible alternative? (I. Jerome)*

Consideration: All proposed units identified for prescribed burning treatments have, at a minimum, also been identified for mechanical mastication treatments. Concurrently, a high percentage of those units will also receive some form of commercial or precommercial thinning treatment. While prescribed fire treatments have been shown to further enhance fire hazard reduction (particularly in extreme fire conditions) as well as ecological components of fire adapted ecotypes; mechanical understory and surface fuel treatments achieve significant fire hazard reductions as compared to no action alternative.

Comment: *The EA assumes "An increase in average tree diameter of the stand reduces fire severity." This oversimplifies very complex effects of logging on fire hazard. It may be that logging increases rather than decreases fire hazard. The ENAP analysis should focus on the trade-offs described below so that the FS can make an informed decision about which fuels (and habitat) to remove and which to retain. (D. Heiken)*

Consideration: It is assumed from best available science that larger diameter and taller trees generally survive greater levels of fire damage (Wyant et al., 1986; Harrington, 1993; Regelbrugge and Conard, 1993; Stephens and Finney, 2002; Thies et al., 2005). A primary principle of fire resistance in dry forests, and the management actions associated with, is to maintain big trees of resistant species (EA pg. 69).

Nonetheless, the effects analysis related to fire hazard under existing conditions and proposed alternatives is tied to flame length and crowning potential. The related stand metrics include stand height, canopy bulk densities, canopy closure, canopy base height and are not tied to tree diameters.

Comment: *The EA needs to recognize that thinning affects fire hazard in complex ways including some tendencies to make fire hazard worse. The agency must address the fact that thinning creates slash; moves fine fuels from the canopy to the ground (increasing their availability for combustion); thinning increases ignition risk (by increasing human access and human activities, including spark-generating machinery); thinning makes the forest hotter-dryer-windier; and makes site resources available to stimulate the growth of future surface and ladder fuels. Amy E.M. Waltz, Peter Z. Fulé, W. Wallace Covington, and Margaret M. Moore. 2003. Diversity in Ponderosa Pine Forest Structure Following Ecological Restoration Treatments. Forest Science 49(6) 2003. (D. Heiken)*

Consideration: The EA includes slash treatment for all units. Treatment of surface fuels after thinning can reduce fire behavior and severity to an extent that it usually outweighs the changes in fire factors such as wind and fuel moisture (EA p. 74).

Where thinning is followed by sufficient treatment of surface fuels, the overall reduction in expected fire behavior and fire severity usually outweigh the changes in fire weather factors such as wind speed and fuel moisture (Weatherspoon 1996, Bigelow and North 2012). Additionally, these changes in canopy characteristics and surface fuels were incorporated into the modeling scenario and are reflected in the resulting hazard outputs. As forest conditions are not static, maintenance treatments will be required in order to maintain the previously described effects so that the growth of flammable material is maintained over time.

Comment: *Also, fire-regime condition-class may not be an accurate predictor of fire hazard, because it assumes incorrectly that time-since-fire is an accurate indicator of fire hazard.*

Consideration: Landscape historic conditions and disturbance patterns are commonly measured in terms of fire regimes and condition class that develop over time and at scales larger than the project area. The existing vegetation conditions are described in those terms (EA p. 65-69). However, fire hazard, which describes the resistance to control once a fire starts, is represented by a matrix of flame length potential and crown fire potential. (EA p. 70-71) The analysis methods and data used are described in the EA p. 62-63.

Comment: *The pre-decisional EA fails to describe the effects to air quality in Chapter 3. Include discussions, information and data in Chapter 3 showing the effects to air quality that will result from logging, road construction and burning that will occur as part of this project. If you feel air quality will not be affected, please describe why. (D. Artley)*

Consideration: Air quality is addressed in the Fire and Fuels section as measure #3 (represented by production of particulate matter). The effects analysis is located on pp. 78-79, 82-83, 88-89, 90. In addition to smoke, dust is addressed on p. 250.

Comment: *Dr. Jack Cohen is a USFS fire physicist working in Missoula, Montana. He has devoted his entire career researching methods to reduce the risk of fire damage to homes located in the WUI. His research indicates fine fuel removal within several hundred feet of structures at risk is the most effective way to prevent damage if a wildfire threatens the home.*

Consideration: The intent of fire hazard reduction is to also reduce threat to values at risk outside of the urban interface, such as wildlife habitat, Old Growth Management Areas, Special Interest Areas, recreation, and scenic views.

HFRA

Comment: *In our scoping comments dated September 3, 2010, AFRC asked if Junction would qualify as an HFRA project. The Forest Service response on page 12 of the EA is "**The Healthy Forest Restoration Act (HFRA) passed in December 2003. This act provided improved statutory processes for hazardous fuels reduction projects and provided direction to help reduce hazardous fuels and restore healthy forest and rangeland conditions**." I would like to point out that this language is in the past tense and leads the reader to believe that HFRA is no longer viable, which is false. HFRA still **provides** processes for hazardous fuels and forest restoration projects. Because Junction is broader in scope than just protecting values at risk the Forest Service does not consider it an acceptable HFRA project. However, a review of the field guidance suggests that Junction is an ideal HFRA project when the insect and disease component is combined with the hazardous fuels reduction, protecting values at risk, and creating safe evacuation corridors. Please revisit the option of making Junction an HFRA project.*

Consideration: The Junction project has not been planned using the HFRA authority. The Forest does not intend to consider using a different authority at this point.

Public Outreach

Comment: *Scoping comments were solicited for Junction in August of 2010 – a full four years ago. Several Firewise Communities have formed in the general area since that time. Growth and turnover of population is frequent in these areas. Did the Forest Service make an effort to reach out to the local residents in this area again to provide information and solicit additional comments prior to developing the EA? If not, please do so as involving these citizens is critical to the success of the Junction project.*

Consideration: The Forest is frequently engaged with the Upper Deschutes River Coalition. Information on project planning including Junction is regularly provided to that group of stakeholders in the area. The Forest will also look for ways to get information to other local residents.

Recreation Impacts

Comment: *Recent statistically significant nationwide surveys/polls indicate between 64% and 73% of Americans (depending on where they live) don't want their national forests logged. When the people who use the forest only for recreation (who make up the vast majority of forest users) were sampled the percentage opposing logging jumped to 87%. (D. Artley)*

Consideration: A recent local survey prepared for the Oregon Forest Resources Institute showed that the participants' top priority for the Deschutes National Forest was to manage forests to reduce high-severity wildfire risk. Three to one, respondents were more in agreement that the Forest Service should actively manage the Deschutes National Forest to improve forest health and reduce wildfire risk rather than it should let nature run its course. Respondents also preferred that forest restoration decisions be based more on the expertise of forest managers than on public preference (DHM Research, OFRI Deschutes County Survey Report, November 2013).

Within the Junction project area, there are no developed recreation sites, summer trails, or facilities. There is "only light recreation." EA p. 243-244. Major access routes in the project area are FSR 40, 42, and 45. Because these are the main arterial paved roads leading to the Cascade Lakes Scenic Byway and numerous recreation attractions they are treated as fuel breaks to provide safe ingress/egress. The EA discloses potential impacts to the kinds of public use that may occur in the project area (pp. 245-246) from project activities.

Effects of No Action

Comment: *The project includes a small amount of real restoration actions. Usually this is decommissioning existing roads. The roads planned to be decommissioned with this timber sale are "temporary" roads that should have been decommissioned years ago. This allows the IDT member to say road decommissioning won't occur under "No Action." Of course it won't. The IDT members fail to tell the public that if road decommissioning were important it would have been done when it first became evident that the road was producing sediment. (D. Artley)*

Consideration: The roads proposed for closure or decommissioning are not producing sediment and are system roads rather than temporary roads. The Forest typically addresses the road system every time a vegetation management project is undertaken.

Comment: *Another handy excuse to recommend "No Action" not be chosen is to say that if "No Action" is not chosen, fuels reduction will not occur, thus a wildfire will engulf the area destroying most natural resources in the area. Fine fuels and small trees contribute to wildfire intensity and rate of spread much more than large trees. The USFS does not acknowledge this because small trees are not merchantable. The USFS knew some people would not buy this excuse to log, so the agency invented the ladders fuels problem which assures merchantable trees would head for the mill. Weather influences fire behavior much more than fuels. Best science clearly shows this. Here are three excerpts from the many contained in Opposing Views Attachment #3: Note the qualifications of these scientists. (D. Artley)*

Consideration: The EA addresses the role of weather in wildfire and describes the kinds of fuels that contribute to the fire hazard analysis (EA pp. 62-65). Where thinning is followed by sufficient treatment of surface fuels, the overall reduction in expected fire behavior and fire severity usually outweigh the changes in fire weather factors such as wind speed and fuel moisture (Weatherspoon 1996, Bigelow and North 2012). Additionally, these changes in canopy characteristics and surface fuels were incorporated into the modeling scenario and are reflected in the resulting hazard outputs. Ladder fuel reduction is cutting and removing small trees when the primary intent is fuels reduction.

Comment: *No Action effects to Air quality effects have been ignored. (D. Artley)*

Consideration: Air quality is measured by the potential production of particulate matter. Under No Action, the analysis describes particulate production that could occur under wildfire conditions, given the kinds of fuels in the project area. There would be no particulate matter produced by prescribed burning or slash burning under the No Action alternative.

Comment: *Soils effects disclosure is partially accurate and partially not. (D. Artley)*

Consideration: The commenter has not provided any detail as to what he feels is not accurate or why.

Comment: *Fish and Water resources No Action effects disclosure is partially accurate and partially not. The first sentence is true. The rest is an irresponsible attempt to convince the public why "No Action" must not be chosen.*

Consideration: The commenter has not provided any detail as to what he feels is not accurate or why.

Opposing Views

Comment: *Opposing Views Attachments #1 and #4 describe the tragic resource damage caused by logging.*

Comment: *Include some source documents from the Opposing Views Attachments in the Literature Cited section of the final EA. (D. Artley)*

Comment: *You have examined the Opposing Views Attachments #1, #3, #4, #5, #17, #14, #8, #9a, #11, and #21 containing quotes from science literature written by over 342 Ph.D. biological scientists explaining how logging/road construction significantly damages scores of natural resources in and downstream from the sale area. (D. Artley)*

Comment: *Opposing Views Attachment #3 contains 56 additional scholarly articles authored by Ph.D. scientists, fire experts and even 2 USFS employees describing how logging merchantable trees to reduce fire risk in the WUI must never be the only consideration.*

Comment: *Opposing Views Attachment #11 contains more detailed information of Dr. Cohen's life-saving methods to decrease the risk that homes will burn.*

Consideration: The attachments have been reviewed. The Literature Cited section of the EA includes documents that were referenced in the environmental assessment. Some of these documents are also listed in commenter's attachments, but there is no need to include those documents in Literature Cited if they were not relied on in the analysis. The attachments contains a great deal of opinion which is generally opposition to "logging" but not specific to the Junction project to warrant a direct response (beyond what has already been provided in the EA and Response to Comments). Some of the opinions and excerpts are completely outside the scope of the actions proposed in the Junction project.

"Opposing Views Attachment #1 – Respected Scientists Reveal the Certainty that Natural Resources in the Forest are Harmed (and some destroyed) by Timber Harvest Activities." This attachment includes 80 quotes with links to documents supporting the quotes. Some sources constitute scientific research and some are opinion pieces, comment letters to other projects, newspaper articles, or blogs. The Junction EA describes the effects of timber harvest activities on all of the resources present (vegetation, wildlife habitat, soils, water, etc.). The analysis in the EA is based on the best available science as referenced throughout the EA. The quotes and cited sources in the attachment deals extensively with the issue of timber harvest and the connected risk of wildfire. Activities proposed in the project are intended to reduce the extreme fire hazard and to create healthy stands that are more resilient to fire. The science presented in these citations do not provide new or additional information that is inconsistent with or refutes science used in the preparation of the Junction EA.

"Opposing Views Attachment #3 – Harvesting Trees to Reduce Fuels is not only Ineffective at Reducing the Risk of Fire Damage to Human Structures but Harms the Forest Ecosystem." This attachment includes 57 excerpts of mostly opinion pieces, some research, some congressional reports and testimony, and publications by special interest groups. The commenter asserts that harvesting trees to reduce fuels in ineffective at reducing risk of fire damage to human structures. The Rocket project does not claim to reduce risk of fire damage to human structures. The commenter also asserts that harvesting trees harms the forest ecosystem. This is similar to the "Opposing Views Attachment #1" comment that states forests are harmed (and some destroyed) by timber harvest activities. Impacts to forest resources are provides in the EA (pp. 57-382). Principles of fire resistance in dry forests are provided in Table 23, p. 73 of the EA. Implementing fuels treatments across the project area follows these principles and will reduce surface fuels, increase height to live crown, decrease crown density, and keep large trees of resistant species.

Previous responses to comment in this appendix have discussed efficacy of fuels reduction. For example, where thinning is followed by sufficient treatment of surface fuels, the overall reduction in expected fire behavior and fire severity usually outweigh the changes in fire weather factors such as wind speed and fuel moisture. Also, Current research supports the idea that fuels reduction treatments in ponderosa pine forests are effective at reducing fire intensity and severity (Agee and Skinner 2005, Fule et al. 2001, Pollet and Omi 2002, Omi and Martinson 2009). On the Deschutes National Forest, fuels reduction treatments have proven effective at slowing the spread of fire on recent incidents such as the 2012 Pole Creek fire.

"Opposing Views Attachment #4 – Roads Damage the Proper Ecological Functioning of the Natural Resources in a Forest." The Junction project does not propose the construction of any new forest roads. Rather, 14.3 miles of temporary roads built to the lower standard that are restored following activities. The project incorporates Best Management Practices to reduce unwanted impacts to soils, and as stated before aquatic resources will not be impacted by project activities because none are present. Due to previous road closures, the open road density is currently a level within LRMP standards and guides.

"Opposing Views Attachment #5 – Insect Activity is a Beneficial Natural Disturbance Event in the Forest." Several of the comments submitted on the EA stress the importance of natural disturbance, including insect activity. These comments have been considered and responded to. The attachments submitted by Dick Artley include newspaper articles, opinion pieces, comments on other projects, and some scientific research. Some of it concerns whether or not existing widespread insect mortality in lodgepole pine increases fire severity. Generally these sources suggest that insects are part of a healthy forest ecosystem, that insect epidemics are an indicator that forest ecosystem is unhealthy, and that forest management is appropriate to maintain a healthy forest ecosystem. The Junction EA acknowledges the importance of insects and does not propose to eradicate insects from the forest. Thinning is proposed to reduce density-related stress and the risk of serious mortality from insects. The excerpts presented in the attachment do not provide new or additional information that is inconsistent with or that refutes the science used in the preparation of the Junction EA.

"Opposing Views Attachment #9a – Herbicides Containing Glyphosate should Never be Applied to Areas where Mammals (including humans), Fish, or Birds Might Visit." The Junction Project does not involve the use of any herbicides. This comment and associated references in the attachment are outside the scope of this project.

"Opposing Views Attachment #11 – Any NEPA Document that Analyzes Treatments to Reduce the Risk of Fire Damage to Homes Located in the WUI must Analyze a Dr. Jack Cohen Alternative in Detail." The Junction Project does not propose treatments to reduce risk of fire damage to homes located in the WUI. Rather, the area identified as WUI are high-use traffic corridors. This comment and associated references in the attachment are outside the scope of this project.

"Opposing Views Attachment #17 – Mountain Pine Beetle Activity in Lodgepole Pine does not Increase the Fire Risk." These attachments deal with the question of whether or not mortality from mountain pine beetles in lodgepole pine forests increase fire risk or is responsible for large fires. Lodgepole pine forests in the Junction project area have experienced mortality from mountain pine beetles. Scientific information on bark beetles as a disturbance agent and thinning to improve resilience to beetle disturbance is summarized in the EA p. 49-50, 56. The EA describes how fire hazard in the project area was analyzed using state of the art scientific tools. Wildfire risk is measured by burn probability, and that analysis is also provided in the EA. Fire/Fuels section pp. 61-90. Fuel models are an input to the FlamMap model used in analysis. Descriptions of the fuel models are provided in the appendix to the Fuels Report.