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Pacific Northwest Region

Tiller Whiskey Complex Fire Salvage Project

Umpqua National Forest
Tiller Ranger District

June 2014

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Tiller Whiskey Complex Fire Salvage Project
Final Environmental Assessment

Douglas County, Oregon
June 2014

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Abstract:

This Environmental Assessment (EA) analyzes a no-action alternative, and one action alternative that includes salvaging approximately 3.4 million board feet of commercial timber on approximately 100 acres, removing danger trees on 188 acres along approximately six and one quarter miles of Forest Service roads, creating shaded fuel breaks by limbing or removing trees less than 8" dbh on approximately 960 acres, conducting maintenance burning on approximately 1,135 acres, treating activity-generated fuels, conducting road work, and other connected actions. The proposed activities are located within Management Areas 10 & 11 of the Umpqua National Forest Land and Resource Management Plan (LRMP), as well as the Matrix and Riparian Reserve land-use allocations as defined by the Northwest Forest Plan. The project area is located within the Jackson Creek Middle South Umpqua and Upper South Umpqua watersheds within the Tiller Ranger District.

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CHAPTER 1 - PURPOSE AND NEED FOR ACTION

Chapter 1 of this Environmental Assessment (EA) describes the Proposed Action, management direction, and Purpose and Need of the project, as well as the scope of the decision to be made. Chapter 1 also includes an explanation of the scoping process and how issues and concerns were addressed by project design features and alternatives in Chapter 2, and the effects analyses in Chapter 3.

PROJECT LOCATION

The Tiller Whiskey Complex Fire Salvage Project (Whiskey Complex) planning area encompasses approximately 17,868 acres located on the Tiller District of the Umpqua National Forest (UNF), approximately ten road miles south of Tiller, Oregon for the Whiskey Fire, and approximately 17 road miles northeast of Tiller for the Buckeye Fire (Figure 1). The planning area boundary is: 1) the Whiskey Fire perimeter situated within Township 30 South, Range 1 East Sections 16-21 & 28-33; Township 30 South, Range 1 West, Sections 22-28 & 34-36; Township 31 South, Range 1 East, Sections 4-9; and Township 31 South, Range 1 West, Sections 1,2 & 11-13, Willamette Meridian, Douglas County, Oregon; and 2) the Buckeye Fire perimeter plus FS Roads 2700 and 27-900 outside of the fire perimeter situated within Township 29 South, Range 1 East, Sections 9-11, 17, 19, 20, 29 & 30, Willamette Meridian, Douglas County, Oregon. All acreage within the planning area is administered by the U.S. Forest Service.

BACKGROUND

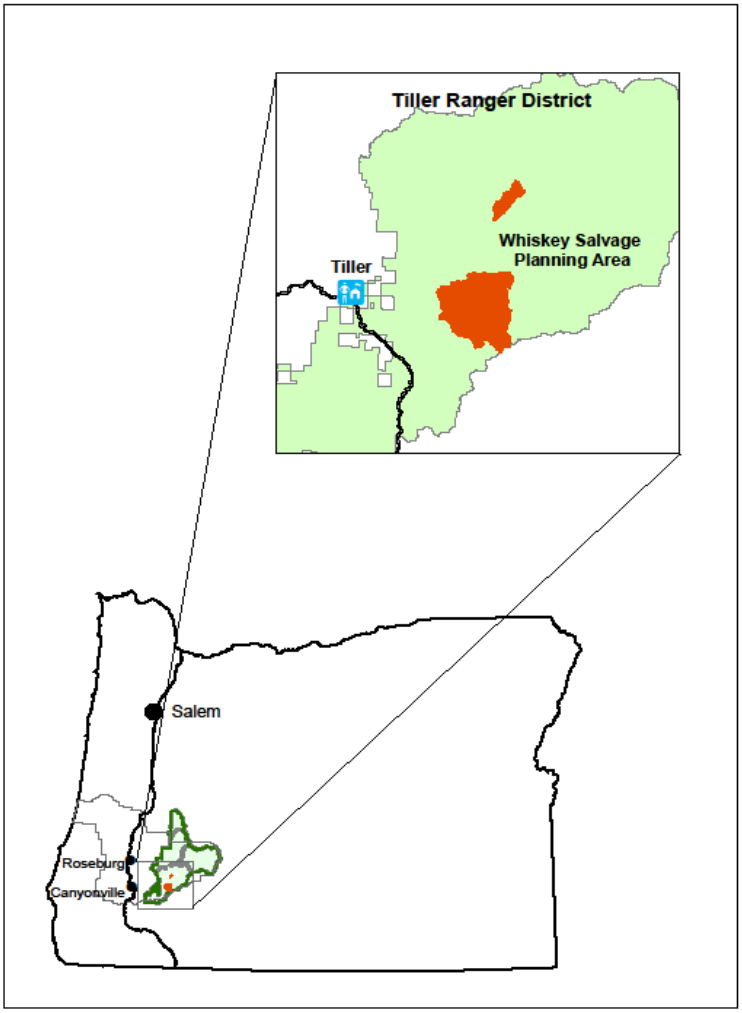
On July 26, 2013, a lightning storm ignited the Smith Ridge, Buckeye, Big Brother and Whiskey fires on the Tiller Ranger District of the Umpqua National Forest, forming the Whiskey Complex. These fires were fought throughout the summer with Smith Ridge Fire contained on September 7, 2013 at 23 acres, the Buckeye Fire contained on October 1, 2013 at 1,683 acres, and the Whiskey and Big Brother Fires, which grew together, contained on October 1, 2013 at 16,185 acres, for a total of 17,891 acres burned in the complex. The Buckeye and Whiskey/Big Brother fires burned in steep and rugged terrain entirely within Matrix land use allocations (17,868 acres). Landscapes affected by the fire including old growth mixed conifer stands, old growth ponderosa pine stands, young conifer plantations, oak woodlands, meadows, hardwood stands, and riparian areas. Burn intensity ranged from very low to high with mixed degrees of mortality. The areas experiencing highest burn intensity include the northwest flank of Coffin Butte and in Pipestone Creek, both within the Beaver Creek watershed.

On September 30, 2013, after determining that trees in the burn area present unsafe conditions for public travel, Forest Supervisor Alice Carlton issued an Area Closure for Public Health and Safety that prohibits public use within or adjacent to the burn area. On May 16, 2014 the Whiskey Fire was declared out and travel restrictions and the Area Closure lifted.

Forest Service resource specialists began evaluating conditions in the project area during and after the fire. The Burned Area Emergency Response (BAER) analyses provided resource assessments on fire effects to soils, watersheds, vegetation, fisheries, wildlife and roads. Field crews conducted surveys on forested stands to collect data on stand mortality and salvage viability. Using field surveys, soil burn severities and vegetation burn severities were mapped to determine the changed conditions. The initial post-fire assessments were completed by the fall

of 2013. This data was provided to resource specialists for additional analysis in order to make recommendations for developing the proposed action for the Tiller Whiskey Complex Fire Salvage Project. Based on burned area reflectance classification, which is a measure of soil burn severity, approximately 2% (359 acres) was classified as high severity, 16% (2,872) as moderate severity, 71% (12,743 acres) low severity and 11% (1,974 acres) as unburned. The Rapid Assessment of Vegetation Condition after Wildfire or RAVG data, which categorizes the effect of the fire on vegetation (primarily canopy loss) and is the basis for analysis within this EA, indicated a more severe burn with 7% (1,286 acres) of the area burning at high canopy loss, 3% (633 acres) at moderate canopy loss and 90% (16,266 acres) at low canopy loss or unburned within the planning area (Buckeye & Whiskey Fires). Acreage variation between classifications and planning area acreages is based upon use of a raster data set from satellite images.

Figure 1. Tiller Whiskey Complex Fire Salvage Planning Area Vicinity Map



RELATIONSHIP TO OTHER PLANNING DOCUMENTS AND ANALYSES

The 1990 Umpqua National Forest Land and Resource Management Plan (LRMP; USDA 1990a) and its amendments to date, including the 1994 Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl (NWFP)(USDA/USDI 1994a; 1994b), provide broad management direction for the Tiller Whiskey Complex Project. The Whiskey Complex planning area includes Management Areas (MA) 10, and 11 as defined by the LRMP, as well as Matrix, Riparian Reserves, and 100 acre "Spotted Owl Activity Centers" Late-Successional Reserve (LSR4) as defined by the NWFP, with the proposed treatment units being located within MA 10 & 11, Matrix, and Riparian Reserve areas.

Management Area 10 provides for production of timber on a cost-efficient sustainable basis consistent with other resource objectives (Table 1).

Management Area 11 provides for big game winter range habitat and for timber production consistent with other resource objectives for wildlife habitat, riparian habitat, water quality, visual quality and recreation.

Riparian Reserves provide an area along all streams, wetlands, ponds, lakes, and unstable and potentially unstable areas where riparian-dependent resources receive primary emphasis.

Matrix consists of those federal lands outside the six categories of designated areas (Congressionally Reserved Areas, Late-Successional Reserves, Adaptive Management Areas, Managed Late-Successional Areas, Administratively Withdrawn Areas, and Riparian Reserves).

Table 1. Acres of Proposed Treatment by Management Area

		Umpqua NF LRMP		NWFP		
Fire Area	**Activity**	**Acres MA 10**	**Acres MA 11**	**Acres Matrix**	**Acres LSR4**	**Acres within Riparian Reserves**
Whiskey	Roadside Danger Trees	118	64	182	0	34
	Salvage Units	0	100	100	0	0
	Shaded Fuel Breaks	551	265	816	0	131
	Maintenance Burning	707	248	1,086	50	229
Buckeye	Roadside danger Trees	5	0	5	0	0
	Shaded Fuel Breaks	33	104	137	0	32

This EA tiers to the Final Environmental Impact Statement (FEIS) of the 1990 Umpqua National Forest LRMP, as amended, and the 2005 Final Environmental Impact Statement for the Pacific Northwest Region Invasive Plant Program.

This EA also incorporates by reference the 2003 Umpqua National Forest Roads Analysis. An Umpqua Forest-Scale Roads Analysis (USDA, 2003a) evaluated access issues for key road systems across the Forest and recommended further evaluations at the watershed and project scale, as needed. Roads analysis below the Forest scale is not automatically required, but may be undertaken at the discretion of the Responsible Official (FSM 7710). It has been determined that a roads analysis below the Forest scale was not needed to support the Tiller Whiskey Complex Fire Salvage Project because road management activities under this project would not result in any changes to access, changes to current use, or changes in traffic patterns or road standards.

This EA incorporates by reference the recommendations and analysis in the 1995 Jackson Creek Watershed Analysis (WA) and the 2012 iteration, 1996 Buckeye/Zinc Watershed Analysis (WA), 1997 Boulder-Ash WA, 2004 Upper South Umpqua Watershed Analysis (WA), as well as the 2006 Umpqua Basin Total Maximum Daily Load (TMDL) and Water Quality Management Plan (ODEQ, 2006), and the 2008 South Umpqua Sub-basin Water Quality Restoration Plan.

This EA incorporates by reference the Project Record (40 CFR 1502.21). Chapter 3 provides a summary of the specialists input in adequate detail to support the rationale for the decisions and the appendices provide supporting documentation. The Project Record contains supplemental information and other technical documentation used to support the analysis and conclusions in this EA. Incorporating this information implements the CEQ Regulations provision that agencies should reduce National Environmental Policy Act (NEPA) paperwork (40 CFR 1500.4), and that environmental documents shall be "analytic rather than encyclopedic, and shall be kept concise and no longer than absolutely necessary (40 CFR 1502.2)". The objective is to furnish adequate site-specific information to demonstrate a reasoned consideration of the environmental impacts of the alternatives 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 Tiller Ranger District Office, 27812 Tiller Trail Highway, Tiller, OR 97484.

PURPOSE AND NEED FOR ACTION

The purpose of this project is to reduce safety hazards for forest workers and fire fighters, allow for safe public access within the project area, provide timber products, and reduce hazardous fuels. This action is needed because of the moderate to high severity fire effects resulting from the Whiskey Complex Fire. This action responds to the goals and objectives outlined in the Umpqua National Forest LRMP by:

1. Reducing safety hazards to the public and forest workers from falling trees by removing dangerous, fire-damaged trees along roads.

2. Reducing hazards to fire fighters by managing the loading, distribution and arrangement of natural and activity fuels for low flame lengths and low rates of spread adjacent to roads by creating and maintaining 150' wide shaded fuel breaks and by conducting maintenance burning.

3. Obtaining the maximum economic commodity value from burned timber by offering it for sale while the wood is still marketable. The Forest Plan (LRMP 4-42) directs the Forest to harvest dead or dying trees to produce wood products as consistent with Forest goals.

Existing and Desired Condition

Current conditions differ from the future desired condition within the proposed project area. The difference between the current conditions and the desired conditions in the planning area defines the need for action in terms of elements that can be measured.

Element 1: Improve fire fighter, forest worker and public safety

Roadways, trails and trailheads within the project area are surrounded by fire-killed and fire-damaged trees that pose a danger to the public and forest workers. Without treatment, dangers would continue to increase, infrastructure may be damaged, access may be impeded and people may be hurt or killed. Trees killed or severely burned by wildfire are often unstable and at risk for falling or snapping off, especially during high wind events. It is important that infrastructure, especially roads, trails, and trailheads, are maintained for use by public and forest workers (*i.e*, abating "danger trees."). While some danger trees were felled during suppression activities, a large number of fire-damaged trees remain and may have or will become weakened since suppression activities. For the purpose of this project, trees determined to have imminent or likely failure potential and are capable of hitting, or causing another tree to hit the road surface, cut slope and/or fill slope would be removed. This is approximately a 200 to 300 foot distance from the road and represents one and one-half tree heights plus a rollout area, based upon slope, for trees that may fall and impact the road.

This element will be measured by the number of miles of road from which danger trees have been removed.

Element 2: Reduce fuel loading

During suppression efforts on the Whiskey Complex, fire behavior dictated managers use indirect attack methods along existing roadways within and surrounding the fire. Roadways were utilized because they offered existing surface fuel breaks. However, to be effectively utilized the road systems had to be "prepped" in order for crews to be able to burn out from the roads and control the fire. "Prepping" essentially is a hastily created 30' to 50' shaded fuel break using crews and/or equipment to remove small vegetation, down wood concentrations, canopy density and ladder fuels that would contribute to undesired fire behavior that could be difficult to contain. Since previous infrastructure (shaded fuel breaks) did not exist in the fire area, managers were forced to identify a large enough area to allow enough time for crews to adequately prepare containment lines. By creating and maintaining a system of shaded fuel breaks on along identified roads throughout the planning area, future fire managers would be given more flexibility to safely and effectively manage fire on the landscape.

Maintenance burning would also occur in the planning area to help reduce fuel loading and improve ecological function. Typically, fire would have occurred frequently within the planning area (0-35 years) and would have been low severity. Fire suppression has led to over stocked stands and encroached meadow areas with high fuel loading of both live and dead material. Implementing maintenance burning would help restore the natural fire regime by creating areas that will be resilient to fire. These areas would most likely not exhibit high intensity fire behavior if maintained on a historic interval, and would allow future fire fighters to use these areas to manage fire on the landscape.

This element will be measured by the number of acres on which shaded fuel breaks have been created and the number of acres to which maintenance burning has been applied.

Element 3: Maximize timber commodity values consistent with Forest goals

Within the Whiskey Fire perimeter, approximately 7% (1,286 acres) of the area burned with a high canopy loss, 3% (633 acres) at moderate canopy loss and 90% (16,266 acres) at low canopy loss or unburned. The areas in which the fire burned with moderate to high canopy loss occurred within MA 10 (Timber production) and MA 11 (Big game winter range and timber production) under the Umpqua LRMP and within Matrix lands designated for timber production under the NWFP. Dead timber loses value if left standing beyond two winters and is most profitable if salvaged even sooner. Capturing the marketability of the timber provides the agency a viable means of meeting this and other project needs. If treatment is delayed beyond the marketability period of the timber, the Forest Service would need to pay for the danger tree abatement and removal of dead and dying trees in order to meet the first element, and may further delay opening the area from the current closure.

This element will be measured by the number of million board feet produced.

PROPOSED ACTION

The Proposed Action (Alternative 2) has been designed to meet the Purpose and Need by implementing the following activities which are discussed in further detail in Chapter 2:

- Felling and removal of roadside danger trees along 6.25 miles of road within the Whiskey (6.0 mi.) and Buckeye (0.25 mi.) fires, totaling approximately 188 acres.
- Create and maintain approximately 960 acres of shaded fuel breaks along 31 miles of major/strategic road systems.
- Conduct maintenance burning on approximately 1,135 acres to reestablish an appropriate fire frequency on the landscape and reduce large fire potential.
- Salvage dead trees and dying trees larger than 10” in diameter on 35 acres of severely burned plantations.
- Salvage dead trees and dying trees on 65 acres of severely burned mature forest.
- Connected actions including log haul, culvert replacement and road maintenance.

Figure 2. Buckeye Fire Roadside Units

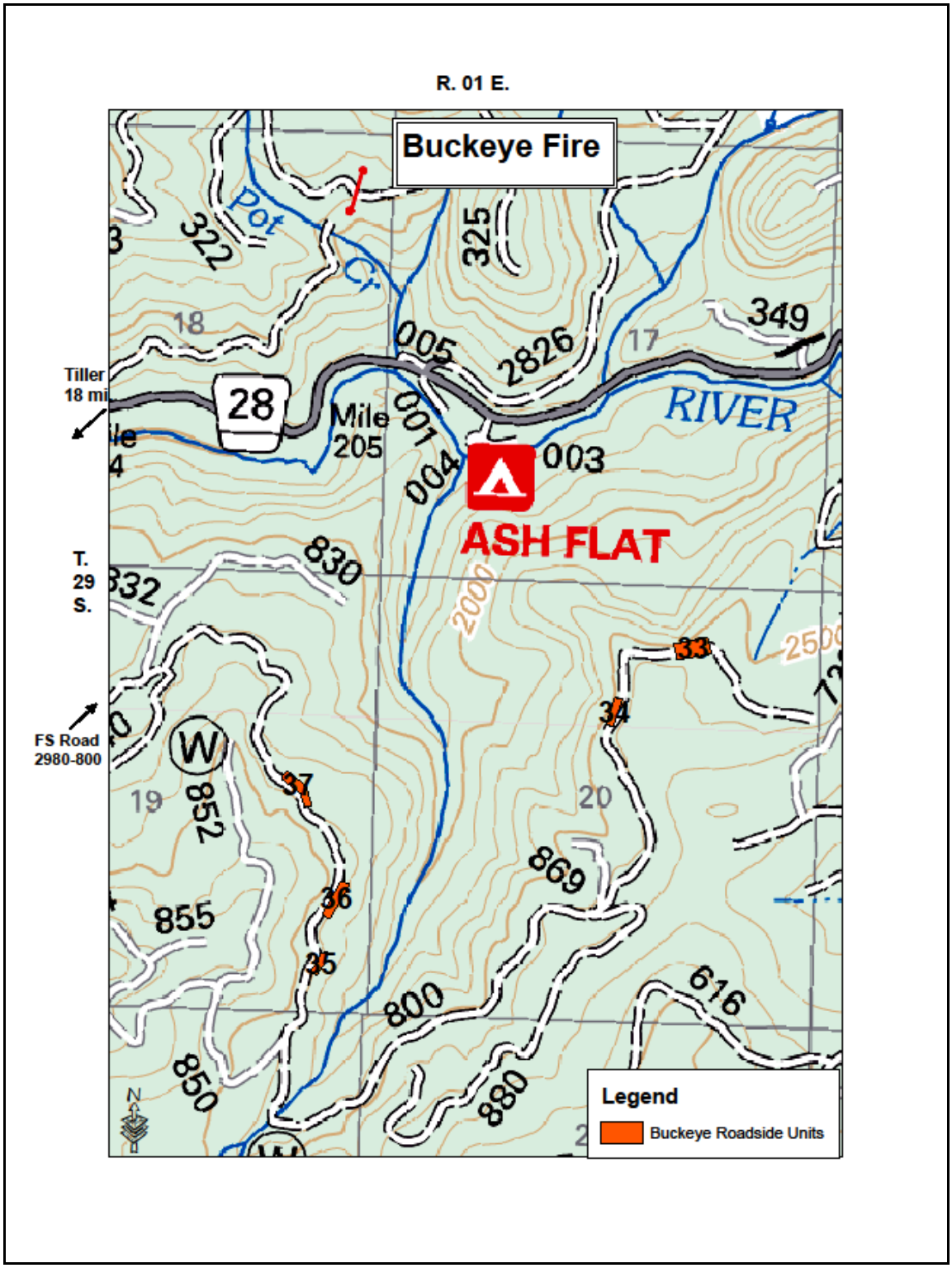


Figure 3. Buckeye Fire Area Shaded Fuel Break

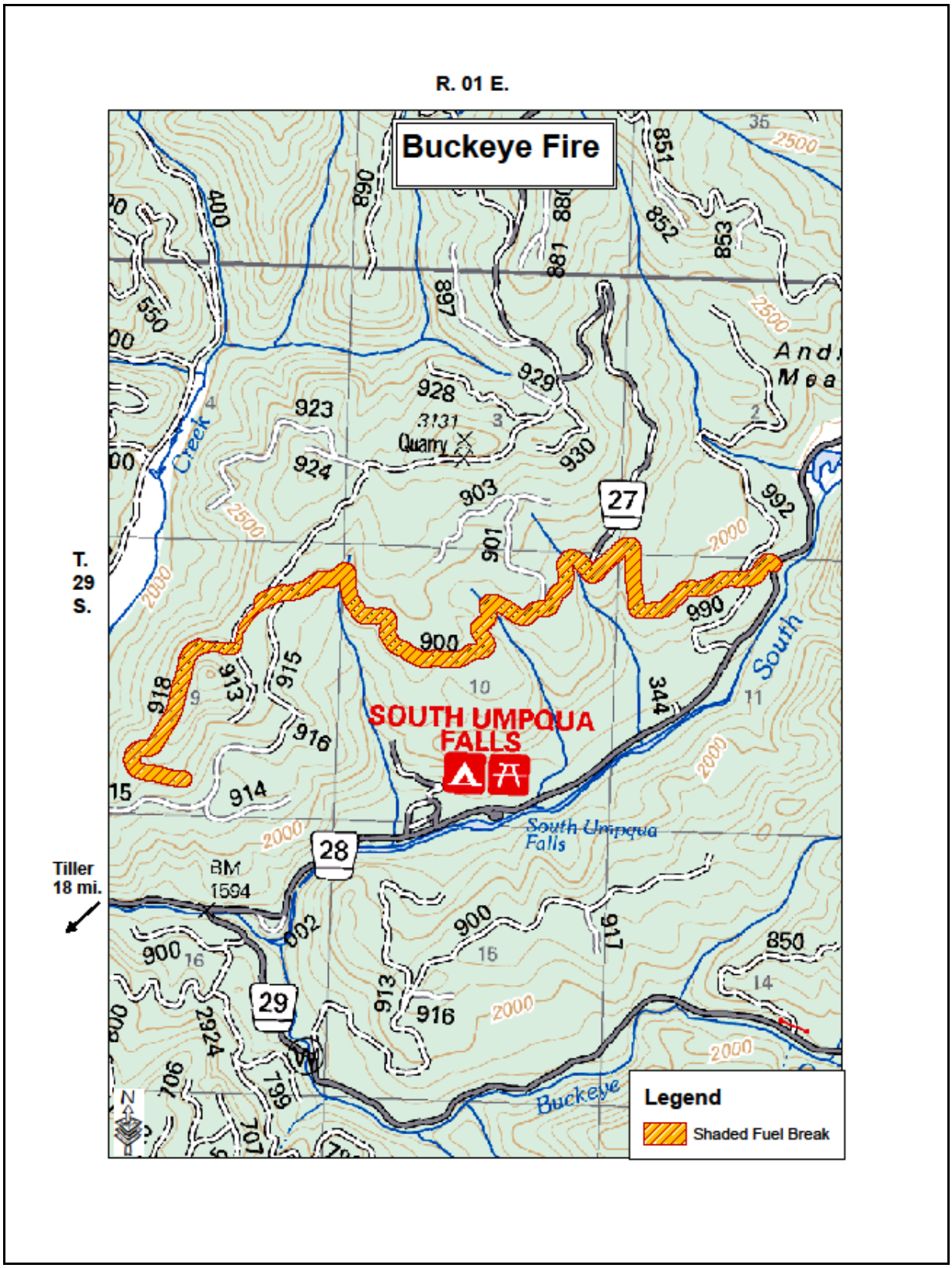


Figure 4. Tiller Whiskey Complex Fire Salvage Project Overview Map

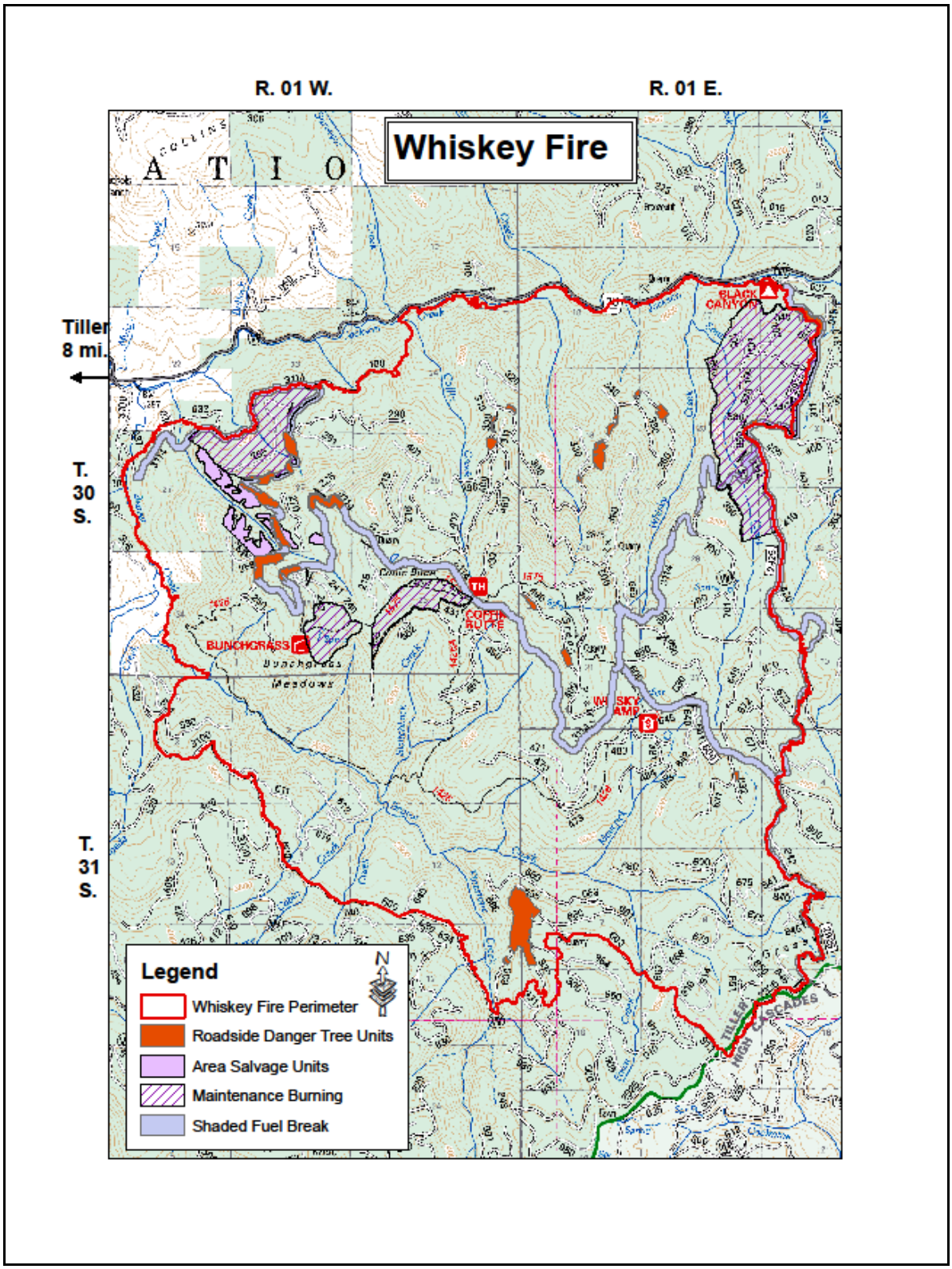


Figure 5. Tiller Whiskey Complex Fire Salvage Project Activities Map – Coffin Butte Area

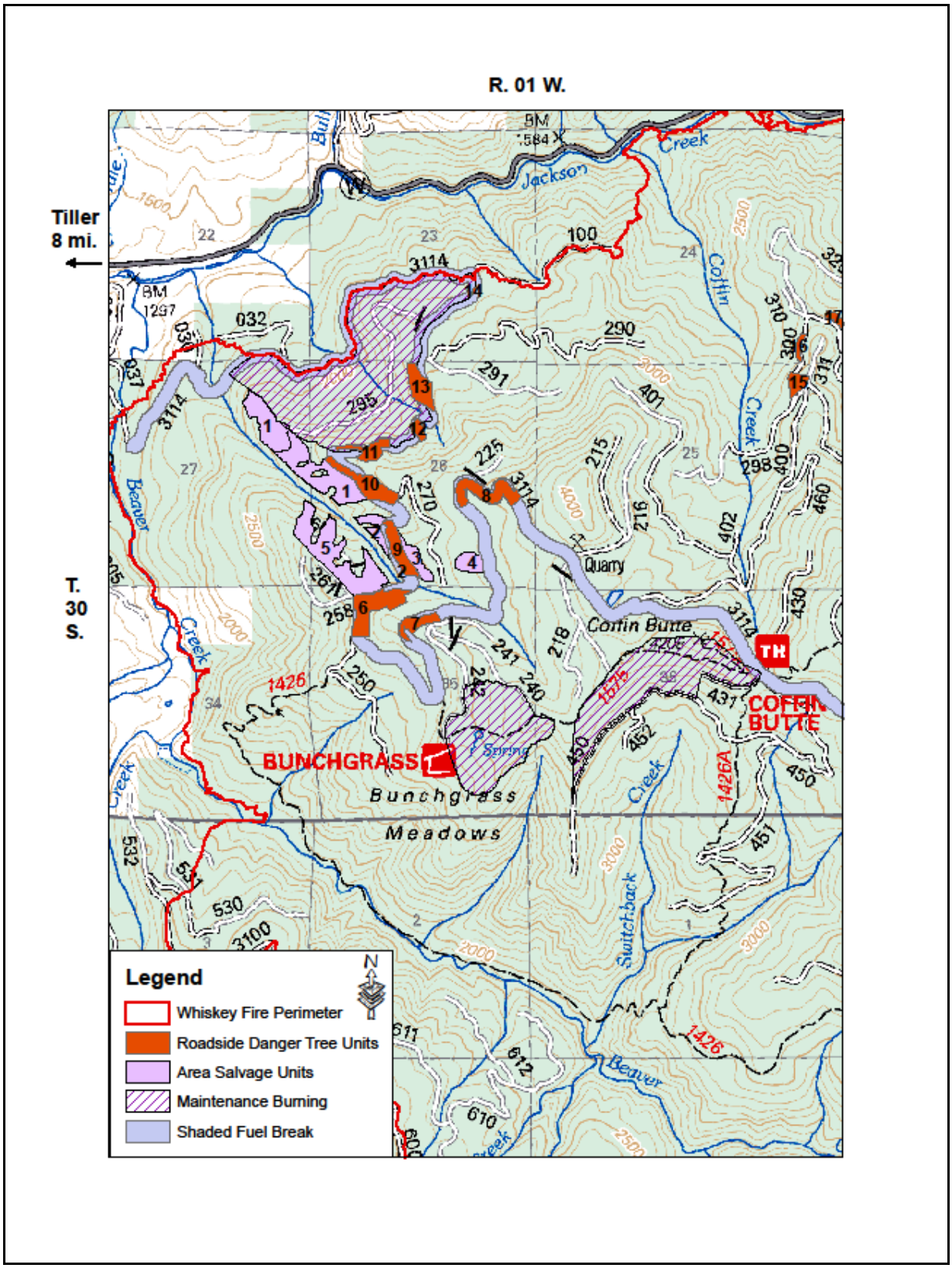


Figure 6. Tiller Whiskey Complex Fire Salvage Project Activities Map -- Area Salvage

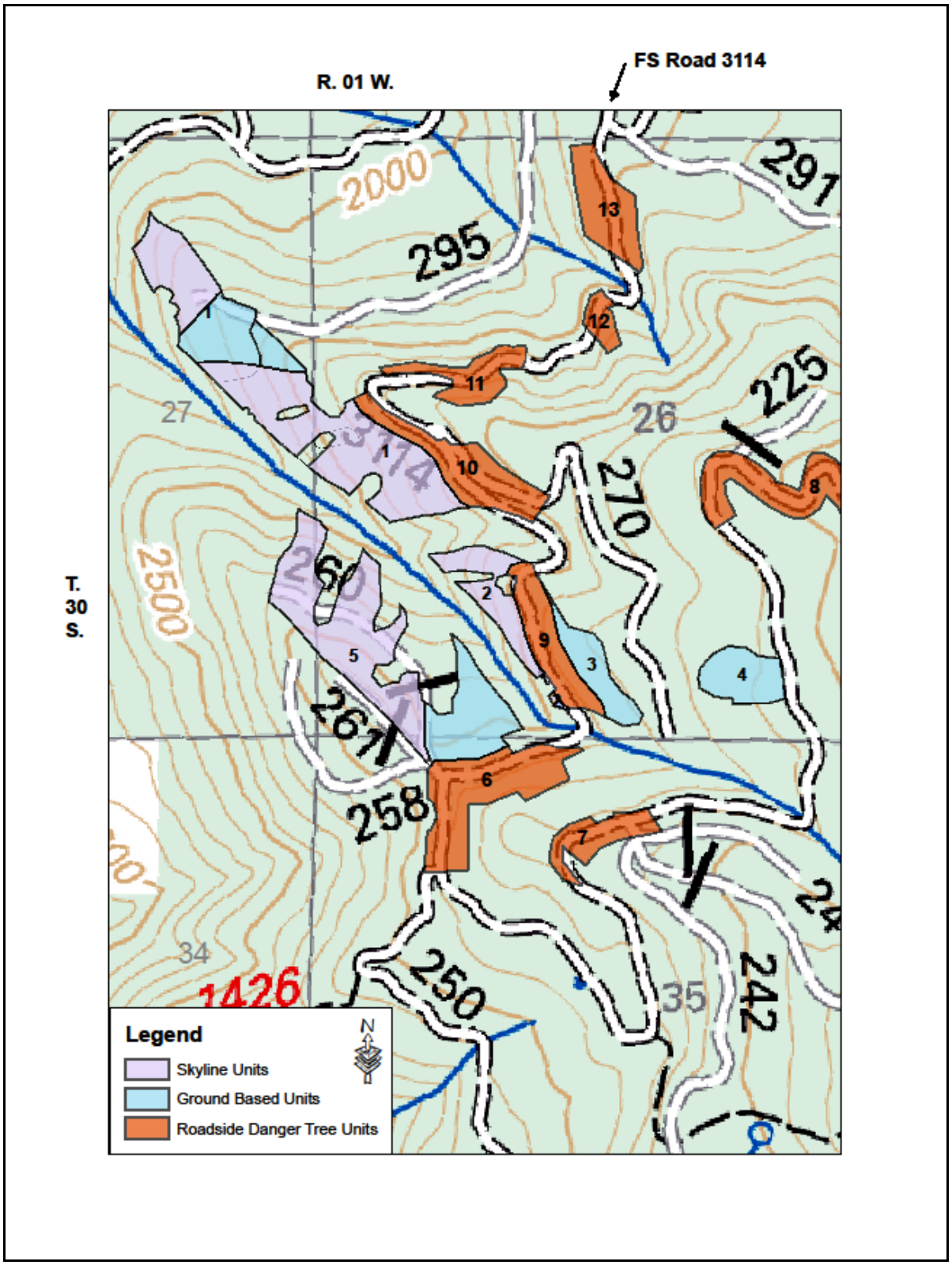


Figure 7. Tiller Whiskey Complex Fire Salvage Project Activities Map -- Black Canyon Area

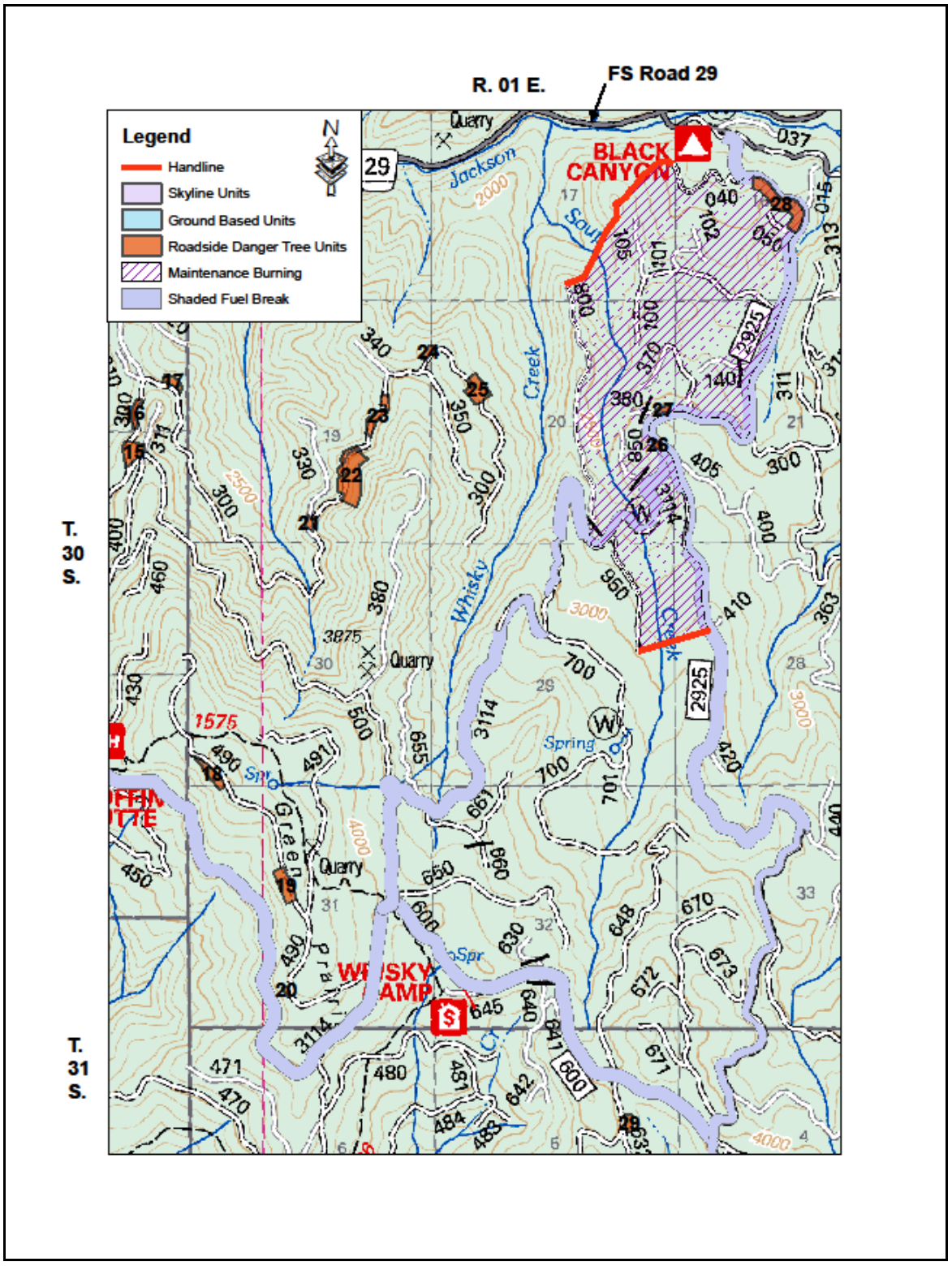
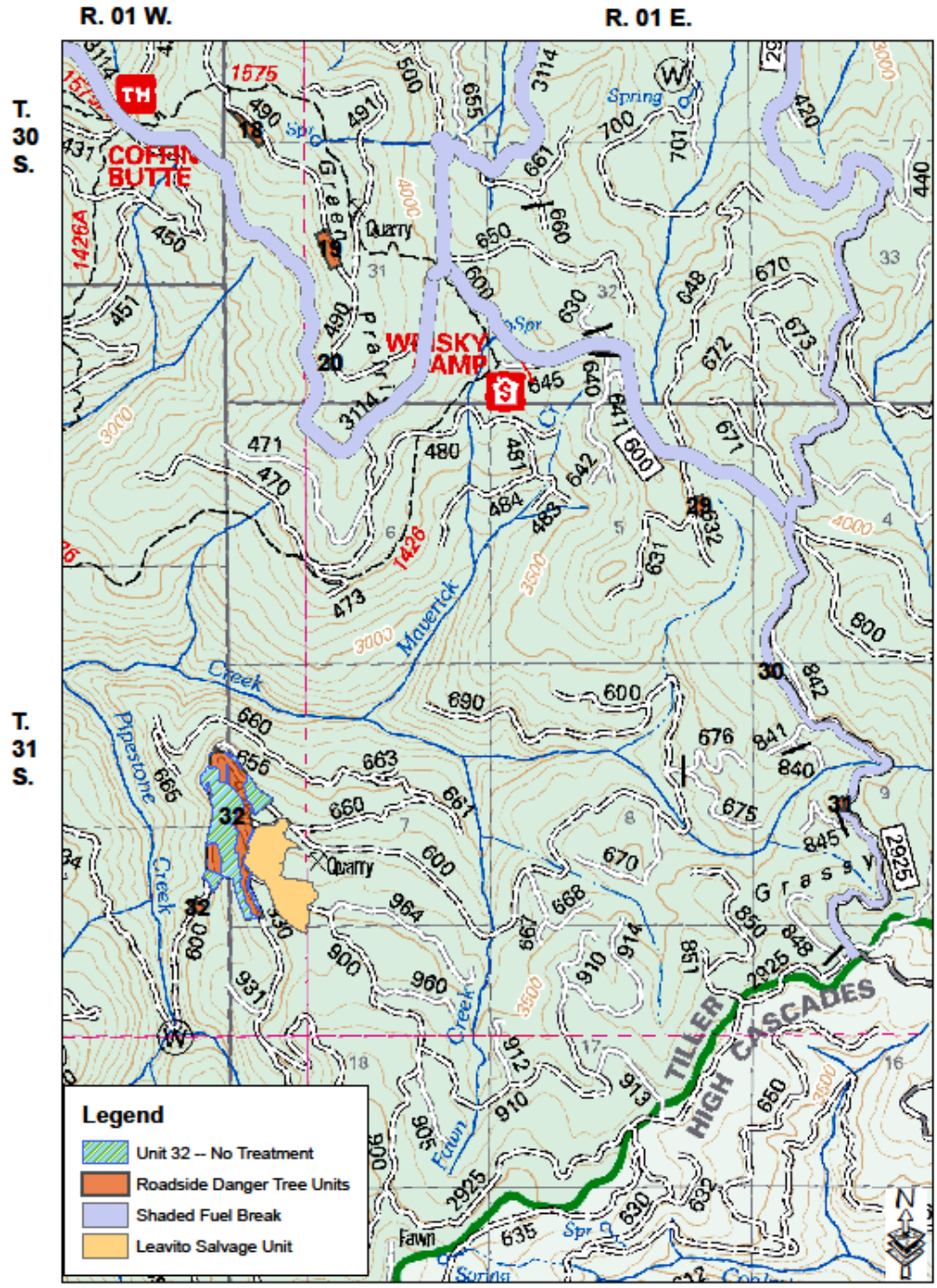


Figure 8. Tiller Whiskey Complex Fire Salvage Project Activities Map – Pipestone Area



DECISIONS TO BE MADE

Based on the analysis documented in this Environmental Assessment, the Tiller District Ranger will decide the following:

- To implement the project (Alternative 2) or to not implement the project at this time (Alternative 1).
- If the project is implemented, which best management practices, project design features, and monitoring activities are necessary to achieve resource goals, objectives, and desired future conditions.
- Whether there is a significant effect on the human environment that would require preparation of an Environmental Impact Statement.

SCOPING

In September of 2013, while fire suppression was still underway, a US Forest Service Rapid Assessment Team (RAT) was assembled to provide recommendations on potential post-fire treatments. Public involvement for the Tiller Whiskey Complex Fire Salvage Project began with a series of field trips with members of the timber industry, environmental groups, local landowners, and local nonprofit organizations in November of 2013. A Public Field Trip and Open House were held at the Tiller Ranger District on November 20th, 2013. In total, twenty five members of the public attended the field trip and/ or the Open House. The project is posted in the January and April 2014 Schedule of Proposed Actions (SOPA). A scoping notice describing the project components was sent to 180 interested members of the public on January 16th, 2014, which initiated the 30 day formal scoping period. In total, 11 letters or emails have been received during the formal scoping period ending on February 18th, 2014, and one additional late comment was received. All input received was considered in order to identify issues and develop alternatives regardless of scoping period timelines.

The Tribal governments (Cow Creek Band of Umpqua Indians, Confederated Tribe of the Grand Ronde Indians, and the Confederated Tribe of the Siletz Indians) were sent a letter describing the project and soliciting issues.

The Tiller Whiskey Complex Fire Salvage Project record contains a detailed scoping summary that describes Forest Service outreach efforts, the scoping comments received for the project, and how the Forest Service addressed scoping comments in the Tiller Whiskey Complex Fire Salvage Project EA.

ISSUES AND CONCERNS

Issues are based on unresolved conflicts concerning alternative uses of available resources that are generally raised during scoping and can be used as the basis for formulating and comparing alternatives to the Proposed Action, for prescribing mitigating and monitoring measures, or for identifying environmental analysis needs (40 CFR 1502.14). Scoping during the Tiller Whiskey Complex Fire Salvage Project planning process identified a number of concerns that have been addressed in the following manner:

Issues that did not drive Alternatives

Comments that raised concerns, but did not provide a cause and effect statement to become an issue that would drive an alternative have been identified and resolved by: 1) clarifying the Purpose and Need or the Proposed Action in Chapter 1; 2) addressing the concern by developing project design features (PDFs), including Best Management

Practices (BMPs), or identifying monitoring activities in Chapter 2; or 3) by disclosing effects in the analyses of Chapter 3. As these concerns were resolved as described below, they did not drive the development of an alternative to the Proposed Action and as such are not discussed or analyzed further.

Concerns addressed by clarification of the Purpose and Need or the Proposed Action in Chapter 1

Concern was expressed regarding creating a shaded fuel break within riparian reserves. Further refinement of the Proposed Action after the scoping period resulted in the treatment being modified to the pruning of trees with lop and scatter of activity generated fuels, rather than the felling and burning of trees < 8" dbh. Shaded fuel break treatments would not be conducted within the primary shade zone (See Table 4) or within riparian reserves containing fish bearing streams.

Concern was expressed that it appeared from the scoping maps that harvest would occur within riparian reserves. The scoping letter clearly defined that harvest would *not* occur within riparian reserves. However, further refinement of the Proposed Action after this comment resulted in clarification of activities which are proposed to occur within riparian reserves in addition to the shaded fuel break. These include: 1) felling of danger trees along roads and retention of all trees greater than 16" dbh; 2) removal of any danger trees less than 16" dbh which land on the road during implementation to avoid fuels buildup; and 3) removal of any trees or parts of trees that pose a threat to culvert inlets or outlets.

Concern was expressed regarding how far from the road edge trees would be taken and a comment made that a tree is not a hazard if it is more than ¾ tree height from a road. Forest Service Manual 7733.3 identifies the "Field Guide for Danger Tree Identification and Response" (Toupin et. al. 2008, USDA Forest Service Publication R6-NR-FP-PR-01-08) as the guide for roadside danger tree assessment which states that the failure zone is 1 ½ x tree height plus slide or rollout area.

Concern was expressed that "large diameter" pines were not defined in the scoping letter. Further refinement of the Proposed Action after the scoping period resulted in retaining an average of the six largest trees per acre exhibiting wildlife characteristics (i.e. broken tops, basal hollows, large horizontal branches and/or multiple tops).

Concern was expressed by several commenters about the need to replant severely burned plantations and other areas within the fire perimeter. This activity is outside the scope of this project and was authorized on April 7, 2014 under a separate Categorical Exclusion (CE).

Concern was expressed that the project development process was "flawed" and that the Purpose and Need of the Project was unclear, and the commenter submitted an alternate version of the Purpose and Need for the Proposed Action. As noted in the Scoping section of Chapter 1, numerous groups including both environmental organizations, timber industry, non-profits and the general public were invited on field trips to provide input into the project development process. Project development and scoping followed FSH 1909.15 (Chapter 11) and 36 CFR 220.4(e)(2), with a scoping notice mailed out to 180 interest parties, including the commenter, on January 16, 2014 with the comment period ending on February 18, 2014. As

such, the project development process is not flawed as it follows both Forest Service Policy and CEQ regulations. Further review of the Purpose and Need proposed by the commenter reveals that the comment differs in scale rather than in the Purpose, e.g. [commenter] … (1) recover merchantable timber volume from all units of moderate to high intensity burn within the entire fire area…, as compared to the Forest Service Purpose and Need on pg. 4 … 3*. Obtaining the maximum economic commodity value from burned timber by offering a sale while the wood is still marketable. The Forest Plan (LRMP 4-42) directs the Forest to harvest dead or dying trees to produce wood products as consistent with Forest goals*. As such, this comment should be considered as an alternative, rather than a change in the Purpose and Need. This alternative is addressed in Chapter 2 under Alternatives Considered, But Eliminated From Detailed Study. Finally, commenter also reorders the Purpose and Need, stating that "…also appears to improperly order the recovery of merchantable volume as a secondary purpose of the project." This is not required because each Purpose and Need element has equal value and is not listed in a priority order.

Concern was expressed that the Proposed Action arbitrarily limits the scope of timber salvage to two units. The Forest Service is charged with managing for multiple uses and objectives as directed by policy, regulations and laws. Case in point, while NFMA, the Umpqua LRMP and NWFP may allow for timber salvage within matrix lands, the 2012 NSO Critical Habitat designation and the 2011 Revised Recovery Plan for the Northern Spotted Owl (NSO), and the Aquatic Conservation Strategy (ACS) for activities within riparian reserves must be considered in project development. As such, limits to the amount of salvage within the Proposed Action are not arbitrary, but rather take into account other requirements the Forest Service must meet.

Concerns addressed by PDFs, BMPs, and Monitoring Activities in Chapter 2

Concern was expressed that there is not enough flexibility in the use of ground based equipment to allow for economic recovery of timber removal under the Proposed Action. Project Design Features and Best Management Practices were developed for the project, based upon site specific conditions and taking into account the severely burned soils present within harvest units. Umpqua NF LRMP Standards & Guidelines for soil productivity require keeping unacceptable soil conditions under 20% within an activity area.

Concern was expressed that not having a logging plan early in the process and having units with retention trees, might lead to unit design that would be difficult to harvest. This concern was addressed as a part of the Interdisciplinary Team process by including a logging systems specialist who fully participated in harvest unit design.

Concern was expressed that the use of cable logging (skyline) may result in increased mortality of live trees within the treatment area. Project Design Features were developed that minimizes the placement of skyline corridors where live trees are present. Based upon safety concerns and the Umpqua NF LRMP Standards & Guidelines for soil productivity that require keeping unacceptable soil conditions under 20% within an activity area, skyline would be used as a logging system where the slope exceeds 35%.

Concern was expressed about the retention of large snags within treatment areas. Project Design Features were developed that retain 30% of the treatment unit and in addition retain an average of the six largest snags per treated acre. The effects of snag removal by the Proposed Action are discussed in Wildlife section and throughout Chapter 3.

Concerns addressed by the analyses in Chapter 3

Concern was expressed regarding dying trees, snag distribution on the landscape, snag size distribution, "snag gaps" and down wood, the effects to which are disclosed in the Wildlife section, which concludes that adequate levels of snags and coarse wood will be retained by the proposed action to provide for wildlife habitat.

Comment was received that the proposed shaded fuel breaks should focus on managed stands and plantations rather than mature natural stands with high canopies and cool-moist understories. Shaded fuel breaks would focus on material <8" dbh that would act as ladder fuel to the overstory canopy. In a true mature stand without the presence of dense ladder fuels, there would be little if any treatment to remove understory vegetation. This topic is analyzed in the Fire and Fuels section of Chapter 3.

Comments were received regarding effects to roadless and wilderness areas. This topic is analyzed in the Inventoried Roadless Areas and Potential Wilderness Areas (PWA) section of Chapter 3 and concludes that the Proposed Action would *not* impact any IRA(s) or PWA(s).

Comments were received regarding the cumulative effects of the Proposed Action in relation to the Beaver Timber Sale and tree planting within the Whiskey Fire. Past, present and future foreseeable projects are disclosed in

Table **6** and Table 7 in Chapter 3, and the cumulative effects of these activities along with the effects of the Proposed Action are analyzed throughout Chapter 3.

Concern was expressed that the Proposed Action does not meet the *Recovery Actions* of 2011 Revised Recovery Plan for the Northern Spotted Owl (NSO) and that salvage logging within NSO critical habitat is not allowed. All activities within the Proposed Action are subject to consultation by the USFWS, and the effects of the Proposed Action on NSO Critical Habitat are addressed in the Wildlife section of Chapter 3, which conclude that 88% of burned foraging habitat would be left intact and undisturbed by the proposed action and that designated leave patches and trees within units would contribute towards Recovery Action 12. This analysis concludes that the Whiskey salvage project is consistent with the Revised Recovery Plan for the northern spotted owl and Recovery Action 12.

Comments were received regarding potential impacts of the Proposed Action and the effects of salvage or lack thereof, have on the human environment. Analysis for this comment is located in the Social Environment section of Chapter 3 for both the action and no action alternatives. This analysis concludes that the proposed action would potentially result in approximately $2.96 million of additional industrial output to Douglas County and provide 29 jobs.

Comments were received that the effects of salvage logging be analyzed over the entire landscape and that that the acreage of severely burned landscape not being proposed for salvage be disclosed. The effects of the Proposed Action are analyzed at multiple scales, including the landscape level, throughout Chapter 3. This topic is further addressed in Chapter 2 -- Alternatives Considered, But Eliminated From Detailed Study.

Concern was expressed about how 30% retention of the natural stand areas proposed for treatment was derived, how this relates to the NWFP, Umpqua LRMP and 2011 Revised

Recovery Plan for the Northern Spotted Owl and why areas within project area not being salvaged are not sufficient to meet these requirements. The 30% retention level is based upon recommendations from Forest Service wildlife biologists for meeting recovery actions within the 2011 Revised Recovery Plan for the Northern Spotted Owl.

Concern was expressed that not planting every acre of severely burned areas within the project area would result in reduced long term sustained yield and not meet the requirements of the National Forest Management Act (NFMA). While tree planting is outside of the scope of this project, the cumulative effects of tree planting, which is being conducted under a separate CE, are accounted for in Chapter 3.

Concern was expressed that not harvesting each acre of severely burned areas within the project area would result in safety concerns that would preclude the planting of these areas. While tree planting is outside of the scope of this project, there is the possibility that the Proposed Action might impact other future foreseeable actions. However, both federal and state OSHA requires that site specific" Job Hazard Analysis" with safety mitigations be completed for each work activity. As such, a job hazard analysis and mitigation plan might not require the falling of all burned trees and might identify the need to utilize lookouts, planting or not planting when a certain wind speed is exceeded, and other site specific conditions at the time of planting to meet safety requirements.

PROJECT IMPLEMENTATION

Should Alternative 2 be selected as a result of this NEPA process, the Forest Service would implement roadside danger tree removal, timber salvage and associated activity fuel treatments and road work through timber sale contracts, stewardship contracts and/or service contracts. In the course of implementing complex projects, minor changes may be needed to better meet on-site resource management and protection objectives. Minor adjustments, within approximately ten percent accuracy of the proposed measures, may be needed to adjust unit boundaries for resource protection, to improve logging system efficiency, and to better meet the intent of the resource prescriptions. For example, changes in aspects of logging systems may be required to better facilitate logging systems and provide for resource protection. These minor changes would not present sufficient potential impacts to require any specific documentation or action to comply with applicable laws. In determining whether and what kind of further NEPA action is required to document any changes, the criteria to determine the need to supplement an existing Environmental Assessment (FSH 1909.15, sec.18) would be followed.

CHAPTER 2 - ALTERNATIVES, INCLUDING THE PROPOSED ACTION

The National Environmental Policy Act (NEPA) requires analysis of a proposed action and other reasonable alternatives, including no action. The no action alternative (Alternative 1) provides a baseline for estimating environmental effects and the Proposed Action (Alternative 2) was developed to meet the Purpose and Need. These two alternatives for the Tiller Whiskey Complex Fire Salvage Project are considered in detail in this EA.

ALTERNATIVES CONSIDERED, BUT ELIMINATED FROM DETAILED STUDY

Comments were received suggesting that an alternative be considered which does not include the 167 acres of proposed salvage within two units. An alternative was considered in response, but eliminated from detailed study because the alternative does not meet the Purpose and Need Element 3: Obtaining the maximum economic commodity value from burned timber by offering a sale while the wood is still marketable. Further, foregoing area harvest is incorporated within the No Action alternative.

Comment was received suggesting an alternative be considered where timber is removed from areas other than the 107 acres of natural stands that burned within the Whiskey Complex. An alternative was considered in response, but eliminated from detailed study because the alternative would be outside of the Project Area and does not meet the Purpose and Need Element 3: Obtaining the maximum economic commodity value from burned timber by offering a sale while the wood is still marketable. Finally, foregoing harvest on 107 acres of natural stands is incorporated within the No Action alternative.

Comments were received suggesting that an alternative be considered that maximizes the amount of timber salvaged from moderate to severely burned matrix lands within the project area. An alternative was considered in response, but eliminated from detailed study because the current Proposed Action treats approximately 22% (288 acres) of the 1,286 acres identified as severely burned (defined as ≥ 50% canopy cover mortality). At the start of the project approximately 710 acres were identified for inclusion into area harvest units. Most of the areas were either eliminated due to: 1) low volume/value per acre of the trees as field reconnaissance was completed; 2) access problems; 3) wildlife issues; and 4) logging feasibility issues. Additionally, the entire project area occurs within NSO critical habitat and the 2011 Revised Recovery Plan for the Northern Spotted Owl (NSO) requires activities on matrix lands to meet identified recovery actions. For areas that were moderately burned (<50% canopy cover mortality) adequate habitat remains such that surveys for Survey and Manage species identified under the 2001 ROD would be required (fungi, bryophytes, lichens, mollusks, and red tree voles), as well as NSO surveys, which could take two years to complete and would not meet the Purpose and Need of the project.

Comments were received suggesting that an alternative be considered that provides for winter haul within the project area. An alternative was considered in response, but eliminated from detailed study because the proposed action occurs primarily within Management Area 11 (Big Game Winter Range) under the Umpqua National Forest LRMP, and alternative does not meet the standard and guidelines restricting haul between December 1 and April 30 within MA 11. Further, analysis by the transportation engineer indicates that bring roads up to standards for winter haul would make the project economically unviable at an estimated cost of over $40,000 per mile.

Comment was received suggesting an alternative be considered where dead end spur roads be excluded from roadside danger tree removal and the road be closed to the public. An alternative was considered in response, but eliminated from detailed study for several reasons. First, analysis by the ID Team identified several of these dead-end spur roads that were eliminated from the project prior to Scoping. The roads identified were FS Road 31-600 past the 31-675 and FS Road 31-690. Both roads go through an NSO owl core and currently FS 31-600 & 690 are effectively closed by down trees. The culvert on Beaver Creek (T 31S R 01 E Section 8) is failing and needs to be either: 1) replaced; or 2) removed and the 600 & 690 decommissioned which is outside the scope of this project. Secondly, based upon scoping comments all maintenance level 1 roads (closed) not associated with timber removal were removed from the Proposed Action (FS Road 3114-320). Additionally, FS Road 3114-648 was removed from the Proposed Action because danger tree treatment was completed along this road during fire suppression to supply trees needed to repair fire suppression damage to instream structures in Beaver Creek. Forest Road 31-660 was removed from the Proposed Action because of a lack of road use and the cost required to bring the road up to standard. Finally, the remaining roads (FS 3114-300, 490, 631 and FS 2980-800) were reviewed by the ID Team and a need for the roads to remain open and have danger tree treatment was identified, as shown in Table 47 of the Transportation section of Chapter 3.

Comment was received suggesting that additional roads be built to remove additional burned trees and material from the fire. An alternative was considered in response, but eliminated from detailed study because the cost of building temporary roads in steeper ground required to get to these areas is prohibitive.

ALTERNATIVES CONSIDERED IN DETAIL

Alternative 1: No Action

Under Alternative 1, no roadside danger tree removal, shaded fuel break creation, maintenance burning, timber production, activity fuel treatments, road work, or other connected actions would take place. No ground-disturbing activities would take place and no timber would be offered for sale. Ongoing and future activities, such as routine road maintenance, recreation use, and noxious weed control would be expected to occur.

Alternative 2: Proposed Action

The Proposed Action (Alternative 2) has been designed to meet the Purpose and Need by implementing the following activities:

- Felling and removal of roadside danger trees along 6.25 miles of road within the Whiskey (6 mi.) and Buckeye (0.25 mi.) fires, totaling approximately 188 acres. Roadside Units are designated as either commercial or firewood. Within commercial harvest units, harvest or fell all fire-killed trees that meet the criteria of “likely” or “imminent” failure potential according to the “Field Guide for Danger Tree Identification and Response” (Toupin et al., 2008) when the potential failure zone includes any maintenance level 2 or higher road. Trees with a probability of mortality of 50% or greater as determined by the Smith and Cluck guidelines would be assessed as fire-killed trees. Fire-killed trees would be topped at a 6” diameter and tops left for down woody debris. Fire-killed trees that do not meet the above danger tree criteria that must be felled for safety or that are incidentally knocked over by logging operations would be left in place. The outer-boundary of firewood units would be flagged based on the above danger tree criteria. Within the unit boundary, any standing dead tree <20” dbh may be harvested within Units 4, 8, 14, 15, 16, 23, 24, 33, 34 & 37, and any standing dead tree

< 16" dbh may be harvested within Units 35 & 36. Slash would be lopped and scattered by the firewood cutters. Commercial roadside units which, post-commercial harvest, have small (dbh <16") standing trees, that would still be considered danger trees due to proximity to the road, would be available for firewood.

- Salvage all dead and dying trees with a probability of mortality greater than 60%, following the methodology of Smith & Cluck 2011 greater than 9.9" diameter at breast height (dbh) on approximately 100 acres (35 acres plantation; 65 acres natural stands). Fire-killed trees would be topped at a 6" diameter and tops left for down woody debris. Any trees or snags occurring within designated "Leave Patches" would not be harvested. Within harvest areas 5-6 large snags per acre would be retained on average. Snags that appear to have been present prior to the fire would be retained and ***do not*** count towards the 5-6 trees per acre retention goal. Criteria for snags to be retained would be a combination of:

    1. Size: Trees should come from the largest diameter classes.
    2. Species: Ponderosa pine, incense cedar, and sugar pine are preferred due to lower value. Douglas-fir may be included if it meets wildlife criteria below.
    3. Wildlife Suitability: Trees with hollow boles, large horizontal limbs, and/or broken tops.

- Approximately 222 acres of ground-based, mechanized logging systems and 66 acres of cable (skyline) logging systems would be employed to implement salvage. For area salvage units mechanized equipment would be utilized on slopes under 35% (34 acres) and skyline systems for slopes greater than 35% (66 acres). For roadside danger tree removal mechanized equipment would be used to remove trees on the road and a lead line and winch would be utilized to remove the remaining trees.

- Approximately 80 landings are proposed, 51 of which are for roadside danger tree removal, 24 in skyline units and 5 in ground-based units for area salvage. The average landing size is estimated at 0.05 acres in skyline units and 0.12 acres in ground-based units.

- Roadside danger trees would be felled within 34 acres of riparian reserve to protect the safety of forest users. Danger tree identification would follow guidelines in the "Field Guide for Danger Tree Identification and Response" (Toupin et al, 2008, USDA Publication R6-NR-FP-PR-01-08). All felled trees would be left in place unless the log would threaten to plug a culvert, or the log lands in the road prism. Any log that threatens a culvert would be bucked and as much left in place as possible. Any log that lands in the road prism greater than 16" dbh would be moved to the downhill side of the road and left as coarse wood, material small than 16" would be removed to avoid concentrations of fuels.

- Create and maintain 960 acres of shaded fuel breaks along 31 miles of the following major/strategic road systems: 1) FS Road 3114 from FS 31 to FS 2925; 2) FS 2925 from FS 29 to FS 6620; 3) FS 3114-600; 4) FS 27 from FS 28 to FS 27-900; 5) FS 27-900; and 6) FS 27-918. Treatment would consist of thinning material on 797 acres of matrix lands using a variable spacing of 8" dbh and smaller trees for 150' either side of the road (excluding east side of FS 2925 from FS 2925-440 to forest boundary to avoid Late Successional Reserves). Roadside edges (approximately 20') may utilize mastication,

keeping equipment on existing roadways. Activity generated fuels outside of riparian reserves would be cut/piled and disposed of by burning, firewood or biomass/char opportunities. Maintenance would take place on a 7-10 year interval. Approximately 229 acres of riparian reserves would be treated as part of the shaded fuelbreak. No treatment would occur within primary shade zones (15 to 85 feet depending on tree height; see Table 4. Primary Shade Zone Distances) of perennial streams or within 10' of intermittent streams. Treatment within riparian reserves outside these buffered areas would be limited to pruning branches, and lopping and scattering the trimmings. This would minimize the impact to riparian reserve vegetation, while providing some increased effectiveness for using the road as a fuelbreak during future wildfires. Riparian reserves along Class 1 anadromous streams, South Umpqua (FS 27 and FS 28 junction), Beaver Creek (lower FS 3114) and Jackson Creek (FS 29 and FS 2925 junction) would be excluded from treatment.

- Conduct maintenance burning within four blocks totaling 1,135 acres. Burns would be conducted starting in 2017 with Bunchgrass Meadows, and would subsequently be implemented on a 7-10 year interval. Burning would be conducted primarily in the fall, but may also be conducted as spring burning. The burn block near the 3114-2925 junction, which overlaps part of the Whiskey Creek LSR 4 core, would only be burned during a fall window.

- Implementing Road Work: No new system roads or temporary spur roads would be constructed.

- Road Maintenance- This project would include maintenance work on portions of approximately 44 miles of existing roads including: adding a 4"- 6" gravel lift at all roadside landings; dust abatement and ditch maintenance as needed; grading, shaping, and rocking of road surfaces; constructing, removing, and replacing water bars and rolling dips; replacing one 18" cross drain on FS Road 3114-300; opening, improvement and reclosing of FS-3114-260 (≈700'), and 3114-261 (≈1,000'); one non-system road connecting to FS-3114-260 would be subsoiled and removed after use (approximately 300'); roadside brushing; use of Coffin Butte quarry as an aggregate source and/or stockpiles of crushed aggregate at Three Cabin quarry and use of 3-4 existing disposal areas for material cleaned from ditches, road surfaces, and excess excavation.

- Connected actions would include repairing a 5' deep headcut in a ditch along FS Road 3114, log haul, replacement of the culvert on Soup Creek (FS Road 3114), and removal of gates on FS Road 3114 (2), FS Road 3114-600 (1), and FS Road 2980-800 (1) at the end of the project.

Table 2. Alternative 2 -- Unit Summary

Unit	Treatment	Acres			Logging System Acres		Fuels Treatment		
		Danger Tree Removal	Area Salvage	Volume (MBF)	Skyline	Ground-based	Hand Pile & Burn (acres)	Lop & Scatter (acres)	Number of Landing Piles
1	Commercial	----	44.2	328	35.0	9.2	----	----	12
2	Commercial	----	7.8	129	7.8	0.0	----	----	9
3	Firewood	----	6.2	----	0.0	6.2	----	6.2	----
4	Firewood & Commercial	----	6.8	105	0.0	6.8	----	2.0	1
5	Commercial	----	34.7	320	24.0	10.7	----	----	5
6	Commercial	15.8	----	538	0.0	15.8	----	----	6
7	Commercial	5.9	----	221	0.0	5.9	----	----	2
8	Firewood & Commercial	12.7	----	27	0.0	12.7	----	12.7	1
9	Commercial	8.5	----	249	0.0	8.5	----	----	3
10	Commercial	11.4	----	296	0.0	11.4	----	----	4
11	Commercial	6.4	----	108	0.0	6.4	----	----	2
12	Firewood & Commercial	2.5	----	54	0.0	2.5	----	0.5	1
13	Commercial	9.0	----	162	0.0	9.0	----	----	3
14	Firewood	0.3	----	----	0.0	0.3	----	3.4	----
15	Firewood	4.0	----	----	0.0	4.0	----	4.0	----
16	Firewood	1.6	----	----	0.0	1.6	----	1.6	----
17	Commercial	1.8	----	48	0.0	1.8	----	----	2
18	Commercial	2.9	----	65	0.0	2.9	----	----	3
19	Commercial	4.5	----	89	0.0	4.5	----	----	2
20	Commercial	0.4	----	13	0.0	0.4	----	----	2
21	Commercial	0.9	----	46	0.0	0.9	----	----	1
22	Commercial	12.1	----	118	0.0	12.1	----	----	2
23	Firewood	3.5	----	----	0.0	3.5	----	3.5	----
24	Firewood	1.1	----	----	0.0	1.1	----	1.1	----
25	Commercial	4.6	----	83	0.0	4.6	----	----	2
26	Commercial	0.7	----	11	0.0	0.7	----	----	1
27	Commercial	0.9	----	24	0.0	0.9	----	----	1
28	Commercial	9.4	----	59	0.0	9.4	----	----	2
29	Commercial	1.4	----	27	0.0	1.4	----	----	1
30	Commercial	0.5	----	13	0.0	0.5	----	----	1
31	Commercial	0.7	----	30	0.0	0.7	----	----	1

Unit	Treatment	Acres			Logging System Acres		Fuels Treatment		
		Danger Tree Removal	Area Salvage	Volume (MBF)	Skyline	Ground-based	Hand Pile & Burn (acres)	Lop & Scatter (acres)	Number of Landing Piles
32	Commercial	58.1	----	245	0.0	58.1	----	----	8
33	Firewood	1.8	----	----	0.0	1.8	----	1.8	----
34	Firewood	0.7	----	----	0.0	0.7	----	0.7	----
35	Firewood	0.5	----	----	0.0	0.5	----	0.5	----
36	Firewood	1.1	----	----	0.0	1.1	----	1.1	----
37	Firewood	1.1	----	----	0.0	1.1	----	1.1	----
	Shaded Fuel Break	----	----	----	----	----	797	163	----
Total		**187**	**100**	**3,408**	**66**	**222**	**797**	**203**	**78**

COMPARISION OF ALTERNATIVES

Table 3 compares the alternatives by the elements of the Purpose and Need, the issue indicators, and summarizes other activities, actions, and effects that would occur.

Table 3. Comparison of Alternatives

	Alternative 1	Alternative 2
Public & Fire Fighter Safety • Miles of Road with Danger Trees Removed • Acres of Danger Trees Removed • Miles of Shaded Fuel Breaks • Acres of Maintenance Burning	 0 0 0 0	 6.25 188 31 1,135
Timber Production • Volume of timber harvested (mbf) • Return to Treasury • Benefit/Cost Ratio	 0 0 0	 3,408 $1,657,034 0.97
Logging Systems • Skyline (acres) • Ground-Based (acres)	 0 0	 66 222
Activity Fuels Treatments • Handpiling and pile burning in Shaded Fuel Breaks (acres) • Lop-and-scatter (acres) • Landing pile burning (piles)	 0 0 0	 797 163 78
Riparian Reserves • Salvage (acres) • Landings (acres) • Tailhold Trees Cut (each) • New Road Construction (miles) • Roadside Danger Tree Felling (acres) • Firewood Cutting/yarding (acres) • Prescribed Underburn (acres) • Shaded Fuel Break (acres) • Handline Construction (miles)	 0 0 0 0 0 0 0 0 0	 0 0 ≤132 0 34 0 128 229 0.3
Operating Seasonal Restrictions • Outside of Normal Operation Season to Winter Range Closure	N/A	11/1 – 11/30

BEST MANAGEMENT PRACTICES, PROJECT DESIGN FEATURES, AND MONITORING

The following measures apply to the Proposed Action. These requirements would be implemented in order to meet laws, regulations, and policies. In most cases they have been designed to reduce potential environmental effects.

Mitigation measures are defined as actions that:

- avoid the impact all together (such as avoiding harvest on unstable land);
- minimize impacts by limiting the degree or magnitude of the action;
- rectify the impact by repairing, rehabilitation, or restoring;
- reduce the impact over time by applying maintenance operations (such as road maintenance).

General Water Quality Best Management Practices (BMPs), symbolized by a checkmark (✓), are mitigation measures prescribed to protect the beneficial uses of water and to address water quality objectives as required by the Federal Clean Water Act and the 1990 Umpqua National Forest LRMP, as amended. Each BMP is listed by the code used in National Best Management Practices for Water Quality Management on National Forest System Lands, National Core BMP Technical Guide (USDA, 2012). A complete BMP checklist is included in the Project Record.

Other project design features (PDFs) not related to compliance with the Clean Water Act are indicated by a round bullet (•). Some of the items included in this list are not considered mitigation, but they are included in order to track project design features or prescriptive details. These are noted with the symbol (**Rx**). Monitoring is delineated by a lightning bolt (🗲). Contract provisions are noted in parentheses where they apply and Standards and Guidelines (S&Gs) from the Umpqua National Forest LRMP and Northwest Forest Plan also are listed.

LOGGING EROSION CONTOL MEASURES

BMPs Veg-1, Veg-2, Veg-3, Veg-7, Veg-8; Forest Plan S&Gs IV-60-5; IV-65-3, IV-71-13, IV-72-16.

OBJECTIVE: Ensure any increase in sedimentation is minimized during and after logging or associated activities. Logging methods are described in the Project Record.

ACTIONS:

✓ Identify areas with high erosion potential and adjust unit design during the planning process.

✓ Stream course protection would be used on all stream classes (BT6.5).

✓ Landings that have been used shall be sloped and ditched to allow water to drain or spread. (BT6.64) (BT6.63) (BT6.6).

✓Establish designated areas for equipment staging and parking to minimize the area of ground disturbance

✓Use provisions in the contract to implement and enforce erosion control on the project area.

✓Work with the contractor to locate landings, skid trails, and slash piles in suitable sites to avoid, minimize or mitigate potential for offsite erosion.

✓Develop erosion control and sediment plan that covers all disturbed areas including skid trails and roads, landings, cable corridors, water source sites, borrow sites or other areas disturbed during mechanical vegetation treatments.

✓Apply soil protective cover on disturbed areas where natural revegetation is inadequate to prevent offsite erosion before the rainy season.

✓Maintain the natural drainage pattern of the area.

✓Control, collect, detain, treat and/or disperse stormwater runoff from disturbed areas.
Divert surface runoff around bare areas with appropriate energy dissipation and sediment filters.
Place all required sediment control activities on sale area map.

✓*Install* sediment and stormwater controls prior to initiating surface disturbing activities. Routinely *inspect* disturbed areas to verify that erosion and stormwater controls are implemented and functioning as designed, and *maintain* erosion and stormwater controls as necessary to ensure proper and effective functioning.

✓Install suitable stormwater and erosion control measures to stabilize disturbed areas prior to seasonal shutdown of operations, or when severe storm or cumulative precipitation events that could result in sediment mobilization.

✓Operate equipment when soil compaction, displacement, erosion and sediment runoff would be minimized.

LOGGING PRACTICES

BMPs Veg-3, Veg-4, Veg-5, Veg-6, Veg-8; Forest Plan S&Gs IV-60-2, IV-60-5, IV-67-1, IV-68-2, IV-176, IV-188, IV-190.

OBJECTIVE: Minimize impacts to water quality and soil productivity from timber harvest to the extent practical through logging practices. (BT 6.5)

ACTIONS:

✓ To reduce the number of skyline corridors, corridors would average 100-150 feet apart from center to center.

✓ Yarding corridors would not be placed within or through riparian reserves or identified unique habitat areas.

✓ Riparian reserves and identified unique habitat areas would be placed on sale area maps.

✓ Use pre-existing skid trails at the discretion of the sale administrator and to the extent feasible. Ground-based equipment shall not operate on slopes that are greater than 25%, unless prior approval is obtained the Timber Sale Administrator. Location of all skid trails would be agreed to prior to felling, unless otherwise agreed to in writing (BT6.422) at an average of 100 feet apart.

✓ Landing size should be no larger than needed for a safe, efficient yarding, chipping, and loading operation (BT6.422).

✓Design and locate skid trails and skidding operations to minimize soil disturbance. Create new skid trails where re-use of existing ones would exacerbate soil and water quality impacts.

✓Locate skid trails outside of the riparian reserves.

✓Sub-soil landings outside of road prisms, all skid trails and un-inventoried non-system roads identified for project use. Subsoiling operations shall lift and fracture the soil between rips to a minimum depth of 20 inches. To further prevent the potential for runoff to be carried down the treated road surface the majority of subsoiling rips shall occurring across the road alignment. Where the soil is too rocky for subsoiling (pulling rock >5 inches in size to the surface). This requirement may be waived by a soil scientist or sale administrator where the ground is less than 20 inches to bedrock or too skeletal (>35% cobbles).

- A winged ripper shank and excavator are recommended for all subsoiling and covering the surface with slash in a single operational pass.

✓Water barring of skid trails may be used where subsoiling is not practical or has not been prescribed, upon approval by a soil scientist or sale administrator. Water bars need to be of adequate depth and length and spacing to effectively disperse surface water runoff without maintenance. Minimum recommended space would include: 200 feet for grades < 5%, 100 feet for grades 6-15%, 50 feet for grades >15%. Water bars should be skewed 30-45 degrees to the skid trail alignment and excavated at least 18 inches below road grade. Runoff outlets would be constructed to prevent ponding behind water bars. Wherever possible, locate outlets to drain onto vegetated undisturbed soil areas.

✓Block skid trails to prevent vehicle access.

✓When skid trails cannot be subsoiled before September 30, cover skid trails with ground cover (straw, slash, wood chips) at a minimum application rate equivalent to a 2-inch application of straw (applied at 2 tons per acre, 80% effective ground cover).

✓Perform skidding/yarding operations when soil conditions are such that soil compaction, displacement and erosion would be minimized. Suspend skidding/yarding operations when soil moisture levels could result in unacceptable soil damage.

✓All skid trail locations would be approved by Forest Service prior to their use. Adequate drainage and water dispersion are critical. Trails located at near right angle to contour shall not exceed 15% grade, since they are nearly impossible to properly drain. All other skid trails shall not exceed 25% grades other than short pitches to 35% less than 100 feet in length.

✓All skid trails used by the operator shall be subsoiled, or water barred where approved and made self-maintaining at the end of each operating season (by September 30 and kept current thereafter) in which they occur.

✓Directionally fell trees to facilitate efficient removal along pre-determined yarding patterns with the least number of passes and least amount of disturbed area (e.g. felling-to-the-lead).

✓Minimize the size and number of landings as practicable to accommodate safe, economical and efficient operations.

✓Re-use existing landings where their location is compatible with management objectives and water quality protection.

•Remove all logging related refuse (e.g. tires, chains, chokers, cable and miscellaneous discarded parts) and contaminated soil to a proper disposal site.

CONTROL OF PURCHASER OPERATIONS

BMPs Veg-1, Veg-2, Veg-4, Veg-5, Veg-6, Veg-7, Chem-1, Chem-3, Road-10 ; Forest Plan S&Gs IV-83-3, IV-82-5, IV-61-9.

OBJECTIVE: Enable the Forest Service to exercise control of operations to prevent impacts which could have detrimental results to water quality.

ACTIONS:

✓ Contract preparation and administration would include operating periods, modification language, and control and acceptance of purchaser work (BT6.1 and BT6.35).

✓ Purchaser erosion control structures and maintenance work which must be inspected prior to acceptance by the Forest Service are to be specified in the contract (CT6.6#).

✓ Pollutants from logging or road reconstruction equipment would be kept from entering waterways during servicing or refueling by selecting areas at least 150 feet away from wet areas and surface water, and by using a berm around sites to contain spills. If the volume of fuel exceeds 660 gallons in a single container or a total on site storage of 1320 gallons, a Spill Prevention Control and Countermeasures (SPCC) Plan (BT6.341) is required and the necessary equipment would be on site during operations (BT6.34). The purchaser shall take appropriate preventative measures to ensure that any spill does not enter any stream. Any spill that occurs must be reported to the Contracting Officer.

✓ All landing locations would be approved by the Forest Service prior to landing construction and agreed upon plans for the landing shall insure water quality protection (BT6.422).

✓Contractors shall furnish, install, maintain and contractor shall routinely inspect and maintain erosion and storm water controls as necessary to ensure proper and effective function in preventing all off-site movement of soil sediment (NBMP fac-2, LRMP IV-71 S&G 11).

✓Contractors who operated outside the normal operating season shall have a minimum of 1-ton of straw, *o*r equivalent material, *or* a chipper on the project area and available as needed for erosion control.

TEMPORARY and SYSTEM ROAD RECONSTRUCTION, MAINTENANCE, AND HAUL

BMPs AqEco-2, Chem-1, Chem-3, Road-3, Road-4, Road-6, Road-7, Road-10, Veg-1; Forest Plan S&G IV-83-6.

OBJECTIVE: To minimize sedimentation, the effects of water concentration on roadbeds, cut slopes or fill slopes, and subsequent production of sediment associated with road work.

ACTIONS:

✓ Roadwork contractors would have spill prevention and recovery equipment on site during all road construction operations as agreed to by the Forest Service.

✓ Avoid blading ditches that are vegetated, functioning and effectively draining.

✓ During reconstruction activities, waste material shall be placed in Forest Service approved waste sites.

✓Instream work would occur between July 1 and September 15 unless a waiver to work outside this window is first approved by the District Fisheries Biologist or Hydrologist. During construction, stream water would be diverted around the work site and back into the channel.

✓ Aggregate would be placed on access roads into water sources, as needed, to reduce the potential for sedimentation to enter stream channels.

✓ Relief culvert locations would be located, flagged, and approved by the Forest Service before installation to ensure that water is routed only onto stable soil/vegetation.

✓ No chemical dust abatement would be applied within 50 feet of perennial streams or any other stream crossing in which water is flowing during chemical application.

✓ No dust abatement chemicals would be applied within 1 foot of the outside edge of road ditch lines.

✓ Application of dust abatement would occur when streams are at their seasonal baseflow. Dust abatement would not be applied during rain or when a 3-day forecast shows any chance of rain.

✓ A soil scientist shall review obliteration of all legacy non-system roads or to treatment to initiate and finalize the treatment prescription; the effectiveness of the road obliteration prescription in preventing erosion and providing suitable plant habitat shall be monitored.

HAUL OUTSIDE the NORMAL OPERATING SEASON

Relevant Dates and Definitions:

Normal Operating Season (June 1 through October 31) - is the period in an average year when groundwater has moved deeper into the soil profile, when seasonal streams and drainage ditches typically stop flowing.

Outside Normal Operating Season (November 1 through May 31) - is the period in an average year when ground water recharge occurs and surface runoff typically occurs.

Erosion Control Deadline (September 30) – This is the date that erosion controls for all previously implemented activities prior to this date have been made current, including grass seeding would be brought up to date for the current season's activities. Following September 30, erosion controls would be in place and current as project progresses.

Erosion Control outside Normal Operation Season (November 1 through May 31) – All erosion control would be inspected and updated as needed to restrict off-site movement of sediment.

Temporary Roads – Recommended construction period (June 1 through August 30), Obliteration (before September 30) of the same year of construction. Must be storm-proofed (by September 30) if road is carried to an additional season. Not to be used outside the normal operating season. Include in C6105.

Off-Site Sediment Movement (any time of year) – The visible movement of sediment or turbid water beyond the area of disturbance. Surface sediment shall be prevented from occurring, or captured and retained on-site.

Sediment Delivery (any time of year) – The visible movement of sediment or turbid water to any annual or perennial aquatic habitat (fen, wetland, pond, lake, stream, etc.), or culvert that drains

to one. Potential violations: Umpqua Road Rules, Clean Water Act, including sections 303, 313, 319

Relevant Direction:
•Commercial Road Use Rules and Road Use Permit Requirements (USDA-Forest Service. May 2012. pp 6&7), for stopping wet weather haul when there are signs of "Road Distress".

•National Best Management Practices for water quality management on National Forest system lands (USDA- Forest Service. April 2012. Fac-2 pp 41&42) for erosion control and monitoring. FS-990a Vol 1: Nat'l Core BMP Tech. Guide.

•Road Maintenance Handbook 7709.59 Chapter 60 (USDA- Forest Service. R6) which considers any section of road that would require application of more than 75 cubic yards per mile of surface aggregate to prevent "road distress" from haul being done under a road construction contract during the normal operating season.

Actions:

✓Only those roads preapproved by Engineering for haul (currently FS Roads 1610, (delete 31-900 rd. not using) 1610 to 1610-300, 1610-300 to 16, 29 to 2925 north from 3114-600, 31 to 31-600, 31-600 to 2925-900, 3114, 3114-600 and 3114-500) requiring less than 75 cubic yards per mile of aggregate for road maintenance, or that have been brought up to Forest Service standards during the normal operating season would be considered suitable for haul outside the Normal Operating Season. Roads approved for haul, but later found to require more than 75 cubic yards per mile of spot rocking in order to prevent "road distress" would no longer be considered suitable until reconstructed during the next "normal operating season".

✓Haul and other project activities, other than erosion control and monitoring, will not occur within MA 11 (Big Game Winter Range) between December 1 and April 30.

✓Surface water runoff dispersion shall be adequate to prevent concentrations of surface water without the need for future maintenance. Road surfaces shall be bladed and shaped using T811 grading specifications. Structures such as waterbars, rolling dips, and grade changes shall be considered as required to further disperse surface runoff.

✓Road surface and roadside sediment controls shall be adequate to restrict the off-site movement of sediment. Erosion controls shall be applied proactively or at the first signs of erosion, road distress, or road subgrade pumping (refer to Commercial Road Use Rules and Road Use Permit Requirements, May 2012. pp 6 & 7).

✓Haul may need to be suspended or modified when rain in excess of ¼ inch is in the 24 hour forecast. Snow melt on the road surface would be handled the same as rain, when determining the potential for environmental and/or road damage as defined under the Commercial Road Use Rules and Road Use Permit Requirements.

✓Haul shall be suspended before or immediately when Road Distress (refer to Facility Distress, Road Rules Exhibit A) occurs. If maintenance to correct the problem cannot be performed, as when rain or snow is occurring or predicted, use must be reduced or stopped until maintenance can occur or signs of distress are no longer present. The Forest Service must agree in writing to a resumption of haul.

i. Road distress indicators on gravel surfaces are:

1. Surface course deformities (potholes, soft spots, ruts, etc.) greater than 2" in depth, or
2. Drainage not functioning as designed (surface and/or structures), or
3. When there is a ½ inch of slurry on the road surface.

ii. Road distress indicators on pavement are:

1. Any perceptible change in the pavement cross section or surface (cracking, shoving, etc.) caused by contract operations, or
2. Drainage structures not operating as designed.

✓All seeding for erosion control and other erosion control measures shall be implemented prior to September 30.

✓Erosion control measures shall restrict any off-site movement of sediment regardless of its potential for delivery to streams. This includes sediment movement from road surfaces, drainage ditches, skid trails, landings, etc.

✓All temporary erosion control structures and devices used to restrict erosion and sediment transport would be removed at the end of the project and inside of the following normal operating season. All captured sediment would be seeded with grass to stabilize or removed then placed and seeded in an approved location.

✓Existing un-inventoried non-system roads identified for short-term project use of two years or less are classified as "existing temporary". Roads identified as "existing temporary" shall meet the following criteria:

- Would be storm-proofed before October 31 to prevent concentrated surface water runoff and off-site movement of erosion, when carried to a second season;
- Would not be used between October 31 and June 1;
- Would be obliterated prior to September 30 within two years or less of their reconstruction.

✓Contractors are responsible for assessing, monitoring, and suspending or moderating their operations as needed to prevent soil displacement or surface erosion and restrict off-site movement of sediment. The following is provided as additional general operating guidelines to operators:

- Haul may need to be suspended or modified when rain is forecasted.
- Snow melt on the road surface would be handled the same as rain, when determining environmental and/or road damage as defined under the Commercial Road Use Rules and Road Use Permit Requirements.
- Contractors shall furnish, install, maintain and ultimately remove/dispose all temporary erosion control structures and devices to restrict erosion and sediment transport.
- Removal of erosion control structures would occur at the end of the project and inside of the normal operating season. All captured sediment would be seeded with grass to stabilize or removed then placed and seeded in an approved location.
- Contractors shall routinely inspect and maintain erosion and storm water controls as necessary to ensure proper and effective function in restricting off-site movement of soil sediment (NBMP fac-2, LRMP IV-71 S&G 11).

- Contractors who ONOS shall have a minimum of 1-ton of protected dry straw, or equivalent material, or a chipper on the project area and available as needed for erosion control.
- Contractors shall keep road maintenance current in regards to drainage features affected by operation, including ditches, culverts, and water-bars.

Timelines

Prior to September 30:
For disturbance occurring before this date, all seeding for erosion control and other erosion control measures would have been made current prior to September 30. One ton of straw shall be staged and available as need for erosion control.

October 1 to November 30:
All bare soil associated with the sale shall be effectively covered with wood chips, wood straw, weed free straw, slash sufficient to restrict off-site movement of sediment regardless of its potential for delivery to streams. The depth, coverage, and stability of ground cover shall be equal to or greater than an application of loose straw applied at a rate of 2-ton per acre (2 to 3 inch depth). This includes skid trails, landings, landing access, temporary roads, drainage ditches, and any portion of a roadway affected by project activities. The contractor is responsible for monitoring all drainage and erosion control features.

December 1 through June 1:
The contractor is responsible for monitoring all drainage and erosion control features

✗Qualified Forest Service personnel would monitor the following:

1. Erosion control measures for any off-site movement of sediment regardless of its potential for delivery to streams. This includes sediment movement from road surfaces, drainage ditches, skid trails, landings, etc.
2. All seeding for erosion control and all erosion control measures are in place prior to September 30**.**
3. All roads to be used for ONOS haul have been appropriately upgraded to standards.
4. All erosion control measures are functional and current with no more than ½ acre of exposed soil in active areas.
5. Compliance with restrictions to all harvest or haul not approved to occur outside normal operating season.

ROCK SOURCES

BMPs Min-6, Veg-8

ACTIONS:

✓ Rock quarry benches, access roads and work areas should be sloped to drain and disperse surface water without ponding. Runoff should not flow directly into streams.

FISHERIES/WATERSHED

BMPs AqEco-1, AqEco-2

ACTIONS:

✓ Hoses used for drafting water from fish-bearing streams must be equipped with a 5/32" mesh screen. Pumping of water for use in road maintenance must allow for the retention of at least 90% of the original stream flow below the pumping site.

RIPARIAN RESERVES

BMPs AqEco-2, AcEco-4, Veg-1, Veg-3; Forest Plan S&Gs IV-60-1, IV-60-4, 5, 6; IV-61-11, IV-33-5.

OBJECTIVE: Establish riparian area protection zones to minimize stream temperature increases, protect channel bank structure, and provide a debris filter for sediment and debris which could enter the channels, protect aquatic and riparian species habitat, and maintain a source of large woody debris for continued stream channel stability and structural diversity.

ACTIONS:

✓ Stream courses and wetlands would be identified on sale area maps.

✓ Streams and wetlands would be protected by applying no-cut riparian reserve buffers for commercial operations. No logging corridors or skid roads would be put through any riparian reserve. If trees are felled within any riparian reserve for tail holds, they would be left on site. When possible, these trees would be felled toward the stream.

✓ For any new streams or wetlands identified in the commercial units during project implementation, the district hydrologist or fish biologist would be consulted to assign appropriate buffers.

✓ The following are the required riparian reserve buffer widths to ensure protection of any unmapped riparian reserves identified during project implementation:

- all streams: 170' or slope break, whichever is greater
- wetlands greater than 1 acre: 170'
- wetlands smaller than 1 acre: to outer edge of wetland vegetation
- natural ponds: 340'
- potentially unstable areas: to full extent of instability

✓No wood would be removed from any riparian reserves, outside of the road prism, except where wood is likely to block culverts or road drainage. When possible, riparian logs would be bucked and only the portions likely to block the culvert would be removed.

✓No new landings would be constructed within riparian reserves

✓When replacing Soup Creek culvert, use stream simulation design to provide for aquatic organism passage.

✓All equipment and materials used near aquatic and riparian areas must be free of aquatic and riparian invasive species.

✓ Protect all no-harvest stream and wetland buffers with directional felling (C/CT6.41#), and waive debris cleanout of streams (B/BT6.5).

✓Specify AMZ layout, maintenance, and operating requirements in contracts, design plans and other necessary project documentation.

✓Clearly delineate riparian reserve locations and boundaries in the project area using suitable markings and/or structures. Maintain or reestablish these boundaries as necessary during project implementation or operation.

•No firewood cutting within riparian reserves.

•In roadside danger tree riparian reserve units, only trees evaluated as "likely" or "imminent" danger trees under the guidelines of the "Field Guide for Danger Tree Identification and Response" would be felled.

•Within riparian reserves, felled danger trees that fall onto the road prism would be removed from the site if less than 16" dbh; those danger trees that fall onto the road prism that are larger than 16" dbh would be moved to the downhill side outside the road prism to provide coarse wood.

SOIL AND SITE PRODUCTIVITY

BMPs Veg-1, Veg-2, Veg-4, Veg-5, Veg-6, Veg-8; Forest Plan S&Gs IV-67-1, 2, 3, IV-71-12

ACTIONS:

✓ Designate and locate skid trails to minimize the area affected by logging operations; use pre-existing skid trails at the discretion of the sale administrator and to the extent feasible.

✓ Locate skid trails away from areas identified as having sensitive soils (such as conditionally unsuitable soils as mapped in the Project Record – Soils).

✓ Maintain at least 45%-65% effective ground cover in order to maintain soil productivity and prevent soil erosion.

• The levels of effective ground cover would be monitored, as funding allows. If monitoring determines that effective ground cover goals are not met then site specific recommendations would be developed by a soil scientist and the fire management officer. Monitoring would include representative samples of each yarding method, fuels treatment, subsoiling mitigation, and tree mortality along treatment areas to determine if soil management objectives are being met (S&G#11, LRMP IV-71).

Rx In order to minimize effects to soils, where practical, slash piles would be placed on new and existing skid trails that have been previously obliterated. When machines are used to pile slash, soil restoration and piling operations would be implemented together in a single pass with equipment that is suited for both operations (i.e. excavator with a combination subsoiler and brush-rake attachment).

FUELS MANAGEMENT AND AIR QUALITY

BMPs Chem-3, Fire-1, Fire-2, Veg-3, ; UNF LRMP S&G's IV-68-2, 3 & 4; IV-92-4, 7, 8; NWFP S&G's C-35 & 36, FM-1, FM-4; Forest Plan S&Gs IV-67-1, 2, 3, IV-71-12

OBJECTIVE: Meet air quality regulations and reduce water quality degradation and soil erosion caused by fuels treatments. Minimize soil compaction, soil displacement and damage to trees remaining after harvest.

ACTIONS:

✓Hand and grapple piles would be burned under moisture conditions that minimize impacts to soils.

✓Machine piles at landings would be built by grapple or shovel to keep dirt and rock debris out. No cat piling or pushing of piles.

✓Apply the following to minimize potential damage to riparian vegetation from activity fuels treatment: in commercial units, no piles would be constructed within riparian reserves.

✓Refueling small power equipment, such as chain saws and pumps, would occur at least 50 feet from any stream or wetland.

✓ Where fire line would be needed on slopes exceeding 30%, water bars would be installed. Fire line water bars would deflect surface run-off from the trail down slope onto stable material such as rock surface cover. Any fire line within 200' of any stream would be covered with slash or wood straw after use. Fire line construction would avoid sensitive areas like unique habitats and wetlands.

✓ Slash piles created by the purchaser around landings would be placed on soil surface that have already been impacted by disturbance (skid trails, landings, temporary roads), away from waterways and ditches.

✓Ignition of prescribed burns would be done away from streams so as to allow fire to back into the riparian zone, to minimize high severity effects to soil and riparian vegetation. Pre-treatment of vegetation would be done if necessary to prevent excessive impacts.

✓ Protect Pacific yew and hardwoods where possible.

Rx In order to minimize effects to soils, where practical, slash piles would be placed on new and existing skid trails.

Rx Hand piles would generally be constructed about 6' x 6' in size and not more than 5' high with slash material less than 6" diameter. The piles should be covered with four millimeter plastic sheeting to facilitate pile burning.

Rx Slash piles shall: 1) Be located a minimum of 10 feet from paved road surfaces and not be located in ditch lines or interfere with functioning of drainage structures or ditches; and 2) Be located a minimum of 10 feet from the base of any leave tree or snag (where possible).

✓ Burn plans would be prepared in advance of ignition and approved by the appropriate line officer for each activity fuels treatment.

•Within Riparian Reserves (outside of primary shade zones), fuel break treatments would be limited to pruning, and lop and scatter; no treatment would occur within the primary shade zone of any perennial stream or within 10' of any intermittent stream. Width of primary shade zone on each side of stream is as shown in Table 4:

Table 4. Primary Shade Zone Distances

Tree Height	Hill Slope		
	<30%	30% - 60 %	>60 %
	PSZ Distance (feet)		
< 20'	12	14	15
20' to 60'	28	33	55
60' to 100'	50	55	60
100' to 140'	70	75	85

• Air quality would be emphasized during activity fuels planning. All burning would be planned and conducted to comply with applicable air quality laws and regulations and coordinated with appropriate air quality regulatory agencies.

WILDLIFE MANAGEMENT

• Retain and protect existing large down wood greater than 16" during all project activities. Avoid mechanical impacts and movement of large down wood when possible. During maintenance burns, design burns to reduce the amount of large down wood which may be consumed by fire.

• Maintain patches and individual existing standing snags which exhibit structural complexity (i.e. broken tops, basal hollows, large horizontal branches, etc.) during all project activities. These leave patches and individual snags would be marked by District Wildlife Biologist or marking crew. Leave felled snags on site to contribute towards down wood percent cover.

• Except for salvage in Units 10, 9, and 3 all proposed actions would be done outside the critical breeding season (March 1- July 15) for the northern spotted owl.

• To protect nesting spotted owls, for proposed and connected actions that create above-ambient noise levels (i.e. road maintenance, brushing, subsoiling, etc.), abide by the terms and conditions in the programmatic Biological Opinion (Tails # 01EOFW00-2012-F-0035; Table 5).

• Guyline trees felled for safety reasons would be left on site after the cessation of logging operations. All anchor trees outside of unit boundaries are to be retained as either live trees or snags if they have been topped.

• To reduce impacts to nesting landbirds, burning of hand piles and machine piles would occur in the fall/winter months and not in spring or summer.

• Retain an average of 1 hand pile per acre within shaded fuelbreaks to provide prey base habitat for spotted owls.

• Shaded fuel breaks within green stands would maintain a minimum of 60% canopy cover regardless of diameter size.

• If a spotted owl is found nesting in the vicinity (65 yards) of harvest unit, the activity will stop, and the USFWS will be consulted.

• If a suspected TES species is found during the operating period, activities would cease until a Forest Service wildlife biologist can be contacted and an identification and evaluation can be made.

Table 5. Relevant Disruption Distances for the Northern Spotted Owl during the critical breeding period (March 1- July 15) for the Whiskey Salvage Project.

Disturbance Source	Disturbance Distance	
	Critical Breeding Period (March 1 - July 15)	Latter Breeding Period (July 16 – September 30)
Aircraft – Type I[2]	402 meters (.25 mile)	402 meters (.25 mile)
Aircraft – Fixed Wing and other[3] Helicopters	110 meters (120 yards)	None
Blasting – Quarries; more than two pounds of explosives	1610 meters (1 mile)	402 meters (.25 mile)
Blasting – Small charge; two pounds or less of explosives	110 meters (120 yards)	None
Chainsaw use – General	60 meters (65 yards)	None
Heavy Equipment , Road Maintenance/Brushing	32 meters (35 yards)	None
Roadside Salvage, firewood, post-and-poles	60 meters (65 yards)	None
[1]Noise disturbance were developed from a threshold of 92dB (USFWS 2003). [2]Type 1 Helicopters seat at least 16 people and have a minimum capacity of 5,000lbs. Both CH-47 (Chinook) and UH-60 (Blackhawk) are Type 1 helicopters [3]All other helicopters (including Kmax)		

SILVICULTURE AND VEGETATION MANAGEMENT

OBJECTIVE: To manage and protect desired vegetation and to reforest all suitable land within five years after harvest.

ACTIONS:
Rx To meet standards and guidelines for roadside/firewood units (C-40), a minimum of 120 linear feet per acre of coarse down wood would be retained (≥16'' dbh and at least 16 foot length logs).

Rx Prior to issuing permits for firewood in post-roadside salvage units, District Fuels Specialist and Wildlife Biologist would ensure that coarse woody debris levels are adequate to meet standards and guidelines for coarse wood in Matrix Land Use Allocation (C-40).

Rx Retain at least 6 snags per acre which exhibit structural complexity (i.e. broken tops, basal hollows, large horizontal branches, decadence etc.). These leave patches and individual snags would be marked by marking crew and/or Forest Service Wildlife Biologists. In absence of structurally complex snags, retain a minimum of 5- 6 snags ≥20'' dbh per acre. Pre-fire snags within salvage units would not contribute towards the 6 snags per acre total.

Rx If feasible, in skyline units, retain all trees used as anchors in the skyline operation as long as they do not pose a hazard.

Rx OSHA requires that dangerous trees/snags be felled to protect workers on the ground during forest operations. Snags that must be felled for safety reasons should be retained on the forest floor to help attain down wood requirements.

BOTANY

R-6 Invasive Plant FEIS S&G: 2, 3, 7, & 13

Contract Provision: B/BT6.35

ACTIONS:

• Treatment of weeds would be based on the Forest Integrated Weed Management Decision Notice and Finding of No Significant Impact signed in June 2003. The Forest Service would flag noxious weed sites to be avoided in the higher priority sites, prior to work commencing. Infested sites to be avoided would be marked with florescent orange flagging and labeled "NOXIOUS WEEDS" with black lettering. Contractor would avoid ground-disturbing activities in the flagged and/or staked areas unless otherwise directed by the Forest Service.

• Conduct road blading, brushing and ditch cleaning in areas with high concentrations of invasive plants in consultation with District or Forest-level invasive plant specialists; incorporate invasive plant prevention practices as appropriate (Prevention Standard 8 - Regional Invasive Plants FEIS). Whenever possible, roadside brushing would be accomplished prior to seed setting of noxious weed species (approximately late June) in noxious weed flagged areas. The intent of this is to stop and/or prevent noxious weed spread and establishment.

• Actions conducted or authorized by written permit by the Forest Service that would operate outside the limits of the road prism (including public works and service contracts) require the cleaning of all heavy equipment (bulldozers, skidders, graders, backhoes, dump trucks, etc.) prior to entering National Forest System Lands (Prevention Standard 2—Regional Invasive Plants FEIS and B/BT6.35).

• A District or Forest weed specialist would inspect active gravel, fill, sand stockpiles, quarry sites and borrow material for invasive plants before use and transport. Use only gravel, fill, sand, and rock that is judged to be weed free by District or Forest weed specialists (including material from commercial sites) (Prevention Standard 7 - Regional Invasive Plants FEIS).

• Treat or require treatment of infested sources before any use of pit material (Prevention Standard 7 - Regional Invasive Plants FEIS). Starting with the highest slopes that have invasive vegetation growing in previously disturbed areas, scrape off the top several inches of soil and rock to remove the seed bank. Stockpile this material in a location at the quarry where it would not be disturbed. This contaminated material would be monitored and covered as necessary to ensure it does not become a future source of weeds at the quarry.

• After harvest and other treatments, monitor and treat remaining or new infestations of noxious weeds.

• Plant vegetation on sites where weeds are removed as well as in areas where exposed mineral soil provides optimal conditions for weeds to colonize. Native plant materials are the first choice in re-vegetation for restoration and rehabilitation where timely natural regeneration of the native plant community is not likely to occur. Non-native, non-invasive plant species may be used in any of the following situations: 1) when needed in emergency conditions to protect basic resource values (e.g., soil stability, water quality and to help prevent the establishment of invasive species); 2) as an interim, non-persistent measure designed to aid in the re-establishment of native plants; 3) if native plant materials are not available; or 4) in permanently altered plant communities. Under no circumstances would non-native invasive plant species be used for revegetation (Prevention Standard 13 - Regional Invasive Plants FEIS).

• If needed, use weed-free straw and mulch for all projects conducted or authorized by the Forest Service on National Forest System Lands. If State certified straw and/or mulch are not available, then it must be certified noxious weed-free. Consult with the District or Forest weed specialist for certifying agencies (Prevention Standard 3 - Regional Invasive Plants FEIS). Note: because of the aquatic nature of rice, the harvested straw is already considered weed-seed free. The District or Forest weed specialist may approve the use of rice straw for some applications.

•No mechanized equipment should be moved through or staged in identified Unique Habitat areas.

•Avoid running equipment or yarding wood through BAER Mulch Test Area (Roadside removal Unit #23, along 2925-900 road between 930 and 925 spurs. Fall away from plots where possible, as safety considerations allow. Sale maps would include BAER Mulch Test Area.

RECREATION and HERITAGE RESOURCES

S&G: IV-19-2; IV-24-5, 6; IV-25-10, 11; USDA Handbook 462 Pg 32-35; IV-29-5 (Cultural Resources); IV-19-1, 2, 4, 5, 6, 8, 10, 12 (Visual Resource).

• In the event that an unknown historic or prehistoric site is discovered in the course of the project, the activity would be stopped and the Forest Archaeologist would be contacted. Appropriate measures would be taken to stop any adverse effects to the site resulting from the activity (BT6.24). Any adverse effects, should they occur, shall be mitigated.

• Site monitoring would be conducted in order to protect known cultural resources.

• A truck haul warning sign would be placed at the appropriate locations along haul routes to warn recreationists of oncoming log truck traffic.

• Restrict haul on FS Road 3114-600 to Monday – Friday 7 am to 5 pm, with no haul on holidays, to minimize audio impacts to the Whiskey Camp Cabin renters. Establish a no “Jake Brake” area 1000’ either side of the FS Road 3114-645.

CHAPTER 3 - AFFECTED ENVIRONMENT AND ENVIRONMENTAL EFFECTS

This chapter describes the components and scope of the human environment that may be affected by implementation of the alternatives outlined in Chapter 2 and discloses the potential consequences of implementing each alternative, including the best management practices and project design features.

This chapter presents the scientific and analytic basis for the comparison of alternatives. The effects are discussed in terms of social and environmental changes from the current condition and include qualitative and quantitative assessments, where possible. All discussions are tiered to the Final Environmental Impact Statement (FEIS) of the 1990 Umpqua National Forest LRMP, as amended, the 2005 Final Environmental Impact Statement for the Pacific Northwest Region Invasive Plant Program, 1995 Jackson Creek Watershed Analysis (WA) and the 2012 iteration, 1996 Buckeye/Zinc Watershed Analysis (WA), 1997 Boulder-Ash WA, 2004 Upper South Umpqua Watershed Analysis (WA), as well as the 2006 Umpqua Basin Total Maximum Daily Load (TMDL) and Water Quality Management Plan (ODEQ), and the 2008 South Umpqua Sub-basin Water Quality Restoration Plan. This chapter also incorporates by reference all reports and analyses prepared by resource specialists, which are summarized in this chapter.

ACTIVITIES THAT MAY CONTRIBUTE TO CUMULATIVE EFFECTS

The tables below document the relevant past, present, and reasonably foreseeable activities that may contribute to cumulative effects for the Whiskey Complex Project. The Council on Environmental Quality issued a memo stating that agencies are not required to "catalogue or exhaustively list and analyze all individual past actions" (CEQ memo, June 24, 2005). Instead, agencies should use scoping to focus on relevant past actions and discuss their relevance in terms of the cause and effect they had on a resource. This direction is followed in this project Table 6, Table 7, and Table 8 summarize information known about the planning area.

Table 6. Past Management Activities in the Beaver and Lower Jackson 6th field HUCs

Activity	Decade	Acres/Miles	Description and Extent of Activity
Overstory Removal	1950's 1960's 1970's 1980's 1990's **Total**	50 813 2,909 553 338 **4,663 acres**	The cutting of trees constituting an upper canopy layer to release understory trees. The primary source of regeneration is advanced reproduction.
Clearcut Harvest on Private Land	~60's-80's Total	1595 **1,595 acres**	Clearcut harvest that has occurred on private land within the project area boundary

Activity	Decade	Acres/Miles	Description and Extent of Activity
Stand Clearcut	1950's 1960's 1970's 1980's 1990's **Total**	2,585 2,908 671 2,600 261 **9,025 acres**	An even-aged regeneration or harvest method that removes all trees in the stand producing a fully exposed microclimate for the development of a new age class in one entry.
Shelterwood Cut	1970's 1980's 1990's **Total**	600 639 82 **1,321 acres**	A type of cut that removes trees except those needed for the purpose of seed production. Prepares the seed bed and creates a new age class in a moderated microenvironment.
Shelterwood Preparatory cut	1970's 1980's **Total**	193 20 **2,130 acres**	An optional cut to enhance conditions for seed production and/or develop wind-firmness for a future shelterwood establishment cut.
Seed-tree Seed Cut	1960's 1970's 1980's 1990's **Total**	10 567 850 146 **1,573 acres**	A type of cut that removes trees except those needed for the purpose of seed production. Prepares the seed bed and creates a new age class in an exposed microenvironment.
Shelterwood Removal Cut	1970's 1980's 1990's **Total**	220 566 617 **1,403 acres**	A final removal cut that releases established regeneration from overstory competition after it is no longer needed for shelter under the shelterwood regeneration method.
Single-tree Selection	1960's 1970's 1980's 1990's **Total**	1,410 6,567 265 151 **8,393 acres**	An intermediate harvest that partially removes the overstory in a prepatory or establishment cut of either a shelterwood or seed-tree harvest system.
Commercial Thin	1970's 1980's 1990's 2000's **Total**	515 1,739 214 1,470 **4,270 acres**	An intermediate harvest with the objective of reducing stand density primarily to improve growth, enhance forest health, and other resource objectives.
Sanitation Cut	1960's 1970's 1980's 1990's 2000's **Total**	491 1,946 54 271 11 **2,773 acres**	An intermediate harvest removing trees to improve stand health by stopping or reducing the actual or anticipated spread of insects and disease.
Salvage Cut	1960's 1970's 1980's 1990's **Total**	3,126 4,518 1,067 506 **9,217 acres**	An intermediate harvest removing trees which are dead or dying because of injurious agents other than competition, to recover economic value that would otherwise be lost.

Activity	Decade	Acres/Miles	Description and Extent of Activity
Broadcast Burning	1950's 1960's 1970's 1980's 1990's **Total**	2,105 2,599 2,546 2,199 820 **10,274 acres**	Manipulation of a site by prescribed burning to enhance the success of regeneration and/or control of understory vegetation
Plant Trees	1950's 1960's 1970's 1980's 1990's 2000's **Total**	1,301 4,090 4,713 4,593 3201 190 **18,087 acres**	The establishment or re-establishment of forest cover artificially by planting seedlings and/or cuttings with or without site preparation.
Pre-Commercial thinning	1970's 1980's 1990's 2000's **Total**	528 1,336 1,580 363 **3,807 acres**	The cutting of trees not for immediate financial return but to reduce stocking.
Fertilization	1970's 1980's 1990's **Total**	125 564 1107 **1,796 acres**	The addition of nutrient elements to increase growth rate, tree vigor or overcome a nutrient deficiency in the soil.
Burning of Piled Material and Underburn	1970's 1980's 1990's 2000's **Total**	865 1,242 1,549 254 **3,910 acres**	Burning of activity generated fuels, or low intensity fire throughout a majority of a harvest unit.
In Stream Fish Habitat Enhancement	2000-2010 **Total**	**5 miles**	Placement of large wood structure in Beaver Creek
Wildfire	2002-2013	**17,926 Acres**	Effects from Wildfire and fire suppression

Table 7. Past Management Activities in the Ash/Zinc and Skillet/Emerson 6th Field HUCs

Activity	Decade	Acres/Miles	Description and Extent of Activity
Overstory Removal	1960's 1970's 1980's 1990's **Total**	580 489 274 41 **1,384 acres**	The cutting of trees constituting an upper canopy layer to release understory trees. The primary source of regeneration is advanced reproduction.
Stand Clearcut	1950's 1960's 1970's 1980's 1990's **Total**	2,950 1,431 496 1,401 611 **6,889 acres**	An even-aged regeneration or harvest method that removes all trees in the stand producing a fully exposed microclimate for the development of a new age class in one entry.
Shelterwood Cut	1970's 1980's 1990's **Total**	160 413 11 **584 acres**	A type of cut that removes trees except those needed for the purpose of seed production. Prepares the seed bed and creates a new age class in a moderated microenvironment.

Activity	Decade	Acres/Miles	Description and Extent of Activity
Shelterwood Preparatory cut	1970's **Total**	24 **24 acres**	An optional cut to enhance conditions for seed production and/or develop wind-firmness for a future shelterwood establishment cut.
Seed-tree Seed Cut	1950's 1960's 1970's 1980's 1990's **Total**	166 0 120 315 84 **685 acres**	A type of cut that removes trees except those needed for the purpose of seed production. Prepares the seed bed and creates a new age class in an exposed microenvironment.
Shelterwood Removal Cut	1960's 1970's 1980's 1990's **Total**	72 27 321 236 **656 acres**	A final removal cut that releases established regeneration from overstory competition after it is no longer needed for shelter under the shelterwood regeneration method.
Single-tree Selection	1950's 1960's 1970's 1980's 1990's **Total**	728 538 3,783 231 1 **5,281 acres**	An intermediate harvest that partially removes the overstory in a prepatory or establishment cut of either a shelterwood or seed-tree harvest system.
Commercial Thin	1970's 1980's 1990's 2000's **Total**	12 364 129 651 **1,156 acres**	An intermediate harvest with the objective of reducing stand density primarily to improve growth, enhance forest health, and other resource objectives.
Sanitation Cut	1970's 1980's **Total**	1,879 74 **1,953 acres**	An intermediate harvest removing trees to improve stand health by stopping or reducing the actual or anticipated spread of insects and disease.
Salvage Cut	1960's 1970's 1980's 1990's 2000's **Total**	1,318 3,105 252 65 235 **4,975 acres**	An intermediate harvest removing trees which are dead or dying because of injurious agents other than competition, to recover economic value that would otherwise be lost.
Broadcast Burning	1950's 1960's 1970's 1980's 1990's **Total**	2,600 1,045 736 1,444 196 **6,021 acres**	Manipulation of a site by prescribed burning to enhance the success of regeneration and/or control of understory vegetation
Plant Trees	1950's 1960's 1970's 1980's 1990's 2000's **Total**	1,725 606 1,004 1,194 1,104 2,316 **7,949 acres**	The establishment or re-establishment of forest cover artificially by planting seedlings and/or cuttings with or without site preparation.

Activity	Decade	Acres/Miles	Description and Extent of Activity
Pre-Commercial thinning	1960's 1970's 1980's 1990's 2000's **Total**	111 903 1,070 1,001 454 **3,544 acres**	The cutting of trees not for immediate financial return but to reduce stocking.
Fertilization	1980's 1990's **Total**	677 695 **1,372 acres**	The addition of nutrient elements to increase growth rate, tree vigor or overcome a nutrient deficiency in the soil.
Burning of Piled Material and Underburn	1960's 1970's 1980's 1990's 2000's **Total**	50 3,119 780 955 738 **5,642 acres**	Burning of activity generated fuels, or low intensity fire throughout a majority of a harvest unit.
In Stream Fish Habitat Enhancement	2000-2013 **Total**	**6 miles**	Placement of large wood structure in Beaver Creek
Wildfire	2002-2013	**4,915 Acres**	Effects from Wildfire and fire suppression

Table 8. Ongoing and Reasonably Foreseeable Activities in the Planning Area

Activity Type	Acres/Miles	Notes
Noxious Weed Treatment	**100 acres**	Ongoing treatment of noxious weeds in the watershed
Private Land Harvest or Thinning	**1,200 acres**	It can be assumed that private industrial lands within the planning area boundary may be subject to harvest at 40 year intervals
Road Maintenance	**15 miles**	Ongoing maintenance of road system in the watershed
North Beaver Prescribed Fire	**396 acres**	Future Prescribed Fire Plan for burning timbered stands and Bunchgrass Meadows
Pre-commercial thinning (PCT)	**85 acres**	Tiller Aquatic Restoration Project proposes 85 acres of PCT in riparian reserves
In Stream Fish Habitat Enhancement	**2 miles**	Placement of large wood and rock structures in Zinc Creek and South Umpqua River.
Commercial Thinning	**1,876 Acres**	Harvest of Victor, LeavItTo and Benny Sales
Pile and Burn Material	**865 Acres**	Piles burning of commercial thin units in Victor, LeavItTo and Benny Sales
Timber Salvage (Beaver)	**56 acres**	Salvage of burned timber sale units in Victor and LeavItTo Sale areas.
Tree Planting	**2,800 acres**	Planting of conifers and hardwoods within Whiskey Fire perimeter.
Whiskey Fire BAER Treatments Gates Cross Channel Tree Felling Culverts	 **4 sites** **2.5 mi.**	Place gates to prevent road damage and protect public. Fell trees across headwater streams to capture sediment and dissipate energy. Replace one culvert and armor two drainage dips.

Activity Type	Acres/Miles	Notes
Whiskey Fire Suppression Rehabilitation Treatments Dozer Line Handline Roads Drop Points Water Sources Fish Log Placement	 **12.5 mi.** **9 mi.** **90 mi.** **30 sites** **18 sites** **40 trees**	Rehabilitation of dozer and handline through berm removal, slash placement, mulching, and water bar placement. Roads include grading, berm removal, drainage improvement and ditch cleaning. Drop point and water source rehab includes mulching, water bar placement and blocking access where appropriate. Place trees in stream channel where instream structures have been damaged.

SOCIAL ENVIRONMENT

Economics

The economic analysis focuses on the direct, indirect, and induced costs and benefits of the alternatives and the connected actions described in Chapter 2. Net present value and benefit/cost ratio are the primary criteria used to compare the direct effects of the alternatives to the Federal Government, termed economic efficiency analysis. Impacts to the general economy of the area are modeled using IMPLAN Professional, an input/output model developed by the Forest Service (IMPLAN 2000). The most current IMPLAN data available is 2010. Assumptions regarding the economic analysis are footnoted where appropriate.

Merchantable sawtimber sold from Umpqua National Forest land is generally marketed to manufacturing facilities in Douglas County, Oregon, therefore, the economic effects of the alternatives will be assessed at the scale of Douglas County. A figure of 3.1 million board feet is used to estimate the contribution of each alternative towards meeting demand. Final demand is assumed to be wood products ready for shipment at the mill yards.

Douglas County Economic Situation

Total employment in Douglas County is difficult to quantify exactly, as the Oregon Labor Market Information System (OLMIS), Census Bureau, and IMPLAN use different criteria to measure employment. Because of this, percentages and relative differences are used for analysis where possible instead of absolute numbers.

The 2008-2009 recession impacted the timber industry in the county especially hard. Unemployment in Douglas County rose from 8.3% in January of 2008 to the highest point in May, 2009 at 16.5% (OLMIS 2014). Current unemployment stands at 10.0% and has been trending slowly downward. According to OLMIS, the county lost 330 logging and wood products manufacturing jobs from January of 2008 through December of 2012.

In 2010, the logging, forestry and wood products manufacturing sectors provided about 9.1% of Douglas County's employment, and 28.6% of the overall industrial output, according to the 2010 IMPLAN data. IMPLAN data through 2010 show total employment in Douglas County has declined by 1.8% since 2002, however, the decline is 38% in forestry, logging and wood products manufacturing. The average annual wage paid in the county in 2010 was $30,978, compared to the forestry, logging, and wood products manufacturing average wage of $56,878 based on the 2010 IMPLAN data. Even with the decline, wood products industry employment is a key part of the economy of Douglas County.

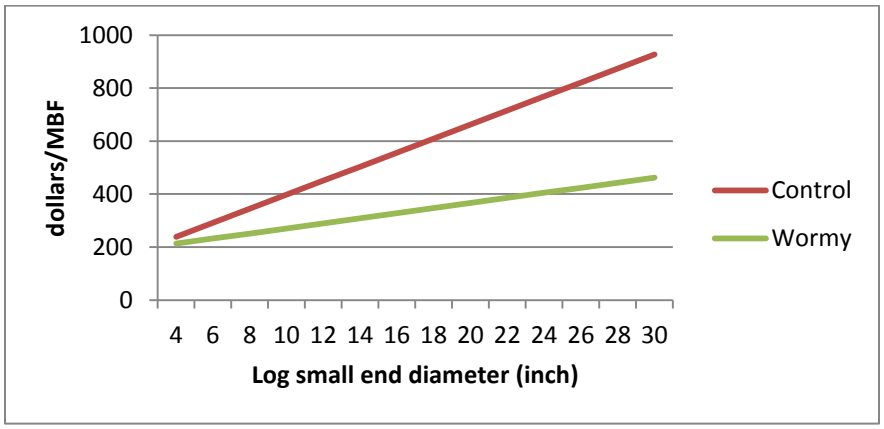
Timber Volume and Value Deterioration

Fire-killed timber undergoes physical deterioration and decay quickly, although studies to quantify the causes and rates of volume loss are limited. The two primary defects that result in scale deductions are weather checks and sap rot. Blue stain in pines, while not a volume loss, is an important economic loss due to reduction in grade (Lowell and Cahill 1996).

Andris Eglitis, a Forest Service entomologist, found significant blue stain in Ponderosa pine following a fire on the Ochoco National Forest in August of 2000 (Eglitis 2006). He found 100% of the butt logs had blue stain 1 year after the fire, and the percentage of stain throughout the whole trees increased to near 100% by the second year.

Blue stained logs are manufactured into lower value end products. The value reduction due to blue stain in Ponderosa pine from the Whiskey fire area is estimated from data published in 2007 by Lowell and Parry. In a mill recovery study of fire-killed Ponderosa pine, a significant drop in average lumber value was found, which is generalized in Figure 9.

Figure 9. Ponderosa Pine Value Loss Due to Blue Stain



For this analysis, the following value reductions for blue stain are estimated for the life of the salvage harvest. Earlier salvage would experience lower reductions in value.

1. Large Ponderosa pine (>26" DBH) = 42%
2. Small Ponderosa pine (12 to 26" DBH) = 35%

Published studies of volume deterioration of fire-killed trees are summarized by Lowell for important western species, including Ponderosa pine (Lowell, et al., 1992). The Pacific Southwest Region of the Forest Service used Lowell's information to publish guidelines for volume reduction for dead trees. (FSH R5-2409.12-2, 2010) Estimates of the reduction in volume for the Whiskey fire for Ponderosa pine over time are shown in Table 9.

Table 9. Ponderosa Pine Percent Sound Board Foot Volume

DBH	2014	2015	2016
10	100	48	12
20	100	53	21
30	100	58	30

Dave Schultz, a Forest Service entomologist, summarized the most comprehensive study of deterioration rates he could find (Kimmey, 1955; and Schultz, 1994). The summary lists the following conditions as affecting decay rates:

1. Tree species – Douglas-fir decays slower than others
2. Tree size – large diameter decays more slowly
3. Percent sapwood – sapwood decays quickly
4. Growth rate – greater rings per inch decays more slowly
5. Climate – cold (<41 degrees) slows decay
6. Elevation – high (no range given) has slower decay rates
7. Aspect – north slope timber decays more slowly

Table 10 displays the effects of decay on Douglas-fir by diameter as summarized by Schultz. These numbers can be considered worst-case as many of the conditions tied to slower decay are present in the sale area. The numbers for each year are percent sound board-foot volume remaining.

Table 10. Douglas-fir Percent Sound Board Foot Volume

DBH	2014	2015	2016
12	82	35	30
20	85	45	44
30	89	57	56
40	92	66	64
50	93	73	72

Lowell and Cahill found significantly less volume loss in a study of fire-killed timber in Northern California and Southern Oregon coastal forests. They reported average volume loss of less than 10% in the second year for all species (Lowell and Cahill, 1996). Neither study described the time of year their data were taken.

For analysis purposes, the rates given in these tables are assumed to be as of the fall of each year, after the hot, dry season. The assumption is that if the timber is logged before the fall of 2014, minor volume loss would be experienced. Thereafter, significantly more loss would occur, resulting in worse economic recovery.

It is estimated that the harvest would take place in the fall of 2014 and the summer of 2015, with 30% of the volume harvested in the fall of 2014. Based on these assumptions, the economic efficiency analysis would use the following volumes by species:

1. Douglas-fir – 1,900 MBF net volume harvested.
2. Hemlock – white fir – 173 MBF net volume harvested.
3. Ponderosa pine – 1,382 MBF net volume harvested.

These volumes represent an approximately 47% total loss in volume due to deterioration after the fire at the time of harvest.

Economic Efficiency Analysis

The direct economic effects of the alternatives are displayed in Table 11. The standard criterion for deciding whether a government program can be justified on economic principles is net present value (NPV) – the discounted[1] monetized [2]value of expected net benefits (OMB A-94).

Forest Service planning costs are not included in the economic efficiency analysis shown in Table 11 since they are considered sunk (OMB A-94). It is estimated that this project has cost about $43,000 to plan. Based on the expected return to the Federal government shown in Table 11, the action alternative is above-cost, including Forest Service planning, sale preparation, and administration costs. Alternative 1 is considered below-cost since there would be no return to the U.S. Treasury with expenditures for planning.

Table 11. Economic Efficiency Analysis

	Alt 2
Timber Volume (MBF)[3] sound sawlog volume harvested	3,408
Total Acres Harvested	288
Volume (MBF)/Acre	12.0
Total Present Value Benefits	
Gross Benefits	$1,657,034
Value/MBF	$480
Value/Acre	$5,754
Total Present Value Costs	
FS Prep & Admin	$95,748
Logging	$779,204
Slash Disposal	$28,293
Road Work	$82,101
Reforestation	$0
Sale Area Improvements (available from the timber sale)	$555,570
Fuels Treatments not funded by the timber sale (approx. 23% of planned treatments)	$162,295
Total Cost	$1,703,211
Cost/MBF	$493
Cost/Acre	$5,914
Net Present Value	-$46,177
Stumpage (2014 dollars)	$861,988
Predicted Stumpage Price/MBF	$249.49

[1] Discounting is the process of calculating the present value of a future amount of money. 4% is the standard discount rate for long-term projects (OMB A-94).
[2] Lit. "to give the character of money to." A cost or benefit is monetized when it is expressed in terms of money.
[3] MBF is thousand board feet. The Forest Service estimates MBF using east-side Scribner rules.

	Alt 2
Potential Return to the Treasury[4]	$237,047
B/C Ratio[5]	0.97

Alternative 2 shows a positive timber sale value if harvested before the end of 2015. The timber sale could generate about 77% of the funds needed to conduct the shaded fuelbreak construction and the maintenance burning described in Chapter 2. Overall, this alternate has a negative Net Present Value and a Benefit /Cost ratio below 1.0. This alternative would need additional funding to complete all of the proposed action. It would, however, provide about $237,047 to the Treasury in 25% fund payments and $624,941 in Sale Area Improvements (2014 dollars).

It is anticipated that the timber sale marketed from the action alternative would be economically viable in 2014. Should the salvage harvest be delayed beyond 2015, the volume deterioration and value reduction would likely result in an uneconomic timber sale.

Log prices fluctuate due to a variety of market forces, many of which are external to Douglas County and Oregon. Typically, log prices are higher in the winter months and lower in the summer/fall, reflecting the availability of logging due to weather. The 2007-2009 recession and slowdown in nation-wide housing has caused the local log market to fall drastically. Figure 10 displays a composite log price average ($/mbf) for the local market since 1995 using Oregon Department of Forestry log price information (ODF 2014). The data in Figure 10 are not adjusted for inflation.

The economic efficiency analysis displayed in Table 11uses average local log prices from the most recent four quarters, adjusted for blue stain in the Ponderosa pine. Log prices hit historic lows during the 1st quarter of 2009 and have since come back to near average levels. The outlook for continued recovery is tenuous, but indications are for housing to continue to slowly improve. In the short-term, log prices could fluctuate based on actual blue stain and decay, import/export pressure, natural disasters, or general economic trends. If log prices decline, the value of the timber could reach a point where an individual sale may not be marketable. However unlikely, a decline in log prices of 53% or more from 4th quarter, 2013 local prices (about $228/MBF) would result in an economically unviable sale. It would be speculative to predict the local markets at the time of sale offer or operation.

Economic Impact Analysis

The economic impact analysis using IMPLAN considers changes in employment and income due to changes in the economic activity of the county from each alternative. Timber sales from the National Forest are viewed as raw material available for the local industry within Douglas County, allowing production and support for jobs in the local economy to be sustained. Local National Forest timber would offset logs imported to the area, potentially reducing overall costs and increasing production.

[4] This is calculated to at least cover the requirement for 25% Payments to Counties and 10% Road & Trail Fund. Some funds can be retained on the Forest in the Salvage Sale Fund, which would reduce the actual amount returned to the Treasury.

[5] B/C Ratio is the benefit/cost ratio, another standard criterion for economic efficiency. It is the product of the present value of benefits divided by the present value of costs.

Figure 10. Average Douglas-fir Log Prices per mbf, Roseburg Market Area.

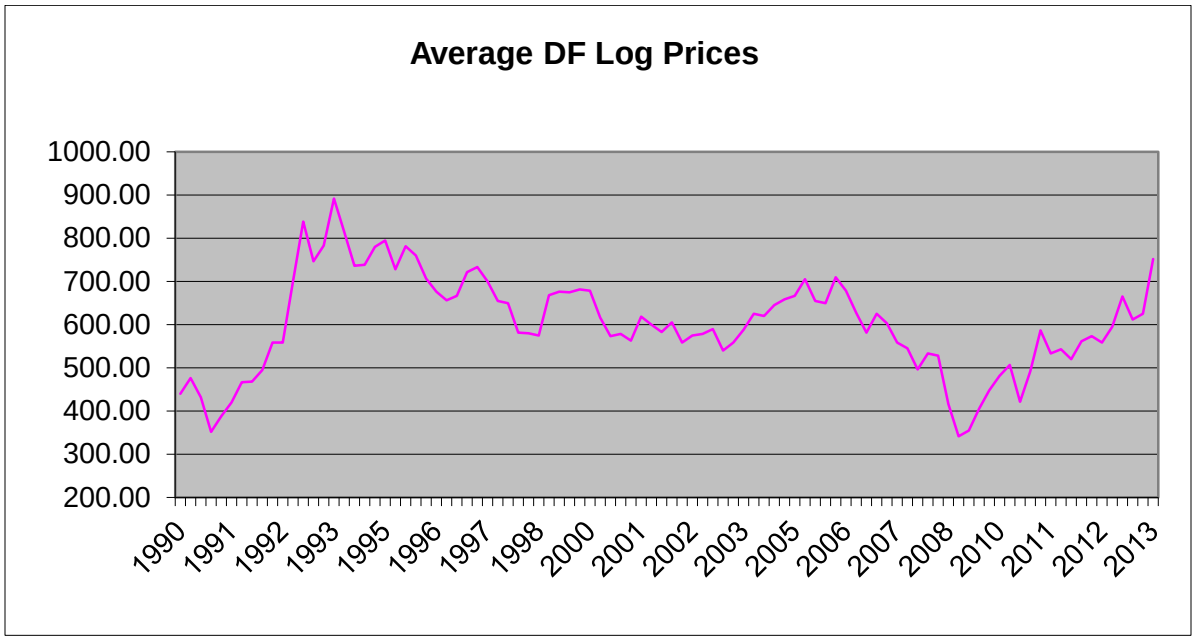


Table 12 displays the results of the economic impact analysis. In general, the sale of timber from the National Forest may result in sustained or increased employment in the logging and wood products manufacturing sectors, in forestry services (slash treatment, planting, etc.) and indirect and induced employment in many other sectors. Payments in lieu of taxes due to Douglas County from timber receipts are not included in these figures, as they are accounted for in the return to the Federal Treasury shown in Table 12.

Other direct, indirect, and induced benefits are derived from road work and other connected actions that may be funded by revenue from the timber sales or other funding sources. These work activities are treated as costs in the benefit/cost analysis since they reduce the revenue to the Federal Treasury, but they have economic benefits to the local community since most are contracted services. These benefits are included in the economic impact analysis and in the numbers reported in Table 12. The IMPLAN output files that document the complete analysis by sector are part of the Economic analysis file.

The numbers in Table 12 are not intended to be absolute. The analysis should be used to compare the relative differences among alternatives. The percentages listed are percentage of the total Douglas county activity, including all sectors. The value of each activity included in the impact analysis was estimated from the cost and benefit analysis spreadsheets. An estimate was made of the percent of each activity's value that may be spent locally. The value to the wood products manufacturing sector was estimated to be 40% of the delivered log price, reflecting the difference between end product value and log cost to the mill. This difference can be widely variable based on mill efficiency and the choice of end products, but it approximates the value given for all of Oregon in 1998 (Gebert et al., 2002).

Table 12. Economic Impact Analysis

	Alt 2	
	Value	**%**
Change in Total Industrial Output	$2,959,331	0.11
Change in Employment (# of jobs)	28.7	0.06
Change in Labor Income	$1,344,147	0.09
Contribution to local mill capacity (MBF)	3,455	0.55

Direct, Indirect, and Cumulative Effects

Alternative 1 is not shown in Table 12 since by definition it would not change the conditions or level of economic activity in the County. This alternative may, however, contribute to a decline in the local timber industry, since it would keep federal timber from the market. Since this is a salvage of fire-killed timber, there would be no potential future benefit from not harvesting the timber now, due to deterioration. No attempt was made to quantify that impact, as it would be speculative to estimate the reasonably foreseeable timber supply in the local area.

Implementation of the Alternative 2 would have a beneficial cumulative effect to the local economy, although relatively small. The No-action alternative would have no beneficial effect and would likely be detrimental to the local economy.

AQUATIC ENVIRONMENT

The Aquatic Conservation Strategy (ACS) was developed as part of the Northwest Forest Plan to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands (USDA/USDI 1994a; 1994b). The ACS strives to maintain and restore ecosystem health at 5th field watershed and landscape scales to protect habitat for fish and other riparian-dependent species to restore currently degraded habitats. Complying with ACS objectives means that an agency must manage the riparian-dependent resources to maintain the existing condition or implement actions to improve conditions. Improvement relates to restoring biological and physical processes within their ranges of natural variability. The Whiskey Salvage alternatives are evaluated in the context of ACS objectives. The project is consistent with Riparian Reserve standards and guidelines that include direction to “meet,” “not adversely affect,” “not retard or prevent attainment of” or otherwise achieve ACS objectives, if the decision maker determines from the record that the project is designed to contribute to maintaining or restoring the fifth-field watershed over the long term, even if short-term effects may be adverse.

During the scoping process, concerns were raised about water quality and riparian reserves; these concerns were considered during the development of the project design features and BMPs. The aquatic effects related to these concerns are disclosed in this section. The results of watershed analyses are presented, a description of the existing condition and the important physical and biological components of the Aquatic Conservation Strategy (ACS) are discussed

regarding how Alternative 2 affects the aquatic environment in terms of the nine ACS objectives, which include:

1. Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.

2. Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.

3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.

4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.

5. Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.

6. Maintain and restore instream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.

7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.

8. Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.

9. Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

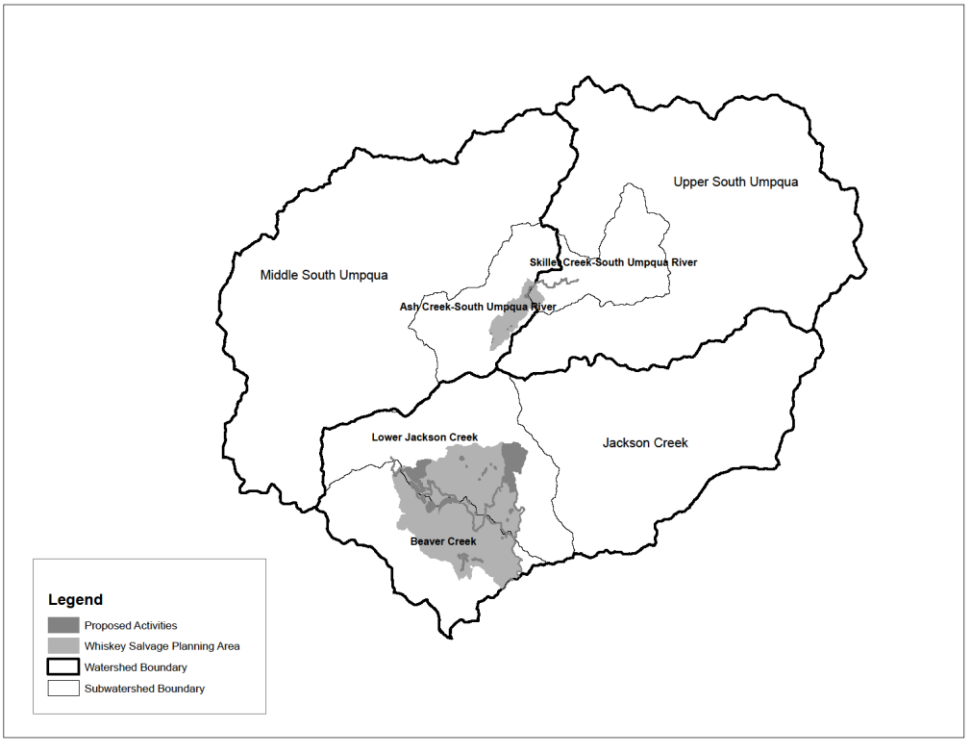
Project Area Overview

The Whiskey planning area is the approximately 17,868 acre fire perimeters of both the Whiskey and Buckeye Fire areas. The Whiskey fire encompassed 16,185 acres within the Jackson Creek watershed, while the Buckeye fire included 1,450 acres within the Middle South Umpqua watershed and 235 acres within the Upper South Umpqua. Another 15 acres of the Whiskey complex burned within the Elk Creek - Rogue River watershed (off the Umpqua NF). Subwatersheds at least partially within the planning area include the Beaver Creek and Lower Jackson subwatersheds in Jackson Creek Watershed, Ash Creek-South Umpqua subwatershed within the Middle South Umpqua Watershed, and Skillet Creek-South Umpqua subwatersheds

in the Upper South Umpqua Watershed (Figure 11). Planning area stream density is approximately 3.6 miles per square mile.

Elevation within the planning area runs from about 1,400 to 4,000 feet, mostly falling within the transitional snow zone. The entire area is within the Western Cascades geologic province with shallow subsurface flow. Precipitation averages between 39 and 55 inches annually. These conditions lead to a flashy hydrologic system with high peak flows resulting from rain-on-snow events in winter, and very low base flows in summer. Slopes are mostly gentle to moderate with 40% of the planning area having a slope of <30%, about 45% is between 30% and 60% slope, and the remaining 15% of the planning area has a slope of >60%. Soils are volcanic, originating from basalt, andesite breccia and tuff; some weathered earthflow also occurs within the planning area.

Figure 11. The three watersheds and four subwatersheds containing the Whiskey Salvage planning area.



Watershed Analysis Recommendations

Both Boulder-Ash and Buckeye-Zinc Watershed Analyses recommend prescribed fire: "the forests… evolved with fire as a fundamental process. With thoughtfully developed and carefully applied prescriptions, and honestly evaluated results, fire can be the best tool for restoring ecosystem functions."

BENEFICIAL USES OF WATER

To meet the Clean Water Act and the Standards and Guidelines in the Umpqua Land and Resource Management Plan (LRMP) (USDA, 1990a), the beneficial uses of waters must be identified and management activities planned so they would not interfere with or be injurious to the beneficial uses of adjacent and downstream waters. The relevant beneficial uses of the South Umpqua River and its tributaries, including Beaver Creek as determined by Oregon Department of Environmental Quality are: 1) public and private domestic water supply; 2) industrial water supply; 3) irrigation; 4) livestock watering; 5) fish and aquatic life; 6) wildlife and hunting; 7) fishing; 8) boating; 9) water contact recreation; 10) aesthetic quality 11) Hydro power (ODEQ, 2003).

Water Quality

Relevant Standards and Guidelines

The relevant Standards and Guidelines related to water quality (as per the 1990 Umpqua National Forest LRMP) and Riparian Reserves (as per the1994 Northwest Forest Plan) specifically related to the Whiskey project includes:

Northwest Forest Plan FM-1: Design fuel treatments to meet Aquatic Conservation Strategy objectives, and to minimize disturbance of riparian ground cover and vegetation. Strategies should recognize the role of fire in ecosystem function and identify those instances where fire suppression could be damaging to long-term ecosystem function.

Northwest Forest Plan FM-4: Design prescribed burning and prescriptions to contribute to attainment of Aquatic Conservation Strategy objectives.

Northwest Forest Plan RF-2a: For each existing or planned road, meet Aquatic Conservation Strategy objectives by minimizing road and landing locations in riparian reserves.

Water quality/riparian area S&G 1: All effective shading vegetation will be maintained on perennial streams unless a site-specific assessment shows that shade removal will not result in water temperature increase or degrade aquatic habitat.

Water quality/riparian area S&G 5: Streams will be designated for protection on timber sale maps (e.g. Timber Sale Contract provision B6.5).

Water quality/riparian area S&G 12: The application of best management practices (BMPs) for the protection of water quality and beneficial uses (e.g. fish habitat or potable water) will be monitored where ground-disturbing activities occur.

Watershed cumulative effects and water quality, S&G 1: The beneficial uses of water must be identified and management activities planned so they will not interfere with or be injurious to the beneficial uses of adjacent and downstream waters.

Watershed cumulative effects and water quality S&G 2: Beneficial uses of water and aquatic habitats will not be degraded by turbidity, sediment, or scoured stream channels caused by timber harvest, road construction, and related activities.

Existing and Desired Conditions – Water Quality

A combination of naturally occurring hydrologic conditions and past management practices have resulted in elevated summer stream temperatures in many streams in the planning area. Removal of stream shade during timber harvesting was a common practice from initial entry into the watershed in the 1940s through the early 1980s on Forest Service lands. Road building

across and along streams also removed shade, and permanent valley-bottom roads essentially caused long-term deforestation in these areas. Flooding and debris torrents also contributed to the loss of stream shade and wider channels. In the early 1980s, riparian buffers were utilized; however these buffers were not always adequate for maintaining stream shade. Only after the Northwest Forest Plan was implemented in 1994 were shade and other riparian dependent functions consistently addressed through retaining riparian reserves along all streams. Low base flows, typical of the Western Cascades, also contribute to conditions which result in relatively high, naturally occurring summer stream temperatures within the planning area.

The Oregon Department of Environmental Quality (ODEQ) water quality standards are applied to protect the most sensitive beneficial uses in a waterbody. Cold water salmon and trout are considered the beneficial uses most sensitive to changes in stream temperature. Numeric criteria in the temperature standard were developed to protect different aspects of the life histories of salmon and trout such as spawning and rearing. Criteria were also developed for critical habitat areas that serve as the core for salmonid protection and restoration efforts. This biologically-based criterion requires that the seven-day moving average of the daily maximum temperature shall not exceed 60.8°F (16°C) year-round for the protection of salmonid and resident fisheries in core cold-water habitat and pertains to the entire planning area. The criteria for waters designated as salmon and steelhead rearing (South Umpqua River, Jackson and Beaver Creeks) is 64.4°F (18°C).

Additional canopy was removed by fire during the Whiskey Complex, but major canopy removal only occurred along a few reaches. These streams include lower Pipestone Creek, Beaver Creek near Pipestone, and 2 small unnamed tributaries to Jackson Creek. Canopy removal along these streams would likely cause an increase in summer temperature in these reaches until vegetation regrows enough to provide shade again.

ODEQ has identified water quality limited streams throughout the State of Oregon as required by the Clean Water Act, Section 303(d) (Table 13). Many of the planning area streams exceed the core cold water temperature criteria at measured sites. South Umpqua River, Beaver and Jackson Creeks are also listed for exceeding the Sedimentation criteria, and Jackson Creek and South Umpqua River also exceed the pH criteria during summer.

Table 13. Temperature, Sedimentation, and pH Water Quality Listings in the Whiskey Salvage Area

Waterbody Name	River Mile	Parameter	Season
Beaver Creek	Mouth to RM 2.1	Temperature Core Cold Water Habitat	All Year
Beaver Creek	Mouth to RM 2.1	Sedimentation	Undefined
Jackson Creek	Mouth to RM 25	pH	Summer
Jackson Creek	Mouth to RM 25	Temperature Core Cold Water Habitat	All Year
Jackson Creek	Mouth to RM 25	Sedimentation	Undefined

Waterbody Name	River Mile	Parameter	Season
South Umpqua River	Corn Cr. to RM 102	Temperature Core Cold Water Habitat	All Year
South Umpqua River	RM 57.7 to 102	pH	Summer
South Umpqua River	RM 80 to 102	Sedimentation	All Year

The presence of instream aquatic plants can have a profound effect on the variability of pH. Nitrogen, phosphorus, light availability, and stream temperature are all parameters necessary for supporting periphyton growth, so high stream temperatures are probably contributing to high pH.

The Umpqua Basin Total Maximum Daily Load (TMDL) was approved in 2007, and addressed temperature and pH, but not sedimentation. Modeling for stream temperature and pH TMDL in Jackson Creek indicated that the past loss of riparian shade has exacerbated naturally high temperature and pH levels (ODEQ, 2006).

Modeling of pH determined that reductions in heat load would reduce periphyton growth and lead to a reduction in pH to natural conditions. Under natural conditions, the model predicts that pH would still exceed the numeric criteria in portions of Jackson Creek, so the target becomes the naturally occurring pH, with an approximate range between 8.5 and 9.1. The Umpqua National Forest continues to collect summer temperature data at permanent sites near the mouths of Beaver Creek and Jackson Creek, and at several places along the South Umpqua River (Table 14).

Table 14. Summer Stream Temperature Monitoring Sites near the Whiskey Salvage Planning Area

Stream	Maximum 7-day Average Temperature	Years monitored
Beaver Creek near mouth	72.5 (2009)	24 years between 1988-2013
Jackson Cr. near mouth.	77.9 (2009)	26 years between 1977-2013
South Umpqua River above the Falls	76.6 (2006)	20 years between 1992-2013
South Umpqua River at Tiller	82.6 (2009)	23 years between 1980-2013
Black Canyon near mouth	67.6 (2010)	4 years between 2010-2013
Devils Knob near mouth	70.6 (1994)	1 year (1994)

South Umpqua River, Beaver and Jackson Creeks are 303(d) listed for sedimentation, but the TMDL discusses these listings in its Overview and Background section: "*DEQ is considering revising the criteria for determination of water quality parameter impairment related to sedimentation. Currently, sedimentation lacks quantitative listing criteria. A quantitative approach using relative bed stability will probably be proposed. To evaluate the fine sediment impacts on stream biota/spawning potential for the remaining three listed reaches of Jackson Creek, Beaver Creek and South Umpqua River additional data would have to be collected if using the relative bed stability approach. Until such data is collected it is suggested to place the remaining listings in a status of "concern" or insufficient data and the work to develop TMDLs for*

the remaining three listings will be placed on hold until criteria are selected and additional data is collected." (ODEQ, 2006)

The historic sediment regime was defined by the occasional episodic sediment delivery from large scale fires followed by years of recovery with little or no disturbance. Most sediment delivery came from fluvial erosion, especially in earthflow areas, as a result of large post fire rainstorms rather than from surface erosion. Debris flows have probably played a minor role in the planning area sediment regime. The sediment regime is also influenced by on-going, chronic sediment delivery at lower levels occurring every winter due to the road system. Both nutrient enrichment and sedimentation can increase substantially after wildfires from storm events, especially in high fire severity areas in steep terrain due to consumption of vegetative matter which releases nutrients to the soil, and leads to reduced groundcover protection from erosion (Rhoades et al., 2011). Water repellency can also increase in high severity areas, leading to increased runoff. During the Whiskey Complex Fire, approximately 19% of the planning area burned with moderate or high soil severity. The remaining 81% were in the unburned, very low or low soil severity category, which would be unlikely to affect infiltration or water repellency. Therefore, increases in nutrient release and sedimentation would likely only be substantial in a few pockets of the fire where high severity fire removed most of the vegetation and increased water repellency, and only during substantial storms.

The desired conditions related to water quality in keeping with ACS Objectives 4 and 5 include the recovery of the sediment regime to more natural conditions, reduction of summer temperature to more natural conditions through the recovery of effective shade lost from anthropogenic activities and increased hyporheic flow from restoration of large wood levels, and the reduction of pH to more natural levels.

Surface soils within the commercial units are primarily loams originating from volcanic basalts, andesites, breccias, and tuffs. Water infiltration and soil drainage is moderate to excessive with water being quickly absorbed by the soil with little if any concentrated surface flow potential unless the soil is in a compacted condition.

Direct and Indirect Effects – Temperature and pH

Direct effects in the context of water quality are those that would occur in planning area streams within a unit and are triggered immediately as a result of Alternative 2. Indirect effects are those that could either occur later in time or downstream of a unit at the drainage or watershed scale.

Alternative 1 would result in no direct or indirect effects to water quality from temperature or pH, since no shade would be removed.

Under Alternative 2, activities that could remove shade along perennial streams include underburning and danger tree felling. Some shade within the primary shade zone (USDA/USDI, 2010) could be lost during prescribed underburning along Soup Creek (non-fish perennial stream) and along 2 small unnamed perennial non-fish tributaries of Jackson Creek, but if such loss occurs, it is likely to be limited to a few individual trees or small patches since BMP's and design features call for only underburning with flame lengths ≤ 2 feet, igniting fire away from streams and letting fire back into riparian areas, and pre-treating fuels when necessary to prevent high severity fire; these requirements greatly reduce the risk of killing overstory trees. Danger trees would also be felled within primary shade zones of 3 non-fish perennial streams. Temperature has not been monitored in these 3 streams but it is likely that they all meet the core cold water temperature criteria since they are small headwater streams, and 2 of these streams had a low canopy mortality from the Whiskey Fire above the activity areas. Since the canopy of most of the danger trees has already been removed by wildfire or is likely to succumb in the near future as a result of wildfire, shade along these streams would not be substantially

reduced, however, standing snags do provide some shade to streams, especially where snags occur at high density. Both of these streams have a Northwest aspect and are moderately incised; these conditions provide significant topographic shade. In fuel break areas, no canopy would be removed within the riparian reserve, which includes the primary and secondary shade zones; this would be effective in protecting stream temperature from any measureable increase (USDA/USDI, 2010). Given the BMP's, project design features, and the small amount of shade lost from these proposed activities, measureable temperature increase and subsequent pH increase are not likely to result from Alternative 2.

Cumulative Effects – Temperature and pH

Given the small amount of shade removal associated with the implementation of the proposed action, the project would not result in an incremental additive impact to the aquatic environment due to elevated stream temperature. Therefore when considering past, present and foreseeable activities there are no anticipated adverse or unacceptable net effects of temperature or pH to streams. Past harvesting of perennial stream shade occurred up until about the early1990's in the planning area. Loss of stream shade has contributed to past elevated stream temperatures in planning area streams until the recovery of stream shade occurs. However, all areas harvested prior to the mid 1980's would today be recovered.

Alternative 1 would result in no direct or indirect effects to water temperature to incrementally add to possible downstream heating due to past, present or reasonable foreseeable future disturbance. Therefore, Alternative 1 would not have a cumulative temperature or pH effect. Alternative 2 would protect the effective shade along perennial streams to avoid stream temperature increases. Therefore, no cumulative temperature or pH effect would result from the action alternative.

Direct and Indirect Effects – Nutrients

Alternative 1 would result in no net increase to nutrients over background levels since no ground disturbance or sedimentation would occur.

Studies have been conducted on the potential disruption of nutrient cycles and their release into streams from forest management practices. Regeneration harvest, even very small ones, can release nitrogen that can leach to adjacent surface waters during runoff, (MacDonald, 1991; Sollins et al., 1980; Sollins, 1981; Brown et al., 1973) however this effect is primarily due to decomposition of leaf litter (Prescott, 2002). In the case of the harvest of burned trees, the needles have already fallen or likely would soon, so leaf litter resulting from logging under the proposed action would likely be much less than has been observed in these research studies. Nutrient leaching to streams from Alternative 2 harvest is not expected to be substantially higher than background levels because nutrient release is expected to be low and full riparian reserve buffers would be applied.

The effects of fire on soil nutrients has been shown to be variable based on fuel type, fire intensity and fire severity with prescribed and lower severity/intensity natural wild fires having less effect than high severity/intensity wildfires (Bormann et al., 2008; Minshall et al., 2001; Monleon et al., 1997; Stephens et al., 2004; Wan et al., 2001). Although the underburning as proposed in the Whiskey Project would potentially release nitrogen to the soil, expected amounts would be low, and the mobile nitrogen would remain local in the upper soil layer and would return to unburned levels within one season. Site released nitrogen would be utilized by microbial activity and/or understory vegetation. Since prescribed fire would not consume large amounts of organic matter (carbon), the surface carbon would help to "hold" fire-released nitrogen at the site (Brady, 1990). Organic matter has been found to regulate nitrogen mobility

in the soil by encouraging microorganism uptake of nitrogen (Prescott et al., 2002; Prescott et al., 2003). The mitigation measures of underburning to retain effective ground cover, and limits on pile size and proximity to streams, would reduce the risk of runoff occurring that could carry nutrient laden sediment to streams. Therefore, any release of nitrogen associated with underburning would not be expected to impact water quality substantially at the site scale or downstream.

Cumulative Effects – Nutrients

Alternative 1 would result in no increased leaching of nutrients over background levels to incrementally add to possible downstream heating, algae responses, or stream turbidity due to past, present or reasonably foreseeable future disturbance.

Beneficial uses of water and aquatic habitats would not be degraded by nutrient leaching caused by timber harvest or underburning activities, therefore, no cumulative effect would result from the action alternative (Alt. 2).

Direct and Indirect Effects – Sedimentation

Erosion and sedimentation are geomorphic processes that shape the physical appearance of the landscape and strongly influence aquatic ecosystems. The range of natural variability for sediment delivery to streams within the planning area is very large, because erosional processes are influenced by natural disturbance events such as floods and wildfire. Sedimentation rates to streams are typically low on a year to year basis but can spike several orders of magnitude during large storm events. Within the planning area, sediment enters the aquatic environment predominantly through mass wasting, and fluvial and surface erosion, especially in earthflow areas. Accelerated erosion after the Whiskey Fire includes rilling and gullying, and stream extension due to collapsed piping and vegetation consumption in some high severity areas. The sediment regime is also influenced by on-going, chronic sediment delivery at lower levels, occurring every winter due to the road system. Sediment delivery to streams can also result from ground disturbing activities related to road work, logging and fuels treatments.

Alternative 1 would result in no direct or indirect adverse effects to sedimentation since no ground disturbance would result. Long term beneficial effects from road maintenance to reduce sediment delivery from the road system through improved drainage, ditch relief culvert additions and fixing headcutting in a ditch along the 3114 road would not be realized. No beneficial subsoiling of legacy roads would be accomplished. It is possible that a future wildfire could result in more sedimentation under Alternative 1 than Alternative 2 since maintenance burning and fuelbreak construction would potentially aid tactically towards reducing the size of future fires.

Activities under Alternative 2 that have the potential to affect water quality from sedimentation include system road maintenance, yarding and skidding, log haul, pile burning and underburning.

Approximately 44 miles of system road maintenance including ditch cleaning, blading, waterbar and dip construction and reconstruction, and culvert installation, would be done under Alternative 2. No new roads would be constructed. Two closed system roads (3114-260, and 261) would be opened, and then closed again after the logging is completed. A short segment of non-system road would also be utilized, then subsoiled after use. The blading of roads and ditches can result in short-term increased sediment delivery due to the removal of vegetation and the loosening of soil surfaces making more material subject to erosion and water transport. However, by following the BMP for only minimal ditch blading, installing erosion control and by maintaining good road drainage, sediment delivery from activities associated with Alternative 2

are expected to be minimal. Effects in response to rain and runoff would be short-term (one season) during the wet season and difficult to discern from background runoff turbidity. One stream crossing culvert replacement is being proposed as a connected action. The use of BMP's and project design features for the reconstruction of the crossing, including timing of in-stream work and erosion control measures, would minimize effects which would occur at the immediate work site and downstream. This activity would cause in-stream work induced sedimentation, but would be short-term and only occur directly during guided instream work periods and indirectly during the first rainy season thereafter. A 5' headcut in a ditch along the 3114 road would also be repaired as a connected action; this site has been a chronic source of sediment and its repair would reduce the long-term impact of sedimentation due to roads, albeit only a very small percentage of the overall road system impact.

The results of research on the effects of post-fire logging on sediment production and its delivery to streams have been extremely variable, showing that post-fire salvage logging can increase or decrease sediment production compared to burned and unlogged sites (Chou et al., 1994; Chase, 2006; Silins et al., 2009; McIver et al., 2006). Some of this variability may result from the difficulty in discerning sediment production from the wildfire, and increases that are a direct result of logging, as well as the challenges of measuring sediment movement. The amount of sediment production and/or delivery to streams as a direct result of post-fire logging varies greatly and likely depends on many site variables including logging systems, slope, catchment area, proximity to streams, soil erosivity, road construction, climate and percent bare ground. Roads were associated with some of the greatest increases in sediment movement. Increases in sediment production may or may not result in increases of sedimentation in streams.

Logging under Alternative 2 would include 35 acres of ground-based logging and 65 acres of skyline logging within the area units, and 188 acres of ground-based logging in the roadside units. Ground-based logging causes more ground disturbance than skyline logging. Approximately 40% of the commercial units (area units and roadside) have gentle slopes (<30%), 42% have moderate slopes (30% to 60%) and 18% are steep (>60% slope). Full riparian reserve buffers are applied to all streams, excluding logging, corridors and equipment from these areas. Although these buffers burned with moderate to high severity during the Whiskey fire and most vegetation was removed, they would still provide filtering through the settling of sediment and the dispersion and infiltration of runoff. Buffers on non-fish streams are 170'; logging would not occur along any fish-bearing stream. Soils in the Whiskey logging units generally have medium to high infiltration capacity, although reductions in infiltration occur in some areas previously logged with ground-based systems. Wildfires generally cause soils to be temporarily water repellent, which increases surface runoff and erosion in post-burn sites. During observations in August 2013, about 12% of the overall fire area showed an increase in moderate to strong water repellency over unburned conditions. During winter observations after the ground had been wetted, soils were not found to be water repellent. Groundcover within the units was much reduced due to the removal of tree crowns and surface vegetation by the fire; however, rocks, needles (in areas where crown was not completely consumed) and fungal mycelia is providing significant soil protection and aiding in infiltration. Down wood surveys in the area units found about 2.5% cover of logs remaining in the area units; this too provides some protection from soil movement where water concentrates. Some regrowth of herbaceous and shrubby plants was observed even in high severity areas within a month after burning. Slash generated from logging would add to the groundcover, although less than a green timber sale would; tops would be left in the units to provide additional ground cover.

No roads would be built under Alternative 2. The combined effects of harvest, landings, and fuels treatment would potentially expose soil over about 12% of tractor harvest units and 2%

percent of skyline units. Skid roads and skyline corridors are most likely to generate sediment and concentrate water enough to deliver that sediment to streams. To reduce ground disturbance, skid road density would be limited to an average of 100 feet apart and skyline corridors would average 100-150 feet apart from center to center. All skid roads and skyline corridors would be located outside riparian reserve buffers which provide a 170' strip of undisturbed buffer between the logging and streams, which would reduce the likelihood of runoff from skids and corridors reaching the stream. Erosion control measures would be required and would restrict any off-site movement of sediment regardless of its potential for delivery to streams; this includes sediment movement from road surfaces, drainage ditches, skid trails, landings, etc. Runoff that would occur on skid trails, landings, and roads where the soil is compacted would quickly be absorbed when it flowed onto more porous soil, with little risk of sediment delivery to streams. Many of the felled trees in the roadside units would be close enough to the road that they could be yarded directly from the road. Some skids would be necessary but the limited extent of the units from the road would reduce the length of skid roads and reduce the area that water can concentrate. Sediment modeling showed sediment yields increasing during storms, but the probability for delivery of that sediment to streams was only 1% higher under Alternative 2 as compared to the no action Alternative 1 (see Soils section of this chapter). Any increases in sediment delivery above current conditions as a result of the proposed actions would be short-term, having the biggest effect the first rainy season, then decreasing for a few years, at which time the vegetation and groundcover would recover, and sediment delivery would return to background levels.

Some log yarding would be done in the roadside firewood units, but this yarding would be limited to logs that could be reached from cabling to a vehicle on the road so impacts would likely be minimal.

Log haul can deliver sediment to streams when sediment from roads is allowed to enter ditches and stream crossings during rainy periods. Restrictions on haul under Alternative 2 would call for mitigation or suspension of haul any time if there is road distress or off-site sediment movement. Only those roads preapproved by Engineering for haul, and that have been brought up to Forest Service standards would be considered suitable for haul outside the Normal Operating Season (June 1 to October 31). Wet season haul would not occur with this project. These requirements would prevent substantial sedimentation from haul.

Some danger tree felling would occur along roads within riparian reserves, but all cut trees would be left in place unless the log would threaten to plug a culvert, or the log lands in the road prism. Any log that threatens a culvert would be bucked and as much left in place as possible, thereby reducing the likelihood of substantial ground disturbance from yarding near a stream.

Prescribed burning and pile burning can also cause sedimentation when significant groundcover is removed where water can carry displaced soil. No piles would be burned within riparian reserves, so any sediment moved from any burned pile area would be highly unlikely to reach a stream. Prescribed burning could occur up to the stream bank, but BMP's, burn plan prescriptions and project design calls for burning under moist conditions and igniting well away from streams to allow fire to back into riparian areas. These guidelines would ensure that fire severity is low throughout most of the riparian reserves, and enough groundcover remains to provide protection from erosion. Some pockets of higher severity groundcover loss would occur, but these would likely be few and broken up by low severity and unburned areas that would filter and dissipate sediment movement. Any sedimentation that does occur as a direct result of underburning would likely be very low, well within the natural range of variability and would be short term during the first rainy season. Handline would be constructed perpendicular to Soup Creek and an intermittent tributary to Soup Creek. The BMP of installing waterbars and covering all handlines within 200' of streams with slash or wood straw would mitigate for this

ground disturbance and prevent measureable sedimentation from handlines. Maintenance burning and pile burning in fuelbreaks is intended to reduce the risk of high severity wildfires, which would potentially have much higher impacts to water quality from sedimentation than burning under prescribed conditions.

Cumulative Effects - Sediment

Alternative 1 would result in no direct or indirect effects in sedimentation to incrementally add to sedimentation over background conditions due to past, present or reasonably foreseeable future disturbance, since there is no ground disturbance. It is possible that a future wildfire could result in more sedimentation under Alternative 1 than Alternative 2 since maintenance burning and fuelbreak construction would potentially provide tactical opportunities for controlling and reducing the extent of future wildfire.

Alternative 2 would cause direct and/or indirect sedimentation from in-stream road work, logging and prescribed burning, but these effects would be short-term, and unmeasurable above background levels. Since the spatial extent of the effect would be for the immediate stream, only similar activities on the same stream would influence a cumulative effect. It is reasonably foreseeable that there would be additional prescribed burning under the North Beaver Prescribed Burn project, roadwork in the Whiskey Salvage planning area, and logging during the Beaver Timber Sales. These areas would be subject to similar BMPs and design features, therefore, the response is anticipated to be short-term, localized and likely immeasurable even at the catchment scale, therefore cumulative effects to downstream beneficial uses is not anticipated.

Beneficial uses of water and aquatic habitats would not be degraded by Temperature, pH, or sediment, caused by timber harvest, fuel treatments, road work, and related activities; therefore, no measurable or additional cumulative water quality effects over background conditions would result from the Alternative 2.

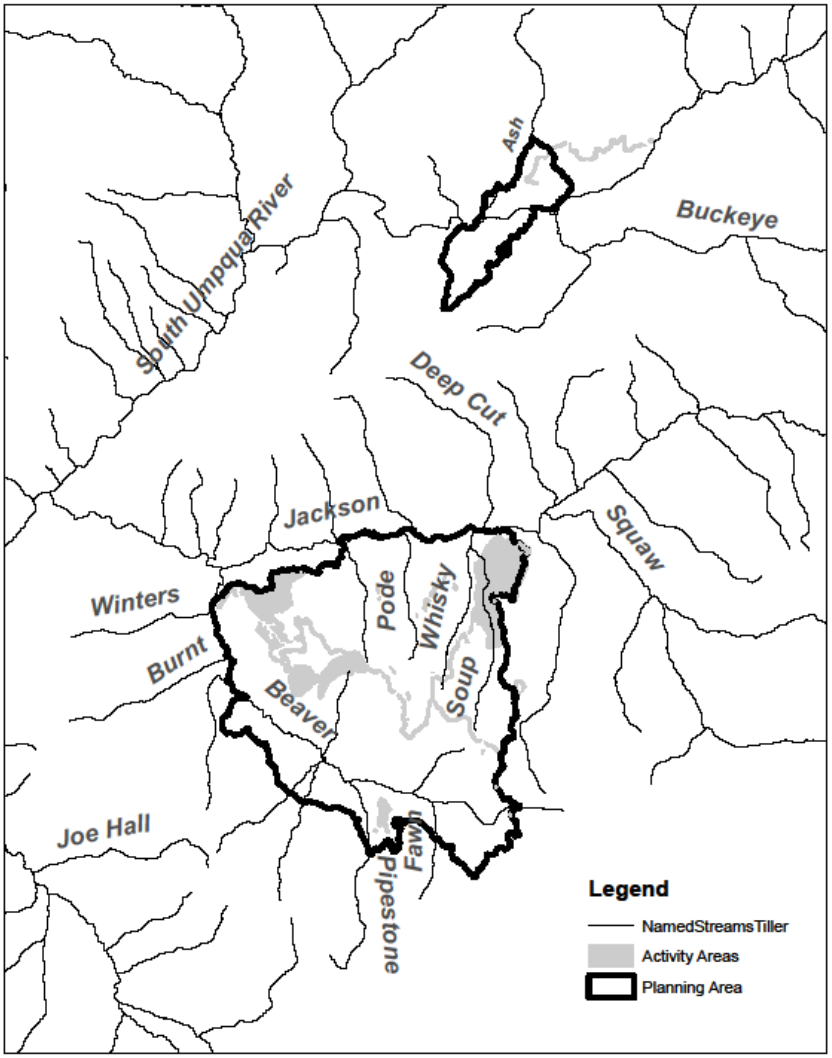
Aquatic Conservation Strategy – Water Quality

As disclosed previously in this water quality section, no prolonged adverse impacts to water quality or the associated beneficial uses of water are expected from any of the proposed activities in Alternative 2 including those actions occurring in the riparian reserve land use allocation. As such, the long-term trend of improving water quality in the watershed would not be set back; water quality in planning area streams would continue to support healthy riparian, aquatic and wetland ecosystems consistent with ACS Objective 4. Since Alternative 2 applies all relevant Standards and Guidelines, it is in keeping with the intent of the Aquatic Conservation Strategy.

Stream Flows

The streamflow regime of the Whiskey Salvage planning area is influenced by Western Cascades geology and the transient snow hydrologic zone where streamflow responds rapidly during winter rain-on-snow events. The streamflow regime also has large annual flow fluctuations between summer low flow and winter high flow. There are approximately 11 miles of anadromous fish streams, 3 miles of resident fish streams, 38 miles perennial non-fish streams, and 53 miles of intermittent or ephemeral streams in or adjacent to the planning area. Some of the channels in the planning area are not connected downstream by surface flow and are referred to as *interrupted* streams. The interrupted channels are typically very small, and the water that flows in them drains back into the soil, becoming subsurface water. Major streams of the Whiskey Salvage planning area are shown in Figure 12.

Figure 12. Major Streams in the Whiskey Salvage Area



Relevant Standards and Guidelines

The relevant standards and guidelines from the Umpqua LRMP related to streamflow include:

Watershed cumulative effects and water quality, S&G 2: Beneficial uses of water and aquatic habitats would not be degraded by turbidity, sediment, or scoured stream channels caused by timber harvest, road construction, and related activities.

Watershed cumulative effects and water quality, S&G 4: Beneficial uses of water and aquatic habitat (water quality) would not be degraded by increased peak flows caused by canopy removal from timber harvest, road construction, and related activities.

Existing and Desired Conditions – Stream Flows

Past management has altered the timing and quantity of streamflows within the planning area. Historical regeneration harvest caused increased peak flows and higher summer flows in the

short term, then as dense plantations re-grew, peak flows returned to pre-cut levels. Summer flows became deficit as dense stands use more water than the old-growth stands they replaced. The planning area is mostly within the transient snow zone, between 2,000 to 5,000 feet in elevation, where winter peak flows are an important fluvial process. In this zone, warm rain can follow a colder snow storm causing rapid snowmelt. In the Upper Willamette sub-basin, 88% of floods with a return period of greater than six years were associated with rain-on-snow events (Christner, 1981; Harr, 1979). Sizeable canopy openings can result in greater snow accumulation and more rapid snowmelt compared to locations lacking large canopy openings. The Umpqua LRMP requires an analysis of forest canopy conditions when any canopy-removing activity is proposed (Standard and Guideline 4, listed above). An area is considered fully recovered when the canopy cover is 70% (USDA, 1990b). An overall hydrologic recovery of 75% or greater within a drainage would maintain current peak flows and avoid adverse change to physical channel condition and associated factors such as water quality and fish habitat. Statistically discernible increases in peak flows have occurred when greater than 25% of smaller drainages have been clear-cut harvested and included roads; that is, the hydrologic recovery was less than 75% (Jones, 1996; Thomas, 1998). Conditions below the 75% hydrologic recovery value (i.e. lower levels of hydrologic recovery) need further evaluation for potential peak flow cumulative effects from rapid snowmelt during rain-on-snow storms (following S&G 4). An analysis of canopy removal from past, present and anticipated activities and wildfire within the Whiskey planning area subwatersheds shows that the baseline hydrologic recovery is well above the level of concern for peak flow increases (See Table 15).

Table 15. Hydrologic Recovery Pre and Post-treatment

Subwatershed	Area (acres)	Current Hydrologic Recovery	Expected Hydrologic Recovery after Proposed Activities
Beaver Creek	22,462	84%	83%
Ash Creek-South Umpqua	14,081	97%	97%
Skillet Creek-South Umpqua	11,460	97%	97%
Lower Jackson Creek	28,441	88%	87%

Some studies have shown that forest roads on steep slopes intercept subsurface flow and hasten its arrival as surface flow to stream channels through the road ditch network, either directly when ditches connect to streams, or by gully formation from ditch relief culverts. This effect is greater on mid-slope roads, and roads with greater distance between ditch relief drainage, as more water is concentrated. This concentration is more likely to form a gully which can carry surface water directly to a stream rather than infiltrating into soil and becoming subsurface flow again (Jones, 2000; Montgomery, 1994; Wemple et al., 1995). The planning area has a high density of existing roads on steep terrain capable of changing flow paths and the timing of peak flows.

Wildfire can also increase peak flows by reducing infiltration by exposing mineral soil to raindrop impact and splash that can seal soil pores at the surface. This may be compounded by water repellency and reduced evapotranspiration from the loss of vegetation, sometimes resulting in dramatic changes in both annual and peak streamflows. (Ice et al., 2004). As part of the Burned Area Emergency Response (BAER) assessment for the Whiskey Complex, The runoff curve

number (CN) model "WILDCAT5" (Hawkins, 1990) was used to estimate pre-fire and post-fire runoff in small watersheds (Rusk, 2013). Modelling estimated a moderate peak flow increase of 22% in middle Beaver Creek during a design storm of 5-year, 24-hour producing of 3.5 inches of precipitation. Such fire-caused peak flow increases generally are highest during the first rainy season, then decrease back to pre-fire levels over several years as vegetation grows back and soil water repellency recovers to pre-fire levels. The reduction in live plants within the high severity areas of the Whiskey Fire would likely result in elevated base flows as evapotranspiration is reduced in these areas. This effect is not likely to be substantial except in the few small watersheds where a relatively high percentage of trees were killed.

The desired conditions related to flow regimes in keeping with ACS Objective 6 include reduction of channel extension due to roads, and the recovery of canopy lost from anthropogenic activities.

Indirect Effects and Cumulative Effects – Stream Flows

Peak flows represent an indirect effect rather than a direct effect. The Forest Plan identified an analysis area of at least 1,000 acres to evaluate potential peak flow responses.

Alternative 1 would have no effect on stream flow above background conditions since no canopy would be removed.

Activities under Alternative 2 that would remove canopy include roadside danger tree removal, shaded fuelbreak construction, and underburning. Since it is difficult to quantify how much canopy would be removed during Whiskey commercial roadside units, these areas were assumed to have 100% canopy removal for HRP analysis purposes. This is grossly overestimating the real extent of canopy removal since most of the trees being removed in the commercial roadside units are already dead. Fuelbreaks would only remove trees up to 8" diameter, so most of this removal would be understory rather than canopy. For analysis, 0% canopy removal was assumed in all stands over 31 years old, and 40% canopy removal was used in stands less than 32 years old, since this is the maximum removal allowed under project design features. In underburn areas, 5% canopy removal was used for analysis since this is the maximum allowed under the burn plan guidelines. Since the impact of canopy removal on peak flow is proportional to the size of the opening, and the fuelbreak and underburn canopy removal is expected to be in very small openings where remaining canopy would continue to intercept snow and break up winds during storms, the overall impact due to opening size is also being overestimated in this analysis. A very small number of green trees would also be cut in riparian reserve roadside danger tree units; the number of these is unknown but an estimate of 1 acre in Lower Jackson and 1 acre in Beaver subwatersheds was used for analysis. Baseline HRP in the project subwatersheds is fairly high, even using conservative estimates of private land potential canopy removal. No subwatersheds would be brought below the threshold of concern (25% canopy removal) for peak flow increase due to the cumulative effects of past and current timber removal, potential removal on private land, the Whiskey fire and the proposed Whiskey Salvage Project activities.

Canopy removal has also been shown to increase summer low flows as evapotranspiration is reduced (Harr et al., 1982; Hicks et al., 1991; Jones, 2004). This effect is likely to be immeasurably small under Alternative 2. Under Alternative 2 the hydrologic recovery would maintain current peak flows and avoid adverse change to physical channel conditions and associated factors such as water quality and fish habitat (consistent with S&Gs 2 and 4, listed above). No cumulative peak flow effect is expected under Alternative 2 when considering past, present, or reasonably foreseeable future activities.

Aquatic Conservation Strategy – Stream Flows

As disclosed above, no impacts to flow regimes or the associated beneficial uses of water are expected from any of the proposed activities in Alternative 2. As such, the timing, magnitude, and duration of peak, high and low flows are protected under Alternative 2, consistent with ACS Objective 6. Since Alternative 2 applies all relevant standards and guidelines, it is also in keeping with the intent of the Aquatic Conservation Strategy.

Riparian Reserves

The riparian reserve land use allocation was established in the Northwest Forest Plan as part of the Aquatic Conservation Strategy (USDA/USDI, 1994a; 1994b). Riparian reserve width, based on guidance in the Northwest Forest Plan, is one site potential tree height on non-fish bearing streams (either perennial or intermittent) and two site potential tree heights on fish bearing streams. Wetlands over one acre in size have a one site potential tree height riparian reserve; for smaller wetlands, riparian reserves include all riparian vegetation. Unstable areas are also included in the riparian reserve land use allocation. A site potential tree height is the average maximum height of the tallest dominant tree at 200 years or older for a given area. The height of site potential trees in the planning area has been established at 170 feet.

The Aquatic Conservation Strategy was developed to restore and maintain the ecological health of aquatic ecosystems at the watershed and landscape scale. This strategy is in part based on natural disturbance processes. Proposed riparian actions are assessed in relation to the watershed's existing condition and any short or long-term effects to such conditions.

Relevant Standards and Guidelines – Riparian Reserves

The Standards and Guidelines for riparian areas (as per the 1990 Umpqua National Forest LRMP) and Riparian Reserves (as per the1994 Northwest Forest Plans) specifically related to the Beaver Timber Sale project includes:

Umpqua LRMP C-2-VIII, IX, X: Prohibit timber harvest and site preparation…except to meet riparian objectives. Yarding corridors are permitted at designated locations with full log suspension over the streambank and protected vegetation. Corridors must minimize disturbance to riparian vegetation and meet riparian objectives. Incorporate activities that minimize both prescribed fire and wildfire damage to riparian vegetation.

Northwest Forest Plan FM-1: Design fuel treatments to meet Aquatic Conservation Strategy objectives, and to minimize disturbance of riparian ground cover and vegetation. Strategies should recognize the role of fire in ecosystem function and identify those instances where fire suppression could be damaging to long-term ecosystem function.

Northwest Forest Plan FM-4: Design prescribed burning and prescriptions to contribute to attainment of Aquatic Conservation Strategy objectives.

Northwest Forest Plan RF-2a: For each existing or planned road, meet Aquatic Conservation Strategy objectives by minimizing road and landing locations in riparian reserves.

Northwest Forest Plan RA-2: Fell trees in Riparian Reserves when they pose a safety risk. Keep felled trees on-site when needed to meet coarse woody debris objectives.

Existing and Desired Conditions – Riparian Reserves

Approximately 26% of the Whiskey Salvage planning area is in the riparian reserve land allocation. Approximately 19% of riparian reserves in the Whiskey Salvage planning area have

been previously clear-cut. Approximately 16 miles of system roads currently exist in riparian reserves in the Whiskey Salvage planning area. Roads in riparian areas have the potential to limit shade and deposition of large wood and debris to streams and riparian areas over long time periods since permanent roads are long-term features. In the Whiskey Salvage planning area there are many miles of abandoned roads within or leading to historical logging units. These dead-end roads were built in the 1950s, 1960s and 1970's to haul logs out of the original clear cuts. These roads are referred to as "unclassified roads" by the Forest Service because they were built and left after logging and never evaluated as part of the long-term road system. Under today's practices, many of the abandoned roads in the project area would have qualified as temporary roads that would have been obliterated following logging use. A few of the abandoned roads that are located on slopes and lack surface rock, have had long-term erosion problems that continue today. During the Whiskey complex fire, approximately 280 acres of riparian reserve within the planning area burned with >50% canopy mortality.

The desired conditions related to riparian reserves in keeping with the ACS Objectives 2, 8 and 9 include riparian reserve vegetation that is within the natural variability for structure, species diversity, and age classes for full ecological function, and the reduction of anthropogenic influences such as roads, within riparian reserves.

Direct and Indirect Effects – Riparian Reserves

The direct effects to riparian forest conditions are defined as those occurring within the riparian reserve of treatment units over the short-term. The indirect effects are those that would occur within the riparian reserves of the treatment units over the long-term (continue for more than two decades), or that would occur beyond the immediate location of the treatment areas.

Under Alternative 1, no soil disturbance or vegetation manipulation would occur, thus no organisms would be killed, no vegetation would be altered, no additional bare soil would be exposed, and no productivity losses would occur in riparian reserves. There would also be no beneficial effect of improved stand resiliency to wildfire that would be realized in riparian reserves from underburning under Alternative 2. Under Alternative 2, activities that would occur within riparian reserves include tailhold tree cutting, danger tree felling, prescribed underburning, shaded fuelbreak treatment and hand fireline construction (See Table 16).

Roadside danger trees would be felled within 34 acres of riparian reserve to protect the safety of forest users. Danger tree identification would follow guidelines in the "Field Guide for Danger Tree Identification and Response" (Toupin et al., 2008). All felled trees would be left in place unless the log would threaten to plug a culvert, or the log lands in the road prism. Any log that threatens a culvert would be bucked and as much left in place as possible. Any log that lands in the road prism >16" dbh would be moved to the downhill side of the road and left as coarse wood. Most of these danger trees are already dead, but a small percentage may be alive. These 34 acres represents 0.8% or riparian reserves within the planning area.

Approximately 132 fire-killed snags would be used as tail holds within the outer riparian reserves in the area salvage units; most of these would need to be felled to protect the safety of logging operations. All tail hold snags felled within riparian reserves would be left on site to provide coarse wood. The cutting of these snags would mean the loss of their value as snags for the time period that they would have remained standing. Given the large number of snags remaining in the affected riparian reserves, the number of snags needed for full ecological function would still be met.

Figure 13. Riparian Reserve System in relation to Whiskey Salvage Project Activities

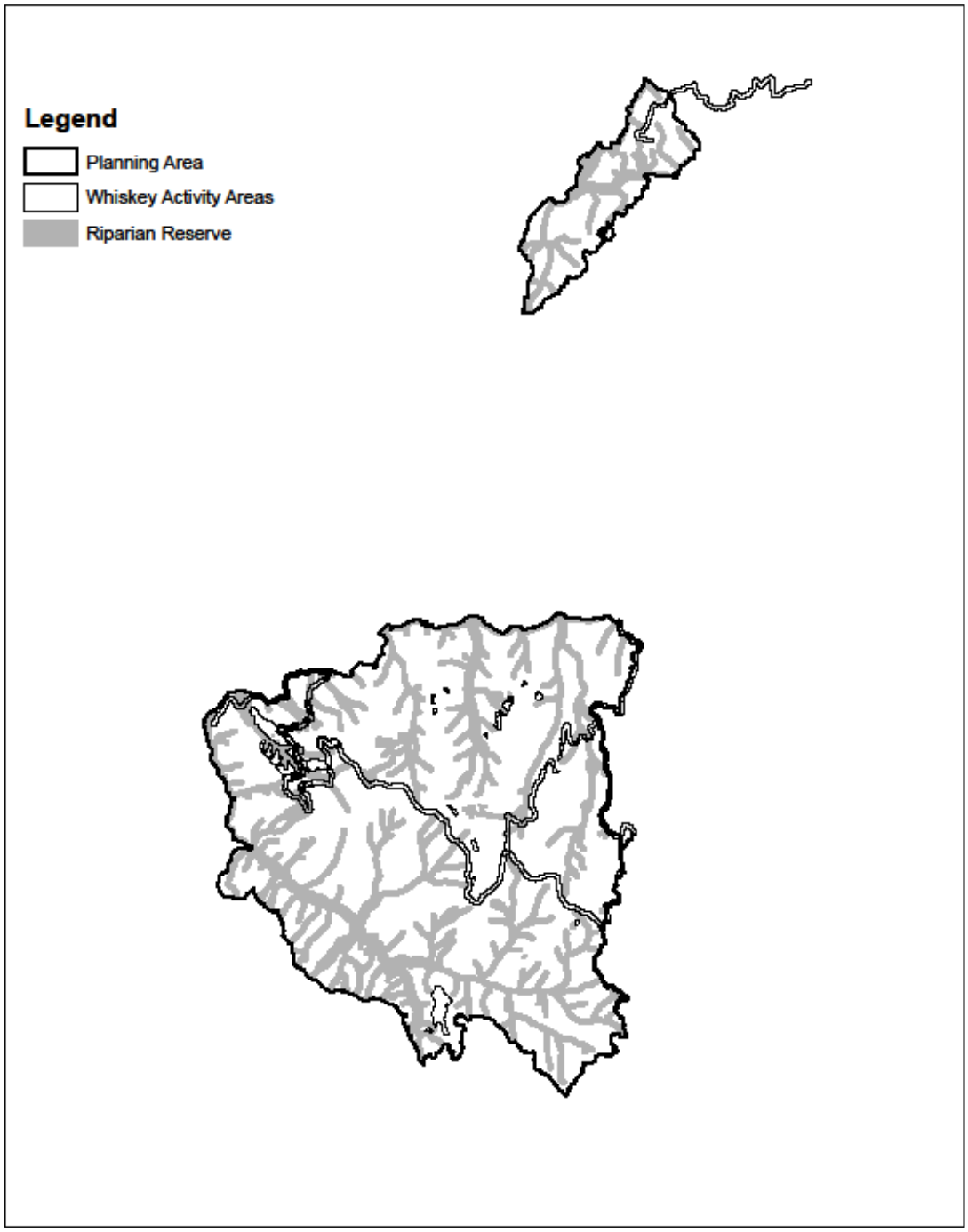


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Table 16. Activities Proposed within Riparian Reserves

Actions	Alternative 1 No Action	Alternative 2 Proposed Action
Commercial Thinning	0	0
Landings	0	0
Tailhold Trees Cut	0	≈132
New Road Construction	0	0
Roadside Danger Tree Felling	0	34 acres
Firewood Cutting/yarding	0	0
Prescribed Underburn	0	229 acres
Shaded Fuelbreak	0	163 acres
Handline Construction	0	0.3 miles

Approximately 218 acres of prescribed underburning in the riparian reserves of streams is proposed by the action alternative. This underburning is expected to negatively affect existing down wood by consuming some of the advanced decay class logs now present on the riparian reserve forest floor. Disturbance of riparian ground cover, vegetation, and small organisms associated with the fuel treatments are minimized through mitigation because the action alternative requires that underburning occur when large down wood and duff are less likely to be completely consumed. This measure is expected to lessen impacts and meet standard and guideline FM-1. Prescribed burns would be ignited outside the riparian areas and allowed to back into them. Higher moisture in these areas would reduce already moderate fire intensity to produce a heterogeneous riparian burn pattern similar to historic wildfires.

Underburning is expected to create exposed soil in about 5% of the overall treatment area and would impact vegetation structure by scorching or consuming some trees and shrubs. Vegetation most effected would occur in scattered pockets and is most likely to be small diameter conifers that are sensitive to burning; most hardwoods and larger conifers and herbaceous plants in these fire-prone areas would survive or are able to re-sprout after low-severity fire such as would be prescribed under Alternative 2. In the 5% of area expected to burn with higher severity, such areas are more prone to surface erosion and noxious weed introductions. These effects are typically short-term, since ground vegetation quickly recovers in the first two years following burning, so the magnitude of such effects would be limited, unless a noxious weed becomes aggressively established in a new area, leading to long-term effects. These impacts are described further in the soil and noxious weeds sections of this Chapter. Alternative 2 would have the beneficial effect of keeping a natural disturbance process on the landscape, and reducing the impact of an unnaturally severe fire in the future resulting from previous fire suppression in these areas.

Approximately 163 acres of riparian reserve would be treated as shaded fuelbreak. No treatment would occur within primary shade zones (15 to 85 feet depending on tree height) of perennial streams or within 10' of intermittent streams. Treatment within riparian reserves outside these buffered areas would be limited to pruning branches, and lopping and scattering the trimmings. This would minimize the impact to riparian reserve vegetation, while providing some increased effectiveness for using the road as a fuelbreak during future wildfires.

In summary, several types of direct adverse effects to riparian reserve conditions can be expected to occur under Alternative 2. The magnitude of these effects at the site-scale in relation to the planning area and the broader watershed scale are inconsequential. This is because both the extent and the duration of these impacts (as described above) are predicted to be low (See Table 17).

Table 17. Summary of Riparian Reserve Actions and Effects

Riparian Actions	Riparian/ Stream Change	Primary Effect (Beneficial and/or Adverse)	Duration	Alternatives	
				1	2
Danger Tree Felling	Felling of snags and green trees	Adverse—loss of ecological value of snags Beneficial—increased value of down wood	1 to 5 years 1 to 5 years	0	34 ac
	Removal of small diameter logs that fall on road or threatens culvert	Adverse—loss of small diameter coarse wood	Up to 30 years		
Tailhold Tree Felling	Felling of snags	Adverse—loss of ecological value of snags Beneficial—increased value of down wood	Up to 30 years Up to 30 years	0	≈132 snags
Prescribed Underburning	Change of vegetation structure	Adverse – consumption of some plants Beneficial—moves stands to more fire resilient condition, and keeps a natural process on the landscape.	5-20 years 20 to 30 years	0	229 ac

Riparian Actions	Riparian/ Stream Change	Primary Effect (Beneficial and/or Adverse)	Duration	Alternatives	
				1	2
	Handline construction	Adverse – soil disturbance, loss of site productivity, risk of weed infestations	5 years	0	0.3 mi
Fuelbreak	Change in vegetation structure	Adverse – pruning of lower limbs, possible shade loss	10 years	0	163 ac

Cumulative Effects – Riparian Reserves

Alternative 1 would result in no cumulative effects to riparian reserves since no ground disturbance or vegetative manipulation would result. It is possible that a future wildfire could result in greater impacts under Alternative 1 than Alternative 2 since maintenance burning and fuelbreak construction that could potentially reduce the extent and severity of the wildfire would not be done.

The potential of Alternative 2 to result in either adverse or beneficial cumulative effects to riparian reserves is addressed at the scale of the planning area. Since the direct and indirect effects of the action alternative would result in low magnitude effects (as detailed above), it is reasonable to assume that these effects would only overlap with the effects of other past, present, and foreseeable future activities at the scale of the planning area rather than at the larger scale of fifth-level watersheds.

The adverse effects of Alternative 2 on riparian forest conditions, such as lower snag levels and ground disturbance, would overlap with the past and present timber harvest and ground disturbance in the riparian reserves in the planning area. The added impacts from Alternative 2 would combine with these on-going past impacts and result in an incremental additive impact to snag habitat structures and ground disturbance. However snag levels would remain within natural ranges and the spatial and temporal extent and magnitude of ground disturbance as shown above would be very small; therefore, the temporary impacts associated with alternative 2 is not expected to cause consequential cumulative effects. A beneficial cumulative effect would result from prescribed burning under Alternative 2, and under the planned North Beaver Prescribed burn, would be the continuation of the natural disturbance processes to these naturally fire-prone areas.

Aquatic Conservation Strategy – Riparian Reserves

Though small scale adverse effects are expected under Alternative 2, these effects are expected to be very small in spatial and temporal extent in relation to the riparian reserve system of the planning area and watershed.

Most of the snags and trees cut within riparian reserves for safety would be left on site as coarse wood, in keeping with ACS Objective 8. The pruning of trees within fuelbreaks would

have minimal impacts to overall vegetation structure, while the benefit to riparian reserve protection from these fuelbreaks may be realized during future wildfires. Ground disturbance and vegetation manipulation caused by underburning would also be minimal in spatial and temporal extent, and would be outweighed by benefits of maintaining landscape scale disturbance processes these areas are adapted to, consistent with ACS Objectives 1, 8 and 9.

Stream Channels

Streams in the planning area are primarily affected by roads that cross them or that exist near them, by the age of the adjacent forest that provides bank stability and large wood input, and by the effects of disturbance such as floods and fire. The impact to streams from the various forms of road work is disclosed in this section.

Standards and Guidelines from the Northwest Forest Plan

RF-2a. For each existing or planned road, meet Aquatic Conservation Strategy objectives by minimizing road and landing locations in riparian reserves.

RF-2e: For each existing or planned road, meet Aquatic Conservation Strategy objectives by minimizing disruption of natural hydrologic flow paths, including diversion of stream flow and interception of surface and subsurface flow.

RF-3a: Meet ACS objectives by reconstructing roads and associated drainage features that pose a substantial risk.

RF-3c: Meet ACS objectives by closing and stabilizing, or obliterating and stabilizing roads based on the ongoing and potential effects considering short-term and long-term transportation needs.

Existing Condition and Desired Condition – Stream Channels

Many of the streams in the Whiskey Salvage planning area have experienced impacts from stream cleanout (removal of wood from the channel), ground-based equipment within channels and riparian forest clearcutting during the early decades of timber harvesting. Wood removal and loss of large wood recruitment and bank vegetation has caused downcutting in many streams, especially those in earthflow areas. Some small channels were destabilized by past road-building, which captured subsurface water and brought it to the surface, sometimes diverting it down skid roads to form gullies. Most of these channels have readjusted and are currently stable and well-vegetated. In 2007 and 2008, large wood was placed in the lower 2.5 miles of Beaver Creek to restore channel stability and complexity in this reach of high fish value.

The desired conditions related to stream channels in keeping with ACS Objective 3,5, 6,and 7 are the recovery of sediment and flow regimes to more natural conditions, and sufficient instream wood levels to provide for geomorphological and biological function.

Proposed Activity in Stream Channels

Only one activity within a stream channel is proposed as a connected action under Whiskey Salvage Project: a culvert would be replaced on the 3114 road at the Soup Creek crossing. This culvert currently has a rotten bottom, bad skew, and impeded passage for aquatic organisms and would be replaced with a stream simulation crossing.

Mitigation measures are included as part of the instream road work in perennial channels to minimize the risk of water contamination and turbidity when equipment and workers are working in and near these streams.

Direct and Indirect Effects – Stream Channels

The direct effects to stream channels are defined as those short-term effects at the immediate location of instream project areas over a period of up to five years. The indirect effects to stream channels are defined as the long-term effects of the instream work that would last longer than five years, plus any downstream effects in perennial streams or fish bearing streams in the planning area.

Under Alternative 1, no direct effects to stream channels or aquatic organisms would occur since no instream work would be implemented. No beneficial effects from the culvert replacement would be realized.

The direct effects to Soup Creek from the proposed culvert replacement would be increased sediment input associated with implementing the work, with bare soil exposure throughout the area of the stream crossing work. Channel banks and beds would also be modified during these activities with equipment working on banks and within channels to excavate existing fill material surrounding the existing culverts and backfill around the new culvert. Fish are probably not present in this stream reach, but a survey would be done before replacement and if fish are found, steps would be taken to move fish from the work site during implementation. Since the disturbed area of this site is very small, the amount of sediment potentially delivered to Soup Creek during and immediately after construction is minimal with respect to the overall sediment regime of the planning area. Moreover, the erosion control measures and restrictions on the timing of work would effectively lower both the extent and duration of the work-site sedimentation. Regrowth of vegetation on the disturbed ground would likely recover substantially after the first 2 growing seasons.

Connectivity would be improved by replacing the culvert. Improved connectivity equates to improved movement of organisms up and downstream and/or improved flow of water, sediment, and wood (to varying degrees) compared to the same site under Alternative 1 where no work would occur. The long-term benefit of improved connectivity under Alternative 2 would outweigh the short-term adverse effect of increased sediment delivery.

Cumulative Effects - Streams Channels

Alternative 1 would result in no direct or indirect effects to stream channels to incrementally add to possible effects due to past, present or reasonable foreseeable future disturbance.

The potential of Alternative 2 to result in either adverse or beneficial cumulative effects to stream conditions is addressed at the scale of the planning area. Since the direct and indirect effects to stream channels result in low magnitude effects it is reasonable to assume that these effects would only overlap with the effects of other past, present, and foreseeable future activities at the scale of the planning area.

Substantial impacts to streams have resulted from past road building and timber harvest in the Whiskey planning area. The existing miles of road in the planning area's riparian zones continues to exert profound local effects to streams at stream crossings with broader stream system impacts to connectivity given the hundreds of stream crossings that exist. The adverse direct effects of the road actions to stream conditions such as sediment delivery and direct channel habitat impacts would temporally overlap with the impacts of the existing road network in planning area streams. However, the longer-term beneficial effects of lowering culvert failure

risk, and improving aquatic organism passage would help off-set the potential cumulative effects of Alternative 2.

Aquatic Conservation Strategy – Stream Channels

The improved connectivity from culvert replacements is consistent with ACS Objective 3 of restoring the physical integrity of stream shorelines, banks and bottom configurations, and ACS Objective 2 of restoring unobstructed routes for aquatic species movement.

Erosion and Sedimentation

Erosion and sedimentation are geomorphic processes that shape the physical appearance of the landscape and strongly influence aquatic ecosystems. The range of natural variability for sediment delivery to streams and wetlands within the planning area is considered to be very large because erosion processes are influenced by infrequent natural disturbance events such as floods and wildfire. Sedimentation rates to streams are typically inconsequential on a year to year basis but can spike several orders of magnitude during large storm events. Land management has the potential to accelerate erosion rates and the volume of sediment entering streams and wetlands. Within the planning area sediment enters the aquatic environment through mass wasting, surface erosion, and primarily by fluvial erosion.

Fluvial Erosion

Fluvial erosion is the erosion of stream banks and stream beds from the forces of water. Stream channels change both spatially and temporally under the fundamental influences of climate, geology, and topography. These factors help determine the stream flow and sediment regimes, as well as riparian vegetation which provides in-stream wood. Disturbances can affect stream channel form and the equilibrium between sediment input and output.

Relevant Standards and Guidelines – Fluvial Erosion

The relevant Standards and Guidelines from the LRMP related to fluvial erosion are:

Watershed cumulative effects and water quality S&G 2: Beneficial uses of water and aquatic habitats would not be degraded by scoured stream channels caused by timber harvest, road construction, and related activities.

Existing and Desired Conditions – Fluvial Erosion

The historic sediment regime was defined by the occasional episodic sediment delivery following large scale fires followed by years of recovery with little or no disturbance. Most sediment delivery from fluvial erosion is a result of large post fire rainstorms, rather than from surface erosion. The Whiskey Complex fire primarily burned with low soil severity, with only 19% of the area burning at a moderate or high soil severity. Elevated sediment delivery and peak flows due to the fire are likely to occur during significant storms for the first decade, although the risk would be reduced each year as vegetation regrows.

The most sensitive channels in the planning area are associated with dormant earthflow terrain. Earthflow channels often lack the complex geology structure in the form of various sized substrates (cobbles and small to large boulders) and are dependent on external input; specifically large wood recruitment for channel complexity and stability. The erosional processes associated with these channels produce a high proportion of fine sediments and little armoring of the bed and banks. As a result they often have little resistance to down-cutting and bank erosion during winter storm flow. Because of this, stream channels in the earthflow

terrain have been the most impacted channels due to historical timber management and road building. The past clearcutting of riparian vegetation, especially along the near vertical banks of these stream channels, has contributed to root strength loss which otherwise helps to bind the fine-textured soil in-place and provides physical resistance to fluvial erosion; thereby controlling sediment delivery. Past logging disturbances from yarding old-growth near and across these sensitive channels without suspension or mitigation measures has also influenced potential delivery of sediment to these stream channels. Large wood left behind in stream channels from past logging has provided channel storage and localized stability. The desired condition is coarse wood input to channels within the range of natural variability to provide stability to channels, and peak flows that are within the range that streams have formed under in the current climate.

Direct and Indirect Effects – Fluvial Erosion

Direct effects from fluvial erosion are described at the scale of stream segments within or adjacent to harvest units and during the activity. Indirect effects are downstream of the unit at the drainage scale and greater, and after the activity over 2-3 decades.

Alternative 1 would not change existing fluvial erosion processes that are currently occurring.

Under Alternative 2, no increased peak flows from canopy removal are anticipated as disclosed in the Stream Flow section of this document. There would also be no substantial increases in sedimentation as a result of Alternative 2 that would affect fluvial erosion. Therefore, no measurable direct or indirect effect over background conditions would be expected associated with fluvial erosion in planning area streams.

Cumulative Effects – Fluvial Erosion

Alternative 1 would not incrementally add to past, present, or reasonably foreseeable future activities to cause a cumulative fluvial erosion effect since no action would occur.

Since Alternative 2 would not cause any indirect fluvial erosion (as described above), it would not have any effects that would incrementally add to past, present, or reasonably foreseeable future activities to cause a cumulative fluvial erosion effect above background levels at any of the analysis scales.

Aquatic Conservation Strategy – Fluvial Erosion

Since there would be no direct or indirect effects to fluvial erosion, the long-term physical channel integrity and sediment regime would be maintained, consistent with ACS Objective 3.

Chemical Contamination

Alternative 2 presents some risk of water contamination due to the use of fuel products and dust abatement chemicals that have the potential to enter streams if spilled or misapplied. Dust abatement, aside from water, would be accomplished through the application of lignin, calcium chloride, and/or magnesium chloride to the gravel haul roads. Excessive rates of application could potentially increase either the surface runoff or the migration of the material through the soil to stream channels. The primary risk of water contamination would occur with a spill near a waterway.

Magnesium chloride is highly soluble and moves through the soil with water. The movement is largely dependent on the rate of application, the frequency and intensity of rainfall, the drainage characteristics of the area of application and the chemical and physical nature of the soil. During periods of long duration or high intensity rainfall, in areas of high surface runoff, or in areas of high soil permeability, magnesium can move considerable distances either as surface runoff or

as soil leachate (materials dissolved in water that is within the soil). Surface runoff typically drains into streams, lakes, or ponds whereas leachates feed ground water.

Under these conditions it is the constituent ions of magnesium and chloride (Mg2+, and Cl-) that migrate through the environment. Magnesium ions are readily held by soil particles while chlorides tend to remain in solution and potentially infiltrate ground water or runoff into surface waters. Magnesium is a very common element in soil and water because it readily bonds with soil particles, however they typically do not migrate far from their point of application, which is the case of dust abatement chemical application (USDA, 1997a). Because chlorides do not bond well with soil particles and tend to migrate, their effects are more widespread. Although chloride is present in all natural waters it usually occurs in concentrations of less than 50 ppm (parts per million). Trout begin to suffer serious effects from chlorides when concentrations reach 400 ppm. Concentrations in excess of 10,000 ppm place all fresh water biota in immediate threat of mortality. At typical application rates, measurable increases in background concentrations would not be expected to occur (USDA, 1999).

Direct Effects – Chemical Contamination

Alternative 1 would have no direct effects relative to chemical contamination because no chemicals would be applied as a result of this alternative.

Under Alternative 2, a dust abatement spill or petroleum spill could potentially result in direct effects to aquatic resources and the beneficial uses of water. Dust abatement would be applied to gravel haul roads as needed, up to 44 miles total over the lifetime of the project. The risk of water contamination due to the application of dust abatement is minimized under Alternative 2 by several mitigation measures that would be required under the timber sale contract. Dust abatement with chemical compounds under Alternative 2 include maintaining an average 50 foot no-application buffer at perennial stream crossings and maintaining a 1-foot no treatment area adjacent to the outside edge of the ditch line. Moreover, the application of dust abatement materials would normally occur only once per year in a window of time when no rain is forecast for at least three days. The buffering of applications away from perennial stream crossings has been found to effectively mitigate pollution of adjacent waters (USDA 1999). The rate of application of dust abatement compounds in the planning area would be “typical” and therefore is not expected to contribute to adverse riparian or aquatic effects.

Magnesium chloride is typically used on a limited basis and at low application rates, as compared to study areas where the most noticeable effects have been seen. Based on the literature review and typical application rates for dust abatement purposes that would be used in the Whiskey Salvage planning area, effects from these compounds to plants and animals in the riparian and aquatic environments would be negligible under Alternative 2.

Timber sale purchasers would be required to have spill prevention and recovery equipment on site, they would be required to develop spill prevention plans if substantial amounts of fuel or other pollutants are stored in sale areas, and traffic control measures would be required in the timber sale contract. All of these requirements associated with Alternative 2, detailed in Chapter 2, function to diminish the chances that potential direct effects to aquatic resources and the beneficial uses of water from project-related pollutants would actually occur. Thus, risk of chemical contamination is considered to be low for Alternative 2.

Indirect Effects – Chemical Contamination

Alternative 1 would not utilize chemical compounds and would result in no risk of indirect effects to downstream beneficial uses due to water contamination.

Alternative 2 would present more risk of indirect effects to downstream beneficial uses because of the amount of potentially polluting products transported to the project area. Alternative 2 presents similar risks of an accidental spill contaminating off-site or downstream waters and the beneficial uses of those waters. The likelihood of an accidental spill is believed to be low under Alternative 2; therefore no mitigation measures would be applied to the transport of potential pollutants outside the timber sale areas.

Cumulative Effects – Chemical Contamination

Most past and on-going land management operations throughout the Umpqua River basin such as silvicultural activities, timber sales, and all forms of road work use a variety of potentially polluting products (such as dust abatement, petroleum, concrete, adhesives, cleansers, herbicides, etc) that pose a risk of entering waterways if spilled or mishandled. The level of timber harvest and associated road work on Federal land has diminished over the last two decades relative to the previous three decades. Therefore, the level of additive effects that can contaminate water from such actions has also diminished.

Potential contamination of waters within the river basin associated with private industrial forestry operations, intensive agricultural operations (using pesticides, fertilizers, other petroleum products, and herbicides), and city and town development and use by people (sewage, plus all the above mentioned potential pollutants and others not mentioned) has not diminished. Water contaminations from these sources can be expected to increase as demand for food and natural resources increases with the human populations. Therefore, the lower areas of the Umpqua River basin are where the cumulative effects of all the additive forms and sources of water contamination would be most likely realized.

The chances of any cumulative effects to water contamination from Alternative 2, hinges on whether a substantial spill of petroleum or dust abatement products occurs. Should a spill occur and clean-up measures fail, a cumulative effect could be realized. This is particularly true the further downstream an accidental spill occurs.

None of the alternatives are expected to appreciably affect water quality over the long-term (decades, or longer), and none are expected to contribute to chemical contamination or have a measurable effect on the nutrient regime unless an accidental spill were to occur. The chances of such a spill are offset as much as possible by a series of Best Management Practices required in the timber sale contract associated with Alternative 2.

Any impacts to water quality associated with contamination of water due to timber sale operations would be short-term and likely localized. As such, the broad-scale goals of the ACS would not be impacted.

Fisheries

Existing Conditions

Upper South Umpqua 5th Field HUC (1710030201)

The Upper South Umpqua (USU) 5th field is approximately 87,037acres with the USFS managing over 99% of lands in the watershed. A total of 156 private acres exists in the USU which account for 0.2% of the lands in the 5th field watershed. Within the National Forest boundary administrative land allocations include 20,099 acres of matrix and 45,226 aces of Late Successional Reserves (LSR). The entire South Umpqua basin on the Tiller Ranger District is classified as a Tier I Key Watershed under the Northwest Forest Plan. The USU is included in this designation and is intended to provide high quality habitat to serve as refugia for the

possible recovery of depressed fish stocks. The main stem and tributaries to the USU support a diverse assemblage of fish species including Coastal cutthroat trout, Oregon Coast Coho salmon, spring Chinook salmon and winter steelhead.

Currently the most important sub watersheds in the USU 5th field for anadromous salmonids are the Skillet/Emerson and Buckeye Creeks (upstream and downstream from the project area). Just upstream from the action area is Quartz Creek which is considered a reference stream for aquatic conditions primarily attributable to the lack of a valley bottom road in the riparian area. Just downstream is Buckeye Creek which is the only area in the Upper South Umpqua where Coho have been documented. It is likely however that during larger escapement years that Coho utilize the Andraieff Meadows portion of the Upper South Umpqua main stem and Quartz Creek.

Aquatic habitat has changed from historic conditions within the river and tributaries of the USU. Stream habitat has been degraded as a result of timber harvest and road building within the basin. The largest effects on this 5th field watershed have been from road building, timber harvest, stream cleanout, and landslide/debris torrents. The 5th field matrix shows that stream bank conditions are properly functioning, physical barriers, pool characteristics and refugia are "at risk" while all remaining indicators were "not properly functioning."

Middle South Umpqua 5th Field HUC (1710030203)

The Middle South Umpqua (MSU) 5th field is approximately 99,330 acres with the BLM administering 17%, USFS 71% and private lands accounting for 12%. Within the Forest Service Boundary, administrative land allocations include 31,368 acres of matrix and 44,461 aces of Late Successional Reserves (LSR). The entire South Umpqua basin on the Tiller Ranger District is classified as a Tier I Key Watershed under the Northwest Forest Plan. The MSU is included in this designation and is intended to provide high quality habitat to serve as refugia for the possible recovery of depressed fish stocks. Tributaries to the MSU support a diverse assemblage of fish species including Coastal cutthroat trout, Oregon Coast Coho salmon, spring Chinook salmon and winter steelhead (Figure 14).

Currently the most important sub watersheds in the MSU 5th field for anadromous salmonids are Dumont and Boulder Creeks (downstream from the project area). Roper (1995) identified Dumont Creek as a nodal habitat, a tributary with high species diversity and productivity. All anadromous salmonid species within the South Umpqua River basin inhabit Dumont Creek at some time during their life cycle and Dumont is considered a refuge for Coho. A substantial proportion (near 100%) of the total smolt production in the Upper South Umpqua basin may come from Dumont. Boulder Creek contained the highest density of young Chinook in the MSU, but the variability was very high. Coho have used this stream for spawning and juveniles are located approximately seven miles upstream of the mouth.

Aquatic habitat conditions have changed from historic conditions within the river and tributaries of the MSU. Aquatic conditions reflect the influences of private forest lands and National Forest management. Stream habitat has been degraded as a result of timber harvest and road building within the basin. Land ownership patterns, soil, road building, timber harvest, stream cleanout, and landslide/debris torrents have negatively affected aquatic ecosystems in this 5th field. The 5th field matrix shows that only chemical/nutrients, refugia and peak/base flows are "at risk" while all remaining indicators were "not properly functioning."

Ash Creek

Ash Creek was surveyed using the Region 6, Level 2, Stream Survey Methodology in the summer of 1997. The Ash Creek drainage is a 4,130-acre (1,652 hectares) watershed tributary to the South Umpqua River that is located approximately 3 miles (4.83 kilometers) upstream from the confluence of the South Umpqua River and Boulder Creek. Approximately 87 percent of the acres in the Ash Creek drainage are considered to be within the transient rain-on-snow elevation band (USFS 1997).

Existing aquatic habitat conditions within Ash Creek are documented in the Boulder/Ash Watershed Analysis and the Ash Creek Level II stream survey. The watershed analysis concluded that habitat conditions in the Boulder and Ash Creek drainages may be negatively influencing salmonid populations and may suggest nonfunctioning ecosystem processes. Changes in aquatic habitat likely resulted from historic riparian reserve timber harvest, salvage, upstream influences of private land, stream cleanout, valley bottom roads and road density (USFS 1997).

Reach Summary

Reach 1 is 0.65 miles in length, begins at to the confluence of the South Umpqua and ends at the private land boundary in Ash Valley. Reach 1 is accessible to anadromous fish up to a series of natural, 10 to 15 foot waterfalls. Large wood is present in levels of 19 pieces per mile of stream. This level of large wood is low. There are 48 pools per mile and pools make up approximately 28 percent of the streams habitat units. 69 percent small trees and 31 percent large trees dominate the Riparian Reserve vegetation. Historic timber harvest in this reach included clear cutting in 1955 and thinning in 1969 (USFS 1997). During that era, timber harvest usually involved stream cleanout and salvage of coarse woody material from the Riparian Reserve. The low amount of wood in reach 1 is likely to be somewhat attributable to these previous harvest/stream cleanout practices.

Reach 2 is 1.1 mile (1.77 kilometers) in length, begins at the uppermost private land boundary in the Ash Valley and ends when gradient and flow was determined to end fish distribution. Reach 2 is not accessible to anadromous fish and therefore is dominated by cutthroat trout (see figure 1). Large wood is present in levels of approximately 21 pieces per mile which is low. There are approximately 49 pools per mile, which is about 18 percent of the total habitat units. Large conifers with a hardwood understory dominate 55 percent of the Riparian Reserve area while small conifers with a hardwood understory dominate 45 percent of the Riparian Reserve. At least three previously harvested units are close enough to the stream to influence Riparian Reserve vegetation. Clear cuts took place in the Riparian Reserve in 1955, 1957, and 1979 (USFS 1997). Low amounts of large wood in reach 2 are likely to be at least partially a result of these actions. The 2001 Umpqua culvert survey indicated there were no barrier culverts in the Ash Creek drainage.

Private land reach (segment between reach 1 and 2)

This reach is approximately 2 miles (3.2 kilometers) long and is currently a straightened, “irrigation canal” type channel. Historically, the stream channel meandered through a low gradient, complex wetland with ash trees, western red cedar and other water tolerant tree species. Sometime in the 1950s, the stream was diverted out of its channel and routed down the East side of the valley to facilitate grazing or agriculture (USFS 1997). This constructed channel is likely a Rosgen “G” or a wide, down-cut stream channel with eroding stream banks with elevated levels of fine sediment. This segment likely contributed large amounts of fine sediment to reach 1 and the South Umpqua River following its channelization. Its current status with respect to sediment contribution is unknown. Historically, it is likely that there was a

Rosgen “C” or “E” (sinuous, narrow and deep) channel in this meadow which would have had large populations of cutthroat trout and likely lamprey (Nichols, Professional Judgment). The channelization and loss of this channel type, floodplain connectively, and valley bottom wetland likely significantly changed the flows, temperature regime and sediment regime of the reach and likely reach 1 (Nichols, Professional Judgment).

The Boulder/Ash Watershed Analysis stated that from 1971 to 1975, William Dugas conducted a suspended sediment study on Ash Creek. The study was initiated to study the effects of several timber harvest units adjacent to the private land portion of Ash Creek on in stream turbidity levels. The study concluded that the timber harvest was having a negligible effect on turbidity levels. During the study however, turbidity increased significantly from a sample point above private land (in reach 2) to a sampling point below private land (reach 1) (USFS 1997). The Boulder/Ash Watershed Analysis theorized one explanation was that eroding stream banks on private land were responsible for the increase in turbidity.

Sediment composition is an important indicator of aquatic health because fine sediment (less than 7 mm) influences the amount of crevice habitat and survival of salmonid eggs and fry from redds (Bjorn and Reiser 1991). In addition, large influxes of sediment (landslides) or cessation of sediment inputs (downstream from dams for example) can cause changes to the morphology of stream channels and therefore influence fish populations (Swanston 1991).
When Ash Creek was surveyed in 1997, sediment was sampled using a modified Wolman pebble count following USDA Forest Service protocol. Sediments were sampled in each of the two surveyed reaches (private lands in the Ash Valley were not surveyed). The sampling yielded the following results: Reach 1 had approximately 7 percent fine sediment present at the sampling site. This translates to a survival rate of 90 percent steelhead and 85 percent for cutthroat trout. Reach 2 had two sample points that yielded measurements of 6 percent and 14 percent fine sediment. This translates to a survival rate of 70 to 95 percent for cutthroat trout. Steelhead survival was not calculated because reach 2 is upstream from a natural upstream migration barrier.

Roth (1937) surveyed Ash Creek and showed an average channel width of 2.3 feet (0.7 meters) over the surveyed length of 4.02 kilometers (2.5 miles). Dose and Roper (1994), in their paper on long-term changes in low flow channel widths in the South Umpqua found that the width of Ash Creek increased to 6.23 feet (1.9 meters) or 211 percent of the historic width. These channel changes likely influenced the amount and quality of aquatic habitat for resident and anadromous fish in Ash Creek. At the watershed level, the increase of channel widths of many tributaries to the South Umpqua is likely a factor in the decline in the populations of salmon, steelhead and trout found in the South Umpqua Basin.

Jackson Creek 5th Field HUC (1710030202)

The Jackson Creek Watershed Analysis provides a detailed description of fish habitat in the planning area and is incorporated by reference into this document. The following paragraphs summarize key information regarding habitat conditions relevant to the Beaver Timber Sale project (Figure 15).

Mainstem Jackson Creek

The Jackson Creek watershed is approximately 103,000 acres in size. The Umpqua National Forest owns 94% of the watershed and private land comprises 6%. Jackson Creek and many of its tributaries exhibit large changes from historic conditions with respect to levels of Large Woody Debris (LWD), flow regime, riparian vegetation, fine sediment levels, streambank

stability, low flow channel widths, water temperatures, velocity refuge, habitat connectivity and substrate particle size distribution (USDA 1995, Roper 1995, Dose and Roper 1994). These habitat parameters have been degraded as a result of land management activities and are likely responsible for the poor egg-smolt survival rates documented for chinook salmon in Jackson Creek (USDA 1995). Some of these same parameters are likely to have had negative effects on the survival of juvenile coho, all life stages of Oregon Coast Cutthroat Trout (OCCT) and other native fishes in Jackson Creek and its tributaries.

The Jackson Creek Watershed Analysis (JCWA) states "Conditions and trends in salmonid abundance as well as macroinvertebrate communities indicate severe impairment of aquatic habitat conditions". While the problems with mainstem and larger tributary habitats appear to be primarily a result of LWD removal, valley bottom roads, channel network extension, and flow regime changes, the headwater stream channels appear to be most affected by riparian logging, grazing and roads (USDA 1995).

Data analyzed in Roper 1995, and the JCWA suggests that density independent factors such as early rearing habitat quality and spawning habitat quality may be having a negative effect on the egg to smolt survival of spring chinook salmon. These aspects of habitat can be adversely affected by sedimentation, floodplain connectivity, road network extension road density/location etc. The primary causes of coho salmon declines appear to be low spawning escapement, lack of juvenile rearing habitat complexity and high summer water temperature (USDA 1995). Many of the aquatic components (Pathways/Indicators) described as *not properly functioning* (PFC) or *at risk* (AR) affect the recruitment of salmonids by either influencing spawning habitat, juvenile rearing habitat or possibly adult holding habitat (pool filling in the low gradient earthflow tributaries).

The most important subwatersheds in the Jackson 5th field for anadromous salmonids are Beaver, Lower and Upper Jackson subwatersheds, Squaw and Falcon Creeks. In addition, the Luck Creek Flat segment of Jackson Creek is especially important to anadromous salmonids because it is one of the few segments of stream in the South Umpqua River upstream from Tiller that has floodplain connectivity, has high quality spawning substrate and good velocity refuges for juvenile rearing. These areas are important because they provide unique aquatic attributes to Jackson Creek. These include high aquatic diversity, important refuge for one or more anadromous species, good water quality and/or largely intact riparian reserves and habitat.

The Jackson Creek watershed was first entered for commercial timber harvest in the late 1940's. Harvest in the 1950's to 1960's were first focused on the most accessible areas along riparian and in earthflow terrain (relatively flat ground). However, it was not until the 1960's that extensive road construction began to access most of the watershed. As a result timber harvest increased substantially for twenty years and had substantial effects on multiple portions of the watershed.

Private lands in the Jackson Creek 5th field occur in the Beaver (lower Beaver), Upper Jackson Facial (Luck Creek) and Lower Jackson (Chapman, Nichols, Mule, and Bullock Creeks) subwatersheds. Private lands in these areas have higher road densities, higher amounts of regeneration and riparian harvest, less hydrologic recovery and greater impacts in the stream channel compared to Forest Service managed lands in the Jackson Creek fifth field. Private lands and roads in the Beaver and Lower Jackson subwatersheds are likely to remain chronic sediment sources over time due to continued management practices. This degraded baseline condition and continued private land management activities would pose challenges to improving

watershed health and recovering listed fish species in the lower portion of this 5th field watershed.

Mainstem Beaver Creek

Beaver Creek is a major tributary of Jackson Creek at river mile 4. Beaver Creek drains a total watershed area of 22,473 acres and ranges from 1300 feet of elevation at the mouth to 5513' at the top of Butler Butte. Much of the Beaver Creek subwatershed is within the transient snow zone and is frequently subject to rain-on-snow runoff events. Approximately 42% of the subwatershed has been characterized as earthflow terrain which is generally considered erosive and prone to mass wasting.

The lower 1.5 miles of Beaver Creek have a unique character relative to most other streams in the Jackson Creek watershed. This reach has an unusually wide valley bottom with a moderately low stream gradient, moderate sinuosity, and a number of well-developed side channels. Although relatively short, this reach constitutes an important stronghold for coho salmon spawning and rearing in the Jackson Creek watershed.

Historic land use in the Beaver Creek subwatershed includes intensive timber harvest, road construction, and grazing. A substantial portion of the riparian areas in the lower reaches of Beaver Creek were clearcut or partial-cut harvested on both sides of the stream within the past 50 years and the channel itself was subject to stream cleanout. Average road densities are approximately 4.5 miles/sq. mile within the subwatershed.

The loss of instream and floodplain wood structure likely resulted in excessive bank erosion and channel downcutting in the mainstem of Beaver Creek and many of its larger tributaries. The high road densities in earthflow terrain that is characterized by deep, finely textured, highly erosive soils lead to elevated fine sediment deposition in lower Beaver Creek during the 1980s through and 2000. Extensive instream restoration was completed in the Beaver Creek subwatershed between 1997 and 2010. Road work (storm proofing, decommissioning etc) was done in the late 1990's within the headwaters of Beaver Creek. From 2007-2009, placement of large wood and constructed wood jams was completed to re-establish stream complexity lost to stream cleanout and logging impacts during the previous 40 years. The wood placements have helped to replace structure, instream complexity and reduce the effects of peak flow events by dissipating stream energy, capturing gravels, improve floodplain connectivity and encouraging side channel development. While these processes are dynamic over time and still evolving, immediate positive results have been documented as a result of these restoration activities.

Approximately 4 miles upstream from the confluence with Jackson Creek, a very significant wide, low gradient stream reach begins and runs for approximately 2 miles (beginning in the vicinity of historic Beaver Lake). Both Coho and steelhead utilize this stretch extensively. Before the stream restoration project placed several hundred logs in the stream, the stream had very low amounts of instream wood, likely as a result of historic stream cleanout. Post project, in stream wood conditions were dramatically improved with frequent, full channel spanning large wood accumulations becoming frequent landscape components. During fire suppression efforts, some of the constructed full spanning large wood structures were cut by fire crews. Post fire suppression damage mitigation work (replacement of the cut structures) in combination with natural recruitment of fire felled trees has likely increased wood levels somewhat over pre-fire levels. The streams sediment budget would likely be elevated above the baseline for a period of years to several decades because of headwalls burning at high intensity in Pipestone Canyon and Tributary A.

Whiskey Creek
Whiskey Creek is a small facial drainage to Jackson Creek of approximately 2,500 acres (counting major tributary Soup Creek's drainage area). Most of its length, the channel is a class 3 (perennial non-fish bearing). The lowest 0.30 mile of stream is possibly anadromous or at least without barriers to prevent usage. Beyond that the stream has several high gradient chutes which are likely to be fish barriers. When surveyed in 1995, the stream went 3.15 miles through areas of frequent timber harvest. The upper 1.5 miles had frequent channel down cutting, fine sediment issues, and low levels of in stream wood. Fine sediment and channel down cutting was likely attributable to the large percentage of the sub watershed area with high erosional risk lands (50%). Whiskey, Soup and Coffin Creeks have some of Jackson Creeks highest landslide rates per square mile because of the high erosional risk lands, historic clear cut timber harvest and road construction (USFS 1995).

Soup Creek
Soup Creek is a 1,473 acre tributary to Whiskey Creek. It is a steep gradient, non-fish bearing stream. Phankuch stream stream stability surveys (1994) indicate approximately ¾ of its length is in poor condition with frequent slumping, down cutting and elevated sediment delivery levels. No timber management, road construction or other management actions since the early 1990's. It is likely that aquatic habitat conditions have improved since this survey was conducted.

Coffin Creek
No survey data on Coffin Creek exists. The stream is similar in nature and morphology to Whiskey Creek. Its morphology is similar to Whiskey Creek therefore, the lower ¼ mile of it may provide anadromous fish habitat.

Aquatic Biological Evaluation and Essential Fish Habitat

There are seven fish species, one aquatic macroinvertebrate and two aquatic mollusk species that have special status and/or management focus on or adjacent to the Umpqua National Forest:

1) Oregon Coast (OC) coho salmon (Federally listed as threatened under ESA) - Oregon Coast coho salmon (*Oncorhynchus kisutch*) use the Jackson Creek watershed for spawning, rearing, and migration. The most productive coho salmon habitat in the Jackson Creek Watershed has historically been in Beaver Creek. Coho salmon use within Beaver Creek extends from the mouth to a series of small chutes that likely block access. Additionally, coho salmon likely occupy the lowest reach of Winters Creek for spawning and rearing. Coho salmon distribution is absent from the other small fish-bearing tributaries that enter Beaver Creek, except for Winters Creek downstream from the 3100 road.

2) Southern DPS North American Green Sturgeon (Federally listed as Threatened) There are no sightings of green sturgeon in the upper South Umpqua River. Over forty years of surveying spring chinook holding pools on the South Umpqua River and Jackson have yet to produce a single sighting for this species. Surveys have been conducted using snorkels and scuba gear in pools which are in excess of 60' deep and would be considered the most likely habitat for sturgeon. Green sturgeon spawning has only been documented in the Klamath, Sacramento and Rogue rivers during recent times. The Klamath Basin supports the largest green sturgeon spawning population. The validity of reports of green sturgeon spawning

in the Umpqua River is unclear, and the possibility of current spawning activity is being investigated.

3) Chinook salmon (Magnuson Stevens species of management focus) *O. tshawytscha* are located in lower gradient reaches of the North and South Umpqua river basins. They spawn in these low to moderate gradient reaches utilizing larger spawning substrate than the other salmonids. The very small South Umpqua population is facing many pressures. They use approximately 55 miles of stream in the mainstem of the South Umpqua River from Tiller to the confluence of Black Rock and Castle Rock Forks and associated tributaries, as well as Jackson Creek from its mouth to Bean Creek,for spawning, rearing and migration.

4) Pacific Coast (PC) chum salmon (FS Sensitive) – Pacific Coast chum salmon (*O. keta*) have not been known to occur in the South Umpqua subbasin. Chum salmon are located approximately 180 miles downstream of the Beaver planning area in the Pacific Ocean/estuaries.

5) Oregon Coast (OC) steelhead trout (FS Sensitive) – Oregon Coast steelhead trout (*O. mykiss*) use Jackson Creek and most major tributaries in the Jackson Creek watershed for spawning, rearing, and migration. Steelhead distribution within Beaver Creek extends approximately 5.75 miles above the mouth to the confluence with Pipestone Creek. Steelhead also occupies the lower reaches of Winters Creek and Devil's Knob Creek. The other smaller tributaries to Beaver Creek do not offer suitable habitat for steelhead.

6) Umpqua Chub (FS Sensitive) - The Umpqua chub (*Oregonichthys kalawatseti*) is endemic to the Umpqua River Basin (the mainstem Umpqua River, South Umpqua River, and to a lesser extent North Umpqua River). Habitat selection by the chub is moderate to slow flowing water (runs and channel margins). Surveys conducted in 1998 indicated distribution extended up to 3C Rock (immediately downstream from the Jackson Creek/South Umpqua confluence.

7) *Namamyia plutonis* Caddisfly (FS Sensitive) - This aquatic caddisfly is suspected to occur on the Forest based upon its documentation elsewhere in southwest Oregon and preference for mature temperate riparian habitats to maintain appropriate water levels and temperatures for development. Lack of information on population distribution and abundance of this species will hinder effective conservation and management.

8) Oregon Chub (proposed for removal from ESA) - In February 2014, currently federally listed as threatened under ESA with designated Critical Habitat) - The Oregon chub (*Oregonichthys crameri*) is indigenous to the Willamette River Basin and have not been known to occur in the South Umpqua subbasin. Habitat selection by this cyprinid is in floodplain habitats with little or no water flow.

9) Rotund Lanx (FS Sensitive) - The rotund lanx (*Lanx subrotuna*) is known to occur on the Umpqua National Forest. The rotund lanx is a small freshwater limpet and the current distribution appears to be scattered and local in portions of the North Umpqua River, portions of the South Umpqua and major tributaries above Roseburg, including Cow Creek. The rotund lanx is found in unpolluted rivers and large streams at low to moderate elevations. They prefer highly oxygenated, swift-flowing streams with stable cobble, boulder or bedrock substrates. They are

not typically found where aquatic macrophytes and epiphytic algae occur. A 2006 aquatic mollusk survey found this species in the mainstem North Umpqua but to date they have not been found in the South Umpqua.

10) Western Ridged Mussel (FS Sensitive) – The Western ridged mussel (*Gonidea angulata*) is suspected to occur on the Umpqua National Forest, however no known sites occur within the Jackson Creek watershed. One report of a shell below 3C rock has been reported (A. Rusk, pers. comm.). Western ridged mussels occur in streams of all sizes and are rarely found in lakes or reservoirs. They are found mainly in low to mid-elevation watersheds, and do not often inhabit high elevation headwater streams where western pearlshells can be found. They often share habitat with the western pearlshell throughout much of the Pacific Northwest. They are more tolerant of fine sediments than western pearlshells and occupy depositional habitats and banks. They can withstand moderate amounts of sedimentation, but are usually absent from habitats with unstable or very soft substrates. There is a general lack of information on life history, reproduction, and ecology of western ridged mussels.

Direct and Indirect Effects - Fisheries

The proposed action (Alt. 2) does not authorize any activities that would modify in-stream habitat or otherwise directly affect fish or sensitive aquatic invertebrates or habitat; therefore, there are no measurable direct effects associated with any alternative.

No meaningful direct impacts to the above described species living in mainstem Beaver Creek, its tributaries, or mainstem Jackson, Coffin, Whiskey, Soup or the South Umpqua, are anticipated from the harvest, log haul, fuels breaks or maintenance burning under the action alternative. This conclusion is based on analysis in the previous section which indicates that the proposed action would result in immeasurable increases in sediment and temperature, would not result in modification of stream channels or streambanks, would not result in an increase in peakflows and would not result in chemical contamination. Further, streams and intermittent streams would be protected from salvage activities by full riparian reserve buffers. Fuel breaks (non-ground disturbing) would be only constructed outside the primary shade zone of non-fish bearing stream channels and outside a 10 foot buffer in intermittent stream channels. The maintenance burning component to the project would have a low intensity prescription which involves flame lengths less than 2 feet high, less than 5% of total area with mineral soil exposed post burn and no riparian reserve ignition. No activities (other than haul of logs on roads, or danger tree falling would occur within the riparian reserves of any resident or anadromous fish bearing streams. Ground disturbance from the implementation of Alternative 2 would not be expected to have an effect on post fire revegetation. The potential for sediment delivery from post fire management activities would be low and of short duration relative to the first two years of sediment delivery following the Whiskey Fire.

The proposed action would not create or burn piles within the no-harvest buffers. Any danger trees needed to be felled within the riparian reserves would be left in place unless they pose a culvert plugging risk. The limited amount of riparian area treated by maintenance burning and fuel breaks combined with the no-treatment stream buffers, and the hand and grapple piling mitigations would minimize the potential for any meaningful direct effects to aquatic habitat.

Activity fuels in commercial harvest units would be left untreated to increase ground cover in burned areas. Skyline systems would yard with minimal tops attached and any fuels would be

treated at the landing by piling and burning all material less than 3" in diameter. This would cause no additional impacts beyond what is described under harvest effects and log haul.

Log haul would be limited to the normal operating season, described as June 1 to October 31 and if fall dry conditions persist longer than normal, a conditional season haul which can go as late as the end of November 30th, may be permitted by the line officer. Wet season haul would not occur with this project. Road maintenance prior to log haul would improve road drainage and assure stream extensions due to ditch lines are minimized by cleaning culverts and adding cross drains where necessary. In addition, blading and reshaping roads, where necessary, would decrease water channeling and ponding on the road surface. Haul within any time period (normal operating season or conditional haul period) would not occur when 1/4 inch or more of precipitation occurs within a 48 hr period of time; and haul would be suspended if surface run off carrying sediment was likely to reach stream channels.

Haul during suitable dry conditions has little potential to create or deliver road-derived sediment to live stream channels. A portion of the haul route crosses OC coho salmon designated critical habitat as well as OC steelhead trout habitat on two bridges that cross Jackson Creek and one that crosses lower Beaver Creek. There are no other areas where the haul route parallels or crosses anadromous habitat on a gravel road. The remainder of the haul route would occur on a paved road (Forest Road 29) which parallels OC coho habitat. The alternate haul option involves logs being transported to the Rogue Valley via crossing the Jackson Creek /Elk Creek ridge top. Logs would be transported down the 1610 and 1610-300 on the Elk Creek side of the ridge then up the Elk Creek drainage to the Rogue Valley. The alternate haul option follows the paved Tiller-Trail highway over into the Rogue Valley via Shady Cove.

Intermittent crossings would not play a meaningful role in potential sediment delivery until rains charge the surrounding watershed enough to produce continuous flow in their channels. This is due to road improvements that would occur prior to haul (in the Normal Operating Season) BMP's that would be in place, and the monitoring of road conditions during haul to assure that road distress or the potential for resource damage are mitigated and haul is suspended before road damage or resource damage can occur.

As part of the maintenance plan, dust abatement may occur, as needed, on the graveled haul routes. Magnesium chloride, calcium chloride or lignin may be applied for dust abatement. Application rates would conform to industry standards and would not be applied within 50 feet of any stream channel. The application of dust abatement materials is not expected to have a measurable adverse impact on water quality or aquatic species in or downstream of the planning area. The use of dust abatement chemicals reduces the amount of water needed to control dust during the low flow time of year.

No measurable direct effects from timber harvest, log haul, or fuels treatment on listed sensitive fish or sensitive aquatic invertebrate species would occur. Maintaining a no-harvest buffer along all streams would adequately filter and disperse overland flow before it reaches the streams. This no-harvest buffer distance would be sufficient in prescription to prevent any meaningful amount of additional sediment from disturbed ground from reaching the stream channel. Burning of slash piles would be limited to the non-riparian portions of fuel breaks, and no slash treatment would be conducted on commercial salvage units. Sediment resulting from slash burning would filter into the forest floor before reaching stream channels.

The creation fuel breaks in the three, fifth field watersheds would allow for better control points for wildfires. By creating these fuel breaks before a fire starts, they would be able to be created under contract with resource protections built in and not in an emergency where fewer environmental protections exist. Although limited in size, the maintenance burning units would restore the historic fire frequency on important parts of the landscape, making future wildfires

burn with a lower intensity and with less resource damage. The Soup Creek burn unit may introduce fine sediment to Soup Creek, Whiskey Creek and potentially Jackson Creek. The amount of fine sediment introduced would be insignificant and unmeasurable against background levels.

The project would authorize up to 44 miles of road maintenance. This would include ditch line and culvert cleaning, road surface blading and shaping, and adding crushed rock where needed. Best Management Practices would be implemented during road maintenance activities. One closed system road would be opened for the project and it would be closed again closed after use (3114-261). Culvert cleanout work associated with road improvement would occur during summer, low flow conditions.

Road improvements would reduce road sediments generated from log haul over the life of the project. Road and haul related sediment would mostly be diverted out of the ditchlines and onto the forest floor through cross drains where it would be largely filtered before reaching stream channels. Extensive post fire slumping and cutslope ravel has occurred in the ditchlines of roads that are interior to the fire. The clean out and road restoration work would reduce the sediment movement off the roads and out of the ditchlines and result in a reduction of sediment introduced to streams (over the existing condition). No new temporary roads would be created as a result of this project.

A small amount of culvert inlet cleaning would occur during road reconstruction to facilitate log haul. All reconstruction sites are located on non-fish bearing stream channels. Ditch relief culverts would be added to the road network to reduce the risk of road failure and reduce the amount of stream channel network extension. This project would liberate small amounts of fine sediment from road activities that would enter stream channels at stream crossings. The impacts are expected to be inconsequential to salmonid habitat. This is due to dry season/conditional season haul only and sediment input would be minimized through BMP's (e.g. turbidity reduction measures and suspension of haul operations if subgrade begins to be mobilized to the surface of the gravel).

Road maintenance activities would minimize disturbance to grasses and forbs that are growing in the ditch line that act as sediment traps. Where haul routes parallel stream channels, a sufficient filter strip between the ditch and the stream exists to slow and capture most sediment laden runoff in the event of a rain storm during haul. The amount of sediment that is liberated from haul and road maintenance would be indistinguishable from back ground levels by the time management-created sediment entrained in stream flows reaches OC Coho habitat. The contract administrator also would suspend operations if weather conditions arise that would cause a transport of sediment from the road surface to the stream.

Given the presence of generally adequate filter strips between the haul roads and the stream, dry season/conditional season haul, following instream work time lines, and road improvements prior to haul, the likelihood and potential quantity of material reaching streams with occupied fish habitat are discountable and inconsequential.

The Whiskey Salvage action alternative would not adversely affect fish and sensitive aquatic invertebrates by measurably affecting downstream water quality or aquatic habitat in fish bearing channels of the Beaver Creek, Lower Jackson subwatersheds or the Middle South Umpqua or Upper South Umpqua 5th field watersheds through the release of additional nutrients, sediment, or by increasing water temperature. The reconstruction of roads within the burn area would likely have a slight improvement on the environmental baseline with respect to fine sediment by potentially eliminating chronic sediment sources or risk of stream diversions.

None of the connected actions described in Chapter 2 proposed under the action alternative would result in any indirect effects over the long-term or in downstream areas as described previously. All of the connected actions are minor activities of limited scope and duration. As such, these connected actions would have little chance of resulting in a negative effect to water quality or instream habitats.

The No Action alternative would leave stands of burned timber un-harvested. There would be no yarding, landings created, haul, burning or road maintenance soil disturbance or sediment created. Road conditions would remain largely unchanged relative to their current condition. As a result, there would likely be a higher risk of ditch relief culvert plugging and diversion/failure under this alternative than the action alternative. There would be no maintenance burning done and no road side fuel breaks created. Fuel breaks would continue to be created in an emergency fashion (during a wildfire) with fewer environmental controls in place during their creation than under the action alternative.

Aquatic Conservation Strategy - Fisheries

The Aquatic Conservation Strategy consists of 4 components: Riparian Reserves, Key Watersheds, Watershed Analysis and Watershed Restoration. The Whiskey Salvage Project is taking place in several 5th field watersheds, all of which have completed watershed analysis documents. No commercial harvest is being conducted within riparian reserves, the only activities being planned in riparian reserves are focused on recreating a historic fire regime, stopping wildfire and reducing the risk of road failure. Most of Tiller Ranger District, including the areas being analyzed for the Whiskey Salvage is Tier 1 Key Watershed. Tier 1 key watersheds were created to "contribute directly to conservation of at risk anadromous salmonids" and "have a high potential for being restored as part of a watershed restoration program". Tiller Ranger District and its partners have invested millions of dollars in the focused restoration of the aquatic ecosystems of Jackson Creek, Middle South Umpqua and to a lesser degree the Upper South Umpqua 5th field watershed.

No measurable negative impacts to habitat elements or the associated beneficial uses of water are expected from any of the proposed activities in the action alternative including those actions taking place within the Riparian Reserve land allocations. The action alternative includes elements which would make roads more resistant to failure and re-establish vegetation and fuel loadings capable of supporting frequent, low intensity fires on the landscape. Getting frequent, low intensity fires back in areas which historically burned in such a manner is a key step to managing wildfires and keeping their effects within the range of natural variability. The activities proposed were designed to accomplish the intent of the Aquatic Conservation Strategy. The No Action Alternative would not proactively implement this conservation strategy.

Cumulative Effects - Fisheries

Private lands make up a portion of each 5th field watershed being analyzed. Upper South Umpqua 5th field has 0.2%, Middle South Umpqua 12% and Jackson Creek 6% private ownership. Private timber lands in this part of Douglas County are usually actively managed for timber, usually have high road densities, are clearcut on a rotation of approximately 50 years, and many employ aerial spraying to control hardwoods. Small farms and multiple private residences are present in the Ash Valley.

Tiller Fires 2002 - 2013

The Tiller Complex of fires of 2002 affected the Aquatic Environmental Baseline of much of the Middle South, Upper South and Jackson Creek 5th field watersheds. In the 2002 fires, no part of the Whiskey Fire burned and therefore the key tributaries of Beaver and smaller tributaries such as Coffin, Whiskey, and Soup were unaffected. The Ash Valley area which was threatened by

the Buckeye Fire in 2013, experienced a burn in 2002 that covered most of its headwaters and the western side of the valley. In 2009, the Bose and Rainbow fires also burned in the Upper South Umpqua 5th field watershed. Aquatic cumulative effects of these fires flow through the main stem South Umpqua River and Ash Creek. Given the extensive re-vegetation that has occurred post fires, it is likely that sediment levels have been greatly reduced from 2002 levels. Sediments created by the much more recent (and higher fire intensity) Boze /Rainbow Fires, is likely still influencing background levels.

In Douglas-fir ecotypes with a fire return interval of 200 years, Agee (1993) hypothesized that sediment output immediately increases by about five times the pre burn levels and then falls to ambient levels over the next 25 years. Severe burns, such as the Bose and Rainbow, are anticipated to take much longer to revegetate and return to ambient sediment levels than the Tiller Complex 2002 or Whiskey 2013. Lower intensity fires, such as the earliest and latest portions of the Tiller Complex 2002 and the later portions of the Whiskey Complex, likely have liberated far less sediment than what Agee observed and returned to lower levels approaching baseline levels faster than 25 years. Nutrients were likely delivered to stream channels at levels higher than baseline for several years post Tiller Complex, Boze/Rainbow and would continue for the Whiskey Complex. Following hot burns there is a significant of total nitrogen as a result of fire volatilizing nitrogen (Agee 1993). Residual fuels left after the burn, contain ammonium nitrogen which is highly available to plants may increase the available amounts of nitrogen beyond pre burn levels. Oxidation of ammonium nitrate can increase nitrate levels in the soil although this is subject to leaching. This leaching can deliver increased levels of nutrients to the stream channels and generate algae blooms (Agee 1993). In basins with high amounts of stream shading, this may be beneficial to aquatic life in that it may increase the amount of nutrients available to aquatic insects and therefore fish. In systems where there is little stream shade or 303(d) listed streams, there are likely to be algae blooms and detrimental effects on water pH and oxygen levels. Given the 25 to 32% high intensity burn on the Tiller Complex of fires, and even lower levels in the Whiskey Complex, there is limited likelihood of nutrient delivery to streams. The patchy nature of the burns may allow for enough nutrient capture by plants where there are no negative aquatic effects. In addition, the time of year that one would expect most leaching to occur at Tiller is winter and spring. Winter and spring nutrient releases would have much less effect on aquatic conditions because flows are much higher, algae grow slower, and solar inputs to the stream are lower.

The Boze and Rainbow fires of 2009 had a much higher intensity burn pattern. It is likely that they delivered nutrients at levels greater than the 2002 Tiller Complex and the 2013 Whiskey Complex. They are located an additional 10 miles upstream than the uppermost portions of the Tiller Complex and the Whiskey Complex. That additional distance potentially gives additional chance for the aquatic life to utilize more of the liberated nutrients before getting to more degraded sections of the South Umpqua River

Post Fire Rehabilitation

Burned Area Emergency Rehabilitation (BAER) efforts followed the Tiller Complex, Boze/Rainbow and Whiskey Complex fires. The most recent fire, Whiskey Complex, included falling fire killed trees into tributary “A” (location of Area Salvage units 1-2 and some roadside danger tree units). Falling was also conducted in the headwaters of Beaver Creek to help trap fine sediment liberated in the two largest areas that burned with a high intensity. Within tributary A, on Forest Road 3114, fills over the large culvert located in T 30S R1W Section 27 were reduced in volume or “cut down” in case the tributary created enough water post fire to cause the culvert to plug or exceed and fail. Reducing the fill volume reduces the fine sediment liberated to downstream occupied fish habitats in case of a failure. Ditch lines and culvert inlets

throughout the fire areas have had some cleaning to reduce risk of stream diversion and road failure.

The proposed action (Alt. 2) does not have the potential to result in any meaningful cumulative effects to water quality, streamflows, or the sediment regime that would measurably affect listed or sensitive fish or sensitive aquatic invertebrates. This is due to the lack of any measurable risk of direct or indirect effects associated with this project. The action alternative would have no measurable effects (either adverse or beneficial) that would incrementally add to any other past, present, or reasonably foreseeable actions in the affected 5th, 6th, or 7th field watersheds.

Determination of Effects - Fisheries

Determinations on the effect of the Proposed Action (Alt. 2) to threatened, endangered and sensitive aquatic species are shown in Table 18.

Essential Fish Habitat – No Adverse Affect

As discussed above throughout this aquatic section, it is unlikely that downstream effects would occur that could adversely affect any Essential Fish Habitat as defined under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) for salmon commercial fisheries. EFH is further addressed in the Fisheries Biological Assessment.

ESA Listed/FS Sensitive Fish and Aquatic Invertebrate Species

Oregon Coast Coho Salmon and Designated Critical Habitat: *May Affect, Not Likely to Adversely Affect (NLAA).*

Southern DPS Green Sturgeon and Oregon Chub and Designated Critical Habitat: *No Effect*

Oregon Coast Steelhead: May Affect Individuals and Habitat But Unlikely to Contribute to a Trend Towards Listing (*MIIH*).

Pacific Coast Chum Salmon, Western Ridged Mussel, Oregon Chub, *Namamyia plutonis* caddisfly, Rotund Lanx and Umpqua Chub*: No Impact (NI).*

Table 18. Determination of effects to Threatened and Sensitive Aquatic Species

Species	Alt. 1	Alt. 2
OC coho salmon (Threatened) and designated critical habitat	NE	NLAA
Southern DPS Green Sturgeon (Threatened) and designated critical habitat	NE	NE
Oregon chub (Threatened) and designated critical habitat	NE	NE
Oregon Coast steelhead (Sensitive)	NI	MIIH
Umpqua Oregon chub (Sensitive)	NI	NI
Pacific Coast chum salmon (Sensitive)	NA	NA
Rotund Lanx (Sensitive)	NI	NI
Western Ridged Mussel (Sensitive)	NI	NI
Namamyia plutonis caddisfly (Sensitive)	NI	NI

Figure 14. Fish Distribution in Buckeye Fire Area

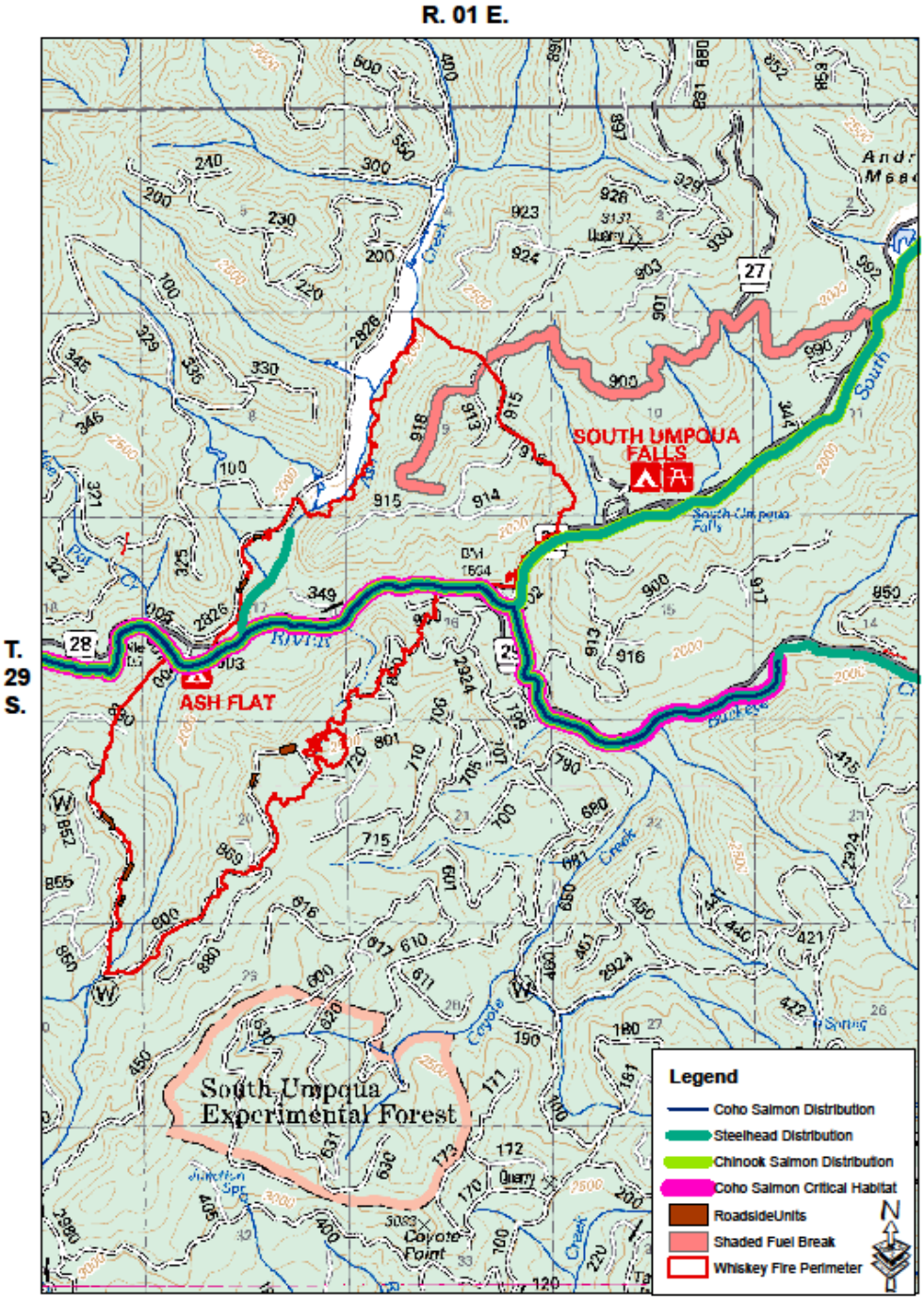
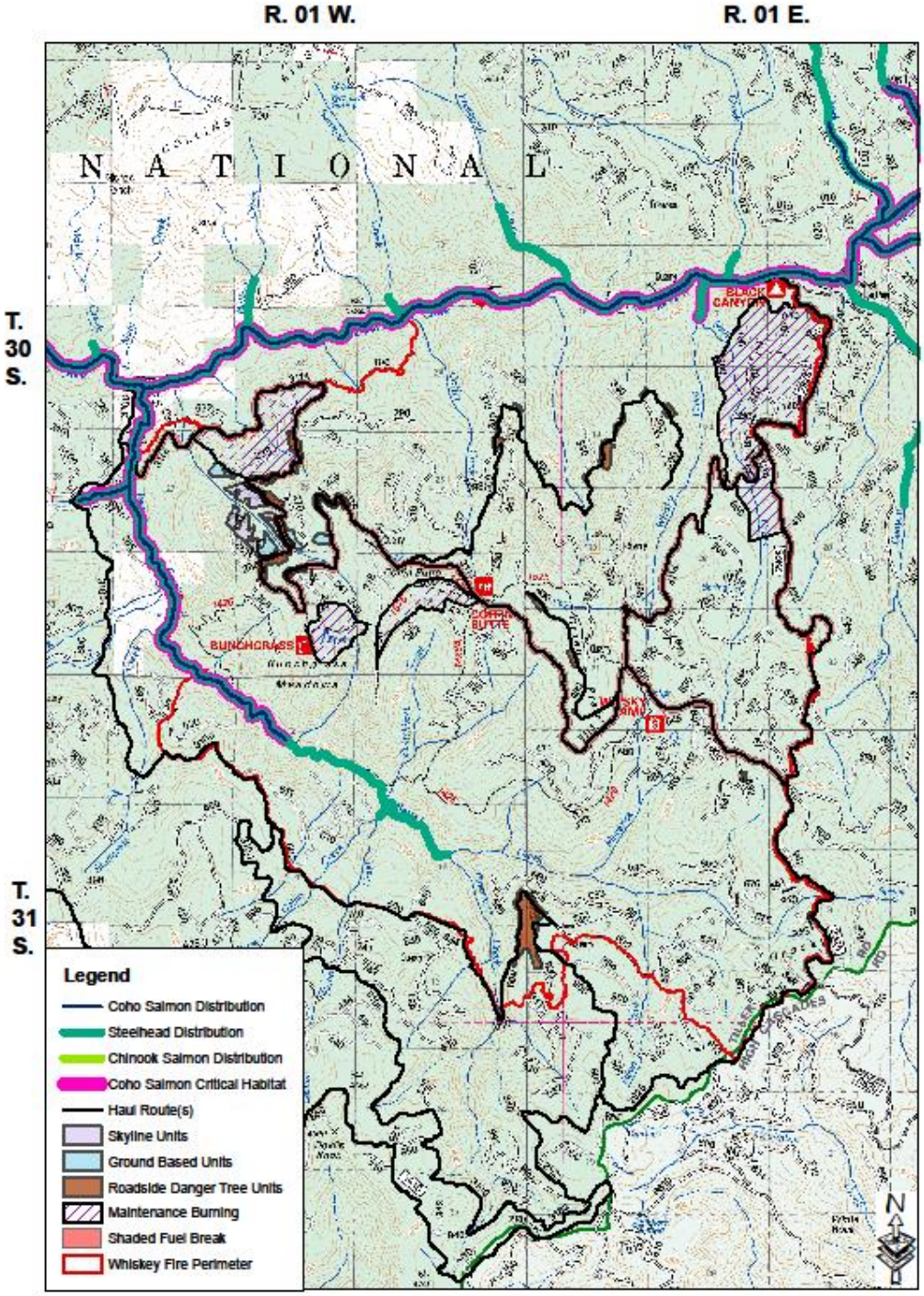


Figure 15. Fish Distribution in the Whiskey Salvage Planning Area



TERRESTRIAL ENVIRONMENT

A detailed description of the terrestrial environment can be found in the Jackson Creek Watershed Analysis (USDA, Umpqua NF 1995) and its 2012 iteration (USDA, 2012), 1996 Buckeye/Zinc Watershed Analysis (WA), 1997 Boulder-Ash WA, and the 2004 Upper South Umpqua Watershed Analysis (WA). Site specific field work and analysis for this project produced additional information, which is provided in the following sections.

Forest Vegetation

Assumptions

Estimates of area burned and intensity comes from aerial imagery, and on the ground measurements. Estimates of the numbers and sizes of trees burned come from sample plots and the interpretation of aerial imagery. Both of these processes are subject to error in measurements as well as statistical error. Therefore, figures presented are just estimates based on data collected, professional experience and judgment. Maps developed and presented representing current conditions and proposed actions are subject to mapping errors. Therefore, representations of these conditions and actions should be considered approximate.

Projections of growth into the future were developed using the Forest Vegetation Simulator computer model. This is a versatile and powerful, non-distance dependent, growth and yield simulation model that can estimate a variety of outputs based on initial conditions and certain assumptions. Variants have been developed to better represent geographical and biophysical conditions and systems. The Western Cascades variant was used for this analysis. All models of biological systems are abstractions of reality and therefore the estimates produced are subject to error.

Existing Conditions

Pre-Fire Conditions

The Tiller Whiskey Complex Fire Salvage Project planning area encompasses approximately 17,868 acres located on the Tiller District of the Umpqua National Forest. Douglas-fir is the primary species found within stands of both natural and artificial origins. A partial list of species found within the planning area include ponderosa pine, sugar pine, western white pine, white fir, grand fir, hemlock, pacific madrone, California black oak, and Oregon white oak. Much of the stand structure is even-aged as a result of past management activities and natural disturbances such as fire. Though not as wide spread as the even-aged stands, there are numerous uneven aged stands. The majority of the non-forest cover areas are composed of wet and dry meadows that support grasses, shrubs, and other herbaceous cover.

Information queried from the Forest Inventory and Analysis (FIA) database, based on pre-fire sample plots, indicates that the average number of standing snags with a dbh ≥ 5” was 14.9 per acre (Miles, 2014) for a 5-mile radius circle centered on the analysis area (Whiskey polygon only). The number of growing stock trees (dhb ≥ 5”) per acre for the same area was 134.9.

Post-Fire Conditions

The Whiskey Complex Analysis Area is composed of two distinct burn areas caused by separate starts: The Whiskey Fire and the Buckeye Fire. Due to a combination of varying weather conditions, fuel types and resulting fire behavior burn severities were variable throughout the area affected by the Whiskey and Buckeye Fires. The fire burned approximately

17,868 acres on the Tiller Ranger District. Table 19 exhibits the estimated vegetation mortality on an acreage basis within the analysis area based on the reduction in canopy cover using areal imagery. Because this estimate does not take into account the mortality of trees that only suffered partial crown scorch, the acreage of mixed and stand replacement is probably somewhat higher than the estimate below. Based on mortality class mid-points (Low=12.5%, Mixed=37.5%, Stand Replacement=75%), estimated trees per acre (dbh>5") from FIA data, and the total acreage burned within the Whiskey Area (16,185 acres), a rough estimate of total snags produced is 401,041 or 24.4 new snags per acre. This does not include the estimated 14.9 snags per acre (FIA data) that existed pre-fire.

Table 19. Vegetation Mortality within the Project Area

Vegetation Mortality Class	Vegetation Mortality Within Analysis Area	
	Whiskey Area %	Buckeye Area %
Low < 25%	89%	94%
Mixed 25 -50%	4%	3%
Stand Replacement > 50%	7%	3%

Desired Conditions

Management direction for the project area comes from both the Forest Plan and the Northwest Forest Plan. The Northwest Forest Plan States that for matrix lands: Matrix objectives for silviculture should include: "(1) production of commercial yields of wood, including those species such as Pacific yew and western red cedar that require extended rotations, (2) retention of moderate levels of ecologically valuable old-growth components such as snags, logs, and relatively large green trees, and (3) increasing diversity by providing early-successional habitat ecological (Standards and Guidelines, Attachment A, pp. B5-B6)". "In the matrix, objectives for management after stand-replacing events would generally differ from those for Late-Successional Reserves. Economic benefits of timber production would receive greater consideration. For example, the commercial salvage of dead trees would be less constrained and replanting disturbed areas would be a high priority ecological" (Standards and Guidelines, Attachment A, pg. B9).

Guidance from the Umpqua National Forest LRM) includes:
FORESTWIDE MULTIPLE-USE RESOURCE MANAGEMENT STANDARDS & GUIDELINES: TIMBER VEGETATION MANAGEMENT

1. The following practices may apply on all lands selected for timber production:
    h. salvage harvest of dead or down trees;

2. Forest openings created by even-aged silviculture shall not exceed a maximum of 60 acres in the Douglas-fir forest types (CH-CW, CD-CP) and 40 acres in the other forest

types (CR-CF, CM-CE). Created forest openings should be shaped or blended with the natural terrain to achieve aesthetic, biological diversity, and wildlife habitat objectives to the extent practicable. Exceptions are permitted for catastrophic events (such as fires, windstorms, or Insect and disease attacks) or on an individual basis after a 60-day public notice period and review by the Regional Forester.

9. An economic analysis shall be prepared for all timber sales offering an estimated total volume In excess of 1.0 million board feet. The magnitude of the analysis should be proportional to the complexity of the project, and should consider the duration of benefits and costs by evaluating the economic consequences over an adequate time frame. For salvage and timber sales without road construction, a time frame focusing on the period from sale initiation to sale closing is adequate.

10. Appropriate species mix for regeneration shall be included in the silvicultural prescription prepared during the environmental analysis for harvesting the area. The prescription should consider natural regeneration potential and advanced regeneration as part of this analysis. Consideration should be given to regenerating and maintaining minor species, where appropriate for the Site, as viable components of future stands, and for enhancement of diversity of vegetation. (See also Wildlife and Visual Forest-wide standards and guidelines.) Stand treatment in managed commercial forests shall provide for species diversity tree species used in planning harvest units should be based on the potential of the site as Indicated by plant associations. Both commercial and pre-commercial thinning should retain a diversity of species based on site potential. Vegetation management activities and hardwood management prescriptions should allow for all natural species to function. None should be eliminated from the Site.

Proposed Treatment Areas

Area Treatment Units
The proposed treatment area boundaries encompass approximately 320 acres. Roadside harvest units total 188 acres, while area units total approximately 132 acres (Figure 6). Within the area units, 32 acres would be designated as “leave patches” where no harvesting would occur. Therefore, the net area harvested within the area units would be approximately 100 acres. The area harvest units are concentrated in the higher burn severity portions of the analysis area where the majority of mortality occurred (Table 20). The area units can also be subdivided based on whether they are stands that originated from natural regeneration (91.9 acres) or whether they were planted following a previous harvest (39.2 acres).

Proportionally the treatment areas comprise a relatively small percentage of the acreages burned within the analysis area. Table 21 breaks out the proportion of treatment area by severity compared to the acres burned within the analysis area based on post-fire imagery. Much of the areas that sustained little to no mortality within the area units are designated as leave patches.

Table 20. Area Salvage Unit Number, Survival and Origin

Unit	Significant Survival	Acres	Origin
1A	No	27.1	Natural
1B	Yes	17.1	Natural
2	No	7.8	Natural
3	Yes	6.2	Natural
4	Yes	6.7	Natural
5	No	34.6	Artificial

Table 21. Burn Severity Comparison

Area and Roadside Unit Burn Severity Comparison by Acreage				
Vegetation Mortality	Low <25%	Mixed 25-50%	Stand Replacement >50%	Totals
Treatment Acres	89.8	114.8	114.5	319.1
Acres Burned in Analysis Area	16,266	633	1,286	18,185
% Treated	<1%	18%	9%	2%

Table 22. Distribution of Mortality across Treatment Units

Vegetation Mortality	Treatment Acres			
	Area Units	Whiskey Roadside	Buckeye Roadside	Total
Low <25%	30.5	53.3	6.0	89.8
Mixed 25-50%	12.8	101.9	0.1	114.8
Stand Replacement >50%	87.8	26.4	0.3	114.5
Total	131.1	181.6	6.4	319.1

In the majority of the area unit harvest units (69.5 ac.), outside of leave patches, mortality is nearly 100% among conifers with the needles and fine branches consumed by the crown-fire that burned through these areas. In some areas however, the fire was a surface fire or passive crown fire that did not immediately kill all of trees (30 ac.). Some of the trees had less than 100% of their crowns scorched and killed. Based on past experience and feedback received during field trips with the public, a probability of mortality of 60% or greater was used for predicting which trees to consider as likely to die. Percent crown-length killed (or scorched) (PCLS) was used for estimating the probability of mortality (Pm) following the guidelines in "Marking Guidelines for Fire-Injured Trees in California" (Smith and Cluck, 2011).

PCLS was used to determine mortality probabilities and design corresponding salvage prescriptions that would assist in retaining healthy green trees in order to provide a seed source for the future stand while removing trees that have a higher probability of dying. This prescription was also designed around the objective of capturing value of the dead and dying trees.

Figure 16, Figure 17, and Figure 18 illustrates both the expected mortality as well as the expected survival within the area units. Figure 16 shows that within units 1B, 3, & 4, mortality occurred in all size classes but survival was best in larger trees. This is expected due to the thicker bark and higher base of the live crown. Figure 17 and Figure 18 depict the nearly complete mortality that can occur, even in large trees when fire behavior is extreme.

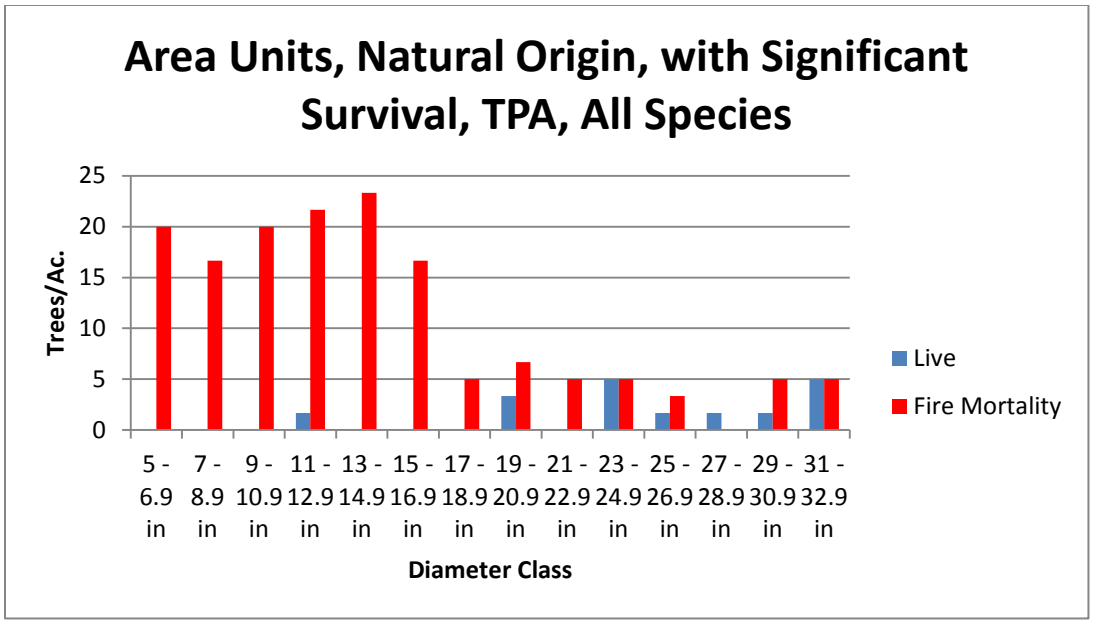


Figure 16: Diameter distribution in trees per acre of area units, of natural origin, with significant survival, for all species.

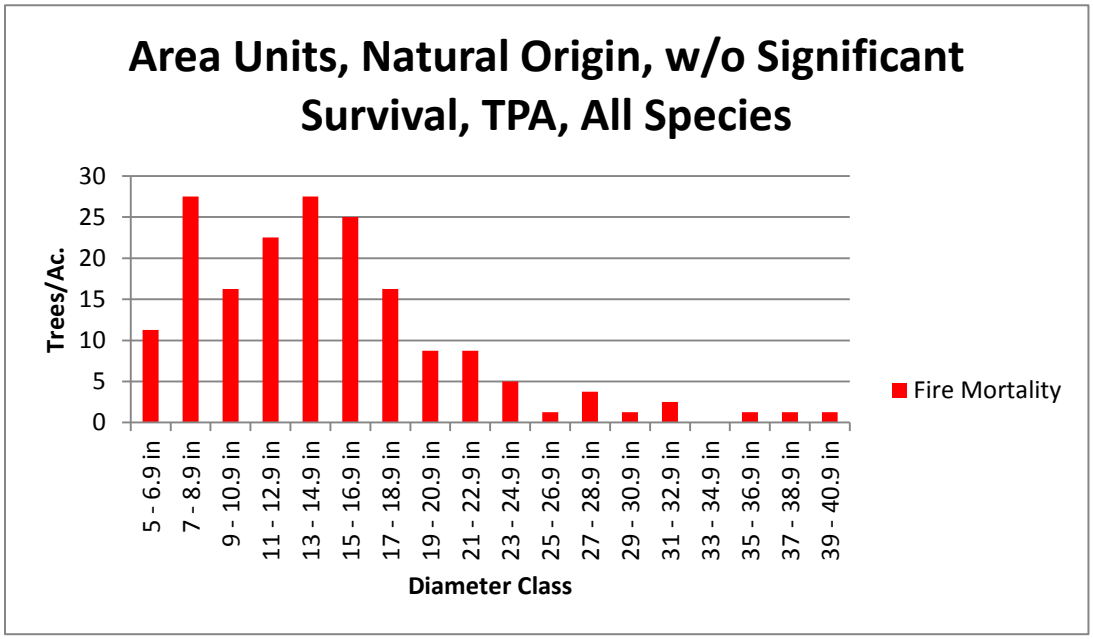


Figure 17: Tree diameter distribution of area units, of natural origin, without significant survival, all species.

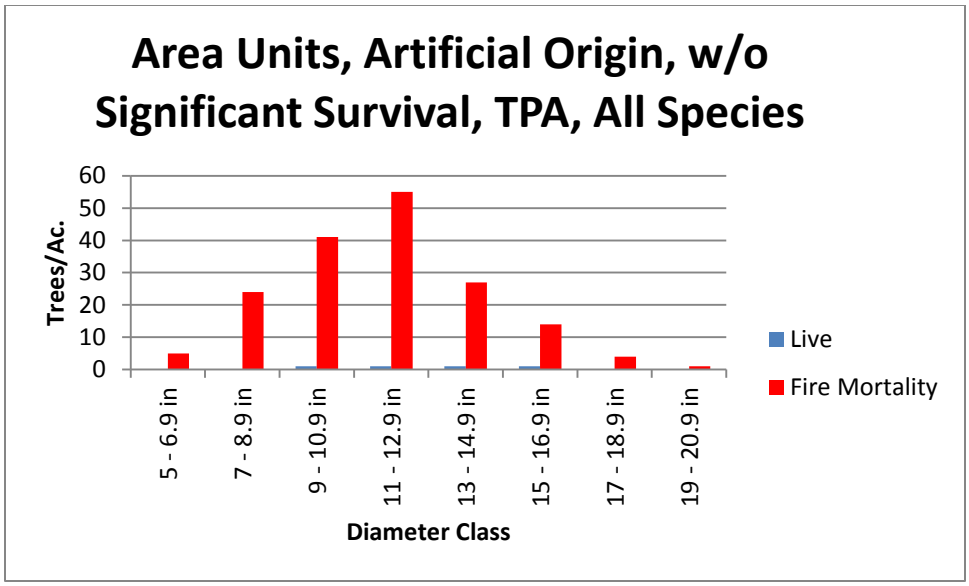


Figure 18: Tree diameter distribution of area units of artificial origin, all species.

Roadside Treatment Units

Roadside treatment units have been designated alongside existing roads where the fire behavior was severe enough to cause varying levels of tree mortality. Within the Whiskey Complex analysis area, 188 acres have been identified as needing treatment (Figure 2, Figure 5, Figure 6, Figure 7, and Figure 8). The driving factor behind treating these units is to reduce or remove the threat of trees falling onto the road. When a tree falls onto the road, there is the possibility of it injuring or killing people, or blocking their ingress or egress. Another factor is the financial burden it places on the Forest Service to treat these roads. Without treatment, snags would begin falling on the road with increasing frequency as they decay. This would require the forest service to expend significant financial resources to have the fallen stags removed from the road prism.

For sampling, the roadside units to obtain diameter distribution as well as other attributes, roadside units were subdivided into strata based on tree size. Within the 188 acres of roadside units, it was determined that there was approximately 53 acres of small diameter stands (max dbh <20”), 109 acres of mixed diameter units with a significant component of small diameter (dbh <20” dbh) trees and numerous larger trees (dbh >20”), and 26 acres of large, mature timber (diameter>20” w/o significant component of small diameter trees). Figure 19, Figure 20, and Figure 21 depict the diameter distribution of both expected mortality and survival within each size class of roadside unit.

Figure 19. Diameter distribution of live and dead/dying trees in small diameter roadside units

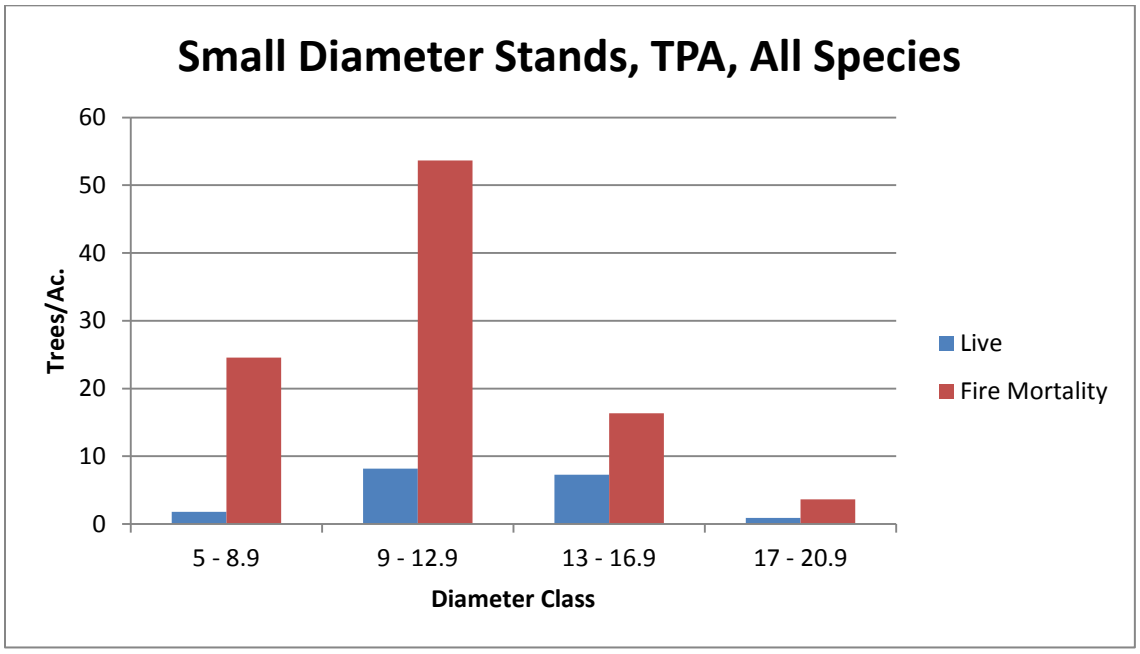


Figure 20. Diameter distribution of live and dead/dying trees in mixed diameter roadside units

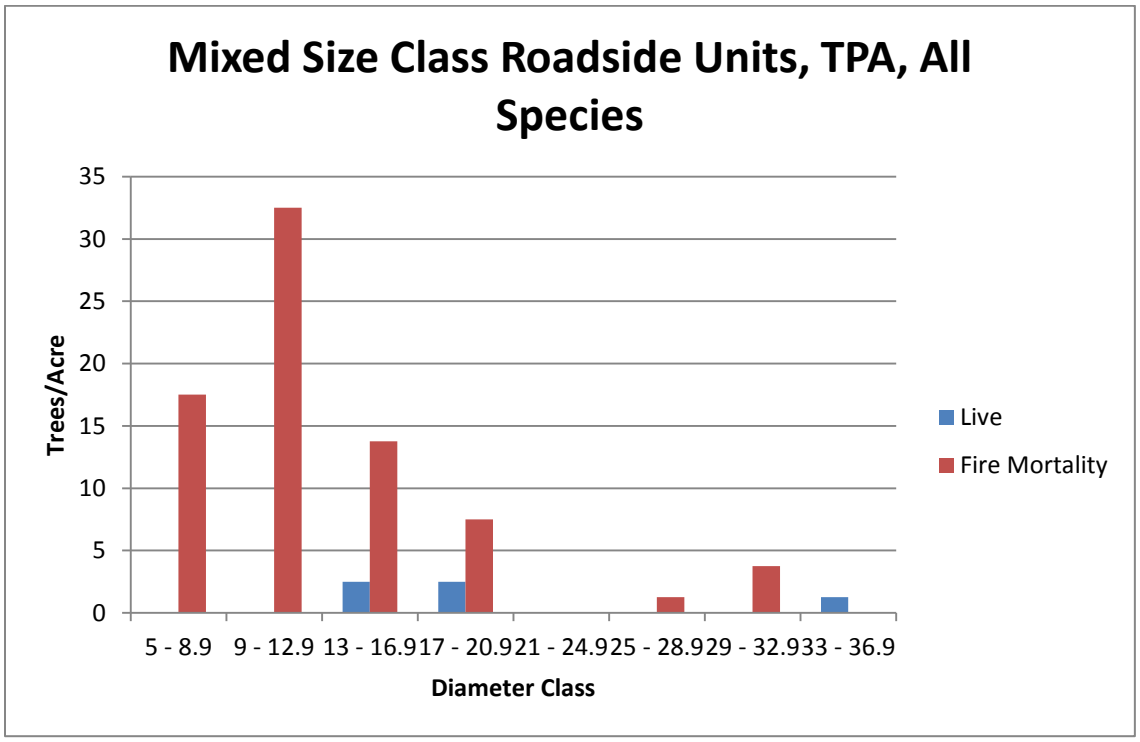
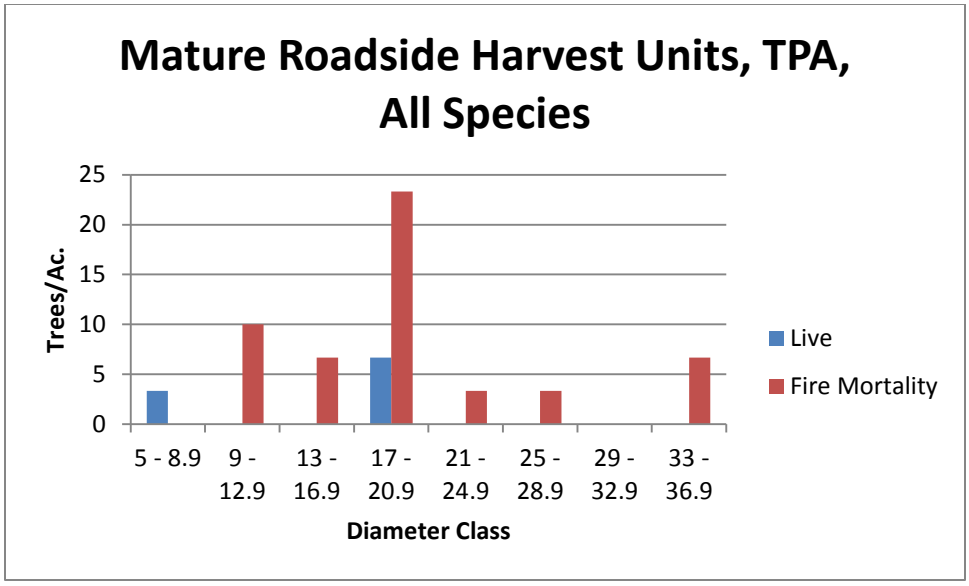


Figure 21. Diameter distribution of live and dead/dying trees in large diameter roadside harvest units



The distance from the road that each unit extends is based upon the height of the trees within the unit that can be classified as “Danger Trees”. The applicable guidance for determining if a tree is a danger tree can be found in the Field Guide for Danger Tree Identification and Response (Toupin et al., 2008; USFS R6-NR-FP-PR-01-08). Generally, the danger zone for a tree extends 1 1/2 times tree height plus potential roll out distance. Therefore, on steep ground uphill of the road, the danger zone can extend a substantial distance beyond 1.5 times the tree length and can only be determined by a trained professional at the site. Conversely, on the downhill side of the road, the distance where a tree presents a hazard would generally not exceed 1.5 times the tree length measured by slope distance, not horizontal distance.

As with the area treatment units, we use the “Marking Guidelines for Fire-Injured Trees in California” (Smith and Cluck, 2011) for estimating the probability of mortality for trees within the roadside harvest units. Trees that have a probability of mortality of 50% or greater are rated under danger tree guidelines as if they are recently dead trees. The rational for taking these trees is that there is a better than even chance that they would be dead within the next few years and then would possibly become danger trees. We used a slightly lower probability of mortality (50%) than we used in the area units because the consequences of a tree falling and hitting the road is much greater than in the area units both from a financial and public/workers safety viewpoint.

Direct and Indirect Effects

Alternative 1 – No Action

The no action alternative would result in no vegetation treatments and no change in live tree or snag density levels. Therefore, without an initial action, there can be no subsequent direct and indirect effects (CEQ 1986).

The road systems within the analysis unit are crucial to providing access to USFS employees for future land management in this area, for fire suppression activities on the surrounding lands, as well as for public access. The general public uses these roads for recreation purposes and access to firewood. Without salvage of dead and dying trees and danger trees adjacent to roads, maintenance costs would rise while safety declines. The absence of salvage operations would result in the loss of economic value of raw material that could potentially be provided to the local industry and community.

Alternative 2 - Proposed Action

Snag Retention within Area Harvest Units
The salvage activities proposed in this alternative would reduce the amount of standing snags within treatment units primarily within the merchantable diameter range of approximately 11 to 41 inches. Due to the existing stand structure and the small percentage of area being treated, this would be a relatively small portion of the snags that would remain after harvest throughout the analysis area. The proposed treatment areas encompass only 7% of the acreage that burned under high severity within the analysis area (Table 19) and approximately 1% of the total area burned.

Within the area harvest units of natural origin, the harvest prescription would retain green trees with a probability of mortality of 59% or less, patches of undisturbed snags and green trees (32 acres) as well as individual large snags distributed between the leave patches.

Within snag leave patches under Alternative 2, snag densities would remain the same as under Alternative 1, as displayed in Figure 22. Outside of snag leave patches, the snag density would be as displayed in Figure 23. One of the rationales for retaining approximately 30 percent of the snags in un-harvested patches is that large snags should remain standing longer within these patches. Russell found that snag basal area per acre had a significantly significant positive effect on increasing snag longevity (Russell et al., 2007).

Compared to Alternative 1 (Figure 22), the no-action alternative, Alternative 2 (Figure 23) has fewer residual snags per acre due to salvage harvesting. Approximately 60 years post-harvest the number of 18” dbh and larger hard snags begins to increase slowly under Alternative 2. By 80 years post-harvest the Alternative 1 also begins to develop more hard snags greater than 18” dbh. This comparison is fairly sensitive to the number of seedlings established by both artificial and natural regeneration. It assumes that under alternative 2, due to artificial regeneration, more seedlings per acre are established and survive.

Within area treatment units, natural regeneration was assumed for Alternative 1. A study of unlogged wildfire sites in SW Oregon and Northern California found that natural regeneration was abundant out to 200 meters from the nearest seed source for white fir series plant associations and about 300 meters for Douglas-fir series (Shatford et al. 2007). One difference between natural and artificial regeneration methods is that artificial regeneration may be completely established in the year following fire and harvest while natural regeneration may occur on a continuous basis for several decades following the fire. This gives artificially regenerated trees a slight competitive advantage allowing them to grow for one or more seasons with reduced competition for light and moisture resources. Therefore this simulation should be thought of as applying to the interior of the unit or a worse-case scenario. For Alternative 2, artificial regeneration was assumed post-harvest as well as some natural regeneration for several years post-harvest.

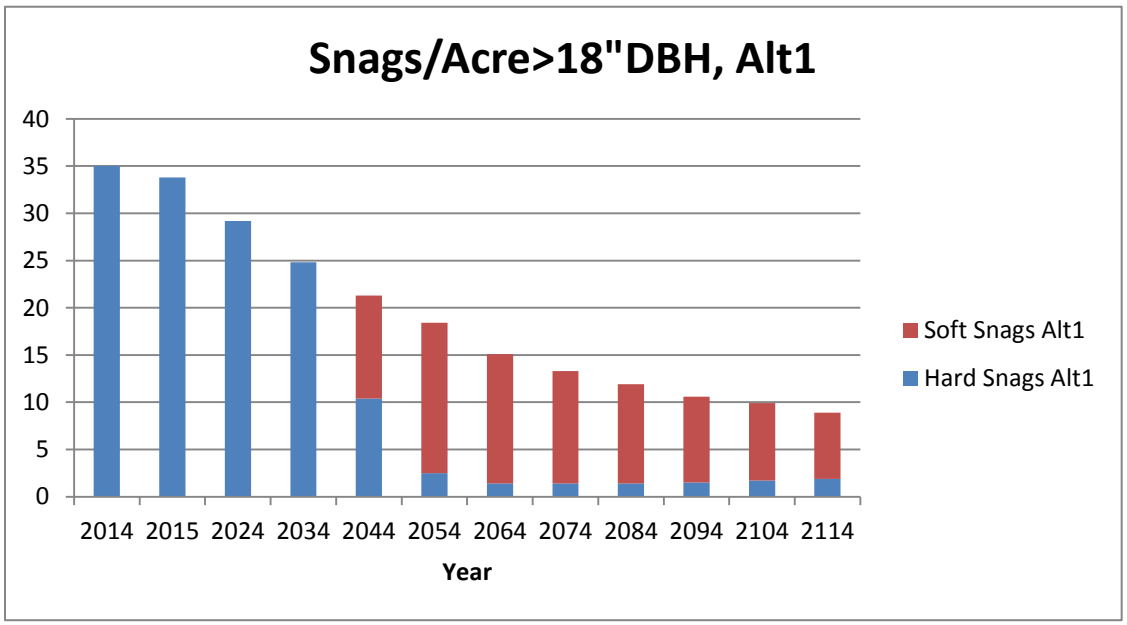


Figure 22: Snag density over time, Alt 1, on stands of natural origin with significant tree survival

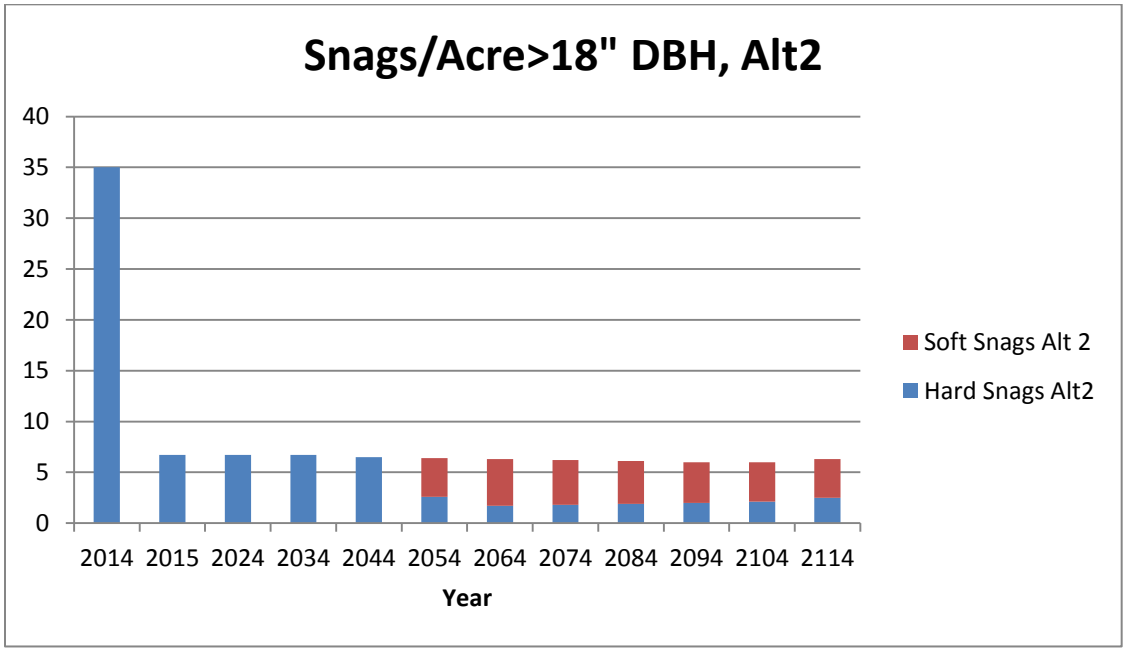


Figure 23: Snag density over time, Alt 2, on stands of natural origin with significant tree survival.

Under Alternative 1 (Figure 24) in stands of natural origin without significant survival, snags gradually reduce in density from the current level of 51.3 snags per acre larger than 18" dhb to 8 snags per acre in 2114. Under Alternative 2 (Figure 25), harvesting reduced the snag density from 51.3 down to 6 snags per acre in 2015. By 2064, the snag density would be approximately 3 snag per acre over 18" dbh. By 2114, the density of these large snags increases to

approximately 8 snags per acre. At the end of the 100 year simulation the number of snags per acre is approximately equal but number of hard snags being generated by current mortality is increasing faster under Alternative 2 because of the assumption of higher initial stocking due to artificial regeneration.

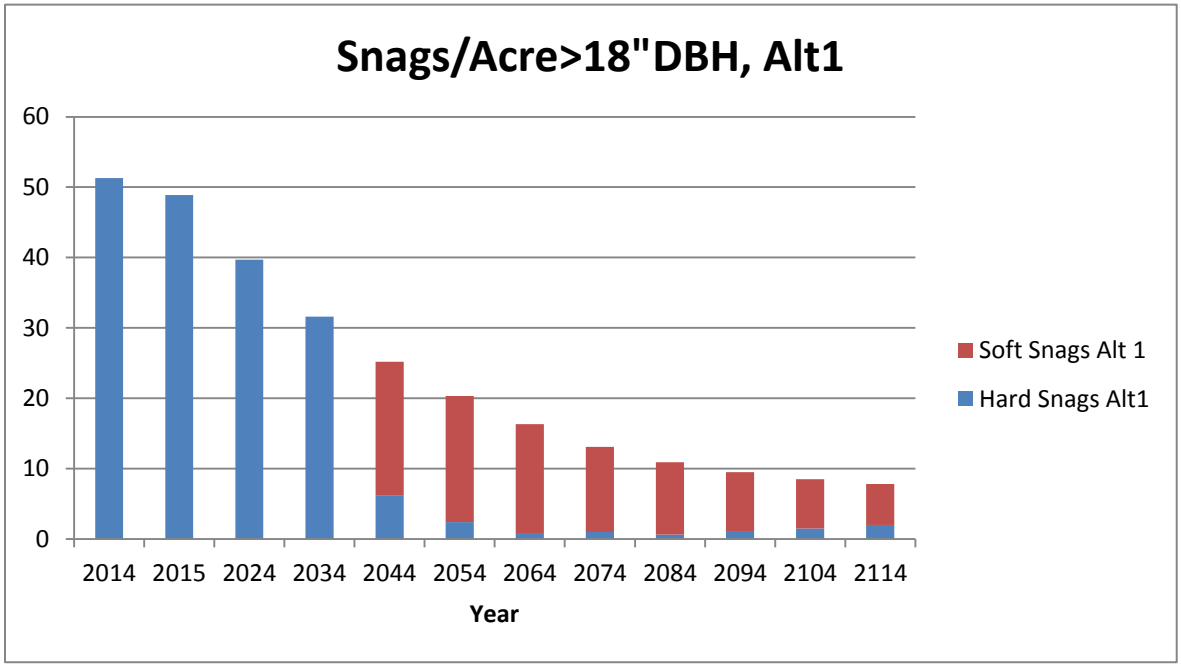


Figure 24: Snag density over time, Alt1, of stands of natural origin without significant tree survival.

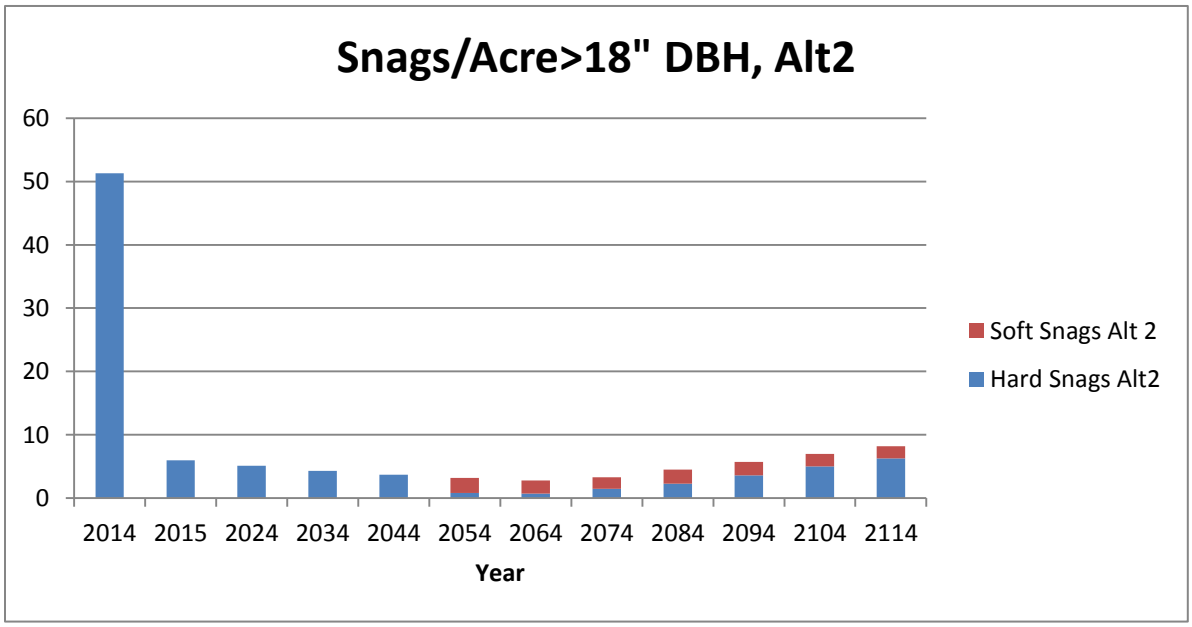


Figure 25: Snag Density over time, Alt 2, of stands of natural origin without significant tree survival.

In area units of artificial origin with little survival, there are few snags>18" dbh and larger because these plantations were fairly young and the largest trees were just beginning to exceed 18" at the time of the fire. The graph for Alternative 1 (Figure 26) depicts the density of snags over time assuming that natural regeneration occurs. Alternative 2 (Figure 27) would not significantly reduce the snag density of larger snags since approximately 5-6 snags per acre over 20" dhb would be retained. By approximately 60 years post-harvest, trees planted in 2015 would begin to generate large snags as density dependent mortality occurs. The rate of large snag generation is slightly higher under Alternative 2 because it is assumed that artificial regeneration would result in higher initial stocking than Alternative 1.

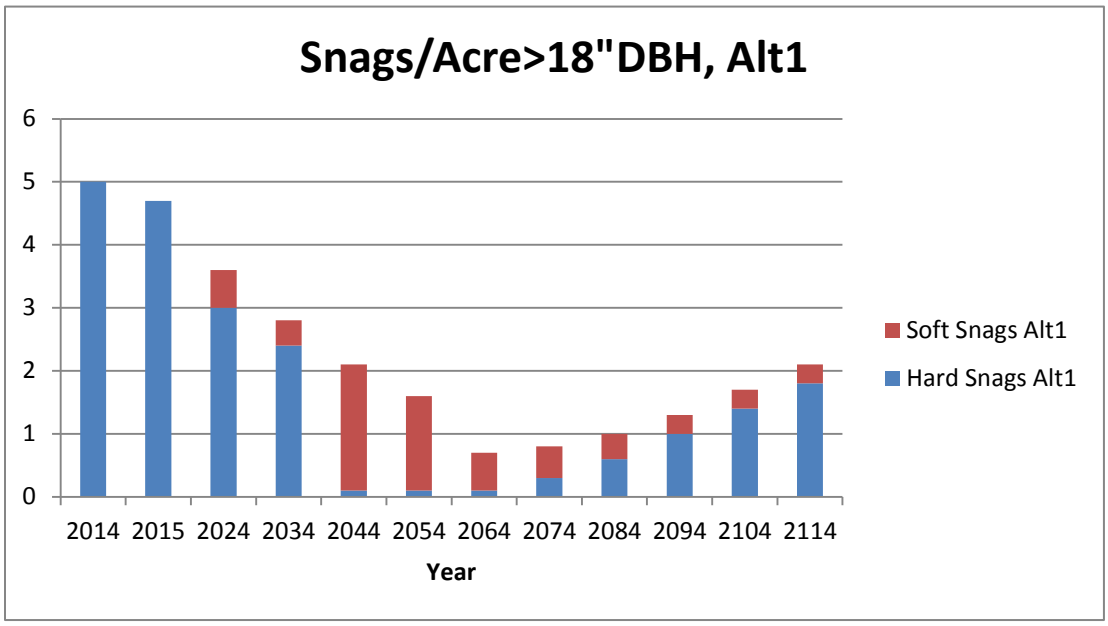


Figure 26: Snag density over time, Alt 1, of stands of artificial origin.

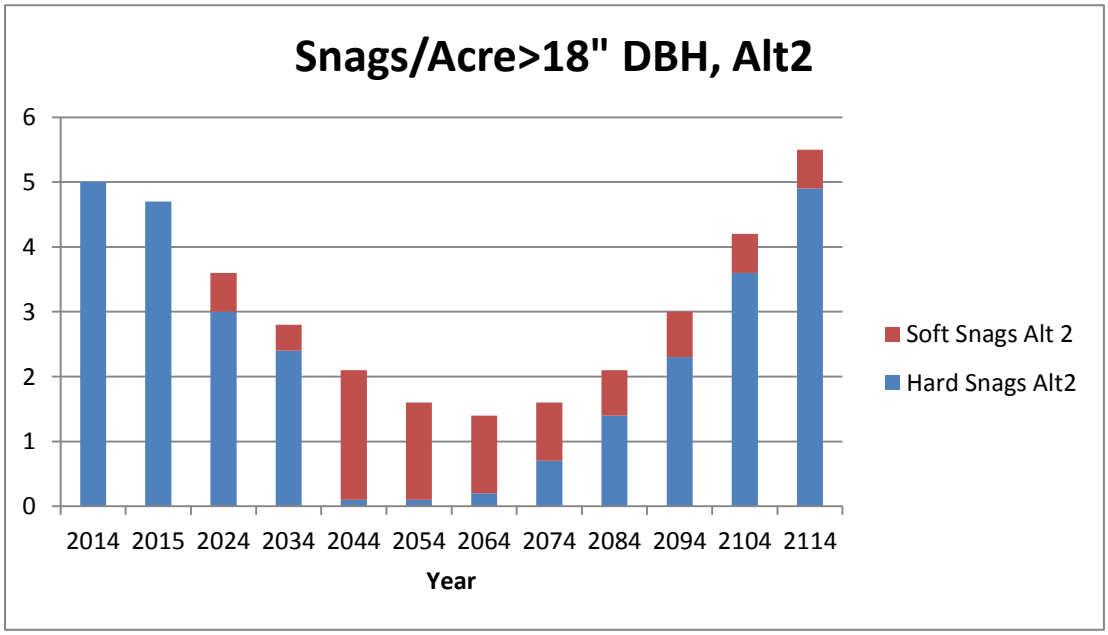


Figure 27: Snag density over time, Alt2, of stands of artificial origin.

Effects on Live Trees within Area Harvest Units

All trees that are not currently dead as a result of the fire have some chance of survival. Therefore there is always going to be a potential for removing trees that would otherwise live regardless of the Pm level chosen. However, this risk was minimized through on the ground reconnaissance and treatment unit design that focused on high severity burn areas. The amount of potential surviving trees removed in the salvage would be minimal.

Damage to live trees from logging the surrounding snags would occur to some extent in units that have live trees remaining. The harvest contract would include penalties for the harvest or damage of live trees that have been marked as leave trees based on the probability of mortality as discussed earlier. Some insect and disease specialists hypothesis that removing dead and dying trees in close proximity to undamaged or damaged trees that are expected to survive fire damage may improve the chance for those trees to survive subsequent bark beetle attacks (Bill Schaupp, personal communication).

Effects on Snags within Roadside Harvest Units

It is assumed for effects analysis that all snags within roadside harvest units that meet danger tree criteria would be felled and removed. The average roadside harvest unit size is 6.5 acres. Most of the units are less than 5 acres in size (Figure 28) and widely distributed across the Whiskey Fire portion of the analysis area (Figure 4).

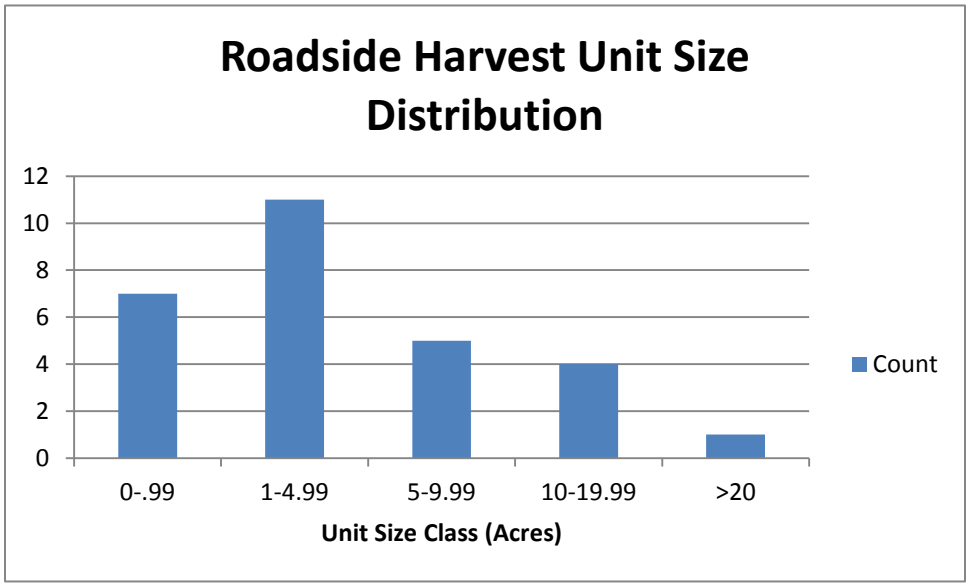


Figure 28: Roadside Harvest Unit size distribution.

Within roadside harvest units, there would be many snags that do not meet danger tree criteria due to their height, distance to the road, and lean away from the road. The number of trees that would be within the roadside harvest units that would not meet the criteria as danger trees was not estimated because this data was not collected. Due to the relatively small size of the units and scattered distribution within the analysis area, the impacts should be minimal.

Within the Buckeye Fire portion of the analysis area, seven roadside harvest units total 6.4 acres in size with an average size of less than an acre. Only firewood harvesting by permit would be allowed within these units. Due to the very small proportion (0.4%) of the burn area

being harvested, the small diameter of the trees within these units, and the scattered geographical distribution of the units, effects would be insignificant.

Effects on Live Trees within Roadside Harvest Units

Within roadside harvest units, live trees with a Pm of less than 50% would not be harvested. Based on sample estimates, approximately 10.1 live trees per acre would remain post-harvest. In some roadside units where fire behavior was extreme, there are no live trees remaining while in other units with less severe fire behavior mortality is much lower. Some of the live trees within the roadside harvest units that are retained due to a Pm<50% would subsequently die from injury sustained during the fire. If these trees meet danger tree criteria in the future, they may be felled. Some live trees would probably be damaged during logging operations. Due to the low number of retained trees per acre in most units, this damage should be isolated in nature and insignificant in effects.

Snag Retention at Analysis Area Scale

As discussed earlier, within the Whiskey Fire, an estimated 24.4 new snags per acre within the 17,868 acre fire perimeter. Based on estimated harvests from both the area units and the roadside units, the average number of snags per acre would drop to 22.9. This does not include the 14.9 snags per acre that are estimated to have existed pre-fire. Presumably some of these pre-existing snags were partially or completely consumed by the fire. However, this data suggests that the number of snags post fire is significantly higher than pre-fire and that the proposed harvests would have only as slight effect on the snag habitat.

Cumulative Effects

Without an initial action, there can be no subsequent incremental impact (CEQ 1986) and consequently no overlap of incremental impacts with impacts of other past, present, and reasonably foreseeable future actions. Therefore, there is no cumulative effect on forest vegetation from Alternative 1. Past, present and reasonably foreseeable activities were reviewed to determine cumulative effects of forest vegetation management activities within the analysis area. Table 23 shows the percentage of treated acres within the two 6th field watersheds contained by the main Whiskey Fire. Since the 1980's the percentage of forest acres treated has dropped dramatically. The project, added to currently planned projects Table 6 and Table 7), equals a treatment percentage of just 3% for this decade. Based on this figure, if it were continued on into the future, it would take approximately 330 years to treat the entirety of the watersheds. Further, the treatment of between 6 and 7 acres within the context of the 14,000 acre Ash/Zinc 6th Field watershed (Table 24) is insignificant.

Of the acres that burned at moderate to high intensity within the Whiskey Fire complex, and therefore produced large numbers of standing snags, the proposed action would only harvest about 12% of that total area. This is a fairly insignificant proportion of the total. Within the treatment units, leave patches are interspersed to provide dense snag habitat for wildlife. Outside of leave patches, approximately 5-6 snags per acre of the largest diameter trees would provide suitable habitat for species that require large snags. When considered in total: the small percentage harvested, the leave patches, and the dispersed leave trees, this project would have a non-significant impact on the early-seral, post-fire resource.

Table 23.Summary of Past, Present, and Reasonably Foreseeable Actions, Beaver Creek and Lower Jackson 6th Field HUCs

	Harvest		Tree
Decade	Regen	Interm.	Planting
1950's	5.2%	0.0%	2.6%
1960's	7.3%	7.1%	8.0%
1970's	12.1%	26.6%	9.3%
1980's	10.6%	6.1%	9.0%
1990's	2.8%	2.2%	6.3%
00 to now	0.0%	2.9%	0.4%
Planned	2.4%	3.9%	5.5%
This Project	0.6%		

Table 24. Summary of Past, Present and Reasonably Foreseeable Actions, Ash/Zinc and Skillet/Emerson 6th Field HUCs

	Harvest		Tree
Decade	Regen	Interm.	Planting
1950's	12.2%	2.9%	6.8%
1960's	8.2%	7.3%	2.4%
1970's	5.2%	34.4%	3.9%
1980's	10.7%	3.6%	4.7%
1990's	3.8%	0.8%	4.3%
00 to now	0.0%	3.5%	9.1%
Planned	0.0%	0.0%	0.0%

Unit #32 (Figure 8) is approximately 59 acres in size and when combined with the Leavito unit that would be salvaged under the Beaver Timber Sale project, this combined area meets the 60 acre limit imposed by the Forest Wide Standards and Guidelines with in the Umpqua National Forest LRMP, and is also under the +50% exemption (TM 2(e); Chapter IV, pg. 43) for catastrophic events such as fires, windstorms, or insect and disease attacks. Application of the project design features and use of the "Field Guide for Danger Tree Identification and Response" (Toupin et. al. 2008, USDA Forest Service Publication R6-NR-FP-PR-01-08) within this unit resulted in the identification of approximately 30 acres that will not be treated because trees were found to be sound, green trees or dead trees on flat ground greater than 1 1/2 tree lengths from the road.

Snags per acre within the area harvest units would range from 33 snags per acre for natural areas with significant survival, to 70 snags per acre for the plantation. Most of these snags would be in trees below 11" dbh with the remainder in the largest diameter classes. Therefore

even with the proposed action implemented, the number of snags per acre would still be well above the average for the analysis area.

Under Alternative 2, natural regeneration could be supplemented by artificial regeneration. Even if natural regeneration is sufficient to fully stock the stand, rust resistant sugar and western white pine would be planted at wide spacing under the Whiskey Reforestation Project.

Wildlife

Terrestrial Wildlife Resources

Coarse Woody Debris

Relevant standards and guidelines: Northwest Forest Plan for Matrix Land Use Allocation (LUA)

(C-40, A.) Provide a renewable supply of large down logs well distributed across the matrix landscape in a manner that meets the needs of species and provides for ecological functions.

(C-40, B.): In western Oregon south of the Willamette National Forest a minimum of 120 linear feet of logs per acre greater than or equal to 16 inches in diameter and 16 feet long should be retained. Decay class 1 and 2 logs can be counted. Down logs should reflect the species mix of the original stand. In areas of partial harvest the same basic guidelines should be applied, but they should be modified to reflect the timing of stand development cycles where partial harvesting is practiced.

(C-40, C.): Coarse woody debris already on the ground should be retained and protected to the greatest extent possible from disturbance during treatment. (e.g., slash burning and yarding) which might otherwise destroy the integrity of the substrate.

(C-42, D) As a minimum, snags are to be retained within the harvest unit at levels sufficient to support species of cavity-nesting birds at 40 percent of potential population levels based on published guidelines and models.

The following section on coarse woody debris was analyzed on two spatial scales. 1) Landscape scale (6^{th} field watersheds), and 2) stand scale. The landscape scale focuses on larger scale conditions (such as forest vegetation patterns). The stand scale generally refers to areas of approximately 5 to 200 acres in size. Stand exams and other field data were used to characterize stand scale conditions. The landscape scale for a portion of this project is based upon the Beaver Creek and Jackson Creek Facial 6th field watersheds. Existing and future conditions were quantified and modeled by the District Silviculturist using stand exam data and the Forest Vegetation Simulator Model (FVS).

Existing Landscape Conditions:

Landscape conditions are typically characterized using common forest-age classes which include:

- Stand Initiation-New stand with an open canopy. Stand age is generally less than 30 years, but can be older, especially in higher, colder elevations.
- Stem Exclusion-Stands where new species do not appear and some present species are dying from competition. Stand age is generally from 30 to 80 years, the average tree diameter is about 10” DBH and canopy cover is ≥53%.

- Mature- Stands where trees reach their maximum height potential. Stand age is generally from 80 to 150 years, the average tree diameter is 10" to 19" DBH and canopy cover is ≥53%. It includes the "understory re-initiation stage" where the understory develops in response to small openings in the canopy (Oliver and Larson, 1996) and the "transition stage" defined in the Northwest Forest Plan as transitioning toward old-growth.
- Old Growth-Stands with overstory trees dying in an irregular fashion and understory trees are filling the gaps. Stand age is generally greater than 150 years, the average tree diameter is ≥20" DBH and conifer canopy cover is ≥70%. This stage includes the "shifting gap" stage as defined in the NWFP (USDA/USDI 1994).

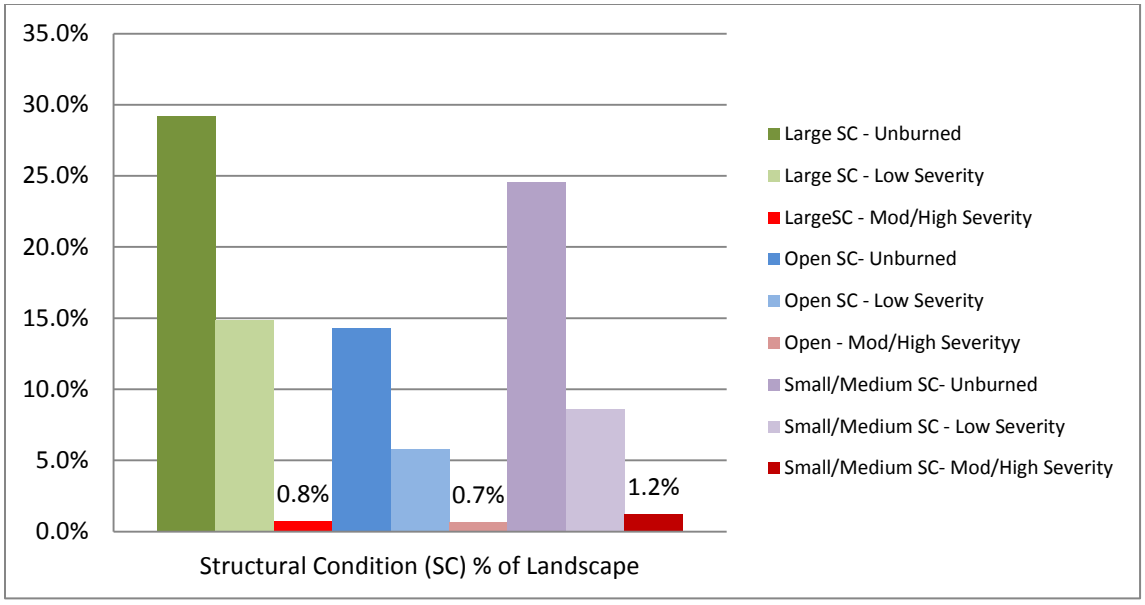
Two common forest-age classes (mature and old growth) were combined for this analysis because natural stands of mixed ages make separation of these older stages difficult with remote sensing. Analysis using 1998 satellite imagery categorized late- successional stands to be generally 80 years and older. The DecAID wood advisory tool is available to help managers evaluate the effects of forest conditions and existing or proposed management activities on organisms that use snags and down wood. DecAID is not a modeling tool but provides the most current research on snags and down wood at one location. DecAID was recently updated in 2012.

Comparison of snag and down wood at the landscape level was conducted for this project. The analyses compared the Beaver Creek and Lower Jackson Creek sub-watersheds (combined for analysis) to conditions described in DecAID for unharvested landscapes in the Southwest Oregon Mixed Conifer-Hardwood Forest habitat types, Small/Medium Trees and Large Tree Vegetation Conditions. Two different vegetation conditions (often referred to as Structural Condition Class) from DecAID (small/medium tree and large tree) were utilized for this analysis because a portion of this project proposes to salvage both natural, and managed stands.

Figure 29 shows the current distribution of structural conditions by percent as derived from the Gradient Nearest Neighbor (GNN) data set developed by the Landscape Ecology, Modeling, Mapping and Analysis (LEMMA) group at Oregon State University for the 15 year monitoring report of the Northwest Forest Plan (LEMMA 2010). Due to the effects of the Whiskey Complex Fire on the vegetative structural conditions in Beaver Creek and Jackson Creek sub-watersheds, additional structural conditions were created (through reclassifying GNN data using a canopy cover percent lost by fire raster in ArcGIS) to quantify the amount of landscape which was not affected by fire, experienced low severity burn, and moderate/high severity burn in terms of canopy cover loss.

Currently, late successional habitat or large tree structural condition accounts for 44.8% of the Whiskey subwatersheds, of that 29.2 % was unburned, 14.9% was burned at low severity and 0.8% was burned with moderate/high severity. Stand initiation or open structural condition totals to 20.8% of the Whiskey subwatersheds, of that 14.3 % was unburned, 5.8% experienced low severity and 0.7% experienced moderate/high severity. Stem exclusion or small/medium tree structural condition totaled to 34.4% of Whiskey subwatersheds, of that 24.5 % was unburned, 8.6% experienced low severity burn, and 1.2% experienced moderate/high severity burn (Figure 29).

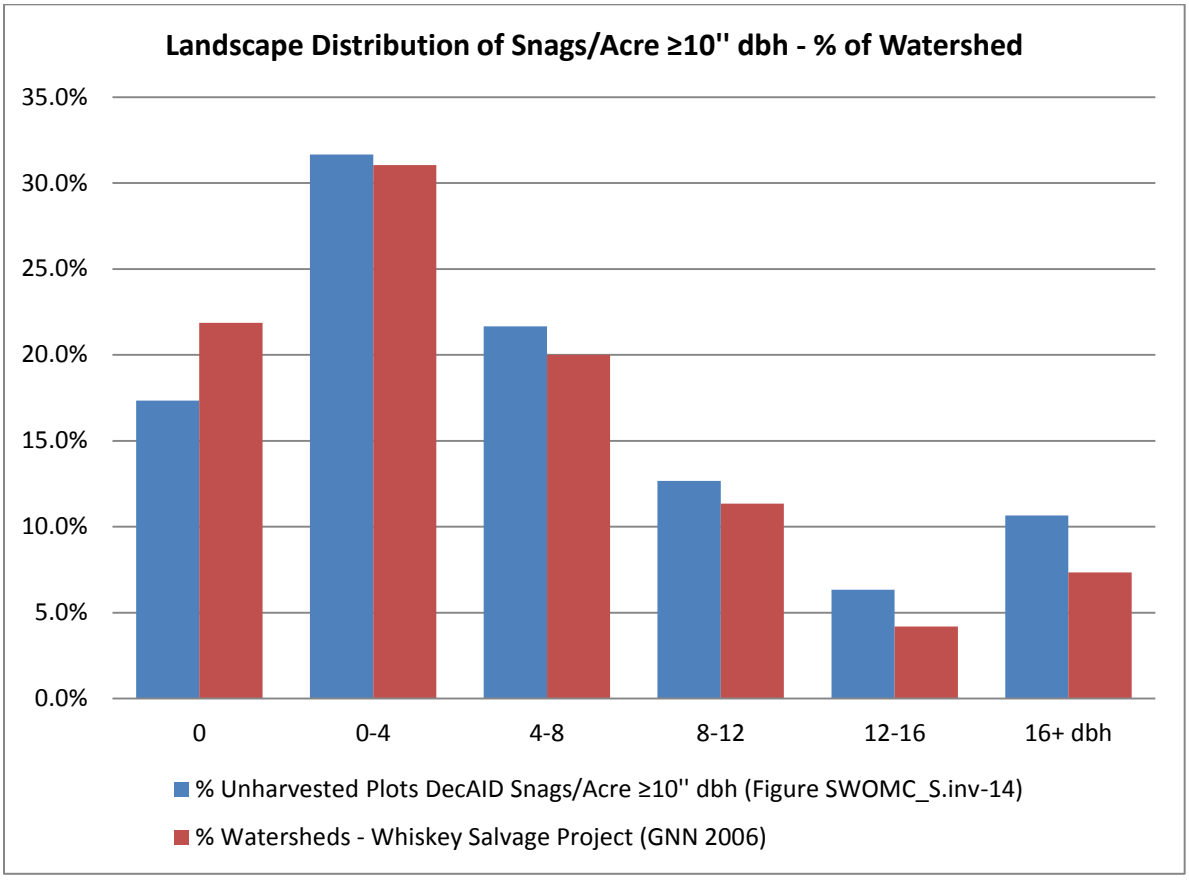
Figure 29. Current Landscape Distribution (%) of Unburned, Low and Moderate/High Burn Severity: Beaver Creek and Lower Jackson Creek 6th Field Sub-Watersheds (GNN 2010).



Coarse woody debris (CWD) is defined here as standing dead trees (snags) and large down woody debris (≥16" diameter). These forest components provide essential habitat for many species of wildlife, plants, fungi, liverworts, mosses, lichens, and ecological processes. Coarse wood helps provide for the maintenance and eventual recovery of late-successional organisms in the matrix land allocation (ROD B-7). Adequate snag habitat must be provided to meet the 60 percent potential population capability (PPC) for cavity nesters (FEIS IV-128). A snag is defined by the LRMP as any dead, partially dead or defective (cull) tree at least ten inches in diameter at breast height and at least six feet tall (FEIS III-72). Modifications for snag habitat prescriptions (and down wood) were provided by the Northwest Forest Plan (USDA/USDI, 1994), which led to watershed analyses (WA) and late-successional reserve assessments (LSRA). These modifications are based on site specific information and the latest scientific information. The Standards and Guidelines in the Northwest Forest Plan were designed, in part, to maintain [through time] ecological components such as down logs, snags, and large trees (ROD B-2). These CWD components account for two of the five structural elements of late-successional forest stands, described as: Live old-growth trees, Standing dead trees (snags), Fallen trees or logs, Multiple canopy layers and Canopy gaps.

Beaver Creek and Lower Jackson Creek sub-watersheds contain a higher percentage of the landscape with zero snags per acre ≥ 10'' dbh (21.9%) and lower percentage of the landscape with 0"-4", 4"-8" and all other categories of snags per acre ≥ 10'' when compared to averages of Southwest Oregon Mixed Conifer-Hardwood Forest habitat types, open canopy, small/medium tree, and large tree vegetation condition landscape distribution data (Mellen et al. 2012; Figure 30).

Figure 30. Landscape distribution of snags/acre ≥10" dbh derived from 2006 GNN Data for the Whiskey Salvage Project as compared to averaged unharvested plots in SW Oregon Mixed Conifer Hardwood Habitat type, open canopy, small/medium tree , and large tree structural conditions (from DecAID Figures SWOMC_O.inv-14 SWOMC_S.inv-14, SWOMC_L.inv-14).



Beaver Creek and Lower Jackson Creek sub-watersheds contain a slightly higher percentage of the landscape with zero snags per acre ≥ 20'' dbh (38.5%) and have slightly higher percentage of 0-4 snags per acre ≥ 20'' dbh (46.3%) when compared to averages of Southwest Oregon Mixed Conifer-Hardwood Forest, open canopy, small/medium tree and large tree vegetation condition landscape distribution data (Mellen et al. 2012; Figure 31).

Figure 31. Landscape distribution of snags/acre ≥20" dbh derived from 2006 GNN Data for the Whiskey Salvage Project as compared to averaged unharvested plots in SW Oregon Mixed Conifer Hardwood Habitat types, open canopy, small/medium tree and large tree structural conditions (from DecAID Figures SWOMC_O.inv-15 SWOMC_S.inv-15, SWOMC_L.inv-15).

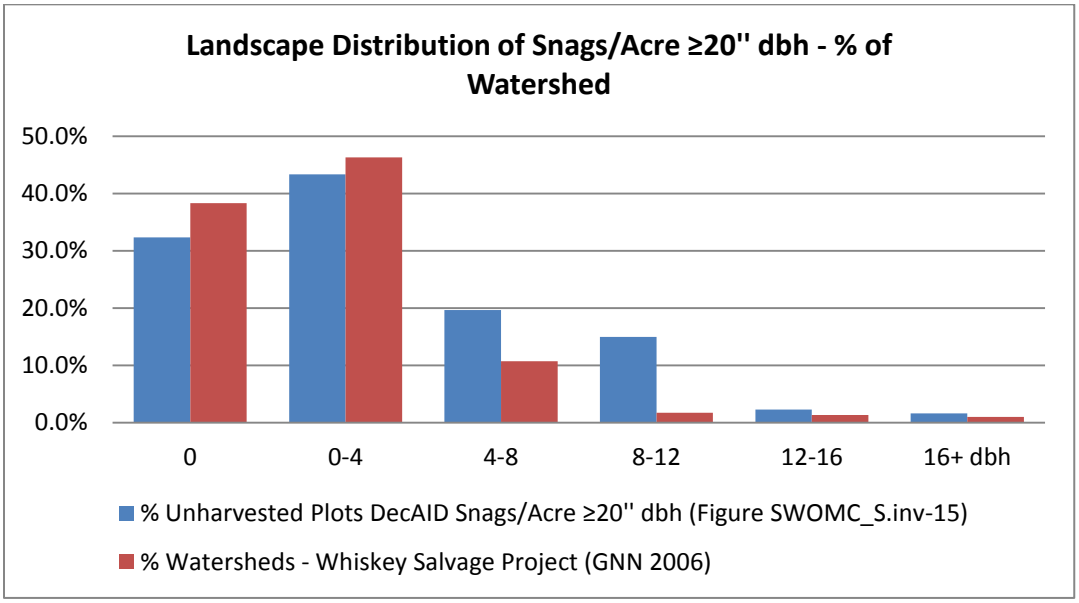


Figure 32. Landscape distribution percent down wood cover derived from 2006 GNN Data for the Whiskey Salvage Project as compared to averaged unharvested plots in SW Oregon Mixed Conifer Hardwood Habitat types, open canopy, small/medium tree and Large tree structural condition (from DecAID Figures SWOMC_O.inv-16, SWOMC_O.inv-17, SWOMC_S.inv-16, SWOMC_S.inv17, SWOMC_L.inv16, SWOMC_L.inv-17, 2012).

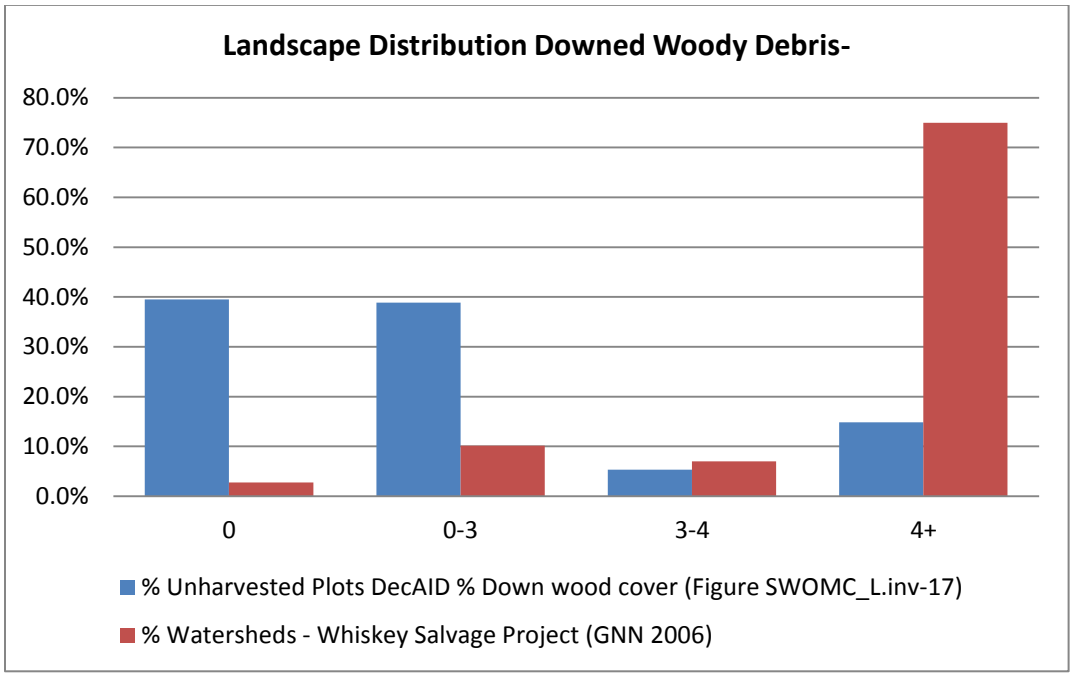


Figure 32 displays percent of down wood cover found within the Beaver Creek and Lower Jackson Creek 6th field sub-watersheds (combined for this analysis). Higher densities of down wood cover is present within the Beaver and Lower Jackson Creek watersheds and is most likely due to past fire exclusion when compared with averaged unharvested plot data from DecAID for south for habitat type Southwest Oregon Mixed Conifer-Hardwood Forest, open canopy, small/medium trees and large tree vegetation condition landscape distribution data (Mellen et al. 2012; Figure 32).

Figure 33, Figure 34, and Figure 35 are based upon stand exam data entered into FVS by the District Silviculturist for the No Action and Proposed Action. These data are shown with DecAID tolerance levels (see glossary) for wildlife species which is an appropriate for use at the stand scale. Implementation of the proposed action indicates that present levels of snags/acre ≥10"dbh, 20''dbh, and percent down wood cover currently meet and would eventually exceed the 30% tolerance levels for wildlife species as described in DecAID for the Southwest Oregon Mixed Conifer-Hardwood Forest habitat type, Small/Medium Trees Vegetation Condition (Mellen et. al. 2012).

FVS runs generated by the District Silviculturist for the no action alternative assumed no regeneration of forested areas, however this is unlikely. Therefore, one should assume a similar level of snag recruitment to the proposed action alternative. The proposed action alternative FVS runs were entered based upon low density planting of native conifers in 2015.

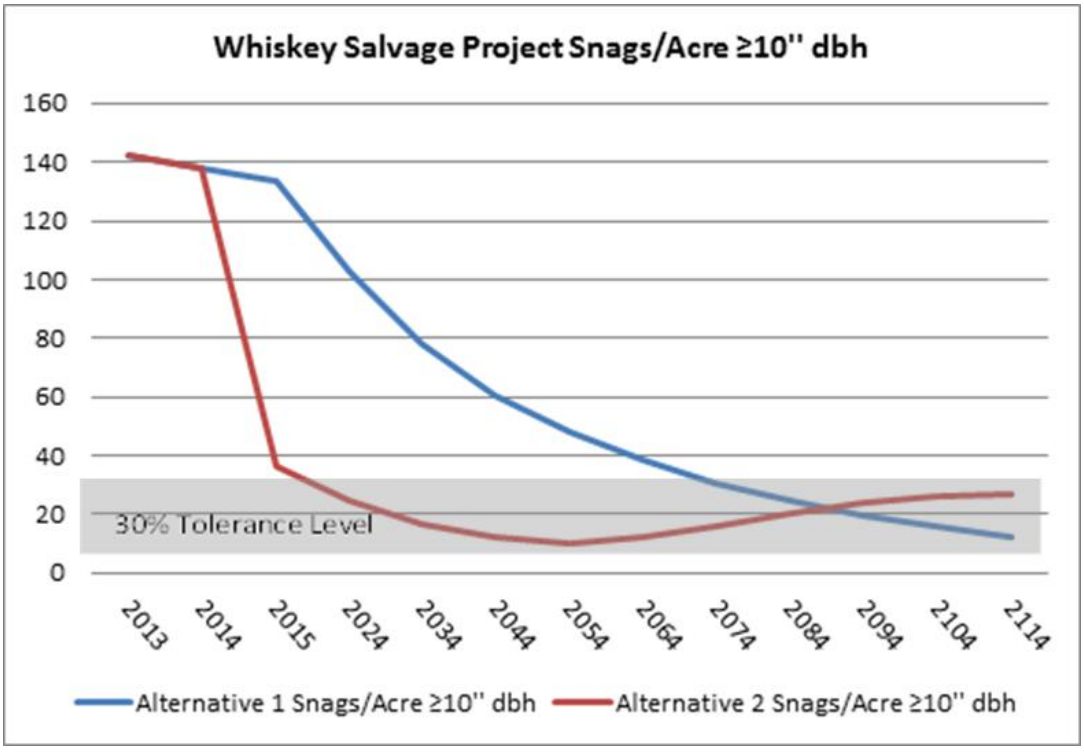


Figure 33. Whiskey salvage project snags/acre ≥10"dbh and the 30% tolerance level based upon wildlife plot data from DecAID for Southwest Oregon Mixed Conifer Hardwood Habitat type, Small/Medium Tree Vegetation condition from DecAID Figures SWOMC_S/L.sp-5 and from unharvested plot data from Figure SWOMC_S.inv-2, 2012.

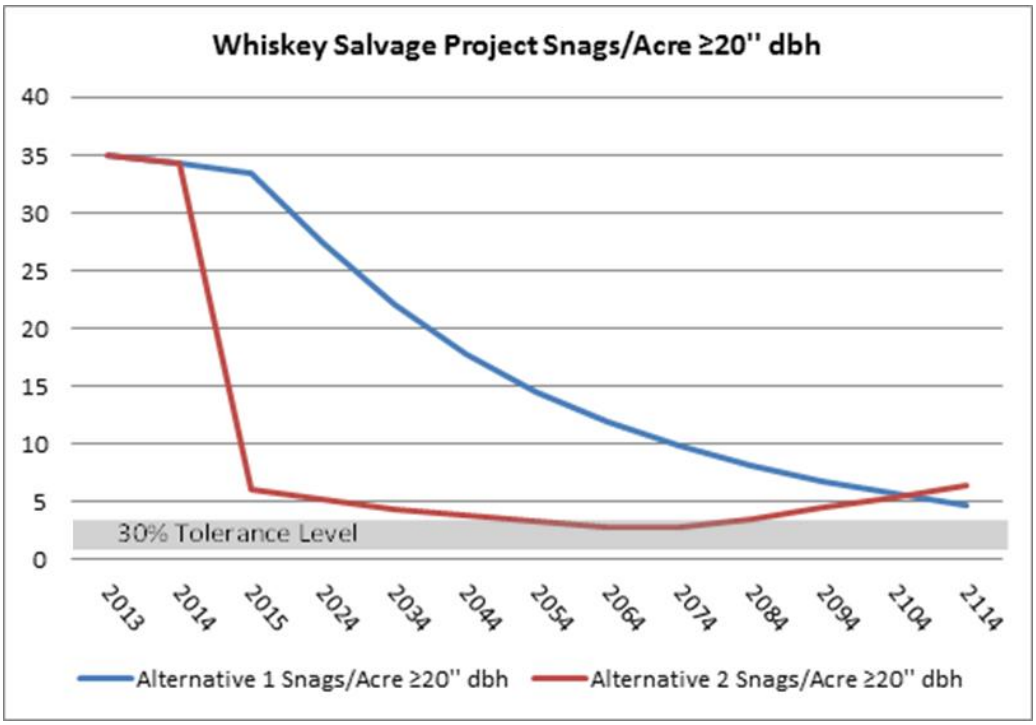


Figure 34. Whiskey salvage project snags/acre ≥20"dbh in the project area by the no action and action alternatives and the 30% tolerance level based upon wildlife plot data from DecAID for Southwest Oregon Mixed Conifer Hardwood Habitat type, Small/Medium Tree Vegetation Condition from DecAID Figures SWOMC_S.inv-3, 2012 (there are no wildlife data for the 30% tolerance level for ≥20'' dbh snags).

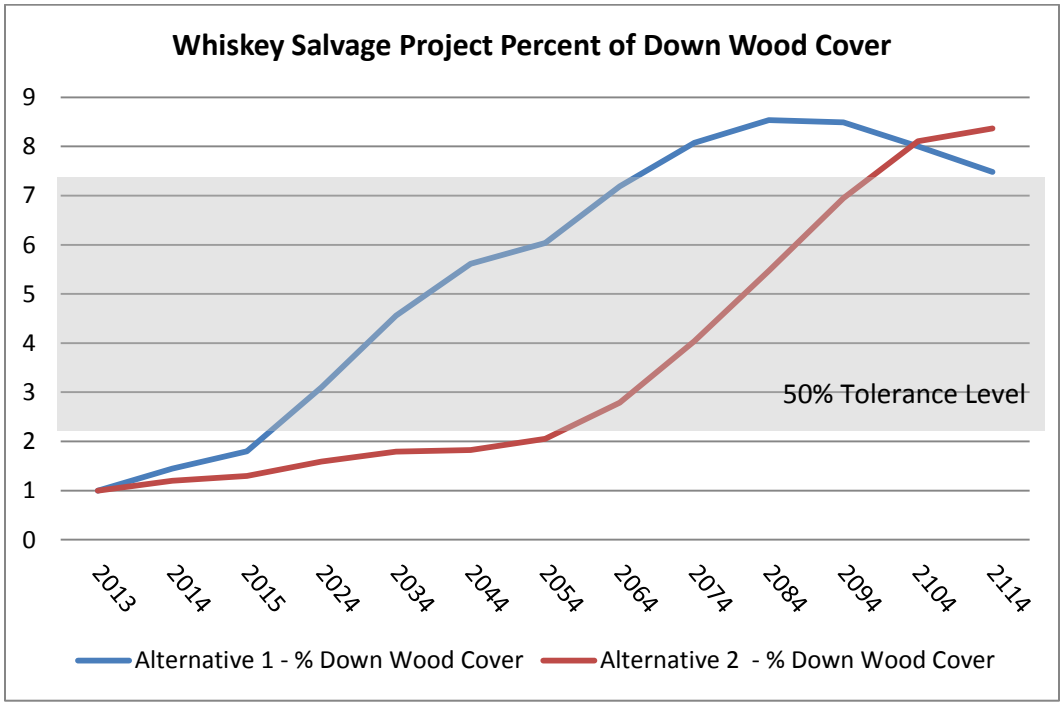


Figure 35. Whiskey salvage project percent down wood cover in the project area by no action and action alternatives and the 50% tolerance level based upon wildlife plot data from DecAID for Southwest Oregon

Mixed Conifer Hardwood Habitat type, Small/Medium Tree Vegetation Condition from DecAID Figures SWOMC_S/L.sp-10, 2012 (there are no wildlife data for the 30% tolerance level for ≥20'' dbh snags).

Existing Stand Scale Conditions:

The Whiskey complex fire altered structural conditions on the stand scale in areas which experienced moderate and high severity fire. Changes to structure from moderate/high severity fire include loss of canopy cover, and consumption of fine fuels with retention of most large down wood.

To estimate post-fire snag and downed wood conditions, transects were randomly generated in ArcGIS (NPS AlaskaPak 2009) in units which are proposed for area salvage. A total of 15 snag and downed wood transects were generated in unit boundaries which experienced moderate/high severity fire which are proposed for area salvage under the action alternative. Ten random snag and downed wood transects were conducted within natural stand units. Five snag and downed wood transects were conducted within the 60 acre plantation stand. These field data serve as the basis for estimates of snags per acre (≥10'' and ≥20''dbh categories) and percent cover of downed wood in areas proposed for area salvage under the action alternative.

It is reasonable to expect that these field data also reflect snag and downed wood levels throughout the Whiskey Planning Area which burned at moderate/high severity within similar structural condition. Table 25 summarizes the results from the snag and downed wood transects which were conducted in January 2014.

Table 25. Average Snags/Acre ≥10" and ≥20"and percent down wood cover in moderate/high severity burned areas.

Unit	Snags/Acre ≥10"	Snags/Acre ≥20"	Average DBH (inches)	Average Height (feet)	% Downed Wood Cover
Unit 1,2 3,4 (combined-Natural Stand)	103	57	36	53	2.0%
Unit 5 (Plantation)	191	6	18	93	3.7%
80% Tolerance Level	17	8	-	-	4.5 - 14%
50% Tolerance Level	8	4.2	-	-	2.2 - 7.2%
30% Tolerance Level	5.3	2	-	-	0.6 -2.5%

Snag Tolerance levels for wildlife species (data available on only one species- fringed myotis) were derived from unharvested inventory plots DecAID Figures (SWOMC_ L.inv-2 and SWOMC_L.inv-3). Down wood percent cover tolerance levels for wildlife use of percent cover of down wood were derived from DecAID Figures (SWOMC_S/L.sp-10, and values are only for class 4,5 decay class down wood).

As evident from Table 25, levels of snags/acre ≥10" dbh in the project area (natural stands and plantation) exceed the 80% tolerance level for wildlife on unharvested inventory plots in DecAID (SWOMC_S/L.inv-2, and SWOMC_S/L.inv-3). Levels of snags/acre ≥20" dbh in the natural stand exceed the 80% tolerance level for wildlife and in the plantation stand, meets the 50% tolerance level for wildlife species on unharvested inventory plots as described in DecAID for Southwest Oregon Mixed Conifer-Hardwood Forest, Small/Medium and Large Trees Vegetation Condition (SWOMC_S/L.inv-2, and SWOMC_S/L.inv-3).

Two percent cover of down wood currently meets the 30% tolerance level for wildlife species use of percent cover of down wood (DecAID Figure SWOMC_S/L.sp-10) in the natural stands.

The 50% tolerance level for wildlife species use of percent cover of down wood (DecAID Figure SWOMC_S/L.sp-10) is met by the 3.7% down wood currently found in the plantation stand.

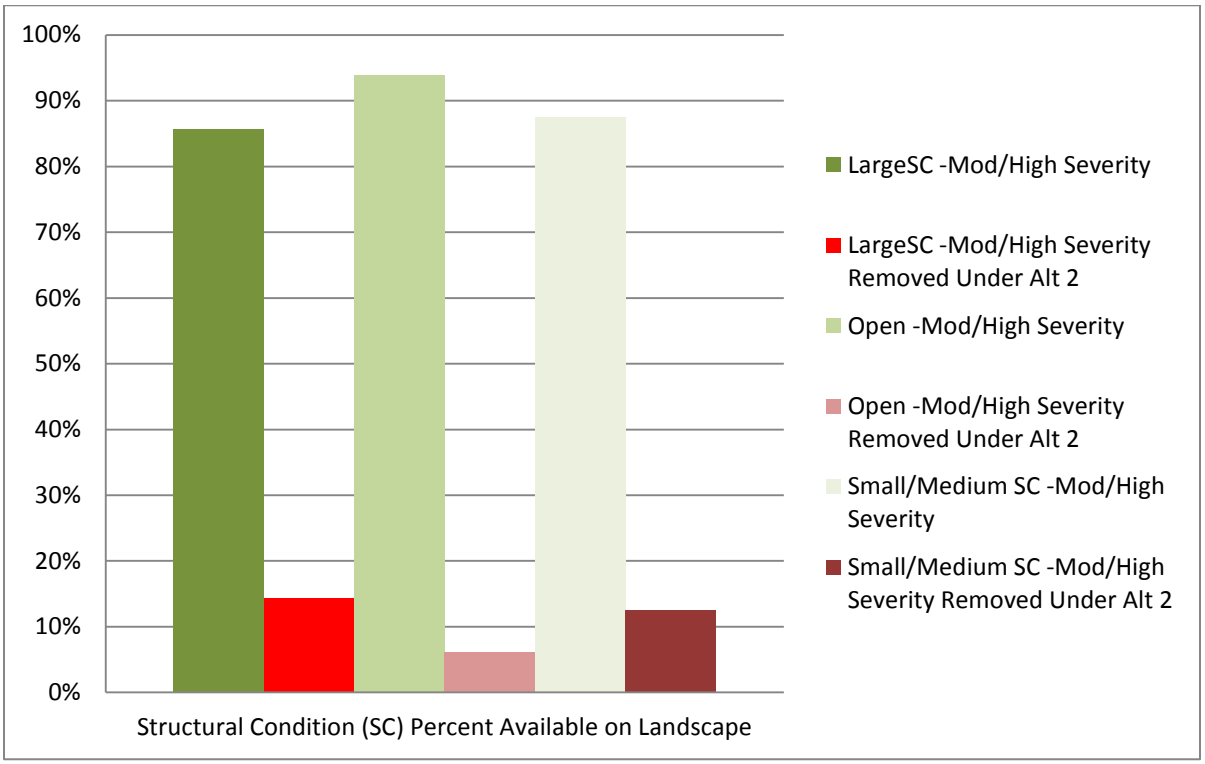


Figure 36. Percent of Moderate/High Severity Burned Structural Condition Available in the Whiskey fire complex burn perimeter and percent of each Structural Condition Proposed for Removal under the proposed action

Direct and Indirect Impacts to Coarse Woody Debris:

The no action alternative would have no direct, indirect, or cumulative impacts to coarse woody debris as no action would take place.

Direct impacts to coarse woody debris from the action alternative include a reduction in standing snags due to harvest and reduction of standing snags knocked over during salvage operations. Snags which are knocked over during harvest would contribute to percent cover of down woody debris. As evident in Figure 36, a small percentage of the overall available wildlife habitat (coarse woody debris) is proposed for harvest. Levels of snags and downed wood in areas where harvest would not occur are expected to be similar to data collected in snag and downed wood transect locations (natural stands and plantation stand). Snag and downed wood levels in Table 25 are well above wildlife tolerance levels as described in DecAID and would provide undisturbed snag and downed wood habitat dispersed throughout the landscape. Prior to issuing firewood permits, levels of downed wood would be assessed to ensure compliance with standards and guidelines in the LRMP and NWFP.

Project design features are in place in treatment units which would retain 6 structurally complex snags per acre in addition to any pre-fire snags in treatment areas. Other project design features would reduce or eliminate large down wood from being impacted from the action alternative. Adequate levels of snags and downed wood would be retained outside of treatment areas to provide wildlife habitat in the Whiskey salvage planning area.

Cumulative Impacts to Coarse Woody Debris:

The Cumulative effects for the alternatives are analyzed at the Beaver Creek and Lower Jackson Creek 6th field sub-watershed scale. The no action alternative would not add any cumulative impacts to coarse woody debris.

The action alternative would reduce amounts of coarse woody debris (snags) in the Whiskey planning area and add to cumulative impacts associated with fire exclusion and past harvest activities. These past events have contributed to the current condition for snags and down wood at the landscape level. There are many areas of the landscape which have older stands where levels of snags and down wood are high as is evident from the landscape analysis provided. The predominant condition at this scale is older stands with adequate numbers of snags and downed wood. Managed stands are the second condition which dominates the landscape with lesser amounts of coarse woody debris.

THREATENED AND SENSITIVE WILDLIFE SPECIES

For the purposes of the following section, analysis area refers to the sub-watersheds which contain portions of the proposed actions (except for northern spotted owl section). The project area refers to the portions of those watersheds which ground disturbing activities are being proposed (Whiskey salvage project area). The watersheds which comprise the analysis area include: Beaver Creek, Jackson Creek Facial 6th field sub-watersheds (southern portion of the Whiskey salvage project area) and Ash Creek and Skillet Creek 6th field sub-watersheds (northern portion of the Whiskey salvage project area). Low fire severity is defined as stands which experienced an under burn which resulted in 0-25% canopy cover loss. Moderate severity is defined as stands which experienced 25-49% canopy cover loss, and high severity is defined as stands which over 50% canopy cover was removed by the Whiskey complex fire. Definitions for Low, Moderate, and High severity fire were derived from utilizing RAVG (Rapid Assessment of Vegetation Condition after a Wildfire, USDA 2013) model outputs of canopy cover loss.

Section 7 of the Endangered Species Act requires all federal agencies to consult with the National Marine Fisheries Service for marine and anadromous species, or the United States Fish and Wildlife Service (FWS) for fresh-water and wildlife, if the agency is proposing an "action" that may affect listed species or their designated habitat. A Biological Assessment was prepared for this project to assess the effects of the proposed action on the northern spotted owl and designated Critical Habitat. The District is in the consultation process at this time with FWS.

The Forest Service Manual (FSM 2672.4) requires a biological evaluation to determine potential effects of proposed ground-disturbing activities on sensitive species. This evaluation analyzes the alternatives and discusses the potential effects on the population or its habitat within the analysis area and on the species as a whole. It also makes recommendations for removing, avoiding, or compensating for adverse effects. In addition, the Umpqua National Forest's Land Management Plan standard and guidelines for wildlife (USDA 1990a) states:

"Any management activity that would negatively affect plant or animal species listed on the Regional Forester's Sensitive Species list, or their habitat would be modified to either avoid (preferable) or minimize the impact. Activities would not be permitted if they would result in the loss of a colony or subpopulation that is important in the natural distribution of the species. "

The following section is a summary which covers species recognized under the federal Endangered Species Act, and species recognized as sensitive by the Forest Service. Federally

listed species require consultation with the U.S. Fish and Wildlife Service before project implementation. No such requirement exists for sensitive species.

A pre-field review was performed to determine which sensitive species are most likely to be impacted by the proposed alternatives. A list of threatened and sensitive wildlife on the Umpqua National Forest, Tiller Ranger District was compiled from the Regional Foresters Revised List, December 2011. Table 26 states general habitat requirements and also displays the occurrence of each species on the Tiller Ranger District.
Table 27 summarizes the presence or absence of habitat and potential impacts on these species and/or their habitat within or adjacent to the proposed actions. Additionally,
Table 27 also discloses which species are omitted from further analysis because either suitable habitat does not occur in the analysis area, or habitat/species would not be affected the action alternative. It is based on the latest documented survey and occurrence data, scientific literature review, and GIS analysis. Impact or effect determinations are made on each species based on this review. If an impact or effect is anticipated, further analysis and discussion of the direct, indirect and cumulative effects is provided in the following sections.

Table 26. Regional Forester Sensitive Species as of December 9, 2011 for the Umpqua National Forest

Common Name	Scientific Name	Habitat	Occurrence on Tiller Ranger District
Northern Spotted Owl	*Strix occidentalis caurina*	Mature, old growth mixed conifer forests	MIS, Documented
Sensitive Birds			
American Peregrine Falcon	*Falco peregrinus anatum*	Forest, Nests on Cliffs	MIS, Documented
Bald Eagle	*Haliaeetus leucocephalus*	Lakes, Rivers	MIS, Documented
Black Swift	*Cypseloides niger*	Forest, Nests Behind Waterfalls	Suspected
Bufflehead	*Bucephala albeola*	Lakes, Ponds	Documented
Harlequin Duck	*Histrionicus histrionicus*	Rivers	Documented
Horned Grebe	*Podiceps auritus*	Lakes, Ponds	Suspected
Lewis' Woodpecker	*Melanerpes lewis*	Ponderosa pine forests	MIS, Documented
Purple Martin	*Progne subis*	Open areas adjacent to forest edges	Documented
Red-Necked Grebe	*Podiceps grisegena*	Lakes, Ponds	Suspected
White-Headed Woodpecker	*Picoides albolarvatus*	Ponderosa pine forests, burned habitats	Documented
Yellow Rail	*Coturnicops noveboracensis*	Wetlands on edges of lakes, ponds	Suspected
Sensitive Mammals			
Fisher	*Martes pennanti*	Forests, woodlands	Documented
Fringed Myotis	*Myotis thysanodes*	Drier grasslands, forests, woodlands	Documented

Common Name	Scientific Name	Habitat	Occurrence on Tiller Ranger District
North American Wolverine	*Gulo gulo luscus*	High elevation talus slopes, wide ranging	Suspected
Pallid Bat	*Antrozous pallidus*	Grasslands, Forests, Caves	Suspected
Townsend's Big-Eared Bat	*Corynorhinus townsendii*	Caves, Forests	Documented
Foothill Yellow-Legged Frog	*Rana boylii*	Low gradient streams	Documented
Oregon Spotted Frog	*Rana pretiosa*	Streams, marshes	Suspected
Pacific Pond Turtle	*Actinemys marmorata*	Ponds, lakes	Documented
Sensitive Invertebrates			
California Shield-Backed Bug	*Vanduzeeina borealis californica*	High elevation grassland meadows	Suspected
Cascades Axetail Slug	*Carinacauda stormi*	Moist Western Red cedar forest habitat	Suspected
Chace Sideband	*Monadenia chaceana*	Rock outcrops, talus slopes	Documented, S&M Species
Coronis Fritillary	*Speyeria coronis coronis*	Meadow, grassland habitats	Suspected
Crater Lake Tightcoil	*Pristiloma arcticum crateris*	Wet edges of higher elevation streams, seeps	Suspected, S&M Species
Evening Fieldslug	*Deroceras hesperium*	Wet meadows in forested areas	Suspected, S&M Species
Gray-Blue Butterfly	*Plebejus podarce klamathensis*	High elevation meadows	Suspected
Johnson's Hairstreak	*Callophrys johnsoni*	Mature forests with western hemlock mistletoe	Documented
Mardon Skipper	*Polites mardon*	Mid elevation grasslands adjacent to water	Suspected
Oregon Shoulderband	*Helminthoglypta hertleini*	Rocks and downed wood in Forests	Documented, S&M Species
Siskiyou Short-Horned Grasshopper	*Chloealtis aspasma*	Meadow, grassland habitats	Suspected

MIS – Management Indicator Species as described in the Umpqua LRMP
S&M- Species identified within the 2001 Record of Decision for the Northwest Forest Plan Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines.

Table 27. Threatened and Sensitive species evaluated and those which are omitted from further analysis.

Common Name	Habitat present/adjacent?	Rationale for omission	Is impact expected?	Loss of viability or trend?
Federally Threatened, Endangered, and Proposed				
Northern Spotted Owl (Threatened)	Yes	N/A	Yes – see discussion	No, see discussion
Sensitive Species Evaluated				
Lewis' Woodpecker	Yes	N/A	MIIH	No
White-Headed Woodpecker	Yes	N/A	MIIH	No
Purple Martin	Yes	N/A	MIIH	No
Common Name	**Habitat present/adjacent?**	**Rationale for omission**	**Is impact expected?**	**Loss of viability or trend?**
Fisher	Yes	N/A	Low Potential- see discussion (MIIH)	No
Fringed Myotis	Yes	N/A	MIIH	No
North American Wolverine	Yes – transient habitat only	N/A	Low Potential- see discussion (MIIH)	No
Pallid Bat	Yes	N/A	MIIH	No
Townsend's Big-Eared Bat	Yes	N/A	MIIH	No
Pacific Pond Turtle	Yes	N/A	MIIH	No
California Shield-Backed Bug	Yes	N/A	MIIH	No
Chace Sideband	Yes, habitat is present	N/A	MIIH	No
Oregon Shoulderband	Yes, habitat is present	N/A	MIIH	No
Siskiyou Short-Horned Grasshopper	Yes	N/A	MIIH	No
Species Omitted from Further Analysis				
American Peregrine Falcon	Yes	No impacts to habitat	NI	No
Bald Eagle	Yes	No impacts to habitat	NI	No

Common Name	Habitat present/adjacent?	Rationale for omission	Is impact expected?	Loss of viability or trend?
Black Swift	No	No Habitat	NI	No
Bufflehead	No	No habitat	NI	No
Harlequin Duck	No	No habitat	NI	No
Horned Grebe	No	No habitat	NI	No
Red-Necked Grebe	No	No habitat	NI	No
Yellow Rail	No	No habitat	NI	No
Foothill Yellow-Legged Frog	Yes, not included in analysis	Buffers prevent impacts	NI	No
Oregon Spotted Frog	No	No habitat	NI	No
Cascades Axetail Slug	Yes, habitat is present	No habitat in units	NI	No
Coronis Fritillary	No	No Habitat	NI	No
Crater Lake Tightcoil	Yes, habitat is present	Buffers prevent impacts	NI, buffers prevent impacts	No
Evening Fieldslug	Yes, habitat is present	Buffers prevent impacts	NI, buffers prevent impacts	No
Gray-Blue Butterfly	No	No Habitat	NI	No
Johnson's Hairstreak	No	No Habitat	NI	No
Mardon Skipper	No	No Habitat	NI	No
MIIH- May Impact Individuals or Habitat **NI –**No Impact				

Effects are classified as direct, indirect, or cumulative. Direct effects are defined as those effects that would occur immediately as a result of implementation. Indirect effects are those that would typically occur over longer time periods. Cumulative effects are the effects of the alternatives that would incrementally add to other past, present, or reasonably foreseeable activities that may result in additive effects to the various species.

Northern Spotted Owl – *Strix occidentalis caurina* – Threatened

Existing Condition -The northern spotted owl was listed in 1990 as threatened under the Endangered Species Act. Critical habitat was designated in 1992, and re-designated in 2008 and 2012. A recovery plan for the species was revised in 2011. The northern spotted owl is closely associated with mature and old-growth coniferous and mixed conifer-hardwood forests that contain habitat characteristics that provide nesting, roosting, and foraging habitat (NRF) (USDI 2008). NRF habitat is strongly associated with late-successional forests containing large trees with broken tops, cavities for nesting, multiple canopy layers (thermal regulation and protections from predation) and adequate amounts of large down wood on the forest floor to support populations of prey base (Thomas et al. 1990). Common northern spotted owl prey includes flying squirrels, wood rats *Neotoma* spp., *Peromyscus spp.* and can include other rodents in addition to other prey items like bats and birds (Ward et al. 1995).

For the purposes of quantifying the existing condition and subsequent effects analysis, "analysis area" is redefined in this northern spotted owl section as: all components of the proposed action with a 1.2 mile buffer around all known owl nest/roost locations which fell within that initial 1.2 mile buffer. The analysis area for this section contains a total of 19 northern spotted owl activity centers (as defined by the 2001 ROD). Activity centers (referred to as owl sites in this document) within the analysis area comprise 6% of the total owl sites designated on the Umpqua National Forest. Table 28 shows the owl sites found within the Whiskey planning area and acres of Non NRF/Dispersal, Dispersal, NRF, burned Dispersal, burned NRF for each spatial attribute of each owl site. The Whiskey fire burned a variety of forest stands at various intensities including 788 acres of dispersal habitat and 1,109 acres of NRF habitat at high to moderate intensity such that over 50 percent of the canopy lost function and the habitat is considered burned NRF habitat. This Assessment hereby refers to burned NRF habitat as post fire foraging (PFF).

Of the 19 owl sites in the analysis area, the Whiskey Complex fire affected 11 owl sites through habitat modification due to scorching. Of those eleven fire affected sites, nine are entirely contained within the fire perimeter, and two sites are only partially contained. The Beaver Lake North site experienced the highest amount of NRF habitat modification through moderate and high severity fire (31% of site) than the remaining sites in the analysis area. Five sites experienced some patchy canopy loss due to limited scorching and limited crown fire while the remaining sites experienced low severity fire.

The current owl occupancy of all 19 sites within the analysis area is unknown. Presence surveys for the spotted owl are not part of the proposed action nor have there been surveys conducted in the area since the inception of the Northwest Forest Plan. The last recorded occurrence of northern spotted owls in the analysis area was in mid-1990.

Table 28. Existing condition of owl sites within the Whiskey planning area shown with owl site spatial scales – (home range – 1.2 miles, core use area -800m, and nest patch -300m) and NRF habitat.

Site #	Site Name	Non NRF/ Disp.	Dispersal	NRF	Burned Dispersal	PFF	Total
312	**BEAVER CREEK**						
	NP	32	13	20	2	3	70
	CUA	128	152	211	4	18	513
	HR	107	841	1090	68	164	2270
326	**BEAVER LAKE NORTH**						
	NP	1	11	31	2	25	70
	CUA	14	40	119	100	153	426
	HR	267	656	848	201	323	2295
316	**BLACK CANYON**						
	NP		15	55			70
	CUA	8	82	337			427
	HR	117	575	1630			2322
320	**BLACK CANYON SOUTH**						
	NP		15	55			70
	CUA	14	50	363			427
	HR	243	848	1226	0.1	6	2323.1

Site #	Site Name	Non NRF/ Disp.	Dispersal	NRF	Burned Dispersal	PFF	Total
335	**BUTLER BUTTE WEST**						
	NP		5	65			70
	CUA	3	62	361			426
	HR	156	742	1418	5	1	2322
332	**CAFFEINE**						
	NP		3	61			64
	CUA	21	147	222	25	12	427
	HR	173	896	857	167	223	2316
334	**DEEPER YET**						
	NP	1	35	34			70
	CUA	14	187	226			427
	HR	251	980	1031	20	20	2302
331	**FAWN CAMP**						
	NP	3	17	50			70
	CUA	21	168	238			427
	HR	223	1216	736	46	102	2323
314	**MAVERICK 2**						
	NP	1	8	51	9	1	70
	CUA	20	141	259	4	3	427
	HR	170	737	1381	16	23	2327
311	**MAVERICK CREEK**						
	NP		7	62	1	1	71
	CUA	25	121	270	4	5	425
	HR	277	829	1086	68	62	2322
300	**SWITCHBACK CREEK**						
	NP	10	28	31		0.3	69.3
	CUA	23	134	202	12	26	397
	HR	192	879	902	141	121	2235
329	**UNION JACK**						
	NP	2	4	46	6	12	70
	CUA	17	98	237	36	39	427
	HR	118	736	1348	21	58	2281
306	**WHISKEY CREEK**						
	NP	5	19	46			70
	CUA	6	95	325			426
	HR	172	762	1281	47	53	2315
Northern Portion of Analysis Area (Buckeye)							
224	**ASH CREEK SOUTH**						
	NP	2.3	10	47			59.3
	CUA	49	111	218			378
	HR	319	783	160	11	26	1299
206	**ASH VALLEY**						
	NP	1	29	40			70
	CUA	60	152	215			427
	HR	200	871	1159	1	0.1	2231.1
228	**CAMP COFFEE POT**						
	NP		3	59		8	70

Site #	Site Name	Non NRF/ Disp.	Dispersal	NRF	Burned Dispersal	PFF	Total
	CUA	1	81	324	2	20	428
	HR	160	751	1407	2		2320
231	**JUNCTION SPRINGS**						
	NP		1	69			70
	CUA	11	53	364			428
	HR	117	624	1552	2	28	2323
236	**SOUTH UMPQUA/ QUART**						
	NP	2	14	54			70
	CUA	77	113	231			421
	HR	223	629	1441			2293
234	**ZINC CREEK**						
	NP		16	54			70
	CUA	30	126	261			417
	HR	134	827	1342		11	2314

HR- 1.2 Mile Home Range for Oregon Klamath Province
CUA- Core use area – 800 m
NP-Nest Patch = 300m
Blanks indicate zero value.

Revised Recovery Plan

The revised recovery plan for northern spotted owl was finalized in July of 2011 (USDI 2011). The Klamath Oregon Physiographic province is the sole province (described in the revised recovery plan) which contains the analysis area. The recovery plan included four Recovery Criterion and 33 Recovery Actions, of which two Recovery Actions apply to the Whiskey salvage project.

- **"Recovery Action 10**: *Conserve spotted owl sites and high value spotted owl habitat to provide additional demographic support to the spotted owl population."*

The proposed action includes a component to reduce fuels adjacent to 30.5 miles of roads within the project area boundaries. Implementation of such activity should reduce fuel loading in areas where light penetration allows thick stands of sapling trees to grow adjacent to roads. These shaded fuel breaks intend to reduce fine/ladder fuels (brush and trees) ≤8'' dbh and intend to retain 60% canopy cover in treated areas. Designated owl sites adjacent to fuel breaks and throughout the area would benefit from this activity because in the event of another wildfire, the likelihood of fire crossing treated roads would decrease because fuels adjacent to prominent roads would have been reduced. Additionally, maintenance burning should further reduce fine fuels located in burn blocks. Despite the recent fire, maintenance burning is intended to re-introduce fire into the ecosystem, reduce fine fuels and increase fire resiliency. Therefore, the Whiskey salvage project is consistent with Recovery Action 10.

- **"Recovery Action 12:** *In lands where management is focused on development of spotted owl habitat, post-fire silvicultural activities should concentrate on conserving and restoring habitat elements that take a long time to develop (e.g., large trees, medium and large snags, downed wood).* Examples of areas where we believe this recovery action would greatly benefit future spotted owl habitat development include such fire-affected areas as the Biscuit fire, the Davis fire and the B&B complex."

Multiple field reconnaissance visits were conducted by Forest Service Biologists to identify and designate patches and/or individual leave trees which are designed to retain decadent habitat characteristics throughout treatment areas. Habitat components which take a long time to develop on the landscape would generally be retained in treatment areas unless those components are located within logging corridors and cannot be safely avoided. Although 12% of burned habitat which could provide foraging opportunities for spotted owls would be harvested under the action alternative, it is important to note that 88% of similar habitat would be left intact and undisturbed in the analysis area. During project implementation OSHA regulations require that snags be felled for safety concerns if purchaser cannot safely work around them. This will likely result in an unknown quantity of snags being felled for safety reasons as the determination to fell a snag for safety will be made by the purchaser at the time of harvest. As such, area salvage will be inconsistent Recovery Action 12. It is important to note that Recovery Actions are non-binding recommendations from the USFWS found in the 2011 Recovery Plan; they are not requirements like LRMP standards and guidelines. The 2011 Recovery Plan states, "Recovery actions are near-term recommendations to guide the activities needed to accomplish the recovery objectives and achieve the recovery criteria" (p. *x* of USFWS 2011). While these recommendations are not required to be followed, the project did attempt to be consistent with them. Over 99% of the project area will not be salvaged and will meet Recovery Action 12.

Critical Habitat

The majority of the project area is located in critical habitat for the northern spotted owl. This critical habitat unit which encompasses the project area is known as Critical Habitat Unit 10, Klamath East sub-unit, KLE-1 (USDI 2012). The Tiller Ranger District comprises the entire critical habitat sub-unit KLE-1. Table 29 displays acreages for critical habitat on the District, analysis area, and acreages for each component of the proposed action. NRF habitat is classified into five distinct categories:

1) non- NRF/ non-dispersal
2) Dispersal
3) PFF
4) Burned Dispersal (>50% canopy removal)
5) Burned NRF (>50% canopy removal)

All acreages are approximate estimates based on ArcGIS 10.1 analysis.

Table 29. Critical Habitat Unit 10, Sub-Unit KLE-1 and NRF Habitat Acreages associated with the Proposed Action.

Location	Total Acres of KLE-1	% of KLE-1 Sub Unit		Non NRF/Disp.	Dispersal	NRF	Burned* Dispersal	Burned* NRF
Tiller Ranger District	242,905	100%		24,849	75,906	138,470	711	1,089
Analysis Area	45,880	19%		4786	17,058	26,242	711	1,089
Project Area (foot print)	17,952	74%		151	854	982	207	231
Area Salvage	100	0.054%		1	0.4	0.8	50	50
Roadside Salvage	182	0.075%		4	26	30**	48	73

Location	Total Acres of KLE-1	% of KLE-1 Sub Unit		Non NRF/Disp.	Dispersal	NRF	Burned* Dispersal	Burned* NRF
Maintenance Burn Blocks	1,135.6	0.5%		71	399	486	71	75

***** PFF/burned Dispersal accounts for PFF which burned (>50% canopy cover loss) in the Whiskey complex fire.
******30 Acres of live NRF are shown in the Table in the roadside salvage row. Some NRF burned at low to moderate intensity and in some cases resulted in canopy cover loss. Trees in this category will be evaluated using guides and techniques described in the proposed action. These live NRF trees may be removed.
† Acres of d PFF which are depicted in the Table in the shaded fuel break row are proposed for harvest under action alternative or result from buffering the centerline of the road by 150 feet.

No Action Alternative

Under the no action alternative, areas which experienced moderate to high severity fire (canopy removal by the Whiskey Complex fire) would remain in place. Maintenance burning would not occur, and shaded fuel breaks would not be implemented. Northern spotted owls would benefit from this alternative because all burned habitats would be retained throughout the analysis area. Retention of PFF/burned Dispersal in the form of moderate/high severity fire killed trees (snags) and subsequent growth and development of early seral habitats in the analysis area would likely provide prey base habitat and potentially enhance foraging opportunities for owls which may reside in the area. Dusky-footed woodrats are a primary component of spotted owl diet throughout the Klamath physiographic province and these woodrats are known to populate open areas and edge habitats, as are other rodents (Ward et. al. 1998).

Maintenance burning would not occur under the no action alternative. Despite the recent effects of the Whiskey Complex fire in the analysis area, maintenance burning is necessary to maintain fire frequencies, reduce fine fuels, and increase fire resiliency in treated areas. A study conducted in Northern California indicated that spotted owls roost and nest in all fire severity categories (except high severity) and forage in all fire severity categories with a selection for high severity burned areas (Bond et. al. 2009). Maintenance burns of mild to low fire severity within fire adapted ecosystems would likely benefit the northern spotted owl from a nesting, roosting, and foraging perspective because through maintenance burning, snag recruitment would likely occur. Additional snag recruitment in areas where maintenance burns would be conducted would provide scattered snags adjacent to forested NRF habitat and likely add foraging areas where spotting prey would be less difficult.

Shaded fuel breaks would not occur under the no action alternative. This component of the proposed action is intended to reduce roadside fuel accumulations along major roadways and allow for better fire management of future fires. Lack of shaded fuel breaks in the analysis area may lead to faster spread of a future wildfire and may depress the Districts ability to adequately manage a future wildfire.

Proposed Action

The Whiskey Salvage Planning Area is located within the Klamath physiographic province. A physiographic province represents an ecological area which is separated by environmental and physical features such as forest communities, topography, and climate among other attributes. In Oregon and in the Klamath physiographic province, northern flying squirrels *Glaucomys sabrinus*, dusky-footed woodrats *Neotoma fuscipes*, red tree voles *Arborimus longicaudus*, and

bushy-tailed woodrats *Neotoma cinerea* comprise the majority of prey items for northern spotted owls (USDI 2012). *Neotoma* species are common in edge habitats as are other rodents (Ward et. al. 1998) and fire created edge habitat would likely increase prey abundance in areas where early seral conditions are allowed to function and develop. Positive and negative impacts to spotted owl site occupancy from edge habitats have been documented by several authors. Increased edge habitat may increase prey availability (Ward et. al. 1998) however, it also may decrease the amount of interior forested habitat which has been associated with decreased owl survival (Clark et. al. 2013).

Burned habitats within 1.5km (0.93 miles) of a nesting or roosting site have been shown to provide suitable foraging habitat for California spotted owls (*Strix occidentalis occidentalis).* Despite canopy cover removal through moderate to high severity wildfires, strongest selection for foraging by California spotted owls occurred in high severity burned forests in comparison with areas which had burned at low and moderate severity (Bond et. al. 2009). Bond suspected that this selection of high severity burned areas for foraging were likely associated with more basal area of snags and higher shrub/herbaceous cover and increased prey accessibility.

Spotted owls infrequently foraged in burned areas of low, moderate, or high severity which were harvested post-fire. Foraging was restricted to riparian areas with live trees and use shifted away from burned stands three years post-fire (USDI 2012). Site occupancy of northern spotted owls can decline from a combination of events like past timber harvest, high severity fire, and subsequent salvage logging (Clark et.al. 2013). It should be noted that the authors acknowledged the study area (Timbered Rock Fire) is highly fragmented (private industrial forest lands) and likely exacerbated the declines in site occupancy observed in their study.

PFF and burned Dispersal habitat have been modified from fully functional NRF/Dispersal habitat to functioning foraging habitats. That is, spotted owls are not likely to nest and roost in areas that experienced high severity fire and completely lack canopy cover. Conversely, spotted owls have been shown to utilize areas which experienced low and moderate severity fire for nesting, roosting and foraging. Currently, 1,089 total acres of PFF and 711 total acres of burned Dispersal habitat are located throughout the analysis area. The action alternative proposes to harvest approximately 50 acres of PFF habitat through area salvage (5%) and 73 acres (7%) of PFF habitat adjacent to roads through roadside salvage. Additionally, the action alternative proposes to harvest approximately 50 acres of burned Dispersal (6%) through area salvage and 48 acres of burned Dispersal (7%) through roadside salvage. The action alternative would result in a net loss of 123 acres of PFF habitat and a net loss of 98 acres of burned dispersal through the proposed action.

The net loss of 123 acres of PFF (11%) and 98 acres of burned Dispersal (12%) habitat under the proposed action may shift owl foraging behavior to less disturbed areas. Implementation of the action alternative would result in removal of foraging habitats and coarse woody debris which could eventually provide habitat for prey items for spotted owls. It is likely that spotted owls would continue to utilize the analysis area for foraging within burned areas because there would be 985 acres of functioning (foraging) NRF and 689 acres of functioning (foraging) Dispersal habitat retained in the analysis area which would provide undisturbed, unharvested habitats which may develop into high quality early seral habitat.

Roadside salvage units would be made available for firewood post-salvage operations. It is expected that post-salvage harvest, some standing snags would be retained which are not of commercial interest. Standing snags remaining would likely be small in diameter and lack significant wildlife values. Trees which would not eventually hit the road would be left onsite to

contribute towards snag and down wood levels. These post-salvage roadside/firewood units would maintain at least the minimum amount of coarse woody debris required by standards and guidelines. In western Oregon south of the Willamette National Forest a minimum of 120 linear feet of logs per acre greater than or equal to 16 inches in diameter and 16 feet long should be retained. Decay class 1 and 2 logs can be counted (C-40). In general, live nesting, roosting, and foraging (NRF) habitat which burned from the Whiskey Complex at low severity throughout the analysis area is not proposed for harvest in the action alternative unless roadside trees now poses a threat from a safety standpoint.

All affected owl sites in the analysis area and associated acreages by components of the proposed action affecting NRF habitat are displayed in Table 30. Note that potential effects would vary based on spatial scale (nest patch, core use area, home range) at which effects are being analyzed.

Table 30. Owl Site Acres of Nest Patch (NP-300m), Core Use Area (CUA-800m) and Home Range (HR- 1.2 mile) affected by the proposed action of the Whiskey Salvage Project.

			Components of the Proposed Action			
Site #	**Owl Site Name**		**Area Salvage**	**Roadside Salvage**	**Maintenance Burns**	**Fuel Breaks**
312	**BEAVER CREEK**		**X**	**X**	**X**	**X**
	NP					
	CUA					
	HR		13	13	9	38
326	**BEAVER LAKE NORTH**		**X**	**X**	**X**	**X**
	NP					
	CUA		34	9		9
	HR		66	63	302	216
316	**BLACK CANYON**					**X**
	NP					
	CUA					
	HR				0.3	3
320	**BLACK CANYON SOUTH**			**X**		**X**
	NP					
	CUA					
	HR			1		55
335	**BUTLER BUTTE WEST**			**X**		**X**
	NP					3
	CUA			0.7		25
	HR			1		47
332	**CAFFEINE**		**X**	**X**	**X**	**X**
	NP					
	CUA			9		19
	HR		64	72	384	236
334	**DEEPER YET**			**X**	**X**	**X**
	NP					
	CUA				3	0.9
	HR			9	448	35
331	**FAWN CAMP**			**X**		
	NP					
	CUA					
	HR			54		

			Components of the Proposed Action			
Site #	**Owl Site Name**		**Area Salvage**	**Roadside Salvage**	**Maintenance Burns**	**Fuel Breaks**
314	**MAVERICK 2**			**X**		**X**
	NP					
	CUA					
	HR			3		69
311	**MAVERICK CREEK**			**X**		**X**
	NP					
	CUA					
	HR			31		102
300	**SWITCHBACK CREEK**			**X**	**X**	
	NP					
	CUA					
	HR				263	4
329	**UNION JACK**			**X**		
	NP					
	CUA			13		
	HR			30		
306	**WHISKEY CREEK**			**X**	**X**	**X**
	NP					8
	CUA				95	41
	HR			23	611	171
Northern Portion of the Analysis Area (Buckeye)						
			N/A	**Firewood Only***	**N/A**	**Shaded Fuel Breaks**
224	**ASH CREEK SOUTH**					**X**
	NP					
	CUA					20
	HR					83
206	**ASH VALLEY***			**X**		**X**
	NP					
	CUA					
	HR			0.6		30
228	**CAMP COFFEE POT***			**X**		
	NP					
	CUA			3		
	HR			9		
231	**JUNCTION SPRINGS***			**X**		
	NP					
	CUA					
	HR			5		
236	**SOUTH UMPQUA/QUART**					**X**
	NP					
	CUA					
	HR					37
234	**ZINC CREEK***			**X**		
	NP					
	CUA					
	HR			3		

Cells which have no value displayed indicate that there is no potential effect to the use area (zero) because no component of the proposed action would occur within that use are of the owl Site.
*Note that the bottom section of the table does not contain a roadside salvage component under the action alternative. These areas and acreages would be made available for firewood only.

Owl sites which would be affected by components of the proposed action (a combination of Area Salvage and Roadside Salvage) have been evaluated further to determine the amount of NRF habitat within each spatial scale (home range, Site use area etc.) and which type of NRF (non-NRF/non-Dispersal, Dispersal, NRF, Burned Dispersal, and PFF) would be removed from the proposed action. The canopy mortality layer was used to remove or downgrade NRF habitat to dispersal habitat based upon the amount of canopy cover mortality. The Canopy cover layer is a model output based upon RAVG data - Rapid Assessment of Vegetation Condition after a Wildfire. Canopy mortality classes of 0 and 0-25% maintained NRF habitat, mortality classes of 25-50% downgraded NRF habitat to dispersal habitat, and mortality classes above 50% altered both NRF and dispersal habitat to PFF or burned dispersal habitat. The post fire habitat map was then used to calculate acreages of NRF and dispersal spotted owl habitat which was modified or likely modified due to fire effects within owl home ranges (1.2 mile buffer) and core use area (800m buffer). No nest patch areas were proposed for area or roadside salvage under the action alternative.

Table 31 displays acreage estimates by habitat removing components of the proposed action shown with NRF habitat type and owl core spatial scale. Note that acreages are estimates based upon ArcGIS analysis described above. Overlap of owl home ranges is a common occurrence during mapping and ArcGIS analysis because a circular provincial home range is created by buffering the last known nest or roost site by 1.2 miles (Figure 37). As a result, it appears to the reader that multiple owl sites are being affected individually which is true but overlapping can cause some acreage estimates to be double counted. Note that each owl site would be analyzed individually but some acreage estimates appear larger due to double counting.

Three out of 19 northern spotted owl sites would be affected by the area salvage component of the proposed action: Beaver Creek, Beaver Lake North, and Caffeine (Table 31).

Table 31. Acreage estimates by habitat removing components of the proposed action shown with NRF habitat type and spatial scales of each affected owl site.

Site Name	Non NRF/Disp.	Dispersal	NRF	Burned Dispersal	PFF
Beaver Creek					
Total NRF Available	*234*	*1001*	*1327*	*84*	*191*
Removed through Area Salvage (HR)				13	
Removed through Roadside Salvage(HR)	1	2	.2	2	8
Beaver Lake North					
Total NRF Available	*284*	*728*	*1018*	*314*	*518*
Removed through Area Salvage (HR)				13	50
Removed through Roadside Salvage(HR)				22	50
Removed through Area Salvage(CUA)				34	
Removed through Roadside Salvage(CUA)				2	6

Site Name	Non NRF/Disp.	Dispersal	NRF	Burned Dispersal	PFF
Caffeine					
Total NRF Available	*199*	*1058*	*1202*	*194*	*231*
Removed through Area Salvage (HR)				23	41
Removed through Roadside Salvage (HR)				9	63
Removed through Area Salvage (CUA)					
Removed through Roadside Salvage (CUA)				9	

Under the proposed action, a total of 20 acres of PFF/burned Dispersal habitat would be removed from the Beaver Creek site which comprises 0.07% of the total habitat available. A total of 177 acres of PFF/burned Dispersal would be removed from the Beaver Lake North site under the proposed action which comprises 6% of the total habitat available. The action alternative would remove 145 acres or 5% of the total habitat available within the Caffeine site.

The majority of PFF proposed for area salvage harvest under the action alternative would occur in the home ranges of the three owl sites in Table 31. The largest impact to any owl site home range is the Beaver Lake North site. This site would lose approximately 100 acres PFF and 35 acres of burned Dispersal habitat within the home range and approximately 36 acres PFF/ burned Dispersal within the core use area (CUA- 800m). The Caffeine owl site would have a net loss of approximately 104 acres of PFF and 32 acres of burned Dispersal at the home range scale and a loss of approximately 9 acres of burned Dispersal at the core use area scale.

The net loss of 123 acres of PFF (11%) and 98 acres of burned Dispersal (12%) habitat under the proposed action may shift owl foraging behavior to less disturbed areas. Implementation of the action alternative would result in removal of foraging habitats and coarse woody debris which could eventually provide habitat for prey items for spotted owls. It is likely that spotted owls would continue to utilize the analysis area for foraging within burned areas because there would be 985 acres of functioning (foraging) NRF and 689 acres of functioning (foraging) Dispersal habitat retained in the analysis area which would provide undisturbed, unharvested habitats which may develop into high quality early seral habitat.

As mentioned above, multiple field reconnaissance visits were conducted by Forest Service Biologists to identify and designate patches and/or individual leave trees which are designed to retain decadent habitat characteristics throughout treatment areas. Habitat components which take a long time to develop on the landscape would generally be retained in treatment areas unless those components are located within logging corridors and cannot be safely avoided. Although 12% of burned habitat (primarily in home ranges) which could provide foraging opportunities for spotted owls would be harvested under the action alternative, it is important to note that 88% of similar habitat would be left intact and undisturbed in the analysis area.

Designated leave patches and trees would contribute towards Recovery Action 12. Project design features are in place to help reduce the number of large, more structurally complex trees from being harvested and retain pre-fire snags, large down wood, and at least 6 structurally complex trees per acre in treatment units. Pre-fire snags within units would not be counted towards the 6 structurally complex trees per acre minimum so it is reasonable to expect more

than 6 large retention snags per acre. The plantation area salvage unit lacks large, structurally complex snags (because it is a plantation) however through discussions with the District Silviculturist, a minimum 5 snags per acre would be left in plantation units.

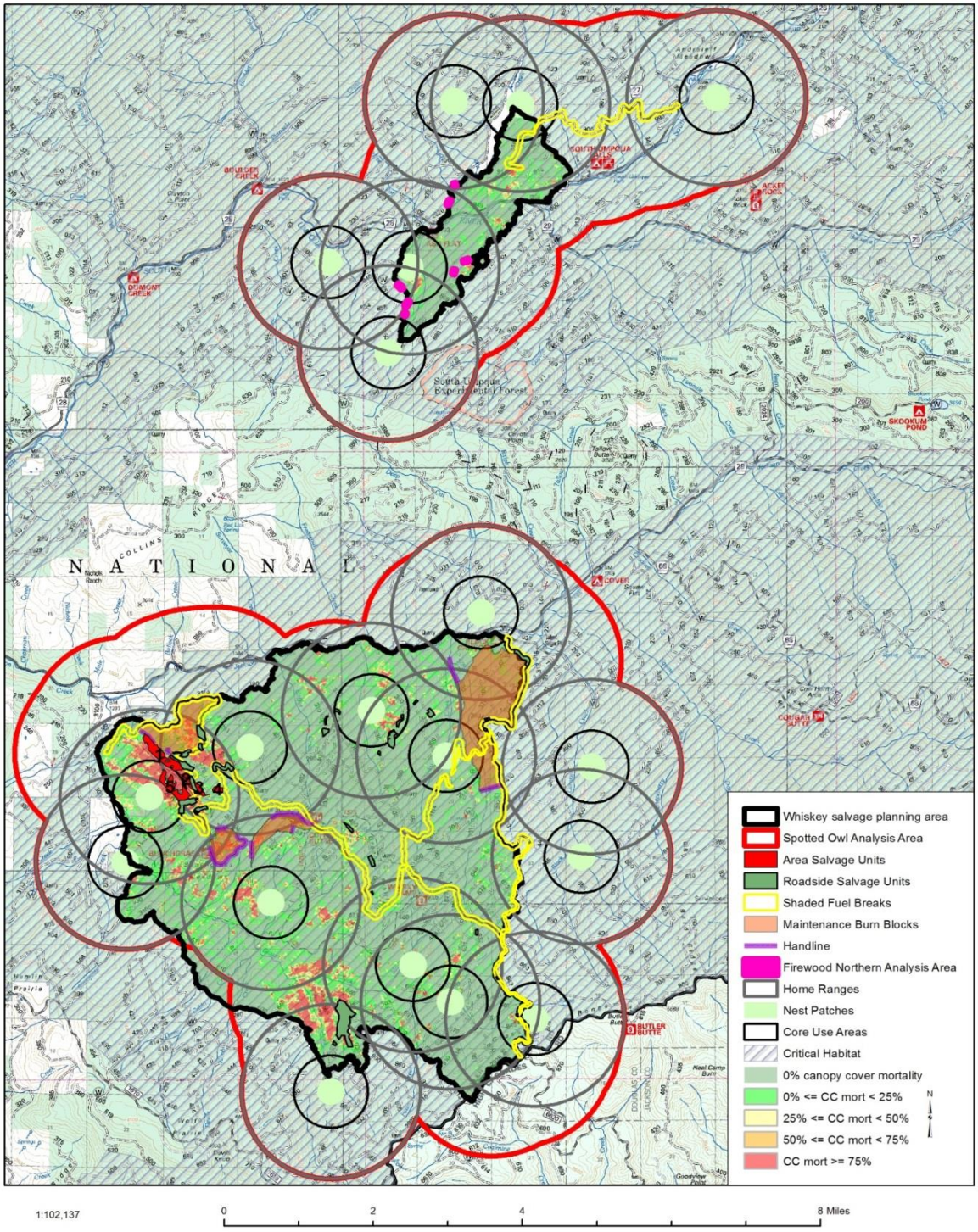


Figure 37. The Whiskey Salvage Planning Area Shown With Spotted Owl Sites (and their Spatial Scales), Components of The Proposed Action and Critical Habitat.

Anchor and Hazard Tree Removal:

Site specific adverse effects to NRF habitat where anchor (tailhold and guyline) trees and hazard trees (as defined by OSHA for worksite safety) associated with harvest units (anchor/hazard trees) are felled would be anticipated in association with the action alternative. Based upon proposed logging systems approximately 105 trees in forest stands adjacent to area and roadside units may be utilized for tailhold or guyline trees. Tailhold trees would be left standing where feasible and the smallest possible trees would be selected. Trees of any diameter could be used but smaller trees are preferred under the project design features. Use of live old-growth trees would be avoided if possible. No felling or use of trees for anchors are proposed within a 100 acre spotted owl site or nest patch. Felled trees would not continue to function as nesting or roosting trees however, they would remain onsite and contribute to down wood cover for prey species.

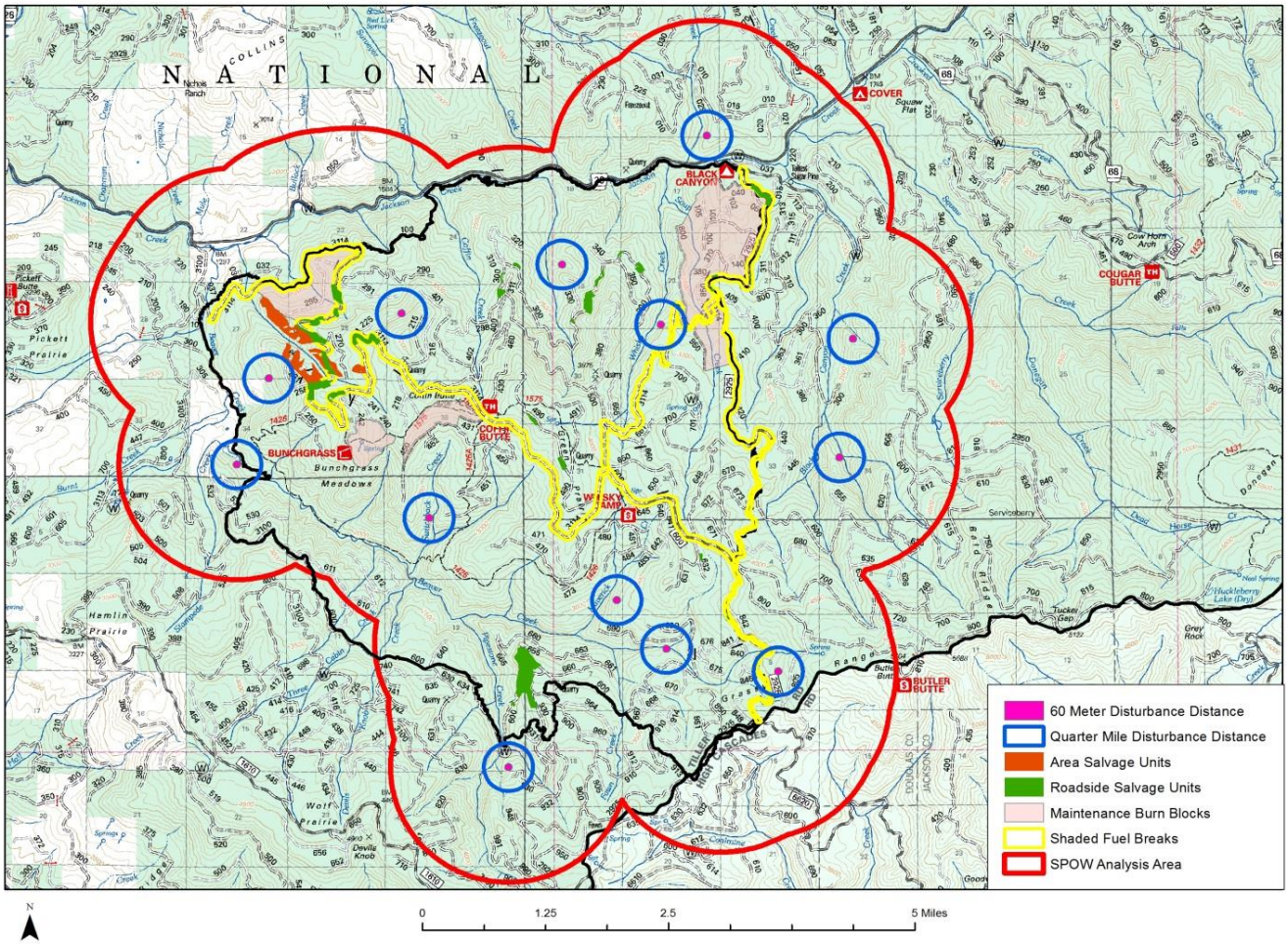


Figure 38. Disturbance distances shown for ¼ mile and 60m for Northern Spotted Owls within the Whiskey Salvage Planning Area (southern portion).

Direct and Indirect Effects from Noise Disturbance- Northern Spotted Owl

No direct or indirect effects to the species or its habitat would result from the no action alternative.

The action alternative would not have direct effects from noise or smoke, as the majority of disturbance related activities would occur beyond disturbances distances determined in consultation with the U.S. Fish and Wildlife Service (Chapman, J., R. Cox, 2011). Figure 38 shows both the ¼ mile and 60m disturbance buffers overlaid with components of the action alternative. All units except for two fall outside of those disturbance buffers. According to the disturbance consultation referenced above, the ¼ mile disturbance buffer is for several activities including aircraft, prescribed burning, and blasting. Those activities are not proposed to occur in the two areas within the ¼ mile buffer however, shaded fuel breaks, firewood harvest (buckeye and whiskey) and roadside salvage are proposed within those two areas. Noise associated with shaded fuel breaks, firewood harvest and roadside salvage would not disturb owls according to the disturbance distances established through the consultation referenced above. No seasonal restrictions would be in place for the Whiskey salvage project. Prior to issuing firewood permits, levels of snags and down wood would be assessed to ensure adequacy for prey base habitat, and compliance with standards and guidelines with the LRMP, NWFP.

Direct and Indirect Effects - Critical Habitat for the Northern Spotted Owl

The no action alternative would have no direct or indirect effects on Critical Habitat for the northern spotted owl. Retention of 1,895 acres of PFF/burned Dispersal habitat throughout the action area would benefit the northern spotted owl because these mosaic patches of burned habitats would allow for more foraging opportunities. The retention of these acres would also benefit prey base species as no ground disturbance within the analysis area would occur.

Direct effects from the action alternative include direct removal of 221 acres of critical habitat (PFF/burned Dispersal) through area and roadside salvage logging. The net loss of 123 acres of PFF (11%) and 98 acres of burned Dispersal (12%) habitat under the proposed action would likely degrade foraging habitat components in the analysis area. PFF and burned Dispersal habitats have been modified from fully functional NRF/Dispersal habitat to functioning foraging habitats as a result of the fire. Spotted owls are not likely to nest and roost in areas that experienced high severity fire and completely lack canopy cover. However, as mentioned above, spotted owls have been shown to utilize areas which experienced low and moderate severity fire for nesting, roosting and foraging. Implementation of the action alternative would result in removal of foraging habitats and coarse woody debris which could eventually provide habitat for prey items for spotted owls. It is likely that spotted owls would continue to utilize the analysis area for foraging within burned areas because there would be 985 acres of functioning (foraging) NRF and 689 acres of functioning (foraging) Dispersal habitat retained in the analysis area which would provide undisturbed, unharvested habitats which may develop into high quality early seral habitat.

The action alternative is not removing fully functional NRF/Dispersal critical habitat components unless they pose a threat from a safety stand point. It is anticipated that 25 functional NRF trees may be removed adjacent to roads through danger tree removal. Direct effects to fully functioning critical habitat from the proposed action includes removal of live NRF trees which could provide nesting, roosting and foraging habitat adjacent to roads. This removal of functional NRF habitat would only occur if live trees rate out as “imminent or likely” according to the Region 6 Field Guide for danger Tree Identification (Toupin et al., 2008; USFS R6-NR-FP-PR-01-08) and can hit the road when considering 1 ½ tree heights plus potential roll out *and* if the trees have had more than 60% canopy removed through moderate/high severity wildfire (50% probability of mortality according to Smith and Cluck, 2011).

Cumulative Effects – Northern Spotted Owl and Critical Habitat

Cumulative effects are analyzed at the Beaver, Lower Jackson Creek, Ash, Skillet 6th field sub watersheds. Past harvest activities and fires have contributed to the current condition.

The no action alternative would have no effect on the northern spotted owl. Retention of 1,895 acres of PFF/burned Dispersal habitat throughout the action area would benefit the northern spotted owl because these mosaic patches of burned habitats would allow for more foraging opportunities. The retention of these acres would also benefit prey base species as no ground disturbance within the analysis area would occur.

Future maintenance burning would not remove NRF/dispersal habitat although it may modify it based on short term impacts to prey species such as woodrats and the likely addition of scattered snags through mortality.

Section 7 of the ESA cumulative effects include the effects of future state, tribal, local or private actions that are reasonably certain to occur within the action area considered in this biological assessment. No tribal or state-administered lands are located within the Umpqua National Forest. The majority of the forested land within the Whiskey Salvage Planning Area is in various stages of re-growth following intensive past harvest activities and wildfire, and is predominately serving as NRF habitat and closely followed by Dispersal which is not NRF. It is not anticipated that the private industrial timber land within the Action Area would contribute in the near term to spotted owl recovery in that private land regeneration harvest rotations are too frequent (every 40 to 60 years) to allow for the development of spotted owl habitat. Private lands within the Action Area provide some NRF and dispersal habitat for the spotted owl which provides some foraging opportunities and contributes to connectivity between blocks of late-seral habitat on federal land. However, habitat conditions can reasonably be expected to continue to decline based on typical private forest management practices (i.e. short rotation, brush control, and low levels of snag and down wood retention) in the Action Area. Cumulative adverse effects to spotted owls would likely continue within the analysis area on private lands. To date, the Oregon Forest Practices Act requires protection of a 70-acre area around occupied nest sites, and does not provide any protection or conservation of other surrounding habitat. Removal of suitable and dispersal habitat on private lands within and around the Forest may also increase the risk to the persistence of the species in the Whiskey Salvage Planning Area**.**

Determination of Impact – Northern Spotted Owl

The no action alternative would have No Effect on the spotted owl because retention of 1,895 acres of modified PFF/burned Dispersal habitats would provide foraging opportunities for the species and retention of coarse woody debris would benefit prey species associated with spotted owls.

The action alternative May Affect, and is Likely to Adversely Affect the northern spotted owl because removal of PFF/burned Dispersal (functioning foraging) habitat may negatively affect spotted owl behavior and forage use patterns in some areas, primarily those located adjacent to area and roadside salvage units where contiguous areas of habitat would be removed.

Determination of Impact -Critical Habitat for the Northern Spotted Owl

The no action alternative would have No Effect on critical habitat for the northern spotted owl because retention of 1,895 acres of modified PFF/burned Dispersal critical habitat would provide large structurally complex components throughout the analysis area which are now

important foraging structures. Furthermore, retention of these components would likely provide prey base habitat in the form of snag basal area, large down wood, and development of early seral habitat within areas that contain complex habitat structure.

The action alternative May Affect, and is Not Likely to Adversely Affect critical habitat for the northern spotted owl because the net loss of 123 acres of PFF (11%) and 98 acres of burned Dispersal (12%) Critical Habitat under the proposed action would likely only degrade burned critical habitat components in the analysis area. Additionally, removal of coarse woody debris would diminish the amount of down wood recruitment within the analysis area and reduce the overall amount of snags.

Lewis' Woodpecker – *Meanerpes lewis* and **White-Headed Woodpecker** – *Picoides albolarvatus*

These woodpeckers are found in open habitats, favoring low canopy closure forest with open understories. The Lewis woodpecker is commonly in open ponderosa pine forest, open riparian woodlands dominated by cottonwood or pine forest that has been logged or burned. It may also inhabit oak or oak/dry coniferous forests. Food items include free-living (not wood boring) insects, acorns, other nuts and fruits (Tobalske 1997). The species has been documented on several of the Audubon survey routes. The *Conservation Strategy for Landbirds in Lowlands and Valleys of Western Oregon and Washington (*Altman 2000) includes habitat recommendations for this species to provide trees greater than 24 inches in diameter at breast height, canopy cover between 10 and 40% and 1 snag per acre greater than 12 inches in diameter at breast height. No records exist for this species within the Natural Resource Information System (NRIS) on the Umpqua National Forest (NRIS 2010) however, a search of ebird records indicated that in April of 2011, a Lewis' woodpecker was observed 3 miles northwest of the planning area within an open habitat adjacent to the South Umpqua River. Additionally, this species has been incidentally observed on the District.

The white-headed woodpecker is most often associated with large diameter, old growth pines and open canopies. In our area it favors ponderosa pine and sugar pine due to the high value seed production of these species (Garret et. al., 1997). This species was documented on the Tiller Ranger District in late 2013 in the Whiskey Salvage Planning Area. The *Conservation Strategy for Landbirds of the East-Slope of the Cascade Mountains in Oregon and Washington (*Altman 2000) includes habitat recommendations for this species. Habitat objectives call for managing ponderosa pine forests with at least 10 trees per acre greater than 20 inches in diameter at breast height, canopy cover between 10 and 40% and 1.4 snags per acre greater than 8 inches in diameter at breast height.

Direct and indirect impacts –Lewis' and White-Headed Woodpeckers

The no action alternative would result in no direct or indirect impacts to these species or habitat. Retention of 1,286 acres of moderate/high severity snag habitat would provide potential nesting and foraging areas for these species.

Direct effects from implementation of the action alternative could include disturbance to individuals from harvest activities, harvesting and falling of suitable nesting snags due to safety requirements or proposed action. Project design features are in place to help reduce the number of large, more structurally complex trees from being harvested and retain pre-fire snags, large down wood, and at least 6 structurally complex trees per acre in treatment units. Under the proposed action a total of approximately 997 acres of intact undisturbed moderate/high

severity snag habitats would be retained. Furthermore, maintenance burning would likely result in more fire killed trees throughout treatment areas and is likely to benefit the species.

Cumulative impacts – Lewis' and White-Headed Woodpeckers

Cumulative effects are analyzed at the Beaver, Lower Jackson Creek, Ash, and Skillet 6th field sub watersheds. The no action alternative would have no cumulative impacts to this species or habitat.

The action alterative may have slight cumulative impacts from past harvesting and fire exclusion in the form of harvesting of snag habitat from the area however, a total of approximately 997 acres of intact undisturbed moderate/high severity snag habitats would be retained so the cumulative impact would be small in scale.

Determination of Impact - Lewis' and White-Headed Woodpeckers

The no action alternative would have No Impact on these species or their habitat.

The action alternative May Impact Individuals or Habitat but is Not Likely to Contribute towards Federal Listing or Cause a loss of Viability to the Population or Species (MIIH) because a total of approximately 997 acres of intact undisturbed moderate/high severity snag habitats would be retained for potential nesting and foraging areas for Lewis' wood pecker and the White-headed woodpecker.

Purple Martin- *Progne subis*

The purple martin is the largest member of the swallow family (hirundinidae) and is also the largest swallow in the world. This species is uncommon in Oregon and is associated with open areas such as rivers, lakes, marshes, fields, and high above canopy forests. The purple martin is an opportunistic nester that has been documented in Oregon nesting in man-made cavities (nest boxes), old pilings, snags in forest clearcuts, snags in burned areas, snags in costal dunes, gourds set on poles in fields and crevices on docks and under bridges. The Pacific Northwest population's food habits are not well studied but other North American purple martins have been documented aerially foraging on insects which include butterflies, dragonflies, beetles, flies, bees, winged termites and typically more butterflies and dragon flies later in summer months (Horvath 2003).

Threats to the purple martin include removal of snags due to logging, fire prevention (preventing snag creation), and competitive exclusion from remaining snags by European Starlings (Horvath 2003).

No records exist for this species within the Natural Resource Information System (NRIS) on the Umpqua National Forest (NRIS 2010) however, a search of ebird records indicated that in June of 2009, a purple martin was observed 3 miles northwest of the planning area within an open habitat adjacent to the South Umpqua River. Habitat occurs throughout the Forest and specifically within the Whiskey Planning Area primarily due to the effects of the Whiskey complex fire. Approximately 1,285 total acres of moderate/ high severity areas exist in the planning area which provides opportunity for purple martins to forage, and nest. Little competition from European Starlings in these upper elevation habitats within the Whiskey Planning Area should provide adequate, low competition (from starlings) snag habitat throughout the planning area.

Direct and indirect impacts –Purple Martin

The no action alternative would have no direct or indirect impacts to these species or habitat. Retention of 1,286 acres of moderate/high severity snag habitat would provide potential nesting and foraging areas.

Direct effects from implementation of the action alternative could include disturbance to individuals from harvest activities, harvesting and falling of suitable nesting snags due to safety requirements or proposed action. Project design features are in place to help reduce the number of large, more structurally complex trees from being harvested and retain pre-fire snags, large down wood, and at least 6 structurally complex trees per acre in treatment units. Under the proposed action a total of approximately 997 acres of intact undisturbed moderate/high severity snag habitats would be retained.

Cumulative impacts – Purple Martin

Cumulative effects are analyzed at the Beaver, Lower Jackson Creek, Ash, and Skillet 6th field sub watersheds. The no action alternative would have no cumulative impacts to this species or habitat.

The action alterative may have slight cumulative impacts from past harvesting and fire exclusion in the form of harvesting of snag habitat from the area however, a total of approximately 997 acres of intact undisturbed moderate/high severity snag habitats would be retained so the cumulative impact would be small in scale.

Determination of Impact - Purple Martin

The no action alternative would have No Impact on this species or its habitat.

The action alternative May Impact Individuals or Habitat but is Not Likely to Contribute towards Federal Listing or Cause a loss of Viability to the Population or Species (MIIH) because a total of approximately 997 acres of intact undisturbed moderate/high severity snag habitats would be retained for potential nesting for the purple martin.

Fisher – *Martes pennant*

Existing Condition - A medium-sized member of the weasel family, the fisher is associated with low to mid-elevation (<4,100 ft.) late-successional and old growth forests in western Oregon (Aubrey and Lewis 2003), but is known to use younger forests that have remnant large trees, snags or logs (USDA/USDI 1994 - Appendix J2-52). Fishers generally avoid non-forested openings (Ruggiero et al. 1994), clearcuts and forested stands with <40% overstory canopy cover and occur at low densities in landscapes that have been extensively fragmented by timber harvesting (Aubry and Lewis 2003). The fisher's diet consists of a variety of small to medium sized mammals and birds and carrion (Ruggerio et al. 1994). Fishers may benefit from a combination of older forest with large trees and snags for denning and resting, and some younger forest because a mixture of different-aged forests increases the density and diversity of prey (Yaeger 2005).

Fisher primarily used live trees for denning and resting (Aubrey and Lewis 2003). Other structures used included large snags and logs. Denning trees were primarily conifer, but included one hardwood species, ranging in size from 24 to 54 inch dbh (average = 37 inch dbh). Fishers are closely associated with forested riparian areas, which they use for foraging, resting

and as travel corridors (Ruggiero et al. 1994). Reasons for their association with riparian areas may be due to the fact that those areas are conducive to developing larger trees and denser canopies and higher abundance of prey species. Rest sites tend to be in larger-diameter stands composed of conifer and hardwood, in drainage-bottoms with greater than 50% canopy cover. Females tended to use older stands for denning and resting then did males. (Lofroth, et al, 2011). They often use tree cavities created by pileated woodpeckers.

Fishers are thought to have occupied most conifer forests in Washington, Oregon and California prior to European settlement in the 1800s (Aubrey and Lewis 2003). Over trapping in the early 1900s (the season was closed in 1930s), combined with widespread habitat loss from clearcut logging, have resulted in the extirpation of this animal from much of its former range in the Pacific states (Aubrey and Lewis 2003, Thompson 2005). Currently in Oregon, there are two separate and genetically isolated populations. One population occurs in the southern Cascade Range and the other in the northern Siskiyou Mountains. The population in the southern Cascade Range was reintroduced between 1961 and 1981 and is descended from fishers from British Columbia and Minnesota (Aubrey and Lewis 2003), while the Siskiyou population is indigenous.

Currently, this species appears to be on the brink of extinction in the Cascade Range (USDA/USDI 1994) and populations are considered extremely low in Oregon (USDA 1994). Fishers were released on the Tiller Ranger District in the 1970's as part of a porcupine control program. Mustelid surveys conducted in the mid to late 1990's did not detect fisher on the Tiller District. A population exists on the Prospect Ranger District, Rogue River National Forest, approximately 20 miles to the east. This is well within the range that individual fishers can travel. A study of radio-collared fishers in the Prospect area from 1995-2001 (K. Aubrey and C. Raley, Pacific Northwest Research Station) showed that the Rogue River -Highway 62 corridor may influence spatial use and distribution of fishers. However, males regularly crossed the corridor during breeding season and the corridor did not appear to impede juvenile dispersal.

The nearest recorded observation of this species to the Whiskey Salvage Planning Area is 7.8 air miles east on the Tiller Ranger District near Falcon Creek. This observation was part of the radio-collared study mentioned above (Aubrey and Lewis 2003). No detections of fishers on the Tiller Ranger District have occurred since.

Direct and indirect impacts –Fisher

No direct or indirect effects to the species or its habitat would result from the no action alternative.

Direct effects from implementation of the action alternative could include disturbance to individuals from harvest activities, harvesting and falling of natal den trees/snags due to safety requirements or proposed action, and impacts to down logs from harvest activities. Project design features are in place to help reduce the number of large, more structurally complex trees from being harvested and retain pre-fire snags, large down wood, and at least 6 structurally complex trees per acre in treatment units. A maintenance burn project design feature is in place which is intended to produce mild to low and burn intensities and also intended to retain large down wood and existing snags. Through maintenance burning, additional snags may be recruited through mortality and potential natal den or resting sites could be created.

Cumulative impacts – Fisher

Cumulative effects are analyzed at the Beaver, Lower Jackson Creek, Ash, and Skillet 6th field sub watersheds. The no action alternative would have no cumulative impacts to this species or habitat.

The action alterative may have slight cumulative impacts from past harvesting and fire exclusion in the form of harvesting of snag habitat from the area however, a total of approximately 997 acres of intact undisturbed moderate/high severity snag habitats would be retained so the cumulative impact would be small in scale.

Determination of Impact - Fisher

The no action alternative would have No Impact on this species or its habitat.

The action alternative May Impact Individuals or Habitat but is Not Likely to Contribute towards Federal Listing or Cause a loss of Viability to the Population or Species (MIIH) because a total of approximately 997 acres of intact undisturbed moderate/high severity snag habitats would be retained for potential natal dens for this species. Additionally, riparian buffers would still provide connectivity to upper and lower elevations within area salvage units for the Fisher.

Fringed Myotis – *Myotis thysanodes*

Existing Condition - The fringed myotis is a small bodied bat with long ears and a fringe of hairs along the posterior edge of the tail membrane (Kays and Wilson 2002). Fringed myotis are known to roost in rock crevices, bridges, buildings, large trees and snags (Cross et al. 1996, Weller and Zabel 2001). Weller and Zabel (2001) documented that habitat use by this species is influenced by the availability of large (>12 inch d.b.h.), tall snags for roosting. Roosts tend to be near stream channels which are used for travel and foraging corridors, and also occurred in portions of stands that had lower canopy closures. Fringed myotis often utilized snags in semi-open areas and forest edges (Cross et al. 1996) and seemed to prefer snags over green trees for roosting. The Pacific sub species of the fringed myotis **(***Myotis thysanodes vespertinus* occurs west of the Cascades in Washington, Oregon, and northern California (Weller 2005). They occupy a wide variety of habitats, including oak woodlands and ponderosa pine and mixed conifer forests from sea level to above 9,000 ft. The utilize a variety of different types of roosts, including caves, mines, bridges, crevices in buildings, and underneath bark in a number of tree species (Keinarth 2004, Weller 2005). Their diet consists mainly of beetles and moths (Keinarth 2004).

Threats include roost loss and modification through human manipulation or disturbance; habitat alteration through loss of large snags used for roosting by timber harvest practices; loss of riparian habitat; and agricultural use of pesticides which can directly cause mortality, reduce reproduction and reduce insect prey populations (Keinarth 2004, Piaggio and Sherwin 2005).

There are no known maternity colonies for this species on the Umpqua National Forest. Rock crevices, bridges and older forests adjacent to proposed harvest units are considered the best potential habitat for the species in the Whiskey Salvage Planning Area. This species hibernates in caves and mines during the winter months. The closest documented sighting is near Riddle approximately 25 miles to the southwest of the Whiskey Salvage Planning Area (Perkins 1983).

Direct and indirect impacts –Fringed Myotis

The no action alternative would have no direct or indirect impacts to these species or habitat. Retention of 1,286 acres of moderate/high severity snag habitat would provide potential roosting habitat.

Direct effects from implementation of the action alternative could include disturbance to individuals from harvest activities, harvesting and falling of suitable roosting snags due to safety requirements or proposed action. Project design features are in place to help reduce the number of large, more structurally complex trees from being harvested and retain pre-fire snags, large down wood, and at least 6 structurally complex trees (basal hollows, broken tops, large horizontal branches) per acre in treatment units. Under the proposed action a total of approximately 997 acres of intact undisturbed moderate/high severity snag habitats would be retained in the planning area.

Cumulative impacts – Fringed Myotis

Cumulative effects are analyzed at the Beaver, Lower Jackson Creek, Ash, and Skillet 6th field sub watersheds. The no action alternative would have no cumulative impacts to this species or habitat.

The action alterative may have slight cumulative impacts from past harvesting and fire exclusion in the form of harvesting of snag habitat from the area however, a total of approximately 997 acres of intact undisturbed moderate/high severity snag habitats would be retained so the cumulative impact would be small in scale.

Determination of Impact - Fringed Myotis

The no action alternative would have No Impact on this species or its habitat.

The action alternative May Impact Individuals or Habitat but is Not Likely to Contribute towards Federal Listing or Cause a loss of Viability to the Population or Species (MIIH) because a total of approximately 997 acres of intact undisturbed moderate/high severity snag habitats would be retained for potential nesting for this species. Furthermore, project design features are in place to help reduce the number of large, more structurally complex trees from being harvested and retain pre-fire snags, large down wood, and at least 6 structurally complex trees (basal hollows, broken tops, large horizontal branches) per acre in treatment units. Under the proposed action a total of approximately 997 acres of intact undisturbed moderate/high severity snag habitats would be retained in the planning area for the Fringed Myotis.

North American Wolverine- *Gulo gulo*

Existing Condition - The wolverine is the rarest carnivore in North America, with stout limbs, long thick brown fur with two lighter brown stripes that extend from the shoulder to the rump (Aubry et al. 2007, Stone 2007). The current range of the wolverine is not well understood. Aubry et al. (2007) analyzed occurrence data throughout the U.S. and determined that through current records (1995-2005) the range of the wolverine was reduced to Washington, Idaho, Montana and Wyoming and the wolverine was likely extirpated in Oregon. However, on April 22, 2011 two wolverines were photographed at a camera bait station in the Wallowa Mountains in northeast Oregon. Over the course of the survey, which continued into June three different animals were identified. Wolverines are a wide ranging species, but their primary habitat is high elevations with alpine vegetation and deep snow cover that extends well into spring. They utilize talus cirques for maternal denning in areas with deep snow cover. They are a wide ranging

species with males having home ranges up to 400 sq. miles while females with young have much smaller home ranges from 40-160 sq. miles (Stone 2007c). Wolverines can feed on a variety of prey including deer, small mammals, berries, etc. (Stone 2007c). Threats to the wolverine are primarily activities that influence sub-alpine and alpine communities including timber harvesting, backcountry skiing and snowmobiling, roads, predator trapping, and high road densities (Stone 2007c). There have been anecdotal records of wolverine around Diamond Lake and Tiller but no confirmed sightings (photos, tracks or hair sample) have been documented on the Tiller Ranger District.

There are no definitive occurrences of this species within the Whiskey Salvage Planning Area. The habitat in the area is not prime wolverine habitat but it could serve as connectivity between prime areas.

Direct and indirect impacts –Wolverine

No direct or indirect effects to the species or its habitat would result from the no action alternative.

The action alternative may have remote possibility for impacts to occur to this species. No confirmed sightings have occurred on the Tiller District and habitat found in the Whiskey Salvage Planning Area serves as connectivity between prime habitats found higher elevations on the District.

Cumulative impacts – Wolverine

Cumulative effects are analyzed at the Beaver, Lower Jackson Creek, Ash, and Skillet 6th field sub watersheds. No cumulative impacts would result from the no action alternative.

The action alternative would not have cumulative impacts to this species or habitat because the species is not likely to occur within or near the planning area and the habitat in the area is marginal.

Determination of Impact – Wolverine

The no action alternative would have No Impact on this species or habitat. A remote possibility exists for impacts to occur to this species or habitat however, the action alternative May Impact Individuals or Habitat but is Not Likely to Contribute towards Federal Listing or Cause a loss of Viability to the Population or Species (MIIH) because habitat in the area is marginal and the proposed action is affecting a small area when compared to a typical home range of a wolverine.

Pallid Bat - *Antrozous pallidus*

Existing Condition - This bat is usually associated with desert areas. On the west side of the Cascades, they are restricted to the dry, interior valleys (Verts and Carraway 1998) at lower elevations. A large, pale bat with large ears (not joined at base), large eyes, a simple muzzle, and yellowish drab dorsal pelage (palest in deserts, darkest along coast); total length 92-135 mm. Documented roost locations of this species include cliffs, caves, buildings, trees, and bridges. Night roosts often or typically are in caves in Oklahoma (Caire et al. 1989). In Oregon, night roosts were in buildings, under rock overhangs, and under bridges; bats generally were faithful to particular night roosts both within and between years (Lewis 1994). This species prefers narrow crevices in caves for hibernation sites (Caire et al. 1989). Young are born in maternity colonies usually in rock crevices or buildings. There are no known maternity colonies for this species on the Umpqua National Forest. Primary diet is arthropods captured on the

ground, after an aerial search. Also captures some food (large insects) in flight, within a few meters of ground vegetation. Food items include flightless arthropods, Jerusalem crickets, moths, beetles, etc.; may eat small vertebrates. This species has been documented visiting bat-adapted succulent plants (e.g., AGAVE), probably seeking insects (Herrera et al., 1993, J. Mamm. 74:601-606). Documented in Dillard and Riddle, Douglas County, Oregon within the South Umpqua watershed in 1983 (Perkins 1983).

There are some rock outcrops and caves near the southwestern corner of the planning area that could serve as hibernacula or roosts. The closest documented sighting is approximately 46 miles to the southeast of the Whiskey Salvage Planning Area.

Direct and indirect impacts –Pallid Bat

The no action alternative would have no direct or indirect impacts to these species or habitat. Retention of 1,286 acres of moderate/high severity snag habitat would provide potential roosting habitat.

Direct effects from implementation of the action alternative could include disturbance to individuals from harvest activities, harvesting and falling of suitable roosting snags due to safety requirements or proposed action. Project design features are in place to help reduce the number of large, more structurally complex trees from being harvested and retain pre-fire snags, large down wood, and at least 6 structurally complex trees (basal hollows, broken tops, large horizontal branches) per acre in treatment units. Under the proposed action a total of approximately 997 acres of intact undisturbed moderate/high severity snag habitats would be retained in the planning area for the Pallid Bat.

Cumulative impacts – Pallid Bat

Cumulative effects are analyzed at the Beaver, Lower Jackson Creek, Ash, and Skillet 6th field sub watersheds. The no action alternative would have no cumulative impacts to this species or habitat.

The action alterative may have slight cumulative impacts from past harvesting and fire exclusion in the form of harvesting of snag habitat from the area however, a total of approximately 997 acres of intact undisturbed moderate/high severity snag habitats would be retained so the cumulative impact would be small in scale.

Determination of Impact – Pallid Bat

The no action alternative would have No Impact on this species or its habitat.

The action alternative May Impact Individuals or Habitat but is Not Likely to Contribute towards Federal Listing or Cause a loss of Viability to the Population or Species (MIIH) because a total of approximately 997 acres of intact undisturbed moderate/high severity snag habitats would be retained for potential nesting for this species. Furthermore, project design features are in place to help reduce the number of large, more structurally complex trees from being harvested and retain pre-fire snags, large down wood, and at least 6 structurally complex trees (basal hollows, broken tops, large horizontal branches) per acre in treatment units. Under the proposed action a total of approximately 997 acres of intact undisturbed moderate/high severity snag habitats would be retained in the planning area for the Pallid Bat.

Townsend's Big- Eared Bat - *Corynorhinus townsendii*

Existing Condition - Townsend's big-eared bat has, as its name implies,long ears and is identified from other vespertilionids by prominent bumps on either side of its nose. They occur across the western United States, and their distribution is correlated to the distribution of caves and abandoned mines, but they can utilize buildings, bridges or hollow trees for roosting (Piaggio and Sherwin 2005). They also use deep rock crevices, shaded rock overhangs, and boulder talus. Townsend's big-eared bats can utilize a variety of habitats from coniferous forests, deserts, prairies, riparian areas, agricultural areas, and coastal habitats, in elevations from sea level to 11,000 feet (Piaggio and Sherwin 2005). They specialize in feeding on moths, which comprise over 90% of their diet.

Threats include roost loss and modification through human manipulation or disturbance; habitat alteration through loss of large snags used for roosting by timber harvest practices; loss of riparian habitat; and agricultural use of pesticides which can directly cause mortality, reduce reproduction and reduce insect prey populations (Keinarth 2004, Piaggio and Sherwin 2005). Hibernacula and maternal roost sites are the most sensitive to human disturbances.

There are no known nursery colonies or winter hibernacula for this bat in or closely adjacent to the Whiskey Salvage Planning Area. There are no documented observations of the species in the Whiskey Salvage Planning Area.

This species has been documented on the Tiller Ranger District near Quartz Mountain approximately 17 miles north of the Whiskey Salvage Planning Area.

Direct and indirect impacts –Townsend's Big Eared Bat

The no action alternative would have no direct or indirect impacts to these species or habitat. Retention of 1,286 acres of moderate/high severity snag habitat would provide potential roosting habitat.

Direct effects from implementation of the action alternative could include disturbance to individuals from harvest activities, harvesting and falling of suitable roosting snags due to safety requirements or proposed action. Project design features are in place to help reduce the number of large, more structurally complex trees from being harvested and retain pre-fire snags, large down wood, and at least 6 structurally complex trees (basal hollows, broken tops, large horizontal branches) per acre in treatment units. Under the proposed action a total of approximately 997 acres of intact undisturbed moderate/high severity snag habitats would be retained in the planning area for the Townsends Big-Eared Bat.

Cumulative impacts – Townsend's Big Eared Bat

Cumulative effects are analyzed at the Beaver, Lower Jackson Creek, Ash, and Skillet 6th field sub watersheds. The no action alternative would have no cumulative impacts to this species or habitat.

The action alterative may have slight cumulative impacts from past harvesting and fire exclusion in the form of harvesting of snag habitat from the area however, a total of approximately 997 acres of intact undisturbed moderate/high severity snag habitats would be retained so the cumulative impact would be small in scale.

Determination of Impact - Townsend's Big Eared Bat

The no action alternative would have No Impact on this species or its habitat.

The action alternative May Impact Individuals or Habitat but is Not Likely to Contribute towards Federal Listing or Cause a loss of Viability to the Population or Species (MIIH) because a total of approximately 997 acres of intact undisturbed moderate/high severity snag habitats would be retained for potential nesting for this species. Furthermore, project design features are in place to help reduce the number of large, more structurally complex trees from being harvested and retain pre-fire snags, large down wood, and at least 6 structurally complex trees (basal hollows, broken tops, large horizontal branches) per acre in treatment units. Under the proposed action a total of approximately 997 acres of intact undisturbed moderate/high severity snag habitats would be retained in the planning area for the Townsends Big-Eared Bat.

Pacific Pond Turtle - *Actinemys marmorata*

Existing Condition - The Pacific pond turtle is a moderate-sized turtle reaching a maximum length of 18-24 centimeters. They are usually dark brown to olive dorsally, or blackish with darker reticulations. There is usually a pattern of dark radiating spots or lines on each scute. The plastron is yellowish, often with dark blotching in the center of the plasteral shields (Storm et al. 1995). The top of the head has black spots or lines (NatureServe 2007). Although this turtle is described as an aquatic turtle occurring in streams, ponds, lakes, and wetlands it also spends a large amount of time away from water. It requires terrestrial habitats for nesting and overwinters on land. In drier regions where stream habitats dry up in the summer, they were documented to use upland habitats an average of 50 m from stream channels (Rathbun et al. 2002). Reese and Welsh (1997) documented overwintering on the average about 200 meters, but as far as 500 meters from river systems, and mainly on north and east facing slopes. The greatest single threat to the pond turtle is habitat destruction, alteration and fragmentation (Ashton et al 1997, NatureServe 2007). Habitat impacts can be caused by conversion of wetlands to farmland, water diversions and dams, channelization, mining, logging, and urbanization. Associated with habitat fragmentation is the effect on genetic isolation. Lack of genetic variability may be a serious threat to the continued survival of populations in Oregon and Washington and are discussed in detail by Holland (1991). Other threats include: motor vehicle traffic, human recreation activities in occupied habitat, chemical spills, exotic predators, grazing, fire, and drought (Olsen et.al. 2009).

The Pacific pond turtle has been documented in the Whiskey Planning Area and throughout the Tiller Ranger District. Several were observed during the Whiskey complex fire on Jackson Creek road, the 3100 road and in Beaver and Jackson Creek.

Direct and indirect impacts –Pacific Pond Turtle

No direct or indirect effects to the species or its habitat would result from the no action alternative. Direct impacts from the action alternative may include mortality from crushing (heavy equipment- vehicles) and injury from vehicles used for project implementation. It is unlikely that a pond turtle would be found on or near the roadway where the majority of action components would occur because primary habitat in these areas is not found and canopy/herbaceous cover removed through moderate/high severity fire has temporarily eliminated ground cover. This species would likely avoid open areas (area and roadside salvage) such as burned areas for nesting sites. Other direct effects from the action alternative may include mortality from maintenance burns.

A project design feature is in place to design maintenance burns to occur at low severity and retain majority of large down wood. These maintenance burns would likely take place in the fall and winter months but spring burning is also a possibility. If winter burning is conducted, direct

mortality may occur due to burning of individuals overwintering in uplands adjacent to ponds or streams. If spring burning would occur, it is unlikely that direct mortality could occur because the majority of turtle during this time return to areas near or within water. Pacific pond turtles both young and adults emerge from nests in spring and travel a short distance to areas with standing or flowing water however, behavior among regions and within populations is highly variable (Pilliod 2013). In either maintenance burn scenario, some individuals may be impacted.

Cumulative impacts – Pacific Pond Turtle

Cumulative effects are analyzed at the Beaver, Lower Jackson Creek, Ash, and Skillet 6th field sub watersheds. The no action alternative would not have cumulative impact this species or its habitat.

The action alternative would slightly add to cumulative impacts to this species and habitat. Maintenance burning is intended to increase resiliency in treated areas and while impacts to individuals may occur, cumulative impacts are small in scale and the cumulative impact to this species and it's habitat is predominately positive. Maintenance burns should increase resiliency in treated areas and provide future refugia for pond turtles during future wildfires.

Determination of Impact - Pacific Pond Turtle

The no action alternative would have No Impact on this species or its habitat. The action May Impact Individuals or Habitat but is Not Likely to Contribute towards Federal Listing or Cause a loss of Viability to the Population or Species (MIIH) because this species is likely to avoid the salvage operations and primary habitat is not found where area or roadside salvage is proposed or where ground based equipment would be staged. Riparian areas are buffered from disturbance and would not be impacted by the proposed action because no heavy equipment which could cause direct impacts to the species or its habitat would be within riparian areas. Furthermore, maintenance burning severity would be designed to be mild/low so intense burning is unlikely near ponds, wetted channels and within the adjacent uplands.

California Shield-Backed Bug - *Vanduzeeina borealis californica*

This small, ¼ inch long insect is distinguished by its enlarged back plate which covers the entire abdomen. This subspecies has been located in Oregon in the Mt Hood area and at the H.J. Andrews Experimental Forest in eastern Lane County. It has not been documented anywhere on the Umpqua National Forest. Life history is poorly understood, but habitat associations are made based upon the few documented specimens. From this limited input, it appears that this subspecies is a tall grass prairie specialist (Foltz, S and S. Jepsen 2009).

Habitat in the Whiskey Planning Area is limited to bunchgrass meadows and on the southern high elevation areas of the planning area. Unique and mosaic non-forested habitats may serve as potential habitats and buffers for these habitats would be in place.

Direct and indirect impacts –California Shield-Backed Bug

No direct or indirect effects to the species or its habitat would result from the no action alternative. Direct impacts from the action alternative are not expected but possible. Habitat for this species is outside of all action alternative components except for maintenance burns. Burning is likely to maintain the California shield-backed bugs habitat of tall grass prairie but there is no supporting information. Unique and mosaic non-forested habitats may serve as potential habitats. Buffers to unique and mosaic habitats are in place.

Cumulative impacts – California Shield-Backed Bug

Cumulative effects are analyzed at the Beaver, Lower Jackson Creek, Ash, and Skillet 6th field sub watersheds. The no action alternative would cumulatively impact this species or its habitat. The action alternative would add slight beneficial cumulative impacts to maintenance burn block areas in that burning meadow blocks may benefit the species if they occur in the Whiskey Planning Area.

Determination of Impact - California Shield-Backed Bug

The no action alternative would have No Impact on this species or its habitat. The action May Impact Individuals or Habitat but is Not Likely to Contribute towards Federal Listing or Cause a loss of Viability to the Population or Species (MIIH) because this species may benefit from maintenance burning and no other action components are proposed within potential habitats. A project design feature is in place to ensure that maintenance burns are designed to burn at low severity in burn blocks.

Chace Sideband - *Monadenia chaceana*

Existing Condition - This species is endemic to northern California and southwest Oregon and has been found on the Tiller Ranger District. Mollusk surveys conducted for Zinc Planning area and Ash Planning area from 1998 through 2001 documented eight locations for this species within those planning areas. These areas are within 6-12 miles north of the Whiskey Salvage Planning Area.

This species is associated with forested and open talus or rocky areas. Vegetation types include dry conifer and mixed conifer/hardwood forests as well as oak communities. Habitat is found in lower reaches of major drainages, in talus and rockslides, under rocks and woody debris in moist coniferous forests, in caves, and in shrubby areas in riparian corridors. Rocks and large woody debris serve as refugia during the summer and late winter seasons.

Fire related impacts can have variable effects on terrestrial mollusks depending on the habitat they occupy. Factors for survival of fires include degree of exposure to lethal temperature, suitability of post-fire vegetation, ability to recolonize, and stress experienced in the post-fire environment. Some individual mollusks could have avoided mortality by occupying interstitial spaces in under rocks or logs, and/or remaining near wetted areas with less herbaceous/litter fuel (Hartley et.al. 2007). Fire which occurred within the Whiskey complex fire was largely low severity and only a small portion of the burned acreage is considered moderate to high severity (1285 acres). It is likely that survival occurred adjacent to moderate and high severity areas and even within those areas where adequate rock and down wood cover provided shelter from the fast moving flames. On July 26th, the ambient temperature was higher than what is recommended for surveys of this species. It is likely that many individuals were not near the soil/rock surface during the fire and many individuals could have survived.

Direct and indirect impacts – Chase Sideband

No direct or indirect effects to the species or its habitat would result from the no action alternative. The action alternative may directly impact individuals which survived the fire and are residing in the burned area or moving to preferable habitats through: direct crushing, and soil compaction and disturbance. Other direct effects include: mortality from maintenance burns however, this is unlikely because maintenance burns would be designed to retain much of the downed wood, and burn at low intensities and should not severely impact rocky habitats and downed woody debris where this species resides. Surveys would be conducted for this species in areas where roadside salvage or area salvage is proposed and appropriate buffers would be in place to reduce impacts to individuals or habitat.

Cumulative impacts – Chase Sideband

Cumulative effects are analyzed at the Beaver, Lower Jackson Creek, Ash, and Skillet 6th field sub watersheds. The no action alternative would have no cumulative impacts. The action alternative would slightly add to cumulative effects in that areas where salvage occurs, herbaceous and shrub cover may temporarily stunted by soil compaction using ground based systems (only in roadside salvaged areas).

Determination of Impact - Chase Sideband

The no action alternative would have No Impact on this species or its habitat. The action May Impact Individuals or Habitat but is Not Likely to Contribute towards Federal Listing or Cause a loss of Viability to the Population or Species (MIIH) because rocky/ large down wood habitats where these species are found would not be fully impacted by heavy equipment due to limited capability of equipment to navigate boulder piles and talus slopes and large down wood. A project design feature is in place to ensure that large down wood are not altered/ disturbed and are retained in treatment areas.

Oregon Shoulderband - *Helminthoglypta hertleini*

Douglas counties (USDI 1999) and has been found on the Tiller Ranger District. It is associated with rocks and woody debris in rocky areas within forest habitats, often adjacent to areas with substantial grass or seasonal herbaceous vegetation. Seasonal deep refugia include talus deposits and outcrops, which contain interstitial spaces (cracks) large enough for snails to enter. These seasonal refugia also provide protection from predation during fires and periods of inactivity. Vegetation types where the species has been located include dry conifer and mixed conifer/hardwood forests as well as oak communities. Forest canopy cover moderates the extremes in environmental conditions and may provide additional moisture to the site in the form of condensation drip. No strong riparian association has been identified for this species (Duncan 2004). It is tolerant of drier conditions than other mollusks and can be found in open woodlands, meadows and road edges.

Fire related impacts can have variable effects on terrestrial mollusks depending on the habitat they occupy. Factors for survival of fires include degree of exposure to lethal temperature, suitability of post-fire vegetation, ability to recolonize, and stress experienced in the post-fire environment. Some individual mollusks could have avoided mortality by occupying interstitial spaces in under rocks or logs, and/or remaining near wetted areas with less herbaceous/litter fuel (Hartley et.al. 2007). Fire which occurred within the Whiskey complex fire was largely low severity and only a small portion of the burned acreage is considered moderate to high severity (1285 acres). It is likely that survival occurred adjacent to moderate and high severity areas and even within those areas where adequate rock and down wood cover provided shelter from the fast moving flames. On July 26th, the ambient temperature was higher than what is recommended for surveys of this species. It is likely that many individuals were not near the soil/rock surface during the fire and many individuals could have survived.

Direct and indirect impacts – Oregon Shoulderband

No direct or indirect effects to the species or its habitat would result from the no action alternative. The action alternative may directly impact individuals which survived the fire and are residing in the burned area or moving to preferable habitats through: direct crushing, and soil compaction and disturbance. Other direct effects include: mortality from maintenance burns however, this is unlikely because maintenance burns would be designed to retain much of the downed wood, and burn at low intensities and should not impact rocky habitats where this

species resides. Surveys would be conducted for this species in areas where roadside salvage or area salvage is proposed and appropriate buffers would be in place to reduce impacts to individuals or habitat.

Cumulative impacts - Oregon Shoulderband

Cumulative effects are analyzed at the Beaver, Lower Jackson Creek, Ash, and Skillet 6th field sub watersheds. The no action alternative would have no cumulative impacts. The action alternative would slightly add to cumulative effects in that areas where salvage occurs, herbaceous and shrub cover may temporarily stunted by soil compaction using ground based systems (only in roadside salvaged areas) however these species are known to occupy talus slopes.

Determination of Impact - Oregon Shoulderband

The no action alternative would have No Impact on this species or its habitat. The action alternative May Impact Individuals or Habitat but is Not Likely to Contribute towards Federal Listing or Cause a loss of Viability to the Population or Species (MIIH) because rocky habitats where these species are found would not be fully impacted by heavy equipment due to limited capability of equipment to navigate boulder piles and talus slopes/ veins.

Siskiyou Short-Horned Grasshopper - *Chloealtis aspasma*

Existing Condition - This small, brown grasshopper occurs in grassland/herbaceous habitats (i.e. high elevation meadows and clear-cuts, grassy hilltops). The species appears to be associated with blue elderberry plants (*Sambucus caerulea*). It has been documented in Woodruff Meadows on the Rogue-Siskiyou National Forest approximately 11 miles east of the Whiskey Salvage Planning Area (Fulton 1930).
Females lay eggs in the pith of elderberry stems in the summer. Eggs hatch the following year. Juveniles forage in open meadows near the ground. The species feeds on grasses and forbs.

Conservation Considerations: Forest logging and mild or low intensity fire appears to provide open habitat for the host plant, blue elderberry, thereby increasing local populations of the grasshopper. Furthermore, planting or placing blue elderberry stems in open areas provides oviposition sites. Limiting factors may include availability of oviposition sites or damaged and loss of foraging habitat (open meadows).

The Siskiyou short-horned grasshopper is suspected on the Umpqua National Forest and the project area contains potential suitable habitat for the species including limited elderberry shrubs. Bunchgrass meadow complex contains some habitat components for this species. The Whiskey complex fire likely benefitted the species in the area by burning the meadow complex at low severity.

Direct and indirect impacts- Siskiyou Short-Horned Grasshopper

No direct or indirect effects to the species or its habitat would result from the no action alternative. Three out of four components of the proposed action would not impact this species' habitat nor the species because the components are not proposed in the available habitat. Maintenance burning would likely benefit this species in the Whiskey Planning Area since prescribed maintenance burning would be designed to burn a low intensity during adequate burn windows.

Cumulative impacts - Siskiyou Short-Horned Grasshopper

Cumulative effects are analyzed at the Beaver, Lower Jackson Creek, Ash, and Skillet 6th field sub watersheds. The no action alternative has no cumulative impacts. The implementation of the proposed action would not add to cumulative effects for this species or its habitat because beneficial effects would result from the proposed action.

Determination of Impact - Siskiyou Short-Horned Grasshopper

The no action alternative would have No Impact on this species or its habitat. The action alternative May Impact Individuals or Habitat, and all Impacts are Beneficial to the Siskiyou short-horned grasshopper and its habitat because only maintenance burning is proposed in suitable habitat and mild/low intensity fire appears to provide open habitats which habitat for host plants (oviposition sites).

SURVEY AND MANAGE

The proposed action alternative complies with the Northwest Forest Plan as amended by the 2001 Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines.

The following Survey and Manage species were considered but not evaluated further for this project. Crater Lake Tightcoil *Pristiloma arcticum crateris* potential habitat is found on the Tiller Ranger District (RD) and suitable habitat is found within the Whiskey Planning Area. The action alternative would not disturb habitat potentially associated with the Crater Lake tight coil because buffers for ponds, wetted areas, unique habitats and riparian areas would prevent impacts to this species. Potential habitat for the Evening Field Slug *Deroceras hesperium* is also found on the Tiller RD and within the Whiskey Salvage Planning Area. The action alternative would not disturb habitat potentially associated with the Evening Field Slug because buffers for ponds, wetted areas, unique habitats and riparian areas would prevent impacts to this species. Great Grey Owl (*Strix nebulosa)* habitat is found on the Tiller RD and suitable habitat is found within the Whiskey Planning Area. Additionally, 2006 Pechman Exemption 4 does not require survey and manage for "hazardous fuel treatments applying prescribed fire for noncommercial projects". This species will not be evaluated any further because both shaded fuel breaks and maintenance burning are noncommercial projects and the only two proposed actions which will occur adjacent to suitable nesting habitat for this species. The action alternative would not disturb habitat potentially associated with great grey owls in the Whiskey Planning Area therefore, the species would not be evaluated any further.

Table 32 provides information relating to survey and manage species which have potential habitat within the Whiskey Planning Area and whether or not surveys would be completed to protocol for each species. Survey and Manage Species which have potential habitat in the Whiskey planning are the Chase (or Siskiyou) sideband *Monodenia chaceana,* Oregon Shoulderband *Helminthoglypta hertleini,* and the Oregon Red Tree Vole *Arborimus longicaudus*.

Table 32. Survey and Manage Habitat Evaluation In The Whiskey Salvage Planning Area and Rationale for Survey Triggers.

Unit	Action	Acres	Mollusk Habitat present and Rationale for Survey Trigger (ST)	ST	Red Tree Vole Habitat Present and Rationale for Survey Trigger (ST)	ST
1	AS	44	Yes, down wood retained and talus piles, bolder meadows. Spot check	Y	No, canopy cover removed through mod/high severity fire	N
2	AS	7.73	Yes, down wood retained and some talus veins	Y	No, canopy cover removed through mod/high severity fire	N
3	AS	6.2	Yes, down wood retained and some talus piles	Y	No, canopy cover removed through mod/high severity fire	N
4	AS	6.7	Yes, green down wood retained and large talus piles low burn severity	Y	Some live canopy old trees appear to provide RTV habitat. Project design has eliminated potential removal of live habitat and trigger for survey.	N
5	AS	34.6	No, lacks down wood and talus piles. Plantation condition lacks large down wood.	N	No, canopy cover removed through mod/high severity fire	N
6	RS	16	Yes, down wood retained, spot check	Y	No, canopy cover removed through mod/high severity fire	N
7	RS	6	Yes, down wood retained, spot check	Y	No, canopy cover removed through mod/high severity fire	N
8	RS	13	Yes, down wood retained and some talus piles	Y	No, canopy cover removed through mod/high severity fire	N
9	RS	9	Talus piles, survey rock outcrops and vein or exclude	Y	No, canopy cover removed through mod/high severity fire	N
10	RS	11	Yes, rock outcrops in older stands. Spot check	Y	No, canopy cover removed through mod/high severity fire	N
11	RS	6	Yes, rock and downed wood habitat adjacent to road. Spot check	Y	No, canopy cover removed through mod/high severity fire	N
12	RS	2.5	Yes, rock and downed wood habitat adjacent to road. Spot check	Y	Yes, canopy cover is intact uphill from proposed salvage. Remove only trees which have no canopy remaining.	N
13	RS	9	Yes, rock and downed wood habitat adjacent to road. Spot check	Y	Canopy cover intact. Project design has eliminated potential removal of live habitat and trigger for survey.	N
14	RS	.3	Yes, riparian buffers prevent impacts	N	No, small trees and canopy cover removed through mod/high severity fire	N
15	FW	4	Yes. No surveys because no heavy equip use will occur thus, no trigger	N	No, small trees and canopy cover removed through mod/high severity fire	N
16	FW	2	Yes. No surveys because no heavy equip use will occur thus, no trigger	N	No, small trees and canopy cover removed through mod/high severity fire	N
17	RS	2	Yes. No surveys because no heavy equip use will occur thus, no trigger	N	Yes, canopy cover intact, lower side of road has older trees which could support RTV. Project design has eliminated potential removal of live habitat and trigger for survey.	N
18	RS	3	Yes, downed wood retained; not much talus	Y	No, highly fragmented section of larger-old trees. No surveys triggered	N
19	RS	5	Yes, lower side of road burned at low/moderate severity; rock and retained downed wood present	Y	Yes, canopy cover intact, lower side of road has older trees which could support RTV adjacent to intact stand. Project design has eliminated potential removal of live habitat and trigger for survey.	N
20	RS	.4	Yes, burned at low/ mod severity; rock and retained downed wood present	Y	Yes, canopy intact surrounded by older forest. Project design has eliminated potential removal of live habitat and trigger for survey.	N

Unit	Action	Acres	Mollusk Habitat present and Rationale for Survey Trigger (ST)	ST	Red Tree Vole Habitat Present and Rationale for Survey Trigger (ST)	ST
21	RS	1	No, no rock and lacks down wood	N	No, canopy cover removed through mod/high severity fire	N
22	RS	12	Yes, upper side of road burned at low severity; rock and downed wood.	Y	Yes, canopy cover intact, upper side of road has ~15 live danger trees mixed with dying which could support RTV. Project design has eliminated potential removal of live habitat and trigger for survey.	N
23	RS	3	Yes, upper side of road burned at low severity; rock and downed wood.	Y	Yes, canopy cover intact but unlikely to support RTV due to small tree size. Project design has eliminated potential removal of live habitat and trigger for survey.	N
24	RS	1	Yes, burned at low severity. Habitat intact	Y	Yes, canopy cover intact. Project design has eliminated potential removal of live habitat and trigger for survey.	N
25	RS	5	Yes, downed wood retained; not much talus	Y	No, canopy cover removed through mod/high severity fire	N
26	RS	1	Yes, mod/high severity fire; down wood retained, no talus present. Spot checks	Y	No, small trees and canopy cover removed through mod/high severity fire	N
27	RS	1	Yes, mod/high severity fire; down wood retained, no talus present. Spot checks	Y	No, small trees and canopy cover removed through mod/high severity fire	N
28	RS	9	Yes, mod/high severity fire; down wood retained, no talus present. Spot checks	Y	No, small trees and canopy cover removed through mod/high severity fire	N
29	RS	1	No, small pocket of trees. Lacks down wood and talus	N	No, canopy cover removed through mod/high severity fire	N
30	FW	.5	Yes. No surveys because no heavy equip use will occur thus, no trigger	N	Yes, dying old trees surrounded by intact canopy. Project design has eliminated potential removal of live habitat and trigger for survey.	N
31	FW	1	Yes, high severity fire; down wood retained, no talus present. Spot checks	Y	Yes, dying old trees surrounded by intact canopy. Project design has eliminated potential removal of live habitat and trigger for survey.	N
32	RS	57	Yes, high severity fire; down wood retained, no talus present. Spot checks	Y	No, canopy cover removed through mod/high severity fire	N
32A	RS	1	No, small pocket of trees. Lacks down wood and talus	N	No, canopy cover removed through mod/high severity fire	N
Northern Portion of Whiskey Planning Area (Buckeye)						
33	FW	1	Yes, firewood gathering will impact microclimate but project design features are in place to protect canopy cover.	N	Yes, canopy intact surrounded by older forest. Project design has eliminated potential removal of live habitat and trigger for survey.	N
34	FW	1	Yes, firewood gathering will impact microclimate but project design features are in place to protect canopy cover.	N	Yes, canopy intact surrounded by older forest. Project design has eliminated potential removal of live habitat and trigger for survey.	N
35	FW	1	Yes, firewood gathering will impact microclimate but project design features are in place to protect canopy cover.	N	Yes, canopy intact surrounded by older forest. Project design has eliminated potential removal of live habitat and trigger for survey.	N

Unit	Action	Acres	Mollusk Habitat present and Rationale for Survey Trigger (ST)	ST	Red Tree Vole Habitat Present and Rationale for Survey Trigger (ST)	ST
36	FW	2	Yes, firewood gathering will impact microclimate but project design features are in place to protect canopy cover.	N	Yes, canopy intact surrounded by older forest. Project design has eliminated potential removal of live habitat and trigger for survey.	N
37	FW	2	Yes, firewood gathering will impact microclimate but project design features are in place to protect canopy cover.	N	Yes, canopy intact surrounded by older forest. Project design has eliminated potential removal of live habitat and trigger for survey.	N
Total Acres of S&M Surveys			Terrestrial Mollusk – **222.53 Acres***		Red Tree Vole- **0 Acres**	
*- Total acreage to be surveyed are estimates based on ArcGIS analysis and field visits. Actual acreage surveyed will likely be different than shown. A total of 86 acres of suitable mollusk habitats in the Whiskey Salvage Planning Area were identified and will be surveyed. **RS-** Roadside Salvage **AS-** Area Salvage **FW**-Firewood Areas						

Surveys were conducted to protocol for survey and manage mollusks. Red tree vole surveys were not completed because project design features (implementing the Smith and Cluck/ danger tree guide methodologies) eliminated the concern due to the fact that live, older forest was excluded from the project as a result of the project design feature implementation. Therefore, red tree vole surveys were not required.

Mollusk survey results were variable. Areas which experienced moderate/high severity fire lacked live survey and manage mollusks as expected. However, some live *Monodenia fidelis fidelis,* and *Vespericola spp.* were found in moderate/high severity areas. Evidence (shells) was found for some survey and manage species in the planning area. Areas where these species were found will have the primary habitat feature buffered out and will equate to approximately ¼ of an acre total buffer area for all sites combined.

MANAGEMENT INDICATOR SPECIES

The Umpqua National Forest Land Management Plan (USDA 1990) designated 7 species, and one group of species (cavity nesters) as Management Indicator Species (MIS, Table 33). They were selected to track and evaluate the effects of forest management activities on all wildlife species that occur on the Forest. The Northern spotted owl and pileated woodpecker represent mature and old growth conifer habitats. Pine marten represents high elevation lodgepole pine and mountain hemlock habitat. Primary cavity excavators represent dead and defective tree habitat. Big game winter range is represented by Roosevelt elk and black-tailed deer. Bald eagle and peregrine falcon are sensitive species that require special management around nest sites. During fieldwork black-tailed deer, Roosevelt elk, pileated woodpecker, white-headed woodpecker, black-backed woodpecker, peregrine falcon, and bald eagle were observed within the Whiskey Salvage Planning Area.

Table 33. List of the Umpqua National Forests Management Indicator Species (MIS).

Umpqua N.F. Management Indicator Species				
Common Name	**Scientific Name**	**Habitat Indicator**	**Habitat Present in the Analysis Area**	**Species Present in the Analysis Area**
Northern Spotted Owl	*Strix occidentalis caurina*	Mature/Old Growth Habitat	Yes	Yes
Pileated Woodpecker	*Dryocopus pileatus*	Mature/Old Growth Habitat	Yes	Yes
Pine Marten*	*Martes americana*	High Elevation Mountain Hemlock/Lodgepole Pine	No	No
Bald Eagle*	*Haliaeetus leucocephalus*	None/Special Management	Foraging habitat present/No nest sites	No nesting habitat will be impacted by this project
Peregrine Falcon*	*Falco peregrines*	None/Special Management	Foraging habitat present/No nest sites	No nesting habitat will be impacted by this project.
Roosevelt Elk	*Cervus elaphus roosevelti*	Big Game Winter Range	Yes	Yes
Blacktail Deer	*Odocoileus hemionus*	Big Game Winter Range	Yes	Yes
Cavity Nesters		Snag Habitat	Yes	Yes

*As no suitable habitat for these species is being proposed for activities under Alternative 2, these species will not be considered in this analysis.

Roosevelt elk (*Cervus elaphus roosevelti*) and **Black-tailed deer** (*Odocoileus hemionus columbianus*) **– Big Game Winter Range**

Existing Condition: Roosevelt elk (*Cervus elaphus roosevelti*) and black-tailed deer (*Odocoileus hemionus columbianus*) were selected as Management Indicator Species as they are an important socio-economic species (USDA 1990). Elk and Black-tailed deer were chosen as MIS species to ensure emphasis of winter range habitat management achieved through forage and cover production on land used or suitable for occupancy by deer and elk. Certain areas of the forest were identified as big game winter range under the Umpqua LRMP (USDA1990). Designated as “Management Area 11”, these areas were designed to provide for big game winter range habitat and timber production consistent with other resource objectives. These areas are generally south facing slopes, below 3500 feet in elevation and less than 70% slope.

Timber harvest is encouraged to provide stable production of forage and cover. A 60:40 ratio of forage to cover habitat was once considered optimum for winter range (Thomas et al. 1979, Smith 1985, Brown 1991), but more recent studies suggest smaller ratios of cover to forage: cover may be suitable as long as the interspersion of forage and cover is good (Larkin et al. 2004). Ultimately however, foraging habitat is identified in the Umpqua National Forest Plan as

well as the Oregon Department of Fish and Wildlife (ODFW) management plan as the limiting factor in the Cascades.

The Forest Plan has several standards and guidelines that apply to elk and deer (big game) winter range. The relevant ones that apply to this project include the use of a habitat effectiveness model ("A Model to Evaluate Elk Habitat in Western Oregon" or similar model) to compare the impact of various alternatives on big game habitat (LRMP IV-38) and direction for management of deer and elk winter range areas described in Forest Plan Prescription C4-I.

The Whiskey Salvage Planning Area is located within the southern portion of the 1,009,697 acre Dixon Wildlife Management Unit (WMU). This WMU contains about 626,622 acres of National Forest Land, 131,286 acres of BLM-managed forest, and private and state lands make up 251,286 acres, located in the western Cascades. The Whiskey Salvage Planning Area makes up about 1.8% of this forest land. The forage/cover ratio in the Dixon WMU is 20/80. Forage could be a limiting factor in parts of this WMU. The elk population trend in this WMU is estimated to be declining and may indicate a decrease in forage habitat that is affecting winter range (Figure 39).

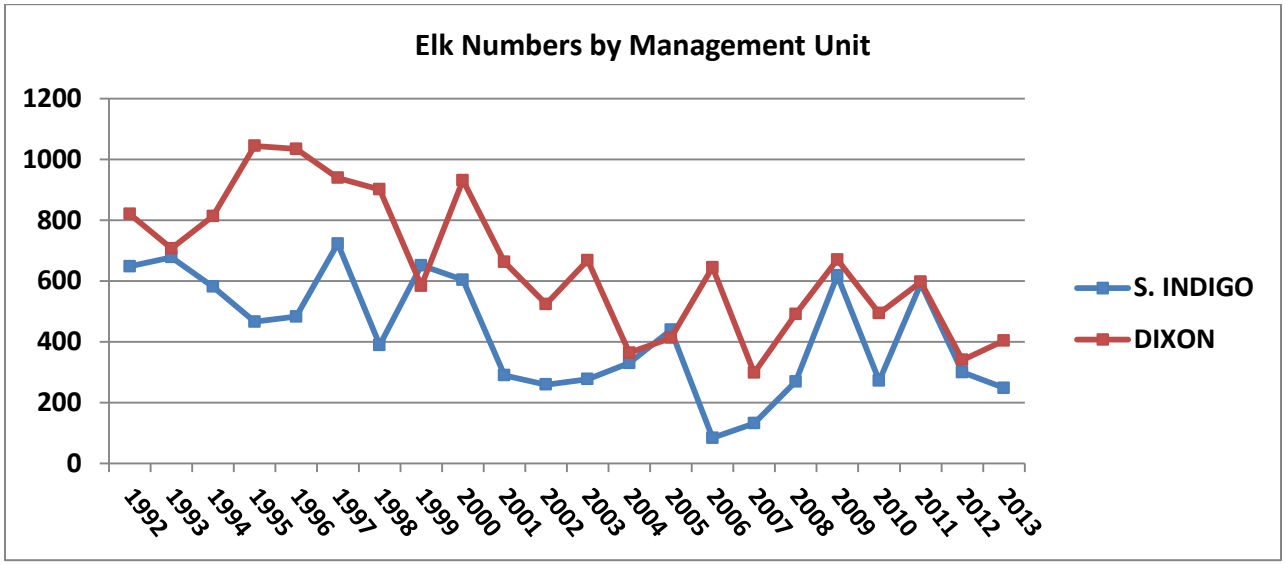


Figure 39. Total number of elk observed during annual monitoring (1992-2013) on two wildlife management units on the Umpqua National Forest.

The Tiller RD has had 82,418 acres of fire from 1982-2009, the majority in 2002 (68,515 acres in the Tiller Complex) and 2009 (10,553 acres of the Boze and Rainbow Fires) which would provide an increase in available forage in the burn areas. The Whiskey complex fire burned a total of 17,951 acres on the Tiller RD which was not counted in these numbers. A moderate portion of the Whiskey Planning Area is within Management Area 11 (6,285 acres).

Black-tailed deer numbers continue to fluctuate. ODFW has conducted counts of deer in the spring and fall annually since 1986. The numbers for deer have stayed relatively stable over those years but showed a decrease in numbers between 2009 and 2012 (Figure 40).

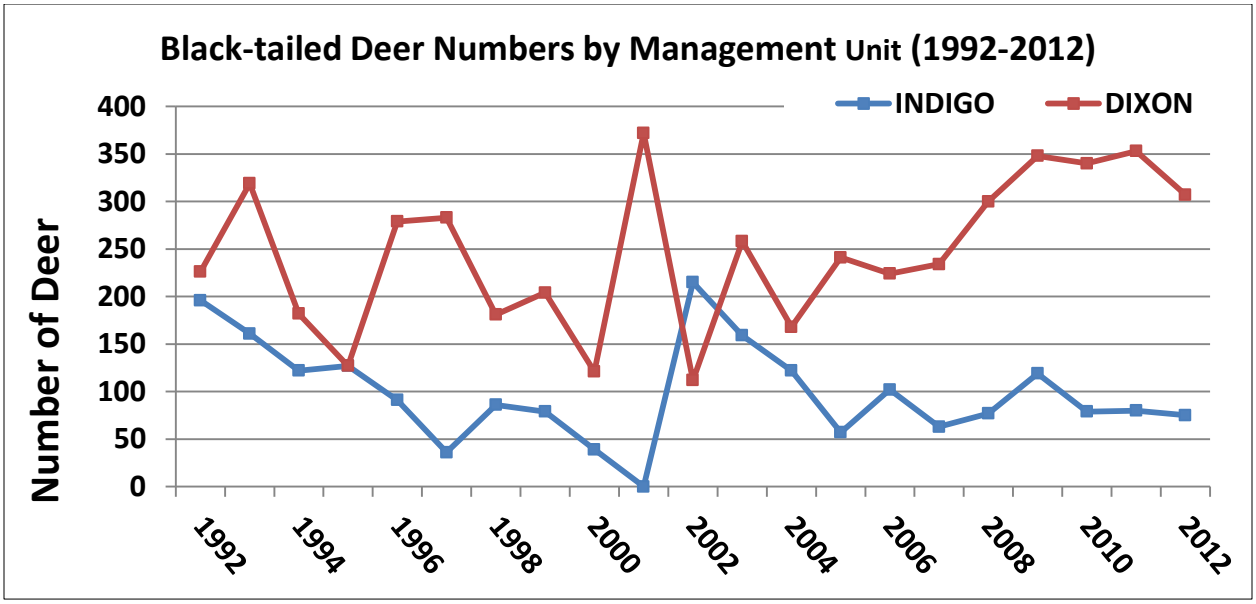


Figure 40. Total number of Black-tailed deer observed during annual monitoring (1986-2012) on two wildlife management units on the Umpqua National Forest.

The majority of the high quality forage in the WMU is found on private lands on the western and southern portions of the WMU, in the lower elevation valleys. Elk herds have relocated to some of these areas over the last 15 years. The majority of activities proposed under the action alternative are within designated winter range. Elk and deer use this area in the spring, summer and fall, and would remain in some areas during winter months if snowfall is light and weather mild. Approximately 6,285 acres of winter range occurs throughout the Whiskey planning area. The Whiskey complex fire burned an estimated 786 acres within winter range at high severity and 314 acres at moderate severity. Winter range also burned at low intensity or did not burn in approximately 4,674 acres of the total 6,285 acres. This mosaic pattern of burning is expected to create areas of good forage in places where stand replacing fire occurred.

Direct and Indirect Effects

The no action alternative would have No direct Impacts to big game or habitat. The direct effects to big game and their habitat from the action alternative are short term noise disturbance from harvest activities which could force animals to move to other areas and ground disturbance which would temporarily affect regrowth of shrubs and herbaceous cover in some areas. The Whiskey project is affecting 4% of the designated winter range through the action alternative (area and roadside salvage) however maintenance burning intends to maintain winter range foraging areas and increase fire resiliency in the treated areas. The action alternative would have a no effect on open road density in the planning area as no new roads would be constructed.

Cumulative Effects

The cumulative effects of these species are analyzed at the WMU-scale, for that portion that is National Forest Land. This is the spatial scale at which elk populations are monitored by Oregon Department of Fish and Wildlife. The Whiskey project would affect 1.8% of the forest land within the Dixon WMU.

The no action alternative would not add cumulative impacts to this species because no disturbance to species foraging areas would occur. The action alternative would slightly add to

cumulative impacts to this management indicator species and its habitat. Impacts are generally beneficial because maintenance burning should result in increasing fire resiliency in the treated stands. Although animals may be forced to move to other areas due to noise and disturbance from harvest operations, the disturbance would be short term and the overall benefits of conducting fuel breaks and maintenance burning likely outweigh short term disturbance.

Primary Cavity Excavators including Pileated woodpecker (*Dryocopus pileatus)*

Existing Condition: Primary cavity nesters are birds who excavate cavities in both live and dead trees for foraging and nesting purposes. Five species of woodpecker are common residents on the district and Include: pileated, hairy and downy woodpeckers, northern flicker, and red-breasted sapsucker. Other species detected on the district are migratory or accidental. These species are Lewis' woodpecker (migratory) and Williamson's sapsucker (accidental). The black-backed woodpecker prefers burned stands for foraging and nesting and was documented on the District in 2013 in the Whiskey Salvage Planning Area. The white-headed woodpecker has been documented on the Tiller district in the same area which the black-back woodpecker was observed but is generally found on the eastside of the Cascades in pine forests. This species has also been found on the Diamond Lake district.

The Forest Plan has standard and guidelines that pertain to primary cavity nesters and snag habitat, which were addressed in coarse woody debris section above. In addition to snag and downed wood standards, the Forest contains a standard and guideline requiring the forest to provide for adequate snag habitat must be provided to meet 60% potential population capability (PPC) for cavity nesters (USDA 1990a). The potential population capacity (PPC) provides an indicator of the number of cavity-nesting species likely to be present on the Forest in comparison to the Forest's total potential.

Primary cavity nesters require habitat with adequate levels of dead and dying trees of sufficient size and densities to support sufficient nesting and foraging opportunities to maintain self-sustaining breeding populations. DecAID, which contains a summary of the best available information on snag and coarse wood requirements for a host of wildlife species (including primary cavity nesters) documents that much higher levels of snag retention are required to maintain individual species than what was originally required by the LRMP (USDA 1990a; Mellen et al. 2012). Snag requirements vary for individual species. Pileated woodpeckers are the largest species found in Oregon and nest and forage on larger diameter (hence older) trees. They are usually found in mature and old growth stands. They occasionally will forage in younger stands and open oak woodlands. Flickers are birds of more open country and often forage on the ground. Hairy woodpeckers inhabit mixed conifer stands and prefer mature stands. Downy woodpeckers are small and tend to prefer mixed hardwoods with conifers especially in riparian areas.

Populations of primary cavity nesters on the Umpqua N.F. likely spend portions of their life on adjacent forested lands therefore population trends for these species will be discussed at the statewide level where sufficient long term population monitoring data is available to determine population trends. The Breeding Bird Survey consists of 136 routes in Oregon, and one of them (69244, Cinderella) is about 30 miles northeast of the Whiskey Salvage Planning Area (Sauer et al. 2011). Population trends for primary cavity nesters are shown in Table 34.

Primary cavity nesters detected during field work in the planning area were: white-headed woodpecker, black-backed woodpecker, northern flicker, hairy woodpecker, downy wood pecker, and pileated woodpecker.

Table 34. Primary cavity nester trends as determined from monitoring data from local BBS routes. (Data available through 2007)

Primary Cavity Nesters	Population Trends through 2007					
	Clearwater (1991-2007)	Cinderella (1993-2007)	Days Creek (1971-2007)	Sams Valley (1993-2007)	Warner Mtn (1992-2007)	Winberry (1968-2007)
Acorn Woodpecker	Not Detected	Not Detected	↓	↑*	Not Detected	Not Detected
Red-breasted Sapsucker	↓	↓	↓	↓	↑	↓
Downy Woodpecker	Not Detected	Not Detected	↑	↓	Not Detected	↑
Hairy Woodpecker	↓*	↔	↓	↔	↓	↑
Northern Flicker	↔	↔	↔	↑	↔	↑
Pileated Woodpecker	↔	↓	↑	↔	↓	↑

↔ This symbol indicates a stable trend (≤2% change per year)
↑ This symbol indicates an increasing trend (>2% positive change per year)
↓ This symbol indicates an decreasing trend (>2% negative change per year)

* Statistically significant ($p<0.05$)

Monitoring of Cavity Nesters on the Umpqua National Forest:
Landbird monitoring (including cavity nesters) occurred in 2010 within the Apple Fire (2002) burn perimeter on the North Umpqua Ranger District. In addition to monitoring the Apple Fire burn area, the Forest utilizes monitoring data from nearby Breeding Bird Survey Routes (Sauer, J. R., J. E. Hines, and J. Fallon. 2008. The North American Breeding Bird Survey, Results and Analysis 1966 - 2007. Version 5.15.2008. USGS Patuxent Wildlife Research Center, Laurel, MD. May 2008). This national monitoring program provides many years of trend data for these nearby areas.

Apple Fire Area on the North Umpqua RD
In 2003 a Breeding Bird Survey (BBS) route was established within the area of the Apple Fire with surveys conducted along the 21.7 mile route. This BBS route has been surveyed post-fire and pre/post salvage logging (from 2003-2010) and has been surveyed for eight consecutive years. The route was surveyed two years before logging, two years when logging was being conducted, and four years after logging. It is located to the north of and is immediately adjacent to the Cinderella BBS Route 69244, a route that has been surveyed for 13 of 15 years (1993-2007).

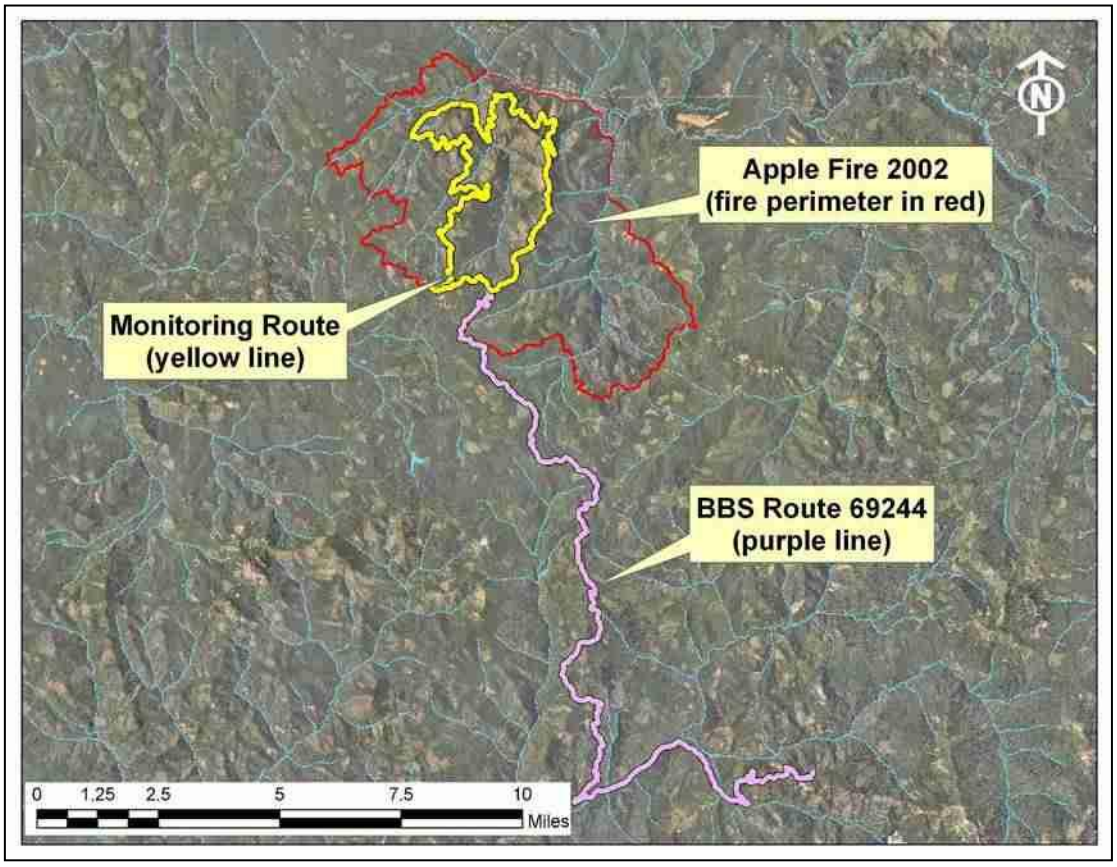


Figure 41. Apple Fire Monitoring and Breeding Bird Survey Routes

USGS Breeding Bird Surveys

These surveys are an important source of information regarding population trends for cavity nesters (and landbirds in general) on the forest. These BBS routes are part of a large-scale survey of North American birds, which started in 1966. Each BBS route is surveyed once annually in June by experienced birders. There are two BBS routes located entirely on the forest (Figure 14), while another four routes are within 10 air miles of the forest boundary. Names and locations of these six routes are as follows:

- Clearwater – 25 miles within the Umpqua NF
- Cinderella – 25 miles within the Umpqua NF
- Days Creek – 4 miles west of the Tiller RD
- Sams Valley – directly south of the Tiller RD
- Warner Mountain - 3 miles east of the North Umpqua RD
- Winberry – 7 miles north of the Cottage Grove RD

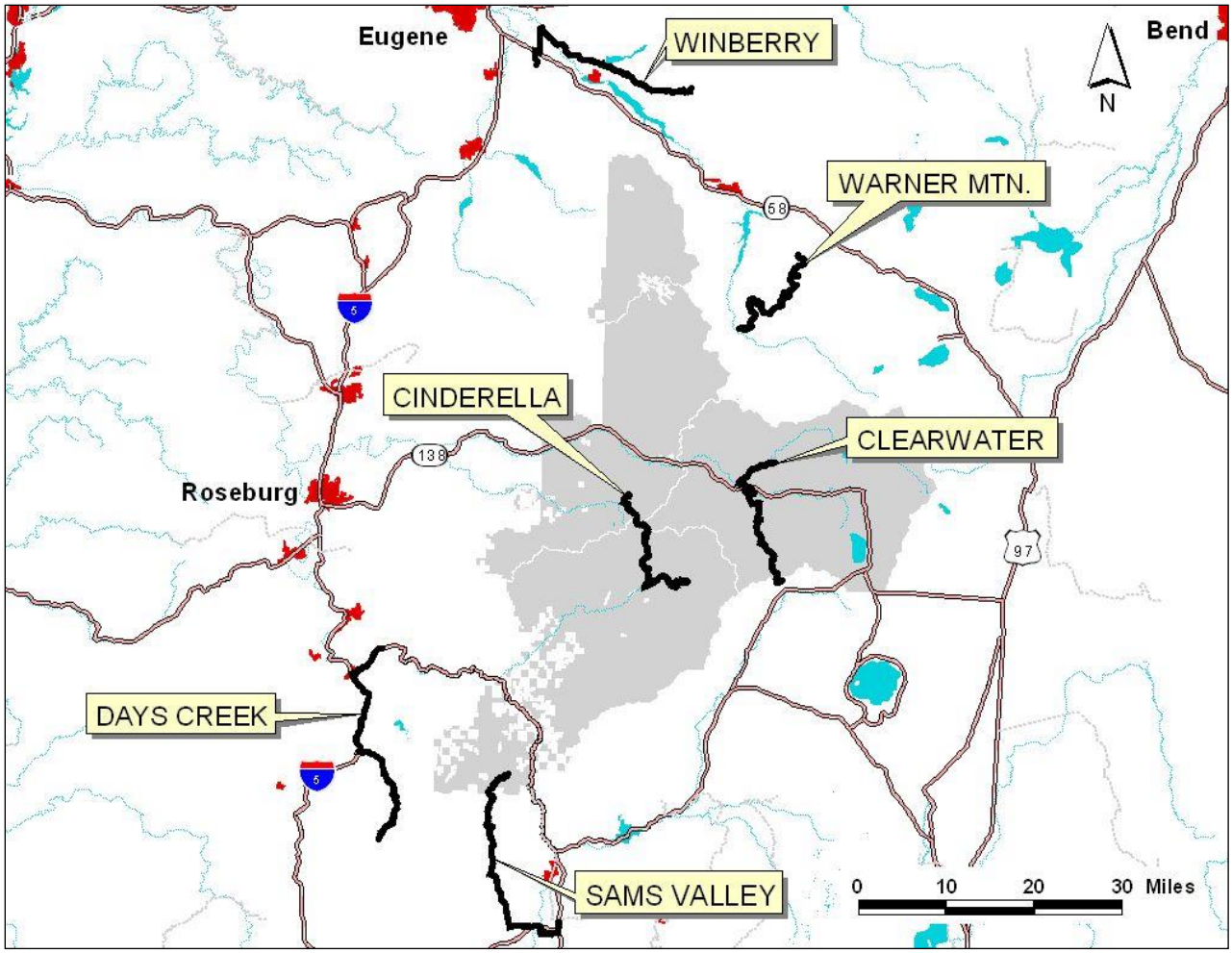


Figure 42. North American breeding bird survey routes on or near the Umpqua NF.

Monitoring results from 2010:

Baked Apple Fire Area

To date, a total of 74 different bird species have been detected within the Baked Apple fire area. Annual species richness has remained relatively stable, ranging from between 36 and 44 species detected from 2003-2010. The June BBS annual species totals for the Baked Apple monitoring route increased from 39 to 44 species from 2003 through 2006, dropping to 40 species in 2007 and 2008 and then declined again in 2009 when 36 species were detected. In 2010 the number of species increased to 40.

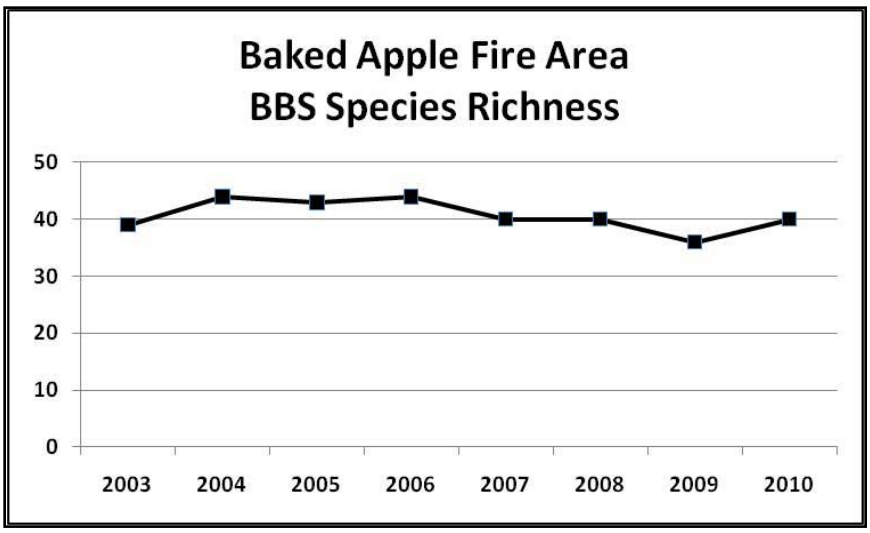


Figure 43. Species richness for Baked Apple Fire BBS route. Data from Baked Apple Fire monitoring (2003-2010).

Four primary cavity nesters have been detected on the Baked Apple BBS route:

- Red-breasted Sapsucker numbers declined within the Baked Apple Fire area in 2010. For two years the species was not detected and then was heard again in 2007. The number detected increased in 2008 and 2009 before declining again in 2010.
- Hairy Woodpecker initially responded positively to the fire and the pulse of snags created by it. Their numbers then declined and overall continue to do so, although there was an increase in their numbers in 2010.
- Northern Flicker levels continue to remain relatively stable, although recent detections increased after initially declining for several years after the fire.
- Pileated Woodpecker numbers have fluctuated. There were no detections for a three-year period, followed by another three year period where the species was detected. In each of these three years the number detected has declined.

Table 35. Primary cavity nester monitoring data from Clearwater and Cinderella BBS routes

NAME	1993-2002	2003	2004	2005	2006	2007	2008	2009	2010
Red-Breasted Sapsucker	2	3	1	0	0	1	2	3	1
Hairy Woodpecker	3	5	7	9	3	7	2	1	3
Northern Flicker	6	4	5	4	5	4	4	5	7
Pileated Woodpecker	2	0	1	0	0	0	3	2	1

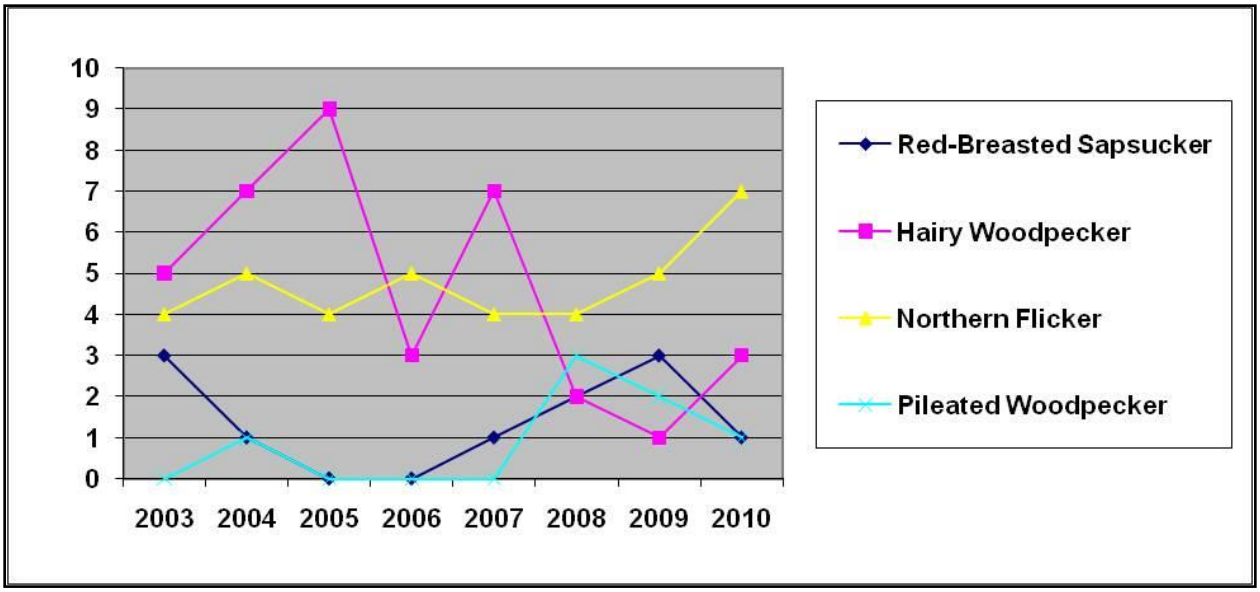


Figure 44. Eight Years of Primary Cavity Nester Monitoring from the Baked Apple Fire

Breeding Bird Survey (BBS)

Information about cavity nesters has been collected for at least 13 years (range 13-37 years) along the BBS routes. The current trends for the six routes on or in proximity to the forest are shown in Figure 45.

The Cinderella and Clearwater BBS routes are located on the forest, with the Cinderella Route immediately adjacent and to the south of the Baked Apple Fire area. Although BBS data has not been updated since 2007, species trends for these two routes are included here for reference.

On the Cinderella and Clearwater routes Red-breasted Sapsuckers trends are decreasing, but the decrease is not statistically significant. Hairy Woodpeckers are decreasing along the Clearwater route and this trend is statistically significant. Northern Flicker populations appear to be stable. Pileated Woodpecker populations have declined on the Cinderella route.

Direct and Indirect Effects

The no action alternative would have No Impacts on these MIS species or their habitat. Retention of 1,286 acres of moderate/high severity snag habitat would provide potential nesting and foraging areas for many cavity nesters.

Direct impacts to cavity nesters from the action alternative include loss of fire killed trees (snags) in area and roadside harvest units and additional loss of snags when safety concerns necessitate the felling of danger trees. Approximately 288 total acres of moderate/high severity burned snag habitat would be removed from the Whiskey Planning Area (22%) and approximately 997 (78%) would remain intact and undisturbed and provide foraging and nesting habitats throughout the planning area. Furthermore, future recruitment of fire killed trees which burned at low to moderate severity fire (post project mortality) is likely to occur within interior portions of the Whiskey planning area which would add to post-implementation snag levels. Project design features are in place to retain at least 6 snags per acre in treatment units which exhibit structural complexity (i.e. broken tops, basal hollows, large horizontal branches,

decadence structure). In addition, pre-fire existing snags within salvage units would be retained if outside of logging corridors. Pre-fire snags would not count towards the 6 snag minimum per acre. The action alternative would affect 0.002% of the Beaver Creek watershed and 0.35% of the Lower Jackson Creek Facial watershed through the area salvage. 0.34% of Beaver Creek watershed and 0.37% of Lower Jackson Creek watershed would also be affected by the roadside salvage component of the action alternative.

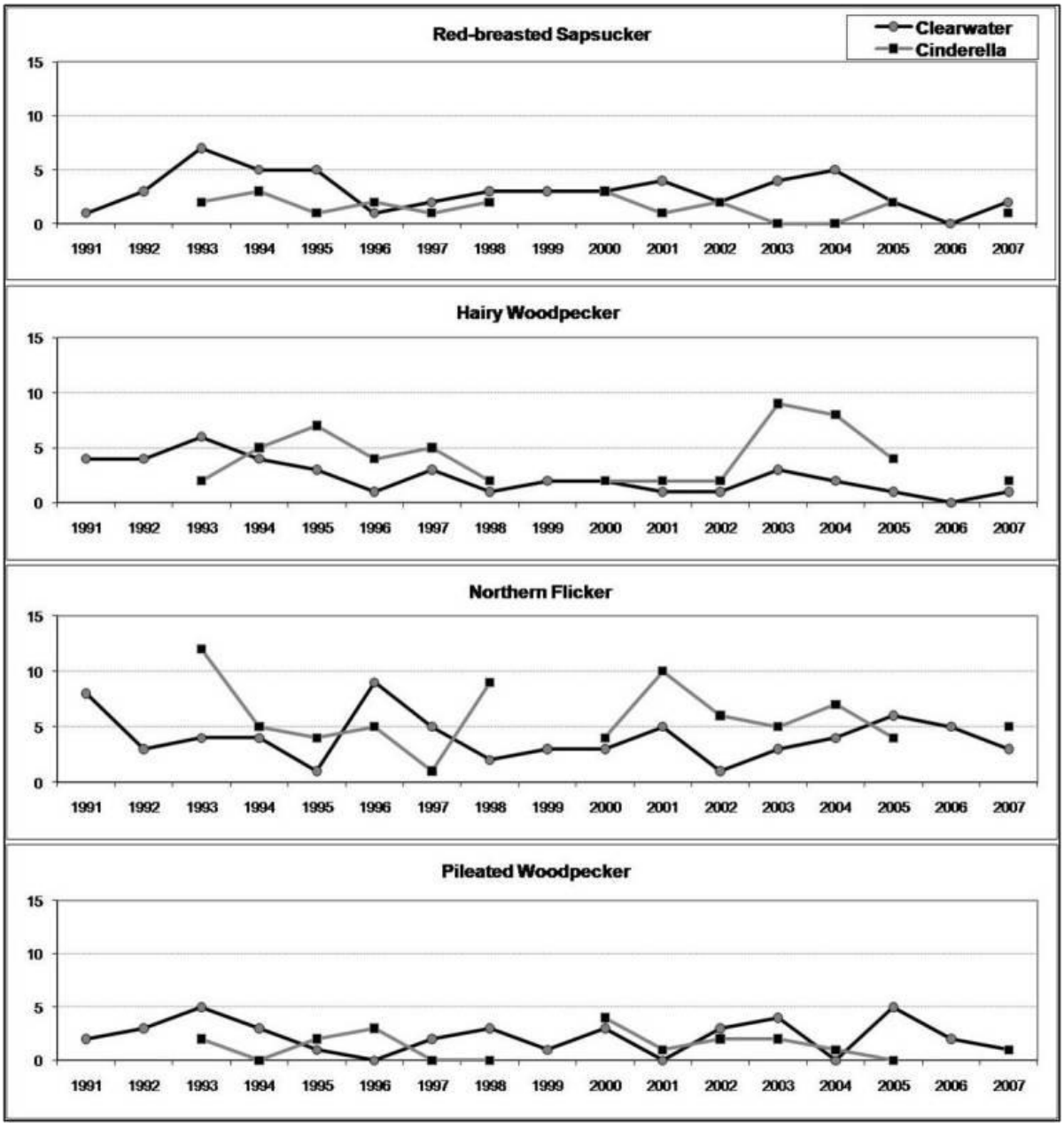


Figure 45. Primary cavity nester trends from two Breeding Bird Survey Routes on the Umpqua NF.

Cumulative effects

Cumulative effects are analyzed at the Beaver, Lower Jackson Creek, Ash, and Skillet 6th field sub watersheds. The no action alternative would have no cumulative impact on cavity nesters or their habitat.

Under the action alternative additional cumulative impacts to these species and habitat from past timber harvest and fire exclusion may include removal of snag habitat which could provide nesting or foraging opportunities for cavity nesters. As mentioned above, there are adequate levels of snags retained through project design features and within the Whiskey planning area.

LANDBIRDS

Population declines of some landbirds resulted in a Landbird Strategic Plan (USDA 2000) that set management goals and actions for providing sustainable landbird habitat. A conservation strategy for landbirds in coniferous forests of western Oregon and Washington was developed by Partners in Flight to guide land management planning efforts to help ensure functional ecosystems with healthy populations of landbirds (PIF 1999). These plans and strategy documents are not regulatory, but provide management recommendations for reversing declining population trends and achieving stable or increasing trends within the next couple of decades.

In addition, Executive Order (EO) 13186, signed January 10, 2001, lists several responsibilities of federal agencies to protect migratory birds, among them to support the conservation intent of the migratory bird conventions by integrating bird conservation principles, measures, and practices into agency activities and by avoiding or minimizing, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions.

Additional direction comes from the Memorandum of Understanding (MOU) between USDA Forest Service and USDI Fish and Wildlife Service, signed January 17, 2001. The purpose of this MOU was to strengthen migratory bird conservation through enhanced collaboration between the Forest Service and Fish and Wildlife Service, in coordination with state, tribal, and local governments. The MOU identified specific activities for bird conservation, pursuant to EO 13186 including: strive to protect, restore, enhance, and manage habitat of migratory birds, and prevent the further loss or degradation of remaining habitats on National Forest System lands. This includes: Identifying management practices that impact populations of high priority migratory bird species including nesting, migration, or over-wintering habitats on National Forest System lands; and developing management objectives or recommendations that avoid or minimize these impacts. Although this interim MOU expired on January 15, 2003, the conservation measures that it contained are still applicable for use in environmental planning today. The MOU continues to provide guidance for the two federal agencies until more detailed direction is developed pursuant to the executive order.

Relevant Standards and Guidelines

The Forest Plan has no specific standards and guidelines for landbirds, other than for cavity nesters (discussed in the previous section), raptors (protected from human disturbance until nesting and fledging is complete), and TES species (e.g., northern spotted owl).

Existing and Desired Conditions

The planning area is located on the west-slopes of the Cascade Mountains in Oregon. There are no Cascade Mountain breeding bird survey (BBS) routes in the project area. There are six routes within 25 miles of the project area. These routes are part of a large-scale survey of North

American breeding birds and have been used to monitor landbirds on an annual basis for many years (Sauer et al. 2008). The conservation strategy for the coniferous forests of western Oregon and Washington (PIF 1999) describes five conditions found within the planning area. These conditions are described below (PIF 1999):

1. Mature Forest: Multi-layered

Many landbird species reach maximum abundance in multi-layered mature forests. Some of these are associated with a single habitat element or attribute of mature forest conditions such as large trees or snags. Other species are associated with the complexity of the forest such as multilayered canopies or diverse vegetative composition and structure below the canopy. Structural and compositional habitat attributes that appear to be most important for landbirds in multilayered/ mature forest are large snags, large trees, closed canopy, deciduous canopy trees, open mid-story, mid-story tree layers, deciduous understory, and forest floor complexity.

2. Young Forest: Understory Re-initiating

All focal species and habitat attributes for this forest condition also occur in the multilayered/mature forest.

3. Pole Forest: Stem Exclusion

These forest conditions are structurally simple and characterized by an even aged, single-layered, closed-canopy with little or no understory development. Where understory vegetation exists, it is generally low growing and dominated by one or two shade-tolerant species. Stands may range from sapling trees with high foliage ratios that have attained canopy closure, to large pole trees that are densely stocked and have low foliage ratios and a high degree of canopy lift. These forest conditions are relatively depauperate in landbird species composition and richness.

4. Early-Seral Forest: Stand Initiation

These natural or human-induced forest openings are characterized by grasses and forbs for the first 23 years, followed by a shrub layer of tall herbaceous vegetation and woody vegetation such as deciduous shrubs and trees and conifer saplings. This condition exists until conifer trees approach crown closure and understory vegetation is reduced due to competition and shading. Many landbird species reach maximum abundance in the stand initiation stage of early- successional forests. Species highly associated with this forest condition are often dependent upon some habitat attribute(s) that is either naturally occurring or can be managed for.

5. Forest Inclusions/Unique Habitats

These unique habitats include mineral springs, waterfalls, high elevation wet meadows and alpine habitat.

The conservation strategy identified focal bird species for each of these forest types; hermit warbler, Pacific-slope flycatcher, Hammond's flycatcher, black-throated gray warbler, Wilson's warbler, winter wren (now called Pacific wren), Hutton's vireo, olive-sided flycatcher, western bluebird, orange-crowned warbler, rufous hummingbird, American pipit, black swift, Lincoln's sparrow, red crossbill, and band-tailed pigeon. The forest conditions these birds are associated with are shown in Table 36.

Table 36. Forest conditions and associated habitat attributes and focal species for landbird conservation in coniferous forests of western Oregon and Washington.

FOREST CONDITION	HABITAT ATTRIBUTE	FOCAL SPECIES
Old-Growth Forest	Large snags	Vaux's swift
	Large trees	Brown creeper
	Conifer cones	Red crossbill
Mature Forest: Multi-Layered	Large snags	Pileated woodpecker
	Large trees	Brown creeper
	Conifer cones	Red crossbill
	Closed canopy	Hermit warbler
	Deciduous canopy trees	Pacific-slope flycatcher
	Mid-story tree layers	Varied thrush
	Open mid-story	Hammond's flycatcher
	Deciduous understory	Wilson's warbler
	Forest floor complexity	Winter wren
Young Forest: Understory Reinitiating	Closed canopy	Hermit warbler
	Deciduous canopy trees	Pacific-slope flycatcher
	Deciduous canopy trees	Black-throated gray warbler
	Open mid-story	Hammond's flycatcher
	Deciduous understory	Wilson's warbler
	Forest floor complexity	Winter wren
Pole Forest: Stem Exclusion	Deciduous canopy trees	Black-throated gray warbler
	Deciduous subcanopy	Hutton's vireo
Early-Seral Forest: Stand Initiation	Residual canopy trees	Olive-sided flycatcher
	Snags	Western bluebird
	Deciduous vegetation	Orange-crowned warbler
	Nectar-producing plants	Rufous hummingbird
Forest Inclusions/Unique Habitats	Mineral springs*	Band-tailed pigeon
	Alpine*	American pipit
	Waterfalls*	Black swift
	High elevation wet meadows *	Lincoln's sparrow

* Do not occur in the project area.

Species from the list above observed during field visits: brown creeper, pileated woodpecker, Pacific-slope flycatcher, varied thrush, winter wren, rufous hummingbird, and band-tailed pigeon.

Direct and Indirect Effects

The no action alternative would have No Impact to landbirds or their habitat. Retention of 1,286 acres of moderate/high severity snag habitat which would provide potential nesting and foraging areas for species which benefit from open habitats.

Direct impacts to landbirds from the action alternative include removal of dead and dying trees used for foraging, roosting, nesting or courtship. Maintenance burning would likely increase fire resiliency in areas which are treated and effects to landbirds would differ based upon time of year burning is conducted. Project design features are in place for maintenance burning to ensure that consumption of dead and down wood does not occur in large amounts and that burn intensity is mild to low. Additionally, a separate project design feature would restrict burning of piles and machine piles to fall and winter months as opposed to spring or summer. Shaded fuel breaks would remove some understory components along existing roadways but understory would be left intact outside of the treatment areas. Shaded breaks are intended to reduce fuel build up alongside roads and facilitate better fire management in the future. Landbird species which benefit from early seral conditions may forage in areas which are not salvaged thus, allowing these areas to develop and function as early seral habitat.

Cumulative effects

Cumulative effects are analyzed at the Beaver, Lower Jackson Creek, Ash, and Skillet 6th field sub watersheds. The no action alternative would have no cumulative impacts to landbirds.

The action alternative would slightly add to cumulative effects in areas where salvage occurs, herbaceous and shrub cover may be temporarily stunted by soil compaction using ground based logging systems (only in roadside salvaged areas). This cumulative impact is small when compared to the watersheds and proposed action components like maintenance burning would help increase forest resiliency in treated areas and beneficially impact landbirds.

Botany

Unique Habitats

Unique habitats are non-forested openings that vary in size from 1 to 75 acres and include meadows, hardwood stands, wetlands, ponds, caves, cliffs, and rock outcrops (USDA Forest Service 1990). They are important due to their high value for wildlife and plants and their scarcity in the forest environment (Thomas et al., 2003; USDA Forest Service 1990a; USDA, 1995). Approximately 85% of the plant species diversity of the Western Cascades is found in non-forested habitats (Hickman 1976) which make up about 3% of the Umpqua National Forest. Similarly, these unique habitats are utilized by 87% of the local wildlife for primary breeding and feeding purposes (USDA, Umpqua NF, 1995).

Existing and Desired Conditions - Unique Habitats

Unique habitats in the Whiskey planning area include wet and dry meadows, rock outcrops, shrub fields, ponds, and some hardwood stands. Unique habitats currently account for 3% (approx. 534 acres mapped) of the 17,868 acre Whiskey planning area. There are approximately 60 acres of unique habitats mapped within or immediately adjacent to areas identified for salvage or danger tree removal. These openings range from 1 to 25 acres in size. The bulk of them are dry meadows consisting primarily of grasses and forbs. These are generally very rocky with thin soil.

The Jackson Creek Watershed Analysis (USDA, 1995) identified that unique habitats in the Jackson Creek watershed represent a small percentage of the total area (6%) yet represents approximately 90% of the biological diversity. These habitats are highly susceptible to naturally occurring disturbances and human mediated activities such as cattle grazing, road building, and timber harvests. Changes associated with these activities have the potential to alter the microclimate, hydrological processes, soil composition, and vegetation characteristics of the unique habitat and the adjoining forested stands.

Dry habitats in the Jackson Creek drainage are usually associated with shallow soil types that can have a high solar exposure. Many of these areas have been impacted from past grazing, road building, and timber harvest activities and continue to be impacted in some places. Fire exclusion has resulted in the gradual succession of meadow openings to closed-canopy forest. This is most evident in and around the perimeter of dry meadows on south- and west-facing slopes where Oregon white oak (*Quercus garryana*), canyon live oak (*Q. chrysolepis*), madrone (*Arbutus menziesii*) and chinquapin (*Chrysolepis chrysophylla*) have been overtopped by conifers. In addition, large ponderosa and sugar pines that are often associated with these openings thrive under open conditions but are now crowded with young Douglas-fir and white fir.

Wetland habitats in or adjacent to units mostly consist of graminoid-dominated meadows, some with ponded water, surrounded by shrub thickets or dry forb meadows. Evidence of historic fire in these habitats is scarce although fire would certainly have occurred. Additional smaller wetland features are scattered throughout units that also provide hydrological function and wildlife benefit. These smaller wetlands would be protected from salvage and other project activities and are addressed in the Aquatic Environment section.

The desired condition of all unique habitats is to maintain or improve vegetative composition and structure of the unique habitats for the benefit of wildlife (Umpqua LRMP IV-200). For wetlands there is the additional objective of maintenance of water tables in accordance with Objective 7 of the Aquatic Conservation Strategy.

Direct and Indirect Effects - Unique Habitats

Direct effects are those that would occur within unique habitats or their immediate surroundings during implementation. Indirect effects are those that could occur later in time or beyond the immediate area of the proposed activities.

Dry meadows adjacent to units would not be buffered from salvage, but no equipment would be run through or staged in meadows. There are no anticipated direct effects from salvage in dry meadows. There may be an indirect benefit due to release and recovery of some of the suppressed hardwoods and pines that are currently dying out from competition, but that is a result of the fire removing competition and potential encroaching conifers, and not from the salvage itself. Maintenance burns would be permitted in the Bunchgrass Meadows area. Anticipated direct effects include reduction in surface fuels (thatch) and increase in vigor of native bunchgrasses. Wet or moist meadows only occur in one area identified for roadside fuels treatments. Buffering may be necessary for wildlife habitat concerns, or as Riparian Reserve, based on determination by the project Hydrologist. Buffering of that meadow is described in the Aquatic Environment section, and effects would not be discussed further here.

Forest Plan Amendment – Unique Habitats

Allowing timber harvest within 150 feet of unique habitats would require a Forest Plan Amendment. Salvage harvest, on the other hand, can occur if it “will not further adversely impact wildlife habitat values” without amending the Forest Plan. No salvage activities including

moving or staging equipment would occur in Unique habitats. No temporary or permanent roads would be built in unique habitats. Salvage would not further adversely affect current wildlife habitat values in the unique habitats, so no Forest Plan Amendment is required for this project.

Cumulative Effects - Unique Habitats
The scope of analysis for cumulative effects to unique habitats is the planning area. Past clearcut harvest and road building has resulted in alteration of wetland hydrology, introduction of invasive weeds, increased sediment input to wetlands, and conversion of ecotonal communities into conifer plantations. Increased sediment into the wetlands may have resulted in loss of open water and accelerated succession to relatively dry plant communities. Roads were built in conjunction with past timber sales that were harvested in the 1950's and 1960's. There is no documentation of weeds present in the watershed prior to the 1990s but many of these weeds would likely have been introduced into the watershed with road building and timber harvest in the 1950s or 60s or from heavy sheep and cattle grazing during the early part of the 1900s. Because there is no direct or indirect effect anticipated from proposed activities upon wetland unique habitats there would be no cumulative effect under any alternative.

Similarly, weed invasion in the drier meadows would have been, in part, facilitated by past timber harvest and road building. Tansy Ragwort, non-native annual grasses, and other minor weeds are present in dry meadows and numerous smaller openings found throughout the sale area. No new impacts are anticipated to occur within the unique habitats themselves but there is potential for expansion of some weeds into the burned area. On-going noxious weed control activities and noxious weed mitigation measures should largely ameliorate the potential for invasion of high priority weeds, and since so few unique habitats are potentially affected, proposed activities under Alternative 2 has limited potential to add to cumulative weed invasion in unique habitats within the planning area.

Aquatic Conservation Strategy - Unique Habitats
As disclosed above in this Unique Habitat section, few impacts to wetlands are expected from any salvage or other project activities in Alternative 2 including thinning, pruning or burning. As such, there would be no measurable effect upon water tables associated with project's wet areas so wet areas would remain unaltered and wet, consistent with ACS Objective 7. See Aquatic Environment section for effects and mitigations.

Invasive Plants/Noxious Weeds

Relevant Standards and Guidelines - Invasive Plants/Noxious Weeds
Forest Service Region 6 issued a Record of Decision (ROD) in October 2005, for the Pacific Northwest Region Invasive Plant Program Final Environmental Impact Statement. The 2005 ROD added a set of standards to Forest Plans (USDA, 2005). Several of the standards that are pertinent to this project are incorporated into the Botany project design features in Chapter 2.

The Umpqua National Forest LRMP was also amended in 2003 (USDA, 2003b) with the following relevant standards and guidelines:

- Integrated weed management prevention and treatment strategies would be used to treat noxious weeds within the constraints of laws, policies and regulations and to meet Forest Management objectives. Methods may include manual (mowing, clipping, grubbing), biological, heated steam, competitive seeding, competitive planting, solarization, prescribed fire, grazing, chemical, or other applicable methods designed to control and/or eradicate the noxious weed. Biological controls tested and sanctioned by

the US Department of Agriculture would be allowed to occur. Manual control methods within disturbed sites, such as along roads, trailheads, landings and within administrative sites would be allowed at any time.

- Require all ground disturbing machinery to be washed prior to entering and leaving the Forest, using the appropriate timber sale contract provisions and construction contract requirements.
- Require the use of certified-weed-free seed for all revegetation projects.
- Revegetate disturbed sites as soon as practical using native species unless there is no immediate resource concern and the site is anticipated to revegetate naturally to native species to desired cover standards.

Existing and Desired Conditions - Invasive Plants/Noxious Weeds

The health of native plant communities throughout the Pacific Northwest is at risk by noxious weeds and other invasive plants. Introduced plant species thrive in their new ecosystems for various reasons including a lack of natural predators, change in disturbance regime, adaptations for growing on nutrient-poor soils, and allelopathic (plants with natural chemical pesticides or herbicides) abilities. As a result, many weeds are capable of out-competing native plants, ultimately altering the structure and lowering the diversity of native plant communities. The frequency of fire can also be altered by noxious weeds in ways that are detrimental to natural ecosystems (Brooks et al. 2004, Harrod and Reichard 2001, Keely 2001). Further, different soil organisms predominate under different kinds of vegetation. Replacement of native plant communities with invasive species can be expected to change soil microbial populations and nutrient cycling processes.

Most weeds take advantage of disturbed areas such as roadsides, trails, logged units, burns, rock quarries, mined sites and areas around human structures. Established populations serve as sources for further dispersal, especially along roads, power line, and trail corridors. Roads are considered the first point of entry for invasive species into a landscape, and roads serve as corridors along which invasive plants move farther into the landscape. Logging, construction equipment and off-road vehicles have the potential to transport weed seed beyond roadsides to the disturbed soil that they concurrently generate. Invasive plant seed can also be moved by wind, water, animals, and humans.

The increase of invasive plant introductions on the Umpqua National Forest is directly related to expanding weed populations on nearby federal, state, and private lands. Populations of extremely aggressive species such as spotted knapweed, meadow knapweed, and rush skeletonweed have become roadside weeds on frequently traveled highways in Oregon and along arterial roads in the Umpqua and adjacent national forests. The greatest risk of human-caused noxious invasive plant introduction into the proposed units is from seed-contaminated vehicles and equipment traveling through the planning area.

The Umpqua National Forest has classified its invasive plants into four categories: high priority species (Forest Rating A) for which treatment of all known sites is a priority, lower priority species (Forest Rating B) which are generally too widespread for control to be feasible, detection species (Forest Rating D) which are surveyed for and would become high-priority if found, and other weeds of interest (Forest Rating O). The noxious weeds known to occur on the Tiller Ranger District of the Umpqua National Forest are presented, by category, in Table 37.

Table 37. Noxious Weed List for the Tiller Ranger District

Common Name	Scientific Name	Whiskey Planning Area
High-Priority Species (Forest Rating A)		
Italian Thistle	*Carduus pycnoephalus*	No
Diffuse knapweed	*Centaurea diffusa*	No
Tocalote, Malta thistle	*Centaurea melitensis*	No
Yellow starthistle	*Centaurea solstitialis*	No
Spotted Knapweed	*Centaurea stoebe ssp. micranthos*	No
Rush Skeletonweed	*Chondrilla juncea*	No
Scotch Broom	*Cystisus scoparius*	Yes
Yellow Toadflax	*Linaria vulgaris*	No
Sulfur Cinquefoil	*Potentilla recta*	Yes
Gorse	*Ulex europaeus*	No
Lower-Priority Species (Forest Rating B)		
Meadow Knapweed	*Centaurea debeauxii spp. thuillieri*	Yes
Bull Thistle	*Cirsium vulgare*	Yes
Canada Thistle	*Cirsium arvense*	Yes
St. Johnswort	*Hypericum perforatum*	Yes
Himalayan Blackberry	*Rubus armeniacus*	Yes
Tansy Ragwort	*Senecio jacobaea*	Yes
Medusahead rye	*Taeniatherum caput-medusae*	Yes
Other Weeds of Interest (Forest Rating O)		
Oxeye Daisy	*Chrysanthemum leucanthemum*	Yes
Chicory	*Cichorium intybus*	Yes
Wild Carrot	*Daucus carrota*	Yes
Foxglove	*Digitalis purpurea*	No
Common Teasel	*Dipsacus fullonum*	Yes
Sweet Pea	*Lathyrus latifolius*	Yes
Reed canarygrass	*Phalaris arundinacea*	No
Common tansy	*Tanacetum vulgare*	Yes
Periwinkle	*Vinca major*	No

Invasive plant surveys for the Whiskey Project were conducted in 2013 and will continue into 2014 as part of the Burned Area Emergency Response (BAER) efforts. Scotch broom is by far the most common priority weed species. Major seed sources within the planning area are being actively managed. The Scotch broom in and adjacent to the planning area would be targeted for removal and subsequent control, if needed and as funded, as outlined in the Botany project design features in Chapter 2.

Invasive species

There are invasive plant (weed) populations within or near the planning area, and severely burned area may be vulnerable to spread of known populations or recruitment of new populations. Many, but not all, weed sites have been identified in NRIS, the database of record for invasive plants. This report documents the potential for weeds to spread into the fire area threatening native plant populations, and a plan to mitigate the effects of weed infestation. It is not the intent of this plan to use the BAER process to treat existing known populations of invasive plants; however, treating known populations may be one method of mitigation available to prevent the spread of weeds into areas compromised by the fires.

Most invasive plants are located along roads, and areas where fire has burned to/over roads with proximity to existing weed populations have the highest degree of vulnerability to the spread of invasive plants. Vehicles also act as a vector carrying invasive seed to vulnerable areas. Areas where the canopy and/or understory are only lightly or moderately burned are relatively less vulnerable to the spread of invasive plants.

Himalayan blackberry (*Rubus armeniacus*)- Blackberry is common throughout the district and is a concern primarily along the 28, 29, 2924, 2924-800 and -900 roads in the Buckeye Fire, and along the 31 and 2925 roads in the Whiskey Fire. Once established it is difficult to remove, but can be reduced as native shrubs and trees shade it out.

Tansy ragwort (*Senecio jacobea*)- Tansy is common on the district, and is a concern particularly in the Whiskey Fire area which active grazing allotments adjacent to the watershed. Tansy is toxic to cattle and thus a threat to the rangeland resource. Tansy is all along the 2925, 3100, 3114, 3100-600 roads and their spurs. Tansy on the Tiller district is found mostly in moist areas, primarily in the ditch lines, but it will expand into closed roads and more open woodland. Fire can kill tansy plants and seed, but wind is the main vector for spreading seed, and there is a high probability of seeds blowing into vulnerable burned areas.

St. Johnswort (*Hypericum perfolatum*)- St. Johnswort is ubiquitous on the district, occurring on most if not all roads in the Tiller district. While typically it is not treated, after the Boze-Rainbow fires of 2009 it was mowed to prevent spread into adjacent burned areas until native vegetation could be re-established.

Bull thistle (*Cirsium vulgare*)- Bull thistle is found throughout the district and in all fire areas. A biennial, it forms a rosette in its first year, then bolts and flowers in the second year. Seeds are spread by wind vector, thus severely burned areas are very vulnerable to the spread of this weed. However, it generally is outcompeted by native vegetation after several years, and is less of a concern than other weeds.

Canada thistle (*Cirsium arvense*)- Canada thistle is generally confined to moist areas on the Tiller district, and although widely distributed, the infestations are generally small. However, once established it is difficult to remove. Seeds are wind-distributed, but the primary mode of spread is vegetatively via rhizomes, which makes it difficult to control if not caught early. New infestations of Canada thistle should be treated aggressively.

Scotchbroom (*Cytisus scoparius*)- Scotchbroom is a fire adapted plant that can aggressively colonize open or disturbed areas, and is widely distributed on the Tiller district. The seeds can remain viable in the seed bank for anywhere from five to eighty years. Top

killed plants can resprout, and fire scarifies the seeds, enhancing germination. Scotchbroom is a severe threat where it is in proximity to burned areas. The Buckeye fire has Scotchbroom primarily on the 2980, 2980-800, 2924, and 2924-800 roads. The Whiskey fire has scotchbroom along the 2925, 2925-930, 3100 and 3100-600 roads. The 2925-930 road area burned hot and is particularly vulnerable to the increase of the Scotchbroom population. Scotchbroom should be treated aggressively to limit spread and prevent development of seedbank.

Meadow knapweed (*Centaurea pratensis*)- meadow knapweed is very common on the Tiller district, primarily along the river corridors, especially north of the South Umpqua River. It may spread into the dozer line on the Smith fire, but is unlikely to reach the fire area. There is a high probability that it would spread into the burned area along the 28, 2826 and 2924 roads in the Buckeye fire area. There is a moderat e probability it would spread into the Whiskey fire area, particularly on the 2925 and 3100 roads near their junctions with the Jackson Creek (2900) road. Typically meadow knapweed is not treated on the district, but new infestations can be controlled using solarization.

Sulphur cinquefoil (*Potentilla recta*)- Cinquefoil is relatively uncommon on the district, but known populations exist in the area of the Buckeye fire on the 2826 road above the Ash Valley community and along the 28 road between Boulder Creek and South Umpqua Falls. Once established it can be difficult to control because of the rhizomatous roots. This plant should be treated aggressively.

Medusahead grass (*Tanaetherium caput-medusae*)- Medusahead is an aggressive annual grass that occurs in many of Tiller district's meadow systems, including Bunchgrass Meadows in the Whiskey Fire area. It is not currently inventoried or treated as part of the regular program of work. It appears that the meadows burned moderately, and it is expected that surviving native bunchgrasses would experience enhanced vigor in the next growing season. There is a moderate probability that meadusahead seed has been killed by the fire, and bunchgrasses would experience a flush of nutrients and enhanced growth with fall rains. No other treatment is recommended.

Hedgehog dogtail (*Cynosurus echinatus*)- Hedgehog is the most common weedy annual grass on Tiller district in open areas and meadows. It is not currently inventoried or treated as part of the regular program of work. The conditions described above for medusahead also apply to hedgehog dogtail, and no treatment is recommended.

All invasive plants mentioned in the descriptions above occur in or adjacent to the Whiskey Fire Complex. Plants of most concern are tansy ragwort, Scotchbroom, and Canada thistle. Himalayan blackberry is present at a number of locations, primarily along the lower reaches of the 3100 road and along Jackson Creek (2900 rd) to the 2925 road. It may move into the fire area and new infestations can be treated. St. Johnswort is ubiquitous throughout the fire area along roads and in open areas. Treatment is unlikely to be successful, although mowing may reduce seed spread into vulnerable areas. Resprouting and germination of native plants may help keep St. Johnswort in check. Meadow knapweed is present throughout the fire area but infestations are not large and localized infestations may be treated most effectively by solarization. Bull thistle is and would be present throughout the fire area and is expected to spread rapidly but would probably not persist as native vegetation resurges over the next few years. Hedgehog dogtail grass is ubiquitous throughout the fire area and treatment is not considered. Medusahead grass is evident in the Bunchgrass Meadows area. Fire has burned

through the meadows and may have impacted Medusahead, particularly the seed bank, while benefiting native grasses present; no further treatment would be done related to the fires. Canada thistle is a species of concern because of its rhizomatous growth form. It can and does propagate by seed but not prolifically. Established populations, however, are difficult to eradicate. There are some small localized populations within the fire area which should be monitored, but it is unlikely to spread far into the fire area. Early Detection/Rapid Response (manual treatment) in the first growing season post fire should limit/halt any spread into the burned area. Tansy ragwort is present throughout the fire area, predominately along roads and in ditches, but also on abandoned roads, old landings and other disturbed areas. Although the plant and seeds can be killed by fire, it propagates primarily by wind dispersed seed, and vulnerable burned areas can be infested by seed coming from plants located some distance away, although most seed lands within meters of the source plant. Native plant seeding of the burned area may provide a competitive barrier to tansy outbreaks, but is uneconomical with a low probability of success. Early Detection/Rapid Response in the first year has most likely chance of success in limiting the spread of tansy ragwort. Scotchbroom is present throughout the fire area, although large populations are localized, primarily on private land on lower 3100 road (not actually in the burned area) and on the 2925-900 road, in the burned area. There are scattered populations on the 2925 and 3100-600 roads as well as other roads in the fire area. Scotchbroom has the ability to resprout after cutting or topburning by fire, and the seeds survive in the seedbank for decades. Fire can scarify seeds, enhancing germination. New plants would probably not flower for 3-5 yrs. For most of the fire area, appropriate treatment would be Early Detection/Rapid Response. The highest probability of infestation in a highly vulnerable area is the population on the 2925-930 road system. In addition to Early Detection/Rapid Response, competitive seeding would help against the spread of scotchbroom.

Lower-priority invasive species are nearly ubiquitous in the planning area along roads and disturbed openings. Of particular concern in the Jackson Creek watershed is the presence of Canada thistle in wetland habitats and the spreading of Tansy Ragwort throughout the planning area.

Canada thistle is an aggressive, colony-forming competitor that can alter wetland ecology, but is a B-listed noxious species in Oregon because it is so widespread and difficult to eradicate. Tansy Ragwort is also a B-listed noxious species in Oregon and there is an ongoing effort to minimize the spread of this weed throughout the Jackson Creek Watershed.

The desired condition for the watershed and planning area is to be free of priority invasive plant infestations and to maintain native plant communities that are resilient to the introduction and spread of all invasive plants. Disturbed areas, such as rock quarries and waste disposal areas would be maintained free of invasive weeds to the degree practicable.

Direct, Indirect, and Cumulative Effects - Invasive Plants/Noxious Weeds

Alternative 1, the no-action alternative, would not result in any direct effects because ground disturbing activities with the potential to encourage new noxious weed invasions would not occur. Invasive plant management would take place subject to district priorities and funding.

Project activities have the potential to directly affect weed spread by vehicles and equipment carrying weeds and seeds to areas being disturbed. All of the priority weed sites are located on designated haul routes, which could directly facilitate the spread of weed propagules. The overall potential for weed spread in this manner is largely minimized through the application of the project design features and Standards and Guidelines outlined in Chapter 2.

Danger tree removal and roadside fuel breaks indirectly affect weed spread by opening canopies and removing competing vegetation, providing an opportunity for weeds to become established. Landings, corridors and skid trails may become occupied by weeds if undetected or untreated. Invasives with a prolific seed source, long-lived seed bank or strongly competitive vegetative propagation would be difficult to control and would likely require treatments for many years in the future. Primary species of concern are tansy ragwort (prolific seeding), scotchbroom (long-lived seedbank) and blackberry (prolific and competitive vegetative structure).

Roads indirectly affect weed spread by creating habitat for invasive weeds and providing corridors for movement of weeds. Alternative 2 proposes no permanent or temporary road construction or obliteration. There would be no direct, indirect or cumulative effects due to road construction.

Cumulative impacts for this project are analyzed at the planning area scale. Numerous activities including historic sheep and cattle grazing, timber harvest, road building, recreation, and burning/fuels treatments, have contributed to bringing in weed seed and creating soil and vegetative conditions conducive to weed invasion. Mixed ownership in the Whiskey planning area would continue to provide a source for invasive plants regardless of treatments on Forest Service land. The proposed project design features and ongoing weed management activities are anticipated to reduce the potential for weed colonization and proliferation. All high-priority species would be managed so the cumulative effect of the proposed actions in conjunction with past, ongoing or anticipated activities would be minimal.

Survey and Manage Botany Species

The Tiller Whiskey Complex Fire Salvage Project is consistent with the Umpqua National Forest District Resource Management Plan/Forest Land and Resource Management Plan as amended by the 2001 *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (USDA/USDI 2001 ROD).

Treatments in the project area include area salvage units where trees identified as having a 60% or greater probability of dying would be harvested (Smith and Cluck, 2011), Roadside danger tree removal which combines danger tree removal (Toupin et al., 2008) and removal of trees having a 50% or greater probability of dying (Smith and Cluck, 2011), roadside shaded fuelbreaks where conifers under 8 inch dbh would be cut and burned, chipped or lopped and scattered. These parts of the project area are exempt under provision 3(d) of what is known as the Pechman exemptions (Northwest Ecosystem Alliance v. Rey, 2006). The Area Salvage units are generally totally burned, with unharvested leave areas containing green trees or otherwise unsuitable for harvest. Areas being salvaged are considered to be reset to early successional status regardless of successional status prior to the fire, thus no longer habitat for most Survey and Manage species. Roadside units may have some green trees in them. Danger trees identified using Region 6 protocol (Toupin et al., 2008) would be felled. Removal of other danger trees in identified areas is limited to trees with a less than 50% probability of surviving (Smith and Cluck, 2011). Approximately 34 acres of the nearly 182 acres of Roadside danger tree removal units were identified as possible habitat for Survey and Manage species based on stands containing predominantly older live trees that might not meet the conditions for removal. These stands could be subject to Survey and Manage surveys. Surveys have not conducted at this time. The only Survey and Manage plant species known to occur in the Whiskey planning area is the lichen *Peltigera pacifica*, a former Region 6 Sensitive species. The single known occurrence is not in the burned area and would not be affected by salvage, danger tree removal, roadside fuel breaks or maintenance burning.

Direct, Indirect, and Cumulative Effects- Survey and Manage
For Survey and Manage species in general, there are no direct, indirect or cumulative effects from Alternative 1, the no action alternative, as there would be no activity to affect populations if they did occur there.

Under Alternative 2, there are no expected direct effects from salvage in Units 1-5 as neither the organisms nor their substrate survived the fire, and those areas are no longer considered appropriate habitat. In the Roadside units, only dead or imminently dying trees would be removed. The trees to be removed no longer serve as habitat and it is unlikely that Survey and Manage organisms survived on the ground except in localized refugia such as rock outcrops and riparian areas. Large coarse woody debris such as large downed logs and stumps may have survived the fire without total consumption and may serve as refugia for some Survey and Manage species. Where possible, large coarse woody debris would be retained and protected from damage. More details on large coarse woody debris can be found in the Terrestrial Environment- Wildlife section.

The approximately 34 acres of potential Survey and Manage habitat is comprised of generally small spatially distant patches ranging from 0.4 to 9.4 acres in size (Table 38). All of the units are adjacent to or bisected by roads. In most cases there is intact or lightly burned forest adjacent or near the Roadside units. There is not accurate information regarding the total amount of late successional or old-growth forested habitat in the fire area, but satellite data (ISAT Age_Class) reclassified 10 years ago analyzed for the Whiskey fire perimeter shows approximately 8431 acres (36%) in forest over 200 years old, and 2678 acres (11%) between 80 and 200 years old. Gradient nearest neighbor (GNN) analysis of forest inventory plots showed that landscape distribution of large timber in moderate to severely burned condition in the Beaver and Lower Jackson Creek subwatersheds is less than 1%, while large timber in unburned to low severity condition is nearly 45%. The 34 acres of potential Survey and Manage habitat identified for Roadside tree removal units is less than 0.5% of the area classified as greater than 200 years old, and less than 0.4% of area classified as over 80 years old. Within those 34 burned acres, there is little of the specialized habitat required for most Survey and Manage plant species, and much of the understory was burned over. Habitat conditions in almost all cases have been altered to low quality for most Survey and Manage species. This risk analysis of the treatment areas summarizes any additional concern for persistence of species beyond that caused by the fire and its suppression. Probability of persistence for some species may increase if mitigations such as conservative retention of green and retention of coarse wood (see BMPs, Chapter 2) are followed. The direct effect of removing trees in these areas is considered non-significant and unlikely to threaten species persistence in the affected watersheds, or in the larger landscape of the Umpqua National Forest. There are no expected indirect or cumulative effects expected for Survey and Manage plant species as a result of this project.

Table 38. Survey and Manage Status of Roadside removal areas

Unit	Unknown	No S&M	Survey/Manage	OG	Total
6		11.15	4.69		15.84
7		5.95			5.95
8		12.69			12.69
9		8.71			8.71
10		11.35			11.35

Unit	Unknown	No S&M	Survey/Manage	OG	Total
11	0.36	3.26	2.76		6.38
12		2.46			2.46
13			9		9
14		0.26			0.26
15		4.02			4.02
16		1.58			1.58
17		1.78			1.78
18			2.89		2.89
19		4.53			4.53
20				0.38	0.38
21		0.89			0.89
22		2.73	9.39		12.12
23		3.04	0.39		3.43
24			1.09		1.09
25		4.62			4.62
26		0.73			0.73
27			0.92		0.92
28		9.38			9.38
29			1.44		1.44
30		0.48			0.48
31		0.74			0.74
32		57.07	1	0	58.07
Totals	**0.36**	**147.41**	**33.57**	**0.38**	**181.73**

Peltigera pacifica

Peltigera pacifica (Pacific felt lichen) is a gray foliose lichen that grows to 15 cm (McCune and Geiser 1997). It has a widespread geographic range with limited distribution occurring in isolated sites within the Northwest Forest Plan area (USDA/USDI, 1994a). On the Umpqua National Forest there are approximately 77 occurrences scattered across the Forest. Typically, Riparian Reserves and mature forests provide habitat for this species (USDA/USDI, 1994a). According to McCune and Geiser (1997), *Peltigera pacifica* occurs on soil, moss, rocks, logs, and tree bases in moist, lower to mid-elevation forests. Within the Tiller Whiskey Complex Fire Salvage Project area, there is one known occurrence of *P. pacifica.* There are no known occurrences where treatment is proposed.

Direct, Indirect, and Cumulative Effects - *Peltigera pacifica*

There would be no direct impact upon *P. pacifica* under Alternative 1 since no activities would occur. Because large decaying logs are a primary substrate for *P. pacifica*, Alternative 1 would provide habitat in the future with recruitment of large woody debris. Alternative 2 has no direct effects on *P. pacifica* as: a) none was known to exist where treatment is proposed; b) habitat no longer exists in areas proposed for salvage; and c) habitat that exists is protected or not suitable for salvage. Since this species appears to be somewhat associated with older forest, past logging of old-growth forest would have contributed to a loss of *P. pacifica* sites across the

planning area. Because there are numerous sites of *P. pacifica* on the Umpqua NF with the best habitat for this species in reserved land allocations (i.e., Riparian Reserve, LSR, and wilderness) activities proposed under Alternative 2 "may impact individuals or habitat but would not likely contribute toward Federal listing or cause a loss of viability to the population or species". While that language is specific to Sensitive species, the take home message is the same. Therefore, Alternative 2 would have no direct or indirect effects and would not cause any adverse cumulative effects to *Peltigera pacifica*.

Fungi

There are no known sensitive or Survey and Manage fungi sites within the Tiller Whiskey Fire Complex Salvage project area, however habitat is assumed to exist in the project area. The described suitable habitat for most rare fungi species is very general and not yet well understood. Although data published on the habitat requirements for rare fungi is only broadly described (Aurora 1986, Castellano et al. 1999, Castellano et al. 2003, Exeter et al. 2006), modeling performed by York and Helliwell (2007) indicates that there is suitable habitat for *Ramaria amyloidea*.

Nine of the eleven Sensitive fungi belong to the ectomycorrhizal (ECM) functional guild. ECM fungi are most abundant and diverse in areas with well-developed surface litter and organic material and a higher density of large-diameter trees with greater canopy closure (Amaranthus et al.1994, Meyer et al. 2008, Smith et al. 2005).

The two remaining Sensitive fungi are saprobic, meaning their mycelia reside in the litter and downed wood which they feed on, and therefore are also more likely to occur in areas with well-developed surface litter and organic debris. Sensitive fungi are less likely to occur in the managed stands because this is not considered to be suitable habitat for these species.

Direct, Indirect, and Cumulative Effects - Fungi

Under Alternative 1, there would be no ground disturbing activities therefore there are no direct, indirect or cumulative effects to Sensitive fungi. Under Alternative 2, Area salvage and roadside removal would remove dead and dying trees in severely burned areas. Fungi habitat was removed and altered as a result of the fires, and removal of trees, including soil disturbance as a result of harvest, may remove important refugia for fungal species. The patch sizes of roadside treatment areas are small, however, and it is likely that there would be adequate recruitment of fungi from adjacent intact forest. The Area salvage sites would retain green stems and green tree leave patches, as well as retaining a substantial amount of standing and down coarse woody debris, which would serve as refugia, and along with the edge of salvage Areas proximate to intact forest provide adequate source of recruitment (see Wildlife section for coarse wood retention).

Past clearcut harvest would have contributed to a cumulative decline in fungi species associated with older forests due to soil compaction, disruption of duff and large decaying logs and loss of older host trees for mycorrhizal species. Based on the relatively small areas and retention of down wood in the salvage areas, the Whiskey planning area would probably retain most or all of the pre-harvest fungal diversity. Therefore the potential for one of the sensitive species being present and being directly or indirectly impacted by timber harvest is low while the potential for rapid recovery to pre-fire diversity and abundance is good. For these reasons, activities proposed under Alternative 2 "may impact individuals or habitat but would not likely contribute to a trend toward Federal listing or cause a loss of viability to the population or species" for those sensitive species of fungi with potential habitat within the project area. There would be "no impact" to the remainder of the fungal species.

Threatened, Endangered, and Sensitive Botany Species- Biological Evaluation

This Biological Evaluation evaluates potential impacts to Threatened, Endangered, or Sensitive (TES) vascular plants, lichens, and bryophytes from the Whiskey project. It is Forest Service policy to "ensure that Forest Service actions do not contribute to loss of viability of any native or desired plant or contribute…trends toward Federal listing of any species" (FSM 2672.41).

There are two species on Forest that are listed under the Endangered Species Act known or suspected to occur on the *Lupinus sulphureus ssp. kincaidii* (Kincaid's lupine) is listed as Threatened and has been documented on the Tiller Ranger District. *Plagiobothrys hirtus* (rough popcorn flower*)* is listed as Endangered and occurs primarily in the vicinity of Sutherlin in northern Douglas County and has not been documented on the Forest to date. There are currently 36 vascular plant species, 11 fungi, 3 lichens, and 25 bryophytes listed as Sensitive on the Umpqua National Forest.

Pre-field Review - Threatened, Endangered, and Sensitive Botany Species

Area salvage and roadside removal areas under Alternative 2 represent poor suitable habitat for most rare plant species. Non-forested areas such as rocky openings, wet meadows, riparian areas and other habitats would be protected from salvage operations, and the burned areas no longer function as habitat for most species. The only species that has been documented within the project area that occupies openings in young stands is wild hollyhock (*Iliamna latibracteata*) which would typically be found along roadsides or in disturbed openings. Previously known occurrences of wild hollyhock are located south of the 1610 RD in proximity to Devils Knob and are far removed from any salvage units. There are also known occurrences of Thompson's mistmaiden (*Romanzoffia thompsonii*) located within unique habitats in the southeastern portion of the project area. Unique habitat features within units such as wetlands and rock outcrops along with old-growth relicts such as large, well-decayed logs and large trees represent the best potential habitat for numerous species. Species that were determined to have potential habitat are noted in Table 39.

Field Reconnaissance - Threatened, Endangered, and Sensitive Botany Species

Intuitive controlled[6] surveys were conducted in Fall, 2013 and Spring, 2014 by Forest Service botanists. Non-suitable habitats in the units were field verified from appropriate vantage points or during travel between suitable potential habitats. Botany surveys complied with established protocols (USDA Forest Service and USDI Bureau of Land Management 1997 &1999; Derr et al. 2003a; and Derr et al. 2003b).

Because of the unique biology of fungi, pre-project surveys are not considered to be a reliable conservation tool. The vegetative component of fungi is composed of a network of thread-like, underground cells called hyphae, which collectively are referred to as the mycelium. The mushroom is the fruiting body of the organism, somewhat like an apple on an apple tree. Mushrooms for most species occur unpredictably and may go years without fruiting. To reliably determine species presence on a given site would require multiple surveys in the fall and spring over several years. Conservation of sensitive fungi species on Forest Service lands entails management of known sites, targeted surveys based on regional priorities and consideration of habitat elements for fungi during project planning.

The proposed project area is traversed so that all major habitats and topographic features have been investigated. Identified suitable habitats receive a complete survey.

Table 39. Project Effects Assessment for Threatened, Endangered & Sensitive Plants

Taxa Group and Species	Potential Habitat	Species Present	Project Effects	
			Alt 1	Alt 2
ESA Listed Species				
Lupinus sulphureus ssp. *kincaidii*	No	No	NE	NE
Plagiobothrys hirtus	No	No	NE	NE
Bryophytes				
Anastrophyllum minutum	No	No	NI	NI
Andreaea schofieldiana	No	No	NI	NI
Blepharostoma arachnoideum	Yes	No	NI	NI
Bryum calobryoides	No	No	NI	NI
Calypogeia sphagnicola	No	No	NI	NI
Cephaloziella spinigera	No	No	NI	NI
Codriophorus depressus	Yes	No	NI	NI
Encalypta brevicollis	Yes	No	NI	NI
Encalypta brevipes	Yes	No	NI	NI
Entosthodon fascicularis	Yes	No	NI	NI
Gymnomitrion concinnatum	No	No	NI	NI
Harpanthus flotovianus	No	No	NI	NI
Helodium blandowii	No	No	NI	NI
Lophozia gillmanii	No	No	NI	NI
Marsupella emarginata var. aquatica	No	No	NI	NI
Meesia uliginosa	No	No	NI	NI
Polytrichastrum sphaerothecium	No	No	NI	NI
Porella bolanderi	Yes	No	NI	NI
Schistostega pennata	Yes	No	NI	NI
Schofieldia monticola	No	No	NI	NI
Splachnum ampullaceum	No	No	NI	NI
Tetraphis geniculata	Yes	No	NI	NI
Tomentypnum nitens	No	No	NI	NI
Trematodon asanoi	No	No	NI	NI
Tritomaria exsectiformis	No	No	NI	NI
Lichens				
Lobaria linita	Yes	No	NI	NI
Pseudocyphellaria mallota	Yes	No	NI	NI
Ramalina pollinaria	No	No	NI	NI
Fungi				
Boletus pulcherrimus	Yes	N/A	NI	MIIH
Cortinarius barlowensis	Yes	N/A	NI	MIIH
Dermocybe humboldtensis	No	N/A	NI	MIIH
Gastroboletus vividus	Yes	N/A	NI	MIIH
Gymnomyces fragrans	Yes	N/A	NI	MIIH
Pseudorhizina californica	Yes	N/A	NI	MIIH
Ramaria amyloidea	Yes	N/A	NI	MIIH
Ramaria spinulosa var. diminutiva	Yes	N/A	NI	MIIH
Rhizopogon exiguous	Yes	N/A	NI	MIIH
Rhizopogon inquinatus	Yes	N/A	NI	MIIH

Taxa Group and Species	Potential Habitat	Species Present	Project Effects	
			Alt 1	Alt 2
Stagnicola perplexa	Yes	N/A	NI	MIIH
Vascular Plants				
Adiantum jordanii	Yes	No	NI	NI
Arabis suffrutescens var. horizontalis	No	No	NI	NI
Arnica viscosa	No	No	NI	NI
Asplenium septentrionale	Yes	No	NI	NI
Botrychium pumicola	No	No	NI	NI
Calamagrostis breweri	No	No	NI	NI
Calochortus umpquaensis	No	No	NI	NI
Carex crawfordii	Yes	No	NI	NI
Carex diandra	No	No	NI	NI
Carex lasiocarpa var. americana	No	No	NI	NI
Carex nardina	No	No	NI	NI
Carex vernacula	No	No	NI	NI
Collomia mazama	No	No	NI	NI
Cypripedium fasciculatum	Yes	No	NI	NI
Elatine brachysperma	No	No	NI	NI
Eriogonum villosissimum	Yes	No	NI	NI
Eucephalus vialis	Yes	No	NI	NI
Frasera umpquaensis	No	No	NI	NI
Gentiana newberryi var. *newberryi*	No	No	NI	NI
Iliamna latibracteata	Yes	Yes	NI	BI
Kalmiopsis fragrans	No	No	NI	NI
Lewisia columbiana var. columbiana	Yes	No	NI	NI
Lewisia leana	No	No	NI	NI
Ophioglossum pusillum	Yes	No	NI	NI
Pellaea andromedifolia	No	No	NI	NI
Perideridia erythrorhiza	No	No	NI	NI
Pinus albicaulis	No	No	NI	NI
Poa rhizomata	Yes	No	NI	NI
Polystichum californicum	Yes	No	NI	NI
Romanzoffia thompsonii	Yes	No	NI	NI
Rotala ramosior	No	No	NI	NI
Scheuchzeria palustris var. americana	No	No	NI	NI
Schoenoplectus subterminalis	No	No	NI	NI
Utricularia minor	No	No	NI	NI
Utricularia ochroleuca	No	No	NI	NI
Wolffia borealis	No	No	NI	NI
Wolffia columbiana	No	No	NI	NI

NE - No Effect (Applies only to Threatened and Endangered species.)
NI - No Impact (Applies to Forest Service Sensitive species.)
MIIH - May Impact Individuals or Habitat but will not likely contribute towards Federal listing or cause a loss of viability to the population or species.
WOFV - 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.

Threatened or Endangered Plants

There is no suitable habitat for either species that are listed under the Endangered Species Act. Kincaid's lupine occurs in low-elevation upland prairies and is primarily known from Willamette Valley grasslands although there are isolated occurrences documented throughout the Umpqua basin. Rough popcornflower is confined to low-elevation wetlands in the vicinity of Sutherlin in northern Douglas County. There are no known sites of either species near the planning area. Because there is no suitable habitat in or near any of the proposed activities under Alternative 2 there would be no direct, indirect or cumulative effects to either species. Therefore there would be "No Effect" to either listed species resulting from either alternative.

Sensitive Botany Species

Wild hollyhock

Wild hollyhock (*Iliamna latibracteata*), is a 1-2 meter tall perennial herb in the mallow family. In our area, wild hollyhock is found primarily in disturbed mesic sites in full sun or partial shade, and can be found in clearcuts. Observations indicate that, like other species of hollyhock, wild hollyhock is likely a fire-associated species whose habitat is declining due to fire exclusion. There are 36 known occurrences of wild hollyhock on the Umpqua National Forest with only three known occurrences located within the Tiller Whiskey Complex Fire Salvage Project area, one of which occurs along road 1610-405 and is discussed in this analysis.

Direct, Indirect, and Cumulative Effects - Wild hollyhock

Alternative 1 would have no direct effects to wild hollyhock since ground disturbing activities would not occur near these populations. Alternative 2 could have direct impacts to potential roadside populations of wild hollyhock caused by road maintenance activities, including brushing, blading and ditch clean-out, along haul routes. No hollyhock is known to occur in the areas proposed for salvage or danger tree removal, so those treatments would have no direct effect on known populations. Since this species is observed to favor disturbance, past activities likely have had a mixed cumulative effect upon this species. Wild hollyhock may have benefited with clearcut logging and prescribed fire although subsequent stand management that allowed for overstocked plantations along with fire suppression appears to have contributed to an overall decline in populations. In particular, wild hollyhock has been observed to thrive where log decks have been burned so there is a possibility that the species could germinate within burn piles where seed is present in the seed bank. There could be an indirect beneficial effect although no activities are proposed to specifically improve habitat. The potential beneficial effect of increased occurrence and abundance of hollyhock comes from the opening of canopy by the fire. Other proposed activities of maintenance burning and roadside shaded fuel breaks also have the potential to indirectly benefit wild hollyhock.

Fire and Fuels

Relevant Standards and Guidelines

Forest Plan Ch. 4 – these guidelines include:

- Protect riparian area from prescribed fire and equipment when treating slash in adjacent harvest unit where practical. (pg. IV-33)

- Maximum utilization of wood residue generated during timber harvest and other management activities should be encouraged to meet, to the extent practicable, all resource objectives. (pg. IV-48)
- Vegetation and dead woody material in riparian units (Class I, II, III, and IV streams) will be protected from prescribed fire. (pg. IV-60)
- To meet acceptable levels of surface soil loss…provide for at least a minimum amount of effective ground cover to exist within the first year following the end of a ground-disturbing activity. (pg. IV-68)
- Surface organic material (litter, duff, and wood) needed to maintain soil productivity, will be planned for all ground disturbing activities. (pg. IV-68)
- Levels and methods of fuels treatment will be guided by the protection and resource objectives within the management area. (pg. IV-92)
- Prescribed fire is a management tool that may be used to meet management and vegetation objectives, and to maintain desired fuels profiles in all ecosystems. (pg. IV-92)
- Burning plans will be prepared in advance of ignition and approved by the appropriate line officer for each prescribed fire. (pg. IV-92)
- Air quality will be emphasized during prescribed fire planning. Mitigating measures will be considered including extending the burning season to spread emissions throughout the year. (pg. IV-92)

FSEIS Standards and Guidelines – these guidelines include:

- FM-1 Design fuel treatment and fire suppression strategies, practices, and activities to meet Aquatic Conservation Strategy objectives, and to minimize disturbance of riparian ground cover and vegetation. (pg. C-35)
- FM-4 Design prescribed burn projects and prescriptions to contribute to attainment of Aquatic Conservation Strategy objectives. (pg. C-36)
- RA-4 Locate water drafting sites to minimize adverse effects on stream channel stability, sedimentation, and in-stream flows needed to maintain riparian resources, channel conditions, and fish habitat.

Current Condition

Fire, from human and natural causes, has burned northwest landscapes for centuries (Agee 1993). It is difficult to identify the relative effects or pattern of human versus natural caused fires during pre-historic times. Beginning in about 1870, the pattern of human ignition changed with increasing European settlement and decreasing Indian populations USDA, 1995). The Forest Service began fire detection and suppression activities in the 1910s but human caused fire was considerable until about the 1930s. The 1929 arson-caused Beaver Creek fire is the most dramatic of these early fires in the planning area.

During the summer of 2013 the Whiskey Fire burned 16,185 acres in the Beaver Creek and Jackson Creek watersheds and the Buckeye Fire burned 1,683 acres in the Middle South

Umpqua drainage. Both of these fires where part of the lightning started Whiskey Complex that began on July 26, 2013 and burned for the remainder of the fire season. Fire initially spread rapidly leaving severely burnt conditions before marine influences and scattered precipitation moderated fire behavior. Due to the steep rugged terrain, inversions and inaccessibility of the Beaver Creek drainage; fire containment was costly and was not attained until October 1, 2013.

Fire History

The landscape and stand-level effects of historic fires can be inferred from fire frequency, intensity, and size. In Jackson Creek all three of these fire characteristics have varied a great deal through time. Since about 1700, the interval between these low intensity fires has ranged from 6 to 100 years. Although high intensity, stand replacing fires have occurred in Jackson Creek since 1700, their frequency was not quantified or recorded. Because fires were not limited by fire suppression efforts, many persisted for several burning periods and grew very large. However, no generalization can be made other than that variation in fire size was extreme. Before about 1700 there appears to have been an intense fire, or series of fires, that burned much of the watershed. The effects of this fire were greater at lower elevations on both sides of Jackson Creek where fewer trees appear to have survived (USDA, 1995).

An analysis of fire history in the Beaver Creek Watershed was conducted as part of the Beaver Creek Timber Sale EA in 2012. At the time records showed that fire size since 1970 was generally small due to aggressive fire suppression efforts illustrates the interruption of the natural fire regime. Since 1970, 98% of the fires were held to 10 acres or less and 100% were limited to less than 100 acres, with the largest being another Whisky Fire, at 22 acres. Information from the Umpqua National Forest database shows that a total of 69 fires occurred in the Beaver Creek watershed between 1970 and 2009. Table 40 displays fire occurrences across all ownerships in the watershed (Beaver EA, 2012).

Table 40. Wildfires in the Beaver Creek watershed between 1970 and 2009

Total Number of Fires	Size Class	Acres
56	A	< .25
12	B	.26 – 10
1	C	10.1 – 99
0	D	100 – 299
0	E	300 – 999
0	F	1000 - 4999
0	G	> 5000

During the Whiskey Fire a large Douglas fir that fell during suppression efforts was dated back to 1686 (Figure 46). The fire return interval in Pipestone Creek between 1753 and 1948 averaged 21 years and ranged between 19 and 24 years (p=0.2). This is a short return interval (either through anthropomorphic or natural ignition) that would have resulted in lower severity-shorter duration fires over the landscape.

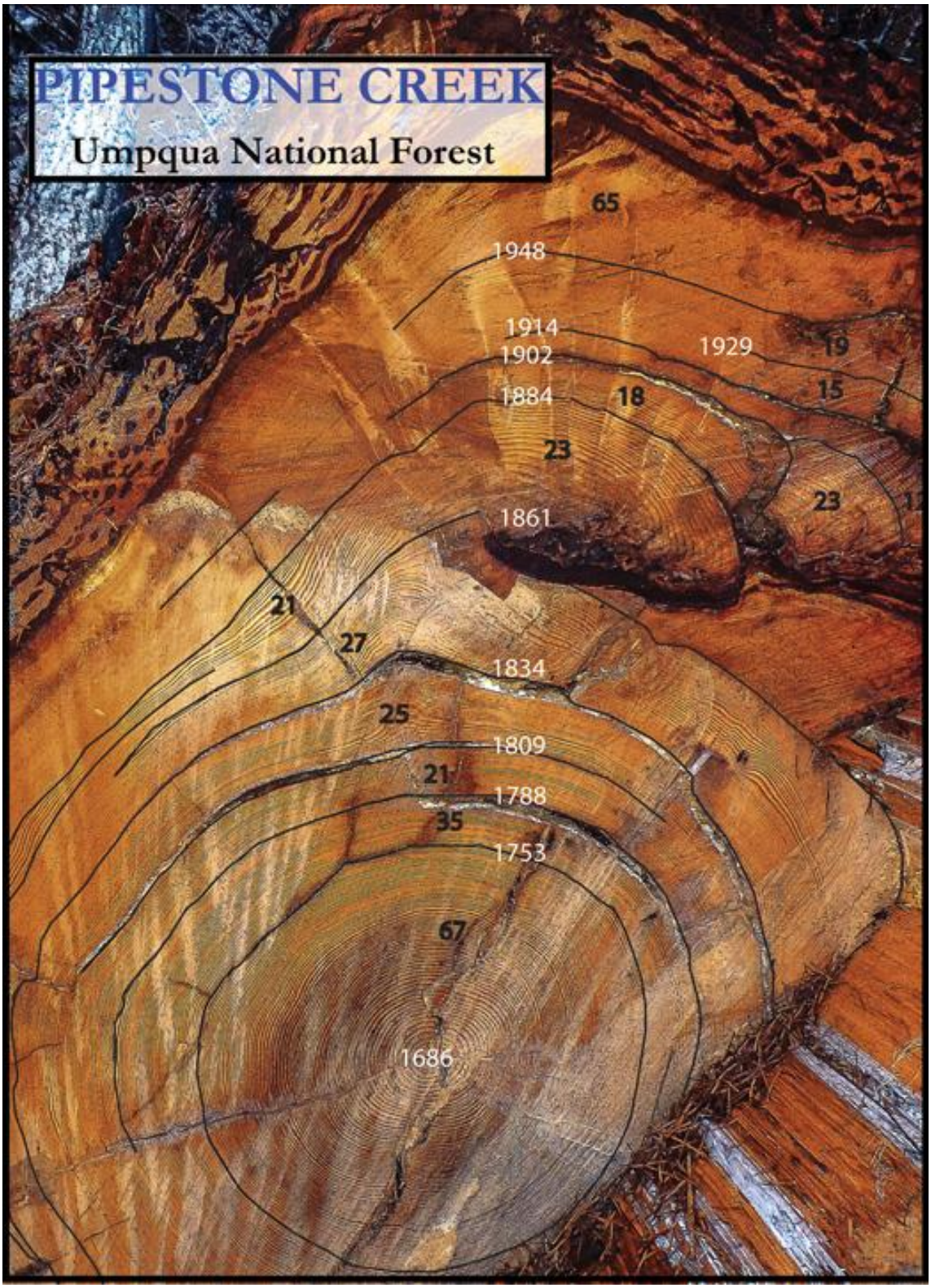


Figure 46 Douglas fir tree showing fire scars in Pipestone Creek Area.

Fire Regimes

Fire regimes refer to a general classification of the role fire would play across a landscape naturally, meaning in the absence of modern human intervention such as fire suppression efforts. The fire regimes are classified based on fire return interval and fire severity.

Table 41. Natural Fire Regimes in the Whiskey Fire Project Area

Fire Regime	Fire Return Interval (in years)	Fire Severity	Percent Whiskey Fire	Percent Buckeye Fire
I	<35	Low	34	46
II	<35	High	3	0.3
III	35 - 100	Mixed	59	53.7
IV	35 -100+	High	0	0
V	200+	High	4	0

Fire Regime I. 0-35 years, High Frequency/Low Severity

Surface fires are the norm with large, high severity fires rarely occurring (i.e. every 200 years

Fire Regime II. 0-35 years, High Frequency/High Severity

Typical fire return intervals are 10-25 years. High fire severity occurs due to the presence of brushy vegetation.

Fire Regime III. 35-100 years, Moderate Frequency/Mixed Severity

Fire severity is mixed with large, high severity fires occurring rarely (i.e. every 200 years). This fire regime exhibits fire behavior that results in mosaic patterns on the landscape with burned and unburned patches.

Fire Regime IV. 35-100 years, Moderate Frequency/High Severity

Typically stand replacement fire occurring more frequently than Fire Regime V. An example would be lodgepole pine forests.

Fire Regime V. 200+ years, Low Frequency/High Severity

High severity, stand replacing fires occur.

The natural fire regimes in the planning area indicate that the landscape experienced fires frequently, less than every 35 years. Figure 47 and Figure 48 display maps of the fire regimes in the Whiskey and Buckeye Fire areas. Most notable are fire regimes I and III. Fire Regime III, a mixed severity regime encompasses most of the planning area. Second most noticeable is Fire Regime I, a low severity, high frequency regime. Fire Regime II sites, of high frequency and severity, are found mostly on southeast, south, and southwesterly slopes. Fire Regime V sites, areas of low frequency but high severity, are either on northerly slopes or tend to be in riparian areas.

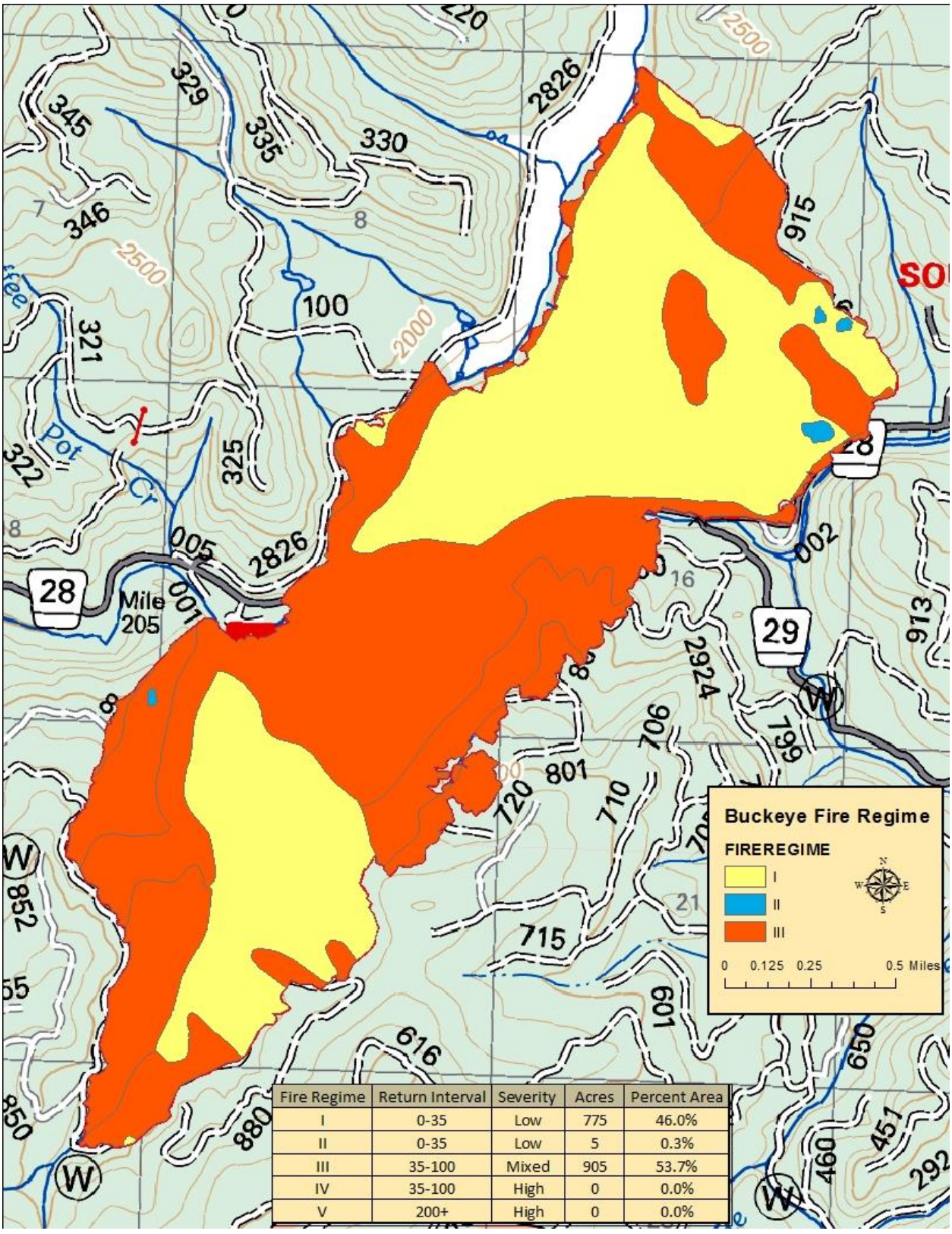


Figure 47. Buckeye Fire Regime Map

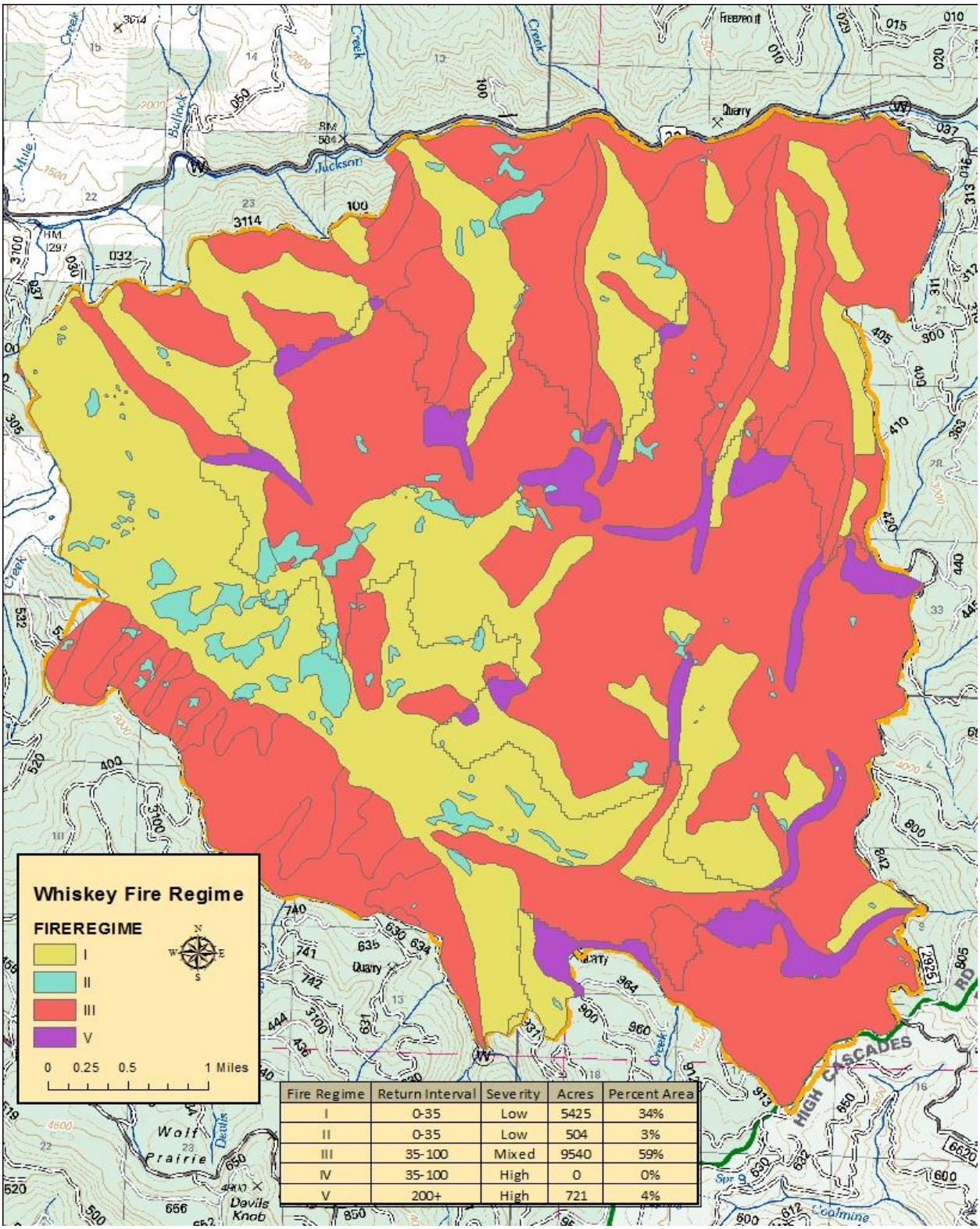


Figure 48. Whiskey Fire Regime Map

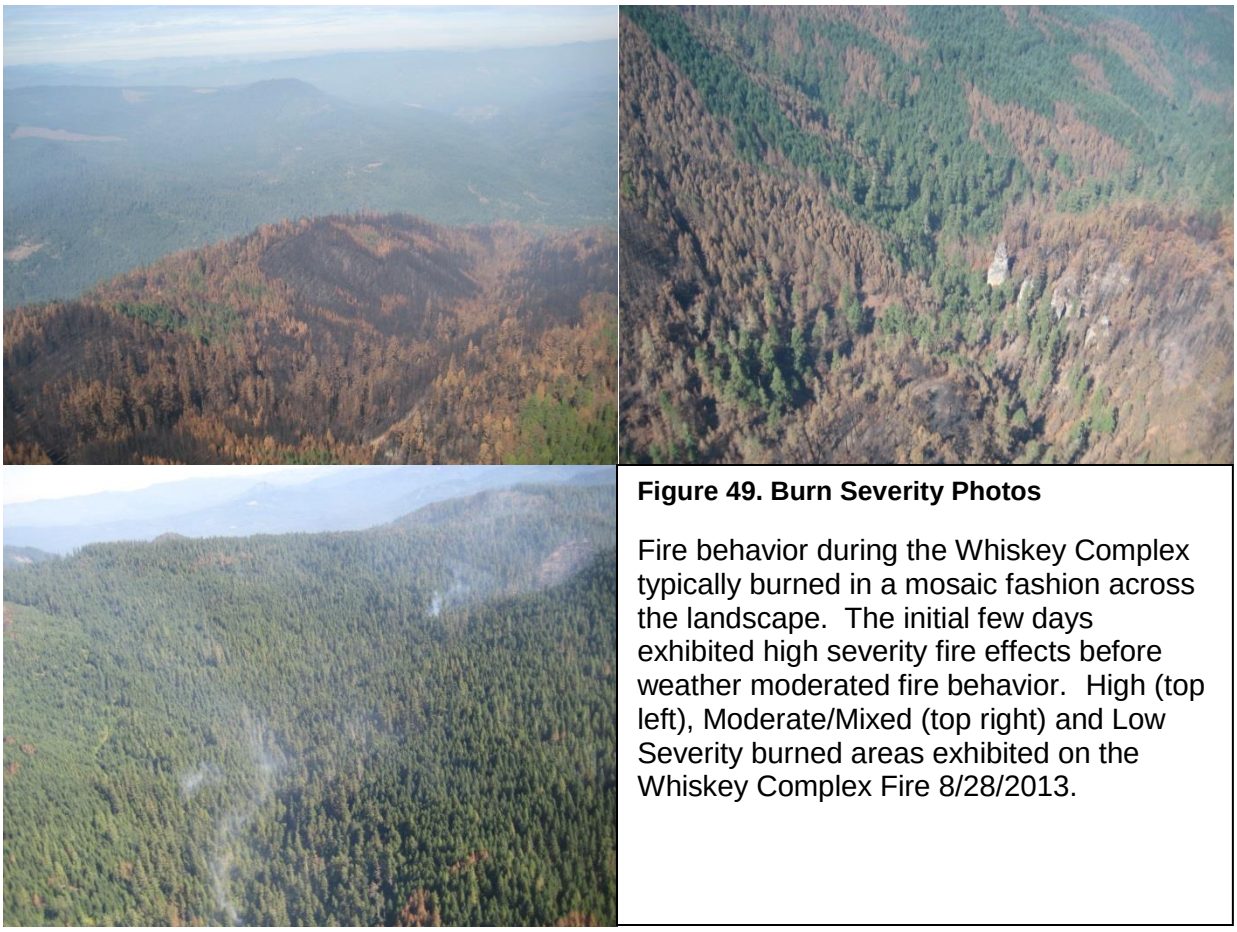


Figure 49. Burn Severity Photos

Fire behavior during the Whiskey Complex typically burned in a mosaic fashion across the landscape. The initial few days exhibited high severity fire effects before weather moderated fire behavior. High (top left), Moderate/Mixed (top right) and Low Severity burned areas exhibited on the Whiskey Complex Fire 8/28/2013.

Wildland Urban Interface (WUI)

Wildland-Urban Interface areas occur where homes and other structures are adjacent to natural or undeveloped areas. Homes and communities in these areas are therefore in close proximity to wildland fuels. The presence of homes increases the risk of wildfire ignition and their location adjacent to wildland fuels makes them vulnerable to wildfire. These areas are therefore identified as a priority for fire hazard mitigation. WUI areas often extend into sub-watershed boundaries and incorporate all ownerships while Communities at Risk (CAR) areas are generally limited to residential private lands. There are no CAR areas within this Planning Area.

Private residences were threated during the Whiskey and Buckeye fires. Fire burned across a small portion of private timber land and along the boundary of private residences located in Beaver Creek. The Buckeye Fire threatened residences in Ash Valley burning up to the boundary of private property. The Buckeye Fire also forced the evacuation of South Umpqua Falls Campground and Ash Flat Campground two very heavily used recreation facilities on the Tiller Ranger District.

Fire Suppression Strategies

Fire suppression strategies are the methods that firefighting personnel use in order to contain wildland fires. The strategy employed depends on the fire behavior. There are essentially two basic fire suppression strategies, direct attack and indirect attack.

Direct Attack can be used when a fire is exhibiting surface or passive crown fire behavior because the fire intensity is low enough to allow for safe operations by firefighters at the fire's edge (NWCG, 1994).

Indirect Attack is used when fire intensity is extreme enough to make working at the fire's edge impractical. This method is usually required when dealing with active crown fires (NWCG, 1994).

Desired Condition – Fire and Fuels

The objective of the proposed fuels treatments is to treat the activity slash to modify fire behavior in post salvage areas, develop a system of shaded fuel breaks to aid in the management of future fire starts and establish fire back on the landscape to continue the natural ecological process. Methods to achieve this objective include slashing small diameter (less than 8") material and hand-pile burning, lop-and-scatter, pruning, landing pile burning and natural fuels prescribed underburning.

Activity Slash: Activity slash generated from timber harvest is expected to be fairly light due to most of the fine fuels no longer being present on the trees being harvested. Down wood transects in area harvest units showed that there was currently light down wood accumulations (1.5 tons/acre on average of fuels 5"+). Fuels in the smaller size classes are low due to their full consumption during the fire.

The Umpqua's Hazard Reduction Standards were developed as a tool to use when determining the level of fuels treatment needed to protect the Forest resources in any given area from the threat of wildfire.[7] The majority of the planning area lays within the moderate-risk zone as defined in the Standards. This risk zone takes into account winter range habitat, private land, and the area's historical fire occurrence. Weather, topography, fuels and predicted fire behavior are also factored into the Standards.

The Standards recommend the following post-treatment fuel loadings in the 0-9 inch size class fuels:

0-1/4 inch: < 1 ton per acre

¼-1 inch: 4-8 tons per acre

1-9 inch: 7-12 tons per acre

Post salvage fuel loadings may exceed the standard in the treatment area, however slash left over from harvest would help replace the duff and litter layers that have become absent post-fire. Remaining slash would also help protect against soil erosion, provide microsites for new vegetation growth and establish a new duff layer as it decomposes.

Slash concentrations located at landing sites generated from processing would be piled and disposed of through burning or hauled off site as biomass. Material suitable for personal use firewood may be utilized before burning of slash. Material generated during roadside danger tree removal would be lopped and scattered unless enough material exists to pile.

Shaded Fuel Breaks: A network of shaded fuel breaks totaling around 960 acres (Figure 3 and Figure 4) would help in future management of fire in the project area. Areas exhibiting severe mortality post fire were surveyed for snags and downed wood (>5" diameter). Downed wood accumulations averaged 1.5 tons/acre post fire due to the consumption of material during the fire. During surveys for downed wood, snags over 10" dbh were also surveyed. Standing dead

[7] Forest Residue Management Group. Umpqua National Forest Hazard Reduction Standards. Addendum to LRMP 1990.

biomass in these areas greater than 10" dbh was very high at 100 tons/acre. Surveys have shown that over half of standing fire killed snags may fall within the first 10 years post fire (Russel et al. 2006), mostly in the smaller diameter range with 70% of trees under 9" dbh falling within the first 10 years (Everett et al. 1999).

In 2003 crews surveyed the 1996 Benchmark Fire on the Tiller Ranger District. This area was salvaged using the "Beschta" (beschta et al., 1995) report recommendations in which numerous snags from multiple size classes were left on site. Downed wood in areas exceeded 200 tons/acre with the majority being greater than 8" in diameter (Figure 50). Typically fuels larger than 9" diameter are not a great concern when addressing impacts to fire suppression however, when they reach such high levels they hinder fire suppression efforts. These stands often render direct attack ineffective due to slowed production rates, increased risk from overhead hazards and increased fire line intensity which would damage soil and existing vegetation. It is not the intent of fuels treatments to remove all of this material, but it must be recognized that future fire management in areas with no fuels treatments would be difficult and hazardous at best.

Creating shaded fuel breaks throughout the fire area gives Fire Management personnel future opportunities to manage fire starts in an area that may not be suitable for direct attack. By preplacing fuelbreaks and maintaining them, a "box" is already established around a future fire start creating a safer perimeter to work from. This can reduce exposure and cost of future fires and allow fire to be utilized on the landscape for ecological benefit.

Shaded fuel break prescriptions would utilize a variable spacing starting with 20' x 20' spacing on leave trees under 8" and allowing for occasional pockets or clumps of trees and brush (around 10% of the area) for wildlife habitat. Treatments would focus on concentrations of fuels and ladder fuels that would lead to fire behavior that is not easily controlled either from torching and spotting or a transition from surface fires to crown fires. In plantations where trees are predominantly less than 8" dbh, 60% of the canopy should be retained to provide shade to the understory. Treatments would focus on pruning to remove ladder fuels and variable spacing to try to reduce canopy continuity. After a fire event such as the Whiskey Fire, there would be an influx of dead material <8" in diameter both standing and on the ground. When piling, material that existed before the fire should be left in place to continue decomposing.

Maintenance Underburning: Four areas within the main Whiskey Fire perimeter (Figure 4) have been identified as areas for maintaining fire on the landscape through prescribed fire. Prescribed fire implementation would likely take place 3-10 years post fire. Two areas referred to as Bunchgrass Meadows (96 acres) and Coffin Butte (110 acres) where areas previously identified and planned as part of the North Beaver Fuels Project (DM 2006). These areas feature unique meadow complexes on the south facing slopes of the Beaver Creek drainage. The purpose and need for maintenance burning would be continue to reduce conifer encroachment into the dry meadow areas while maintaining areas that are fire prone (Fire Regime I & II) through natural processes. Implementation would likely occur in these areas first.

Figure 50. Benchmark Fire (1996).
Photographed in April of 2003 (Top) and again in March of 2014 (bottom) on the Tiller Ranger District.

The other two prescribed fire areas are referred to as the Lower 3114 (255 acres) and Soup Creek (674 acres) prescribed burns. These areas have been identified based on their vegetation type. These areas are Ponderosa pine, Douglas fir and oak areas. Due to fire suppression these stands exhibit higher densities of conifers then they would have if a natural fire regime were to occur. The Jackson Creek Watershed Analysis (1995) recommends restoring high fire frequency areas to composition and structure that is more sustainable and typical of native forest prior to fire suppression.

By utilizing prescribed fire in these areas, a natural fire regime can be reestablished. The time frame of 3-10 years post burn was identified to help reduce increased surface fuel loading due to small diameter fire killed trees falling and adding to uncharacteristic fuel loads. After the initial prescribed fire entry all areas would be evaluated for follow-up prescribed fire to reestablish a historic fire regime interval.

Effects Analysis – Fire and Fuels

The environmental effects discussed below display how fuel loadings, fire behavior characteristics, and fire effects would differ between the two alternatives over the short term (10 years) post fire.

Direct and Indirect Effects

The action alternative for the project area would include; piling and burning of landing slash, lop and scatter of activity generated slash not associated with a landing site, creation of shaded fuel breaks and maintenance underburning.

Activity Fuel Treatments: Activity fuel treatments would occur on landing sites associated with salvage logging. Salvage treatments would help to reduce future surface fuel loading on sites with severe burn and high rates of standing dead material. The Benchmark Fire (1996) on the Tiller Ranger District showed high surface fuel loading in excess of 200 tons / acre seven years post fire. This area located in the Jackson Creek drainage is similar to the area burned in the Whiskey Fire and fuel loadings can be expected to be similar in the future. Currently surface fuel loading in Area Salvage units is light (1.5 tons/acre), however as material begins to transfer to the forest floor, these rates would rise.

Utilizing the FVS – FFE model, estimates for surface fuel loading were compared for the Action (Alt 2) and No Action Alternative (Alt 1). The majority of surface fuel loading currently and in the future would be in the 3" and larger size classes. Most fire behavior models take into account fuels smaller than 3" to generate flame length and fire spread; however they do not adequately capture excess fuel loading's effects on soil damage, resistance to control and damage to regeneration and existing green trees. Figure 51 displays fuel loading transfer for both alternatives.

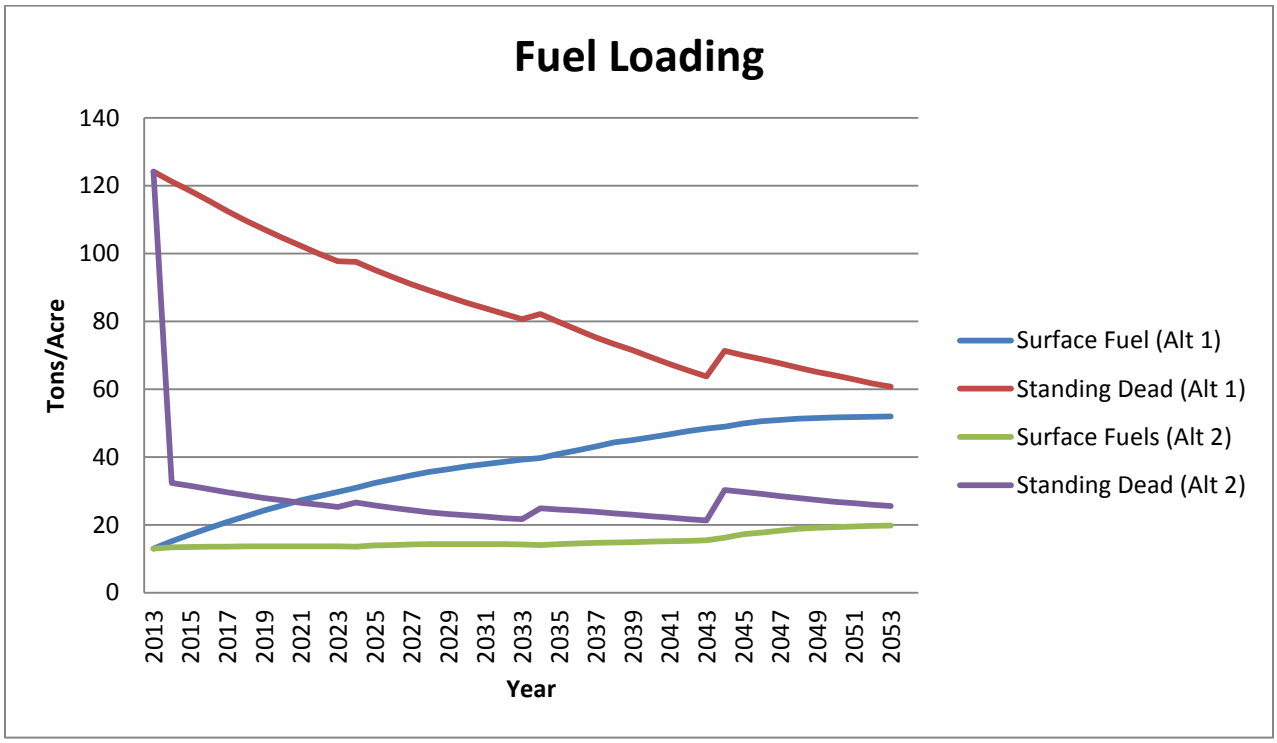


Figure 51. Standing dead tons/acre transfer to surface fuels over 40 years post-fire for Alternative 1 and Alternative 2.

Removal of merchantable material would help alleviate future fire risk to the area. Post-harvest fuel loads show a reduction in surface fuel loading by an average of 56% over 40 years as compared to no action. No action peak surface fuel loading is modeled to be 52 tons/acre in 40

years without treatment. Alternative one shows peak surface fuel loading to be 19.8 tons/acre in 40 years. Surface fuel loading immediately post-harvest is modeled to be 13 tons an acre. This falls within the Umpqua Fuels Reduction Standard therefore not requiring activity fuels treatment within the unit. The material that breaks off through felling and yarding would be left in place to help stabilize slopes and decompose.

Material from danger tree removal along roadways would be lopped and scattered to help reduce activity fuel concentrations and help speed the decomposition of material. In areas of shaded fuel breaks, material occurring within 150' of the roadway would be piled and burned.

The **No Action Alternative** would have no salvage occurring with no associated activity fuels treatments. These areas in particular would see large amounts of surface fuel loading due to dead trees eventually falling to the forest floor. Not all of the material would fall at once with the smaller diameter size classes falling first. These areas would see fuel loads in excess of 50 tons/acre. Future fire management would be hindered by fire behavior associated with these high loads of course woody debris (Brown et. al., 2003).

Shaded Fuel Breaks: Shaded fuel breaks could help in the future fire management of the area. The recently burned areas would pose a challenge to fire managers due to the nature of working in areas of excessive fuel loads and numerous aerial hazards associated with fire scars. Creating a network of shaded fuel breaks would reduce ladder fuels, reduce surface fuel loading and create a safer working environment to aid in fire management. In the event of a fire start in the same areas as the previous summer's wildfires management strategies would likely be indirect suppression. By creating and maintaining fuel breaks managers can work towards reestablishing a natural fire regime in the area, while having a safer place to work from.

The **No Action Alternative** would not establish fuel breaks within the project area. During suppression efforts on the Tiller Ranger District and surrounding areas, firefighting personnel are often in shortage during the peak of wildfire season. Often due to a lack of pre-suppression infrastructure, indirect attack often becomes a game of catch-up having to make the "box" bigger to allow preparation time for burn out activities. By not creating and maintaining an infrastructure of fuel breaks, managers may have to work behind the curve in an area that would be more prone to increased fire intensity and resistance to control. No activities would take place to improve firefighter and public safety.

Maintenance Underburning: Underburning in the identified areas would start to establish fire on the landscape at a meaningful scale. Underburning in the Bunchgrass Meadows area would help reduce conifer encroachment into the meadows. Underburning in the lower portions of Jackson Creek (Soup Creek, Lower 3114) would help maintain diverse stands of mixed conifer and oak species. Underburning treatments would also help reduce the influx of surface fuels associated with fire killed trees transitioning to the forest floor. These areas would also help reduce future fire behavior (Graham et. al., 1999) in an area that naturally would be of low intensity.

The **No Action Alternative** would not maintain the area with low intensity surface fire. Meadow areas would be subject to future conifer encroachment and stands of mixed conifer and oak would transition to conifer shading out oak areas. Surface fuel loading would be high and future fire behavior in the event of a wildfire could be detrimental to the surviving stands.

Table 42. Summary of Fuels Treatment Acres and Effects

Treatment type	Alternative 2	Effects
Landing Pile and Burn	≈78 piles	Beneficial – Reduction of activity related fuels at landing sites. Material suitable for personal use firewood, may be utilized as opposed to burning. Adverse – Has the potential to damage soil and surrounding vegetation. Underutilization of woody material and release of carbon.
Lop and Scatter	≈203 ac.	Beneficial – Distribute activity related fuels closer to the surface allowing them to break down faster and reducing ladder effects and concentrations that could be harmful to surrounding vegetation in the event of fire. Adverse – Can contribute to surface fuel loading, particularly fuels <3" in diameter that can contribute to surface fire spread.
Shaded Fuel Break Handpile and Burn	≈960 ac.	Beneficial - Reduction of standing fuels; separation of crown layers; short and long-term effect of reducing crown fire potential; long-term benefit of increased fire resiliency against crown fire. Provide areas to help manage future wildfire within the project area. Adverse – Can alter stand structure, reduce wildlife cover and contribute to carbon emissions.
Maintenance Underburning	≈1,135 ac.	Beneficial – Reduced post fire surface fuels both for the short-term (up to 5 years) and the long-term (greater than 5 years) and increased stand resiliency to potential wildfire effects. Decrease conifer encroachment into the Bunchgrass Meadows area and reestablish historic fire return intervals on the landscape. Can contribute to overstory loss and reduction of future seedling survival; however effects can be minimized in a much more controlled environment than that of a wildfire.

Cumulative Effects

The analysis area for fuels covers two areas in the project. The first are discussed is the Beaver and Lower Jackson Creek Facial 6th field HUCs. The second area is the Ash/Zinc and Skillet/Emmerson 6th Field HUCs. All past activities, whether described here or unknown to the planning team, impacted vegetation and fuel conditions to some degree. The impact these changes had on the current conditions are quantitatively or qualitatively captured in the existing conditions section.

Beaver and Lower Jackson Creeks:

Since the 1970s there have been about 3,807 acres of pre-commercial thinning (PCT) treatments. Pre-commercial thinning reallocated growing space to fewer individual trees,

increased the horizontal distance between tree crowns, and increased the vertical distance between tree crowns and the existing ground fuels.

Commercial thinning occurred on 4,270 acres with the objective of reducing stand densities primarily to improve growth, enhance forest health, and other resource objectives.

Underburning has occurred on 3,910 acres wildfire has occurred on 17,926 acres (since 2002).

These past fuels related practices have reduced fuel loadings, reduced the risk of stand loss to potential wildfires, and changed the baseline surface fuel conditions of the managed stands, especially in those stands that were burned post-harvest.

Ash, Zinc, Skillet and Emerson:

Since the 1970s there have been about 3,544 acres of pre-commercial thinning (PCT) treatments. Pre-commercial thinning reallocated growing space to fewer individual trees, increased the horizontal distance between tree crowns, and increased the vertical distance between tree crowns and the existing ground fuels.

Commercial thinning occurred on 1,156 acres with the objective of reducing stand densities primarily to improve growth, enhance forest health, and other resource objectives.

These past fuels related practices have reduced fuel loadings, reduced the risk of stand loss to potential wildfires, and changed the baseline surface fuel conditions of the managed stands, especially in those stands that were burned post-harvest.

Alternative 1

Alternative 1 would not contribute to the beneficial cumulative effect of reducing fuels across the landscape, as no treatment would occur. As the forest ages and current suppression policies remain in place, fuels would continue to build over the landscape. Fires that escape control have the potential to become partial or stand replacement events. Effects detrimental to short or long-term forest health from such fires include loss of portions of the duff/litter layer and other nutrient sources, moderately to severely burned soils, loss of winter range habitat, and degraded water quality where riparian areas are affected. As the potential for an uncontrollable fire builds, the potential fire effects become more severe.

Alternative 2

The cumulative effect resulting in a decrease in fire behavior of the 22,329 acres (completed) plus the 2,095 acres associated with fuel treatments throughout the planning area. The Beaver Timber sale currently taking place would add 1,435 acres of commercial thinning to the past activities.

Soil Productivity

The maintenance of soil productivity during forest management activities is critical to maintaining a healthy forest. Consequently, soil productivity is addressed in the Umpqua Land and Resource Management Plan (LRMP) with several standards and guidelines. The primary focus of this analysis centers on past and predicted soil disturbances and the maintenance of ground cover.

Relevant Standards and Guidelines

The most relevant standards and guidelines from the Umpqua Land Resource Management Plan (LRMP) related to soil productivity (USDA Umpqua NF 1990a) include:

Soil Productivity S&G #1, p IV-67: Requires that the combined total amount of unacceptable soil conditions in proposed activity areas (compaction, displacement of surface soil and severe burning) will not exceed 20 percent, including areas in roads and landings.

Soil Productivity S&G #2, p IV-68, S&G #13, p IV-71: Requires maintenance of effective ground cover to prevent loss of topsoil through erosion.

Soil Productivity S&G #3, p IV-68: Requires maintenance of ground cover for surface organic material (defined as litter, duff and wood) to maintain long-term soil productivity of the site.

Soil productivity S&G # 4, 5, 10, 11, and 12 and other North West Forest Plan requirements also apply and are described in this section or are listed as best management practices, project design features, management requirements and monitoring in Chapter Two.

Soil Suitability - Exceptions to harvesting only on suitable (regeneration) lands shall be documented during NEPA (S&G #6, LRMP IV-44).

Soil Productivity Standards and Guidelines and Best Management Practices were developed to limit management related impacts to soil tilth, soil carbon, surface organic matter, and large woody material to a level that provides protection of the soil hydrology, soil biology and flora and fungi, soil stability and erosion, and soil fertility.

Existing and Desired Conditions

The Whiskey planning area is the approximately 17,868 acre fire perimeters of both the Whiskey and Buckeye Fire areas. The Whiskey fire encompassed 16,456 acres within the Jackson Creek watershed, while the Buckeye fire included 1,450 acres within the Middle South Umpqua watershed and 234 acres within the Upper South Umpqua. Another 15 acres of the Whiskey complex burned within the Elk Creek - Rogue River watershed (off the Umpqua NF). Subwatersheds at least partially within the planning area include the Beaver Creek and Lower Jackson subwatersheds in Jackson Creek Watershed, Ash Creek-South Umpqua subwatershed within the Middle South Umpqua Watershed, and Skillet Creek-South Umpqua subwatersheds in the Upper South Umpqua Watershed (Figure 11). Elevation within the planning area runs from about 1,400 to 4,000 feet, mostly falling within the transitional snow zone. The entire area is within the Western Cascades geologic province.

Based on burned area reflectance classification, which is a measure of soil burn severity, approximately 2% (359 acres) was classified as high severity, 16% (2,872) as moderate severity, 71% (12,743 acres) low severity and 11% (1,974 acres) as unburned. The Rapid Assessment of Vegetation Condition after Wildfire or RAVG data, which categorizes the effect of the fire on vegetation (primarily canopy loss), indicated a more severe burn with 7% (1,286 acres) of the area burning at high canopy loss, 3% (633 acres) at moderate canopy loss and 90% (16,266 acres) at low canopy loss or unburned.

Many of the harvested areas in the Whiskey Salvage Planning area were harvested before 1965 were often located on slopes less than 45% were originally clearcut using large dozers that displaced, compacted, and exposed the soil. Tractor yarding that occurred on slopes over 35% required cutting skid trails and roads into the slope. When swales were crossed with tractors, subsurface flow was often intercepted and brought to the surface. New surface flow can result in the extension of new stream channels and the production of large quantities of surface

erosion that can continue until eventually stabilized. For the most part, slopes and streams affected by these skid trails have had time to adjust and stabilize.

The units located on steeper terrain were originally clearcut using a highlead[8] logging system where entire log lengths were dragged either down or uphill without any part of the log suspended off the ground. Highlead yarding often displaced large amounts of soil that ended up at the bottom of slopes and in streams, along with large amounts of large woody debris. Most of the old surface erosion from the historic highlead logging has subsided with the recovery of ground cover and stream flow, thus restoring site productivity.

Existing roads are another source of surface erosion that leads to sedimentation of streams. Road inventories in the planning area revealed an overall low level of road prism erosion. When erosion is occurring it is mostly due to lack of aggregate or aggregate that has broken down, and lack of road maintenance on most roads that traverse the planning area. Regular road maintenance is critical to keeping the levels of road-related surface erosion in check. However, road maintenance has declined sharply in the last two decades because fewer timber sales have occurred to help accomplish road maintenance and appropriated funds to do road maintenance have also declined. Annual road maintenance is limited to main use roads.

The desired condition is to reduce total compaction (legacy plus predicted) to no more than 20% of an area (LRMP S&G 1, pp. IV68), and to reduce long-term chronic surface erosion associated with system roads, legacy skid trails, and future wildfire in keeping with ACS objective #5, which calls for the restoration of sediment regimes.

Soil interpretations for the planning area were made using the Umpqua Soil Resource Inventory (SRI, USDA 1976), field review, and further refined with GIS (Table 43). The SRI inventory provides landscape-scale soils information on broadly mapped areas (average size = 250 acres) that have distinctly unique geology, landform and soils that affect the growth and development of forest vegetation. This information was reviewed for each landform and provides useful information for sale planning. The geology of Beaver Creek is associated with rock units of the Western Cascades, consisting of a complex mixture of volcanic basalt, volcanic tuffs and breccias, and weather resistant shallow intrusive rhyodacite.

Table 43. Landform distribution and characteristics for the Whiskey Salvage Planning Area.

LANDFORM	Planning Area	Proposed Mgt	Water Yield Class (III-IV)	Erosion Risk (High)	Soil Burn Severity (L to M)	Mass Soil Movement Hazard (Deep)	Mass Soil Movement Hazard (Shallow)
Alluvial Terrace	3%	0%	2%	87%	99%	9%	13%
Colluvial Terrace & Toe	34%	22%	11%	46%	91%	31%	17%
Shoulder & Ridgetop Sideslope	39%	52%	19%	25%	83%	39%	29%
	24%	26%	51%	6%	77%	11%	72%

Shoulder and Ridge Tops: Fifty-two percent of the proposed harvest and fuel treatments would occur on the gentle to moderately steep shoulder and ridge top landforms. These landforms represent half the proposed management of the Whiskey Salvage Planning Area.

[8] Highlead logging was used up until the mid-1970's. The system lacked a tall tower and typically lacked the ability to suspend any portion of the log off the ground. It has been replaced by skyline logging which typically gets one end of the log off the ground.

The shoulder and ridge top landforms make up 39% or the planning area. Mass wasting hazard is rated low to moderately unstable and deep-seated movement or dormant earthflows. Surface water erosion potential is mostly low to moderate with moderate to high runoff infiltration. One-tenth of an acre in this landform has been mapped as unstable and unsuitable for timber management activities. Streams in this landform are moderately incised, often discontinuous, flowing over a bedrock and cobble streambed emerging from shallower soils on slopes greater than 35% and flowing subsurface in the deep flatter section with slopes under 35%. There is a moderate to high risk for rill and gully erosion where surface water is allowed to concentrate, and moderate to high turbidity hazard. The minimum effective ground cover prescription for the gentle dormant earthflows is 65%. Grass competition can be high where the forest floor is opened up to light. Brush competition and windthrow hazard is considered to be low to moderate unless the ground has been severely burned. The Whiskey fire resulted in severely burned soil over seventeen percent of the shoulder and ridgetop landscape. Brush competition would be expected to be higher in these locations. Soils are fine to medium texture and hydrophobicity was not found to be present following precipitation. Within the Whiskey Salvage Planning area these landforms have mostly (81%) moderate to high water storage capacity and low to moderate surface runoff and peak-flow responses.

Colluvial Terrace & Toe Slopes: Twenty-two percent of the proposed harvest and fuel treatments would occur on the gentle to moderately steep colluvial terrace and toe slope landforms. These landforms represent almost one-quarter of the proposed management of the Whiskey Salvage Planning Area. The colluvial terrace and toe slope landforms make up 34% or the planning area. Mass wasting hazard is rated low to moderately unstable and deep-seated movement or dormant earthflows. Surface water erosion potential ranges from low to high with moderate runoff infiltration. Three-tenths of an acre of this landform has been mapped as unstable and unsuitable for timber management activities. Streams in this landform in the planning area are moderately incised, often discontinuous. There is a moderate to high risk for rill and gully erosion where surface water is allowed to concentrate, and moderate to high turbidity hazard. The minimum effective ground cover prescription for the gentle dormant earthflows is 70%. Grass competition can be high where the forest floor is opened up to light. Brush competition and windthrow hazard is considered to be low to moderate unless the ground has been severely burned. The Whiskey fire resulted in severely burned soil over nine percent of the colluvial terrace and toeslope landscape. Brush competition would be expected to be higher in these locations. Soils are fine to medium texture and hydrophobicity was not found to be present following precipitation. Within the Whiskey Salvage Planning area these landforms have mostly (89%) moderate to high water storage capacity and low to moderate surface runoff and peak-flow responses.

Sideslopes: Twenty-six percent of the proposed harvest and fuel treatments would occur on steep to moderately steep sideslopes. These landforms represent a-quarter of the proposed management of the Whiskey Salvage Planning Area. These sideslope landforms make up 26% or the planning area. Mass wasting hazard is rated high over 72% of this landscape. However, surface water erosion potential is rated low to moderate with moderate to high runoff infiltration. A quarter of an acre has been mapped as unstable and unsuitable for timber management activities. Streams in this landform are moderately to deeply incised and seasonal. There is a moderate to high risk for rill and gully erosion where surface water is allowed to concentrate, and moderate turbidity hazard. The minimum effective ground cover prescription for the gentle dormant earthflows is 70%. Brush competition can be high where the forest floor is opened up to light. Brush competition and windthrow hazard is considered to be low to moderate unless the ground has been severely burned. The Whiskey fire resulted in severely burned soil over twenty-three percent of the sideslope landscape. Brush competition would be expected to be

higher in these locations. Soils are fine to medium texture and hydrophobicity was not found to be present following precipitation. Within the Whiskey Salvage Planning area these landforms have low to moderate retention storage capacity over 51% of the sideslope landscape with a higher potential for peakflow response from canopy loss. We can expect exposed subsoil piping and channel increased channel extension as these landscapes readjust increased flows and loss of root strength.

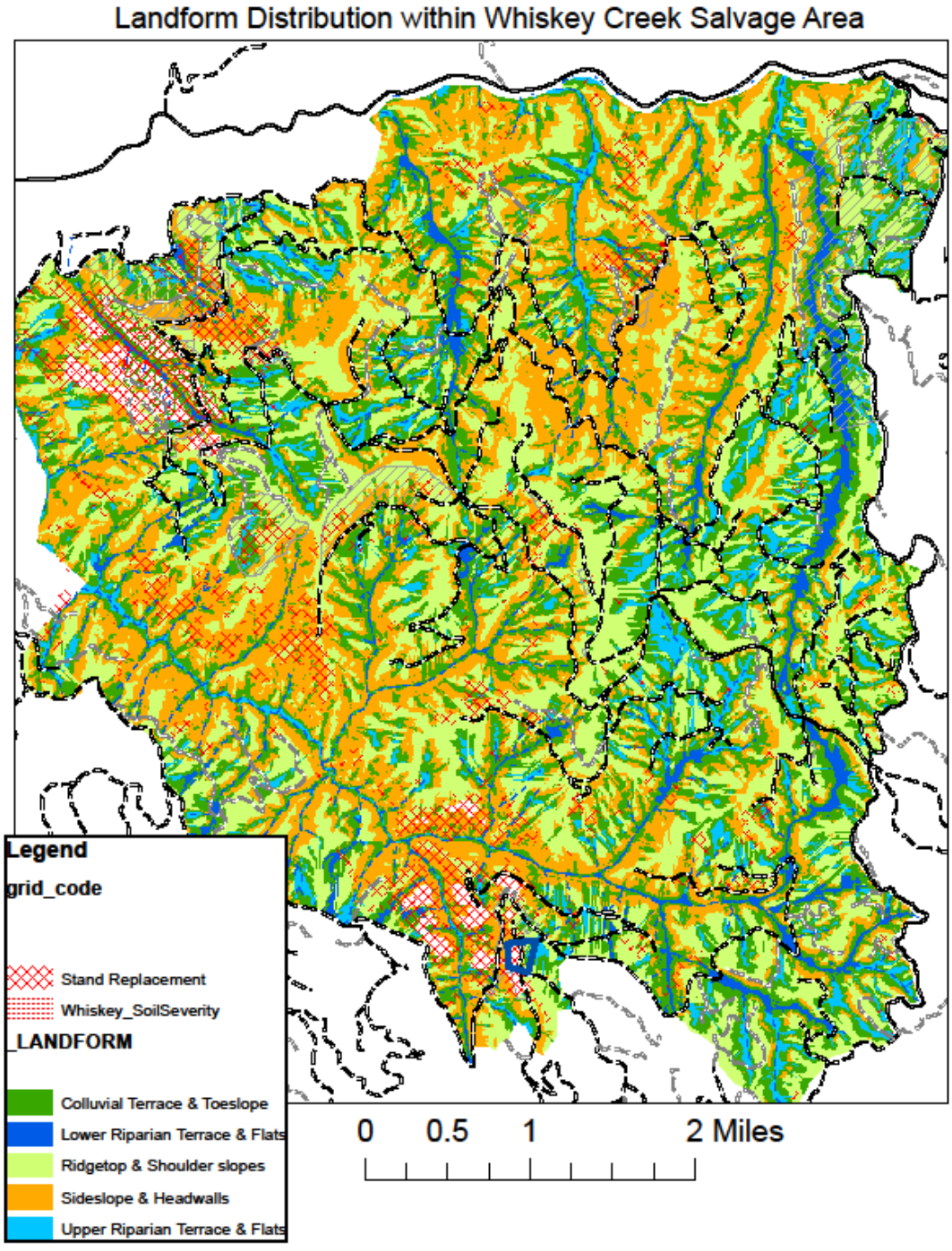


Figure 52. Landform distribution within the Whiskey Salvage Planning Area.

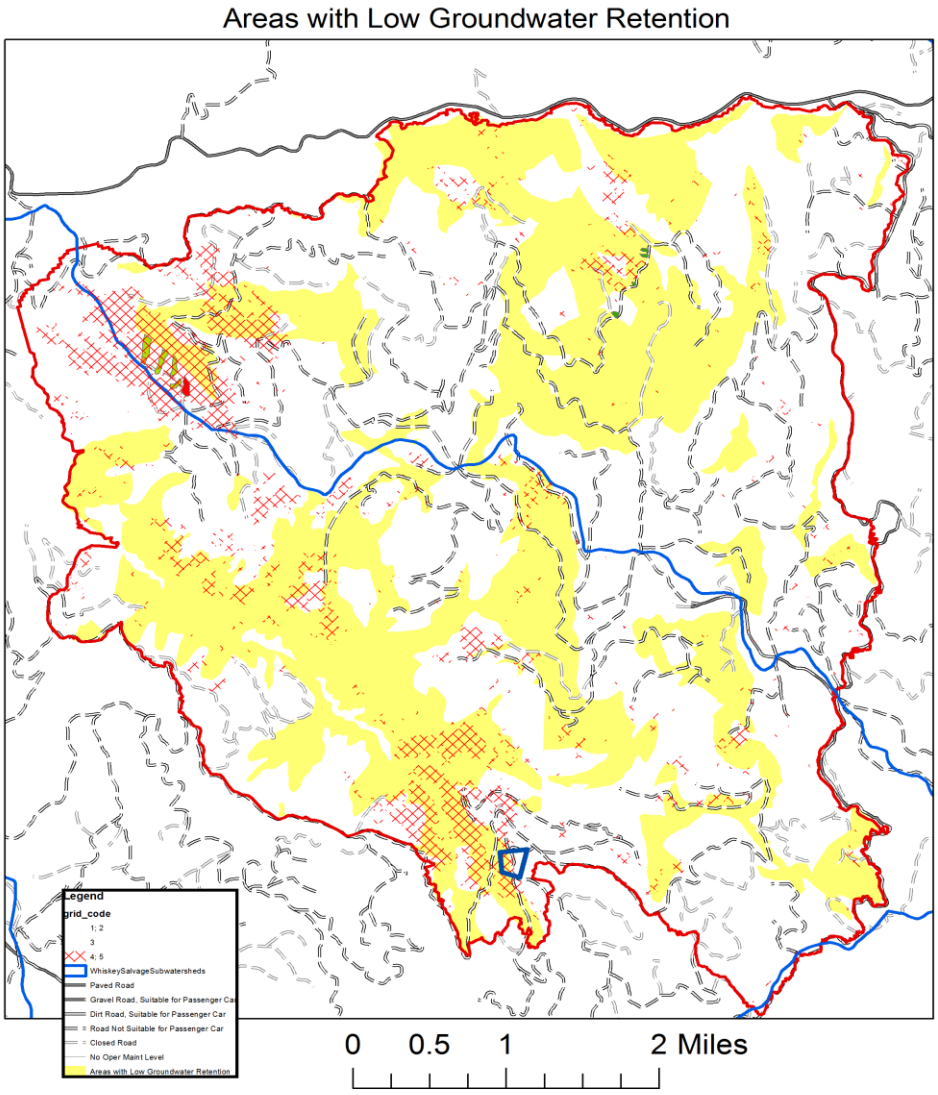


Figure 53. Areas of low storm water retention and groundwater storage capacities within the Whiskey Salvage Planning Area. Locations that are both severely burned and have low water retention and groundwater storage

The desired condition for soils is to keep cumulative impacts of compaction and displacement to less than 20% of the treatment area (LRMP IV-67) and to maintain at least 65% to 85% effective ground cover of stable surface organic material for soil productivity and erosion control (LRMP IV-68, S&G 2 & 3).

Direct and Indirect Effects

The direct and indirect effects are discussed at the scale of the 2,383 acres analyzed for treatment within the 17,868 acre Whiskey Salvage Planning Area. Alternative 2 is a result of this interdisciplinary team assessment. Alternative 2 would prescribe felling and removal of roadside danger trees along 6 miles of road within the Whiskey (6.0 mi.) and Buckeye (0.25 mi.) fires, totaling approximately 188 acres. Create and maintain 960 acres of shaded fuel breaks along 31 miles of major/strategic road systems. Conduct maintenance burning on approximately 1,135 acres to reestablish an appropriate fire frequency on the landscape and reduce large fire potential. Salvage all dead trees and dying larger than 10" in diameter on 35 acres of burned plantations. Salvage dead trees and dying trees on 65 acres of severely burned mature forest. Connected actions include road maintenance, culvert replacement and gate removal. Direct effects would occur immediately as a result of thinning, fuels treatment, and road work while indirect effects would occur in the future as a result of road side fuel breaks to improve firefighter safety and access and facilitate future fire management and suppression tactics.

Under Alternative 1, legacy soil displacement and compaction would remain unchanged at around 150 acres of the treatment units (Table 44). Overall legacy compaction units previously tractor logged averages 25% to 30%. Some areas exceed standards and guidelines for disturbance by as much as 10% to 20% (LRMP pp. IV-68). The action alternatives would re-use many of the pre-existing skid trails and landings. No new system or temporary roads have been proposed.

Seven acres of ground based harvest has been proposed on gentle slope high severity stand replacement. Public concern was expressed that there is not enough flexibility in the use of ground based equipment to allow for economic recovery of timber removal under the Proposed Action. Project Design Features and Best Management Practices were developed for the project, based upon site specific conditions and taking into account the severely burned soils present within harvest units. Umpqua NF LRMP Standards & Guidelines for soil productivity require keeping unacceptable soil conditions under 20% within an activity area. Subsoiling of skid trails and landings is prescribed to meet the cumulative effects of current, past, and present disturbances on these gentle slopes.

The project design features for compaction using subsoiling has the direct effect of reducing disturbance, improving water infiltration, and decreasing the risk of erosion. Alternative 2 would subsoil all temporary roads, landings, and skid trails used by the purchaser as a normal operating procedure. This would treat roughly 3.4 acres of soil disturbance and have the potential to move legacy compaction soils towards a more acceptable condition with increased infiltration and permeability. Soil compaction would remain as a long-term effect (>50 years) if not treated. De-compacting damaged soil through subsoiling landings, and skid trails would increase the soils permeability, and help to disperse surface water runoff to decrease erosion delivery potential. Following harvest and subsoiling, all units in the action alternative would meet soil standards and guidelines for acceptable levels of soil disturbance for both compaction and effective ground cover, thus complying with soils S&G #1 and erosion risk S&G #2 (LRMP pp 67-68). However, full recovery of soil productivity and soil carbon in severely burned soils is a biological process that takes time (10+ years).

Monitoring between 1993 and 1998 found that together, harvest and fuel treatments would typically maintain more than 80% to 90% or more effective ground cover over the gentle to moderately steep landscape and 60% to 70% on the upper end of steep landscapes (USDA Forest Service 1998). Effective ground cover is defined as all herbaceous or stable dead woody materials, synthetic materials and rock fragments >0.75" diameter that cover the surface of the

ground and prevent soil surface erosion (LRMP IV-68). Minimum ground cover recommendations have been prescribed to address both the risk of soil erosion (LRMP IV-68 S&Gs #2 and #3) and the need to maintain soil organic matter for long-term site productivity. Ground cover is pretty much gone in the stand replacement portions of the Whiskey Fire where there was both high soil severity and high canopy severity burning. Ground cover recovery is expected to occur as vegetation sprouts and grows over the next three years. These locations are also some of the steepest and would experience some of the highest erosion rates and sediment delivery potentials within the burn area. Sediment rates would eventually decrease as limbs and snags begin to cover the ground and vegetation recovers. However, there are large portions of the stand replacement that killed the canopy without consuming the needles. This has resulted in large areas within the stand replacement stands with 100% ground cover averaging an inch in depth. By the fall of 2013, mycorrhizal mycelia were binding this needle cover into a stable mat over much of the landscape.

Table 44. Unacceptable Soil Disturbance Estimates

Type of Soil Disturbance	Alt 1	Alt 2
Legacy Compaction (Skid trails and Landings) Legacy Compaction (Abandoned roads)	7 ac 0.4 ac	7 ac 0.4 ac
New Compaction (perm roads)	0 ac	0 ac
Estimated New Compaction (temporary roads) Estimated New Compaction (logging disturbance)	0 ac	0 ac 0.2 ac
Subsoiling (temporary roads) Subsoiling (landings and skid trails)	0 ac	-3 ac -0.4 ac
Estimated total compaction after subsoiling	**7.4 ac**	**4 ac**

Carbon (standing and down woody material, litter, soil organic matter) is a critical element to site productivity and soil development. Most plant available nutrients are retained by the organic fraction in the upper ten inches of forest soils. Fine roots and mychorrizal fungi activity occurs at the litter-soil interface and in the surface two inches of soil. Fine root development plays an important role in soil carbon sequestration (Lal 2005) and long-term soil fertility. Forest soils that are low in organic matter are also less productive. Increased carbon storage in forest soils can be achieved through forest management including site preparation, and fire management. The Whiskey Complex fire primarily burned with low soil severity, with only 19% of the area burning at a moderate or high soil severity. Soil surveys following the Whiskey Fire found hydrophobic soil properties within the severely burned soil areas. Hydrophobicity in soil causes water to collect on the soil surface rather than infiltrate into the ground. Wildfires generally cause soils to be hydrophobic temporarily, which increases water repellency, surface runoff and erosion in post-burn sites. Hydrophobic soils are created when hydrocarbon residue is created after organic material is burnt and soaks into empty pore spaces in the soils, making it impervious to water. Dryness, plant chemicals, fungal mycelia, aromatic oils, and other chemicals also cause hydrophobicity. Although high-clay-content soils have been known to become water-repellent, sand's relatively small surface area per unit of volume makes sands much more susceptible than clays (Karnok and Tucker 2002). Soils in the planning area are

loamy and less likely to be severely hydrophobic. As soils become wet they would change markedly from hydrophobic to hydrophilic within short periods, primarily due to the increase in soil water content (Vogelmann et al. 2013). Coarse - textured, sandy soils are most likely to become water-repellent. Soils tested in the first fall after a wetting rain no longer showed signs of hydrophobicity.

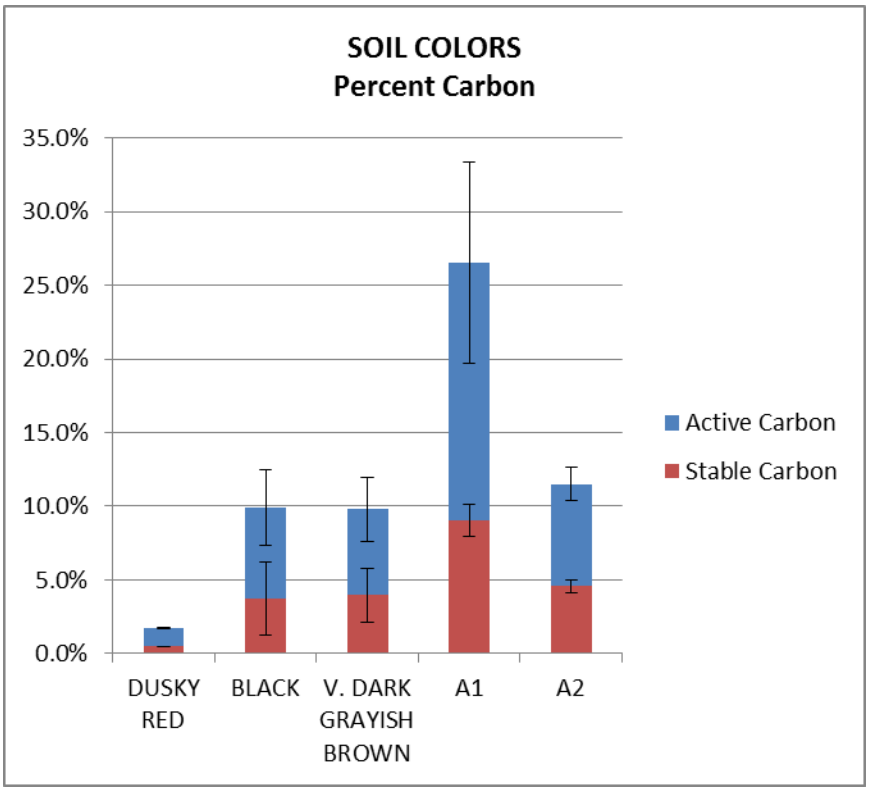


Figure 54. Soil carbon measurements following the Whiskey Fire. A comparison soil carbon levels with changes in soil colors as a result of heating. A1 and A2 where sampled from the upper horizon from an unburned island.

The combined effects of harvest, landings, and fuels treatment would potentially expose soil over about 12% of tractor harvest units and 2% percent of skyline units. The combined amount of potential disturbance anticipated under skyline and ground based harvest in the Whiskey Salvage alternative would be approximately 3% to 4% of the harvested area and considered acceptable for maintaining long-term soil productivity (LRMP IV-68). Seven acres are proposed for tractor harvest and would require that all skid trails, landings, and temporary landings be subsoiled to meet minimum soil disturbance standards (LRMP IV-67, S&G 1). The action alternative is expected to result immeasurable effects to soil carbon when considered with past disturbances and would not be considered outside the range of natural variability for these landscapes. Roadside salvage would be expected to have similar effects as skyline. The risk of wildfire would be a potential indirect effect of increased down wood as snags continue to fall.

Under Alternative 1 (No Action), a future wildfire would potentially increase the risk of reburn on the landscape with increase burning durations through jackpot material, increasing the possibility for erosion and would potentially reduce long-term site productivity on less resilient sites such as portions of the steep side slopes with shallow soils. While the risk of future wildfires would remain high it is expected that the proposed action (Alt 2) would reduce the risk to firefighters accessing key locations in the watershed.

Under the worst case scenario all predicted soil disturbances for Alternative 2 would meet all long-term soil productivity standards and guidelines. There would be no adverse direct, indirect, or cumulative effects associated with connected actions outside an acceptable range.

There would be no new system road or temporary spur road construction. This project would include maintenance work on portions of approximately 44 miles of existing roads including: adding a 4"- 6" gravel lift at all roadside landings; dust abatement and ditch maintenance as needed; grading, shaping, and rocking of road surfaces; constructing, removing, and replacing water bars and rolling dips; replacing one 18" cross drain on FS Road 3114-300; opening and reclosing 3 existing spur roads totaling approximately one mile; roadside brushing; using Coffin Butte quarry as an aggregate source and/or stockpiles of crushed aggregate at Three Cabin quarry and 3-4 existing disposal areas for material cleaned from ditches, road surfaces, and excess excavation. These maintenance items would improve road drainage from its current condition. Improving drainage would better disperse road runoff, preventing water from concentrating and doing future damage.

Cumulative Effects

The Whiskey Salvage planning area is in a mixed severity fire regime dominated by soils that are relatively resilient to disturbance. Alternative 2 is within the parameters of acceptable disturbance and therefore would not add to any past soil impacts and as such adverse cumulative effects to soils outside the current condition is not anticipated.

Considering recent and foreseeable activities in the Beaver Creek subwatershed, there would be a cumulative net beneficial effect to long-term soil productivity. Other sales that have been implemented in the subwatershed in the past ten years have addressed existing levels of legacy compaction, including decommissioning and subsoiling. In addition, fuel treatments have resulted in low impact, low intensity, and short duration burns that result in acceptable levels of soil disturbance[9] while reducing the future potential wildfire risk.

The action alternative, along with other present, recent past and reasonably foreseeable timber sale thinning and fuels management activities within the Beaver Creek subwatershed may potentially reduce the risk of severe wildfire effects to soils and result in a beneficial cumulative effect by creating tactical opportunities for future fire management and fire suppression activities. Alternative 1 has the potential to result in severe soil effects from longer duration wildfire as fuels accumulate, and may continue to add to adverse soil impacts across the landscape. However, because there is no action taken, no cumulative effects can technically occur.

Erosion and Sedimentation

Erosion and sedimentation are geomorphic processes that shape the physical appearance of the landscape and strongly influence aquatic ecosystems. The range of natural variability for sediment delivery to streams and wetlands within the planning area is considered to be very large because erosion processes are influenced by infrequent natural disturbance events such as floods and wildfire. Sedimentation[10] rates to streams are typically inconsequential on a year to year basis but can spike several orders of magnitude during large storm events. Land management has the potential to accelerate erosion rates and the volume of sediment entering

[9] Fuel monitoring fuels summaries from 1998, on file at the Umpqua National Forest.

[10] Sedimentation pertains to the deposition of settling of rock and soil materials in an aquatic environment.

streams and wetlands. Within the planning area sediment enters the aquatic environment through mass wasting, surface erosion and fluvial erosion.

Disturbed WEPP from the Forest Service Interface for the Watershed Erosion Prediction Project computer model (USDA Forest Service 1999) was used to predict sediment recovery over three years with management occurring in year two. While modeling all actions in a single year resulted in an elevated three year sediment yield 29% to 72% higher during a 50-year storm return, the probability for delivery was only 1% higher, than under the no action alternative (Alternative 1). Any increases in sediment delivery current condition would be of short duration and would not further delay recovery of the watershed. With Alternative 2 there would be no measurable or additional cumulative water quality effects over background conditions.

Table 45. Estimates of sediment delivery potentials for Whiskey Salvage Alternatives using WEPP modeling with management in year two. (Alternative 1 – No Action; Alternative 2 – Proposed Action)

SEDIMENT DELIVERY POTENTIALS		2013 to 2016 ALTERNATIVE 1				2013 to 2016 ALTERNATIVE 2				2013 to 2016 Potential Change		
	RETURN PERIOD	ton/acre/year			Delivery Probability	ton/acre/year			Delivery Probability	ton/acre/year		
SKYLINE UNITS	2.5	165	to	499		210	to	642		*45*	*to*	*143*
	50	1,657	to	3,821	57%	2,099	to	5,150	73%	*442*	*to*	*1,329*
GROUNDBASED UNITS	2.5	0	to	16		0	to	20		*0*	*to*	*4*
	50	3	to	131	69%	3	to	175	70%	*-1*	*to*	*44*
MAINTENANCE BURN UNITS	2.5	0	to	231		0	to	624		*0*	*to*	*393*
	50	174	to	5,002	47%	288	to	10,060	47%	*114*	*to*	*5,058*
FUEL BREAKS UNITS	2.5	0	to	21		0	to	93		*0*	*to*	*72*
	50	0	to	2,708	58%	0	to	4,736	58%	*0*	*to*	*2,027*
FUEL BREAKS (RIPARIAN	2.5	1	to	7		1	to	10		*0*	*to*	*3*
	50	12	to	148	36%	0	to	226	54%	*-12*	*to*	*78*
TOTALS	2.5	166	to	774		211	to	1,389		*27%*	*to*	*80%*
	50	1,846	to	11,810	49%	2,389	to	20,346	50%	*29%*	*to*	*72%*

Log haul would be limited to the normal operating season, described as June 1 to October 31 and if fall dry conditions persist longer than normal, a conditional season haul which can go as late as the end of November 30th may be permitted by the line officer. Wet season haul would not occur with this project. Road maintenance prior to log haul would improve road drainage and assure stream extensions due to ditch lines are minimized by cleaning culverts and adding cross drains where necessary. In addition, blading and reshaping roads, where necessary, would decrease water channeling and ponding on the road surface. Haul within any time period (normal operating season or conditional haul period) would not occur when 1/4 inch or more of precipitation occurs within a 48 hr period of time. Mitigation or suspension of haul would occur if

there is road distress or off-site sediment movement. Road damage or Sediment delivery to a stream would be considered a breach of the Purchaser's contract.

Mass Wasting

Mass wasting is the dominant mechanism of sediment production within the temperate Western Cascade forests of the Pacific Northwest (Naimen, et al. 1990), which includes the Beaver Creek watershed. The potential mass wasting processes within the planning area include rapid-shallow landslides such as debris avalanches and in-channel debris flows primary in the shoulder and ridgetop (29%) and sideslope landscapes (72%), and slow-moving deeper-seated forms of mass-movement that include rotational slumps, earthflows, and soil creep in the colluvial terrace and toe slope landscapes (31%) landscapes and the shoulder and ridgetop (39%). Topography has a strong influence on the form of a landslide.

Table 46. Mass Soil Movement Hazards

LANDFORM	Mass Soil Movement Hazards			
	Low to Moderate	Deep	High	Extreme
Alluvial Terrace	78%	9%	3%	10%
Colluvial Terrace & Toe Slope	53%	31%	16%	1%
Shoulder & Ridgetop	31%	39%	29%	0%
Sideslope	11%	17%	72%	0%

Less than one acre (0.65 acre) was mapped as unstable and unsuitable for management activities. The unstable features that were identified occurred on steep severely burned slopes where subsurface laminar water flow creates soil piping which can collapse to form deep ruts, stream channel extension, and occasional mass failure (Figure 55). Other sites were found in unstable road fill slopes where large wood in the fill had been consumed. No activities would occur on unstable soils. Neither Alternative 1 nor 2 would have an effect on slope stability over background conditions. Therefore there would not be a direct, indirect, or cumulative effect on mass soil movement.

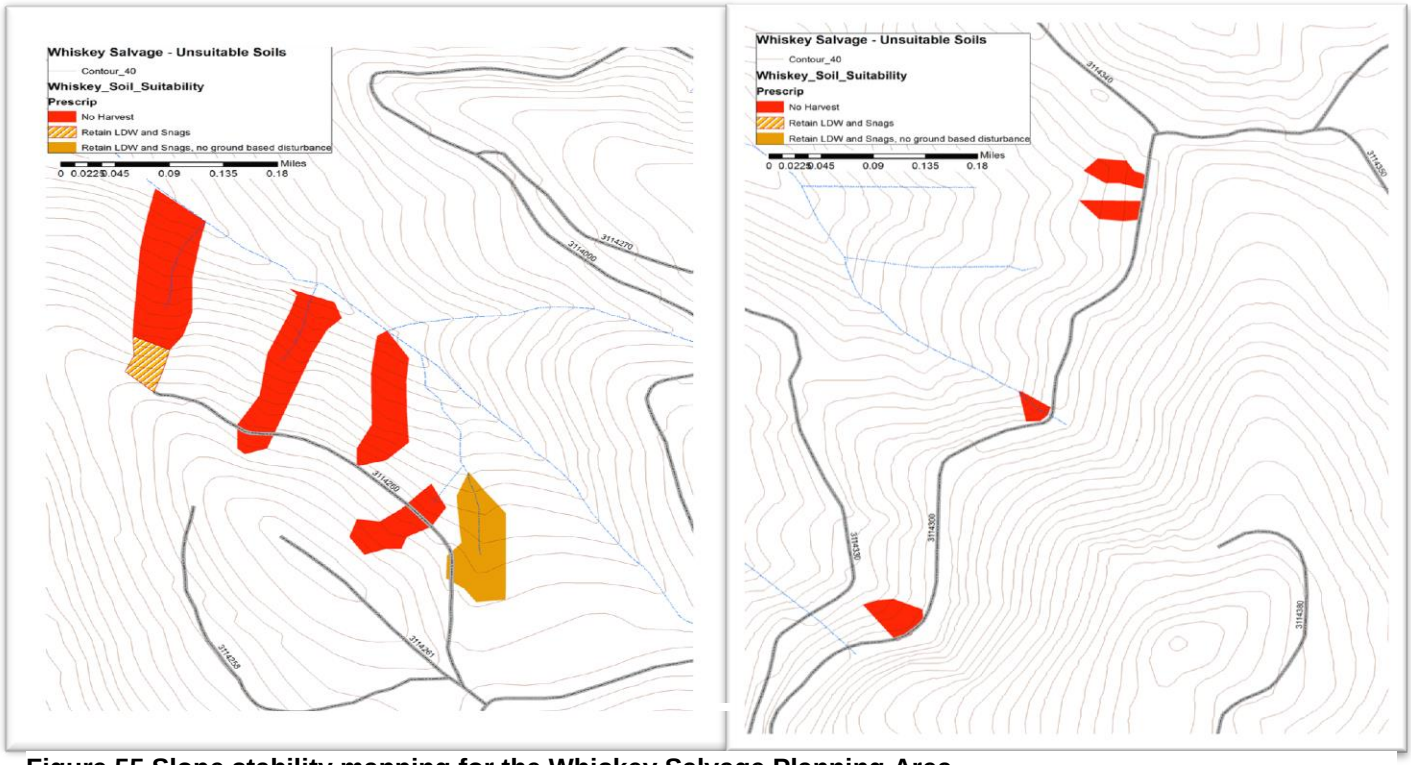


Figure 55 Slope stability mapping for the Whiskey Salvage Planning Area.

Climate Change

Guidance for considering greenhouse gas emissions and climate change were provided by Rationale for Project-Scale Effects Conclusions on Climate Change (R6 Memo January 14, 2011); Climate Change Considerations in Project Level NEPA Analysis (Washington Office Memo January 13, 2009); and Executive Order 13514 of October 5, 2009[11].

Effects of climate change on the project area

Projected effects of future climate change to the Whiskey Salvage Planning Area include (BASC 2010, Ryan et al. 2010):

- Decreased forest growth in warmer climates;
- Water availability will decrease where rivers are fed by snowpack;
- Earlier aquifer recharge with earlier base flow discharge to streams
- Increased insect outbreaks
- Increased danger of wildfire

As forest carbon storage increases, there is a potential for greater loss of carbon stores from forest fires, and insect outbreaks. Climate change threatens to amplify these risks by increasing the frequency of these disturbances. As climate change increases the frequency of disturbance, many forests could release substantial amounts of carbon to the atmosphere over the next 50-100 years. Climate change could also increase soil decomposition, leading to carbon losses from a part of the ecosystem that we consider to be relatively stable. At the

[11] Executive Order 13514—Federal Leadership in Environmental, Energy, and Economic Performance. Federal Register /Vol. 74, No. 194 /Thursday, October 8, 2009 / Presidential Documents

landscape level over the long term, disturbance would not cause a net loss of forest carbon as long as the forest regenerates. But if the frequency and/or severity of fire disturbance increase substantially, long-term carbon storage at the landscape scale would be reduced because the fraction of the landscape with large older trees (that have high carbon stores) would decline (Ryan et al. 2010).

The timing of annual snowpack discharge would also be affected by predicted changes in climate. Regional warming of the past several decades has affected the shape of the annual hydrograph, with the temporal center (mid-point of total annual streamflow) of the hydrograph occurring earlier in the season and reduction of minimum flows (Jefferson et al, 2006). Continued warming is predicted to lead to loss of snowpack and continued decline in minimum flows. Whiskey Salvage Planning Area is located within the transitional snow zone. The action alternative would allow more snow to accumulate in some small openings due to the reduction in canopy; however snowpacks are projected to be greater under the no-action alternative due to continued loss of canopy due to potential wildfire. Young stands use more water which could offset any increases in minimum streamflows due to canopy loss.

Most recent studies on the interaction between climate change and invasive plants conclude that climate change is likely to favor invasive plant species to the detriment of native plant species for individual ecosystems (Chornesky et al. 2005, Climate Change Science Program 2008, Dukes and Mooney 1999, Hellmann et al. 2008, Pyke et al. 2008). In some studies, invasive plant species have demonstrated increased growth rates, size, seed production, and carbon content in the presence of elevated CO_2 levels (Rogers et al. 2008, Rogers et al. 2005, Smith et al. 2000, Ziska 2003). Warming climates may remove elevational barriers to invasive plant distribution that currently exist (Tausch 2008). Many invasive plants are species that can thrive in the presence of disturbance and other environmental stressors, have broad climatic tolerances, large geographic ranges, and possess other characteristics that facilitate rapid range shifts. The predicted changes in climate are thought to contribute additional stressors on ecosystems, including those on National Forests, making them more susceptible to invasion and establishment of invasive plant species (Joyce et al. 2008). Predicted conditions may also make management of invasive species more difficult. Some current treatments used on invasive plants may be less effective under conditions of climate change scenarios and/or elevated CO_2 (Hellmann et al. 2008, Pike et al. 2008, Ziska, Faulkner, and Lydon 2004). Predicting how climate change would affect invasive plants, and invasive plant management, at the local or even regional scale is more difficult to deduce than are these general indications. Anticipated changes in the climate for the Pacific Northwest (e.g. more rain, less snow, warmer temperatures (Mote 2004, Mote et al. 1999, National Assessment Synthesis Team 2000) or elevated CO_2 may not be realized at a local area, particularly within the time frame of this analysis. Growth of invasive plants under elevated CO_2 conditions would also be influenced by environmental conditions such as soil moisture, nutrient availability, and the plant community in which the invasive species occurs (Cipollini, Drake and Whigham 1993; Curtis, Drake, and Whigham 1989; Dukes and Mooney 1999; Johnson et al. 1993; Taylor and Potvin 1997). The complex interaction of multiple and uncertain variables make site-specific predictions speculative.

Effects of the project area on Climate Change.

The proposed action would primarily affect dead trees and would not result in additional loss of carbon sequestration capacity. This scope and degree of change would be minor relative to the amount of forested land within the Whiskey Salvage Planning Area as a whole. Currently, there are no Federal statutes, regulatory standards, or policy direction on the significance of such effects on which to weigh Alternative 2. As greenhouse gas emissions are integrated across the

global atmosphere, it is not possible to determine the cumulative impact on global climate from emissions associated with the Whiskey Salvage alternatives (Climate Change Considerations in Project Level NEPA Analysis, January 13, 2009 WO memo).

Recreation and Visuals

The Tiller Whiskey Complex Fire Salvage Project is proposed by the Tiller Ranger District to ensure public and forest worker safety, salvage burned timber and reduce fuel loading in the areas affected by the Whiskey and Buckeye fires in 2013. Management activities would occur in two Scenic Allocations (Maximum Modification and Partial Retention) as well as two different management allocation areas (MA's 10 and 11). There is a popular recreation rental cabin, motorized trails and scenic driving opportunities within the project area, and popular campgrounds just outside the area. Proposed activities would help ensure public safety and potentially reduce the chance of catastrophic wildfire in the future.

Regulatory Framework

- Umpqua National Forest Plan land management allocations: 10 and 11
- 1995 Jackson Creek Watershed Analysis
- 1996 Buckeye/Zinc Watershed Analysis
- 2004 Upper South Umpqua Watershed Analysis
- 2008 South Umpqua Sub-basin Water Quality Restoration Plan

Existing Condition

The 28 (South Umpqua River) road is an inventoried sensitivity level 2 (visually sensitive) route and about 2 miles of this route fall within the project area. This portion of the 28 road lies within the area that was burned in the 2013 Buckeye Fire. The 28 road is used by hunters, campers and recreationists to access campgrounds, wilderness areas, swimming holes and hunting locations on the forest. The 28 road has 2 miles that fall within the salvage area. The 28 road, within the fire perimeter, has mostly open views to the river and show evidence of the fire on either side of the river. These 2 miles have no planned activities. This corridor is managed as Roaded Natural on the Recreation Opportunity Spectrum (ROS).

Whisky Camp Guard Station is a popular year round rental cabin in Section 32 of Township 30 South, Range 1 East. The Whiskey Fire burned around the Whiskey Camp Guard Station in 2013. The burn was mostly of moderate severity in the vicinity of the cabin. From the cabin visitors can see the effects of the fire. These affects are blackened trees and ground fuels in the near vicinity of the cabin. Some of the smaller trees have been killed but most of the larger diameter trees remain alive. The cutting, piling and burning of the smaller trees, up to 7.9" DBH and smaller, within 150' of the 3114-600 road would reduce the risk for future large wildfires. The Whiskey Camp Guard Station is managed as Roaded Natural.

Trails 1426, 1426A, and 1575 are within the project area and provide 14.3 miles of motorized, multiple use single track opportunities. The Whiskey Fire burned through the trail areas with a varying degree of severity and destroyed the Bunchgrass Shelter. The trail system is located within the area currently closed. The Whiskey Salvage incorporates a danger tree removal principal that would make the access roads available to the public and allow for Forest visitors to return to the area. During the height of use the Bunchgrass trail system receives about 200 user days a week. This trail system is

mostly Roaded Modified with approximately 20 acres of Roaded Natural near the Bunchgrass Trailhead.

Other popular recreation activities in the area include; dispersed camping, hunting, fuel wood cutting, and Christmas tree harvesting. The Whiskey Salvage would re-open these areas to the public by reducing roadside hazards.

Black Canyon Camp is just outside the Whiskey Salvage boundary. This camp attracts summer and fall visitors. There would be approximately ½ mile of gravel road that would receive log truck traffic from the main 29 road to the entrance of Black Canyon Camp. The salvage would mitigate danger trees within this ½ mile stretch. This camp falls is managed Roaded Modified on the ROS.

The Tallest Sugar Pine resides on the 2950 road. There would be approximately ½ mile of gravel road that would receive log truck traffic from the main 29 road to the entrance to the 2950 road upon which the tree resides. The salvage would mitigate danger trees within this ½ mile stretch. The Tallest Sugar Pine receives approximately 8 visitors a day during the summer months.

Desired Condition

Direction for the desired scenic condition for the area is described in the Umpqua Forest Plan and varies by management allocation. There are units within two different scenic management allocations in the planning area. These different allocations vary in the desired condition and the amount of activity that can dominate the landscape. This range is described below.

Management Allocation	Salvage Acres	Roadside Removal Acres	Shaded Fuel Break*	Maintenance Burn Acres*	Landscape condition	Definition
Maximum Modification	Alt 2: 100	185	903	1,047	Heavily altered	Human activity may dominate the characteristic landscape, but it should appear as a natural occurrence when viewed from a distance.
Partial Retention	Alt 2: 0	3	57	88	Appears slightly altered	Humans' activities may be evident, but are subordinate to the characteristic landscape.

Methodology

The analysis methods used to evaluate the effects of the alternatives on scenery resources were based on a review of the Forest Plan for consistency with applicable standards and guidelines, and Scenery Management Systems handbook direction. Field reviews of the proposed units, from critical viewpoints, in conjunction with GIS geo-spatial mapping was used to determine design criteria, mitigations and evaluate project effects on visual quality.

Incomplete and Unavailable Information

Limited data is available for many recreation activities such as hunting, berry picking and OHV riding. Observations were made in the field when conducting analysis, however this was limited. The "Social Acceptability" of forest management practices is an ever changing value that changes with societal views, what was once a reasonable action may not be now and vice

versa (Brunson and Shindler, 2004). So the public's perception of visual changes to the forest is somewhat difficult to predict.

Direct and Indirect Effects – Alternative 1

Alternative 1 would leave the area in its current state and not modify any hazards. This alternative would not reduce the roadside hazards to the public that allows for access to the motorized trails as well as access to approximately 16,000 acres of land for recreation use.

Direct and Indirect Effects – Alternative 2

Alternative 2 would have indirect and direct effects on the recreation resources in the Whiskey Salvage area.

The proposed fuel break on the 27-900 road would have minimal effect on the 28 road (South Umpqua River), South Umpqua Campground or the Ash Flat Campground, due to the fact that this proposed fuel break is not visible from any of these locations. A small section of the 27-900 road resides within a sensitivity level 2 foreground. Effects from activities would be chainsaw noise, small stumps and handpiles. Under the proposed action the area would meet standards and guidelines for both visuals and recreation post sale.

The proposed shaded fuel break for the 3114-600 road could have short term effects to cabin users and the visuals of the area. Operations creating noise, dust and smoke could deter people from renting the cabin or disturb their stay. There effects are expected to be short term (3-4 weeks) and given that the cabin is open year around opportunities still exist. This fuel break targets 7.9" DBH or smaller trees along the road and within view from the Whiskey Camp Guard Station. These activities would bring the forest landscape more into compliance with the desired future condition as stated in the forest plan and the effects would be unnoticed by most forest users. This fuels treatment would decrease the potential for catastrophic wildfire in and around the Whiskey Camp area leaving the area more fire resilient in the future.

The closest roadside treatment unit is approximately ½ mile away from the Whisky Camp rental cabin while the area units are approximately 3 miles away. These treatments could have minimal effect on the recreational experience due to noise and increased traffic on the road system.

Trails 1426, 1426A, and 1575 intersect the area roads in numerous places. The trail users would experience vegetative management activities. Short term effects to users through trail closures (less than 2 weeks) for safety reasons could be possible.

This visual disturbance from these management activities would be short term (stumps and slash for approximately 4 years) and are consistent with the VQO management guidelines for the area.

The Visual Quality Objective that dominates the Whiskey Salvage planning area is maximum modification. Maximum modification encompasses approximately 16,992 acres of the 17,868 acre planning area while the remaining 876 acres fall into partial retention. Maximum modification does not distinguish distance zones, and instead includes all zones with a site specific analysis of suggested range openings (acres) and a maximum percentage of created openings at one time at 33%. Management prescriptions for the project meet these objectives.

Approximately 3 acres (Polygon 7) of the roadside salvage portion of the project fall into the VQO of partial retention. Approximately 88 acres of maintenance burning and approximately 57 acres of the shaded fuel break fall within the VQO of partial retention.

There would be short term (1 to 2 year) negative visual effects from slash and stumps, specifically during project implementation, but these effects should diminish over time and long term benefits such as plant diversity and increased site distances should prevail. The Whiskey Salvage management activities are likely to benefit recreational opportunities in the area such as cross country hiking, hunting, wildlife watching, and general nature viewing.

The maintenance burns totaling approximately 1300 acres would take place every 7-10 years. There may be restricted access to these areas for a few days to a week every decade or so and recreationists may have some smoke impacts. Approximately 110 acres of maintenance burning fall within the VQO of partial retention. These 110 acres would need to follow the VQO for partial retention so the activities need to remain subordinate to the characteristic landscape.

Wild and Scenic Rivers

There are no Wild and Scenic Rivers in the project area. The FEIS Appendices – Volume 2, Appendix E-5, Table E-2 shows that Jackson Creek and The South Umpqua River do not meet definition of "Outstandingly Remarkable". (USDA, 1990b)

Inventoried Roadless Areas and Potential Wilderness Areas

There are no Inventoried Roadless Areas (IRA) or Potential Wilderness Areas (PWA) within the project area. The Donegan IRA is located approximately 600' from the southeast corner of the project area. The treatment in this vicinity is shaded fuel break with the nearest roadside removal unit, which is about ¾ acre, located approximately 1/3rd mile away.

Cumulative Effects

Cumulative Effects – Scenery

The proposed treatments when combined with past, present and reasonable foreseeable actions would not degrade any of the scenic allocations out of compliance with the Forest plan**.** Past treatments have occurred in the area, but are considered recovered under forest plan guidelines.

The fires of 2013 have left the area, as seen from viewpoints, in a mosaic pattern. Some areas burned intensely while the fire crept in other places. Burning the area on a 7-10 year basis would allow for a more natural looking fire regime and still comply with VQO objectives. The salvage areas would comply with VQO and may increase the safety of Forest visitors by opening the line of sight while driving on the road system and giving visitors a maintained road. Opening the view from the road for Forest visitors should give them a better opportunity to view wildlife.

Cumulative Effects – Recreation

The proposed treatments when combined with past, present and reasonable foreseeable actions would be within management direction for the ROS classes as designated by the forest plan. Forest visitors would experience increased dust, noise and traffic while the haul occurs.

Conclusion

Given the relative small amount of acreage being harvested in relation to the planning area and district the effects to both scenic resources and recreation resources over time and space for the life of the project should be minimal. Effects can be lessened by implementing best

management practices. Slight changes to the landscapes natural appearance may be visible for a short time in some areas. Some changes (stumps, slash) would blend quickly while longer term changes (gaps, road cuts) would take a little longer, but would not dominate the landscape. After the initial re-opening of the area some recreation activity may be displaced during on-going project implementation.

Transportation

Approximately 162 miles of road are contained within the Whiskey Planning area. The composition of roads are 29 miles of Maintenance Level 1 (18%), 119 miles of Maintenance Level 2 (74%), 7 miles of Maintenance Level 3 (4%), and 7 miles of Maintenance Level 4 (4%). Road surfaces within the planning area are primarily gravel (129 miles, 80%), with some native surface (26 miles, 16%) and asphalt (7 miles, 4%). Maintenance Level 1 roads are primarily single lane native surface spur roads, many of which are blocked, constructed for the purpose of accessing timber harvest units. Maintenance Level 2 roads are single lane roads designed as haul routes, are most suitable for high clearance vehicles and provide for the bulk of road use for both the Forest Service and the public. Maintenance Level 3 roads are single lane suitable for passenger vehicles, and Maintenance Level 4 are double lane, paved roads.

Road construction within the planning area has occurred between 1930 and 1991, with 4% of the construction occurring in the 1930's, 19% in the 1950's, 24% in the 1960's, 30% in the 1970's, 22% in the 1980's and 1% in the 1990's. Approximately 77% of roads and culverts within the planning area are over 40 years old, resulting in an increased need to replace culverts and an increased cost to maintain roads for log haul and general use.

During the project planning process, an assessment of Maintenance Level 2 roads affected by the fire and needed for continued use by the Forest Service and the public was conducted (Table 47) and approximately 14.3 miles were identified as needed.

Table 47. Spur Road Analysis.

Road Number	Length (mi.)	Maintenance Level	Analysis
2980-800	6.4	2	Provides only access on South Umpqua facial area between Zinc and Buckeye Creeks. Potential dispersed campsite at end of road. Needed for fire management.
3114-300	4.2	2	Provides only access to the west side of Whiskey Creek and the Whiskey Creek facial area on Jackson Creek. Needed for fire management.
3114-490	2.4	2	Provides access to vista overlooking lower Beaver Creek and Bunchgrass Meadows, a trail system and a historic grave. Provides access to Green Prairie, a popular camping, hunting and hiking area. Needed for fire management.

Road Number	Length (mi.)	Maintenance Level	Analysis
3114-600	1.1	2	Access *not* needed at this time. Segment north of Beaver Creek blocked by downed logs, located within owl core. Beaver Creek culvert failing.
3114-631	1.3	2	Provides access to the only vista (overlook) in upper Beaver Creek. Needed for fire management, used by sightseers and hunters.
3114-660	2.0	2	Access *not* needed at this time. Currently closed by downed trees and small landslides. Minimal access no covered by 3114-600. French drain needs to be covered to protect wildlife.
3114-690	1.1	2	Access *not* needed at this time. Currently blocked with downed logs, located within owl core. Beaver Creek culvert failing.

Heritage Resources

The affected environment for heritage resources falls within the areas of proposed activities with the potential to affect those resources (timber harvest, fuels treatment, road reconstruction, subsoiling, and landing construction, etc.).

Forest Plan goals and objectives and Cultural Resource (Heritage) Standards and Guidelines are listed in Chapter IV, pages 28-30 of the Umpqua National Forest LRMP. All applicable Standards and Guidelines have been met through the inventory and evaluation of any historic or prehistoric heritage resources. All historic properties eligible to the Register of Historic Places have been avoided.

A heritage resource inventory was conducted as part of the compliance process of section 106 of the National Historic Preservation Act of 1966. The Whiskey Complex Fire Salvage reconnaissance report would be been completed and submitted to the State Historic Preservation Office (SHPO) as required. The Whiskey cultural resources inventory and monitoring meets the criteria for Case-by Case Review required by the Programmatic Agreement among the United States Department of Agriculture Forest Service, Pacific Northwest Region (Region 6), the Advisory Council on Historic Preservation, and the Oregon State Historic Preservation Officer Regarding Cultural Resources Management in the State of Oregon (PA).

A small potential exists for unidentified heritage resources in the Whiskey Complex project area. Mitigation measures described in Chapter 2 would protect undiscovered heritage resources, lowering the potential for effects to these resources.

Overall, proposed project activities have met the criteria of historic properties avoided for known heritage resources. Standard contract provisions would provide for protection of heritage resources discovered during project implementation.

The Umpqua National Forest sent a cover letter with the quarterly copies of the Schedule of Proposed Action (SOPA) to each of the Tribes. Each quarter, the cover letter highlights new projects and projects that may be of interest to the Tribes; the Whiskey Complex Fire Salvage project was identified as a new project when the project was first initiated. The Confederated Tribes of the Grand Ronde, Confederated Tribes of the Siletz, and the Cow Creek Band of Umpqua Tribe of Indians were contacted by letter. Other contacts in the form of phone calls, letters, and opportunities to participate in public tours and public meetings, and meetings at Tribal offices were also utilized to interact with the Tribes. No interest in this project was expressed by any of the Tribes.

Under the treaties with the Tribes, no trust resources or reserved treaty rights are given for the lands managed by the Umpqua National Forest. Therefore, no effects to trust resources or reserved treaty rights would occur with any of the alternatives.

Based on the results of the heritage surveys, review and mitigation of known resources, mitigation of undiscovered sites, and consultation with tribes, there would be no direct, indirect, or cumulative effects on the known heritage resources as the result of implementing any of the proposed Whiskey Complex Fire Salvage alternatives, because all known sites eligible to the National Register of Historic Places occur outside of the area affected by the project. The No Action alternative would have no direct or cumulative effect on any heritage resources.

SPECIFICALLY REQUIRED and OTHER DISCLOSURES

Air Quality and Smoke Management

Standards for ambient air quality[12] are set by the Environmental Protection Agency (EPA) and are designed to protect human health and welfare. Air quality can be impacted by the presence of particulate matter and other pollutants produced by both prescribed burning and wildfire[13]. Although smoke from wildfire is considered a natural event by the EPA's Natural Events Policy (air quality standards do not apply), smoke generated from prescribed burning must meet federal and state air quality standards set forth in the Clean Air Act (CAA) (section 160). All activities associated with this project would be implemented to meet standards in the CAA.

The Forest Service is required to file a burn plan with Oregon Department of Environmental Quality (ODEQ) and would comply with the strict standards for air quality.

ODEQ would not provide approval for burning when atmospheric conditions exist that may result in an inversion or other atmospheric conditions that would cause air quality violations. ODEQ strictly regulates burning; as such, there is very little likelihood that the effects to air quality from Alternative 2 will exceed air quality standards, even when combined with other burning and pollution sources.

Regional Haze Rule was designed by the EPA to call on states to establish goals for improving visibility in mandatory Class I areas and to develop long term strategies for reducing emissions of air pollutants that cause visibility impairment to these areas. At this time, Oregon does not yet have a State Implementation Strategy (SIS) to deal with regional haze or visibility impairment so no standards currently exist. However, the importance of visibility in these areas,

[12] Ambient air quality is defined under the Clean Air Act of 1963 as the air quality outside of industrial site boundaries.
[13] Although prescribed burning affects air quality in ways similar to wildfire, it offers some advantages over wildfire. Prescribed burning plans are developed and implemented to minimize impacts on the airshed by the consideration of atmospheric conditions, season of burn (e.g., burning is restricted between July 1 to September 15 under the Oregon Visibility Protection Plan), fuel and duff moisture, diurnal wind shifts, ignition techniques and rapid mop-up.

such as nearby Crater Lake National Park, is recognized and burn prescriptions would be designed to minimize potential for smoke intrusion in these areas.

Since prescribed burning is not a stationary source of pollutants and because no burning associated with this project is within a non-attainment area, Prevention of Significant Deterioration, and the conformity provisions of the CAA are not applicable.

Other air quality impacts that may occur related to prescribed burning include: temporary and localized loss of aesthetic qualities due to visibility reduction, reduced visibility on highways and roads causing potential safety issues, health problems for sensitive people (i.e. asthma), and human discomfort. These impacts may occur at pollutant levels that are within air quality standards. Smoke impacts to safety, human health or visibility that occur within air quality standards are termed "nuisance smoke".

The closest smoke sensitive receptors[14] are Eagle Point (30 miles), Roseburg (29 miles) and Central Point/Medford (37 miles) from the project. The closest Class I Airsheds are Diamond Peak Wilderness (34 miles) and Crater Lake National Park (26 miles) from the project. Burn plans would be designed to minimize the chance that these sensitive and protected areas would be impacted by project activities.

Wetlands and Floodplains

Floodplains are associated with perennial streams and vary from only a few feet to much larger areas depending on the size of the stream and the topography of the streambanks and surrounding area. Alternative 2 proposes limbing and lop and scatter of fuels in riparian areas. Alternative 2 would also include general road maintenance activities, and culvert replacement. Most of these actions would be improvements over the existing condition by reducing erosional risks. No new occupancy of project floodplains would occur; road work would occur within the original locations.

No effects to floodplains associated with timber harvest under Alternative 2 would occur since perennial streams would receive no-cut buffers.

No adverse direct, indirect, or cumulative effects to floodplains are expected to occur.

The environmental effects of road reconstruction within the floodplain are consistent with the Standards and Guidelines for the Umpqua National Forest LRMP and have been evaluated and declared in the LRMP Final EIS (March 1990). Since the activities in this project follow those Standards and Guidelines, this activity would not be declared separately for this sale.

Potential impacts to wetlands are described under unique habitats in the terrestrial section and under Riparian Reserves in the aquatic section of Chapter 3. Alternative 2 is consistent with objective 7 of the Aquatic Conservation Strategy, which calls for the maintenance of water table elevations in meadows and wetlands. Given the design features and mitigation incorporated into Alternative 2, no adverse direct, indirect, or cumulative effects to wetlands are anticipated under the Tiller Whiskey Complex Fire Salvage project action alternative.

Potential Wilderness Areas

Section 1909.12, Chapter 70 of the Forest Service Handbook (FSH) addresses lands suitable for possible designation as potential wilderness areas. Areas of potential wilderness are identified using inventory criteria found in FSH 1909.12, Chapter 71. This inventory of potential wilderness is not a land designation, nor does it imply or impart any particular level of

[14] Smoke Sensitive Receptors are areas designated by the state board of forestry, in consultation with the Department of Environmental Quality, that is provided the highest level of protection under the smoke management plan because of its past history of smoke incidents, density of population or other special legal status.

management direction or protection. The inventory is not an evaluation of potential wilderness, as described in Chapter 72, or a preliminary administrative recommendation for wilderness designation, as described in Chapter 73. The inventory of potential wilderness areas does not change existing administrative boundaries.

To be considered a potential wilderness, an area must meet criteria 1 and 3, or 2 and 3 as described in section 71.1, as shown below:

1. Areas contain 5,000 acres or more.
2. Areas contain less than 5,000 acres, but can meet one or more of the following criteria:
    a. Areas can be preserved due to physical terrain and natural conditions.
    b. Areas are self-contained ecosystems, such as an island, that can be effectively managed as a separate unit of the National Wilderness Preservation System.
    c. Areas are contiguous to existing wilderness, primitive areas, Administration-endorsed wilderness, or potential wilderness in other Federal ownership, regardless of their size.
3. Areas do not contain forest roads (36 CFR 212.1) or other permanently authorized roads, except as permitted in areas east of the 100 meridian.

No potential wilderness areas were identified within the Tiller Whiskey Complex Fire Salvage project area boundary because:

1. There are no areas within the project area boundary that contain 5,000 acres or more that do not contain forest roads; therefore criteria 1 and 3 are not met; and

2. While there is an area within the project area boundary adjacent to and northeast of Beaver Creek that does not contain forest roads, it is less than 5,000 acres and does not meet any of the sub-items of criteria 2.

There are no areas, therefore, within the Tiller Whiskey Complex Fire Salvage project area that qualifies for potential wilderness based on FHS 1909.12.

Prime Farmlands, Rangelands, Forestlands, and Parklands

No prime farmlands, rangelands, forestlands or parklands exist within the area; therefore; no direct, indirect or cumulative effects would occur.

Conflicts with Plans, Policies, or Other Jurisdictions

Implementation of any of the alternatives would not conflict with the plans or policies of other jurisdictions, including the Tribes. This project would not conflict with any other policies, regulations, or laws, including the Clean Water Act, Endangered Species Act, and the National Historic Preservation Act. Effects to air quality and compliance with the Clean Air Act are described in this chapter.

Potential or Unusual Expenditures of Energy

Alternative 2 would require expenditures of fuel for workers to access the Whiskey Complex Fire Salvage Project for use of power equipment and to utilize the logging systems. Alternative 1 would require no expenditure of fuel. No other direct, indirect, or cumulative effects are expected to occur with any of the action alternatives.

Consumers, Civil Rights, Minority Groups, and Women

Contracting procedures would ensure that projects made available to contractors through this project would be advertised and awarded in a manner that gives proper consideration to minority and women-owned business groups. Because of this consideration, there would be no direct, indirect, or cumulative effects to consumers, civil rights, or minority groups with implementation of any of the alternatives.

Environmental Justice

On February 11, 1994, President Clinton signed Executive Order 12898. This order directs Federal agencies to address environmental justice by identifying and disclosing the effects of the proposed activities on minority and low-income populations. The effects of the alternatives on the economic conditions of the State and county are disclosed in the Economics section of this chapter.

According to 2012 statistical data for Douglas County, about 11% of the population is made up of minorities. Unemployment and poverty in the county is higher than the State average. The project occurs well away from any large population center that would be directly affected by the project. Several small communities are located along the haul routes, some of which may see an increase in business during logging operations and an increase in traffic. The ongoing and reasonably foreseeable activities may also contribute to log truck traffic; overall, this increase in traffic may be measurable, but would not be comparable to the logging that occurred in the area in the late 1980s. No other adverse direct, indirect, or cumulative effects to these communities are expected to occur.

Areas that would be treated by the project may have some recreational value, as described in the recreation section. Where there is dispersed recreation, the effects to those recreating in the area would be greatest. Minority groups or low-income groups that use these areas may be impacted during logging operations by the increase in log truck traffic. These groups may choose to recreate elsewhere. Adverse impacts to these groups would end when logging and other connected actions are completed. Overall, none of the action alternatives imposes any other additional hardships on minority or low-income communities; therefore, there would be no direct, indirect, or cumulative effects to environmental justice with any action alternative. Alternatives would have no direct, indirect, or cumulative effects to any low-income or minority populations that utilize the area for recreation.

CHAPTER 4 – CONSULTATION WITH OTHERS

Public Involvement

Public involvement for the Whiskey Complex Fire Salvage Project began on November 20, 2013 with a public field trip of the project area and an open house. Notification of the project was publishing in the January 2014 Schedule of Proposed Actions (SOPA). A scoping notice describing the project components sent to approximately 180 members of the public on January 16, 2014, which initiated the scoping period. Twenty-five members of the public attended the field trip on November 20, 2013 and eleven comment letters were received during the scoping period.

The Tribal governments (Cow Creek Band of Umpqua Indians, Confederated Tribe of the Grand Ronde Indians, and the Confederated Tribe of the Siletz Indians) were sent a letter describing the project and soliciting issues.

Comments and concerns related to the project, and the responses by the Forest Service are outlined in the Scoping section of Chapter 1 and the Tiller Whiskey Complex Fire Salvage project record contains a detailed scoping summary that describes the scoping comments received for the project, and how the Forest Service addressed scoping comments.

In September of 2013, while fire suppression was still underway, a US Forest Service Rapid Assessment Team (RAT) was assembled to provide recommendations on potential post-fire treatments. Public involvement for the Tiller Whiskey Complex Fire Salvage Project began with a series of field trips with members of the timber industry, environmental groups, local landowners, and local nonprofit organizations in November of 2013. A Public Field Trip and Open House were held at the Tiller Ranger District on November 20th, 2013. In total, twenty five members of the public attended the field trip and/ or the Open House. The project is posted in the January and April 2014 Schedule of Proposed Actions (SOPA). A scoping notice describing the project components was sent to 180 interested members of the public on January 16th, 2014, which initiated the 30 day formal scoping period. In total, 11 letters or emails have been received during the formal scoping period ending on February 18th, 2014, and one additional late comment was received. All input received was considered in order to identify issues and develop alternatives regardless of scoping period timelines, and is documented in Chapter 1 under Issues and Concerns, and in Chapter 2 under Alternatives Considered, but Eliminated from Detailed Study.

On April 11, 2014 a legal notice initiating the Notice of 30-day Comment on Environmental Assessment Tiller Whiskey Complex Fire Salvage Project was published in the News Review and on the USFS public SOPA website. The comment period closed on May 12, 2014. During the comment period on the draft Environmental Assessment six sets of comments from eight commenters were received and the Response to Comments is located in Appendix A .

Agency and other government Consultation

The regulatory agencies charged with overseeing the Endangered Species Act (ESA), the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS), were consulted and communicated with as appropriate during the planning process. The National Marine Fisheries Service participated in a field trip on January 22, 2014 review the Proposed Action. The USFWS participated in a field trip on February 5, 2014 to review the Proposed Action.

On May 5th, 2014 a Biological Assessment for OC coho salmon was submitted to, and accepted by, the National Marine Fisheries Service for informal consultation on Endangered Species Act Section 7(a)(2) Concurrence Letter and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Whiskey Salvage Complex, Tiller Ranger District, Umpqua National Forest, Jackson Creek watershed (fifth-field HUC: 1710030202), Middle South Umpqua River – Dumont Creek watershed (fifth-field HUC: 1710030203), Upper South Umpqua River watershed (fifth-field HUC: 1710030201), and Elk Creek-South Umpqua watershed (fifth-field HUC: 1710030204), Douglas County, Oregon. Based on analysis of the BA, NMFS concurred with the Forest Service that the proposed action is not likely to adversely affect OC coho salmon and designated critical habitat, and that the action would not adversely affect Essential Fish Habitat under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), issuing a Letter of Concurrence on June 6, 2014 for the project (Reference # WCR-2014-882).

On June 5, 2014 a Biological Assessment for the Northern Spotted Owl was submitted to, and accepted by, the US Fish and Wildlife Service for Formal Consultation on The Tiller Whiskey Fire Projects, with a determination by the Forest Service of “may affect and is likely to adversely affect” the northern spotted owl, and “may affect, but are not likely to adversely affect” 2012 critical habitat.

Tribal Consultation

In accordance with the National Historic Preservation Act, consultation regarding this project included the following tribes: Cow Creek Band of Umpqua Tribe of Indians; Confederated Tribes of Grand Ronde; Confederated Tribes of Siletz Indians.

Interdisciplinary Team

The following people are members of the Interdisciplinary Team (IDT) that participated in the preparation or review of all or part of this environmental assessment:

David Baker	Botanist
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Brett Brown	Fire/Fuels Specialist
Mike Harris	Economics
Chris Kelly	Archaeologist
Laura Miller	Logging Systems Specialist
Robert Nichols	Fisheries Biologist
Steve Nelson	Economics
Greg Orton	Soil and Climate Change Specialist
Ken Powell	Recreation Specialist
Bill Reading	Forester/Silviculturist
Peggy Roberts	Road Engineering
Andre Silva	Wildlife Biologist
Linda Spencer	District Roads Manager
Amy Rusk	Hydrologist
Donni Vogel	Environmental Coordinator

In addition, the following people assisted in developing the proposal or in the editing and review of this document:

Jane Beaulieu	Environmental Coordinator
Josh Chapman	Forest Wildlife Biologist
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Donna Owens	District Ranger, Line Officer
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Kris Sexton	Planning and Products Staff Officer
Jason Wilcox	Forest Fisheries Biologist

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GLOSSARY

Hydrology

Class 1 stream – Streams (or segments thereof) that are direct sources of water used as a public water supply or provides habitat usable by anadromous salmonids

Class 2 stream – Streams (or segments thereof) that provide habitat usable by resident salmonids

Class 3 stream – Perennial streams or segments thereof which are not Class 1 or 2

Class 4 stream – Intermittent or seasonal streams which are not Class 1 or 2

Fish-bearing stream – Any stream containing any species of fish for any period of time

Periphyton – Sessile organisms, such as algae, that live attached to surfaces projecting from the bottom of a freshwater aquatic environment

Fire and Fuels

Crown or canopy base height is the lowest point to which branches reach.

Crown fire is a forest fire that advances with great speed jumping from crown to crown of trees ahead of the ground fire burning in surface fuels.

Fire Regime describes the historic role of fire on the landscape. Fire regimes for Oregon and Washington are from the 1999 National Fire Strategy and are redefined for Region 6 based on common severity type and the frequency of that expression on the landscape.

Fire regime group for R6	Frequency (Fire return interval)	Severity
I	0-35 years	Low severity (underburn)
II	0-35 years	High severity (stand-replacing)
III A	< 50 years	Mixed severity
III B	50-100 years	Mixed severity
III C	100-200 years	Mixed severity
IV A	35-100 years	High severity (stand-replacement), juxtaposed
IV B	100+ years	High severity (stand-replacing), patchy arrangement
IV C	100-200 years	High severity (stand-replacement)
V. A	200-400 years	High severity (stand-replacing)
V B	400+ years	High severity (stand-replacing)
V C	No Fire	
V D	Non-forest	

Fire Regime Condition Class (FRCC) describes the degree of departure of current vegetation from the historic fire regime (Hann, et.al. 2003).

FRCC 1

- Fire regimes near historic range (departure is no more than one return interval)
- A low risk of losing key ecosystem components
- Vegetation attributes are functioning within historical range

FRCC 2

- Fire regimes have been moderately altered from historical range; moderate changes in fire size and intensity has resulted
- Moderate risk of losing key ecosystem components
- Vegetation attributes have been moderately altered

FRCC 3

- Fire regimes have been significantly altered from their historical range; dramatic changes in fire size and severity has resulted
- Severe loss of ecosystem components
- Vegetation attributes have been significantly altered

Fuel loading refers to the amount of fuel present in terms of weight per unit area. Fuels are expressed by size and by hours required to dry.

- 0” – .24” or 1 hour fuels
- .25” – .99” or 10 hour fuels
- 1.0” – 2.99” or 100 hour fuels
- ≥3.0” or 1000 hour fuels

Grapple piling is done by an excavator that picks up and piles slash in large piles, which are later burned during moist conditions.

Resilience is the capacity of a system to undergo change and still retain its basic function and structure.

Recreation

Recreation Opportunity Spectrum (ROS) – An array of recreational activities, settings, and experiences used as a basic freamework in planning and managing the recreation resource, and divided into the following classes:

> Primitive – Area characterized by essentially unmodified natural environment of a size or location that provides the opportunity for isolation from sights and sounds of people. Motorized use is not permitted.

Semiprimitive Nonmotorized – Area characterized by predominately unmodified natural environment of a size or location that provides a good-to-moderate opportunity for isolation from sights and sounds of people. Motorized use is not permitted.

Semiprimitive Motorized – Area characterized by predominately unmodified natural environment of a size or location that provides a good-to-moderate opportunity for isolation from sights and sounds of people except for facilities essential for the use of motorized equipment.

Roaded Natural – Area characterized by predominately natural-appearing environments with moderate evidences of the sights and sounds of people. Such evidences usually harmonize with the natural environment.

Roaded Modified – An area characterized by a natural environment with much evidence of the works of humans. Such evidence usually dominate the natural environment.

Rural – Area characterized by substantial modified natural environment, with sights and sounds of humans readily evident and interaction between users often moderate to high.

Urban – Area characterized by city and country parks, and highly organized recreational activities.

Roadless Areas – Areas studied during the Roadless Area Review and Evaluation process (RARE II) which are roadless and at least 5,000 acres in size. Also applies to unroaded areas under 5,000 which are adjacent to existing wildernesses.

Visual Quality Objective (VQO) – The levels of visual quality that have been adopted by management through the Forest land management planning process.

Preservation – Allows for natural ecological changes only.

Retention – Where human's activities are not evident to the average forest visitor.

Partial Retention – Humans' activities may be evident, but are subordinate to the characteristic landscape.

Modification – Human activities may dominate the characteristic landscape; but, at the same time, utilizes naturally established form, line, color, and texture.

Maximum Modification – Human activity may dominate the characteristic landscape, but it should appear as a natural occurrence when viewed from a distance.

Wildlife

Tolerance Level (limit) - The specific value at the edge of a tolerance interval. For example, if a 50% tolerance level of snag dbh used by wildlife species in a specific vegetation condition is, say, 40 cm, this means that 50% of all individuals of the wildlife populations used less than or equal to that size snag. An 80% tolerance level would correspond to 80% of the individuals using that corresponding size snag. A 100% tolerance level means all of the individuals would use that size snag (100% tolerance intervals correspond to the maximum observed values, such as the largest dbh snag observed to be used by a wildlife species).

APPENDIX A – RESPONSE TO COMMENTS

INTRODUCTION

This appendix to the Tiller Whiskey Complex Fire Salvage Project EA (DN) documents the public involvement process that occurred during planning, including a description of the 30-day public comment process, the comments received on the Environmental Assessment (EA), and the Forest Service's response to those comments.

SCOPING AND COMMENT PERIOD

In September of 2013, while fire suppression was still underway, a US Forest Service Rapid Assessment Team (RAT) was assembled to provide recommendations on potential post-fire treatments. Public involvement for the Tiller Whiskey Complex Fire Salvage Project began with a series of field trips with members of the timber industry, environmental groups, local landowners, and local nonprofit organizations in November of 2013. A Public Field Trip and Open House were held at the Tiller Ranger District on November 20th, 2013. In total, twenty five members of the public attended the field trip and/ or the Open House. The project is posted in the January and April 2014 Schedule of Proposed Actions (SOPA). A scoping notice describing the project components was sent to 180 interested members of the public on January 16th, 2014, which initiated the 30 day formal scoping period. In total, 11 letters or emails have been received during the formal scoping period ending on February 18th, 2014, and one additional late comment was received. All input received was considered in order to identify issues and develop alternatives regardless of scoping period timelines, and is documented in Chapter 1 under Issues and Concerns, and in Chapter 2 under Alternatives Considered, but Eliminated from Detailed Study.

On April 11, 2014 a legal notice initiating the Notice of 30-day Comment on Environmental Assessment Tiller Whiskey Complex Fire Salvage Project was published in the News Review and on the USFS public SOPA website. The comment period closed on May 12, 2014. During the comment period on the draft Environmental Assessment six sets of comments from eight commenters were received and are shown below in Table 48.

Table 48 Commenters on the Tiller Whiskey Complex Fire Salvage Project Draft Environmental Assessment

Commenter	Format Received	Date Received
William Conway	email	4/17/2014
Doug Heiken, Oregon Wild	email	5/7/2014
Joseph Patrick Quinn, Umpqua Watersheds	email	5/8/2014
Tom Partin, American Forest Resource Council & Bob Ragon, Douglas Timber Operators	email	5/9/2014
Francis Eatherington, Cascadia Wildlands & George Sexton, Klamath Siskiyou Wildlands	email	5/9/2014
David & Laurene Steward	email	5/12/2014

All comments submitted must be considered and addressed. It should be noted that all comments received are valuable. Alternative preferences, values, and feelings also contribute to increased understanding and were carefully read and considered. The following tables

contain the comments, in the order in which they were received, and the corresponding Forest Service responses.

Comment from William Conway	
Comment	**Response**
I fully support this action to salvage dead trees from the Whiskey Complex fire area.	Thank you for your comment.

Comments from Doug Heiken, Oregon Wild	
Comment	**Response**
We urge the FS to focus efforts on felling imminent hazard trees along well-traveled roads. Trees more than 1 site-potential tree from the road are not a hazard to the road. The chances of such trees falling and hitting the road are very low. We can accept that very small risk in exchange for retaining the habitat value associated with large snags in a landscape where snag habitat is about to become scarce.	Forest Service Policy, as written in Forest Service Manual 7733.3 identifies the "Field Guide for Danger Tree Identification and Response" (Toupin et. al. 2008, USDA Forest Service Publication R6-NR-FP-PR-01-08) as the guide for roadside danger tree assessment, which states that the failure zone is 1 ½ x tree height plus a slide or rollout area which is based upon slope. Hazard tree removal activities included in this project were designed to meet this direction. An in-depth analysis of roads needing treatment to meet the Purpose and Need of the project was conducted by the ID Team. Several dead-end spur roads were eliminated from the project prior to Scoping, including FS Road 31-600 past the 31-675 and FS Road 31-690. All maintenance level 1 roads (closed) not associated with the project were removed from the Proposed Action, which includes FS Road 3114-320. FS Road 3114-648 was removed from the Proposed Action because danger tree treatment was completed along this road during fire suppression to supply trees needed to repair fire suppression damage to instream structures in Beaver Creek. Forest Road 31-660 was removed from the Proposed Action because of a lack of road use and the cost required to bring the road up to standard. Finally, the remaining roads (FS 3114-300, 490, 631 and FS 2980-800) were reviewed by the ID Team and a need for the roads to remain open and have danger tree treatment was identified, as shown in Table 47 of the Transportation section of Chapter 3.
We urge that shaded fuel breaks along roads be done in a highly strategic fashion, e.g.: • close to communities, • where they are likely to be maintained, • focusing on plantations, not mature native forests; • leave all mature trees and significant shade to help	The shaded fuel breaks proposed in the project occur adjacent to the communities of Ash Valley (.25 miles); Beaver Creek which has two separate private inholdings with multiple houses, cabins and outbuildings (1 mile); as well as the communities of Devil's Knob (4 miles) and Jackson Creek (4 miles); all of which were considered threatened during the Whiskey Complex. Maintenance on the proposed fuel breaks, ideally every 7-10 years, will need separate NEPA analysis prior to implementation.

Comments from Doug Heiken, Oregon Wild	
Comment	**Response**
maintain a cool-moist microclimate and to help suppress the growth of ladder fuels; • retain patches of understory plants for ecological mitigation, such as wildlife cover, visual diversity, especially retain all yew trees, and healthy understory plants that produce forage, berries, nuts, etc. • skip riparian reserves.	Shaded fuel breaks will focus on material <8" dbh throughout the project area. In mature stands, these trees would be understory vegetation that would act as ladder fuel to the overstory canopy. In a true mature stand without the presence of dense ladder fuels, there would be little if any treatment to remove understory vegetation. However most stands that exhibit mature characteristics also have a "road effect" where understory vegetation is often dense and provides an opportunity for fire to spread to the dominant overstory trees. Shaded fuel break prescriptions will utilize a variable spacing starting with 20' x 20' spacing on leave trees under 8" and allowing for occasional pockets or clumps of trees and brush (around 10% of the area) for wildlife habitat. Treatments would focus on concentrations of fuels and ladder fuels that would lead to fire behavior that would not easily be controlled either from torching and spotting or a transition from surface fires to crown fires. In plantations where trees are predominantly less than 8" dbh, 60% of the canopy should be retained to provide shade to the understory. Treatments would focus on pruning to remove ladder fuels and variable spacing to try to reduce canopy continuity to limit fire spread to dominant over story trees and snags helping to prevent their loss to future fires. In a previously burned area, future fire management will likely be indirect due to slower production rates in areas of increased downed woody material and to reduce firefighter exposure to snags. Creating continuous fuelbreaks, gives fire management personnel an opportunity to safely and efficiently manage fires in the area while providing opportunity to have fire on the landscape as part of the natural ecological process. Within riparian reserves all understory plants will be retained in all primary shade zones of all perennial streams, and within 10' of all intermittent and ephemeral streams. Primary shade zone width varies from 12' to 85' depending on slope and tree height. These "patches" will provide for cover, microclimate protection, forage and other functions associated with riparian vegetation. For riparian reserves outside of the primary shade zone treatment would be limited to only pruning conifer branches up to 8' off the ground, and removal of upland shrubs, leaving about 10% in scattered clumps to preserve species diversity and structure. Moist site species such as vine maple, would not be treated. In the Whiskey planning area, yew are found almost entirely along the riparian areas within the primary shade zones; a bmp (see Chapter 2

Comments from Doug Heiken, Oregon Wild	
Comment	**Response**
	Fuels Management and Air Quality) to protect yew and hardwoods where possible will further protect these species.
We object to the goals to "maximize timber commodity values." The FS is not required to (or even allowed to) "maximize" commodity values on public land. Economic values must always be harmonized with other public values, and constrained as necessary to meet legal requirements related to clean water, recovery of threatened species, etc .	NFMA, Umpqua LRMP and NWFP all authorize the salvage of trees provided it is consistent with all applicable laws, regulations and policies. The Tiller Whiskey Complex Fire Salvage Project IDT utilized a stepwise process in developing the project, starting with development of the Purpose and Need for the project and requesting public input. From these activities a Proposed Action and project area were developed, the land use allocation determined (MA11 under the LRMP; matrix and riparian Reserves under the NWFP), and the project was evaluated for consistency with the standards and guidelines contained within the Umpqua National Forest LRMP and the Northwest Forest Plan. Northern Spotted Owl critical habitat and Recovery Plan recommendations, Oregon Coast coho salmon critical habitat, and Clean Water Act requirements were then overlaid over the project to make sure the proposed action is consistent with all legal requirements. Maximize timber commodity values does not necessarily mean removal of every burnt tree within the project area, in the case of this project approximately 288 acres of out of 1,286 acres of severely burned (approximately 22%) are being treated, leaving 998 acres untreated. Maximizing commodity values takes into account other factors, such as tree deterioration, harvesting methods, haul routes and required road work to produce a project that maximizes the value of the timber being removed (see Chapter 3, Economic Efficiency Analysis).
Large live trees should not be used for tailholds, especially in riparian reserves. We need to keep all the live trees in this burned landscape to mitigate for the future snag gap	Most tailhold trees would be snags since the salvage logging would be done in areas of very high mortality. It is possible that a few live trees would be used if available, but these would be very few in number, representing an extremely small proportion of the live trees left untreated within the riparian reserve system in the planning area.
We urge the FS to maintain a strict limitation on log hauling during wet season or wet conditions.	Haul will not be allowed to occur after November 30. Numerous Best Management Practices and Project Design Features (see Chapter 2, *HAUL OUTSIDE the NORMAL OPERATING SEASON*) have been put in place to protect water quality between the end of the normal operating season (October 31) and November 30.
The FS should not be salvage logging in northern spotted owl CHU. Salvage logging in any part of the CHU renders Recovery Action 12 null-and-void, if the FS can just	The Whiskey Fire was 90% low severity (0-25% canopy cover lost), and was a beneficial reintroduction of fire into the action area which reduced fuel loadings and increased habitat diversity by increasing the amount of snags and structural

Comments from Doug Heiken, Oregon Wild	
Comment	**Response**
choose to follow that Recovery Action in some places while ignoring the recommendation (and degrade NSO habitat development) in other portions of the designated CHU	heterogeneity throughout its perimeter. The area in which the Whiskey Fire burned last experienced a fire in the early 1900's, which means that it has missed one to two fire return intervals. This reintroduction of low to moderate severity fire, with the additional maintenance burning proposed will result in a long term benefit to the owl by decreasing fuel loadings within the action area. In the areas outside of the proposed salvage (>99% of the fire acreage), this recovery action will be met. Recovery Actions are non-binding recommendations from the USFWS found in the 2011 Recovery Plan, they are not requirements like LRMP standards and guidelines. The 2011 Recovery Plan states, "Recovery actions are near-term recommendations to guide the activities needed to accomplish the recovery objectives and achieve the recovery criteria" (p. *x* of USFWS 2011). As they are recommendations, the FS is not required to follow them but the Forest Service should and did address how we attempted to be consistent with them. As stated above, over 99% of the burned Whiskey Complex fires will not be salvaged and will meet Recovery Action 12. Section 7(a)(2) of the Act requires Federal agencies to ensure that any action they fund, authorize, or carry out is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or determinations of designated critical habitat of such species. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency (action agency) must enter into consultation with the USFWS and/or NMFS. Section 7 Consultation for the project has been initiated with USFWS for the Northern Spotted Owl to ensure that the project is in compliance with all ESA requirements, with an agency determination for the project of "may affect and is likely to adversely affect" the northern spotted owl, and, "may affect, and is not likely to adversely affect" 2012 critical habitat.
Any salvage logging proposal must also carefully disclose and balance all detrimental effects and alleged beneficial effects of salvage logging and connected actions like road building.	CEQ regulations (40 CFR 1508.8(b)) and Forest Service policy (FSH 1909.15) require that effects of the proposed action and all connected actions, both positive and negative, be disclosed to the public. This information can be found in Chapter 3 of the Tiller Whiskey Complex Fire Salvage Project Environmental Assessment. The Interdisciplinary Team (IDT) designs projects to meet the purpose and need while minimizing adverse effects to resources, following all applicable laws, regulations and

Comments from Doug Heiken, Oregon Wild	
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	policies. This ensures a balanced approach. For example, an analysis of salvage treatments on the Tiller Ranger District between 2002 and 2013 (Figure 56) indicates that the current project treats 22% (288 acres) of the high fire severity area within matrix land use allocation, while in 2009 0% of the 848 acres of high fire severity because the fire was within the late seral reserve land use allocation. Overall, since 2002 approximately 8.3% (869 acres) of areas suffering catastrophic events have been treated, leaving the remaining 91.7% (9,606 acres) to function on the landscape. Road building is not proposed for the project (see Chapter 2, Proposed Action, pg. 22).
Logging in unroaded areas will causes significant impacts requiring an EIS. The EA limits its analysis to inventoried roadless areas and potential wilderness areas, but NEPA requires the FS to address all relevant environmental factors. There is significant scientific evidence that large unroaded areas >1,000 acres are ecologically significant (and deserve conservation and require NEPA analysis) regardless of whether they are IRAs or PWAs.	Forest Service Policy (FSH 1909.12) requires that effects of a project to Inventoried Roadless Areas (IRA) and Potential Wilderness Areas (PWA) be conducted. As stated in Chapter 2 (pg. 22) there are no IRAs or PWAs within the project area and road building is not proposed for the project (see Chapter 2, Proposed Action, pg. 22). The EA analyzes the effects of the proposed action for the whole project area on the human, physical and biological environments; including those contained within any "unroaded" areas. Based upon the analysis contained within the Tiller Whiskey Complex Fire Salvage Project Environmental Assessment, a Finding of No Significant Impact on the quality of the human environment has been made by the Deciding Official, and an environmental impact statement is not required.
Snag recruitment over time depends on a adequate population of large live trees from which to recruit future snags. Stand replacing disturbance results in the death of most of the live trees needed for future recruitment of snags. This means the snags we have now from the fire are all we can expect for decades to come. After most of the existing snags fall down, there will be a temporal "gap" in the recruitment of large snags. If any large snags are removed from areas where the fire killed most of the trees, the snag gap will be made worse than it would be naturally. To make a natural snag shortage worse, is a significant adverse effect.	As discussed in Chapter 3 "Snag Retention within Area Units" a decrease in both hard and soft snags for treatment units in natural stands is anticipated when compared with the No Action Alternative, while densities of larger snags within plantation units are anticipated to be the same between alternatives 1 & 2. However, this reduction in snags when viewed within a watershed context equates to 5% of severely burned areas (65 acres treatment/1,286 acres sever burn) and 0.35% of the total area within the fire perimeter. Furthermore, future recruitment of fire killed trees which burned at low to moderate severity fire (post project mortality) is likely to occur within interior portions of the Whiskey planning area which would add to post-implementation snag levels. A prescription was designed to retain at least 5-6 large, structurally complex standing snags per acre in area salvage units in order to provide some standing snag structure in treatment areas in lieu of snag recruitment. At the landscape level, since 2002 approximately 8.3% of moderate and severely burned areas have been treated on the Tiller Ranger District (Figure 56).

Comments from Joseph Patrick Quinn, Umpqua Watersheds	
Comment	**Response**
We note with approval the district's plans to insure the safety of important forest routes by means of its road side hazard tree proposal and to increase the resiliency of the district's holdings by means of shaded fuel breaks and controlled burning of fuel rich stands. As presented in the draft EA, both endeavors appear to UW to contain design features that respect and, in some cases, enhance the ecological protection and/or restoration of riparian zones within the fire perimeter. These features we endorse.	Thank you for your comment.

Comments from Joseph Patrick Quinn, Umpqua Watersheds	
Comment	**Response**
Umpqua Watersheds is fully aware that the Forest Service finds itself under intense pressure from the timber industry, et al. to conduct extensive area salvage, with its associated extraction of burned stems from the fire impacted lands of the Whiskey Complex and the host of adverse environmental impacts that inevitably flow from such extraction. While all of the UW Board and a preponderance of its membership generally oppose post fire salvage in critical habitat, there are some on the UW Board of Directors and a number of its active and informed membership who strongly oppose such salvage. Again, ideally, we would prefer that no area salvage be conducted in critical habitat. Further, it is difficult for UW to find itself acceding to such salvage. However, after careful discussion and weighing of alternatives, it is UW's considered opinion that the Tiller Ranger District's post-fire planning team has wisely limited the scope of its area salvage proposal. UW also feels that the District has incorporated significant environmental safeguards and design features, therein. UW, if reluctantly, is willing to agree to this limited compromise of its general opposition to post fire salvage in the interest of allowing the larger restoration challenges of the District to be advanced.	Thank you for your comment, your thorough review and evaluation of the draft EA is appreciated.

Comments from Joseph Patrick Quinn, Umpqua Watersheds	
Comment	**Response**
As a general principle, UW opposes area salvage of burned stands, especially of primary or natural stands, which have been designated by the USFWS as habitat critical to the recovery of the Northern Spotted Owl (NSO). Numerous credible scientific studies have concluded that intense post fire salvage is harmful to the recovery and even, cumulatively, to the very survival of the NSO, while, at the same time, hampering the eventual return of burned forests to a more complex, historically natural and resilient state, as well.	The project complies with all requirements under the Endangered Species Act, and with the 2011 Revised Recovery Plan for the Northern Spotted Owl. Consultation will be completed with the US Fish and Wildlife Service prior to signing of the Tiller Whiskey Complex Fire Salvage Project Decision Notice
We would find any notable increase in area salvage acreage in the final EA, or reduction of the ecological values in the design features of the current salvage proposal (to wit: notable increases in area salvage acreage, reduction of the percentage of retention patches, limits on yarding corridors, impacts to soil, snag retention, riparian reserves, etc.) to be cause for our future objection to such modification and, perhaps, to our support of a final proposal incorporating such adverse modifications, in general.	There were only a couple for modifications to the project between the draft EA and the Final EA. The first there is a decrease in the danger tree treatment area within Unit 32 as a result of applying the project BMPs and PDFs. Approximately 30 acres within the unit boundary were found to be sound, green trees or dead trees on flat ground greater than 1 1/2 tree lengths from the road that do not require treatment, resulting in a treatment area for Unit 32 of approximately 28.1 acres. Secondly, there is a slight increase in the estimated volume from 3.1 to 3.4 million board feet. The initial 3.1 million board foot estimate was based upon plot data from the district silviculturist. The final board foot estimate of 3.4 million board feet is based upon a more accurate timber cruise of the project.

Comments from Tom Partin, American Forest Resource Council & Bob Ragon, Douglas Timber Operators	
Comment	**Response**
2. AFRC and DTO Support the Purpose and Need of the Project. AFRC and DTO support the Purpose and Need of the salvage to provide timber products and agree that "[o]btaining the maximum economic commodity value from burned timber by offering it for sale while the wood is still marketable," is necessary to respond to the Purpose and Need. Draft EA at 4.	Thank you for the comment.
3. The Forest Service Did Not Consider a Reasonable Range of Alternatives to Meet the Purpose and Need of the Project Because it Failed to Consider a Feasible Alternative Which Allowed for Greater Economic Recovery of Merchantable Timber with Minimal Environmental Impacts. 5. The Forest Service Designed the Treatment Units too Conservatively, Despite its Recognition that the Proposed Salvage Treatment Essentially has Insignificant Effects on the Landscape. DTO in its scoping comments specifically requested that an alternative be analyzed that allows for increased economic recovery of merchantable timber. The Forest Service eliminated this request from consideration, noting that "the remaining salvageable acres appears to be economically unviable due to small unit size, low volumes, lack of road access and long flight distances," and also because the agency would have to conduct Northern Spotted Owl (NSO) surveys in moderate Burn Areas. Draft EA at 19. AFRC and DTO strongly disagree with this conclusion. AFRC has identified several areas that it strongly believes would support economically viable operations, and both	At the start of the project, (11/13/2013) approximately 710 acres were identified for inclusion into area harvest units. Most of the areas were either eliminated due to: 1) low volume/value per acre of the trees as field reconnaissance was completed; 2) access problems; 3) wildlife issues; and 4) logging feasibility issues. As Figure 57 shows the potential area harvest units being analyzed as of 11/13/2013 by the ID Team overlayed with the approximate boundaries suggested by the commenter from the Whiskey_A map submitted with the comment. As the map shows, the ID Team did include in its analysis most or all of the area suggested by AFRC. The District Silviculturist performed an on-the-ground reconnaissance of these areas early on in the process. The areas were not included in the proposed action for several reasons including: 1. Areas SW of FR261 seemed to have a non-commercial volume/acre of salvageable trees. 2. The area NW of FR261 did indeed have a merchantable volume of timber/acre and would have made a good harvest unit. However, the existing road (FR261) did not extend far enough to the NW to be able to harvest this area using cable logging systems. A temporary road would have had to be developed extending to the NW. The decision had been arrived at by the ID team not to build any temporary roads as part of this project based on recommendations within the Jackson Creek WA and input from all publics participating in project field trips. Without using cable systems, the only other possible method would have been helicopter logging. Due to the probable deterioration of the logs by the time the NEPA process was likely to be completed, it was determined that this was not likely to be feasible.

Comments from Tom Partin, American Forest Resource Council & Bob Ragon, Douglas Timber Operators	
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AFRC and DTO believe these units should be analyzed by the Forest Service. Please see the attached maps entitled Whiskey_A and Whiskey_B. The areas identified in green represent areas AFRC and DTO feel very confident that the Forest Service could conduct additional, commercially viable salvage operations. Conservatively, these areas total approximately 150 acres, and are predominately in Matrix lands. In addition to these identified areas, there are additional high severity burn areas with commercial timber scattered throughout the fire perimeter which should have been identified and analyzed for salvage. AFRC and DTO are concerned that the Forest Service has arbitrarily pre-determined its decision and limited its analysis to a consideration of only one alternative, in violation of NEPA. NEPA's regulations require that the agency "briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action." 40 C.F.R. § 1502.13. Where an agency puts its desired project design and/or features ahead of the true underlying purpose and need for the project, the agency violates NEPA. In this situation, the Forest Service is only considering its predetermined proposed action to the exclusion of other reasonable alternatives that would meet the underlying purpose and need of obtaining maximum economic commodity value from burned timber. Again, given that these are Matrix lands, and our confidence that additional, commercially viable salvage can be conducted, AFRC and DTO are concerned that these areas were not, at the very least, incorporated into an additional alternative for analysis. AFRC and DTO request that these additional salvage areas be included in	3. Several field trips with interested public groups indicated that logging of area units was going to be highly controversial due to perceived impacts to critical habitat and loss of high quality early seral habitat. The ID Team decided to limit the amount of area units harvested to those with the best access and highest economic feasibility and to incorporate mitigations that would lessen the negative impacts to habitat. For the unit shown on the commenters map in Pipestone Creek (Whiskey-B, T31S R 01W Sec 12) this unit and an additional unit proposed by the USFS on the north side of FS Road 31-600 were eliminated from the proposed action because there were not any viable tailholds to support a skyline operation that would be required to remove trees on a 60% slope. Field evaluation on Forest Road 31-660 determined that the road was not being currently used by the public due to several small landslides and that given the patch nature of the burn, two year fungi surveys would be required to meet survey and manage requirements and the road was not needed for fire suppression as the FS 31-600 was much more desirable for fire management. FS Road 31-690, also identified by the commenter, was evaluated for treatment and dropped from the proposed action because the road did not have evidence of public use, was not identified as needed for fire management, was partially located within a Category 4 LSR which would require an LSR Assessment to be completed prior to a decision and was located beyond a failing culvert on Beaver Creek (between FS Roads 31-670 and 675), the disposition of which is beyond the scope of this project. As such, treatment of either road does not meet the purpose and need of the project. NEPA does not require the analyses of alternatives that do not meet the purpose and need, are not technically feasible, or that cannot be implemented because they are not consistent with law, regulations or policy. For example, in case of FS Roads 31-660 and 690, an LSR Assessment and two year fungi survey could be completed for an alternative, however during the additional time that would be required to complete this process (up to one additional year for the fungi surveys and 3 months for individual LSR Assessment and Review), the trees would most likely deteriorate to a point that Purpose and Need No. 3. "Maximize timber commodity values consistent with Forest goals" would not be met.

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the Forest Service's final decision.	Inclusion of additional acreage in the final decision will not meet Purpose and Need No. 3. "Maximize timber commodity values consistent with Forest goals" because reinitiation of consultation with the regulatory agencies would be required to account for the effects of addition acreage treatment on NSO and OC coho salmon. This would delay the final decision and would in result in implementation being delayed into the summer of 2015. Given the loss of timber values to deterioration as discussed in the *Timber Volume and Value Deterioration* section of Chapter 3 of the EA, this would result in further loss of value.
4. An Additional Alternative Analyzing Increased Salvage Should Have Been Analyzed for Safety Concerns and to Protect the Reforestation Investment. AFRC and DTO note that in addition to the Purpose and Need's economic concerns, the salvage identified purposes relating to safety, including "to reduce safety hazards for forest workers and fire fighters, allow for safe public access within the project area," and to "reduce hazardous fuels." Draft EA at 4. In light of these identified purposes, the Forest Service' decision not to conduct salvage on the areas identified by AFRC where commercially viable salvage may occur is concerning for two reasons. First, the Forest Service in a separate decision document identified areas in need of replanting after the Whiskey Complex fire, and is utilizing a CE in order to accomplish that replanting. The Whiskey Fire Restoration CE authorizes replanting on up to 2,800 acres within the fire perimeter. The areas identified for replanting on the CE map overlap with some of the same areas that are not currently proposed for salvage, but that AFRC and DTO believe are commercially viable. Compare CE Map (attached) with Whiskey A and Whiskey B. AFRC and DTO question why salvage was not conducted in these areas that are potentially commercially viable, given that planting crews will be	The public safety issue was adequately dealt with by treating the roadside harvest units. Post-harvest these areas will have few to no dead trees capable of hitting the road. If individual trees die along the road after timber harvest, they can be cut down if needed to abate the safety hazard. The areas of high intensity burn, outside of the project area but in close proximity to it, including the area that was specified by AFRC's comments, have already been planted so tree planter safety is not an issue. If this area did re-burn in the future, the road uphill of it is protected by the roadside harvest unit. Any areas to be planted in subsequent years under the Whiskey Planting CE will be evaluated on a site by site basis at the time of planting. This is necessary because standing dead snags decay and become unstable at variable rates based on such factors as species, diameter, and height.

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entering the areas. Leaving large amounts of dead and dying wood in these areas where individuals will soon be entering will create numerous safety issues. Has the Forest Service done any analysis on when planters would safely be able to enter these areas, and whether replanting under these conditions will conform with all applicable safety requirements? Altogether, AFRC and DTO are concerned that it not only would have been highly feasible from an economic perspective to conduct additional salvage, but it would have been exceedingly practical from a safety perspective, given the Forest Service's decision to go forward with replanting in the areas. Second, AFRC and DTO argue that conducting salvage in the areas identified by AFRC would also better accomplish the Purpose and Need of reducing hazardous fuels. The Forest Service recognized that the "removal of merchantable material will help alleviate future fire risk to the area," and also noted that surface fuels will increase on areas where no salvage and associated fuel treatments are pursued. Draft EA at 194–95. It is perplexing, then, that the Forest Service would not pursue the proverbial "win-win" of reducing fuel loading in areas where money is being spent to reforest and maximizing economic gains in the areas identified by AFRC. As we explained above, AFRC and DTO are concerned that the Forest Service has preselected its proposal and ignored the underlying Purpose and Need for action. Based on the potential safety benefits, the economic benefits, and the long-term benefits of protecting the reforestation investment, we strongly urge to include additional salvage in your decision. We strongly believe	

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that this will better meet the Purpose and Need for the project.	
6. The Whiskey Salvage Fails to Correctly Balance the Needs of the NSO with the Management Direction of Matrix Lands by Imposing Arbitrary Tree Retention Levels on all Treatment Units. AFRC and DTO understand the Forest Service's responsibility to contribute to the recovery of the Northern Spotted Owl (NSO). We also understand that this project area is designated as both Matrix and NSO critical habitat. Therefore, we understand that NSO critical habitat must be considered. Ultimately we feel that this balance has not been achieved by the Forest Service through the Whiskey Fire Salvage Project. The small percentage of burned stands being salvaged coupled with the conservative design features of those stands that are being salvaged leads us to the conclusion that a disproportionate focus was placed on the recovery of the NSO over all other management objectives in your Forest Plan. The areas being harvested are not in a Late Successional Reserve and the harvest of desired stands with little or no canopy will not downgrade any critical habitat. One particular project design that we are confused with is the 30% tree retention level on area salvage units; this level is supplemented by an additional 5-6 snags throughout the salvage units. AFRC expressed this concern in its scoping comments as well. The EA states that this percentage level was recommended based on the 2011 Recovery Plan for the NSO; most likely recovery action 12 which recommends retention of habitat elements that take a long time to develop. However, the	Snag retention recommendations for area salvage units will adhere to the following prescription: "Retain at least 5-6 snags per acre which exhibit structural complexity (i.e. broken tops, basal hollows, large horizontal branches, decadence etc.). These leave patches and individual snags would be marked by marking crew and Level 1 Team Wildlife Biologists. In absence of structurally complex snags, retain a minimum of 5- 6 snags ≥20'' dbh per acre. Pre-fire snags within salvage units would not contribute towards the 6 snags per acre total." The commenter suggests that we proposed 30% retention and additional 5-6 snags per acre, however the EA does not state that a 30% retention level will occur. The original scoping document mentioned 30% retention in treatment units, but after discussions with the ID team that level of retention was altered to reflect 5-6 snags per acre prescription rather than a percentage. The ID team understood that through wildlife survey results, buffers for Riparian Reserves, steep/ unstable slopes, and unique and mosaic habitats, snag retention levels in the planning area would be satisfactory. The cavity nester guild (primary cavity nesters) is identified as a Management Indicator Species on the Umpqua NF. Additionally, the LRMP states that the Forest must provide adequate snag habitat to meet 60% Potential Population Capability (PPC) for cavity nesters in treatment units. PPC is the level expressed in percent at which an area is capable of supporting populations of snag-dependent species (LRMP). Despite the small tree sizes found in Unit 5 (plantation), at least 5 snags per acre >20'' diameter in order to provide for snags in treatment units.

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EA fails to describe how the Forest Service wildlife biologists determined that these “elements” could not be retained adequately with less than a 30% dead tree retention level instead of being consistent with tree snag retention levels of the Forest Plan. Under the Plan, snags can be retained on a landscape level. AFRC generally does not support arbitrary limits implemented by the Forest Service. We prefer the agency to assess each treatment area individually to determine what its needs are. In other words, we would like the Forest Service to allow the stand characteristics to drive the silvicultural prescription. In the case of the Whiskey Fire Salvage Project, the ID team identified a need to conserve habitat elements such as large trees, medium and large snags, and downed wood to be in compliance with their interpretation of the NSO critical habitat unit. So how did the Forest Service determine that 30% dead tree retention and 5-6 additional snags is the all encompassing prescription needed to meet this recovery action? What if a stand such as Unit 5, which a plantation, does not have any large snags or large trees present? Under the prescription adopted for this project, 30% of the dead stand plus 5-6 additional snags would still be retained. The EA states on page 133 that “the plantation area salvage unit lacks large, structurally complex snags, however a minimum 5 snags per acre will be left in plantation units.” But for what? Not for recovery action 12. The EA does not disclose what resource this high level of retention is designed to meet. This is the primary pitfall of using arbitrary limitations on vegetation management projects. These limitations undermine the purpose & need of the project and the Forest Plan direction by assuming every portion of every stand is the same.	

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7. The Forest Service Should Have Pursued Commercial Salvage in Burned Riparian Reserves. AFRC and DTO are disappointed that the Forest Service deferred commercial salvage of the burned riparian reserves. Almost 300 acres of riparian reserve areas burned severely, and we believe these 300 acres may pose a future fire liability. During our trips out to the fire perimeter we noticed increased fire activity in riparian reserves that had high levels of fuel buildup. One particular area where this is evident is along the 600 road where fire crews conducted a burned out operation to stop fire progression up the hill through the managed plantations. From our visits to this area it was obvious that the one location where the fire almost jumped the road was in an intermittent stream riparian area. It acted as a funnel that created intense fire conditions. The underburning proposed in the action alternative will not account for the high level of standing dead trees that could pose a future fire risk capable of creating intense fire conditions. Following the Panther Fire on the Klamath National Forest, the Forest Service salvaged within riparian reserves because the reserves would spread a future fire. The decision to salvage in the riparian reserves was upheld by the Ninth Circuit Court.	Riparian Reserves on the Whiskey Complex were not proposed for harvest to protect downstream occupied Critical Habitat (CHU) for Oregon Coastal Coho Salmon and to maintain consistency of the proposed action with the Aquatic Conservation Strategy (ACS). The Northwest Forest Plan Standard and Guidelines call for salvaging in riparian reserves only if is required to meet ACS objectives. Additionally, the Jackson Creek WA (1995, pg 223) recommends that salvage *not* be conducted within riparian reserves. On Tiller Ranger District, riparian reserve thinning has been done multiple times in green, managed stands to meet site specific riparian objectives (density management, speeding growth of the remaining stand etc). Harvesting trees in burned riparian areas is less compelling. Harvesting of trees, large wood and skidding operations within burned riparian reserves will lead to sediment displacement, skid trail erosion and increase sediment entering streams and Coho Salmon CHU. Skidding wood within burned riparian reserves would result in increased sediment production in closer proximity to streams; this reduced stream buffer would increase the likelihood of sediment delivery which is inconsistent with the ACS Standards and Guidelines to maintain water quality and sediment regime (ACS Objectives # 3, 4 and 5). Many streams in the Whiskey planning area lack adequate instream wood because of past timber harvest, road building and stream cleanout. Instream wood is important for channel stability, habitat complexity, and is especially important in watersheds that have burned recently at high severity which experience higher peak flows as a result of increased runoff. The salvage of burned trees that will fall into stream channels lacking adequate instream wood is inconsistent with ACS Objectives 1, 2, 3 and 8.
8. The Forest Service's Definition of Coarse Woody Debris for the Whiskey Salvage Differs Significantly from the Northwest Forest Plan's Definition. We are confused with the language on page 112 of the EA that describes Coarse Woody Debris (CWD). The EA defines CWD as "standing dead trees and large down	The language the commenter discusses on page 112 of the EA was an error. The intent is to have CWD defined as 16'' diameter. This has been corrected for the Final EA. This diameter was selected based on the NWFP standards and guidelines (Attachment A- to the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl) in section C-40 (B) states that "In western Oregon south of the Willamette National Forest a minimum of 120 linear feet of logs per acre greater than

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woody debris >6" diameter." The Northwest Forest Plan defines CWD as a "portion of a tree that has fallen or been cut and left in the woods. Usually refers to pieces at least 20 inches in diameter." Why has the definition for CWD deviated so substantially from the Forest Plan for this analysis? It's unclear as to whether this deviation has altered the design of the treatment units; however, the Forest Service must be consistent with the adopted plan when designing vegetation management projects. CWD standards exist in the Forest Plan for management throughout the Matrix. Those standards were developed with the above definition of CWD in mind. Applying the same standards to a new definition will result in a deviation from what is required by the governing Plan.	or equal to 16 inches in diameter and 16 feet long should be retained".
9. Proposed Shaded Fuel Break Treatments Will Likely Limit the Future Supply of Commercially Available Timber from Matrix Lands. We are concerned with the potential effects that the shaded fuel break treatments will have on the future timber supply. The treatments are described in the EA as 797 acres of treatment where trees >8" dbh will be cut. Our concern is that such treatments will be cutting trees that would otherwise be available for future commercial timber extraction.	This treatment does not involve cutting trees greater than 8" dbh. The proposed action specifies that trees **less than** or equal to 8" dbh will be harvested, not greater than 8" as the commenter states. In most areas this will equate to a thinning from below. This is a well-recognized silvilcultural technique for maintaining or increasing the growth rates of the residual trees resulting in larger, commercially viable trees in a shorter time.
10. Unnecessarily Restrictive Language in the EA and Subsequent Contracts Regarding Operations Should be Avoided so the Forest Service and Our Members May Realize the Most Value From the Whiskey Salvage . AFRC and DTO need all timber sales to be economically viable. We feel that there are several ways to properly harvest any piece of ground, and certain restrictive language can limit some potential bidders, thus driving the	In addition to economic considerations, harvesting systems are applied as appropriate from ecologic and safety perspectives, which limit ground-based systems to a certain percent slope. Also, the soil compaction analysis in the EA is based not on prescribing or limiting specific pieces of equipment, but rather on effects to soil resources, and specifically refers to Standard and Guideline 1 of the LRMP on page IV-67 which states that the combined total amount of unacceptable soil conditions in proposed activity areas (compaction, displacement of surface soil, and severe burning) would not exceed 20 percent.

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bid value down. Including language in the EA and contract that specifies tolerance levels rather than firm restrictions gives the operator flexibility to utilize their equipment to its maximum efficiencies. Allowing the use of processors and fellerbunchers throughout these units can greatly increase its economic viability, and in some cases decrease disturbance by decreasing the amount of cable corridors, reduce damage to the residual stand and provide a more even distribution of woody debris following harvest.	
11. Winter Season Operations and Haul Should Be Allowed to Ensure the Expeditious Removal of Merchantable Timber. Consistent and steady operation time throughout the year is important for our members not only to supply a steady source of timber for their mills, but also to keep their employees working. These two values are intangible and hard to quantify as dollar figures in a graph or table, but they are important factors to consider. The ability to yard and haul timber in the winter months will often make the difference between a sale selling and not, and we encourage the Forest Service to continue to look for ways to accommodate winter operations. This issue has been repeatedly emphasized by AFRC and DTO to the Tiller District. Particularly on a fire salvage project, the need to get the burned logs out of the woods and to a mill is crucial, which the Forest Service seems to understand. This project will still be implementing a “closed season” that will begin as late as November 30. While we appreciate the season extended for a potential month, we believe there should be an opportunity to operate year round. Using the term “wet weather” as opposed to “wet season” is one way to allow operations under certain conditions. This discussion is similar to our concerns with	The proposed action occurs primarily within Management Area 11 (Big Game Winter Range) under the Umpqua National Forest LRMP and allowing haul between December 1 and April 30 does not meet the standard and guidelines for MA 11. BMPs and PDFs to allow haul until winter range closure have been incorporated into the project. Further, analysis by the transportation engineer indicates that bring roads up to standards for winter haul would make the project economically unviable at an estimated cost of over $40,000 per mile. Opportunities for winter haul are evaluated on all district projects involving timber harvest projects.

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arbitrary limitation expressed earlier. We see a "wet season" description as arbitrary. February may be wet, but it may be dry. So why place an arbitrary limitation on a project that assumes one or the other exclusively? AFRC and DTO note that there is no reason wet season operations and hauling cannot occur under existing guidelines. DTO specifically noted in its scoping comments that the Umpqua National Forest has agreed in recent years to Operating Guidelines for Winter Haul that adequately addressed the risks associated with wet season haul. Finally, AFRC and DTO note that it is particularly important that operations and hauling during the winter seasons be allowed for the Whiskey Salvage so that the economic value of the timber can be recovered before it is lost to insects and decay.	
12. AFRC and DTO Support the Forest Service's Recognition that Urgent Action is Needed to Recover Merchantable Timber, and It's Efforts to Move Forward Expeditiously.	Thank you for your comment.

Comments from Francis Eatherington, Cascadia Wildlands & George Sexton, Klamath Siskiyou Wildlands	
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Eliminate the 65 acres of native forest logging. If high-quality early-seral forests that resulted from the Whiskey Complex fire are not salvaged, such as the 65 acres in this project, fewer unburned live, mature forests will have to be clearcut to provide this missing habitat.	Salvaging these acres would not cause other areas to be clearcut, nor would salvage affect the seral stage of the area. Whether we harvest these 65 acres or not, the area will still be high quality early seral habitat due to the design features included in the Proposed Actions such as retention of leave patches and the retention of 5-6 large snags per acre. By planting the areas that we harvest with tree seedlings, we may shorten the time period this area remains in the brushy stage of stand development. However, this area is small compared to the number of acres that burned at medium to high intensity in the project area that are not being harvested (See Forest Vegetation Section in Chapter 3 of the Final EA).
Snags: Of the snags required to be left (EA page 21), 5 per acre, none have to be Douglas firs. The highest quality Douglas fir snags will be sold, leaving pine snags because they have a less commercial value than Douglas fir. Wildlife habitat should be a higher priority than commercial value when determining what species of snags to leave on site. Douglas fir will outlast pine as a snag and provide higher-quality habitat. The EA is unclear on how many snags per acre must be left. Page 21 requires as few as 5 snags per acre to be left. EA page 38 requires 6 snags per acre to be left. Page 106 of the EA says only 4 snags per acre over 20" DBH would be left. Which is it? Even the biggest number, 6 snags per acre, is not enough. On page 38, it appears the 6 snags per acre could be any size if they are structurally complex. Only if they are not structurally complex, they have to be over 20" DBH. It would better if	Please see page 4 of the EA which describes the purpose and need for this project. The purpose and need for this project is to reduce safety hazards for forest workers and fire fighters, allow for safe public access within the project area, provide timber products, and reduce hazardous fuels. The description of the purpose and need goes on to explain that an element of the purpose is to "obtain the maximum economic commodity value from burned timber by offering it for sale while the wood is still marketable. The Forest Plan (LRMP 4-42) directs the Forest to harvest dead or dying trees to produce wood products as consistent with Forest goals". Page 21 in the EA states that if Douglas-firs meet the criteria described on page 21, that those trees could be retained. In general, the largest most structurally complex trees in the treatment areas are incense cedar, ponderosa pine, followed by Douglas Fir. A prescription was designed which was intended to provide for RA 12 consistency and to meet standards and guidelines for snag habitat for the whiskey salvage project (cavity nesters). This project contains a prescription which reads "Retain at least 5-6 snags per acre which exhibit structural complexity (i.e. broken tops, basal hollows, large horizontal branches, and decadence, etc.). These leave patches and individual snags would be marked by marking crew and/or Forest Service Wildlife Biologists. In absence of structurally complex snags, retain a minimum of 5- 6 snags ≥20'' dbh per acre. Pre-fire snags within salvage units would not contribute towards the 6 snags per acre total." The ID team agreed that 5-6 snags per acre would be sufficient. As the commenter notes, page 106 states 4 snags per acre >20'' diameter would be left. This is an error and will be corrected for the Final EA. In general, the prescription is intended for the natural stand to have 6 snags per acre while the plantation stand would have 5 snags/acre > 20'' diameter. The prescription was designed so that one description of snag retention could serve for both a natural stand and plantation. Russell et al.,

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the largest snags in the stand be retained, as they will persist longer into the new stand.	2006 showed that Douglas-fir of the same diameter will last longer than ponderosa pine. However the tree diameters of ponderosa pine available to be left as leave trees was much larger than for Douglas-fir. According to Russell, the parameter estimate for the effect of diameter was larger than that of the species. Therefore it is expected that these larger ponderosa pine will remain standing longer than the smaller Douglas-fir.
Yarding: Under the description of the Proposed Action on page 20, the EA says that the tops of trees will be left on the ground when removing roadside danger trees. This prescription is not repeated for the logging units, but the EA on page 61 implies it will happen there also. Tops of trees will be left in the units "to provide additional ground cover." (EA 61). On page 86, the EA again implies that tops in the Skyline systems will be treated at the landing. More than just the tops should be left in the units. Limbs should also be left. To help prevent erosion and to provide nutrients to the soils, whole-tree yarding should not occur as it creates large, wasteful slash piles at the landing that are burned up, usually without even producing biochar. Whole tree yarding reduces wood and the nutrients the wood provides to the units.	The proposed action has been updated for area logging units (EA pg. 21) to include that tree tops be left on site. The ID Team anticipates that over 50% of branches will remain within the unit through breakage from the felling and removal of trees. Addition limbs could be left on site by the purchaser to meet project BMPs and PDfs, which include: ✓ Maintain at least 45%-65% effective ground cover in order to maintain soil productivity and prevent soil erosion. ✓Apply soil protective cover on disturbed areas where natural revegetation is inadequate to prevent offsite erosion before the rainy season.
This project proposes to remove many of the burned trees from 188 acres that are up to 300 feet away from 6.25 miles of roads, even roads that should be closed. This is excessive and could cause too many high-value old growth snags to be removed.	Forest Service Policy, as written in Forest Service Manual 7733.3 identifies the "Field Guide for Danger Tree Identification and Response" (Toupin et. al. 2008, USDA Forest Service Publication R6-NR-FP-PR-01-08) as the guide for roadside danger tree assessment, which states that the failure zone is 1 ½ x tree height plus a slide or rollout area which is based upon slope. An in-depth analysis of roads needing treatment to meet the Purpose and Need of the project was conducted by the ID Team. Several dead-end spur roads were eliminated from the project prior to

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The Forest Service should have considered an alternative that addressed safety of forest visitors, while protecting valuable large snags within 300 feet of roads. Our scoping comments asked the FS to also consider closing roads. Some of the roads we mentioned in our scoping comments were eliminated from the project, but some were not, like road 631. It is unclear if other dead-end roads are still included in the project. The Forest Service should consider closing roads instead, especially dead-end roads, or roads that have an easy drive-around, for a few years until the danger is over. If trees do fall into the road, they can be removed at a later time.	Scoping, including FS Road 31-600 past the 31-675 and FS Road 31-690. All maintenance level 1 roads (closed) not associated with the project were removed from the Proposed Action, which includes FS Road 3114-320. FS Road 3114-648 was removed from the Proposed Action because danger tree treatment was completed along this road during fire suppression to supply trees needed to repair fire suppression damage to instream structures in Beaver Creek. Forest Road 31-660 was removed from the Proposed Action because of a lack of road use and the cost required to bring the road up to standard. Finally, the remaining roads (FS 3114-300, 490, 631 and FS 2980-800) were reviewed by the ID Team and a need for the roads to remain open and have danger tree treatment was identified, as shown in Table 47 of the Transportation section of Chapter 3.
Claiming trees 300 feet away from a road are a danger to the public is exaggerating the problem. The chance that a tree considered “likely dying”, that would actually die and fall the right direction and hit another tree that would fall the right direction and hit a road exactly when a forest traveler is in that spot, and that person doesn’t move out of the way, is virtually an impossible scenario. The EA gives too much allowance to cut trees too far from the road.	There is more to maintaining safety than preventing dead trees from falling on people. Any tree material laying on a road surface is dangerous and can cause accidents. It is Forest Service policy to maintain clear, passable roads. Forest Service Policy, as written in Forest Service Manual 7733.3 identifies the “Field Guide for Danger Tree Identification and Response” (Toupin et. al. 2008, USDA Forest Service Publication R6-NR-FP-PR-01-08) as the guide for roadside danger tree assessment, which states that the failure zone is 1 ½ x tree height, plus a slide or rollout area which is based upon slope. Treatment of roadside danger trees is based upon Forest Service policy, and is site specific. For example, for a road on flat ground, any trees identified as danger trees which are 100’ tall and within 150’ of the road would be removed, while that same 100’ tree on 60% slope above a road may be treatment An in-depth analysis of roads needing treatment to meet the Purpose and Need of the project was conducted by the ID Team. Several dead-end spur roads were eliminated from the project prior to Scoping, including FS Road 31-600 past the 31-675 and FS Road 31-690. All maintenance level 1 roads (closed) not associated with the project were removed from the Proposed Action, which includes FS Road 3114-320. FS Road 3114-648 was removed from the Proposed Action because

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Unit 32: The EA, page 109, states: "Unit #32 (Figure 8) is approximately 58 acres in size and when combined with areas that will be harvested adjacent to the unit under the Leavitto Timber Sale, this combined area may exceed the 60 acre limit imposed by the Forest Wide Standards and Guidelines with in the Umpqua National Forest LRMP by 3 to 4 acres…" The LRMP does not allow the 60-acre limit to be exceeded, especially by several acres. The unit size must be reduced. Unit 32 is a roadside hazard tree salvage, not a unit. Figure 8 failed to show the Leavitto sale. This would have been important cumulative impact to show on the map. The Forest Service should also have told us, for cumulative impacts, what replacement volume was awarded the purchasers of the Beaver sale for the part burned up.	While the Umpqua NF LRMP clearly allows for Forest openings up to 90 acres in size for catastrophic events (pg 43 states "The 60-acre limit on created forest openings may be exceeded by as much as 50 percent…"), application of the project design features and use of the "Field Guide for Danger Tree Identification and Response" (Toupin et. al. 2008, USDA Forest Service Publication R6-NR-FP-PR-01-08) resulted in the identification of approximately 30 acres within Unit 32 that will not be treated for because trees were found to be sound, green trees or dead trees on flat ground greater than 1 1/2 tree lengths from the road. This will result in a cumulative treatment area of approximately 59 acres for Unit 32 and the salvage area of the adjacent Leavito Sale Unit from the Beaver Timber Sale Project. Figure 8 and the EA have been updated. Cumulative effects analysis for the project is located in Chapter 3. There is no replacement volume needed from the Tiller Whiskey Complex Fire Salvage Project for any of the timber sales within the Beaver Timber Sale Project (Jim Campbell, Rogue River/Siskiyou/ Umpqua NF Timber Contracting Officer, Pers. Comm.).
All live trees should be protected from logging in all units and road-side hazard removals. Instead, the Forest Service is using a probability of morality of 60% or	The Smith and Cluck (2011) guidelines are appropriate for use in the Whiskey fire based on the species of trees and study areas used in developing the guidelines. The guidelines for Yellow pine (ponderosa and Jeffrey pine), white fir, sugar pine and incense cedar guidelines are based on: Hood, Sharon M.; Smith, Sheri L.; Cluck, Daniel R. 2010. Predicting mortality for five California

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greater, using "Marking Guidelines for Fire-Injured Trees in California". (EA page 98). The guidelines cited are for California. The EA should have described its relevance to the wetter forests of Oregon, and if the publication was peer reviewed. To be on the safe side, the Forest Service should just retain all live trees, including all trees that made it through the winter and have new spring buds.	conifers following wildfire. Forest Ecology and Management. 260: 750-762. The sample area for this study included the Sierra Nevada and Southern Cascade ranges where relatively dry forest type prevail and where high frequency, low intensity fire is the dominant disturbance regime. These are the same species and fire regime as found in the Whiskey Fire Salvage planning area. For Douglas-fir, the guidelines rely on: Hood, Sharon M. 2008. Delayed Tree Mortality following Fire in Western Conifers. JFSP Final Report 05-2-1-105, US Department of Agriculture, Forest Service, Rocky Mountain Research Station, Missoula, MT. 35 p. The sample data for this study was pooled across five different states although, for Douglas-fir, the data came from Montana, Idaho, and Wyoming. Therefore, the study evaluated the effects on *Pseudotsuga menziesii* var. glauca while we have var. menziesii on the Umpqua. The fire effects to both species should be similar since the principal botanical difference between the two species is a difference in the cones. Both varieties evolved in high frequency, low intensity fire regimes. Based on the above reasons, and the recommendation of USFS Southwestern Oregon zone entomologist, Bill Schaupp, the guidelines should be appropriate for predicting tree mortality.
The EA is inconsistent. Page 98 states all trees with a 60% or greater chance of dying will be logged. But in the description of Alternative 2 on page 20, and again on page 21, the EA states trees with a 50% or greater chance of mortality will be logged, in road-side and other units. Which is it? We suggest it should be neither. All live trees, especially trees with spring buds, and alive at time of tree-marking, should be retained.	The threshold probability of mortality is different for the roadside hazard units (50%) and the area units (60%). The EA was incorrect on pg 21 and has been updated to reflect the higher 60% probability of mortality required for treatment in the area units.
The EA page 102 says the reason for taking trees with a probability of mortality of 50% (meaning 50% of the trees logged could not have died) along roads, is that trees now alive could become danger trees in future. However, the Umpqua National Forest has an on-going program of	The original probability of mortality for roadside units proposed during scoping to the public was 40%. Through internal discussions and public comment the probability of mortality was raised to 50%. This probability of mortality is lower than the 60% mortality for area units because the consequences of a dead tree falling on the roadway are higher than falling elsewhere. Future risks to public safety, as well as costs, will be reduced if we take more future mortality now rather than wait for it to die over an extended period of time. Leaving more of these trees that will probably die will cost the Forest Service more money and lower the benefits to the local economy.

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removing road-side danger trees, so there is no reason they cannot be cut later (or not), IF they actually do die. In fact, the EA states (page 108) that trees near roads that do die later will be removed later. Therefore, it makes more sense to leave more trees that might live now, since the ones that do die will be evaluated for their hazard and removed later anyway.	
The Forest Service has not done northern spotted owl (NSO) surveys in the project area for 20 years. An owl could be nesting in one of those trees that are alive but with a 50% chance of dying, perhaps one of the best wildlife trees in the project area. The FS doesn't know if it will be cutting down a nest tree. Owls survive fire events and return to the nest trees. "A study conducted in Northern California indicated that spotted owls roost and nest in all fire severity categories (except high severity) and forage in all fire severity categories with a selection for high severity burned areas." (EA 128). The Forest Service must do a NSO survey before cutting any trees that have the potential to be a nest tree. While the known Beaver Lake North owl site will loose the most habitat to salvage logging, 100 acres of NRF, the biggest problem could be the loss of sites that have developed over the last quarter of a century since the last owl survey.	Northern spotted owl surveys were not conducted for this project. Habitat which experienced complete mortality of canopy cover (moderate/high severity fire) is not likely to provide nesting or roosting potential as the commenter stated. Roadside and area salvage units are comprised of habitat which burned at the severities which completely removed canopy cover. Concern for removing potential nest trees during project implementation is eliminated by the fact that trees which will be removed do not have canopy cover and no longer provide the potential for nesting or roosting. A project design feature is in place which states "If a suspected TES species is found during the operating period, activities would cease until a Forest Service wildlife biologist can be contacted and an identification and evaluation can be made." This PDF was intended to provide a safeguard if marking crews/biologists or purchaser notices a nesting structure on the periphery of a unit. As mentioned above, concern for removing potential nest trees during project implementation is eliminated by the fact that trees which will be removed do not have canopy cover and no longer provide the potential for nesting or roosting. A prescription was designed which was intended to provide for RA 12 consistency and to meet standards and guidelines for snag habitat for the whiskey salvage project (cavity nesters). This project contains a prescription which reads "Retain at least 5-6 snags per acre which exhibit structural complexity (i.e. broken tops, basal hollows, large horizontal branches, decadence etc.). These leave patches and individual snags would be marked by marking crew and/or Forest Service Wildlife Biologists. In absence of structurally complex snags, retain a minimum of 5- 6 snags ≥20'' dbh per acre. Pre-fire snags within salvage units would not contribute towards the 6 snags per acre total."

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The EA states (page 133): "Although 12% of burned habitat (primarily in home ranges) which could provide foraging opportunities for spotted owls will be harvested under the action alternative, it is important to note that 88% of similar habitat will be left intact and undisturbed in the analysis area." Taking 12% will significantly degrade that site, and might be the push that eliminates those owls. And far more habitat could be taken from an unknown owl site. The 2011 northern spotted owl recovery plan for the spotted owl states: Recovery Action 12: In lands where management is focused on development of spotted owl habitat, post-fire silvicultural activities should concentrate on conserving and restoring habitat elements that take a long time to develop (e.g., large trees, medium and large snags, downed wood).	The Whiskey Fire was 90% low severity (0-25% canopy cover lost), and was a beneficial reintroduction of fire into the action area which reduced fuel loadings and increased habitat diversity by increasing the amount of snags and structural heterogeneity throughout its perimeter. The area in which the Whiskey Fire burned last experienced a fire in the early 1900's, which means that it has missed one to two fire return intervals. This reintroduction of low to moderate severity fire, with the additional maintenance burning proposed will result in a long term benefit to the owl by decreasing fuel loadings within the action area. In the areas outside of the proposed salvage (>99% of the fire acreage), this recovery action will be met. Recovery Actions are non-binding recommendations from the USFWS found in the 2011 Recovery Plan, they are not requirements like LRMP standards and guidelines. The 2011 Recovery Plan states, "Recovery actions are near-term recommendations to guide the activities needed to accomplish the recovery objectives and achieve the recovery criteria" (p. *x* of USFWS 2011). As they are recommendations, the FS is not required to follow them but the Forest Service should and did address how we attempted to be consistent with them. As stated above, over 99% of the burned Whiskey Complex fires will not be salvaged and will meet Recovery Action 12.
Any salvage logging for economic reasons, in critical habitat, is not allowed. This is counter to the purpose and need for this project, economic recovery.	Review of the USFWS Endangered and Threatened Wildlife and Plants; Designation of Revised Critical Habitat for the Northern Spotted Owl; Final Rule (Federal Register Vol. 77, No. 233 pgs 71876 – 72068) does **not** state that salvage logging is prohibited. Section 7(a)(2) of the Act requires Federal agencies to ensure that any action they fund, authorize, or carry out is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or determinations of designated critical habitat of such species. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency (action agency) must enter into consultation with the USFWS and/or NMFS. Section 7 Consultation for the project has been initiated with both regulatory agencies and will be completed prior to the signing of the decision notice for the project.
The EA documents that two pairs of black-backed woodpeckers and one white-	Unit #7 contains many small ponderosa pines which are not a threat to the road. Many are small in diameter and ~ 30 -40 feet tall. Most trees within this category and area (where both of these

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headed woodpeckers were observed in the project area, in a burned pine plantation. The map shows the location is within the roadside-unit #7, and within a shaded fuel break section. The Forest Service should eliminate this area from logging and do protocol surveys of the entire salvage area for the woodpeckers. The EA assures us that some snags will be left for the woodpecker, however, the Forest Service has no way of knowing if the woodpecker nest tree will be cut down. Also, typical snag retention standards for salvage logging are not adequate to ensure nesting success of black-backed woodpeckers . For instance, the woodpeckers were seen in small ponderosa pines, while the Forest Service plans to remove virtually all small ponderosa pines in the unit the woodpecker was seen in. The Forest Service must conduct protocol surveys for black-backed woodpeckers in the fire area prior to any salvage logging, including most of the roadside hazard tree-felling. The black-backed woodpecker is undergoing a federal status review and a proposed listing is likely during 2014. The EA failed to analyze management options that would assure viability of black-backed woodpeckers on the Umpqua National Forest.	species were observed by a Forest Service biologist) will not be removed because they pose no danger to the road system. The commenters concern of removing black-backed woodpecker nest can be alleviated by the fact that at least one breeding cycle would have occurred prior to project implementation. Additionally, if a nest tree happened to be removed, it would occur when breeding/fledging period is complete. A prescription was designed to retain at least 5-6 large, structurally complex standing snags per acre in area salvage units in order to provide some standing snag structure in treatment areas in lieu of snag recruitment. These leave trees will be large in diameter and offer more surface area (future breeding opportunities) when compared to smaller pines where the black-backed/white-headed woodpeckers were observed foraging. Black-backed and white-headed woodpeckers are specifically mentioned in the NWFP in the Protection Buffers Section (C-46). One hundred percent of Potential Population Levels can be provided with .60 snags/acre (>15'' DBH) for white-headed woodpeckers and .12 snags/acre (17'' DBH) for black-backed woodpeckers. The prescription mentioned above provides snag retention levels which exceed standards and guideline requirements for these two species in the NWFP.

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Great Grey Owl: The EA sates that no Great Grey Owl surveys were done because the logging "will not disturb habitat potentially associated with great grey owls". However, Bunchgrass Meadows and other natural openings are within the planning area. Surveys are required.	According to the protocol for Great Grey Owls (Version 3.0, page 5), only activities which meet all three of the following criteria require great grey owl surveys: 1) The proposed activity is within the range of the great grey owl; 2) The proposed activity is within or contains suitable nesting habitat; 3) The proposed activity will cause a significant negative effect on the species' habitat or persistence of the species at the site. The Whiskey Salvage Project is within the range of the great grey owl and contains suitable habitat for the great grey owl, however is not expected to cause any "significant negative effect on the species' habitat or persistence at the site". The Whiskey Salvage Project proposes to create shaded fuel breaks (see proposed action) by removing understory fuels < 8'' DBH (and not potential nesting structures), and conduct maintenance burning in portions of bunchgrass meadows. These two actions are not considered significant negative effects because shaded fuel breaks will help reduce roadside fuels < 8'' DBH and help the Forest better manage future fires and maintenance burning should help to maintain meadow health and vigor. Furthermore, under the 2006 Pechman exemption Category 4 does not require survey and manage for "hazardous fuel treatments applying prescribed fire for noncommercial projects". The shaded fuel break and maintenance burning activities are consistent with treatments described within the 2006 Pechman Exemption Category 4.
EA failed to consider the use of salts on road-side vegetation. Research has found that, "As far as plants and vegetation are concerned, the accumulation of salts in the soil adversely affects their physiology and morphology by: increasing the osmotic pressure of the soil solution, by altering the plant's mineral nutrition, and by accumulating specific ions to toxic concentrations in the plants." Biological toxicity in the environment in plants could be a problem where magnesium chloride is used.	Commenter suggests that using Magnesium chloride ($MgCl_2$) for dust abatement would negatively affect roadside vegetation due to chloride toxicity. While there are many studies on the effects of $MgCl_2$ when used as a deicer, there are few studies on the effects to vegetation when $MgCl_2$ is used for dust abatement. In the case of dust abatement (as opposed to deicing roads in the winter) vegetation experiences the chloride by ion movement through the soil/water solution, thus movement of the ion in the soil solution is primarily downslope although upslope vegetation can be affected depending on where their root system is located, i.e ditchlines, etc. Damage can include loss of canopy cover and needle mortality in conifers, with pines and hemlocks most susceptible (Goodrich et al., 2008). In a study of road dust abatement treatment in Colorado, Goodrich and others (2008) found that roads treated with $MgCl_2$ had more severely damaged trees (7.6%) than untreated roads (4%), and that the severity of damage increased with increasing levels of $MgCl_2$ treatment. Damage was estimated by visible changes in foliage and canopy cover. However, the differences noted were not significant for all tree species even though the differences were visible for all species. While the paper made a case for the damage occurring by chloride toxicity instead of other plant stressors by a logic comparison, there was no quantitative estimate of damage by other stressors, or what caused the damage in untreated sites. Additionally, the treated roads varied in number of years treated, as well as average and cumulative quantities of $MgCl_2$ applied, but there was no calculation of effect due to repetitive or cumulative treatments. Presumably,

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	toxicity would be more probable in roadside areas that are treated regularly, such as county roads. For the Whiskey project, the dust abatement treatment is only planned for the year(s) of harvest and haul, so there won't be regular contributions and accumulation of $MgCl_2$ in the soil solution. Precipitation in the project area is generally light during harvest and haul seasons, and $MgCl_2$ is not applied when raining or within 3 days of predicted rain events, so mobility of chloride ions in the soil solution is minimal. In wetter seasons the amount of precipitation generally observed would render a more dilute soil solution which would reduce the probability or level of chloride toxicity, if any. The contract provision for dust abatement calls for applying $MgCl_2$ at the rate of 19 tons/mile, at a 12' width, with a 1' no treatment buffer to the ditchline. This would limit application to well within the road prism, where there might be additional vegetation management treatments as part of road maintenance. Often the vegetation is weedy, including possible invasives. There is no concern over toxicity with these species. Other treatments include the removal of small trees and/or shrubs to prevent encroachment into the roadway even if rooted off the road, and there is no concern over toxicity with these plants. It is unlikely that treatment with $MgCl_2$ would encourage non-native invasives to supplant natives in treated areas as there are no known salt-tolerant invasives in the project area or on the forest. In the Whiskey project area, much of the road treatment would occur where roadside vegetation was already damaged by fire activity, although a quantitative measure of how much roadside vegetation is already damaged versus undamaged on the roads that will be treated is unknown. While it is likely there are some negative effects to roadside vegetation from applying $MgCl_2$ to project roads, as noted in the paper cited above, contract provisions and other mitigations would minimize those effects. Additionally, it is desirable to remove invasive plants and encroaching tree and shrub vegetation from the roadway and prism, so there is no concern of toxicity in these plants. Precipitation patterns would likely provide very dilute soil solution to desirable vegetation and because vegetation may already be showing effects as a result of the fire or its suppression, it is not possible to know quantitatively what effect the $MgCl_2$ has or will have on the remaining desirable vegetation. Negative effects of dust abatement treatment are expected to be very small and unlikely to be discerned and separated from other factors.
Table 3 states that 132 Tailhold Trees will be cut down within Riparian Reserves! Page 68 the EA tells us these are fire-killed snags, but to get the right tailhold in the right place, some of them could be live trees or trees that have a 50-50 chance of	The vast majority of the tailhold trees within riparian reserves would be snags since much of these areas burned with 100% mortality. A few live trees or dying trees could be used if available, but these would be very few in number, representing an extremely small proportion of the live trees left untreated within the riparian reserve system in the planning area. The units requiring tailholds within riparian reserves have no roads at the bottom that could be used. One third of the riparian reserve tailhold trees would be needed within the plantation unit, so these trees would not be large

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surviving. We find this riparian reserve impact alarming, especially since tailhold trees have to be a large size, which mean they have to be older. Cutting down 132 large, valuable snags (or live trees) in the Riparian Reserve to facilitate logging should not happen. While the EA specifies these trees would be left on site (pg 45), and not sold, none the less, the EA should have discussed alternatives that would allow these trees to remain green-side-up. For instance, if a small unit requires many large, old tailhold trees to facilitate yarding, the EA should have eliminated that unit. Or the EA could have required equipment in roads to act as tailholds if possible. It is also unclear why the EA assumes the tailhold trees would be cut down. Protective straps should be required and girdling forbidden if it is a live tree	ones since none are present in the plantation. The minimum size needed for a tailhold tree is 12 to 14 inches dbh, although bigger ones are better for stability and safety. Probably not all tailhold trees would be cut down, but it is impossible to say how many would or would not, since that is determined by the purchaser during operations. None of these cut trees would be removed, so all would still provide value as coarse downed wood, and snag surveys after the fire indicated that the remaining snags in the riparian reserves would meet or exceed snag guideline requirements.
The Jackson Creek Watershed Analysis says: “Defer salvage harvest of standing dead and dying timber in WAA's that are deficient in 40 acre area distribution of snags.” Is this the case in the project area? Page 233 of the watershed analysis requires the Forest Service to: “Manage stands to provide, at least, the snag and down woody debris amounts described in the Desired Future Condition.” Was this done?	The Jackson Creek Watershed Analysis on pg 223 states “Salvage is acceptable outside of Riparian Reserves. Adjusting Riparian Reserve buffers for salvage is not recommended. Defer salvage harvest of standing dead and dying timber in WAA's that are deficient in 40 acre area distribution of snags.” While the Jackson Creek Watershed Analysis does not conduct an analysis of which WAA’s are deficient in 40 acre area distribution of snags, FIA data estimates 14.9 snag per acre pre-fire (see Forest Vegetation section in Chapter 3), which is well above the Desired Future Conditions, with an estimated additional 24.4 new snags per acre created by the fire for the Beaver Creek WAA. It is anticipated that overtime, that down wood pieces/ acre will increase as fire killed trees (snags) fall over from natural causes in areas outside of unit boundaries. Based upon Figure 5, pg 40, in the Jackson Creek WA the treatment units are within the High Fire Frequency Regime, and the Desired Future Conditions for this fire regime in Beaver Creek is:

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<tr><th>Condition & Diameter Class</th><th>Snags/Acre</th><th>LWD Pieces/Acre</th><th>Feet of LWD/Acre</th></tr>
<tr><td>Hard >21”</td><td>2</td><td>4</td><td>130</td></tr>
<tr><td>Soft > 21”</td><td>1</td><td>3</td><td>100</td></tr>
<tr><td>Hard < 21”</td><td>1</td><td>2</td><td>50</td></tr>
<tr><td>Soft < 21”</td><td>1</td><td>4</td><td>110</td></tr>
</table>

Post Project Estimates are:
<table>
<tr><th>Condition & Diameter Class</th><th>Snags/Acre</th><th>LWD Pieces/Acre</th><th>Feet of LWD/Acre</th></tr>
<tr><td>Hard > 21’’</td><td>57 (Natural Average)-6 (Plantation Average)</td><td>2 (Natural Average) – 2.2 (Plantation Average)</td><td>146 (Natural Average)-55 (Plantation Average)</td></tr>
<tr><td>Soft > 21’’</td><td>No data – Hard snags will decay to soft snags.</td><td>No data – Hard LWD will decay to soft snags.</td><td></td></tr>
<tr><td>Hard < 21’’</td><td>103 (Natural Average) – 191 (Plantation Average)</td><td>2.3 (Natural Average)-6.2 (Plantation Average)</td><td>116 (Natural Average)-76 (Plantation Average)</td></tr>
<tr><td>Soft < 21’’</td><td>No data – Hard snags will decay to soft snags.</td><td>No data – Hard LWD will decay to soft snags.</td><td></td></tr>
</table>
</td></tr>
<tr><td>The EA claims Alternative 1 would “contribute to a decline in the local timber industry” and therefore “be detrimental to the local economy”. This is unsubstantiated speculation and should be corrected in the final EA. The “decline of the local timber industry” is based on mill automation and demand for milled lumber or raw-logs exports, not supply of trees.</td><td>The EA actually states under the Economics analysis of Direct, Indirect, and Cumulative Effects on pg 52: “Alternative 1 is not shown in Table 12 since by definition it would not change the conditions or level of economic activity in the County. This alternative may, however, contribute to a decline in the local timber industry, since it would keep federal timber from the market”. This statement does not claim that a low supply of timber is the only cause in the decline of the timber industry.</td></tr>
</table>

Comments from Francis Eatherington, Cascadia Wildlands & George Sexton, Klamath Siskiyou Wildlands	
Comment	**Response**
In the Economic Analysis, the Forest Service failed to quantify the money saved on prescribed burning due to the occurrence of a beneficial wildland fire	This was not quantified for several reasons: 1) the activity occurred pre-project; 2) of the 16,266 acres of low severity (which would be the effect of a typical prescribed fire) or unburned, the % unburned cannot be quantified and as a result a "savings" cannot be accurately quantified; and 3) using an estimated cost of $25 million in suppression expenses for 16,266 acres, the cost of over $1,400/acre well exceeds our average prescribed burning cost of $150-$500/acre. Theoretically the District could have treated 50,000 – 166,666 acres with prescribed fire if funded with $25,000,000. Often cost becomes a major factor in the management of fires with longer duration fires often being equated with more costly fires. This leads to the desire of controlling fires as quick as possible to prevent high costs, even if the fire may play a beneficial role on the landscape. By implementing fuels treatments (fuel breaks and prescribed fire maintenance blocks), it may bring future wildfire costs down by having key infrastructure already in place thus allowing the fire to be managed to benefit the landscape without the added pressure to keep cost down.
The EA should have considered an alternative where the Forest Service adopts a forest wide fire plan.	The Umpqua Forest Plan states in Chapter IV – 92: *1. Wildfires that threaten life property, public safety, improvements, or investments will receive aggressive suppression action using an appropriate suppression response.* *2. All wildfires will require the use of the appropriate suppression response. This will provide the option of applying the appropriate strategy to all areas of the Forest, using cost efficiency and meeting resource management objectives.* However, it also states; *8. Unplanned ignitions (lightning caused) may be used for prescribed fire if (1) a prescribed fire plan has been prepared and approved and (2) the fire is burning within prescribed parameters.* The Forest Plan has not been amended to allow fires to burn on the Umpqua National Forest. By completing the NEPA analysis for prescribed fire and creating a burn plan for the identified areas, we are left with some flexibility to manage fire in the area. Amending the Forest Plan to allow for naturally caused ignition to burn is beyond the scope of the current project.

Comments from David & Laurene Steward	
Comment	**Response**
I think this project will be a good one. I like what is proposed so far.	Thank you for your comment.
The only matter that was not mentioned was the Winter Range Closures for deer and elk. All of the sale area and haul routes are in winter range. The closure for winter range is Dec. 1 to April 30.	Winter Range is identified in the EA as Management Area 11, from the Umpqua NF LRMP, on pg. 3 and acres of proposed activities within MA 11 are shown in Table 2. While this closure is mentioned in Chapter 2 under *Haul Outside the Normal Operating Season*, and in Aquatic Environment Section in Chapter 3, a BMP clearly stating this closure to activities has been added in Chapter 2, pg 31. This BMP states "Haul and other project activities, other than erosion control and monitoring , will not occur within MA 11 (Big Game Winter Range) between December 1 and April 30."

Figure 56. Tiller Ranger District Salvage Efforts 2002-2013

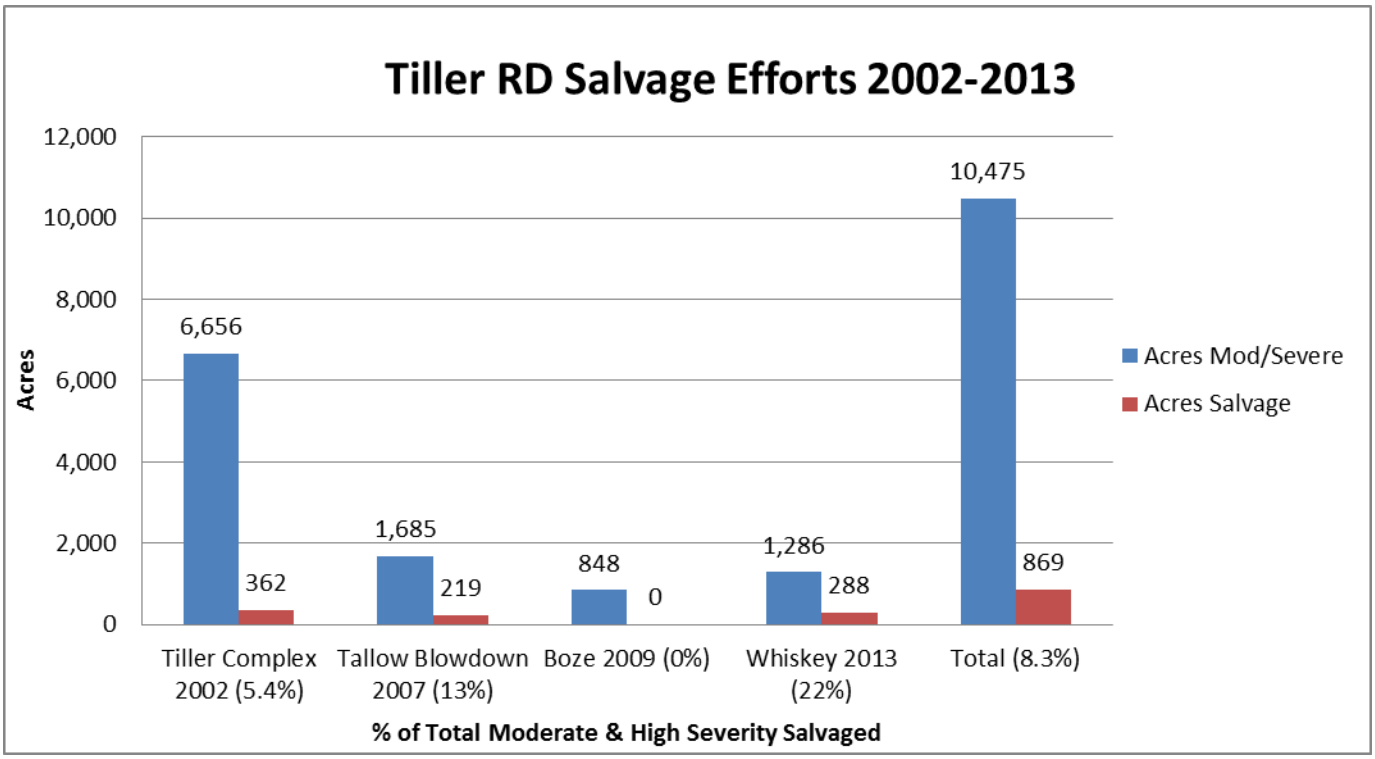

Figure 57 Areas Analyzed by Tiller Whiskey Complex Project and AFRC/DTO Proposed Units