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File Code: 1950 **Date:** May 9, 2014
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Subject: North Fork Mill Creek Revised EA – Wildlife Specialist Report
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It is Forest Service policy to protect the habitat of federally listed and sensitive species from adverse modification or destruction, as well as to protect individual organisms from harm or harassment as appropriate (FSM 2670.3). All Forest Service projects, programs, and activities are to be reviewed for possible effects on threatened, endangered and sensitive species, and the findings documented in a Decision Notice.

Project Description

The revised Proposed Action (Alternative 2) includes treating 1,009 acres within the Mill Creek watershed. This represents approximately 50 percent of the National Forest System lands burned by the Government Flats Complex Fire in August and September 2013. The Proposed Action includes restoration thinning, hazard tree removal, and reforestation treatments.

Restoration Thinning treatments would harvest timber from 253 acres within the Government Flats Complex Fire perimeter. These units are all under existing stewardship contacts (Roan and Eques), and the Forest Service has a contractual obligation to analyze continued operations on these lands in order to make the purchasers whole and/or to provide the necessary context for contract modifications. Fire-killed and dying trees would be harvested and removed from areas of high to moderate severity burn (146 acres). The dying trees are trees that experienced damage as a result of the fire activity. Snags would be retained to meet habitat requirements for the Northern spotted owl and snag and down log associated species, as much as possible. If additional trees are needed for soil stability or soil productivity, these trees would be retained and limbed as needed. A minimum of 10 snags per acre would be retained. Restoration thinning would also occur on the unburned to low severity burns with minor changes to the prescriptions (107 acres). These changes would focus on the gaps; in large part, the gaps would no longer be needed due to the fire activity within the units.

Restoration thin units in all burn severities may be made available for firewood and/or restoration log removal, if the harvest operations are not able to be conducted while the product is viable. Vegetation treatment over most of the area would involve the use of available roads and skid trails existing from past activities. Less than one mile of temporary roads would be constructed for removal of vegetation in some stands, but these roads would be rehabilitated at the end of the project.

Hazard trees would be removed on 134 acres. These treatments would remove any tree that is classified as a hazard tree and that is predicted to strike or damage the road up to 200-feet from

either side of the center line of the road. All hazard (danger) trees evaluation and identification must follow the "Field Guide for Danger Tree Identification and Response" (Toupin et. al. 2008). Any slash exceeding Forest Plan standards and guidelines would be machine and/or hand-piled to reduce the resulting fuel loading. If additional trees are needed for soil stability or soil productivity, these also would be felled and left on site. Approximately 125 hazard trees have already been felled along Forest Service Road 1711-630 as part of the Burned Area Emergency Response (BAER) work. These trees would be removed, if they exceed Forest Plan standards and guidelines. On lands within Riparian Reserves (Units 87A, 106A, 107A, and 108A), the hazard trees would be felled and left on-the-ground in order to comply with the Northwest Forest Plan.

Approximately 622 acres would be planted to reforest moderate to high severity burn areas in naturally forested areas and not in grass or meadow plant communities. Hazard trees within the stand would be hand-felled in order to facilitate safe tree planting operations. These trees would be left on-the-ground and used as contour trees whenever possible. These trees would be used to provide micro-siting for planted tree seedlings as well. All other treatment areas would be reforested as needed in order to establish slow growing, shade intolerant, rot resistant species, such as ponderosa pine, western white pine and western larch. Any slash along the roads within these units that exceeds Forest Plan standards and guidelines and that are not needed for soil stability or soil productivity would be piled to reduce the resulting fuel loading. These units were all originally analyzed under the North Fork Mill Creek Restoration Opportunities EA, but they have not met the desired future condition given the severity of the burn and anticipated natural regeneration.

In addition to the Proposed Action, the No Action Alternative (Alternative 1) and Snag Retention (Alternative 3) were developed. Under the No Action Alternative, the only action that would take place is the felling of hazard trees that pose an imminent threat to human safety or infrastructure. The goal for felling these hazard trees would be to re-open the road for administrative and public use. Alternative 3 was designed to minimize the number of snags removed from the landscape based on the recommendations resulting from the DecAID analysis (see Section 3.2, Wildlife for more information). Snags would only be removed to meet health and safety objectives, including Occupational Safety and Health Administration (OSHA) standards. As such, no thinning would take place on the moderate to high severity burn areas. These units are changed to hazard tree and reforestation treatments when compared to the Proposed Action. For more details on these alternatives, see EA, Chapter 2.

Overall Methodology

Four species of wildlife and critical habitat that are classified as threatened, endangered or proposed may be found on or adjacent to the Hood River Ranger District. There are seventeen U.S. Forest Service Region 6 Sensitive species (2011), seven Survey and Manage species (2001), and seven Management Indicator species that may also be found on the District. The status of species in the project area is listed in Table 1. Species that are not present or do not have habitat within the project area will not be discussed further in this biological evaluation.

Table 1: The status of Threatened, Endangered, and Proposed Species; Forest Service Region 6 Sensitive Species; Survey and Manage Species; and Management Indicator Species in the Project Area

Species	Habitat	Presence
Federally Threatened, Endangered or Proposed		
Northern spotted owl (*Strix occidentalis caurina*)	yes	yes
Northern spotted owl critical habitat	yes	yes
North American wolverine (*Gulo gulo luscus*)	yes	unknown
Canada lynx (*Lynx canadensis*)	no	-
R6 Sensitive Species		
Bald eagle (*Haliatus leucocephalus*)	no	-
Peregrine falcon (*Falco peregrinus anatum*)	no	-
Bufflehead (*Bucephala albeola*)	no	-
Harlequin duck (*Histrionicus histrionicus*)	no	-
White-headed woodpecker (*Picoides albolarvatus*)	yes	yes
Lewis' woodpecker (*Melanerpes lewis*)	yes	yes
Cope's giant salamander (*Dicomptodon copei*)	no	no
Cascade torrent salamander (*Rhyocotriton cascadae*)	no	-
Oregon spotted frog (*Rana pretiosa*)	no	-
Townsend's big-eared bat (*Corynorhinus townsendii*)	no	-
Fringed myotis (*Myotis thysanodes*)	no	-
Pacific fisher (*Martes pennanti*)	no	-
Western bumblebee (*Bombus occidentalis*)	yes	unknown
Beller's ground beetle (*Agonum belleri*)	no	-
California Shield-backed bug (*Vanduzeenia borealis californica*)	no	-
Johnson's hairstreak (*Callophyrs johnsoni*)	no	-
Mardon skipper (*Polites mardon*)	no	-
Survey and Manage		
Great gray owl *(Strix nebulosa)*	no	-
Larch Mountain salamander *(Plethodon larselii)*	no	-
Dalles sideband *(Monadenia fidelis minor)*	yes	yes
Crater Lake tightcoil *(Pristiloma arcticum crateris)*	yes	unknown
Evening fieldslug *(Deroceras hesperium)*	yes	unknown
Puget Oregonian *(Cryptomastix devia)*	yes	unknown
Columbia Oregonian *(Cryptomastix hendersoni)*	yes	unknown
Management Indicator Species		
Mule Deer (*Odocoileus hemionus*) and Elk (*Cervus elaphus nelsoni*)	yes	yes
Pileated Woodpecker *(Dryocopus pileatus)*	yes	yes
American Marten *(Martes americana)*	yes	yes
Wild Turkey *(Meleagris gallopavo)*	yes	yes
Western Gray Squirrel *(Sciurus griseus griseus)*	yes	yes
Other Speices of Interest		
Snag and Down Log Associated Species	yes	yes
Neotropical Migratory Birds	yes	yes

The following analysis includes a discussion for wildlife species for the components of the North Fork Mill Creek project that have a changed condition resulting from the Government Flats Complex Fire; that have a changed condition resulting of regulation, policy, or law; or that were not present when the original analysis was completed, but are present now. If there was no change in condition, that component of the North Fork Mill Creek Revised analysis will not be discussed further in this assessment. The effects to the species with no changed condition are analyzed and fully disclosed within the original North Fork Mill Creek Restoration Opportunities Wildlife Biological Evaluation (Walcott, 2008). This analysis is available in the project record, located at the Hood River Ranger District in Mount Hood-Parkdale, Oregon.

Threatened, Endangered and Proposed Species

Northern Spotted Owl

Methodology

Disturbance
The U.S. Fish and Wildlife Service (USFWS) has concluded that noise, smoke, and human presence can result in a disruption of breeding, feeding or sheltering behavior of the northern spotted owl (spotted owl) such that it creates the potential for injury to individuals (i.e., incidental take in the form of harassment). For a significant disruption of spotted owl behavior to occur as a result of disturbance caused by the Proposed Action, the disturbance and spotted owl(s) must be in close proximity to one another. Human presence on-the-ground is not expected to cause a significant disruption of behavior because spotted owls do not seem to be startled in those situations.

A spotted owl that may be disturbed at a roost site is presumably capable of moving away from the disturbance without a substantial disruption of its behavior. Since spotted owls forage primarily at night, projects that occur during the day are not likely to disrupt its foraging behavior. The potential for effects is mainly associated with breeding behavior at active nest sites.

In the late breeding period, potential effects from disturbance decline because juvenile spotted owls are increasingly more capable of moving as the nesting season progresses. To ensure that more than 86 percent of juvenile spotted owls in the Oregon Eastern Cascades Physiographic Province are able to move away from disturbance without increasing their risk of predation or harm, the critical breeding period is considered to be March 1 through July 15. After July 15, it is estimated that most fledgling spotted owls are capable of sustained flight and can move away from most harmful disturbances.

The USFWS has based disruption distances on interpretation of the best available science. The Proposed Action for this project that generate noise above ambient levels would be the use of heavy equipment and chainsaw use. Disruption distances of 35 yards for heavy equipment use and 65 yards for chainsaws have been set by the USFWS.

Home Range and Core Area
Since there are few recent surveys for spotted owls that show the locations of active nest sites on the Forest, historical spotted owl information is used. Historical nest sites are used because studies show that nests are used for many years and when a site has been found to be unoccupied during surveys, it can be subsequently utilized by a different pair of owls years later. In addition to historic sites, predicted nest sites are used to analyze the effects of the proposed project on spotted owls. The predicted sites are used for areas with incomplete or no spotted owl survey information. The purpose of using predicted sites is to estimate spotted owl numbers and distribution within unsurveyed habitat for purposes of assessing the effects of a proposed project on spotted owls. These predicted sites are based on factors known to influence the carrying capacity of a given area for spotted owls.

While it is usually the alteration or removal of suitable habitat that potentially results in adverse impacts to a territorial pair of spotted owls, the loss or degradation of dispersal habitat may also result in short-term impacts. For the Willamette Province, the home range is a 1.2 mile radius circle (2,955 acres) centered on a nest site. Incidental take would be presumed to occur when suitable habitat is removed from a home range and if suitable habitat is less than 40 percent of the home range. A core area has been defined as the area within a home range that receives disproportionately high use (503 acres or 0.5 mile radius circle from the historic nest). Incidental take would be presumed to occur when suitable habitat is removed from a core area and if suitable habitat is less than 50 percent of the core area.

Changed Condition

Habitat
There are four home ranges that overlap with the proposed treatment units. Because of the amount of habitat that burned in the Government Flats Complex Fire, all home ranges are currently below the threshold of 40 percent suitable habitat in the home range and 50 percent suitable habitat within the core area. The amount of suitable habitat within the fire perimeter reduced by 248 acres and the amount of dispersal habitat was reduced by 257 acres (Table 2). There are currently 689 acres of suitable nesting habitat and 269 acres of dispersal habitat within the proposed project area.

Table 2. Suitable and Dispersal Habitat Pre and Post Fire

	Northern Spotted Owl Habitat	
Acres	Dispersal	Suitable
Pre Fire	526	937
Post Fire	269	689
Total Acres Lost	**257**	**248**

Snags
Because of the fire, the number of snags in the project area has increased since the original North Fork Mill Creek Restoration Opportunities analysis in 2008. It is estimated that there are currently an average of 60 to 100 snags per acre ≥ 20 inches in diameter and 100 to 150 snags

per acre between 8 and 19.9 inches in diameter. The snags created by the fire were in the moderate to high severity portions of the burn on a total of 1,298 acres on the Forest. Given the above averages, the total number of snags in the project area is estimated at 77,880 to 130,000 snags ≥20 inches in diameter and 130,000 to 194,700 snags between 8 and 19.9 inches.

Management and Population Trends
The Revised Recovery Plan for the Northern Spotted Owl (U.S. Fish and Wildlife Service 2011) has developed a habitat modeling tool to aid in the development of future land management plans by Federal land managers, and the consideration of management options by State, Tribal or private land owners. The Recovery Plan has been updated since the orginial Wildlife Biological Evalutaion (2008) was completed.

Given the continued decline of the species, the apparent increase in severity of the threat from barred owls, and information indicating a recent loss of genetic diversity for the species, the Revised Recovery Plan recommends retaining more occupied spotted owl sites and unoccupied, high value spotted owl habitat on all lands. Vegetation management actions that may have short-term impacts, but are potentially beneficial to occupied spotted owl sites in the long-term meet the goals of ecosystem conservation. Such actions may include silvicultural treatments that promote ecological restoration and are expected to reduce future losses of spotted owl habitat and improve overall forest ecosystem resilience to climate change, which should result in more habitat retained on the landscape for longer periods of time.

In the more disturbance-prone provinces on the east side of the Cascade Mountains, agencies are working to develop strategies that incorporate the dynamic natural disturbance regime in a manner that provides for long-term ecological sustainability through the restoration of ecological processes while conserving spotted owl habitat over the long-term.

The Revised Recovery Plan also identifies competition from the barred owl as an important threat to the spotted owl. Since barred owls are more aggressive and also use the same habitats and prey as spotted owls they are believed to be out competing spotted owls for habitat and food (USFWS 2011, Wiens 2012). Within the Oregon demographic study areas, there has been a steady increase in the number of barred owls as measured by the proportion of spotted owl sites with barred owls detected, with as many as 60 percent of the spotted owl sites having barred owls detected, see Figure 1 (Forsman et al. 2011).

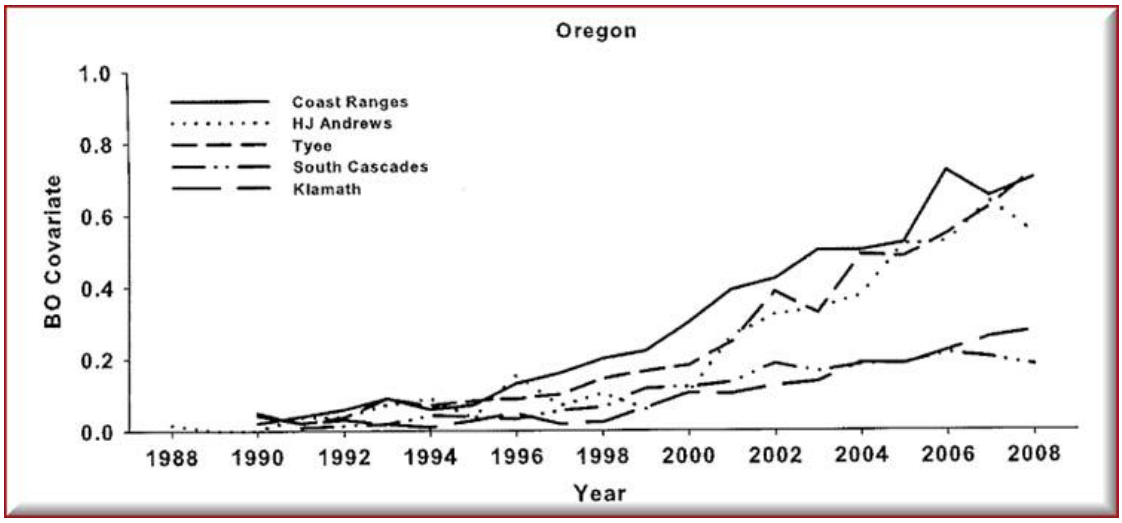

Figure 1: Annual Proportion of Spotted Owl Territories with Barred Owl Detections

Dugger et al. (2011) modeled extinction and colonization rates for spotted owl pairs in the South Cascade Demographic Study area where barred owls were detected on some home ranges. They found that extinction rates for spotted owls increased with decreasing amounts of old forest in the core area, and that the effect was 2-3 times greater when barred owls were detected. They found that colonization rates for spotted owls decreased as the distance between patches of old-growth forest increased (i.e. increased habitat loss and fragmentation) and that barred owl presence similarly decreased the rate of colonization of spotted owl pairs. They concluded that conserving large blocks of contiguous old-forest habitat was important for reducing interference competition between the two owl species. They mapped old-forest habitat as generally >100 years of age with trees diameter at breast height (dbh) >35 cm (K. Dugger, personal communication, 2012). Wiens (2012) also found that the relative probability of a location being selected by spotted owls was reduced if the location was in close proximity to the core-use area of a barred owl.

Effects Analysis

Analysis Area

The analysis area for spotted owl includes the Government Flats Complex Fire perimeter and the four spotted owl territories that overlap and extend beyond the fire perimeter (Figure 2).

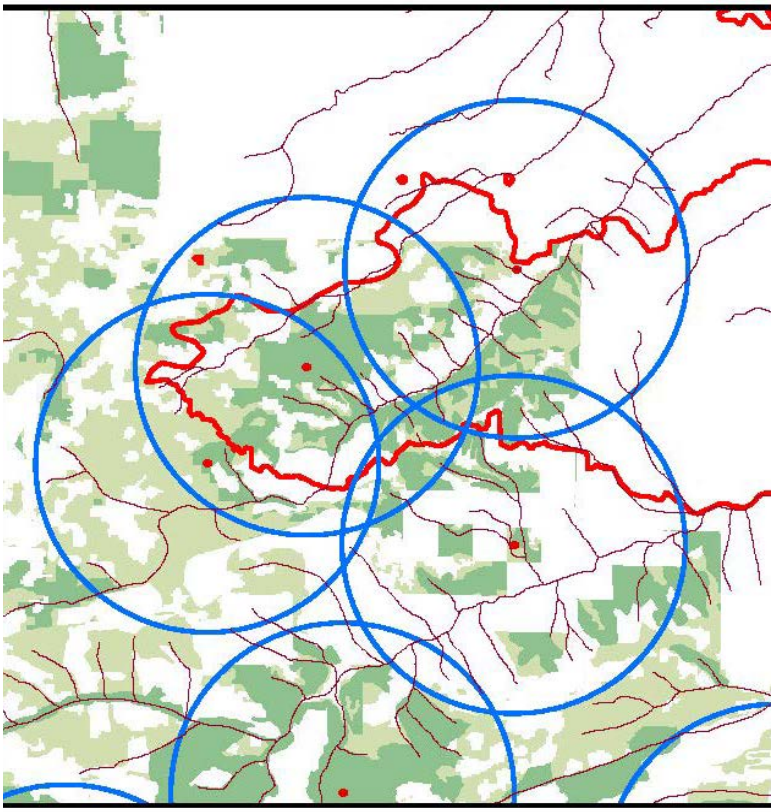

Figure 2. Spotted owl analysis area

No Action – Direct and Indirect Effects
Under the No Action Alternative there would be no reforestation in the burned area to accelerate the development of desired forest conditions. Longer time periods between fire and seedling establishment may decrease the ability of tree seedlings to compete with shrubs. Without reforestation or sufficient natural regeneration, the moderate to high severity burned areas of the project may experience stands that are dominated by dense shrubs for several decades. Early seral habitat could persist for a century or more in some places of moderate to high burn severity, depending on the success of natural regeneration since burned stands would be dependent on nearby natural seeds for reforestation.

Restoration thinning in high severity burned areas would not occur and these areas would continue to serve as foraging habitat for spotted owls. Hazard trees would be felled and left along roads over a longer time period as they pose an imminent threat to human safety or infrastructure, which would also provide for foraging habitat over a longer period of time.

Alternative 2–Direct and Indirect Effects

Habitat Impacts
The proposed treatments under Alternative 2 would impact 70 acres of dispersal habitat and 15 acres of suitable habitat. This habitat would be impacted by reducing the canopy cover from

approximately 70 percent to less than 40 percent and the loss of some down wood, shrubs and snags, which provide habitat for prey species. These units would no longer function as suitable and dispersal habitat after treatments. It is estimated that these units would again provide dispersal habitat approximately 20 years after harvest, but it would be many decades before it would again provide suitable nesting habitat.

There are four home ranges that overlap with the proposed treatment units. Because of the amount of habitat that burned in the Government Flats Complex fire, all home ranges are currently below the threshold of 40 percent suitable habitat in the home range and below the threshold of 50 percent suitable habitat within the core area. The proposed treatments would further reduce the amount of suitable habitat within either the core area or home range in two of the territories.

The impacts to dispersal habitat from the proposed treatments under Alternative 2 would affect the ability of owls to move through these treated stands since they would no longer be providing dispersal habitat. In the high severity burned areas of the project area dispersal habitat was reduced by 257 acres (see Table 2) and this Alternative would further reduce the amount of dispersal habitat by 70 acres. Because the impacts to dispersal habitat are considered at the landscape scale, the removal of this habitat would not prevent owls from dispersing between territories. Although there is no suitable habitat north and east of the fire and the project area, the removal of the dispersal habitat would not prevent owls from dispersing to the west and the south.

Snag Removal

Alternative 2 would remove snags on 146 acres in the Restoration Thin treatment units in the moderate to high severity burned areas and on 134 acres in the Hazard Tree treatment units. In addition to these acres, snags would be felled in the Reforestation units and Restoration Thin treatment units in the low severity burned and unburned areas in order to meet OSHA standards for worker safety.

The total number of snags to be removed in the Restoration Thin units is estimated to be 11,000 snags ≥20 inches in diameter and 15,600 snags 8 to 19.9 inches in diameter. Based on field reviews, it is estimated that approximately 40 percent of the trees in the hazard tree units would need to be removed for an average of 4,000 snags ≥20 inches in diameter and 7,000 snags 8 to 19.9 inches in diameter for Hazard Tree treatments. A total of approximately 37,600 snags (14.1 percent of snags in project area) would be removed under this Alternative (Table 3).

Table 3. Number of Snags Removed by Alternative 2.

	≥ 20”	**8” to 19.9”**	**Total**
Restoration Thin (Moderate to High)	11,000	15,600	26,600
Hazard Tree Treatments	4,000	7,000	11,000
Total	15,000	22,600	**37,600**

Results from three radio-telemetry studies of spotted owls in post-fire landscapes indicate that spotted owls use forest stands that have been burned, but generally do not use stands that have been burned and logged. California spotted owls tracked 4 years post-fire in burned, unlogged stands had 30 percent of their nonbreeding-season roost locations within the fire's perimeter (Bond *et al.* 2010); selected low-severity burned forests for roosting during the breeding season (Bond *et al.* 2009); and selected low-, medium-, and high-severity burned forests for foraging within 1.5 km of the nest or roost site, with the strongest selection for high-severity burned forest (Bond *et al.* 2009). However, for spotted owls in stands that had been harvested post-fire, infrequent foraging in stands burned with low-, medium-, and high-severity fires was restricted to areas with live trees such as those in riparian areas (Clark 2007), and use shifted away from burned stands during 3 years post-fire (King *et al.* 1997).

Based on these studies and because there is sufficient suitable habitat adjacent to the burned area to support a nesting pair of owls, the removal of post fire habitat would reduce available foraging on 280 acres from Restoration Thin treatments and Hazard Tree treatments. And reforestation activities on 622 acres would be expected to increase the rate at which seedlings become established which could increase the rate of establishing large tree structure and canopy cover needed for suitable spotted owl habitat (See Silviculture Specialist Report, No Action Alternative, available in the project record).

Barred Owls

There is concern that timber harvest and other silvicultural activities may directly or indirectly affect the interaction between barred owls and spotted owls and increase the competitive advantage for barred owls. The main areas of concern that may be related to the Proposed Action are: logging may expand the range of barred owls; and silvicultural treatments that thin forests and create early seral habitat, or create edge habitat, may favor barred owls over spotted owls.

Across their range barred owls are known to use a wide variety of forest types and it has been suggested they are habitat generalists that may benefit from timber harvest activities such as clearcutting and thinning (Hamer et al. 1989, Iverson 1993). However, a detailed review for the spotted owl recovery plan found much evidence that barred owls prefer old-growth and older forest habitat in the Pacific Northwest (USFWS 2011). While a suggestion has been made that timber harvest activities may favor barred owls, an alternative hypothesis is that barred owls have a wider range of habitat use in the northern part of the spotted owl's range, and the spotted owl has a narrower one. But in the more southerly part of the spotted owl's range, the spotted owl seems to have a broader range of habitat use than does the barred owl (Courtney et al 2004). Therefore, timber harvest may have the effect of leading to a competitive advantage for barred owls in some areas, but not in others (Courtney et al 2004, Dugger et al. 2011).

In some portions of the spotted owl's range, barred owl populations are increasing while spotted owls are declining, to some degree independently of forest management history in the area (Courtney et al 2004). For example, barred owls are increasing while spotted owls are declining throughout the Olympic peninsula in both industrial and national forest, but also in the National Park in areas that have never been harvested. On the Gifford Pinchot National Forest

(Washington), the density and impact of barred owls appears higher in areas without timber harvest (Pearson and Livezey 2003).

Wiens (2012) conducted a detailed study of the interaction between barred and spotted owls in the moist temperate forests of western Oregon by radio tracking 29 spotted owls and 28 barred owls in 36 neighboring territories over a 2-year period. He found that both owl species had similar use of young, mid-seral, and mature forests and that both species avoided areas within 135 meters of forest/non-forest edges. Both species avoided open areas and young forests less than 60 years of age and used mature conifer forests (60-120 years of age) proportional to their availability within the landscape (second order selection).

Because barred owls can prey on a wider range of species than spotted owls, there has been speculation that thinning may increase prey favored by barred owls. The Young Stand Study on the Willamette National Forest found that commercial thinning of mid-seral stands would significantly increase the abundance of deer mice and Townsends chipmunks (McComb et al 2013). Wiens (2012) found that these two species comprised about 5 percent of the prey biomass for spotted owls compared to 3 percent for barred owls in an area of western Oregon. Therefore, the small mammal species that have been found to increase most after thinning are not ones that are selectively favored by barred owls more than spotted owls. Based on these studies, the proposed treatments in the project area would not create habitat favored by barred owls over spotted owls and would not expand the range of barred owls.

Sound Disturbance

The sound from project activities would not adversely affect the breeding behavior of spotted owls during their critical breeding period because no heavy equipment, chainsaw use, or helicopter use would occur within the 35 to 120 yard disruption distances. Some activities would take place during the critical nesting season between March 1 and July 15, but these activities would be beyond the disruption distance of an actively nesting spotted owl pair or beyond the disruption distance from the nest patch of a predicted site.

Cumulative Effects

The following list of past, present, and reasonably foreseeable future projects overlap the analysis area in time and space and were considered in the cumulative effects analysis: Stewardship Projects (Lokai Stewardship [unsold]; Roan and Eques Stewardship outside fire boundary; and, Appy, Buckskin, and Clyde Stewardship [completed]), past timber harvests, private land timber harvest activities, hazard tree removal, The Dalles Watershed Fuelbreak Stewardship Projects (Hodi, Alder and Willow Stewardship), and The Dalles Watershed Phase II Stewardship Projects (Mint, Fern, and Voodoo Stewardship).

The cumulative effects to spotted owls and dispersal habitat from Alternative 2 and the above listed projects would not prevent spotted owls from continuing to forage or disperse throughout the watershed because dispersal and foraging habitat is not the limiting factor for owls in the analysis area. The amount of suitable habitat proposed for removal in the Revised EA as analyzed at the watershed scale is approximately 0.03 percent of the available habitat and cannot be meaningfully measured in terms of impacts to owls. Therefore, there are no measurable cumulative effects to spotted owl suitable habitat from Alternative 2.

Snags would not be cut in the other projects considered under cumulative effects unless they pose an imminent threat to human safety or infrastructure. The exact number is unknown, but is extremely small and would not contribute to cumulative effects under this Alternative. None of these projects propose to salvage burned trees associated with east-side mixed conifer or ponderosa pine/Douglas fir habitat types within the Mill Creek Watershed; therefore, there are no cumulative effects from the Restoration Thin treatments in the moderate to high severity burned areas.

ESA Effects Determination

Because suitable habitat would be removed in territories that are currently below the threshold levels, and because foraging would be reduced on 280 acres, the proposed project **may affect, and is likely to adversely affect** spotted owls. Although the rationale for the effects determination has changed, the original analysis also included an effects determination on may affect and is likely to adversely affect spotted owls.

Alternative 3– Direct and Indirect Effects

Habitat Impacts

The habitat impacts under this Alternative are the same as those discussed in Alternative 2.

Snag Removal

Alternative 3 would remove snags on 167 acres of Hazard Tree treatment units and would not remove any snags in the Restoration Thin treatments units. In addition to these acres, snags would be felled in all the Reforestation units and Restoration Thin treatment units in the low severity burned and unburned areas in order to meet OSHA standards for worker safety.

The number of snags to be removed for Hazard Tree treatments would be greater under Alternative 3 than Alternative 2 since the acres of treatment increased. Based on field reviews, it is estimated that approximately 40 percent of the trees in the hazard tree units would need to be removed. Alternative 3 would remove an estimated 5,300 snags ≥20 inches in diameter and approximately 8,400 snags 8 to 19.9 inches in diameter for Hazard Tree treatments. A total of approximately 13,700 snags (5.1 percent of snags in project area) would be removed under this Alternative (Table 4). That is less than the total amount of snags removed under Alternative 2 which was 14 percent.

Table 4. Number of Snags Removed by Alternative 3.

Hazard Tree Treatments	≥ 20”	8” to 19.9”	Total
Alternative 2	4,000	7,000	**11,000**
Alternative 3	5,300	8,400	**13,700**

Based on the telemetry studies discussed above under Alternative 2, and because there is sufficient suitable habitat adjacent to the burned area to support a nesting pair of owls, the removal of post fire habitat under Alternative 3 would reduce available foraging on 167 acres. This is less than the amount of foraging habitat impacted from Alternative 2 which was 280

acres. And reforestation activities on 732 acres would be expected to increase the rate at which seedlings become established which could increase the rate of establishing large tree structure and canopy cover needed for suitable spotted owl habitat (See Silviculture Specialist Report, No Action Alternative, available in the project record).

Sound Disturbance
The sound from project activities would not adversely affect the breeding behavior of spotted owls during their critical breeding period because hazard tree removal activities would not occur within the 65 yard disruption distance. Some activities would take place during the critical nesting season between March 1 and July 15, but these activities would be beyond the disruption distance of an actively nesting spotted owl pair or beyond the disruption distance from the nest patch of a predicted site.

Cumulative Effects
The following list of past, present, and reasonably foreseeable future projects overlap the analysis area in time and space and were considered in the cumulative effects analysis: Stewardship Projects (Lokai Stewardship [unsold]; Roan and Eques Stewardship outside fire boundary; and, Appy, Buckskin, and Clyde Stewardship [completed]), past timber harvests, private land timber harvest activities, The Dalles Watershed Fuelbreak Stewardship Projects (Hodi, Alder and Willow Stewardship), and The Dalles Watershed Phase II Stewardship Projects (Mint, Fern, and Voodoo Stewardship).

The cumulative effects to spotted owls and dispersal habitat from the Alternative 3 and the above listed projects would not prevent spotted owls from continuing to forage or disperse throughout the watershed because dispersal and foraging habitat is not the limiting factor for owls in the analysis area. The amount of suitable habitat proposed for removal in the Revised EA as analyzed at the landscape scale is approximately 0.03 percent of the available habitat and cannot be meaningfully measured in terms of impacts to owls. Therefore, there are no measurable cumulative effects to spotted owl suitable habitat from Alternative 3.

Snags would not be cut in the other projects concerned for cumulative effects unless they pose an imminent threat to human safety or infrastructure. The exact number is unknown, but is extremely small and would not contribute to cumulative effects from Hazard Tree treatments under this alternative.

ESA Effects Determination
Because suitable habitat would be removed in territories that are currently below the threshold levels, and because foraging would be reduced on 167 acres, the proposed project **may affect, and is likely to adversely affect** spotted owls.

Consistency Determination
See the Consistency Determination under Spotted Owl Critical Habitat below.

Northern Spotted Owl Critical Habitat

Methodology

Critical habitat (CH) includes those specific areas within the geographical area occupied by the species at the time it was listed and on which are found those physical or biological features essential to the conservation of the species, and which may require special management considerations or protection. For the spotted owl, these features are defined as primary constituent elements (PCEs) which include particular forest types that are used or likely to be used by spotted owls for nesting, roosting, foraging, or dispersing habitat. The effects to CH are analyzed based on the impacts to the individual PCEs. The PCEs for the spotted owl were defined in the Final Rule, Federal Register Vol. 77, No. 233 December 4, 2012. They are listed as:

1. Forest types that support the spotted owl across its geographic range. This PCE is essential to the conservation of the species because it provides the biotic communities that are known to be necessary for the spotted owl.
    a. Includes - Sitka spruce, western hemlock, mixed conifer, mixed evergreen, grand fir, Pacific silver fir, Douglas-fir, white fir, Shasta red fir, redwood/Douglas-fir, and the moist end of ponderosa pine.
    b. Coniferous zones at elevations up to 6000'.
    c. This PCE must be in concert with at least one other PCE to be critical habitat.

2. Habitat for nesting and roosting. Nesting habitat is essential to provide structural features for nesting, protection from adverse weather conditions, and cover to reduce predation risks. Roosting habitat is essential to provide for thermoregulation, shelter, and cover to reduce predation risk while resting or foraging.
    a. These habitats must provide:
        i. Sufficient foraging habitat to meet home range needs of territorial pairs throughout the year.
        ii. Nesting and roosting habitat (see definition above)

3. Foraging habitat is essential to provide a food supply for survival and reproduction.
    a. Varies widely across the range in accordance with ecological conditions and disturbance regimes that influence vegetation structure and prey species distributions
    b. East Cascades foraging habitat
        i. Stands of nesting or roosting habitat
        ii. Stands of Douglas-fir or white fir/Douglas-fir mix
        iii. Mean tree size >16.5"dbh
        iv. Increased density of large trees (>26" dbh) and increased basal area
        v. Large accumulations of fallen trees and other woody debris
        vi. Sufficient space below canopy to fly

4. Habitat to support the transience and colonization phases of dispersal.
    a. Would optimally be composed of nesting, roosting or foraging habitat but may also be composed of other forest types that occur between larger blocks of nesting, roosting, and foraging habitat

i. Where nesting, roosting, and foraging habitat is insufficient to support dispersal, dispersal habitat may be provided by:
    1. Habitat supporting the transience phase of dispersal
        a. Stands with adequate tree size and canopy cover to provide protection from avian predators and minimal foraging opportunities
        b. May include but is not limited to trees at least 11" dbh and a minimum of 40% canopy cover AND
        c. Younger and less diverse forest stands than foraging habitat like even-aged, pole-sized stands if they contain some roosting structures and foraging habitat to allow for temporary resting and feeding during the transience phase
    2. Habitat supporting the colonization phase of dispersal
        a. Equivalent to nesting, roosting, and foraging habitat but may be smaller in area than that needed to support nesting pairs

The Final CH Rule has a section entitled "Determining Whether an Action is Likely to Adversely Affect CH" (77 FR 71939). For this analysis the stand scale was utilized to assess effects for all four PCEs. This scale of analysis is consistent with the current method recommended by the Willamette Province Level 1 Team for addressing effects to CH for consultation.

PCE 1 is the forest types that support spotted owls. This criterion was used to identify CH affected by the Proposed Action. PCEs 2, 3, and 4 (nesting/roosting, foraging, and dispersal habitat) were specifically considered with respect to the Proposed Action to determine if they were removed, reduced, maintained or enhanced at a stand level. The analysis of impacts has both a temporal scale (would the actions delay or accelerate the development of the PCEs in the stand following treatment) and a qualitative scale (would the life history needs of the spotted owl be better or worse with respect to the PCEs as a result of the treatment).

In addition to the above scales, the effects to the PCEs are evaluated at the scales of the CH subunit, CH unit, and the range of the spotted owl. However, if the Proposed Action does not have significant effects at a smaller scale they would not have significant effects at increasingly larger scales and would therefore not be analyzed at the larger scale. For example, if the Proposed Action maintains the PCEs in a manner that meets the life history needs of the spotted owl at the stand scale, then it would not have significant adverse impacts at the subunit scale.

<u>Changed Condition</u>

In 2008, the analysis area did not include any critical habitat for northern spotted owls. The critical habitat was designed by USFWS in 2012 (Final Rule 50 CFR 17).

A total of 9,577,969 acres in 11 units and 60 subunits have been designated as CH for the spotted owl. The 11 units identified as CH are: (1) North Coast Olympics, (2) Oregon Coast Ranges, (3) Redwood Coast, (4) West Cascades North, (5) West Cascades Central, (6) West Cascades South, (7) East Cascades North, (8) East Cascades South, (9) Klamath West, (10) Klamath East, and (11) Interior California Coast Ranges. The proposed project falls within unit 7: East Cascades

North (ECN) and includes a total of 1,345,523 acres in 9 subunits. The proposed project falls within subunit 7.

The ECN-7 subunit consists of approximately 139,983 ac in Hood River and Wasco Counties, Oregon, and is comprised of only Federal lands managed by the U.S. Forest Service under the Northwest Forest Plan (USDA and USDI 1994). Special management considerations or protection are required in this subunit to address threats from current and past timber harvest, removal or modification of habitat by forest fires and the effects on vegetation from fire exclusion, and competition with barred owls. This subunit is expected to function primarily for demographic support to the overall population, as well as north-south and east-west connectivity between subunits and other CH units.

An evaluation of sites known to be occupied at the time of listing indicates that nearly 100 percent of the area of ECN-7 was covered by verified northern spotted owl home ranges. When combined with likely occupancy of suitable habitat and occupancy by nonterritorial owls and dispersing subadults, we consider this subunit to have been largely occupied at the time of listing. In addition, there may be some smaller areas of younger forest within the habitat mosaic of this subunit that were unoccupied at the time of listing.

The CH Rule determined that all of the unoccupied and likely occupied areas in this subunit are essential for the conservation of the species to meet the recovery criterion that calls for the continued maintenance and recruitment of northern spotted owl habitat (USFWS 2011). The increase and enhancement of northern spotted owl habitat is necessary to provide for viable populations of northern spotted owls over the long term by providing for population growth, successful dispersal, and buffering from competition with the barred owl.

Effects Analysis

Analysis Area
The analysis area for spotted owl CH is the ENC-7 subunit. The analysis for the effects to spotted owl CH relates the impacts of activities within the fire perimeter to the subunit (ENC-7) as described above. The impacts to the subunit are then related to impacts at the unit and range-wide scale.

No Action – Direct and Indirect Effects
Under the No Action Alternative there would be no reforestation in the burned area to accelerate the development of PCEs. Longer time periods between fire and seedling establishment may decrease the ability of tree seedlings to compete with shrubs. Without reforestation or sufficient natural regeneration, the moderate to high severity burned areas of the project may experience stands that are dominated by dense shrubs for several decades. Early seral habitat could persist for a century or more in some places of moderate to high burn severity, depending on the success of natural regeneration since burned stands would be dependent on nearby natural seeds for reforestation. There would be no restoration thinning in the moderate to high severity burn and these areas would continue to provide PCEs 3 and 4. Hazard trees would be felled and left along roads over a longer time period as they pose an imminent threat to human safety or infrastructure and therefore PCEs 3 and 4 would be provided over a longer time period.

Alternative 2– Direct and Indirect Effects
The Alternative 2 would impact the PCEs at the stand scale. Fifteen acres of nesting habitat (PCE 2) would be removed and 70 acres of dispersal habitat (PCE 4) would be removed in treatment units. In addition to the removal of this habitat, potential foraging habitat (PCE 3) would be reduced on 280 acres in the adjacent burned stands. These treatments would delay the development of PCEs in the stand following treatment, and the life history needs of the spotted owl would no longer be met in these treatment units. Reforestation would increase the rate of the development of all PCEs on 622 acres. See Silviculture Specialist Report for a discussion on the rate of seedling establishment with and without reforestation activities.

In addition to the effects at the stand scale, the effects to the PCEs were evaluated at the scales of the CH subunit, CH unit, and the range of the spotted owl. Removal of the PCEs within the analysis area would impact approximately 0.1 percent of Subunit ENC-7. Therefore, the life history needs of the spotted owl would continue to be met at the subunit, unit, and range-wide scale and these CH units would continue to function as demographic support to the overall population, as well as providing connectivity between other CH units and subunits.

Cumulative Effects
The following list of past, present, and reasonably foreseeable future projects overlap the analysis area in time and space and were considered in the cumulative effects analysis: Stewardship Projects (Lokai Stewardship [unsold]; Roan and Eques Stewardship outside fire boundary; and, Appy, Buckskin, and Clyde Stewardship [completed]), past timber harvests, private land timber harvest activities, The Dalles Watershed Fuelbreak Stewardship Projects (Hodi, Alder and Willow Stewardship), and The Dalles Watershed Phase II Stewardship Projects (Mint, Fern, and Voodoo Stewardship).

The cumulative effects to spotted owl critical habitat under Alternative 2 from the above listed projects would not prevent spotted owls from continuing to disperse or forage (PCEs 3 and 4) throughout the subunit because dispersal and foraging habitat is not the limiting factor for owls in the analysis area. The amount of suitable habitat (PCE 4) proposed for removal under Alternative 2 and analyzed at the subunit scale is approximately 0.04 percent of the available habitat and cannot be meaningfully measured in terms of impacts to CH. Therefore, there are no measurable cumulative effects to spotted owl CH from Alternative 2.

Snags would not be cut in the other projects considered in cumulative effects unless they pose an imminent threat to human safety or infrastructure. The exact number is unknown, but is extremely small and would not contribute to cumulative effects from Hazard Tree treatments under this alternative. None of these projects propose to harvest burned trees associated with east-side mixed conifer or ponderosa pine/Douglas fir habitat types within Subunit ENC-7; therefore, there are no cumulative effects from the Restoration Thin treatments in the moderate to high severity burned areas.

ESA Effects Determination
Because PCEs 1 through 4 would be removed on 15 acres, and PCEs 3 and 4 would be removed on an additional 280 acres and these treatment units would no longer provide the necessary PCEs, Alternative 2 **may affect, and is likely to adversely affect** spotted owl critical habitat.

Alternative 3– Direct and Indirect Effects
Alternative 3 would impact the PCEs at the stand scale. Fifteen acres of nesting habitat (PCE 2) would be removed and 70 acres of dispersal habitat (PCE 4) would be removed in treatment units. In addition to the removal of this habitat, potential foraging habitat (PCE 3) would be reduced on 167 acres in the adjacent burned stands. These treatments would delay the development of PCEs in the stand following treatment, and the life history needs of the spotted owl would no longer be met in these treatment units. Reforestation would increase the rate of the development of all PCEs on 732 acres. See Silviculture Specialist Report for a discussion on the rate of seedling establishment with and without reforestation activities.

In addition to the effects at the stand scale, the effects to the PCEs were evaluated at the scales of the CH subunit, CH unit, and the range of the spotted owl. Removal of the PCEs 1 through 4 within the analysis area would impact approximately 0.1 percent of Subunit ENC-7. Therefore, the life history needs of the spotted owl would continue to be met at the subunit and unit scale and these CH units would continue to function as demographic support to the overall population, as well as providing connectivity between other CH units and subunits.

Cumulative Effects
The following list of past, present, and reasonably foreseeable future projects overlap the analysis area in time and space and were considered in the cumulative effects analysis: Stewardship Projects (Lokai Stewardship [unsold]; Roan and Eques Stewardship outside fire boundary; and, Appy, Buckskin, and Clyde Stewardship [completed]), past timber harvests, private land timber harvest activities, The Dalles Watershed Fuelbreak Stewardship Projects (Hodi, Alder and Willow Stewardship), and The Dalles Watershed Phase II Stewardship Projects (Mint, Fern, and Voodoo Stewardship).

The cumulative effects to spotted owl critical habitat under Alternative 3 from the above listed projects would not prevent spotted owls from continuing to disperse or forage (PCEs 3 and 4) throughout the subunit because dispersal and foraging habitat is not the limiting factor for owls in the analysis area. The amount of suitable habitat (PCE 2) proposed for removal in the Revised EA as analyzed at the subunit scale is approximately 0.04 percent of the available habitat and cannot be meaningfully measured in terms of impacts to CH. Therefore, there are no measurable cumulative effects to spotted owl CH from Alternative 3.

Snags would not be cut in the other projects considered in cumulative effects unless they pose an imminent threat to human safety or infrastructure. The exact number is unknown, but is extremely small and would not contribute to cumulative effects from Hazard Tree treatments under this Alternative. None of these projects propose to harvest burned trees associated with east-side mixed conifer or ponderosa pine/Douglas fir habitat types within Subunit ENC-7; therefore, there are no cumulative effects from the restoration thin treatments in the moderate to high severity burned areas.

ESA Effects Determination
Because PCEs 1 through 4 would be removed on 15 acres, and PCEs 3 and 4 would be removed on an additional 167 acres, the proposed project **may affect, and is likely to adversely affect** spotted owl critical habitat.

Consistency Determination for Spotted Owl and Critical Habitat for Alternatives 2 and 3

The effects to spotted owls and CH for this project will be included in a letter for reinitiation of consultation that will be submitted to the U.S. Fish and Wildlife Service in June 2014.

This project is consistent with the Northwest Forest Plan and with the Revised Northern Spotted Owl Recovery Plan (U.S. Fish and Wildlife Service 2011). The Final Rule for Critical Habitat Designation refers to the Recovery Plan for habitat management guidance:

- Known spotted owl activity centers within the project area would be protected (ROD Standards and Guidelines pp C-10). One hundred acres of the best spotted owl habitat would be retained as close to the nest site or owl activity center as possible for all known spotted owl activity centers (as of January 1, 1994) located on federal lands.
- Salvage should only occur in stands where disturbance has reduced canopy closure to less than 40 percent. (Standards and Guidelines pp C-14).
- Management following a stand-replacing event should be designed to accelerate or not impede the development of late-successional conditions (Standards and Guidelines pp C-14).

The Following Mt. Hood National Forest Land and Resource Management Plan Standards and Guidelines that apply to the Proposed Action alternatives and would be met:

- FW-174: Habitat for threatened, endangered, and sensitive species has been identified and managed in accordance with the ESA (1973), the Oregon ESA (1987), and FSM 2670.
- FW 177 & 178: Consultation with the USFWS shall occur on each program activity or project that the Forest Service determines may affect threatened or endangered species. Consultation shall be completed before any decision is made on the proposed project.

North American Wolverine

Changed Condition

Since the original analysis for the North Fork Mill Creek was completed, The U.S. Fish and Wildlife Service proposed to list the distinct population segment of the North American wolverine under the endangered Species Act (U.S. Fish and Wildlife 2013). The extended comment period for this proposal closed on December 2, 2013 and a Final Rule is expected in 2014.

Effects Analysis

Analysis Area
The analysis area includes the Mill Creek Watershed

No Action – Direct and Indirect Effects
Under the No Action Alternative there would be no reforestation in the burned area to accelerate the development of forested conditions. Early seral habitat could persist for a century or more in

some places of moderate to high burn severity, depending on the success of natural regeneration. Burned stands would be dependent on nearby natural seeds for reforestation. Hazard trees would be felled and left along roads over a longer time period as they pose and imminent threat to human safety or infrastructure. The Mill Creek Watershed does not include denning habitat and therefore there would be no impacts to denning habitat under this alternative. There would be no disturbance to dispersing wolverine under the No Action Alternative.

Alternative 2 and 3–Direct and Indirect Effects
Activities from thinning of burned and unburned stands and hazard tree removal would not impact individuals through disturbance because there is a very low probability that a wolverine would be in the area. There would be no effect to wolverine from the proposed alternatives. Any wolverine in the watershed would be a dispersing individual and activities would not prevent them from moving across the landscape. The Mill Creek Watershed does not include denning habitat and therefore there would be no impacts to denning habitat under these alternatives. Restoration thinning and hazard tree treatments would not impact wolverine prey species.

Cumulative Effects
Because there are not direct or indirect effects to the wolverine under the proposed alternatives, there would be no cumulative effects.

Consistency Determination
The following Mt. Hood National Forest Land and Resource Management Plan Standards and Guidelines that apply to the Proposed Action alternatives and would be met:

- FW-174: Habitat for threatened, endangered, and sensitive species has been identified and managed in accordance with the ESA (1973), the Oregon ESA (1987), and FSM 2670.

Snag and Down Log Associated Species

Methodology

The Mill Creek Watershed as a whole was analyzed for historic and current snag levels because stand level analyses do not provide a meaningful measure to snag and down wood dependent species. Habitats created by fire represent a small percentage of landscapes, and therefore, the analysis for fire created dead wood habitats need to be conducted on a scale larger than just the burned area. Impacts to snags and down wood in proposed treatment units would be compared to unharvested stands which represent historic conditions. To best provide for the largest number of snag dependent species, management objectives should mimic natural conditions and the distribution of unharvested portions of the landscape across the landscape.

DecAID Advisor
Wildlife species models and advisory tools related to managing snags and down wood on federal lands in the Pacific Northwest were first developed in the 1970's and 1980's (Thomas and others 1979, Neitro and others 1985, and Raphael 1983). Although these tools were based on sound empirical information and expert knowledge available at the time, the data and model structures

have become outdated. A considerable amount of new information about the ecology, dynamics, and management of decayed wood has become available since the 1980's. More recent field studies, particularly in eastern Oregon (e.g., Bull et al.1997), suggest that the amounts and sizes of snags selected by wildlife are far greater than those depicted by previous models.

DecAID is a planning tool intended to help advise managers as they conserve and manage snags, partially dead trees and down wood for biodiversity (Mellen et al. 2006). It also can help managers decide on snag and down wood sizes and levels needed to help meet wildlife management objectives. This tool is not a wildlife population simulator nor is it an analysis of wildlife population viability.

Modeling biological potential of wildlife species (particularly primary cavity excavator birds) has been used in the past and DecAID was developed to avoid some pitfalls associated with that approach. There is not a direct relationship between the statistical summaries presented in DecAID and past calculations or models of biological potential. Field studies have suggested that predictions of biological potential (relative or absolute population sizes of snag associated wildlife species) do not match research findings.

To assess the effects of the proposed alternatives to snag and down wood dependent species, information contained within the wildlife data found in DecAID for recent post-fire and large tree environments was used. The wildlife data in DecAID is provided in the form of tolerance levels of 30 percent, 50 percent, or 80 percent. DecAID tolerance levels "may be interpreted as three levels of "assurance": low (30% tolerance level), moderate (50% tolerance level), and high (80% tolerance level)" (Mellen et al. 2006). The higher the tolerance level, the higher the "assurance" that snag and down wood habitat is being provided.

A critical consideration in the use and interpretation of the DecAID tool is that of scales of space and time. DecAID is best applied at scales of subwatersheds, watersheds, subbasins, physiographic provinces, or large administrative units such as Ranger Districts or National Forests. DecAID is not intended to predict occurrence of wildlife at the scale of individual forest stands or specific locations. It is intended to be a broader planning aid, not a species or stand specific prediction tool. Refer to the DecAID web site listed in the References section for more details and for definitions of terms.

Changed Condition

Snags

The Government Flats Complex Fire burned approximately 2,200 acres on the Forest. Of these acres, 660 burned as high severity, 638 burned as moderate, and 549 acres were unburned or low severity. The moderate and high severity burned areas represent the greatest potential for an increase in snag habitat. All of these acres burned within the DecAID wildlife habitat type (WHT) of Eastside Mixed Conifer Cascades/Blue Mountains and vegetation condition of "large trees." An additional 1000 acres of this habitat type burned in moderate to high severity on adjacent State of Oregon and City of The Dalles lands. These State and City lands have already been salvaged or are proposed for future harvest. For the purpose of this analysis, it is assumed that these lands would not significantly contribute to the amount of snags in the watershed.

Large snags (≥ 20 inches) comprise 39 percent and small snags (≥ 10 inches) account for 61 percent of the burned area on the Forest. Table 5 shows the estimated total number of snags within the fire perimeter on Forest Service land.

Table 5. Number of Snags Created by the Government Flats Complex Fire

DBH	Number of Snags
≥ 10 in.	162,350
≥ 20 in.	103,940
Total	**266,290**

Due to the fire, the moderate and high severity burned areas (1,298 acres) are now within the WHT identified in DecAID as the Eastside Mixed Conifer Forest Cascades/Blue Mountains and vegetation condition of "post fire." For this habitat type, the DecAID advisor identifies the 30, 50, and 80 percent tolerance level for snags. Data on snag density used by wildlife at the 80 percent tolerance level range from 63 to 119 snags per acre for snags ≥10 inches dbh and 16 to 40 snags per acre for snags ≥ 20 inches dbh. Snag densities used by wildlife at the 50 percent tolerance level range from 40 to 82 snags per acre for snags ≥10 inches dbh and 6 to 17 snags per acres for snags ≥ 20 inches dbh. Snag densities used by wildlife at the 30 percent tolerance level range from 18 to 57 snags per acre for snags ≥10 inches dbh and 0.2 to 2 snags per acres for snags ≥ 20 inches dbh (Table 6). The project area currently has 100 to 150 snags per acre ≥10 inches dbh and 60 to 100 snags per acre ≥ 20 inches dbh which is above the 80 percent tolerance level for this WHT.

Table 6. Various tolerance levels used by wildlife in post fire habitat.

Snags	30% Tolerance Level	50% Tolerance Level	80% Tolerance Level
≥ 10 dbh	18 – 57	40 – 82	63 – 199
≥ 20 dbh	0.2 – 2	6 – 17	16 – 40

Figures 2 through 5 show the condition of snags on the Forest and in the Mill Creek watershed compared to the reference conditions for the WHT. When calculating the snags at the watershed scale for large trees post fire, 50 percent of the acres burned were from the 0 snags per acre category, 25 percent were from the 0 to 2 snags per acre category, and 25 percent were from the 2 to 6 snags per acre category. These percentages were then added to the highest density category of 10+ snags per acre. The same percentages were also used for the small snag analysis and taken from the 0, 0 to 6, and 6 to 18 snag per acre categories and added to the 30+ snags per acre. The pre and post fire snags for the Forest were not broken into separate categories. The snags created by the fire only represent 0.1 percent of the WHT at the Forest scale and did not show a marked change between pre and post fire conditions. The current condition for the Forest includes the snags from the Government Flats Complex fire.

While the Government Flats Complex Fire created snags, when these snags are added to the current condition, the number of snags per acre at the watershed and Forest scale is still below

historic levels. The largest increase (2.4%) was small snags in high density patches (30+), but with the addition of these snags, the post fire condition is still 3 times lower than what occurred on the landscape historically. In all cases, at the watershed and Forest scale, the fire did not increase the current levels enough to meet the reference conditions.

Figure 3 shows that a greater percentage of the watershed (60.6 percent) has zero large snags (≥20 inches) per acre, compared to the reference condition of 34.6 percent of the watershed. Historically, 29 percent of the watershed had 2 to 6 snags per acre. Currently, just over 10 percent falls within this same category. Figure 2 also shows that the watershed is lacking in high density patches of large snags. The reference condition shows 8.1 percent of the watershed with 10+ large snags per acre and the current condition post fire is 4.6 percent of the watershed in the same category.

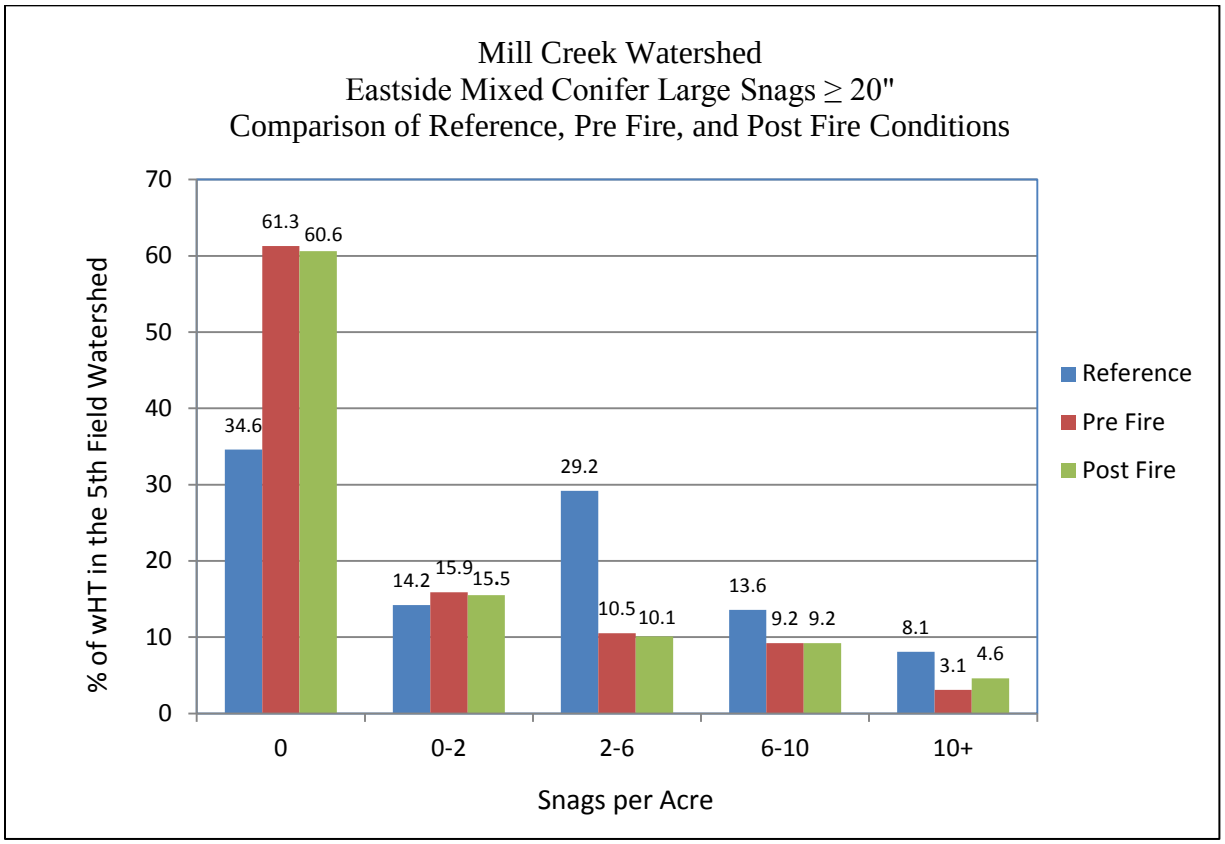

Figure 3. Comparison of reference, pre fire, and post fire conditions for large snags in the Mill Creek Watershed.

Figure 4 compares the reference and current conditions of large snags for this WHT at the Forest scale. The difference in these conditions is similar to the differences for the watershed, although there is a greater departure from historic levels of snags in the 6 to 10 and 10+ snags per acre categories for the Forest. The reference condition indicates that 13.6 percent of the Forest should have 6 to 10 snags per acre compared to the current condition of 5.8 percent. Also, 1.7 percent of the Forest is in the category of 10+ snags per acre compared to 8.1 percent at historic levels.

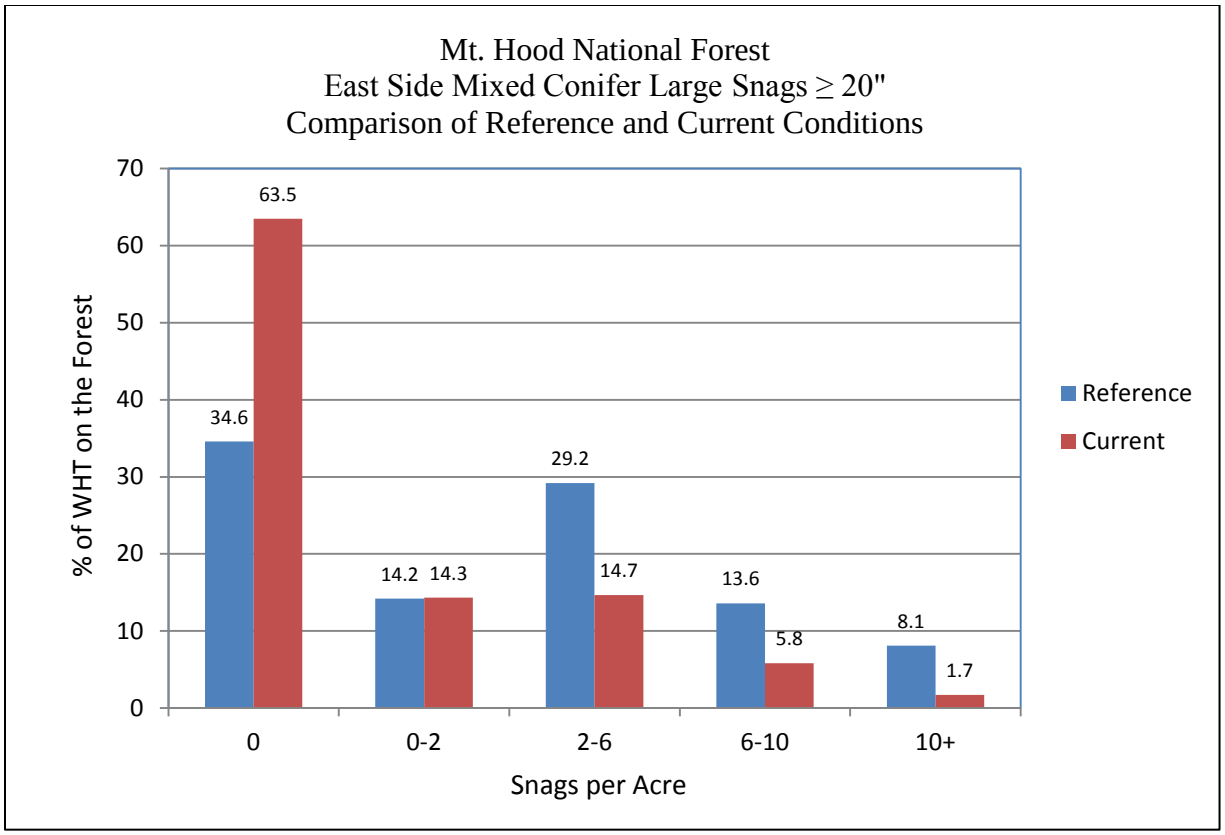

Figure 4. Comparison of reference and current condition for large snags on the Forest.

Figure 5 compares the reference condition with the pre and post fire condition for small snags in the watershed. Historically, 20 percent of the watershed contained zero snags per acre. Currently, 3 times as much of the watershed has zero snags per acre. The watershed is below the reference condition in all the remaining categories, especially in the 0 to 6, 6 to 18, and high density patches of 30+ snags per acre.

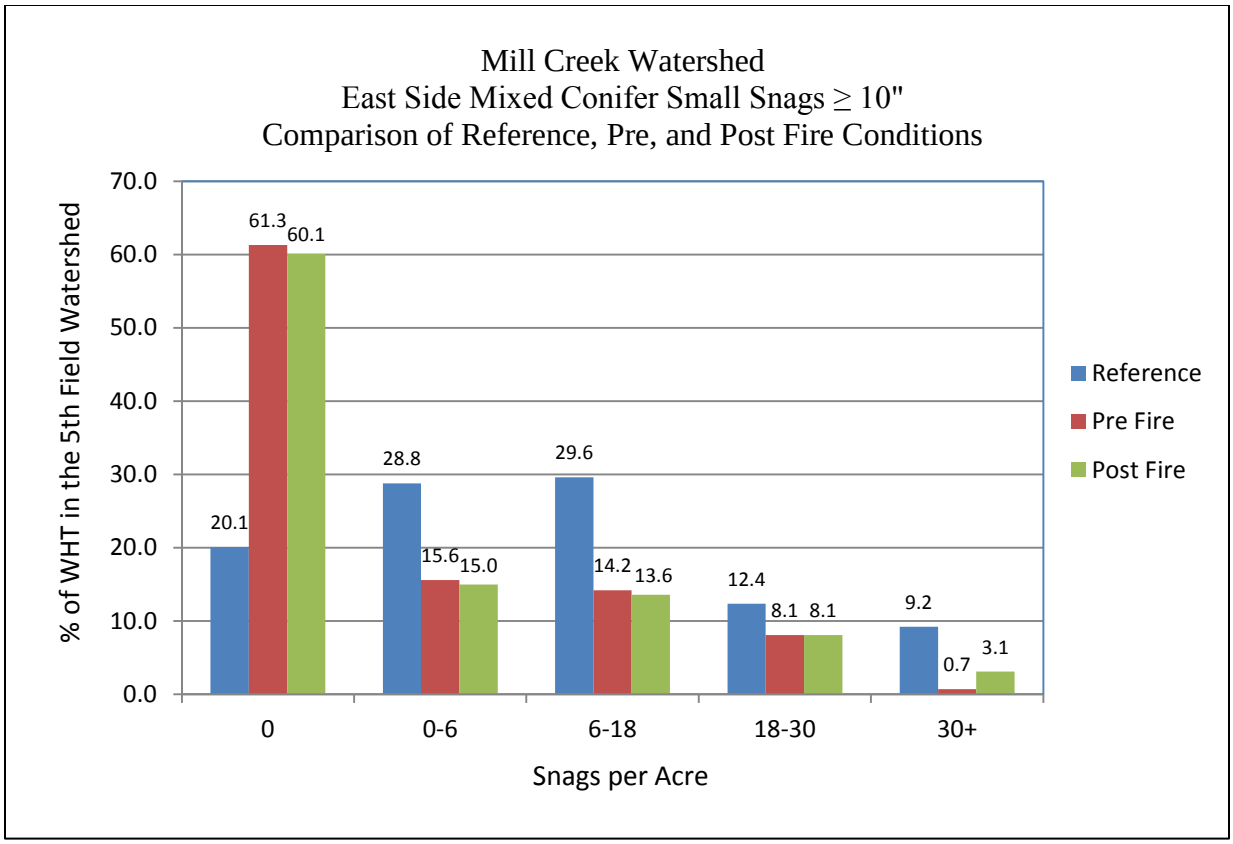

Figure 5. Comparison of reference, pre fire, and post fire conditions for small snags in the Mill Creek Watershed.

Figure 6 compares the reference and current conditions of small snags for this WHT at the Forest scale. The difference in these conditions is similar to the differences for the watershed, although there is a greater departure from historic levels of snags in the 18 to 30 categories for the Forest. The reference condition indicates that 12.4 percent of the Forest should have 18 to 30 snags per acre compared to the current condition of 5.0 percent.

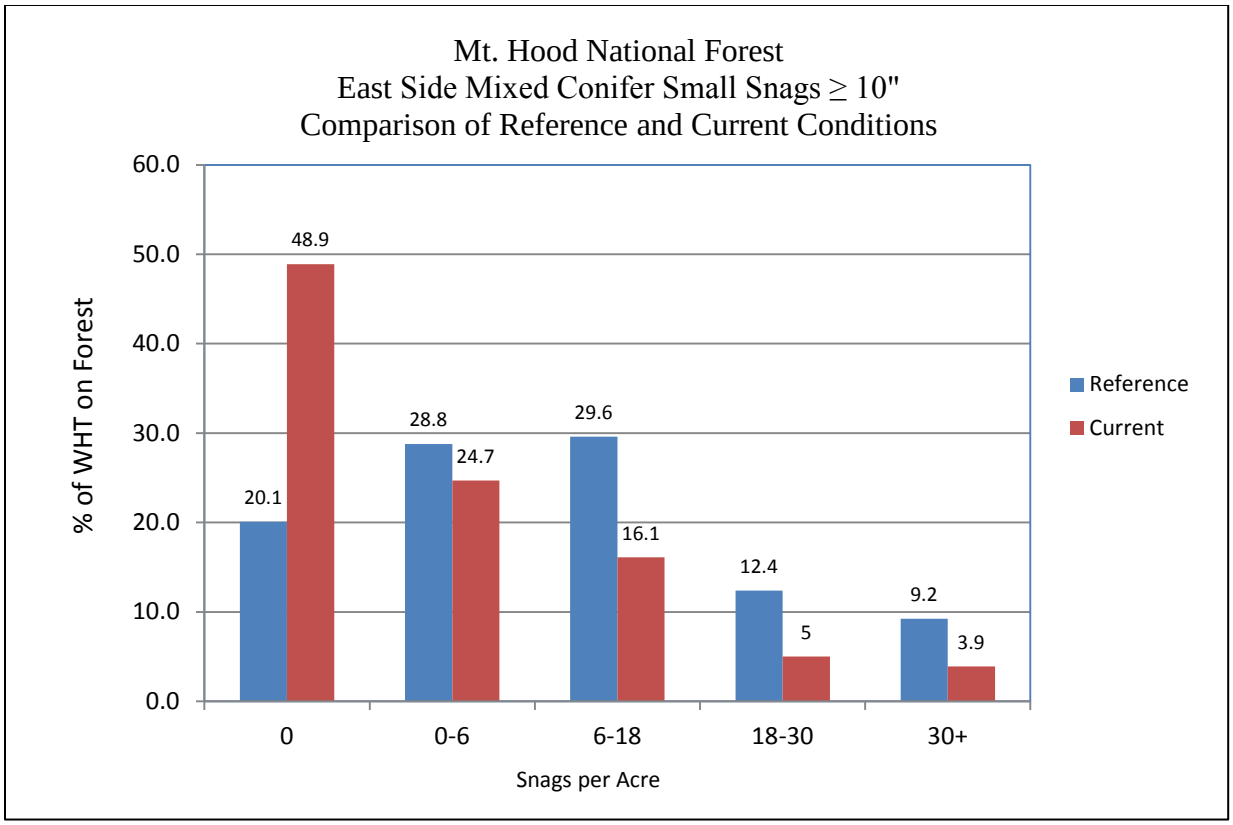

Figure 6. Comparison of reference and current condition for large snags on the Forest.

Down Wood

Logs are an important component on the landscape. They provide organic and inorganic nutrients in soil development, provide microhabitats for invertebrates, plants, amphibians, and other small vertebrates, and provide structure for riparian associated species in streams and ponds. It has been shown that size, distribution, and orientation may be more important than tonnage or volume. Small logs provide escape cover or shelter for small species. Tallmon and Mills (1994) have shown that red-backed voles, a primary prey species for the spotted owl, are highly associated with large down material in more advanced decay stages. Truffles, a dietary staple of the northern flying squirrel, have also been loosely associated with down material.

Too much down material may impede travel by big game and present a fire hazard. However, increased levels may protect seedlings from browse and scorching. Orientation has also been shown to be important. Logs that lie along a contour are used more than those lying across contours. Larger sized logs are also used more and by more species than smaller logs. (Bull et al. 1997).

A variety of species are associated with down wood. Use by species differs in relation to size, decay class, and purpose of use, as well as many other factors. Therefore, by providing for varying densities, sizes, species, and decay classes on the landscape, it would provide for an array of wildlife species. Most available information of wildlife use of down wood is representative of green stands. No information is available for down wood in DecAid for post-

fire environments and little literature exists for wildlife use of down wood n post-fire environments.

Down wood within the fire perimeter is limited because the fire consumed a large portion of the down wood. It is estimated that approximately 75 percent of all snags are likely to fall within 20 years (Keen 1929, Dahms 1949, Parks et al. 1999, and Everett et al. 1999). This influx of snags to down wood will increase the amount of down wood in the next 20 years. In the mixed severity areas, trees that survived the fire will provide a more consistent supply of dead wood material.

Within stand replacement areas, much of the pre-existing down wood was consumed. However, within the fire perimeter a percentage of the existing down woody material are trees that have fallen since the fire and most are in Decay Classes 1 and 2 (Thomas 1979, Brown 1985). Some downed material was consumed within the low severity areas where fire intensity was greater. This primarily consisted of smaller material (<12 inches dbh) and advanced decayed logs.

Down wood abundance within the watershed and on the Forest is highly variable due to many factors. The Forest lies on the eastside of the Cascades where there is a limited availability of water and nutrients as compared to the west side of the Cascades. This, combined with overcrowded stand conditions due to fire suppression, has led to tree mortality above historic levels especially within smaller size classes. Plant association groups that tend to be drier (i.e. ponderosa pine and mixed conifer dry) may recruit higher levels of down wood today than historically. This is the case with the Surveyors Ridge Late Successional Reserve (LSR) in the western portion of the watershed. In addition to fire suppression, past harvest activities in the watershed have created large areas of small diameter trees with little down wood present in the stand.

Effects Analysis

Analysis Area
The analysis area includes the Mill Creek Watershed. The condition of snags across the Forest was also reviewed because the current levels within the watershed are, in some cases, far below historic levels. The intent of examining snags at the Forest level was to determine if conditions were being met at a larger scale.

No Action – Direct and Indirect Effects
There would be a short-term increase in snag numbers as additional trees die from fire damage. Over the long-term, the number of snags would decrease creating a gap in time when little snag habitat would exist (primarily in stand replacement areas) because there are few green trees of sufficient size to provide recruitment. Dahms (1949) found that 50 percent of fire killed ponderosa pine snags remained standing after 10 years, but this declined to 22 percent standing after 20 years. It is estimated that approximately 75 percent of all snags may fall within 20 years (Parks et al. 1999, and Everett et al. 1999). Under the No Action alternative, the 80 percent tolerance level would be met for this WHT.

Reforestation of desired tree species (Ponderosa pine, western white pine and western larch) would not occur to accelerate the development of desired forest conditions. Stands that underwent stand-replacement and mixed severity fires would be dependent on nearby natural seeds for reforestation. Under the No Action Alternative, the time period of dominance by shrubs could last up to a century. Delayed reforestation would increase the likelihood of this period of shrub dominance.

Alternative 2 – Direct and Indirect Effects
Alternative 2 would treat 107 acres of green tree habitat. When considered at the watershed scale, this does not result in any new effects to snags and down wood from treatments in these units. As such, the analysis in the original Biological Evaluation (2008) for Restoration Thin treatments in low severity burn to unburned areas would still apply.

Snags
Restoration thinning in the high to moderate burn severity areas on 146 acres would leave 10 snags per acre which would be reduced to less than 2 snags per acre within 20 years based on the rates of snags falling over time. Hazard Tree treatments on 134 acres would potentially remove all snags. Hazard Tree treatments and Restoration Thin in the moderate to high severity burned areas would reduce the number of snags within the eastside mixed conifer habitat type by 37,600 snags which is approximately 14.1 percent of the snags within the burned area on the Forest. These treatments would remove snag habitat to below the 30 percent tolerance level in those units. The density of large and small snags is currently below historic levels and the removal of snags in the Restoration Thin and Hazard Tree treatments would further reduce the amount of high density snags within the watershed.

Reforestation activities on 622 acres would not have an impact on current snag levels and would be expected to increase the rate at which seedlings become established which would increase the rate of establishing trees needed for future snags and down wood.

Down Wood
Most available information for wildlife use of down wood is representative of green stands. Wildlife use data are not available for percent cover in DecAid for post-fire environments and little literature exists for wildlife use of down wood in post-fire environments.

Restoration thinning in the high to moderate burn severity areas on 146 acres would decrease the amount of down woody material for future recruitment (primarily material $\geq$10 inches dbh). This would result in a decrease in habitat for some species requiring large logs. Reducing down woody material levels would provide for species that utilize areas without heavy accumulations of down wood, such as deer and elk. The largest snags would be retained and would include ponderosa pine, whenever possible. Ponderosa pine generally last longer on the landscape. Hazard tree treatments on 134 acres would remove all snags which would also eliminate future recruitment of down wood. These trees would be removed, if they exceed Forest Plan standards and guidelines. On lands within Riparian Reserves, the hazard trees would be felled and left on-the-ground in order to comply with the Northwest Forest Plan.

Reforestation activities on 622 acres would be expected to increase the rate at which seedlings become established which would also increase the rate of establishing trees needed for future snags and down wood.

Alternative 3– Direct and Indirect Effects

Snags

Based on field reviews, it is estimated that approximately 40 percent of the trees in the hazard tree units would need to be treated to address safety concerns. Hazard Tree treatments on 167 acres would reduce the number of snags within the eastside mixed conifer habitat type by approximately 13,700 snags. This is 5.1 percent of the snags within the burned area on the Forest. These treatments would remove snag habitat to below the 30 percent tolerance level in those units. The density of large and small snags is currently below historic levels and the removal of snags for Hazard Tree treatments would further reduce the amount of high density snags within the watershed.

Reforestation activities on 732 acres would not have an impact on current snag levels and would be expected to increase the rate at which seedlings become established which would increase the rate of establishing trees needed for future snags and down wood.

Down Wood

Most available information for wildlife use of down wood is representative of green stands. Wildlife use data are not available for percent cover in DecAid for post-fire environments and little literature exists for wildlife use of down wood in post-fire environments.

Hazard tree treatments on 167 acres would remove all snags which would also eliminate future recruitment of down wood. These trees would be removed, if they exceed Forest Plan standards and guidelines. On lands within Riparian Reserves, the hazard trees would be felled and left on-the-ground in order to comply with the Northwest Forest Plan. This would result in a decrease in habitat for some species requiring large logs. Reducing down woody material levels would provide for species that utilize areas without heavy accumulations of down wood such as deer and elk. The largest snags would be retained and would include ponderosa pine, whenever possible. Ponderosa pine generally last longer on the landscape.

Reforestation activities on 732 acres would be expected to increase the rate at which seedlings become established which would also increase the rate of establishing trees needed for future snags and down wood.

Cumulative Effects for Alternatives 2 and 3

The following list of past, present, and reasonably foreseeable future projects overlap the analysis area in time and space and were considered in the cumulative effects analysis: Stewardship Projects (Lokai Stewardship [unsold]; Roan and Eques Stewardship outside fire boundary; and, Appy, Buckskin, and Clyde Stewardship [completed]), past timber harvests, private land timber harvest activities, hazard tree removal, The Dalles Watershed Fuelbreak Stewardship Projects (Hodi, Alder and Willow Stewardship), and The Dalles Watershed Phase II Stewardship Projects (Mint, Fern, and Voodoo Stewardship).

Most of these projects focus on thinning young stands or thinning from below to restore and enhance mixed conifer stands while reducing the risk of stand replacing fires. The exception to this is The Dalles Watershed Fuelbreak which was designed to prevent fires from entering the municipal watershed. These projects would thin green stands and would not remove snags aside from hazard tree removal. Overall, treatments proposed would reduce the risk of losing existing snags and down wood from future large-scale disturbances. As such, these projects do not have any cumulative effects with this project.

Hazard trees would not be cut in the other projects considered in cumulative effects unless they pose an imminent threat to human safety or infrastructure. The exact number is unknown, but is extremely small and would not contribute to cumulative effects from Hazard Tree treatments under this alternative. None of these projects propose to harvest burned trees associated with east-side mixed conifer or ponderosa pine/Douglas fir habitat types; therefore there are no cumulative effects from the restoration thin treatments in the moderate to high severity burned areas.

Consistency Determination
Both alternatives are consistent with all standards and guidelines. The Landbird Conservation Strategy objectives include retention of all ponderosa pine trees and snags >20 inches dbh. This objective would not be met.

Region 6 Sensitive Species

Methodology

All Region 6 sensitive species within the project area must be analyzed in a Biological Evaluation, as required by the Forest Plan. The sensitive species within the project area are the white-headed woodpecker, the Lewis's woodpecker, and the western bumblebee. Information on these species from the Interagency Special Status / Sensitive Species Program as well as other research was reviewed and summarized below to determine how these species use the project area and the impacts that this project would have on these species.

White-headed Woodpecker

Changed Condition

The white-headed woodpecker is now on the Regional Forester's Sensitive Species List (2011) for both Oregon and Washington.

Life History/Habitat
White-headed woodpeckers are cavity nesting birds strongly associated with coniferous forests dominated by pines. They are residents from south-central British Columbia, north-central Washington and northern and western Idaho south through eastern and southwest Oregon to southern California and west-central Nevada (, Garrett et al. 1996). White-headed woodpeckers range from very rare in British Columbia to common further south in their range in California.

In Oregon and Washington, white-headed woodpeckers occur primarily in open ponderosa pine (*Pinus ponderosa*) or dry mixed-conifer forests dominated by ponderosa pine (Bull et al. 1986, Dixon 1995a, Frenzel 2004, Buchanan et al. 2003). They have also been found in moderate densities in dry mixed conifer forests which were dominated by firs but contained both ponderosa pine and sugar pine.

Nesting usually occurs in open ponderosa pine forests with higher number of large trees and snags than the surrounding forest (Buchanan et al. 2003, Frenzel 2004, Hollenbeck et al. 2011) and typically excavate nest cavities in large, moderately decayed, ponderosa pine snags (Buchanan et al. 2003, Dixon 1995a, Frenzel 2004). White-headed woodpeckers forage in ponderosa pine trees in stands with higher canopy closure than nest stands (Dixon 1995a, Fredrick and Moore 1991).

White-headed woodpeckers have also been found to use recently burned forest of ponderosa pine (Forristall et al. 2004, 2007, Kozma 2011, 2012, Kozma and Kroll 2012, Saab and Dudley 1998, Wightman et al. 2011). In south central Oregon, nest success was higher in burned habitats than unburned habitats (Forristal et al. 2004, Frenzel 2004).

Landscapes with a mosaic of open habitat for nesting in close proximity to closed-canopy forests which provide foraging habitat seem to be important for White-headed woodpeckers (Hollenbeck et al. 2011, Wightman et al. 2010, Latif et al. 2012). Closed-canopied forests with cone-producing pine trees and insects may be important for year-round foraging, particularly outside the breeding season (Garrett et al. 1996).

White-headed woodpeckers may rely more on decay condition of snags than density (Wightman et al. 2010). Saab and Dudley (1998) found this species selected for the largest and most heavily decayed snags compared to other woodpeckers. However, snags created by fire have lower retention rates than trees killed more slowly by insects or disease and fire-killed snags may not reach levels of decay favored by white-headeds until 2-3 years post-fire (Wightman et al. 2010). Therefore, snags existing before fire, if retained, or those with more advanced decay seem to be critical components in post-fire landscapes, especially in the first few years after fire (Wightman et al. 2010).

Nest trees of White-headed woodpeckers are typically large, moderately decayed, ponderosa pine snags. In Oregon and Washington, 6 separate studies indicate average nest tree dbh of 15 to 40 inches dbh. Wightman et al. (2010) found nest survival rates were higher in burned areas than nest success reported for unburned forests in central Oregon. Wightman et al. (2010) also found white-headed woodpeckers selected for nest snags >20 inches dbh from unburned or low severity burned areas that contained live trees. Table 7 displays summarized data in the 30, 50, and /80 percent tolerance levels for the white-headed woodpecker in post fire habitats. No data was available for white-headed woodpeckers in post fire habitats for large snags (greater than 20 inches). The snags greater than 20 inches are represented in the >10 inches category.

Table 7. Snags per acre at various tolerance levels in post fire habitats within DecAIDfor white-headed woodpecker*.

	30% Tolerance Snags per acre	50% Tolerance Snags per acre	80% Tolerance Snags per acre
Snags > 10”	0.0	40.0	118.4

*From DecAID Table EMC_PF.sp-22

Forests with live trees have more abundant and complex assemblages of predators than high severity burned areas (Wightman et al. 2010). The golden-mantled ground squirrel and yellow pine chipmunk are known nest predators. Golden-mantled ground squirrels are positively associated with down wood volume and yellow pine chipmunks are positively associated with shrub cover (Wightman et al. 2010). Down wood and shrub cover are less in post-fire environments, thus nest placement in high severity burned areas may be a viable strategy to reduce nest predation as long as unburned or low severity burned areas are available within the landscape for foraging (Wightman et al. 2010). Nests in unburned forests may be more vulnerable than those in burned forests as these may also experience lower ambient temperatures which affect incubation behavior and reproductive effort (Hollenbeck et al. 2011).

Hollenbeck et al. (2011) developed a habitat suitability index model for unburned forests of central and southeastern Oregon. Based on this model, there are 2,887 acres of highly suitable habitat, 5,357 acres of marginally suitable habitat, and 1,010,461 acres of non-habitat for white-headed woodpecker on the Forest. Approximately 75 acres of the burned area on the Forest are within the marginal habitat and the remainder is within the non-habitat. Based on the average home range size of 793 acres in fragmented habitat, the project area may provide enough habitat for 1 to 2 pairs of white-headed woodpeckers.

Threats

Habitat loss is the primary threat to White-headed woodpeckers (NatureServe 2008). Logging practices that target large ponderosa pine, snag removal, and fragment forests contribute to declines in habitat, especially in the northern half of the species range (Garrett et al. 1996). Fire suppression has led to changes in forest tree species composition and structure primarily due to the development of true fir (*Abies spp.*) in the understory. These changes have altered fire regimes, and as a result ponderosa pine forests are no longer maintained by frequent natural fire, which leaves the forests susceptible to stand-replacing fires (Nature Serve 2008).

Wightman et al. (2010) and Frenzel (2004) found that predation by small mammals was the most common cause of nest failure of White-headed woodpeckers. Increasing shrub cover may lead to increasing populations of small mammals (Smith and Maguire 2004). Nest success of White-headed woodpeckers is higher at nest sites with lower shrub cover (Frenzel 2004, Kozma and Kroll 2012).

Landbird Conservation Strategy

Oregon-Washington Partners in Flight have developed conservation strategies for the east-slope of the Cascades and the northern Rocky Mountains of Oregon and Washington (Altman 2000a, 2000b). The White-headed woodpecker is a focal species for ponderosa pine or dry habitats in

both ecoregions. Strategy objectives include no net loss of this habitat type, retention of all ponderosa pine trees and snags >20 inches dbh, use of natural disturbance regimes such as fire, and restoration of at least 30 percent of the potential late-successional forest by 2025.

Management considerations should focus on white-headed woodpecker habitats on public lands which are primarily, low-elevation, dry forests with a component of large ponderosa pine. In Oregon and Washington, the vast majority of habitat for this species is on National Forest System lands. Private, State, and City lands are not managed for woodpecker habitat, therefore, it is assumed that any habitat currently present in those areas, would not be maintained for the long term. Management considerations should include spatial heterogeneity at the landscape scale that mimics historical conditions.

Effects Analysis

Analysis Area
The analysis area includes the Mill Creek Watershed.

No Action – Direct and Indirect Effects
There would be a short-term increase in snag numbers as additional trees die from fire damage. Over the long-term, the number of snags would decrease creating a gap in time when little snag habitat would exist (primarily in stand replacement areas) because there are few green trees of sufficient size to provide recruitment. Dahms (1949) found that 50 percent of fire killed ponderosa pine snags remained standing after 10 years, but this declined to 22 percent standing after 20 years. It is estimated that approximately 75 percent of all snags may fall within 20 years (Parks et al. 1999, and Everett et al. 1999). Snags created by fire have lower retention rates than trees killed more slowly by insects or disease and fire-killed snags may not reach levels of decay favored by white-headed woodpeckers until 2-3 years post-fire (Wightman et al. 2010). The effects associated with reforestation are the same as those described under the snags and down wood section above.

Alternative 2– Direct and Indirect Effects
Caution should be exercised when using the white-headed woodpecker data from DecAID, which are from a population where adult mortality is outpacing recruitment (Frenzel 2004). The density of snags may or may not be part of the issue with this species since white-headed-headed woodpeckers do not rely on snags for foraging and thus may be able to use areas with lower snag densities than other woodpecker species that do forage extensively on snags.

Reforestation activities on 622 acres would be expected to increase the rate at which seedlings become established which would also increase the rate of establishing large trees needed for white-headed woodpecker habitat.

Restoration thinning on 107 acres of unburned to low severity burned areas would impact habitat for white-headed woodpecker because ponderosa pine trees, including trees greater than 20 inches would be cut in these units. In the long term, the health of these stands would improve which would increase the potential for maintaining larger green trees on the landscape,. Moving stands toward historic conditions of more open fire resistant stands would improve habitat in the

future for white-headed woodpecker. See the DecAID analysis for a discussion on the effects to snag and down wood from green tree harvest in these units.

Restoration thinning on 146 acres of moderate to high severity burned areas would leave 10 snags per acre which would be reduced to less than 2 snags per acre within 20 years based on the rates of snags falling over time. Based on field reviews, it is estimated that approximately 40 percent of the trees in the hazard tree units would need to be removed for an average of 4,000 snags ≥20 inches in diameter and 7,000 snags 8 to 19.9 inches in diameter for Hazard Tree treatments. A total of approximately 37,600 snags (14.1 percent of snags in project area) would be removed under this Alternative (Table 3). Of these snags, 15,000 are >20 inches dbh. Approximately half of the trees in this portion of the watershed are ponderosa pine.

The removal of large pine trees and snags would reduce the amount of suitable nesting habitat available for white-headed woodpeckers. Nest success would also be reduced since potential nest trees would be removed from the moderate to high severity burned areas and success was shown to be highest in burned areas. The Landbird Conservation Strategy for white-headed woodpeckers calls for no net loss of this habitat type and retention of all ponderosa pine trees and snags >20 inches dbh. The large snags that would be removed could not be replaced until the forest regenerates and is able to supply large trees again which could become snags. This could take hundreds of years in the east side dry forests.

As mentioned above, habitat loss is the primary threat to white-headed woodpecker. The removal of large ponderosa pine trees and snags contributes to declines in habitat. Hazard Tree and Restoration Thin treatments in the moderate to high severity burned areas would remove large ponderosa pine trees and snags. Under Alternative 2, Hazard Tree and Restoration Thin treatments in the moderate to high burn severity units **may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.** While snags within this habitat type are below historic levels at the watershed and at the Forest scale (see DecAID analysis), white-headed woodpeckers do not appear to rely on these high density patches and may rely more on the presence of large ponderosa pine. Based on the average home range size within the fragmented habitat, and the amount of suitable habitat within the analysis area, the proposed project would not impact more than one territory.

Cumulative Effects

The following list of past, present, and reasonably foreseeable future projects overlap the analysis area in time and space and were considered in the cumulative effects analysis: Stewardship Projects (Lokai Stewardship [unsold]; Roan and Eques Stewardship outside fire boundary; and, Appy, Buckskin, and Clyde Stewardship [completed]), past timber harvests, private land timber harvest activities, hazard tree removal, The Dalles Watershed Fuelbreak Stewardship Projects (Hodi, Alder and Willow Stewardship), and The Dalles Watershed Phase II Stewardship Projects (Mint, Fern, and Voodoo Stewardship).

Most of the other projects considered in the cumulative effects analysis focus on thinning young stands or thinning from below to restore and enhance mixed conifer stands while reducing the risk of stand replacing fires. The exception to this is The Dalles Watershed Fuelbreak which was

designed to prevent fires from entering the municipal watershed. These projects would thin green stands and would not remove snags aside from hazard tree removal. Overall, treatments proposed would reduce the risk of losing existing habitat from future large-scale disturbances. Private lands are not managed for woodpecker habitat and therefore, it is assumed that any habitat provide there is incidental and may not be long term.

Snags would not be cut in these others projects unless they pose an imminent threat to human safety or infrastructure. The exact number is unknown, but is extremely small and would not contribute to cumulative effects from Hazard Tree treatments under this alternative. None of these projects propose to harvest burned trees associated with east-side mixed conifer or ponderosa pine/Douglas fir habitat types; therefore, there are no cumulative effects from the Restoration Thin Treatments in the moderate to high severity burned areas.

Alternative 3– Direct and Indirect Effects
Reforestation activities on 732 acres would be expected to increase the rate at which seedlings become established which would also increase the rate of establishing large trees needed for white-headed woodpecker habitat.

Restoration Thin on 107 acres of unburned to low severity burned areas would impact habitat for white-headed woodpecker. Ponderosa pine trees, including trees greater than 20 inches would be cut in these units. Snags would not be removed in these units unless they pose a safety risk. In the long term, the health of these stands would improve and the potential for larger green trees and thus the recruitment of larger snags would increase. Moving stands toward historic conditions of more open fire resistant stands would improve habitat in the future for white-headed woodpecker. See the DecAID analysis for a discussion on the effects to snag and down wood from green tree harvest.

The number of snags to be removed for Hazard Tree treatments would be greater under Alternative 3 than Alternative 2 since the acres of treatment increased. Based on field reviews, it is estimated that approximately 40 percent of the trees in the hazard tree units would need to be removed. Alternative 3 would remove an estimated 5,300 snags ≥20 inches in diameter and approximately 8,400 snags 8 to 19.9 inches in diameter for Hazard Tree treatments. A total of approximately 13,700 snags (5.1 percent of snags in project area) would be removed under this Alternative (Table 4). This is less than the total amount of snags removed under Alternative 2 which was 14 percent.

The removal of large pine trees and snags would reduce the amount of suitable nesting habitat available for white-headed woodpeckers. Nest success would also be reduced since potential nest trees would be removed from the moderate to high severity burned areas and success was shown to be highest in burned areas. The Landbird Conservation Strategy for white-headed woodpeckers calls for no net loss of this habitat type and retention of all ponderosa pine trees and snags >20 inches dbh. The large snags that would be removed could not be replaced until the forest regenerates and is able to supply large trees again which could then become snags. This could take hundreds of years in the east side dry forests.

As mentioned above, habitat loss is the primary threat to white-headed woodpecker. The removal of large ponderosa pine trees and snags contributes to declines in habitat. Hazard Tree and Restoration Thin treatments would remove large ponderosa pine trees and snags. Under Alternative 3, Hazard Tree and Restoration Thin treatments **may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.** White-headed woodpeckers do not appear to rely on these high density patches and may rely more on the presence of large ponderosa pine. Based on the average home range size within the fragmented habitat, and the amount of suitable habitat within the analysis area, the proposed project would not impact more than one territory.

Cumulative Effects
The following list of past, present, and reasonably foreseeable future projects overlap the analysis area in time and space and were considered in the cumulative effects analysis: Stewardship Projects (Lokai Stewardship [unsold]; Roan and Eques Stewardship outside fire boundary; and, Appy, Buckskin, and Clyde Stewardship [completed]), past timber harvests, private land timber harvest activities, hazard tree removal, The Dalles Watershed Fuelbreak Stewardship Projects (Hodi, Alder and Willow Stewardship), and The Dalles Watershed Phase II Stewardship Projects (Mint, Fern, and Voodoo Stewardship).

Most of the other projects considered in the cumulative effects analysis focus on thinning young stands or thinning from below to restore and enhance mixed conifer stands while reducing the risk of stand replacing fires. The exception to this is The Dalles Watershed Fuelbreak which was designed to prevent fires from entering the municipal watershed. These projects would thin green stands and would not remove snags aside from hazard tree removal. Overall, treatments proposed would reduce the risk of losing existing habitat from future large-scale disturbances. Private lands are not managed for woodpecker habitat, therefore, it is assumed that any habitat provided by this land is incidental and may not be long term.

Snags would not be cut in these other projects unless they pose an imminent threat to human safety or infrastructure. The exact number is unknown, but is extremely small and would not contribute to cumulative effects from Hazard Tree treatments under this alternative.

Consistency Determination
Both alternatives are consistent with all Forest Plan standards and guidelines. The Landbird Conservation Strategy objectives include no net loss of this habitat type and retention of all ponderosa pine trees and snags >20 inches dbh. This objective would not be met.

Lewis's Woodpecker

Changed Condition
This species was not analyzed in the original Wildlife Biological Evaluation (2008) because nesting and foraging habitat is strongly tied to burned forests and this habitat was not present in the Mill Creek Watershed at that time. The Government Flats Complex Fire burned 11,354 acres, 2,200 of which are on the Forest. There is now suitable habitat in the analysis area for Lewis's woodpeckers in the moderate to high severity portions of the burn on the Forest (1,298 acres) and it is expected that they would utilize these areas for nesting and foraging.

Life History/Habitat
Formerly widespread, this species is common year-round only in the white oak ponderosa pine belt east of Mt. Hood. Habitat for the Lewis' woodpecker includes old-forest, single-storied ponderosa pine, and Oregon white oak. Burned ponderosa pine forests created by stand-replacing fires provide highly productive habitats compared to unburned pine (Wisdom et al. 2000). Lewis's woodpeckers feed on flying insects and are not strong cavity excavators. They require large snags in an advanced state of decay that are easy to excavate, or they use old cavities created by other woodpeckers. Nest trees generally range from 17 to 44 inches in diameter (Saab and Dudley 1998, Wisdom et al. 2000).

In evaluating landscape predictor variables for the Lewis's woodpecker, Saab et al. (2002) found a negative correlation to burned ponderosa pine/Douglas-fir stands with a high density of small snags and high crown closure (>70%). They also found that partially logged landscapes were favored by Lewis's woodpeckers. Although it selects for more open stands, this species selects nest sites with higher densities of large snags (>20"dbh) (Saab and Dudley 1998). Table 8 displays summarized data in the 30, 50, and 80 percent tolerance levels for the Lewis' woodpecker in post fire habitats.

Table 8. Snags per acre at various tolerance levels in post fire habitat within DecAID for Lewis' Woodpecker*.

	30% Tolerance Snags per acre	50% Tolerance Snags per acre	80% Tolerance Snags per acre
Snags > 10"	24.8	43.0	71.0
Snags > 20"	0.0	6.2	16.1

*From DecAID Table EMC_PF.sp-22

From the snags per acre in Table 8, it appears that the more snags that are found per acre, the higher the quality of habitat. This may not necessarily be the case as Lewis' woodpeckers are most commonly found in open woodlands and the most important breeding habitat is open canopies with large diameter dead or dying trees. Open foraging habitats are selected as shown by the utilization of logged areas more often by Lewis' woodpeckers than unlogged areas that Sabb et al. (2002).

The data in Table 8 is based upon 0.10 acre plots taken around the nest sites then extrapolated to reflect the per acre number of snags (Saab et al 1998 from DecAID). Data indicates that Lewis' woodpeckers depend upon densely stocked pockets of snags for nesting habitat. For quality nesting, there is a need for these dense pockets of snags to be situated near openings to allow for effective foraging. Providing these snag densities near openings would create habitats that are similar to the sites found in the Saab et al. studies from 1994 to 1998.

Threats
The Lewis's woodpecker is declining throughout its range. Threats to this species include the loss of suitable habitat, competition for nest trees, and effects of pesticides on insects. Abele et al. (2004) completed a Technical Conservation Assessment for the Rocky Mountain Region of

the Forest Service and threats to the conservation of the Lewis's woodpecker are listed below. The threats that are relevant to this project include #1 and 2.

1. The loss of breeding and wintering habitats in burned pine forests, park-like pine forests, riparian cottonwood stands, and woodlands.
2. Reduction of natural disturbances and management activities associated with these disturbances. For example a wildfire followed by salvage logging.
3. Fire Suppression within pine forests that have increased canopy cover and reduced shrub and grass understories, which reduces insect populations that Lewis's woodpeckers forage on.
4. Water regulation, which has altered riparian woodlands.
5. Cattle grazing by altering the historic fire regimes with a reduction of understory vegetation.
6. Firewood cutting by reducing potential nest sites.
7. Competition with European starling and other cavity nesting species for nest sites.

Effects Analysis

Analysis Area
The analysis area includes the Mill Creek Watershed.

No Action – Direct and Indirect Effects
There would be a short-term increase in snag numbers as additional trees die from fire damage. Over the long-term, the number of snags would decrease creating a gap in time when little snag habitat would exist (primarily in stand replacement areas) because there are few green trees of sufficient size to provide recruitment. Dahms (1949) found that 50 percent of fire killed ponderosa pine snags remained standing after 10 years, but this declined to 22 percent standing after 20 years. It is estimated that approximately 75 percent of all snags may fall within 20 years (Parks et al. 1999, and Everett et al. 1999). Lewis' woodpecker would continue to utilize the burned area for several years after the fire as snag densities decline due to small snags falling. The effects associated with reforestation are the same as those described under the snags and down wood section above.

Alternative 2– Direct and Indirect Effects
Restoration thinning on 107 acres of unburned to low severity burned units would not immediately impact habitat for Lewis' woodpecker. The watershed is currently below historic levels for snags and down wood. Potential nesting snags would not be removed in these units unless they pose a safety risk. In the long term, the health of these units would improve and the potential for larger green trees and thus the recruitment of larger snags would increase in these units. See the DecAID analysis for a discussion on the effects to snag and down wood from green tree harvest.

Restoration thinning on 146 acres would leave 10 snags per acre (80% tolerance level) which would be reduced to less than 2 snags per acre (below 30% tolerance level) within 20 years based on the above rates of snags falling over time. Lewis' woodpecker often prefer more open post-fire habitat and these stands would initially provide some suitable nesting habitat, but would

lose most of their snags and provide very little or no habitat nesting habitat within the next 20 to 30 years. Based on field reviews, it is estimated that approximately 40 percent of the trees in the hazard tree units would need to be removed. This is approximately 82 trees per acre, leaving approximately 123 trees per acre, which is above the 80 percent tolerance level for post fire habitat for Lewis' woodpecker (Table 8).

As noted above, some of the threats to Lewis' woodpecker include the loss of breeding habitat and salvage logging. The removal of snags would reduce the number of potential nest sites for Lewis' woodpecker. The watershed and the Forest are lacking in high density patches of snags compared to historic conditions. The high density patches of snags that were created by the fire are rare on the landscape and are the only place in the watershed where these conditions can be found. See the DecAID analysis for a more detailed discussion on snag and down wood levels at the watershed and Forest scale.

There are no known immediate impacts to the Lewis' woodpecker from activities associated with the 622 acres of reforestation. In the long-term, planting would accelerate forest development, and as green trees develop and stand densities increase, open areas for foraging would decrease. Reforestation could limit foraging opportunities in the long-term within these areas at a more expedited rate than other unplanted areas of the fire.

The Hazard Tree and Restoration Thin treatments in the moderate to high burn severity units **may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.** Lewis' woodpeckers do not appear to rely on these high density patches since this species is most commonly found in open woodlands and the most important breeding habitat is open canopies with large diameter dead or dying trees. Nesting habitat would be provided since high density patches of snags would remain in the hazard tree units and untreated burned areas which are adjacent to more open stands that will provide the necessary foraging habitat.

Cumulative Effects

The following list of past, present, and reasonably foreseeable future projects overlap the analysis area in time and space and were considered in the cumulative effects analysis: Stewardship Projects (Lokai Stewardship [unsold]; Roan and Eques Stewardship outside fire boundary; and, Appy, Buckskin, and Clyde Stewardship [completed]), past timber harvests, private land timber harvest activities, hazard tree removal, The Dalles Watershed Fuelbreak Stewardship Projects (Hodi, Alder and Willow Stewardship), and The Dalles Watershed Phase II Stewardship Projects (Mint, Fern, and Voodoo Stewardship).

Most of the other projects considered in the cumulative effects analysis focus on thinning young stands or thinning from below to restore and enhance mixed conifer stands while reducing the risk of stand replacing fires. The exception to this is The Dalles Watershed Fuelbreak which was designed to prevent fires from entering the municipal watershed. These projects would thin green stands and would not remove snags aside from hazard tree removal. Overall, treatments proposed would reduce the risk of losing existing habitat from future large-scale disturbances. Private lands are not managed for woodpecker habitat, therefore, it is assumed that any habitat provided by this land is incidental and may not be long term.

Hazard trees would not be cut in these other projects unless they pose an imminent threat to human safety or infrastructure. The exact number is unknown, but is extremely small and would not contribute to cumulative effects from Hazard Tree treatments under this alternative. None of these projects propose to harvest burned trees associated with east-side mixed conifer or ponderosa pine/Douglas fir habitat types; therefore, there are no cumulative effects from the Restoration Thin treatments in the moderate to high severity burned areas.

Alternative 3– Direct and Indirect Effects
Restoration thinning on 107 acres of unburned to low severity burned areas would not immediately impact habitat for Lewis' woodpecker and are the same as discussed under Alternative 2. See the DecAID analysis for a discussion on the effects to snag and down wood from green tree harvest.

The number of snags to be removed for Hazard Tree treatments would be greater under Alternative 3 than Alternative 2 since the acres of treatment increased. Based on field reviews, it is estimated that approximately 40 percent of the trees in the hazard tree units would need to be removed. This is approximately 82 trees per acre, leaving approximately 123 trees per acre, which is above the 80 percent tolerance level for post fire habitat for Lewis' woodpecker (Table 8). Private, State, and City lands are not managed for woodpecker habitat, therefore, it is assumed that any habitat currently present in those areas, would not be maintained for the long term.

The removal of snags under this alternative would reduce the number of potential nest sites for Lewis' woodpecker. The watershed and the Forest are lacking in high density patches of snags compared to historic conditions. The high density patches of snags that were created by the fire are rare on the landscape and are the only place in the watershed where these conditions can be found. See the DecAID analysis for a more detailed discussion on snag and down wood levels at the watershed and Forest scale.

There are no known immediate impacts to the Lewis' woodpecker from activities associated with the 732 acres of reforestation. In the long-term, planting under this alternative would accelerate forest development, and as green trees develop and stand densities increase, open areas for foraging would decrease. Reforestation could limit foraging opportunities in the long-term within these areas at a more expedited rate than other unplanted areas of the fire.

The Hazard Tree treatments **may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.** Lewis' woodpeckers do not appear to rely on these high density patches since this species is most commonly found in open woodlands and the most important breeding habitat is open canopies with large diameter dead or dying trees. Nesting habitat would be provided since high density patches of snags would remain in the hazard tree units and untreated burned areas which are adjacent to more open stands that will provide the necessary foraging habitat.

Cumulative Effects
The following list of past, present, and reasonably foreseeable future projects overlap the analysis area in time and space and were considered in the cumulative effects analysis: Stewardship Projects (Lokai Stewardship [unsold]; Roan and Eques Stewardship outside fire boundary; and, Appy, Buckskin, and Clyde Stewardship [completed]), past timber harvests, private land timber harvest activities, hazard tree removal, The Dalles Watershed Fuelbreak Stewardship Projects (Hodi, Alder and Willow Stewardship), and The Dalles Watershed Phase II Stewardship Projects (Mint, Fern, and Voodoo Stewardship).

Most of the other projects considered in the cumulative effects analysis focus on thinning young stands or thinning from below to restore and enhance mixed conifer stands while reducing the risk of stand replacing fires. The exception to this is The Dalles Watershed Fuelbreak which was designed to prevent fires from entering the municipal watershed. These projects would thin green stands and would not remove snags aside from hazard tree removal. Overall, treatments proposed would reduce the risk of losing existing habitat from future large-scale disturbances. Private lands are not managed for woodpecker habitat, therefore, it is assumed that any habitat provided by this land is incidental and may not be long term.

Hazard trees would not be cut in these other projects unless they pose an imminent threat to human safety or infrastructure. The exact number is unknown, but is extremely small and would not contribute to cumulative effects from Hazard Tree treatments under this alternative.

Consistency Determination for Alternatives 2 and 3
Both alternatives are consistent with all Forest Plan standards and guidelines. The Landbird Conservation Strategy objectives include no net loss of this habitat type and retention of all ponderosa pine trees and snags >20 inches dbh. This objective would not be met.

Western Bumblebee

The analysis area for the Western bumble bee includes the area within the project area of the Proposed Action.

Changed Condition
The western bumblebee was widespread and common throughout the western United States and western Canada before 1998 (Xerces Society 2009). The former range of U.S. states included: northern California, Oregon, Washington, Alaska, Idaho, Montana, western Nebraska, western North Dakota, western South Dakota, Wyoming, Utah, Colorado, northern Arizona, and New Mexico. Since 1998, populations of this bumblebee have declined drastically throughout parts of its former range. In Alaska, east of the Cascades and in the Canadian and U.S. Rocky Mountains, viable populations still exist. Populations of the western bumblebee in central California, Oregon, Washington and southern British Columbia have mostly disappeared. It is difficult to accurately assess the magnitude of these declines since most of this bee's historic range has not been sampled systematically.

Life History
According to Goulsen (2003a), bumblebee colonies are annual. In the late winter or early spring, the queen emerges from hibernation and then selects a nest site, which is often a pre-existing hole, such as an abandoned rodent hole. She then supplies the nest with pollen as well as nectar, which she stores in a wax pot formed by wax secreted by specialized glands. The queen then starts her new colony by laying between 8 and 16 eggs in her first batch, which she then incubates until hatching. The young feed upon the food mass provided by the queen and subsequent feedings are provided by the queen regurgitating food from her crop. After feeding has been completed, the young pupate in cocoons spun from silk. The queen ceases to forage within a few days of the workers' emergence and then focuses upon increasing the colony's population. Male bumblebees develop from unfertilized eggs and females develop from fertilized eggs. According to Thorp et al. (1983), around the time that the number of workers equal or outnumber the brood to be fed, some unfertilized eggs have been laid, which would develop into males, while fertilized eggs become new queens. Young queens may assist with some household activities before leaving the hive to mate with the male drones. After mating, the queen then digs a hole in which she would hibernate through the winter. The rest of the colony including the old queen, workers and males die out.

Bumblebees would visit a range of different plant species and are important generalist pollinators of a wide variety of flowering plants and crops (Goulsen 2003a;). Although bumblebees do not depend on a single type of flower, some plants rely solely on bumblebees for pollination. In addition, native bees, such as bumblebees are adapted to local conditions (Goulsen 2003b).

Threats
There are several threats which face bumblebees and are leading to their decline. The following threats and conservation considerations are from a status review, co-authored by Robbin Thorp, Elaine Evans, and Scott Hoffman (Thorp et al. 2008).

Agriculture and urban development alter landscapes and habitat required by bumblebees while grazing livestock poses a threat since the animals remove flowering food sources, disturb nest sites and alter the vegetation community. Foraging bumble bees are directly threatened by insecticide applications when used in agricultural settings. Massive bumble bee kills have occurred as a result of insecticide application on Forest Service managed public lands intended for the control of spruce budworm. Bumble bees can be indirectly harmed when the flowers that they normally use for foraging are removed by the application of broad-spectrum herbicides. When exotic plants invade and dominate native grasslands, they may threaten bumble bees by competing with the native nectar and pollen plants relied upon by bumble bees.

Habitat
Surveys for Western bumble bees were conducted by the Xerces Society on the Mt. Hood National Forest in 2013. A total of 34 locations were surveyed and Western bumble bees were located at 8 of these locations. All bumble bee detections were east of the Pacific Crest and above 3,800 feet in elevation.

Effects Analysis

Analysis Area
The effects to this species were considered at the Mill Creek Watershed scale, since genetic diversity and connectivity between colonies is a concern for the Western bumble bee.

No Action – Direct and Indirect Effects
Under the No Action alternative, bumble bee nesting, foraging, and over-wintering habitat would not be impacted. The moderate to high severity burned areas within the project area would eventually provide foraging habitat as flowering plants recolonize the stands.

Alternative 2– Direct and Indirect Effects
Alternative 2 may temporarily impact flowering plants during restoration thinning and associated fuels activities. Reducing this food source would reduce the ability of foraging bees to find nectar at these sites which is a required food source for young bees. It is expected that these shrubs would regenerate within a few years and that the bumblebees would have other nectar plants available within the project area.

There are no known immediate impacts to bumblebees from activities associated with the 622 acres of reforestation. In the long-term, planting would accelerate forest development, and as green trees develop and stand densities increase, open areas for foraging plants would decrease. Reforestation could reduce foraging opportunities in the long-term within these areas at a more expedited rate than other unplanted areas of the fire.

The proposed project may temporarily impact nest sites if these nests are located within abandoned bird nests or other structures above ground. Restoration thinning and associated fuels activities could temporarily reduce the number of nests available and, therefore, reduce the number of bumblebees that this area could support. Nest sites would increase within a few years after treatment.

The temporary reduction in flowering shrubs and nesting sites **may impact individuals, but will not likely contribute to a trend towards federal listing or cause a loss of viability of the population or species**. The total number of acres impacted would not exceed 107 acres since most of the activities are within heavily timbered units or within the moderate to high severity burned areas and do not currently provide foraging habitat or nest sites. This impact represents less than one percent of the Forest Service owned lands within the Mill Creek Watershed. While the number of bees in the project area may be slightly reduced, this reduction would be temporary as flowering shrubs and nest sites increase within a few years after treatments. Nest sites and flowering plants would also increase in the untreated portions of the burn as shrubs recolonize the area over the next decade.

Because bumble bees can forage for nectar on a variety of flowering plants, the untreated portions of the Mill Creek Watershed would continue to provide a food source. These untreated portions of the watershed would also continue to provide for nesting and hibernating habitat. The adjacent untreated areas would allow for bumble bees to recolonize the impacted acres within the treatment area as foraging and nesting habitat returns.

Cumulative Effects
The following list of past, present, and reasonably foreseeable future projects overlap the analysis area in time and space and were considered in the cumulative effects analysis: Government Flats Complex Fire suppression repair activities, Stewardship Projects, road building, past timber harvest, pre-commercial/sapling thinning, road and trail maintenance, Bonneville Power Administration maintenance, The Dalles Watershed Fuel Break Stewardship Projects, livestock grazing in the Long Prairie Grazing Allotment, road closures, and invasive plant treatments. Cumulative effects for this species were considered at the watershed scale, since genetic diversity and connectivity between colonies is a concern for the bumble bee.

Projects that may increase or improve foraging habitat in the long-term include road closures, sapling thinning, and noxious weed treatments. Depending on the prescription and the condition of the stand before treatments, timber/stewardship sales may increase or decrease the amount of foraging habitat available. Road, trail, and Bonneville Power Administration maintenance have the potential to reduce the amount foraging habitat. Livestock grazing also reduces the amount of foraging and nesting habitat.

Habitat alterations including those that could destroy, fragment, alter, degrade or reduce the food supply produced by flowers as well as destruction of nest sites and hibernation sites for overwintering queens, such as abandoned rodent burrows and bird nests, adversely affect these bees. Large scale ground disturbing activities alter landscapes and habitat required by bumble bees by removing flowering food sources, disturbing nest sites and altering the vegetation community. The size of bumble bee populations diminish and inbreeding becomes more common as habitats become fragmented. This in turn, decreases the genetic diversity and increases the risk of population decline.

While the projects analyzed under cumulative effects may have impacts to individual bumble bees, the main threats to this species are agriculture and urban development, livestock grazing, and broad scale insecticide application (Thorp et al. 2008). These kinds of activities are not included in the Alternative 2. Because some of the proposed activities increase or improve habitat while others may decrease it, the impacts would likely be beneficial and detrimental at the same time, and populations of this species would still persist at the watershed scale.

Alternative 3– Direct, Indirect and Cumulative Effects
There would be a slight increase in the number of acres for Reforestation treatments from 622 to 732 acres. In the long-term, planting would accelerate forest development, and as green trees develop and stand densities increase, open areas for foraging plants would decrease. Reforestation could reduce foraging opportunities in the long-term within these areas at a more expedited rate than other unplanted areas of the fire. The effects of restoration thinning on low severity burn to unburned areas remain unchanged from Alternative 2.

Because the differences between Alternatives 2 and 3 are related to treatments in the high to moderate severity burned areas which do not provide habitat for the bumblebee, the cumulative effects under this Alternative are the same as those discussed under Alternative 2.

Consistency Determination
The Proposed Action alternative is consistent with the following Standards and Guidelines for sensitive species: (1) FW-174: Threatened, endangered and sensitive plants and animals shall be identified and managed in accordance with the Endangered Species Act (1973), the Oregon Endangered Species Act (1987), and FSM 2670; and, (2) FW-175: habitat for threatened, endangered and sensitive plants and animals shall be protected or improved.

Survey and Manage Species

Dalles Sideband, Crater Lake Tightcoil, Evening Fieldslug, Puget Oregonian, Columbia Gorge Oregonian

Changed Condition
The amount of suitable habitat for these species has been reduced in the project area because of the Government Flats Complex Fire. Because these species are closely associated with old-growth forests, the amount of habitat impacted by the fire is represented by the changed condition to suitable spotted owl habitat. See the discussion under Northern Spotted Owl "Changed Condition" for the suitable habitat impacted by the fire. More information is available on the methodology and existing conditions for these species in the Wildlife Biological Evaluation (2008) from the original analysis, available in the project record.

Effects Analysis

Analysis Area
The analysis area includes the units within the proposed project boundary.

No Action– Direct and Indirect Effects
Under the No Action Alternative, there would be no reforestation in the burned area to accelerate the development of desired forest conditions. Longer time periods between fire and seedling establishment may decrease the ability of tree seedlings to compete with shrubs that have had a longer period to become established. Without reforestation or sufficient natural regeneration, the moderate to high severity burned areas of the project may experience stands that are dominated by dense shrubs for several decades. Early seral habitat could persist for a century or more in some places of moderate to high burn severity, depending on the success of natural regeneration. Burned stands would be dependent on nearby natural seeds for reforestation. Hazard trees would be felled and left along roads over a longer time period as they pose and imminent threat to human safety or infrastructure.

Alternative 2– Direct and Indirect Effects
Overall, Alternative 2 would impact 15 acres of habitat for these species. When considered at the unit scale, this does not result in any new effects. As such, the analysis in the original Biological Evaluation (2008) would still apply. Reforestation activities on 622 acres would be expected to increase the rate at which seedlings become established which could benefit these species by increasing the rate that habitat would be established.

Alternative 3– Direct and Indirect Effects
Because the differences between Alternative 2 and Alternative 3 are related to treatments in the high to moderate severity burned areas which do not provide habitat for these species, the impacts under this Alternative are the same as under Alternative 2.

There would be a slight increase in the number of acres for Reforestation Treatments from 622 to 732 acres. Reforestation activities would be expected to increase the rate at which seedlings become established which could benefit these species by increasing the rate that habitat would be established.

Cumulative Effects for Alternatives 2 and 3
Because the analysis area is within the project unit boundaries, there are no projects that overlap in time or space, and therefore, there are no cumulative effects.

Consistency Determination
All required survey protocols for these species have been followed. As such, both action alternatives are consistent with the survey requirements and management provisions found in the Record of Decision and Standard and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines 2001.

Management Indicator Species

Methodology for All Species
The National Forest Management Act requires the Forest Service to manage wildlife habitat to "maintain viable populations of existing native and desired non-native vertebrate species in the planning area." The National Forest Management Act requires the Forest Service to identify Management Indicator Species through the planning process, and to establish objectives to maintain and improve the habitat of indicator species. The primary assumption of this process is that indicator species represent the habitat needs of other species because they have similar habitat requirements. Spotted owls, for example, indicate the needs of a variety of animals that use old growth forest. This analysis focuses on certain key species and does not specifically address common species except to the extent that they are represented by these management indicator species.

Management Indicator Species for this portion of the Forest within the project area include northern spotted owl (see analysis above), deer and elk, pileated woodpecker, American marten, wild turkey, and western gray squirrel (Table 9).

Table **9:** Management Indicator Species for the Project Area.

Management Indicator Species	Habitat Description	Habitat Present in Analysis Area	Species Present in Analysis Area
Northern Spotted Owl	Old Growth	Yes	Documented
Deer and Elk	Early Forest Succession Mature/Old Growth	Yes	Documented
Pileated Woodpecker	Mature/Over Mature	Yes	Documented

Management Indicator Species	Habitat Description	Habitat Present in Analysis Area	Species Present in Analysis Area
American Marten	Mature/Over Mature	Yes	Suspected
Wild Turkey	Pine / Oak	Yes	Documented
Western Gray Squirrel	Pine / Oak	Yes	Documented

Mule Deer and Elk

Changed Condition

There are approximately 1,885 acres of B10-Deer and Elk Winter Range (Forest Plan Land Use Allocation) in the project area and 540 acres of B10 in the Mill Creek Watershed outside of the project area. A total of 53.5 percent of these B10 lands experienced a moderate to high severity burn in the Government Flats Complex Fire. The habitat within this burned area is no longer providing optimal and thermal cover.

Black-tailed deer are common and relatively abundant in the spring, summer, and fall within the project area. Elk are less common. Population numbers for deer and elk are probably most limited by the unavailability of quality winter range. Elk herds within the project area likely exhibit a close association with riparian habitat in areas of gentle terrain and low road density. Research on elk in this kind of habitat generally shows that elk spend most of their time in close proximity to a stream or wetland. Forage is widely available, but is generally of low quality. The low quality of the forage and the lack of wetlands and permanent low-gradient streams are considered one of the limiting factors for elk and possibly deer in the project area.

Thermal cover for deer and elk is defined as a stand of coniferous trees at least 40-feet tall with an average crown closure of 70 percent or more. Optimal cover is found mainly in multi-storied mature and old-growth stands.

The Mt. Hood Land and Resource Management Plan (Forest Plan) Standards and Guidelines have minimum requirements for optimal and thermal cover habitat components, but no specific level for forage. During the 1980s and 1990s, wildlife managers considered thermal cover to be important to deer and elk survival and production. Over time, wildlife managers have questioned if elk required thermal cover. Telemetry data presented at the Elk Modeling Workshop (April 2010) indicated that elk were negatively associated with cover and that openings are far more valuable for elk than cover. With the reduction in regeneration timber harvest, the Forest now has abundant optimal and thermal cover, but openings for forage are becoming scarce. There are approximately 69,226 acres of early-seral habitat on the Forest. This level is declining over time at mid and lower elevations since plantations have grown dense with trees that shade out forage. The Gnarl Ridge and Dollar Lake fires have increased forage at the higher elevations and The Government Flats Complex Fire increased forage in the Mill Creek Watershed.

Effects Analysis

Analysis Area
The analysis area includes the Mill Creek Watershed.

No Action – Direct and Indirect Effects
Under the No Action Alternative there would be no reforestation in the burned area to accelerate the development of desired forest conditions. Longer time periods between fire and seedling establishment may decrease the ability of tree seedlings to compete with shrubs. Without reforestation or sufficient natural regeneration, the moderate to high severity burned areas of the watershed may experience stands that are dominated by dense shrubs for several decades. Early seral habitat could persist for a century or more in some places of moderate to high burn severity, depending on the success of natural regeneration. Burned stands would be dependent on nearby natural seeds for reforestation.

Hazard trees would be felled and left along roads over a longer time period as they pose and imminent threat to human safety or infrastructure. Due to the fire's intensity in these stands, thermal cover is largely reduced, but the high density of standing dead trees in some areas does provide some thermal habitat. The removal of hazard trees would further reduce the ability of the stands to provide cover.

Although shrubs would provide forage, as the shrubs increase in age, the palatability of these plants decreases. This typically occurs within the first 10 years after the fire. Overstory canopy cover from regenerating trees typically shade out shrubs providing opportunities for other plants to get started, providing a mosaic of cover and forage over time. Without reforestation, the length of time before forested stands develop may increase, limiting the quality of forage to cover ratios.

Alternative 2 – Direct and Indirect Effects
Treatment on 107 acres of forested habitat (Restoration Thin treatments on low severity burned to unburned areas) would further reduce the amount of available cover in B10 winter range which is now below the Forest Plan Standard of 50 percent of the area maintained in optimal and thermal cover habitat. The loss of thermal cover in the proposed units would alter the distribution and use of habitat by deer and elk in the project area. During the summer, fewer animals would be expected to use the area since it would be relatively open. Forage would increase, but would not occur close enough to cover for it to be fully utilized by deer and elk. Most of the lost thermal cover characteristics in the stands should be regained in the next 40 to 50 years.

The Hazard Tree and Restoration Thin treatments in the moderate to high severity burned areas (approximately 280 acres) would have some impacts to deer and elk. Large accumulations of down wood have the potential to impede deer and elk movement. Due to the fire's intensity in these stands, thermal cover is largely reduced, but the high density of standing dead trees does provide some thermal habitat. This habitat does not currently meet the Forest Plan Standards and Guidelines as thermal cover. After treatment, these units would have 10 snags per acre or less and thermal cover would be further reduced until the establishment of a closed canopy stand

which may take more than 100 years. The removal of dead material that may fall and impede movement may benefit big game as they move throughout the project area.

Reforestation on approximately 622 acres would benefit deer and elk winter habitat. Replanting would help establish trees sooner than what would occur with natural regeneration thereby developing the thermal cover needed in winter range more rapidly.

Alternative 3– Direct and Indirect Effects
The impacts of Restoration Tinning in the unburned and low severity burned areas are the same as Alternative 2 since that portion of the project remains the same. The Hazard Tree treatments on 167 acres in the moderate to high severity burned areas would still have some impacts to deer and elk, although the amount of habitat impacted would be less than Alternative 2. While the total number of snags removed is less under Alternative 3, the number of acres with zero snags and less cover would increase from 134 acres in Alternative 2 to 167 acres in Alternative 3. Due to the fire's intensity in these stands, thermal cover is largely reduced, but the high density of standing dead trees does provide some thermal habitat. This habitat does not currently meet the Forest Plan Standards and Guidelines as thermal cover. After treatment, these units would have 10 snags per acre or less and thermal cover would be further reduced until the establishment of a closed canopy stand which may take more than 100 years (Sessions et al. 2004, Swanson et al. 2010). Large accumulations of down wood have the potential to impede deer and elk movement. The removal of dead material that may fall and impede movement may benefit big game as they move throughout the project area.

Reforestation on approximately 732 acres would benefit deer and elk winter habitat. Replanting would help establish trees sooner than what would occur with natural regeneration thereby developing the thermal cover needed in winter range more rapidly.

Cumulative Effects for Alternatives 2 and 3
The following list of past, present, and reasonably foreseeable future projects overlap the analysis area in time and space and were considered in this cumulative effects analysis: Stewardship Projects (Lokai Stewardship [unsold]; Roan and Eques Stewardship outside fire boundary; and, Appy, Buckskin, and Clyde Stewardship [completed]), past timber harvests, private land timber harvest activities, hazard tree removal, The Dalles Watershed Fuelbreak Stewardship Projects (Hodi, Alder and Willow Stewardship), and The Dalles Watershed Phase II Stewardship Projects (Mint, Fern, and Voodoo Stewardship).

The cumulative effects to deer and elk from Alternative 2 and the above listed projects would decrease thermal, optimal, and hiding cover and would increase forage. These projects are not within deer and elk B10 winter range and are in habitat that would benefit deer and elk by providing both forage and cover. Most of these projects focus on thinning young stands or thinning from below to restore and enhance mixed conifer stands while reducing the risk of stand replacing fires, which would temporarily increase forage and decrease cover. These projects would thin green stands and would not remove snags aside from hazard tree removal. The exception to this is The Dalles Watershed Fuelbreak which was designed to prevent fires from entering the municipal watershed and in this case, no cover remained. Overall, these projects would reduce the risk of losing cover and optimal habitat from future large-scale disturbances.

Snags would not be cut in these projects unless they pose an imminent threat to human safety or infrastructure. The exact number is unknown, but is extremely small and would not contribute to cumulative effects from Hazard Tree treatments under this Alternative. None of these projects propose to salvage burned trees; therefore there are no cumulative effects from the restoration thin treatments in the moderate to high severity burned areas.

Consistency Determination

The following Mt. Hood National Forest Land and Resource Management Plan Standards and Guidelines that apply to the Proposed Action alternatives and would be met:

- B10-012, 013: Regulated timber harvest should occur. Timber salvage activities may occur.

The following Mt. Hood National Forest Land and Resource Management Plan Standards and Guidelines that apply to the Proposed Action alternatives and would not be met. A Forest Plan exception is proposed for these standards in order to allow the project to be implemented as described (see Chapter 2 for more details).

- B10-14: Forest canopy closure should reach at least 70 percent canopy closure within 10 years of the last commercial thinning activity.
- B10-021, 022: Optimal cover and thermal cover habitat components for deer and elk should encompass at least 50 percent of the area. Optimal cover should be at least 25 percent.

Pileated Woodpecker

Changed Condition

The amount of suitable habitat for this specie has been reduced in the project area because of the Government Flats Complex Fire. Because pileated woodpeckers are closely associated with old-growth forests, the amount of habitat impacted by the fire is represented by the changed condition to suitable spotted owl habitat. See the discussion under Northern Spotted Owl "Changed Condition", for the suitable pileated woodpecker habitat impacted by the fire. More information is available on the existing conditions for this species in the Wildlife Biological Evaluation (2008) from the original analysis, available in the project record.

Effects Analysis

Analysis Area

The analysis area includes the Mill Creek Watershed.

No Action– Direct and Indirect Effects

Under the No Action Alternative there would be no reforestation in the burned area which could delay the development of suitable habitat for pileated woodpecker. Longer time periods between fire and seedling establishment may decrease the ability of tree seedlings to compete with shrubs that have had a longer period to become established. Without reforestation or sufficient natural regeneration, the moderate to high severity burned areas may experience stands that are dominated by dense shrubs for several decades. Early seral habitat could persist for a century or

more in some places of moderate to high burn severity, depending on the success of natural regeneration. Burned stands would be dependent on nearby natural seeds for reforestation. Hazard trees would be felled and left along roads over a longer time period as they pose an imminent threat to human safety or infrastructure.

Alternative 2 and 3– Direct and Indirect Effects
Restoration tinning in the low severity and unburned units under both alternatives would impact 15 acres of suitable pileated woodpecker habitat. When considered at the project boundary scale, this does not result in any new effects. As such, the analysis in the original Biological Evaluation (2008) would still apply.

Reforestation activities on 622 (Alternative 2) or 732 acres (Alternative 3) would be expected to increase the rate at which seedlings become established which could benefit this species by increasing the rate that habitat would be established. Hazard Tree and Restoration Thin treatments in the moderate to high severity burned areas are not expected to impact pileated woodpecker since they are not know to utilize areas within stand replacing fires.

Cumulative Effects for Alternatives 2 and 3
The amount of suitable habitat proposed for removal in the Revised EA as analyzed at the watershed scale is approximately 0.03 percent of the available habitat and cannot be meaningfully measured in terms of impacts to pileated woodpeckers. Therefore, there are no measurable cumulative effects to pileated woodpecker suitable habitat from Alternatives 2 and 3 since there are no direct or indirect effects.

American Marten

Changed Condition
The amount of suitable habitat for this species has been reduced in the project area because of the Government Flats Complex Fire. Because American marten are closely associated with old-growth forests, the amount of habitat impacted by the fire is represented by the changed condition to suitable spotted owl habitat. See the discussion under Northern Spotted Owl "Changed Condition / Current Condition", for the suitable habitat impacted by the fire. More information is available on the existing conditions for this species in the Wildlife Biological Evaluation (2008) from the original analysis, available in the project record.

Martens are closely associated with forested habitats that have complex physical structure near the ground (Slauson et al. 2007). Open areas, such as regeneration logging units, recent severely burned areas, and natural openings are avoided, especially during the winter. All areas that received stand replacement fire are no longer considered habitat.

Effects Analysis

Analysis Area
The analysis area includes the Mill Creek Watershed.

No Action– Direct and Indirect Effects
Under the No Action Alternative, there would be no reforestation in the burned area which could delay the development of suitable habitat for American marten. Longer time periods between fire and seedling establishment may decrease the ability of tree seedlings to compete with shrubs. Without reforestation or sufficient natural regeneration, the moderate to high severity burned areas of the project may experience stands that are dominated by dense shrubs for several decades. Early seral habitat could persist for a century or more in some places of moderate to high burn severity, depending on the success of natural regeneration. Burned stands would be dependent on nearby natural seeds for reforestation. Restoration thinning would not occur in the moderate to high severity burned areas which are no longer providing suitable habitat. Hazard trees would be felled and left along roads over a longer time period as they pose and imminent threat to human safety or infrastructure.

Alternatives 2 and 3– Direct and Indirect Effects
Alternatives 2 and 3 would impact 15 acres of habitat. When considered at the watershed scale, this does not result in any new effects. As such, the analysis in the original Biological Evaluation (2008) would still apply.

Reforestation activities on 622 acres (Alternative 2) or 732 acres (Alternative 3) would be expected to increase the rate at which seedlings become established which could benefit these species by increasing the rate that habitat would be established. Hazard Tree and Restoration Thin treatments in the moderate to high severity burned areas are not expected to impact American marten since these units are not providing suitable habitat for this species.

Cumulative Effects Alternatives 2 and 3
The amount of suitable habitat proposed for removal in the Revised EA as analyzed at the watershed scale is approximately 0.03 percent of the available habitat and cannot be meaningfully measured in terms of impacts to marten. Therefore, there are no measurable cumulative effects to marten suitable habitat from Alternatives 2 and 3 since there are no direct or indirect effects.

Wild Turkey and Western Gray Squirrel

Changed Condition
Wild turkeys and Western gray squirrels rely mostly on the dry Douglas-fir, ponderosa pine, and Oregon white oak habitat within the project area. The amount of this habitat was reduced by 505 acres because of the Government Flats Complex Fire. Both species are generally associated with the mixed conifer and pine/oak vegetation classifications. Nest sites are closely associated with mixed conifer stands. Wild turkey roost trees are large diameter (> 20 inch dbh) ponderosa pine and douglas fir. All areas that received stand replacement fire are no longer considered habitat.

Effects Analysis

Analysis Area
The analysis area includes the Mill Creek Watershed.

No Action– Direct and Indirect Effects
Under the No Action Alternative, there would be no reforestation in the burned area which could delay the development of suitable habitat for turkeys and gray squirrels. Longer time periods between fire and seedling establishment may decrease the ability of tree seedlings to compete with shrubs. Without reforestation or sufficient natural regeneration, the moderate to high severity burned areas of the project may experience stands that are dominated by dense shrubs for several decades. Early seral habitat could persist for a century or more in some places of moderate to high burn severity, depending on the success of natural regeneration. Burned stands would be dependent on nearby natural seeds for reforestation. Restoration thinning would not occur in the moderate to high severity burned areas which are no longer providing suitable habitat. Hazard trees would be felled and left along roads over a longer time period as they pose and imminent threat to human safety or infrastructure.

Alternatives 2 and 3– Direct and Indirect Effects
Alternatives 2 and 3 would have the same effect to turkey and gray squirrel. Both would impact 107 acres of habitat (Restoration Thin treatments in low severity burned to unburned areas). When considered at the watershed scale, this does not result in any new effects. As such, the analysis in the original Biological Evaluation (2008) would still apply.

Reforestation activities on 622 acres (Alternative 2) or 732 acres (Alternative 3) would be expected to increase the rate at which seedlings become established which could benefit these species by increasing the rate that habitat for wild turkey and gray squirrel would be established. Hazard Tree and Restoration Thin treatments in the moderate to high severity burned areas are not expected to impact turkey and gray squirrel since these units are not providing suitable habitat for these species.

Cumulative Effects Alternatives 2 and 3
The following list of past, present, and reasonably foreseeable future projects overlap the analysis area in time and space and were considered in this cumulative effects analysis: Stewardship Projects (Lokai Stewardship [unsold]; Roan and Eques Stewardship outside fire boundary; and, Appy, Buckskin, and Clyde Stewardship [completed]), past timber harvests, private land timber harvest activities, The Dalles Watershed Fuelbreak Stewardship Projects (Hodi, Alder and Willow Stewardship), and The Dalles Watershed Phase II Stewardship Projects (Mint, Fern, and Voodoo Stewardship).

Most of the other projects considered in the cumulative effects analysis focus on thinning young stands or thinning from below to restore and enhance mixed conifer stands while reducing the risk of stand replacing fires, which would benefit turkey and gray squirrel. These projects would thin green stands and would not remove snags aside from hazard tree removal. The exception to this is The Dalles Watershed Fuelbreak which was designed to prevent fires from entering the municipal watershed and in this case, little suitable habitat remained. Overall, these projects in conjunction with the treatments in the unburned units of the proposed action, would reduce the risk of losing suitable habitat from future large-scale disturbances by reduce the hazard fuel loadings.

Consistency Determination for All Management Indicator Species

This analysis is consistent with The National Forest Management Act which requires the Forest Service to manage wildlife habitat to "maintain viable populations of existing native and desired non-native vertebrate species in the planning area." The National Forest Management Act requires the Forest Service to identify Management Indicator Species through the planning process, and to establish objectives to maintain and improve the habitat of indicator species. A Forest wide analysis was completed and is incorporated by reference. Viable populations of all the Management Indicator Species addressed in this biological evaluation would be maintained at the Forest scale.

Neotropical Migratory Birds

Methodology

The Forest Service has implemented management guidelines that direct migratory birds to be addressed in the NEPA process when actions have the potential to impact migratory bird species of concern. The methodology for this analysis follows "Incorporating Migratory& Resident Bird Concerns into the National Environmental Policy Act Process Region Six Forest Service & OR/WA Bureau of Land Management" (Bresson 2013).

Conservation strategies for land birds of the east slope of the Cascade Mountains in Oregon and Washington and a conservation strategy for land birds in coniferous forests in western Oregon and Washington were prepared in June 2000 and March 1999 respectively by Bob Altman of American Bird Conservancy for the Oregon-Washington Partners in Flight. The strategies are designed to achieve functioning ecosystems for land birds by addressing the habitat requirements of "focal species." By managing for a group of species representative of important components of a functioning ecosystem, it is assumed that many other species and elements of biodiversity would be maintained. The Mill Creek Watershed contains elements of both these physiographic regions.

Changed Condition

The habitat for migratory bird species has changed since the original North Fork Mill Creek Restoration Opportunities analysis in 2008. Prior to the fire the landscape was comprised of several plant communities ranging from mixed conifer to pine/oak with fire return interval that ranged from 15-200 years (Refer to fire and fuels report). Within the Mill Creek Watershed the high to moderate burn severity areas have been converted to an early seral forest habitat. Early seral forest habitat is defined as "those ecosystems that occupy potentially forested sites in time and space between a stand-replacement disturbance and re-establishment of a closed forest canopy" (Swanson et al. 2010). These habitats can persist from decades to centuries depending on the successful establishment of new trees.

Table 10 displays the focal species potentially positively or negatively affected by changes in habitat in the eastern slope of the Cascade Mountains region, and the forest conditions and habitat attributes they represent.

Table 10**:** Focal Migratory Bird Species

Forest Conditions	**Habitat Attribute**	**Focal Species**
Ponderosa Pine	Old forest, large patches	White-headed woodpecker
	Large trees	Pygmy nuthatch
	Open understory, regeneration	Chipping sparrow
	Burned old-forest	Lewis's woodpecker
Mixed Conifer	Large trees	Brown Creeper*
	Open understory, regeneration	Williamson's sapsucker
	Grassy openings, dense thickets	Flammulated owl
	Multi-layered, structural diverse	Hermit thrush
	Fire edges and openings	Olive-sided flycatcher*
Oak-Pine Woodland	Early-seral, dense understory	Nashville warbler
	Large oaks with cavities	Ash-throated flycatcher
	Large pine trees/snags	Lewis' woodpecker
Lodgepole Pine	Mature/old-growth	Black-backed woodpecker
Whitebark Pine	Mature/old-growth	Clark's nutcracker
Montane Meadows	Wet and dry	Sandhill crane
Aspen	Large trees/snags, regeneration	Red-naped sapsucker
Subalpine fir	Patchy presence	Blue grouse*

*Significantly declining population trends in the Cascade Mountains Physiographic Region.

In developing the list of species to be considered in the planning process, the current (updated every 5 years) USFWS Birds of Conservation Concern was consulted as was the State lists, and comprehensive planning efforts for migratory birds. This analysis was completed in part to evaluate the effects of the agency actions on migratory birds, focusing first on species of management concern along with their priority habitats and key risk factors.

Approximately 30 species of migratory birds occur within the District, some of which are present within the project area during the breeding season. Some species favor habitat with late-successional characteristics, such as the hermit thrush and brown creeper, while others favor early-successional habitat such as the Nashville warbler. Lewis's woodpeckers, white-headed woodpeckers, and olive-sided flycatchers would be found in or near the burned portions of the project area.

Effects Analysis

Analysis Area
The analysis area includes the Mill Creek Watershed.

No Action– Direct and Indirect Effects
Under the No Action Alternative, there would be no reforestation in the burned area which could delay the development of suitable habitat for late seral species such as the brown creeper. Longer time periods between fire and seedling establishment may decrease the ability of tree seedlings to compete with shrubs. Without reforestation or sufficient natural regeneration, the moderate to high severity burned areas of the project may experience stands that are dominated by dense shrubs for several decades which would benefit. Early seral habitat could persist for a century or more in some places of moderate to high burn severity, depending on the success of natural regeneration, which would benefit Nashville warbler and other early seral habitat species. Burned stands would be dependent on nearby natural seeds for reforestation. Restoration thinning would not occur in the moderate to high severity burned areas. Hazard trees would be felled and left along roads over a longer time period as they pose and imminent threat to human safety or infrastructure.

Alternative 2– Direct and Indirect Effects
Alternative 2 would treat 107 acres of green tree habitat (Restoration Thin treatments on the low severity burn to unburned areas). When considered at the watershed scale, this does not result in any new effects to migratory bird species from treatments in these units. As such, the analysis in the original Biological Evaluation (2008) for green tree treatments would still apply.

Reforestation activities on 622 acres under Alternative 2 would be expected to increase the rate at which seedlings become established, increasing the rate of establishing trees which would benefit brown creeper and other species dependent on large trees.

Restoration Thin on 146 acres in moderate to high severity burn areas would leave 10 snags per acre which would be reduced to less than 2 snags per acre within 20 years based on the rates of snags falling over time. Hazard Tree treatments on 134 acres would remove all potential nest trees. Hazard Tree and Restoration Thin treatments in the moderate to high severity burned areas would reduce the number of snags within the eastside mixed conifer habitat type (Table 3). These treatments would reduce the number of snags within the eastside mixed conifer habitat type by 54,095 snags which is approximately 20 percent of the snags within the burned area on the Forest (Table 3). Of these snags, 20,950 are >20 inches dbh. Approximately half of the trees in this portion of the watershed are ponderosa pine. These treatments would benefit species associated with early seral habitat and would remove habitat for species associated with large snags or high density patches of snags. See the above analysis for impacts to white-headed and Lewis's woodpeckers.

Alternative 3– Direct and Indirect Effects
Similar to Alternative 2, this alternative would treat 107 acres of green tree habitat (Restoration Thin treatments on the low severity burn to unburned areas). When considered at the watershed scale, this does not result in any new effects to migratory bird species from treatments in these units. As such, the analysis in the original Biological Evaluation (2008) for green tree treatments would still apply.

Reforestation activities on 732 acres under Alternative 3 would be expected to increase the rate at which seedlings become established, increasing the rate of establishing large trees, which would benefit brown creeper and other species dependent on large trees.

Hazard Tree treatments on 167 acres would remove all snags. This would reduce the number of snags by 34,235 snags which is approximately 12.8 percent of the snags in this habitat type within the burned area on the Forest. While the total number of snags removed is less under Alternative 3, the number of acres with zero snags would increase from 134 acres in Alternative 2 to 167 acres in Alternative 3. Of these snags, 13,360 are larger than 20 inches in diameter (Table 4). These treatments would benefit species associated with early seral habitat and would remove habitat for species associated with large snags or high density patches of snags. See the above analysis for impacts to white-headed and Lewis's woodpeckers.

Cumulative Effects
The following list of past, present, and reasonably foreseeable future projects overlap the analysis area in time and space and were considered in this cumulative effects analysis: Stewardship Projects (Lokai Stewardship [unsold]; Roan and Eques Stewardship outside fire boundary; and, Appy, Buckskin, and Clyde Stewardship [completed]), past timber harvests, private land timber harvest activities, The Dalles Watershed Fuelbreak Stewardship Projects (Hodi, Alder and Willow Stewardship), and The Dalles Watershed Phase II Stewardship Projects (Mint, Fern, and Voodoo Stewardship).

Most of the other projects considered in the cumulative effects analysis focus on thinning young stands or thinning from below to restore and enhance mixed conifer stands while reducing the risk of stand replacing fires, which would benefit late seral dependent species and reduce habitat for early seral species in the long-term. These projects would thin green stands and would not remove snags aside from hazard tree removal which would maintain the existing habitat for snag dependent species.

Consistency Determination
The Proposed Action is consistent with Executive Order 13186 (66 Fed. Reg. 3853, January 17, 2001) "Responsibilities of Federal Agencies to Protect Migratory Birds." This Executive Order directs federal agencies to avoid or minimize the negative impact of their actions on migratory birds, and to take active steps to protect birds and their habitat. This Executive Order also requires federal agencies to develop Memorandum of Understandings (MOU) with the USFWS to conserve birds including taking steps to restore and enhance habitat, prevent or abate pollution affecting birds, and incorporating migratory bird conservation into agency planning processes whenever possible. The Bureau of Land Management and U.S. Forest Service have both completed, and are currently implementing, their respective MOU's with the USFWS.

Summary of Effects by Alternative
Table 11 shows a summary of the effects to wildlife species by Alternatives.

Table 11: Summary of Effects to Wildlife Species by Alternatives

Species	Impact of Alternative 2	Impact of Alternative 3	Impact of No Action
Federally Threatened, Endangered or Proposed			
Northern spotted owl (*Strix occidentalis caurina*)	LAA	LAA	NE
Northern spotted owl critical habitat	LAA	LAA	NE
North American wolverine	NE	NE	NE
R6 Sensitive Species			
White-headed woodpecker	MII-NL	MII-NL	NI
Lewis's woodpecker	MII-NL	MII-NL	NI
Western bumblebee (*Bombus occidentalis*)	MII-NL	MII-NL	NI

NE: No Effect
LAA: Likely to Adversely Affect
MII-NL: May Impact Individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.
NI: No impact

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