Mt. Ashland LSR Habitat Restoration and Fuels Reduction Project
Wildlife Report
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1.1 Wildlife and Habitat

Significant Issue of spur road construction effects on habitat

The alternatives propose construction of between 2.27 and 6.86 miles of temporary spur road. Under Alternative 2, the majority of temporary spur road construction –approximately 5.3 miles- would occur within the Long John and Beaver Grouse 7th field watersheds. This would increase the miles of road per square mile of land within these 7th watersheds from 4.92 to 5.29 and from 4.50 to 4.69, respectively. Under this Alternative, the majority of the proposed temporary spur roads – approximately 6.4 miles - would occur in plantations, early-, and mid-successional stands. Thus, less than 0.5 mile of temporary spur road is proposed in late-successional forest. Additionally, all proposed temporary spur roads will be decommissioned after project implementation.

The construction of temporary spur roads will fragment habitat and increase habitat edge. However, expected impacts to habitat are not evenly distributed across habitat types within the Project area. Less than 0.5 mile of temporary spur road construction would occur in late-successional stands. This would result in the degrading of approximately 1.1 acres of late-successional forest. (Degraded refers to forested stands in which some late-successional qualities may be removed but as a whole the stand would still retain late-successional character). Although the degradation of 1.1 acres will fragment and increase edge habitat in late-successional forests, these impacts are expected to be minor when considered at the scale of the Project area. The majority of habitat fragmentation and increase in edge effects would occur in early- and mid-successional stands. However, all temporary spur roads will be decommissioned after project implementation and road surfaces will be prepared for revegetation (planting and/or seed establishment). The early- and mid-successional stands adjacent to these decommissioned roads will also mature overtime. As the overstory canopy in these stands becomes dominated by larger diameter trees, canopy cover over the decommissioned roads will likely increase. Once the decommissioned roads become revegetated and the early- and mid-successional stands begin to mature, fragmented and edge habitats will begin to be obscured. Thus, the effects of habitat fragmentation and increasing edge habitat from temporary spur road construction are expected to be short term.

Although the construction of temporary spur roads will impact habitat and has the potential to increase harassment of wildlife, effects would be expected to vary by species. For example, there is little evidence to suggest that highly mobile species such as the northern spotted owl and pacific fisher would be significantly impacted by the level of habitat fragmentation typically associated with logging road construction. Conversely, logging roads likely create partial barriers to movements for species that have limited dispersal capabilities such as salamanders and mollusks. Likewise,

temporary spur roads may impact movements and habitat use patterns for species that are sensitive to human disturbance such as elk. These potential impacts, however, are only expected to occur in the short term until temporary spur roads are decommissioned or until vegetation becomes reestablished on the decommissioned roads.

New roads have the potential to harass wildlife by increasing public access and introducing activities that create noise above ambient levels. Because all temporary spur roads will be decommissioned after project implementation, potential harassment of wildlife is only expected to occur in the short term while temporary spurs are still open.

See Chapter 3 - Wildlife and Habitat - for species specific discussions regarding temporary spur road construction effects on habitat.

Wildlife species potentially affected by the project include federally listed species, Forest Service Region Five sensitive species, Survey and Manage species, KNF Management Indicator species, and big game that may be affected by the Mt. Ashland LSR Habitat Promotion and Fuels Reduction project (Project). Among the most notable of these are NSO which are protected through multi-state habitat management plans.

1.1.1 Late-successional Reserves

The entire project is within the boundary of the Mt. Ashland LSR. LSRs are land allocations established in the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl (NSO) also known as the Northwest Forest Plan (NWFP) (USDA Forest Service and USDI Bureau of Land Management 1994a). LSRs in combination with other land allocations and associated standards and guidelines (S&Gs), were established to maintain a functional, interactive, late-successional and old-growth forest ecosystem. They were designed to serve as habitat for late-successional and old-growth related species including the NSO. Specific to NSOs, LSRs primary function are to support population clusters.

Within the LSR network, the Mount Ashland LSR has particular significance in that it provides an important link in the connectivity between the interior Cascade and Sierra mountain ranges as well as providing an important link in connectivity between these interior mountain ranges and the coastal mountain ranges. Thus, the Mount Ashland LSR provides for both intra- and inter-provincial connectivity.

Desired structural components in LSRs include (1) multispecies and multilayered assemblages of trees, (2) moderate-to-high accumulations of large logs and snags, (3) moderate-to-high canopy

closure, and (4) moderate-to-high number of trees with structural imperfections such as cavities, broken tops, and large deformed limbs. Because not all forested stands within LSRs are late-successional, the NWFP recognized the role of silviculture in providing and maintaining these components.

Currently, only 30% of the Mt. Ashland LSR contains late-successional forest. This is approximately 30% below the desired amount of late-successional forest for this LSR (USDA Forest Service 1996; USDA Forest Service 1999). Because many of the early- and mid-successional stands within the project are young and healthy, they are expected to respond favorably to silvicultural treatments that reduce stand density. Some legacy late-successional components from the original stand exist in mid-successional stands but generally large-diameter trees, snags, and downed and woody debris (DWD) are lacking.

Patterns of fire severity play an important role in determining stand and landscape diversity (Skinner et al. 2006). Historically, the general fire regime within the Klamath Mountains Bioregion (northwestern California and southwestern Oregon) was frequent, low- to moderate-intensity fire (Ibid). Under this regime, stands were generally open and the landscape was characterized by a mosaic of successional stages and a high degree of spatial complexity due to the creation of openings of variable size within the forest matrix (Taylor and Skinner 1998; Taylor and Skinner 2003). This suggests that dense, homogenous stands of late-successional forest were historically distributed in a complex mosaic across the landscape. As fire occurrence in the Klamath Mountains has declined (Skinner et al. 2006) changes in landscape patterns have become evident. Today forests are generally denser, have a greater concentration of fuels, have a higher incidence of shade-tolerant species, and are less spatially complex; the size and total acres of forest openings is declining (Skinner 1995; Taylor and Skinner 2003; Skinner et al. 2006). Effects of recent high-severity burns appear to be different than historic patterns with more area burning at high intensity (Skinner et al. 2006). This pattern suggests that late-successional habitat is less sustainable currently than it was historically. To some degree proposed treatments are expected to mimic natural disturbance by reducing stand density and existing fuel loads. Thus, proposed treatments are expected to increase the sustainability of late-successional habitat in the Project Area by changing stand structure to more closely resemble historic conditions.

Prior to timber harvest activities throughout much of the 1900s, much of the Beaver Creek watershed, which includes the Project Area, was late-successional mixed-conifer forest (USDA Forest Service 1996). This suggests that late-successional stands were well-distributed, even though late-successional forest in the Project Area is naturally fragmented due to its historic fire regime, predominately south facing orientation, and naturally occurring openings at higher elevations. Currently, only 1,200 acres (10%) of the Project Area contain late-successional stands. Throughout most of the Project Area, remnant late-successional stands occur in small patches (typically between

1 to 25 acres) and are not widely distributed. Much of the intervening forest is composed of plantations and early- and mid-successional stands exhibiting high density and canopy closure. Larger, more contiguous patches of late-successional forest exist in the higher elevation portions of the mixed conifer zone and true fir zones but are limited to the northeast corner of the Project Area. Thus, the amount and distribution of late-successional stands are considerably reduced in the Project Area relative to its historic condition.

1.1.1.1 *Effects of Alternative 1 – No Action*

Under the No Action Alternative late-successional habitat would be slow in developing and the potential fire behavior in the Project Area would remain unacceptable relative to LSR objectives. Forest Vegetation Simulator (FVS) modeling indicates that 50 years from present stands will still be dense, averaging >340 trees and 285 ft^2 basal area/acre, and dominated by trees <12.5" DBH. An average of seven to nine trees per acre >30" would be expected. Density related mortality is expected to continue, with between 35 to 60% of the extant trees dying within that period. Thus, surface fuels are expected to dramatically increase over time. Additionally, in the event of a fire start, the Fire Fuels Extension (FFE) of the FVS model indicates several general patterns regarding fire behavior and fire induced tree mortality over time including (1) a constant or increasing crown fire potential under both moderate and severe weather conditions, (2) an increase in surface fire intensity under both moderate and severe weather conditions, and (3) either a constantly high or increasing level of basal area mortality. Thus, the No Action Alternative increases the potential for fire to remove the desired structural components of a LSR and does little to promote and maintain a functional, interactive, late-successional and old-growth forest ecosystem.

1.1.1.2 *Effects of Alternatives 2, 4, and 5 – Action Alternatives*

The action alternatives would have similar effects to LSR function and will be discussed together except where specifically stated otherwise.

Thinning and Fuels Reduction

Thinning designed to promote the development of late-successional habitat will not remove important structural components of LSRs such as large-diameter trees (>20"), snags, and DWD. Thinning prescriptions have been designed to retain trees >20" because trees in this size class provide the primary and most immediate recruitment pool for large tree restoration and forest inventory data indicates that trees in this size class are very limited within the Project area (USDA Forest Service 2004). Trees infected with mistletoe may be removed, but prescriptions have been designed to ensure that this structural component will remain on the landscape. Thinning to create

defensible fuel profile zones (DFPZs) and fuels reduction treatments may remove large-diameter trees, snags, and DWD. The removal of large-diameter trees would only occur under limited circumstances (see fire and fuels chapter). Therefore, the number of large trees to be removed is expected to be minimal. Additionally, where stand conditions permit, incorporation of Mt. Ashland Late-successional Reserve Assessment (MLSRA) recommendations for snags and DWD will ensure that these components are retained. Therefore, only 4 acres of late-successional forest is expected to be degraded in DFPZs under alternatives 2 and 4.

Over time, thinning and fuel reduction treatments are expected to enhance the connectivity and late-successional and old-growth ecosystem function of the LSR by increasing the amount, distribution, and diversity of late-successional habitat and by reducing fuels to a level that would result in an acceptable fire behavior and post fire stand condition. FVS modeling indicates that 50 years post thinning stands will be less dense (averaging between 56 and 81 trees/acre) and will increase in basal area. Average tree diameter would increase to between 24 and 27” and 14 to 15 trees per acre >30” would be expected. An increase in the amount of large-diameter trees also improves the recruitment of large snags and DWD. FFE modeling indicates that thinning and subsequent fuels treatment will generally reduce crown fire potential or maintain a surface fire type and significantly reduce predicted stand mortality in the event of a fire start. These factors indicate that stands will be more resistant to large-scale fires but will burn with sufficient intensity to create small openings within forested habitat.

Temporary Road and Landing Construction

Construction of temporary roads and landings has the potential to remove large-diameter trees, snags, and DWD, and fragment existing late-successional stands. To the extent possible, temporary spurs have been routed to minimize impacts to large-diameter trees and late-successional stands. Approximately 0.2 to 0.4 mile of temporary spur road is proposed through existing late-successional stands. Thus, approximately 1.1 acres of late-successional forest, or < 0.1% of extant late-successional forest in the Project Area will be degraded. Late-successional stands proposed to be entered include an open-canopy ridge-top stand and a closed-canopy mixed conifer stand. These stands range in size from approximately 4 to 35 acres with the intervening forest consisting of predominately early- and mid-successional stands with scattered patches of late-successional stands. A sample inventory of stands within the Project area indicated that DWD > 24” is very limited (T. Laurent, pers. comm. 2006). Therefore, because large DWD is an important structural component of LSRs , all trees >24” that need to be felled for a temporary road will be left on site. By removing mid-successional habitat the construction of temporary spurs also has the potential to increase fragmentation of future late-successional stands preventing that piece of ground from developing into late-successional habitat in at least the near term. Due to their distribution and the linear nature of roads, the effects of these actions are generally dispersed across the Project Area; however, more

concentrated effects may occur in the upper portion of the Siskiyou Gap DFPZ under Alternatives 2 and 4. However, at the scale of the LSR this level of potential fragmentation is expected to be insignificant relative to the ability of the LSR to provide its intra- and inter-provincial connectivity roles and to provide a functional, interactive, late-successional and old-growth forest ecosystem.

By routing temporary roads through non-late-successional stands wherever possible, routing temporary roads to minimize the felling of large-diameter trees, and because temporary roads are designed to facilitate activities that promote the development of and protection of existing late-successional stands, the proposed temporary road construction is consistent with NWFP S&Gs for LSRs (USDA Forest Service and USDI Bureau of Land Management 1994a, p. C-16).

No landings are proposed in existing late-successional habitat.

Road-Related Activities

Road-related activities, including maintenance, closures, and decommissioning is not expected to remove any important structural components of the LSR.

1.1.1.3 *Cumulative Effects*

According to the Mt. Ashland LSR Assessment, 30% (14,980 acres) of the LSR contained late-successional stands in 1996. The majority of these existing stands occurred in the northern portion of the LSR (8,370 acres), where it was distributed in large contiguous blocks. In the southern portion of the LSR, late-successional stands were less abundant (6, 610 acres) and were typically found in draws resulting in smaller more linear blocks. Since 1996 there has been no measurable loss of late-successional forest in the LSR. Reasonably foreseeable actions in the northern portion of the LSR include the Ashland Watershed Protection Project, the Mt. Ashland Ski Area Expansion, and the Ashland Forest Resiliency Project. The Ashland Watershed Protection Project will remove approximately 18 acres of late-successional habitat while the Mt. Ashland Ski Area Expansion will remove 44 acres. (Late-successional habitat for the Ashland Watershed Protection Project, Mt. Ashland Ski Area Expansion, and the Ashland Forest Resiliency Project is defined in the Ashland Forest Resiliency DEIS as, "…late successional forest stages as well as other interrelated elements of an ecosystem resulting in habitat where dependent species are capable of surviving." It is important to note that this differs from the definition of late-successional stands or forest (stands with average tree diameter >24") referred to during the analysis of project effects. However, the ski area is a Special Use Permit area and thus, is not allocated as LSR lands under the NWFP. The Ashland Forest Resiliency Project is designed to restore more fire resilient forests in the Ashland watershed by implementing several types of hazardous fuel treatments. Approximately 1,000 acres of late-successional habitat will be removed with the implementation of that project. Other actions

proposed or expected to occur in the southern portion of the LSR include pre-commercial thinning in plantations, grazing, and dispersed recreation. These actions would have no impact to LSR components.

The activities that have led to the current condition of the LSR vary from the northern and southern portions. A large section of the northern portion of the LSR is allocated as the Ashland watershed. Within this watershed timber harvest has been limited to small clear cuts adjacent to the 2060 road, thinning to create shaded fuelbreaks, individual and small group selection harvest to reduce fire hazard, and roadside salvage. To the east of the Ashland watershed, harvest has been more extensive and late-successional habitat has been impacted to a greater extent.

Cumulatively, the project will have effects to the Mt. Ashland LSR as it will degrade up to 5.1 acres of late-successional forest. These acres represent approximately 0.02% of the extant late-successional forest in the LSR. Thus, at the scale of the LSR these activities are not expected to significantly impact the ability of the LSR to provide a functional, interactive, late-successional and old-growth forest ecosystem.

1.1.1.4 *Determination*

Short term impacts of the project will not significantly impact the ability of the LSR to provide a functional, interactive, late-successional and old-growth forest ecosystem. By promoting the development of late-successional stands, the project is expected to enhance the function of the LSR over the long term.

1.1.2 Northern Spotted Owl Critical Habitat

The project will occur within two NSO critical habitat units (CHUs). NSO critical habitat was designated based on the identification of large blocks of suitable habitat that are well distributed across the range of the NSO (USDI Fish and Wildlife Service 1992a). CHUs are intended to identify a network of habitats that provide the functions considered important to maintaining stable, self-sustaining, and interconnected populations over the range of the NSO, with each CHU having a local, provincial, and a range-wide role in NSO conservation. Most CHUs were expected to provide suitable habitat for population support, though some were designated primarily for connectivity, and others were designated to provide for both population support and connectivity.

Primary constituent elements (PCEs) are the physical and biological features of critical habitat essential to a species' conservation. PCEs identified in the NSO critical habitat final rule include those physical and biological features that support nesting, roosting, foraging, and dispersal (USDI

Fish and Wildlife Service 1992a). Features that support nesting and roosting habitat typically include a moderate to high canopy coverage (60–90%); a multi-layered, multi-species canopy with large (>30” DBH) overstory trees; a high incidence of large trees with various deformities (e.g., large cavities, broken tops, mistletoe infections, and other evidence of decadence); large snags; large accumulations of fallen trees and other woody debris on the ground; and sufficient open space below the canopy for owls to fly (Thomas et al. 1990). Foraging habitat generally consists of attributes similar to those in nesting and roosting habitat, but may not always support successfully nesting pairs (USDI Fish and Wildlife Service 1992a). Dispersal habitat, at minimum, consists of stands with adequate tree size and canopy closure to provide protection from avian predators and at least minimal foraging opportunities: there may be variations over the owl’s range (e.g., drier sites in the east Cascades or northern California) (Ibid).

Evaluation of potential impacts to NSO critical habitat should consider the effects to the primary constituent elements (nesting, roosting, foraging, and dispersal habitat) (USDI Fish and Wildlife Service 1992a).

The project will occur within CHUs CA-14 and the southern half of CHU OR-76 (Map 1). These units are contiguous, separated only by the California and Oregon state boundary. CHU OR-76 is divided into a north and south section by the Siskiyou Crest. Together these two CHUs encompass over 68,000 acres, approximately 23,000 of which is suitable NSO habitat (USDA Forest Service and USDI Bureau of Land Management 1994b). These CHUs are expected to support 20 NSO pairs over time and provide important intra- and inter-provincial connectivity (USDI Fish and Wildlife Service 1991).

Surveys over the past five years indicate that these CHUs are supporting between 12–14 pairs of NSOs; 30–40% below the desired number of pairs. While NSO habitat is fairly abundant and contiguous in the northern half of CHU OR-76, it is more limited and patchy in CA-14 and the southern half of OR-76. Within the Project Area there are approximately 250 acres of nesting/roosting habitat, 2,500 acres of foraging habitat, and 5,800 acres of dispersal habitat.

1.1.2.1 *Effects of Alternative 1 – No Action*

Under the No Action Alternative the primary constituent elements of critical habitat would be slow in developing and the potential fire behavior in the Project Area would remain unacceptable relative to critical habitat objectives. FVS modeling indicates that 50 years from present stands will still be dense (>340 trees and 285 ft^2 basal area/acre), and dominated by trees <12.5” DBH. Stands of this structure typically do not provide the habitat components commonly associated with NSO nesting, roosting, or foraging habitat (Solis and Gutierrez 1990; LaHaye and Gutierrez 1999; North et al.

1999; Irwin et al. 2004). Density related mortality is expected to continue, with between 35 to 60% of the extant trees dying within that period. Thus, surface fuels are expected to dramatically increase over time. Additionally, in the event of a fire start, FFE modeling indicates several general patterns regarding fire behavior and fire induced tree mortality over time including (1) a constant or increasing crown fire potential under both moderate and severe weather conditions, (2) an increase in surface fire intensity under both moderate and severe weather conditions, and (3) either a constantly high or increasing level of basal area mortality. Thus, the No Action Alternative increases the potential for fire to remove the existing physical and biological features important to functioning critical habitat and does little to promote the development of such characteristics.

1.1.2.2 *Effects of Alternatives 2, 4, and 5 – Action Alternatives*

The action alternatives would have similar effects to one another for critical habitat function and will be discussed together except where specifically stated otherwise.

Thinning and Fuels Reduction

Thinning designed to promote the development of late-successional stands and the primary constituent elements of NSO critical habitat will not remove important structural components of nesting, roosting, or foraging habitat such as large-diameter trees, snags and DWD. A minimum of 60% canopy closure will be retained in existing nesting, roosting, or foraging habitat and 40% in dispersal habitat. Trees infected with mistletoe may be removed, but project S&Gs will ensure that this component will remain on the landscape. Fuel reduction treatments have the potential to remove DWD but prescriptions are designed to retain MLSRA recommendations for DWD.

Thinning to create DFPZs has the potential to impact NSO critical habitat by removing large-diameter trees (>20”), snags, and DWD. To meet objectives for the Siskiyou Peak DFPZ under Alternatives 2 and 4, approximately four acres of foraging habitat will be downgraded to dispersal habitat in stand 339. However, due to the physiographic features associated with these acres (high elevation, ridge top), it is unlikely that they provide significant foraging opportunities for NSOs. Outside of stand 339, the removal of large-diameter trees would only occur under very limited circumstances when it is necessary to meet stand density objectives or if a tree shows obvious signs of disease or poor vigor. Therefore, the number of large trees to be removed is expected to be minimal. Additionally, where stand conditions permit, project S&Gs for snags and DWD will ensure that these components are retained. The silvicultural prescriptions also ensure that the DFPZs will not result in large canopy gaps. Although some structural components of critical habitat may be reduced with the above actions, when assessed at the stand scale, effects are not expected to change the function of NSO habitat (i.e., stands providing foraging habitat will remain foraging quality post treatment).

Over time, thinning and fuel reduction treatments are expected to enhance the function of CHUs CA-14 and OR-76 by increasing the amount and distribution of nesting, roosting, foraging and dispersal habitat and by reducing fuels to a level that would result in an acceptable fire behavior and post fire stand condition. FVS modeling indicates that 50 years post thinning the average tree diameter within a stand would increase to between 24 and 27” and 14 to 15 trees per acre >30” would be expected. Stands with this type of structure are more typical of stands associated with NSO nesting and roosting habitat Solis and Gutierrez 1990; LaHaye and Gutierrez 1999). More large stems per acre would also increase recruitment of large snags and DWD. Stands will also be less dense (averaging between 56 and 81 trees/acre) and will average between 216 and 257 ft^2 of basal area per acre. These basal area values are within the optimal range for NSO foraging habitat as reported by Irwin et al. (2004). FFE modeling indicates that thinning and subsequent fuels treatment will generally reduce crown fire potential or maintain a surface fire type and significantly reduce predicted stand mortality in the event of a fire start. These factors indicate that stands will be more resistant to large-scale fires but will burn with sufficient intensity to create small openings within forested habitat. This type of pattern, which would create a mosaic of stands in different successional stages, would be consistent with patterns under historic fire regimes. Over time, this pattern would likely enhance critical habitat function by providing horizontal diversity of habitat across the landscape.

Temporary Road and Landing Construction

No temporary road or landing construction is proposed in nesting or roosting habitat. Construction of temporary roads and landings is expected to remove small patches (0.5 acre or less) of foraging habitat totaling between 2.5 and four acres and 19 to 35 acres of dispersal habitat in 0.5 to two acre patches. These acres represent approximately 0.1 to 0.2 and 0.3 to 0.6% of extant foraging and dispersal habitat in the Project Area, respectively. Because large DWD is an important structural component of NSO critical habitat and is generally lacking in the Project Area, all trees >24” that need to be felled for a temporary road or landing will be left on site. Because patches of foraging habitat to be removed are small, impacts to foraging habitat are dispersed across the Project Area, and the total acres of foraging habitat to be removed is minimal, these actions are not expected to impact the ability of CA-14 and OR-76 to provide foraging opportunities for NSOs. More concentrated effects to dispersal habitat may occur in the upper portion of the Siskiyou Gap DFPZ, particularly under Alternatives 2 and 4. However, due to the existing amount of dispersal habitat within the Project Area, total acres of dispersal habitat to be removed, and the linear nature of the effects resulting from temporary spur construction, the dispersal function of CA-14 and OR-76 is not expected to be affected.

Road-Related Activities

Road-related activities, including maintenance, closures, and decommissioning is not expected to remove any important structural components of NSO critical habitat.

1.1.2.3 *Cumulative Effects*

According to USDA Forest Service and USDI Bureau of Land Management (1994a), there were 23,116 acres of suitable NSO habitat within CA-14 and OR-76 in 1994. Since that time only 74 acres of habitat has been removed (USDA Forest Service 2005a). Reasonably foreseeable actions in CA-14 and OR-76 south of the Siskiyou Crest include three KNF projects; Tennis Thin, Colestine, and plantation thinning projects, as well as grazing and dispersed recreation. The Tennis Thin project includes commercial thinning and fuels reduction in overstocked mixed conifer stands and the Colestine project includes commercial thinning in pine plantations. Pre-commercial thinning will also continue on plantations throughout the Project Area. None of these projects will remove suitable NSO habitat. Additionally, grazing and recreation are not expected to impact the primary constituent elements of NSO critical habitat. North of the Siskiyou Crest reasonably foreseeable future actions include the Ashland Watershed Protection Project, the Mt. Ashland Ski Area Expansion, and the Ashland Forest Resiliency Project. The Ashland Watershed Protection Project will remove approximately 18 acres of suitable NSO habitat while the Mt. Ashland Ski Area Expansion will remove 44 acres. The Ashland Forest Resiliency Project is designed to restore more fire resilient forests in the Ashland watershed by implementing several types of hazardous fuel treatments. Approximately 1,000 acres of suitable NSO habitat will be removed or downgraded (nesting, roosting, and foraging habitat converted to dispersal habitat post treatment) with the implementation of that project. There are no other actions proposed in these CHUs.

Cumulatively, the project will impact CA-14 and OR-76 by removing or downgrading between 6.5 and eight acres of foraging habitat and 19 to 35 acres of dispersal habitat. These acres represent <0.1% and 0.5 of extant foraging and dispersal habitat in these CHUs, respectively. Due to the limited impacts to the primary constituent elements, the action alternatives will not significantly increase the cumulative effects to these CHUs.

1.1.3 Northern Spotted Owl

The northern spotted owl *(Strix occidentalis caurina)* was listed as Threatened under the Endangered Species Act on June 26, 1990, due to widespread habitat loss and the inadequacy of existing regulatory mechanisms to provide for its conservation (USDI Fish and Wildlife Service 1990a).

NSOs generally inhabit older forested habitats because they contain the structures and characteristics required for nesting, roosting, foraging, and dispersal (Forsman et al. 1984; Gutiérrez 1996; LaHaye and Gutiérrez 1999). Specifically, habitat features that support nesting and roosting include a multi-layered, multi-species canopy dominated by large overstory trees; moderate to high canopy closure; a high incidence of trees with large cavities or other types of deformities; numerous large snags; an abundance of large, dead wood on the ground; and open space within and below the upper canopy for NSOs to fly within (Thomas et al. 1990). Basal area within nest stands often exceeds 200 ft^2/acre (Solis and Gutiérrez 1990). Foraging habitat generally consists of attributes similar to those in nesting and roosting habitat, but much variation exists over the NSO range. Recent research addressing NSO foraging habitat in California, suggests that the basal area of a stand influences use, with 160–240 ft^2/acre basal area providing optimal foraging conditions (Irwin et al 2004; Irwin et al 2006). Dispersal habitat, at minimum, consists of stands with adequate tree size and canopy closure (>40%) to provide protection from avian predators and some foraging opportunities (USDI Fish and Wildlife Service 1992a).

Physiographic features (i.e., slope position, distance to water) also appear to influence habitat used for nesting, roosting, or foraging (Solis and Gutiérrez 1990; Blakesley et al. 1992; LaHaye and Gutiérrez 1999; Folliard et al. 2000; Irwin et al. 2004; Irwin et al. 2006). Studies from northern California indicate that NSOs typically nest and roost on the lower one-half of slopes within a given drainage while avoiding the upper third of slopes. Similarly, both California spotted owls and NSOs generally forage on lower slopes adjacent to streams.

Recent landscape-level analyses suggest that in the southern portion of the subspecies' range a mosaic of large patches of late-successional habitat interspersed with other vegetation types may benefit NSOs more than large, homogeneous expanses of older forests (Franklin et al. 2000; Olson et al. 2004). Franklin et al. (2000) hypothesized that a mosaic of different vegetation and seral stages may offer a stable prey resource for NSOs while providing adequate protection from predators. Franklin et al. (2000) and Dugger et al. (2005) also reported habitat fitness potential (the potential fitness that can be achieved by an owl occupying a given territory with certain habitat components) for NSOs was greater where large amounts of older forest were present in the NSOs core area.

Composition of prey in NSO diet varies likely in response to prey availability (Carey 1993; Forsman et al. 2001). Northern flying squirrels (*Glaucomys sabrinus*) and woodrats (Neotoma spp.) are usually the predominant prey both in biomass and frequency (Forsman et al. 1984; Ward et al. 1998; Forsman et al. 2001, 2004) with woodrats generally the dominant prey item in the drier forests typically found in the southern portion of the NSO range (Forsman et al. 1984; Sztukowski and Courtney 2004). Other prey species (e.g., voles, mice, rabbits and hares, birds, and insects) may be seasonally or locally important (Rosenberg et al. 2003; Forsman et al. 2004).

Home range size varies geographically, likely in response to differences in habitat quality (USDI Fish and Wildlife Service 1990b). Home ranges are smaller during the breeding season and often increase dramatically in size during fall and winter (Forsman et al. 1984; Glenn et al. 2004). The average home range size is approximately 3,300 acres in the California Klamath Province. Radiotelemetry studies in northern California and the western Oregon Cascades indicate that NSO core areas – the portion of the owl's home range that receives disproportionate use – is typically between 500 to 900 acres (Bingham and Noon 1997; Irwin et al. 2000). The amount of suitable habitat within a home range has also been shown to influence NSO productivity and survivorship (Simon-Jackson 1989; Bart 1995; Franklin et al. 2000; Dugger et al. 2005).

Nesting typically occurs from March to June. At about 35 days old, the young leave the nest but are incapable of flight (Forsman 1976). Juveniles typically spend the summer in close proximity to the nest core (Forsman et al. 1984; Miller 1989) and may begin to disperse by September (Gutiérrez et al. 1985; Forsman et al. 2002). Dispersing owls typically traversed a wide range of forest conditions and levels of habitat fragmentation (Forsman et al. 2002). Large non-forested valleys (e.g., the Willamette Valley) are apparent barriers to dispersing juvenile and adult NSOs (Forsman et al. 2002).

The effects of noise on NSOs is largely unknown. Although information specific to behavioral responses of NSOs to disturbance is limited, research indicates that recreational activity can cause Mexican spotted owls (*Strix occidentalis lucida*) to vacate otherwise suitable habitat (Swarthout and Steidl 2001) and helicopter overflights can reduce prey delivery rates to nests (Delaney et al. 1999). Additional effects from disturbance, including altered foraging behavior and decreases in nest attendance and reproductive success, have been reported for other raptors (White and Thurow 1985; Andersen et al. 1989; McGarigal et al. 1991).

In addition to habitat loss other factors including wildfire and barred owls pose a threat to NSOs. At the time of listing there was recognition that catastrophic wildfire posed a threat to the NSO (USDI Fish and Wildlife Service 1990a). The amount of habitat lost to wildfire in the relatively dry East Cascades and Klamath Provinces of Oregon and California (approximately 158,000 acres) (Bigley 2004) suggests that fire may be more of a threat than was previously thought.

Since 1990, the barred owl (*Strix varia*) has expanded its range such that it is now roughly coincident with the range of the NSO (Gutiérrez et al. 2004). Barred owls apparently compete with NSOs through a variety of mechanisms: prey overlap (Hamer et al. 2001); habitat overlap (Dunbar et al. 1991; Herter and Hicks 2000; Pearson and Livezey 2003); and agonistic encounters (Leskiw and Gutiérrez 1998; Pearson and Livezey 2003). Recent research and observations also indicate that barred owls may displace NSOs (Kelly et al. 2003) and Anthony et al. (2006) reported that barred owls had a negative effect on NSO survival in three demographic study areas in Washington.

Although the barred owl currently constitutes a significantly greater threat to the NSO than originally thought at the time of listing, it is unclear whether forest management has an effect on the outcome of interactions between barred owls and NSO (Gutiérrez et al. 2004).

Results of the January 2004 NSO demographic meta-analysis workshop indicate that across the range of NSO, populations declined at an average of approximately 3.7% per year from 1985–2003 (Anthony et al. 2006). Results from this workshop also suggest that NSO populations had higher demographic rates on federal lands than elsewhere. Populations on the demographic study areas closest to the Project Area, Oregon south Cascades and northwestern California) appear to be stable and experiencing a slight decline during the same time period, respectively (Anthony et al. 2006).

Historic timber harvest within the Project Area has likely impacted NSOs by removing habitat suitable for nesting, roosting, or foraging. Additionally, the stands that have regenerated following timber harvest typically lack the structural attributes and diversity necessary to support nesting pairs (multi-layered and multi-species canopies; large, decadent trees and snags; and large downed woody debris). Past timber harvest has also reduced the amount and recruitment of important habitat components of NSO prey such as large-diameter snags and downed woody debris.

Extant suitable NSO habitat covers about 20% of the Project Area and includes approximately 250 acres of nesting/roosting habitat and 2,500 acres of foraging habitat. Habitat estimates are based on the KNF NSO habitat layer, 2005 digital orthophoto quads, and field reconnaissance. Nesting/roosting habitat occurs in small (<25 acres), widely scattered patches. Due to the size of nesting habitat patches, the amount of edge between nesting and other habitats may be indicative of low habitat fitness potential. Foraging habitat is more widely distributed and occurs in somewhat larger blocks.

The estimated home ranges of 12 historic activity centers overlap the Project Area and have actions proposed within their boundaries. The amount and quality of habitat within the core areas and home ranges is highly variable. Existing habitat within eight of these estimated home ranges is below the level (1,336 acres) at which NSO abundance is expected to decrease and productivity is anticipated to be impaired (Table **Error! No text of specified style in document.**-1). Additionally, eight of the core areas lack large amounts or contiguous blocks of nesting and roosting habitat.

Table Error! No text of specified style in document.**-1 Acres Of Suitable Habitat Within Core Areas And Home Ranges Of NSOs Located Within 1.3 Miles Of The Mt. Ashland Habitat Restoration And Fuels Reduction Project Stands.**

Activity Center #	Name				Habitat Removed/ downgraded Home Range
		Pre-treatment Core (0–0.7mi)	Pre-treatment Home Range (0–1.3 mi)	Habitat Removed/downgraded Core (0–0.7mi)	

										(0–1.3mi)	
		NR	F	Total	NR	F	Total	NR	F	NR	F
KL1167 (SK102)	Deer Cr.	34	405	439	400	1197	1597	0	0	0	0.5
KL1169 (SK291)	N. Hungry Cr.	115	658	773	272	1834	2106	0	0	0	0.5
KL1176 (SK041)	S. Cottonwood Cr.	69	610	679	319	1499	1818	0	0	0	0
KL1178 (SK220)	Grouse Cr.	16	291	307	45	712	757	0	0.5	0	0.7
KL1180 (SK101)	Cow Cr./Long John Cr.	23	210	233	154	638	792	0	0.5	0	2.5
KL1185 (SK307)	Upper Grouse Cr.	79	209	288	85	489	574	0	0	0	0
KL1188 (SK308)	W. Branch Long John	15	122	137	26	370	396	0	0	0	4
KL1189	Long John	2	127	129	14	522	536	0	0	0	6
KL1267 (SK449)	Fly Stain Cr.	256	456	712	395	1622	2017	0	0.5	0	0.5
KL1297 (SK320)	N. Cottonwood Cr.	138	161	299	390	776	1166	0	0	0	0
KL1310 (SK501)	Lower Grouse Cr.	2	191	193	111	1129	1240	0	0.2	0	1
KL131	W. Fork Big	151	83	234	595	373	968	0	0	0	2

1 (SK529)	Red Mtn.										

The Project Area and adjacent lands have been extensively surveyed over the past five years by FS and USFWS personnel, private contractors, and private timber companies. Results of these surveys indicate that occupancy and reproductive rates are highly variable at historic sites between years but low over the five-year period. Low occupancy and reproductive rates observed over the last five years may be indicative of the amount and size of nesting habitat patches within core areas.

Most recently, the first year of two-year protocol surveys was completed for the entire Project Area in 2006. These surveys indicate that occupancy and reproductive rates were relatively high in 2006; five of the activity centers within the Project Area and two of the activity centers outside of, but adjacent to, the project were occupied and three produced young. Because reproductive rates, and to a lesser degree, site occupancy, have been shown to exhibit substantial annual variation (Loschl 2004; Olson et al. 2004; Olson et al. 2005; Anthony et al. 2006), data from one year can not be interpreted as a trend in occupancy and reproduction rates within the Project Area.

The effects of drought, overstocking of stands, and years of fire exclusion have put NSO habitat within the Project Area at an unacceptable risk of a wildfire. Because NSO habitat is limited within the Project Area, wildfires that remove habitat could impact the ability of NSO to occupy this area.

1.1.3.1 *Effects of Alternative 1 – No Action*

In the absence of large-scale natural disturbance it is unlikely that the amount of NSO habitat in the Project area will significantly change in the near future. FVS modeling indicates that 50 years from present stands will still be dense (>340 trees and 285 ft^2 basal area/acre), and dominated by trees <12.5” DBH. Thus, under the No Action Alternative, stands would require greater than 50 years to become late-successional habitat. Density related mortality is expected to continue, with between 35 to 60% of the extant trees dying within that period. Thus, surface fuels are expected to dramatically increase over time. Additionally, in the event of a fire start, FFE modeling indicates several general patterns regarding fire behavior and fire induced tree mortality over time including (1) a constant or increasing crown fire potential under both moderate and severe weather conditions, (2) an increase in surface fire intensity under both moderate and severe weather conditions, and (3) either a constantly high or increasing level of basal area mortality. Thus, the No Action Alternative increases the potential for wildfire to remove existing NSO habitat and impact recruitment of important habitat components such as large DWD for decades

1.1.3.2 *Effects of Alternatives 2, 4, and 5 – Action Alternatives*

The action alternatives would have similar effects to one another on NSOs and will be discussed together except where specifically stated otherwise.

Thinning and Fuels Reduction

Thinning designed to promote the development of late-successional stands will not remove important structural components of nesting, roosting, or foraging habitat such as large-diameter trees, snags, and DWD. A minimum of 60% canopy closure will be retained in existing nesting, roosting, or foraging habitat and 40% in dispersal habitat. Where existing stand conditions permit, >200 ft^2 basal area/acre will be retained in nesting or roosting habitat and >160 ft^2 basal area/acre will be retained in foraging habitat. Trees infected with mistletoe, which may provide nesting structure, may be removed. However, silvicultural prescriptions have been designed to ensure that this habitat component will remain on the landscape, particularly on the lower half of north and east facing slopes where probability of nesting is greatest. Fuel reduction treatments have the potential to remove snags and DWD. However, where stand conditions permit, fuel reduction prescriptions are designed to retain MLSRA recommendations for these components.

Thinning to create DFPZs has the potential to impact NSO habitat by removing large-diameter trees (>20”), snags, and DWD. To meet objectives for the Siskiyou Peak DFPZ under alternatives 2 and 4, approximately four acres of foraging habitat will be downgraded to dispersal habitat in stand 339. Stand 339 is a high elevation (6500’), ridge top, true fir stand that is exhibiting a high level of mortality. Outside of stand 339, the removal of large-diameter trees would only occur under very limited circumstances when it is necessary to meet stand density objectives or if a tree shows obvious signs of disease or poor vigor. Additionally, thinning in DFPZs will meet the canopy retention requirements for NSOs discussed above. Therefore, the number of large trees to be removed is expected to be minimal and would not change the function of any stands (i.e., stands that provide foraging habitat would continue to provide foraging habitat post harvest). Additionally, incorporating the MLSRA recommendations for snags and DWD ensures that these components will be retained. The silvicultural prescriptions also ensure that the DFPZs will not result in large canopy gaps.

Thinning and fuel reduction treatments also have the potential to impact food and cover for some NSO prey species (Colgan et al.1999; Carey 2000) by removing snags and DWD. However, prescriptions are designed to meet project S&Gs for these important components of NSO prey species habitat. Where thinning and fuel reduction treatments similar to those proposed in this project have been applied, effects to the abundance of NSO prey species and their forage have been shown to be insignificant or of short duration (Waters et al. 1994; Carey and Wilson 2001; Suzuki

and Hayes 2003; Gomez et al. 2005). Additionally, the prescriptions for thinning and fuels reduction treatments are consistent with the recommendations by Lemkuhl et al (2006a; 2006b) for maintaining habitat for northern flying squirrels and woodrats in northern interior forests while managing for fire and healthy forest ecosystems.

To ensure the distribution of NSO prey will not be significantly impacted by fuel reduction treatments, Project conservation measures limit the amount of NSO habitat that can be included within proposed underburn perimeters annually to <35% of the suitable habitat within a NSO core area and <25% of the suitable habitat within a home range. However, the area within a fire perimeter that actually burns is highly variable (Sugihara et al. 2006). Unburned areas within the fire perimeter may act as refugia for some small mammals (Lyon et al. 2000). Underburn monitoring data collected by the KNF from 1998 to 2005, indicates that an average of 31% of the area within an underburn remains unburned post treatment (USDA Forest Service 2005b). Therefore, the actual number of acres burned within an NSO core area or home range is expected to be considerably lower than 35 and 25%, respectively. Thus, effects to NSO prey species distribution are expected to be minimal.

In the long term, thinning and fuel reduction treatments are expected to have significant benefits to NSOs by increasing the amount and distribution of nesting, roosting, foraging and dispersal habitat and by reducing fuels to a level that would result in an acceptable fire behavior and post fire stand condition. FVS modeling indicates that 50 years post thinning the average tree diameter within a stand would increase to between 24 and 27” and 14 to 15 trees per acre >30” would be expected. Stands with this type of structure are typically used by NSOs for nesting and roosting (Solis and Gutierrez 1990; LaHaye and Gutierrez 1999). More large stems per acre would also increase recruitment of large snags and DWD, an important structural component of NSO habitat. Stands will also be less dense (averaging between 56 and 81 trees/acre) and will average between 216 and 257 ft^2 of basal area per acre. These basal area values are within the optimal range for NSO foraging habitat as reported by Irwin et al. (2004). FFE modeling indicates that thinning and subsequent fuels treatment will generally reduce crown fire potential and maintain a surface fire type and significantly reduce predicted stand mortality in the event of a fire start. These factors indicate that stands will be more resistant to large-scale fires but will burn with sufficient intensity to create small openings within forested habitat. This type of pattern, would create a mosaic of stands in different successional stages, and be consistent with patterns under historic fire regimes. This pattern of successional stages would likely benefit NSOs by creating horizontal diversity of habitat across the landscape.

Temporary Road and Landing Construction

No construction of temporary roads or landings is proposed in nesting or roosting habitat. Temporary road and landing construction is expected to remove between 2.5 and four acres of

foraging habitat. Foraging habitat proposed to be removed occurs in small patches (0.5 acre or less) and is dispersed across the Project Area. Because large DWD is an important component of NSO foraging habitat, all trees >24” that need to be felled for a temporary road or landing will be left on site.

Construction of temporary roads and landings will also remove between 19 and 35 acres of dispersal habitat. These acres represent approximately 0.4 to 0.5% of extant dispersal habitat in the Project Area. Patches of dispersal habitat to be removed range from 0.5–2 acres.

Road-Related Activities

Road-related activities, including maintenance, closures, and decommissioning is not expected to remove any important structural components of NSO habitat.

Effects to Individual NSOs and Historic Activity Centers

To ensure that NSOs are not directly impacted, all thinning and fuels reduction activities that modify habitat (including activities that degraded or are beneficial) within 0.25 mile of an active nest site or unsurveyed nesting/roosting habitat will be seasonally restricted from February 1st to September 15th.

Thinning and fuels reduction activities have the potential to create smoke and noise above ambient levels. To ensure that breeding NSOs are not disturbed by activities that create noise above ambient levels, a seasonal restriction of February 1st to July 9th will apply to these activities when they occur within 0.25 mile of an active nest site or unsurveyed nesting/roosting habitat. To ensure that breeding NSOs are not affected by the intrusion of smoke into their nest stand, a seasonal restriction of February 1st to July 31st will apply to activities that create smoke within 0.25 mile of an active nest site or unsurveyed nesting/roosting habitat. Dates for seasonal restrictions cover the time period from which adult owls typically initiate breeding activity to the point where juvenile owls are physically capable of moving away from such disturbances.

No nesting/roosting habitat will be removed. Foraging habitat will be removed or downgraded from six NSO home ranges that currently contain limited amounts of habitat (KL1178, KL1180, KL1188, KL1189, KL1310, KL 1311) (Table 1). However, only 0.2 to 0.5 acre of foraging habitat would be removed from any one NSO core area and between 0.5 and six acres would be removed or downgraded from any one NSO home range. These acres represent <0.1 to approximately 1.1% of the extant suitable habitat within these NSO core areas and home ranges, respectively. Additionally, the majority of impacts to foraging habitat would occur outside of the core area and breeding season home range of any NSO activity center. Also, it is unlikely that the four acres of foraging habitat to

be downgraded in stand 339, which occurs in the home ranges of KL 1188 and KL 1189, provide quality foraging habitat due to the physiographic features associated with these acres. Therefore, because patches of foraging habitat to be removed are small, foraging habitat to be downgraded likely has low intrinsic value, impacts to foraging habitat are dispersed across the Project Area, and most of the foraging habitat to be removed occurs in the outer portion of any given home range, the removal and downgrading of foraging habitat is not expected to impact foraging opportunities for NSOs in the Project Area.

Case studies examining the foraging activity of NSOs before and after thinning are limited. Meiman et al. (2003) reported that commercial thinning adjacent to an active NSO nest, resulted in the expansion of the males' home range and a shift in the core use area post harvest. However, the sample size in their study was one, and the authors note that drawing conclusions from a case study of one animal has limitations and that they were unable to apply their findings to NSOs in general. In another experimental study conducted by Irwin et al. (2006; L. Irwin pers. comm. 2006), 10 to 20% of 16 NSO core areas were thinned or partially harvested. Following treatment some owls moved their site centers away from treated stands, while other owls shifted their activity centers closer to treated units. Additionally, no changes in home range sizes that could be attributed to the treatments were detected. The equivocal results of these studies make inferences to this project difficult. However, Irwin et al. (2006) noted that the size class of trees and the amount of basal area remaining post treatment influenced habitat used by foraging owls. Because thinning and fuel reduction prescriptions for the project are designed to retain stand conditions within the optimal range used by foraging owls (160 to 250 ft^2 basal area/ acre where existing stand conditions permit, largest trees retained) impacts to patterns of habitat use by NSOs are expected to be minimal and of short duration.

In general, impacts to dispersal habitat will be dispersed; however, more concentrated effects to dispersal habitat may occur in the upper portion of the Siskiyou Gap DFPZ, particularly under alternatives 2 and 4. However, due to the patch size and percentage of dispersal habitat to be removed and the amount of existing dispersal habitat within the Project Area the removal of 19–35 acres of dispersal habitat is not expected to create any dispersal barriers for NSOs in the Project Area.

Due to the limited impact to NSO habitat and their prey, it is unlikely that the proposed thinning and fuel reduction treatments will have an effect on influencing the likelihood or outcome of barred owl and NSO interactions. The project will not remove nesting/roosting habitat and will result in insignificant changes to the amount and distribution of foraging and dispersal habitat across the landscape. Therefore, the project will have no effect on the local or regional population trends of NSOs.

The draft NSO recovery plan (USDI Fish and Wildlife Service 1992b) includes guidelines for managing NSO habitat on federal lands. In those guidelines the authors recognized that long term maintenance and distribution of NSO habitat in the more fire prone provinces may require management actions that adversely impact suitable habitat in the short term in order to improve long term conditions. Because this project is designed to promote the development of late-successional habitat, will result in a greater assurance of long-term maintenance of existing NSO habitat, and would have minimal impacts to existing habitat, the above actions, when considered together, are consistent with the draft NSO recovery plan.

1.1.3.3 *Cumulative Effects*

This cumulative effects analysis considers the effects to NSOs within the Project Area as well as the effects within the estimated 1.3 mile home range of NSOs that overlap with project treatments. The Project Area is predominately federal lands with small in-holdings of private ownership. Much of the Project Area is bounded by industrial timber lands. Prior to European settlement the majority of the Beaver Creek watershed, which includes the Project Area, was late-successional mixed conifer forest with fire created openings. During the railroad logging era (1910–1932) the Project Area was privately owned and was extensively harvested. An estimated 90% of the trees within the Project Area were removed. During this era pine was the preferred species with the largest trees on the landscape being targeted for removal. Thus, at the conclusion of the railroad logging era NSO habitat in the Project Area was limited to higher elevation true fir stands and scattered pockets of mixed conifer at lower elevations. After acquiring much of the railroad logged area in land exchanges, the KNF conducted partial cuts and clearcuts during the 1950s–1970s, further contributing to changes in distribution and abundance of NSO habitat. Similar to railroad logging, KNF partial cuts primarily targeted large trees but did not focus on pine. Timber harvest on private lands has also reduced the amount and distribution of suitable habitat for NSOs within the analysis area. For this analysis a new NSO habitat layer was created from 2005 digital orthophoto quads and field verification. Actions on private lands within the Project Area that occurred in 2005 were reviewed to identify activities that may have impacted NSO habitat after the photos were taken. All 2005 actions that impacted NSO habitat that were not captured by the photos, and all 2006 activities, were then used to revise the habitat baseline. Thus, the baseline acres of habitat discussed in this analysis include all past impacts to NSO habitat. See Table 2 for a list of private lands timber harvest that were used to revise the 2005 photos. Reasonably foreseeable future actions within the Project Area include small scale timber harvest

Table Error! No text of specified style in document.**-2 KNF and Private Land Projects Used to Update the 2005 Digital Orthophoto Quads in Creating the NSO Habitat Baseline.**

THP Name and/or Landowner	Year	Type of Action	Acres[1]	Location
Sterling (Timber Products)	2005	Timber Harvest	64	T48N; R8W; Sec 19
Caswell	2004–2005	Timber Harvest	136	T41S; R1E; Sec 18
Caswell	2004–2005	Timber Harvest	520	T41S; R1E; Sec 8
Caswell	2004–2005	Timber Harvest	24	T41S; R1W; Sec 13
Caswell	2006–2007	Roadside hazard tree removal	NA	T41S; R1E; Sec 18
Meriwether	2006	Timber Harvest	102	T40S; R1E; Sec 28
Kunkle	2005	Timber Harvest	Approx. 50 acres	T41S; R1E; Sec 17
Hungry Parrot (Fruitgrowers Supply Co.)	2006	Timber Harvest	10	T48N; R8W; Sec 25
Klamath NF (Tennis Thin)	2006–2007	Timber Harvest	175	T41S; R1E; Sections 9 and 16
Klamath NF (Colestein Project)	2006	Timber Harvest	425	T40S; R1E; Sections 34 and 35
Klamath NF	On-going	Pre-commercial thinning	unknown	unknown

[1] Data in this column represent total acres of the action not acres of NSO habitat impacted by these projects.

on private lands. Within these areas suitable habitat is not abundant and consists primarily of foraging or dispersal quality habitat. Although proposed activities would not likely remove habitat in these areas, these activities will likely degrade existing habitat. Outside of the Project Area but within the estimated 1.3 mile home range of NSOs that overlap with project treatments (herein referred to as the NSO analysis area) there are two timber harvest plans (THP) expected to be implemented in the reasonably foreseeable future (Bumblebee, and Hungry Youth). The Bumblebee THP is expected to remove approximately 25–30 acres of foraging habitat from two NSO home ranges (4 acres from KL1167 and 25 acres from KL1267). Due to the extant amount of habitat in these home ranges this action is not expected to have a significant impact to NSOs. Approximately 400 acres of the Hungry Youth THP overlaps with the NSO analysis area. These acres contain roughly equal amounts of foraging and dispersal habitat. Although silvicultural prescriptions for the

Hungry Youth THP have not yet been finalized, it is expected that approximately 25% of the THP will be in clearcut patches (Doug Staley pers. comm. 2006). Thus it is reasonable to conclude that the Hungry Youth THP would remove up to 50 acres of foraging habitat from the home range of KL1169 and up to 5 acres from the home range of KL1176. A similar amount of dispersal habitat would also be expected to be removed from these home ranges with the implementation of the hungry Youth THP. However, due to the existing amount of habitat in these home ranges these impacts are not expected to be significant. Other planned projects or activities expected to occur on federal land within the Project Area include ongoing pre-commercial thinning in existing plantations, grazing, and dispersed recreation. These activities are not expected to impact NSO habitat. See Table **Error! No text of specified style in document.-**3 for a list of reasonably foreseeable future actions used for this cumulative effects analysis.

Table Error! No text of specified style in document.**-3 Foreseeable Future Actions Considered For NSO Cumulative Effects Analyses**

THP Name and/or Landowner	Year	Type of Action	Acres[1]	Location
Caswell	unknown	Timber Harvest	unknown	T41S; R1E; Section 18
Caswell	unknown	Timber Harvest	unknown	T41S; R1E; Section 8
Caswell	unknown	Timber Harvest	unknown	T41S; R1W; Section 13
Bumblebee	2007	Timber Harvest	Approx. 100	T48N; R8W; Section 33
Hungry Youth	2009	Timber Harvest	Approx 1,000	T48N; R8W; Sections 13, 24, 25, and 30
USFS	On-going	Grazing	Project area	Area wide
USFS	On-going	Recreation	Project area	Area wide
USFS	On-going	Plantation thinning	unknown	Unknown

[1] Data in this column represent total acres of the action not acres of NSO habitat impacted by these projects.

Cumulatively, the project may impact NSOs by removing or downgrading between 61 and 63 acres of foraging habitat and 74 to 90 acres of dispersal habitat from 10 home ranges (Table 4). However, all affected home ranges will retain adequate amounts of suitable habitat post treatments.

Table Error! No text of specified style in document.**-4 Cumulative Acres Of Suitable Habitat Removed/downgraded Within Core Areas And Home Ranges Of NSOs Located Within 1.3 Miles Of The Mt. Ashland Habitat Restoration And Fuels Reduction Project Stands.**

Activity Center #	Name	Pre-treatment Core (0–0.7mi)			Pre-treatment Home Range (0–1.3 mi)			Cumulative Habitat Removed/downgraded Core (0–0.7mi)		Cumulative Habitat Removed/ downgraded Home Range (0–1.3mi)	
		NR	F	Total	F	F	Total	NR	F	NR	F
KL1167 (SK102)	Deer Cr.	34	405	439	400	1197	1597	0	0	0	4.5
KL1169 (SK291)	N. Hungry Cr.	115	658	773	272	1834	2106	0	0	0	55.5
KL1176 (SK041)	S. Cottonwood Cr.	69	610	679	319	1499	1818	0	0	0	5
KL1178 (SK220)	Grouse Cr.	16	291	307	45	712	757	0	0.5	0	0.7
KL1180 (SK101)	Cow Cr./Long John Cr.	23	210	233	154	638	792	0	0.5	0	2.5
KL1185 (SK307)	Upper Grouse Cr.	79	209	288	85	489	574	0	0	0	0
KL1188 (SK308)	W. Branch Long John	15	122	137	26	370	396	0	0	0	4
KL1189	Long John	2	127	129	14	522	536	0	0	0	6
KL1267 (SK449)	Fly Stain Cr.	256	456	712	395	1622	2017	0	0.5	0	25.5
KL1297 (SK320)	N. Cottonwood Cr.	138	161	299	390	776	1166	0	0	0	0
KL1310 (SK501)	Lower Grouse Cr.	2	191	193	111	1129	1240	0	0.2	0	1
KL1311 (SK529)	W. Fork Big Red Mtn.	151	83	234	595	373	968	0	0	0	2

Additionally, the cumulative acres of habitat removed or downgraded represent 0.8% and 1.3% of extant foraging and dispersal habitat in the NSO analysis area, respectively. Due to the limited impacts to habitat, the action alternatives will not significantly increase the cumulative effects to NSOs.

1.1.4 Bald Eagle

The bald eagle *(Haliaeetus leucocephalus)* was originally listed as Endangered because of a severe decline in numbers. This decline was primarily attributed to the use of certain organochlorine pesticides, which caused reproductive dysfunction and eggshell thinning and habitat loss (USDI Fish and Wildlife Service 1995). Eagle populations have rebounded since the banning of DDT and the increased protection for nesting and winter roosting habitat. Bald eagles have been downlisted to Threatened as a result of increased populations and are currently under review for removal from the endangered species list.

Bald eagles forage on a variety of foods based on prey species availability, with birds, fish, and mammals being the most common prey items (Swenson et al. 1986; Stalmaster and Kaiser 1998; Buehler 2000). Carrion is also an important food source especially during winter (Swenson et al. 1986; Buehler 2000). Nest sites typically occur in forests with old growth components such as very large open-limbed trees (Buehler 2000), and nest sites are usually within a mile of a large body of water (Lehman 1979; Swenson et al. 1986; Anthony and Isaacs 1989). Roost sites are associated with foraging areas but are not necessarily as close to water as nest sites (Buehler 2000). Throughout the species' range roost sites are typically in super-canopy trees (Keister and Anthony 1983; Chester et al. 1990; Buehler et al. 1991).

Bald eagles are known to roost and forage in the vicinity of the Beaver Creek and Klamath River confluence, approximately seven miles south of the Project Area. The nearest known nest site is on the Klamath River, more than nine miles southwest of the Project Area. There are no large rivers, lakes, or other bodies of water suitable for bald eagles within the action area.

1.1.4.1 *Effects of the All Alternatives*

There are no known nest sites, roost sites, rivers, or large bodies of water suitable for bald eagle foraging in the Project Area. Although large, mature trees suitable for nesting and roosting exist in the Project Area, their distance from the lower Beaver Creek and Klamath River likely precludes their use. Thus, the proposed alternatives will have no effect on bald eagles.

1.1.4.2 *Cumulative Effects*

The proposed project will have no effect on bald eagles; thus there will be no cumulative effects resulting from the proposed alternatives.

1.1.5 Peregrine Falcon

Peregrine falcons *(Falco pergrinus)* are listed as a Forest Service Region 5 Sensitive Species due to severe population declines resulting from the use of certain pesticides which caused reproductive dysfunction and eggshell thinning. Over the past 20-plus years, the population has rebounded and the bird was removed from the endangered species list in 1999.

Presently, there are 15 active peregrine falcon nesting territories being managed on the KNF. The peregrine falcon nesting territory (Indian Scotty eyrie) nearest the Project Area is approximately 30 miles to the southeast.

Prominent cliffs are the most common habitat characteristic of peregrine nesting territories. Prominent cliffs function as both nesting and perching sites, and provide unobstructed views of the surrounding landscape. Nest site suitability requires the presence of ledges that are essentially inaccessible to mammalian predators, that provide protection from the elements, and that are dry (Johnsgard 1990). A source of water, such as a river, lake, marsh, or marine waters, is typically in close proximity to the nest site and likely is associated with an adequate prey base of small to medium-sized birds (Ibid).

Foraging areas include wooded areas, riparian areas, open grasslands, shrubby areas, and along rivers. Peregrines feed primarily on avian prey (White et al. 2002) and have been recorded foraging as far as 26 miles from nesting areas (Enderson and Craig 1997).

Field review by U. S. Fish and Wildlife Service (USFWS) personnel determined that there are no large rocky cliffs or outcrops suitable for peregrine falcon nest sites within the Project Area.

1.1.5.1 *Effects of All Alternatives*

There are no known peregrine eyries in proximity to the Project Area and there is no suitable habitat for peregrine nesting. The proposed alternatives will have no effect on peregrine falcons.

1.1.5.2 *Cumulative Effects*

The proposed alternatives will have no effect on peregrine falcons; therefore, there will be no cumulative effects from the proposed alternatives combined with other actions in the analysis area.

1.1.6 Northern Goshawk

Goshawks are listed as a Forest Service Region 5 Sensitive Species due to the loss of mature conifer forest habitat in the western United States. The Forest Ecosystem Management Assessment Team (FEMAT) analysis of the NWFP gave the goshawk a 100% chance of remaining well distributed throughout the northwest (Thomas et al. 1993).

Goshawks *(Accipiter gentilis)* inhabit a wide variety of forest habitats, including true fir (red fir, white fir, and subalpine fir), mixed conifer, lodgepole pine, ponderosa pine, Jeffrey pine, montane riparian deciduous forest, and Douglas-fir (USDI Fish and Wildlife Service 1998). Goshawk nest sites tend to be associated with patches of relatively larger, denser forest than the surrounding landscape; however, home ranges often consist of a wide range of forest age classes and conditions (Ibid).

In the Pacific coastal states, Goshawks typically nest in conifers (Hargis et al. 1994; Bull and Hohmann 1993; McGrath et al. 2003). Numerous habitat studies and modeling efforts have found nest sites to be associated with similar factors including proximity to water or meadow habitat, forest openings, level terrain or ‘benches’ of gentle slope, northerly aspects, and patches of larger, denser trees, but these factors vary widely (USDI Fish and Wildlife Service 1998). Goshawks are sensitive to noise disturbances during nesting and often exhibit defensive territorial behavior around nest sites when disturbed (Squires and Reynolds 1997).

Results of radio telemetry studies on goshawks in California, and elsewhere in the west, suggest that foraging goshawks avoid dense young forest stands, brush, and clearcuts, but use a wide variety of stand conditions, showing some preference for relatively mature stands with moderate canopy closure (Austin 1993; Hargis et al. 1994; Beier and Drennan 1997; Bloxton 2002; Drennan and Beier 2003). Goshawks feed primarily on small mammals and birds. Prey is caught in air, on ground, or in vegetation, using fast, searching flight or rapid dash from a perch (Squires and Reynolds 1997).

Despite the fact that goshawks have been widely studied, very little is know regarding goshawk habitat use in the interior mixed conifer forests of the Klamath Province (B. Woodbridge pers. comm. 2006).

Within the Project Area, there exists approximately 2,700 acres of suitable nesting and foraging habitat for goshawks. Because habitat used by goshawks on the westside of the KNF appears to be similar to that used by NSOs, NSO habitat is a proxy for goshawk habitat. Due primarily to the lack of mature, late successional habitat and the overstocked character of many of the mid-successional stands, existing habitat is patchy, and/or of low quality.

The effects of drought, overstocking of stands, and years of fire exclusion have put goshawk habitat within the Project Area at risk of uncharacteristically severe wildfire. Because goshawk habitat is already limited, wildfires that remove habitat could significantly impact the ability of goshawks to occupy or colonize this area.

There are nine historic goshawk territories on the Oak Knoll Ranger District with only one (Flystain Creek) occurring within the Project Area. An active nest was first discovered at the Flystain Creek site in 1994. Since that time, protocol surveys have not been conducted in the area of this nest site. Because goshawks exhibit high territory fidelity (Reynolds and Joy 2006; B. Woodbridge, pers. comm. 2006), it is assumed that this territory is still occupied.

Surveys were conducted in 2005 and 2006 in the areas of highest quality habitat outside of the historic Flystain Creek territory with no detections. Additionally, no goshawks were detected during project field reviews or during NSO surveys (D. Johnson pers. obs.).

1.1.6.1 *Effects of Alternative 1 – No Action*

In the absence of large-scale natural disturbance it is unlikely that the amount of goshawk habitat in the Project Area will significantly change in the near future. FVS modeling indicates that goshawk habitat will be slow in developing. FFE modeling also indicates that fire behavior is expected to change in the long term, increasing the potential to remove existing and future goshawk habitat in the event of a fire start within the Project Area. Thus, the No Action Alternative does little to promote the development of goshawk habitat and increases the potential for wildfire to remove habitat in the long term.

1.1.6.2 *Effects of Alternatives 2, 4, and 5 – Action Alternatives*

The action alternatives would have similar effects to goshawks and will be discussed together.

Current management direction for northern goshawks on the KNF is provided by the KNF Forest Plan in the form of S&Gs. These S&Gs call for establishing a primary nest zone (0.5 mile radius) and a foraging habitat zone (1 mile radius) around all known goshawk nest sites. Approximately 300 acres of mature conifer forest should be maintained within the primary nest zone, and 900 acres of mid-mature and mature forest in the foraging zone. In addition, seasonal restrictions are required for habitat modification within 0.5 mile of known sites and for activities that create noise above ambient levels within 0.25 mile of known sites. No habitat is proposed to be removed from the primary nest zone or the foraging habitat zone of the historic Flystain Creek site. Outside of the Flystain Creek site, approximately four to eight acres of goshawk habitat will be removed. However, by applying

the above S&Gs to any new sites discovered during the life of this project, the proposed alternatives will have no effect to northern goshawks.

By reducing the density in overstocked stands, thinning would likely improve foraging opportunities in the near term. Nesting opportunities are also expected to improve over the long term as thinned stands develop late-successional characteristics. FFE modeling also indicates that the proposed thinning and fuel treatments would change expected fire behavior over time, resulting in fires of less intensity, thus, reducing the potential that existing and future goshawk habitat will be removed.

1.1.6.3 *Cumulative Effects*

The proposed alternatives will have no effect on northern goshawks; therefore there will be no cumulative effects from the proposed alternatives combined with other actions in the analysis area.

1.1.7 Great Gray Owls

Great gray owls *(Strix nebulosa)* (GGOs) are listed as a Forest Service Region 5 Sensitive Species due to loss of mature conifer forest habitat in the western United States. FEMATs analysis of the NWFP gave the GGO an 83% chance of remaining well distributed throughout the northwest (Thomas et al. 1993). GGOs typically nest in mature or old growth coniferous or mixed forests (Bull and Henjum 1990) but hardwood woodlands may also be used (Fetz 2003). Nest sites tend to be adjacent to openings that have sufficient prey (Goggans and Platt 1992) and typically occur in forested stands with canopy closure exceeding 60% (Bull and Henjum 1990), although local variation of canopy closure at nest sites can occur (D. Johnson pers. ob. 2005). GGOs do not build their own nests but use existing platforms such as depressions on broken-topped snags, dwarf mistletoe brooms, or old raptor or corvid nests (Bull and Henjum 1990). Owlets leave the nest before they are able to fly relying on their wings, bill, and talons to climb tree trunks and leaning trees (Bull and Henjum 1990). At approximately two weeks owlets are able to fly (Ibid).

Throughout the GGO’s range, foraging habitat typically consists of open, grassy habitat; natural meadows; open forests; and selective and clear cut forests (Bryan and Forsman 1987; Bull and Henjum 1990; Johnsgard 1988; Goggans and Platt 1992). GGO prey species consist mainly of small mammals, especially rodents. Voles and pocket gophers are primary prey species with shrews, moles, mice, flying squirrels, and chipmunks also consumed (Bull and Henjum 1990; Duncan and Hayward 1994; Fetz 2003).

GGO home range size is highly variable (1–25 square miles) and is likely dependent upon on food supply and environmental condition such as snow depth (Bull and Henjum 1990).

Population trends for GGOs are uncertain due to limited long term survey data (Duncan and Hayward 1994) and difficultly of detection (Godwin pers. comm. 2005). Most commonly seen in wet meadows of the Sierra Nevada and the Cascades, vagrant individuals have also been recorded in northwestern California and the Warner Mountains (McCaskie et. al. 1988). The KNF is on the edge of the known range of the species and is not included in the range as described in Bull and Duncan (1993). However, according to Quintana et al. (2004), GGOs have been observed during the breeding season in the California Klamath and California Cascades Physiographic Provinces, although breeding has not been confirmed in those areas.

Surveys were conducted by biologists from the Rogue River-Siskiyou National Forest on the Siskiyou Crest in the vicinity of Mt. Ashland, with no owls detected (D.Clayton, pers. comm. 2005). Although surveys did not find GGOs in the vicinity of the Project Area, GGOs are difficult to detect and negative surveys do not necessarily mean owls are not present; owls may be rare in the area and/or were not detected during the survey effort (S.Godwin, pers. comm. 2005). Additionally, not all potential GGO habitat in the Project Area was covered by these surveys. An incidental sighting of a GGO occurred in the vicinity of the Siskiyou Crest near Mt. Ashland in 2005 (C.Oakley, pers. comm. 2005), but the territorial status of that owl is not known. The closest confirmed GGO nest sites to the project occur approximately 8 miles to the west in the Applegate River drainage, and 14 miles to the northeast on the Dead Indian Plateau of southern Oregon (Godwin pers. comm. 2005).

GGO habitat within the Project Area consists of high elevation, mature true fir stands with open to moderately closed canopies. Many of these stands contain nesting platforms in the form of broken-topped trees or snags and are adjacent to naturally occurring meadows exhibiting pocket gopher and vole mounds and tunnels (D. Johnson, pers. obs. 2005). Approximately 300 acres of potential forested habitat adjacent to meadows occurs within the Project Area.

1.1.7.1 *Effects of Alternative 1 – No action*

In the absence of large-scale natural disturbance it is unlikely that the amount of GGO habitat in the Project Area will significantly change in the near future. However, FFE modeling indicates that in the event of a fire, crown fire potential and expected tree mortality will increase over time. Nesting structure will likely continue to be recruited as winter storms in the higher elevation fir stands create broken-topped trees and snags. Foraging habitat may decline in the absence of fire as conifer encroachment will continue to reduce the size and total acreage of natural meadows.

1.1.7.2 *Alternatives 2, 4, and 5 – Action Alternatives*

The action alternatives would have similar effects to GGOs and will be discussed together.

Thinning and Fuels Reduction

Thinning and fuels reduction treatments are proposed in approximately 30–45 acres of potential GGO nesting and foraging habitat. Thinning may remove individual trees that contain nesting structure. However, where existing conditions permit, three snags >25” DBH and four to five snags per acre >15” DBH will be retained. Additionally, average canopy closure will be >60% after thinning. Thus, no acres of nesting habitat are expected to be removed. By reducing stem densities in overstocked stands and reducing ladder fuels and ground cover, habitat for many GGO prey species including gophers, voles, and mice may be improved. Additionally, because GGOs prefer to forage in more open forested stands, thinning of overstocked stands may increase the amount of foraging habitat accessible to GGOs.

Although adult GGOs are highly mobile, nestlings and recently fledged owlets that are unable to fly may be susceptible to injury or mortality from thinning and fuels reduction activities during the nesting season (April through July). To avoid the possibility of injuring or killing nestlings or recently fledged owlets or disturbing adults during the breeding season, a seasonal restriction of March 1st to July 31st will apply to all thinning and fuels reduction activities that are proposed within 0.25 mile of GGO habitat.

Because no suitable habitat for GGOs will be removed, seasonal restrictions to protect nestlings and owlets and breeding activities of adults will be implemented, incorporation of MLSRA recommendations for large snags will ensure that nesting structure is retained, and the limited number of acres of suitable habitat to be entered, thinning and fuels reduction treatments will have no adverse effect to GGOs.

Temporary Road and Landing Construction

No temporary road or landing construction is proposed in GGO habitat.

Road-Related Activities

Road-related activities will not impact GGO habitat.

1.1.7.3 *Cumulative Effects*

The project will have no effect on GGOs; therefore there will be no cumulative effects from the proposed alternatives combined with other actions in the analysis area.

1.1.8 Willow Flycatcher

Willow flycatchers *(Empidonax virescens)* are listed as a Forest Service Region 5 Sensitive Species due to the loss and degradation of riparian shrub habitats throughout its range, cowbird nest parasitism, and livestock grazing.

The willow flycatcher is a rare to locally uncommon summer resident in wet meadow and montane riparian habitats at 2000–8000' in the Sierra Nevada and Cascade Range. In California, this species most often occurs in broad, open river valleys or large mountain meadows with lush, high-foliage volume willows (Harris et al. 1987; CDFG 2006). Across its range, willow flycatchers typically select willow for nesting but may use other species of shrubs (Sedgwick 2000).

Willow flycatchers have been captured at the MAPS (Monitoring Avian Productivity and Survivorship) banding station in large willow thickets at Seiad Valley along the Klamath River over the past eleven years (S. Cuenca, pers. comm. 2006). This mist-netting station is approximately 19 miles from the project. Both adults and young of the year juveniles have been captured, indicating the species breeds in the Siskiyou Mountains. Willow flycatchers have also been detected during songbird surveys in the southern portion of the Mt. Ashland LSR (S.Cuenca, pers. comm. 2006).

Within the Project Area, suitable habitat for willow flycatchers consists of small (typically <1 acre in size), isolated patches of willow and/or alder. These patches of habitat are located within riparian reserves and are scattered throughout the Project Area.

1.1.8.1 *Effects of Alternative 1 – No action*

In the absence of large-scale natural disturbance it is unlikely that the amount of willow flycatcher habitat in the Project Area will significantly change in the near future. However, FFE modeling indicates that in the event of a fire, fire would burn through many riparian areas, potentially removing riparian shrub habitat.

1.1.8.2 *Effects of Alternatives 2, 4, and 5 – Action Alternatives*

The action alternatives would have similar effects to willow flycatchers and will be discussed together.

Thinning and Fuels Reduction

Thinning and fuel reduction treatments may occur within suitable willow flycatcher habitat. However, where thinning is proposed in willow flycatcher habitat, prescriptions are limited to pre-commercial thinning of existing conifers and hand-piling of fuels. Thus, no suitable nesting habitat will be removed and no heavy machinery that has the potential to disturb habitat will be employed. Although prescribed fire will not be ignited within riparian reserves, underburns will be allowed to back into them. Thus, up to approximately 15 acres of willow flycatcher habitat may be underburned. Potential impacts include the removal of habitat or if underburning occurs in the spring, disturbing normal breeding activities. Because underburns are designed to imitate low intensity fire and shrubs such as willow and alder often become established following a disturbance (Petrides 1992), any impacts to willow flycatcher habitat are expected to be short term.

Temporary Road and Landing Construction

No temporary road or landing construction is proposed in suitable willow flycatcher habitat.

Road-Related Activities

Road decommissioning may impact small, discrete patches of habitat.

1.1.8.3 *Cumulative Effects*

Little is known about the hardwood/shrub composition and overall riparian reserve condition in the Project Area prior to Euro-American settlement. However, it is reasonable to conclude that activities such as mining, grazing, road construction, and to a lesser extent timber harvest, have all led to a considerable reduction in willow flycatcher habitat. The Project Area is predominately federal lands with small in-holdings of private ownership. KNF Forest Plan S&Gs ensure that actions on federal lands within the Project Area will have minimal impacts to riparian reserve habitat. However, ongoing grazing throughout the Project Area will likely continue to have adverse impacts to willow flycatcher habitat. Other projects or activities expected to occur within the Project Area include ongoing pre-commercial thinning in existing plantations and dispersed recreation. These actions are not expected to impact willow flycatcher habitat.

1.1.9 Wolverine

Wolverines *(Gulo luscus)* are listed as a Forest Service Region 5 Sensitive Species due primarily to naturally low population densities that have been impacted by trapping, human disturbances (roads, logging), and overgrazing in high mountain meadows.

Across their range wolverines are restricted to boreal forests, tundra, and western mountains (Banci 1994). Wolverines will roam through a variety of vegetative types including Douglas-fir, red fir, lodgepole pine, mixed conifer, subalpine conifer, dwarf shrub, and barren areas, and likely use wet meadows, montane chaparral, and montane riparian (CDFG 1990). They also can travel over extremely rugged topography (Copeland and Yates 2006). In California, wolverines are considered a scarce resident of the north coast mountains and the Sierra Nevada and have been sighted from Del Norte, Trinity, Shasta and Siskiyou Counties in the north, and south along the crest of the Sierra Nevada to Tulare County (CDFG 1990). Because wolverines are wary and elusive and sightings are rare, accurate population estimates are difficult to obtain. Observations of wolverines in California have occurred between 1,600 and 10,800' in elevation (CDFG 1990).

Wolverines have extremely large home ranges (up to 375 square miles) (Hornocker and Hash 1981) and may undertake extensive daily and seasonal movements (Inman et al. 2004; Copeland and Yates 2006). Wolverines are considered a solitary species, with adults apparently associating only during the breeding season. Recent research indicates that male home ranges may overlap (up to 30%) while female home ranges are exclusive or have very limited overlap (Krebs and Lewis 2000; Copeland and Yates 2006).

Habitat for wolverines is more likely defined by distribution and abundance of food and structures for denning and avoidance of high temperatures, humans, or human caused disturbances than specific vegetative parameters (Hornocker and Hash 1981; Weir 2004). Throughout the year wolverines use a wide variety of structural stages although mature and old forest stages may be used predominately (Weir 2004).

Wolverines use caves, hollows in cliffs, logs, rock outcrops, and burrows for cover, generally in denser forest stages (CDFG 1990). They den in caves, cliffs, hollow logs, cavities in the ground, under rocks, and may dig dens in snow or use beaver lodges (CDFG 1990; Magoun and Copeland 1998; Krebs and Lewis 2000; Weir 2004; Copeland and Yates 2006).

Studies have shown the importance of large mammal carrion, notably ungulate carrion to wolverines; and the availability of large mammals underlies the distribution, survival, and reproductive success of wolverines (Banci 1994). Deer and elk populations may be enhanced by the provision of early seral stages through logging or burning. However, these activities may exclude

wolverines from areas that ungulates still use if these habitats do not provide for the wolverine's other life needs (Banci 1994).

Numerous carnivore surveys have been conducted adjacent to the Project Area in the Rogue-Siskiyou and Klamath National Forests and on private lands in northern California in the past decade, including: over 150 baited camera stations on the Cascade Zone of the Rogue River National Forest and baited stations in the Ashland Watershed (USDA Forest Service 2005a); 12 track plate and camera stations that were periodically monitored by the KNF on the Oak Knoll and Scott River ranger districts from 1992–1996 (USDA Forest Service no date); 19 4-square-mile survey areas in the Collins-Baldy LSR in 2004 (Farber and Franklin 2005); 60 track plate stations monitored by the USFWS on the Oak Knoll and Scott River ranger districts in 2005 and 2006 (S. Yaeger, pers. comm. 2006) and 21 4-square mile survey areas in the Mt. Ashland LSR and adjacent private lands (Farber and Criss 2006). None of these efforts detected wolverines.

There have been unconfirmed sightings of wolverines on the Scott River Ranger District on Scott Bar Mountain and in the Canyon Creek watershed approximately 26 miles southwest of the Project Area. However, there are no historic records of this species in the Project Area. Due to the large home ranges used by wolverines, their ability to travel long distances over rugged terrain, the variety of habitats that they use, and the proximity of remote, rugged habitats in Wilderness areas, it is expected that wolverines may disperse into, or forage in the Project Area, either as part of individual home ranges or as individuals dispersing through the area. Based on home range sizes and limited intrasexual territoriality of the species, there is the potential that one reproductive unit (1 male and 1 or more females) overlaps with the action area.

1.1.9.1 *Effects of Alternative 1 – No action*

In the absence of large-scale natural disturbance, it is unlikely that the amount of wolverine habitat in the Project Area will significantly change in the near future. FVS modeling indicates that important structural components for denning and cover such as large-diameter DWD will be slow in developing. Additionally, FFE modeling indicates a pattern of fire behavior and fire induced tree mortality over time that would increase the likelihood that these habitat components would be removed in the event of a fire.

1.1.9.2 *Effects of Alternatives 2, 4, and 5 – Action Alternatives*

The action alternatives would have similar effects to wolverines and will be discussed together.

Thinning and Fuels Reduction

Thinning in DFPZs and fuels reduction treatments may remove individual snags or large DWD that may be used for cover or denning. However, by incorporating MLSRA recommendations for these habitat components impacts to wolverine habitat are expected to be negligible. Thinning and fuels reduction activities will employ heavy machinery and may require repeated visits to a site. Because wolverines are sensitive to human disturbance, these activities will likely prevent wolverines from using the Project Area during implementation. Thus, normal movement patterns or foraging activities may be disrupted.

Thinning is expected to have long-term benefits to wolverines by promoting the development of late-successional habitat. Additionally, FFE modeling also indicates that the proposed thinning and fuel treatments would change expected fire behavior over time, resulting in fires of less intensity. Thus, reducing the potential that existing wolverine habitat will be removed. By reducing the density of overstocked stands, thinning may also improve habitat for deer, an important prey species.

Temporary Road and Landing Construction

Temporary road and landing construction may remove individual snags or large DWD that may be used for cover or denning. At the scale of a wolverine's home range, these impacts to habitat are expected to be negligible. However, temporary road and landing construction will employ heavy machinery that will create noise above ambient levels and increase the likelihood that wolverines will avoid the area.

Road-Related Activities

Road-related activities are not expected to remove suitable habitat but will employ heavy machinery and increase the likelihood that wolverines will avoid the area.

1.1.9.3 *Cumulative Effects*

The Project Area is predominately federal lands with small in-holdings of private ownership. Prior to European settlement the majority of the Beaver Creek watershed, which includes the Project Area, was late-successional mixed conifer forest with fire created openings. During the railroad logging era (1910–1932) the Project Area was privately owned and was extensively harvested. An estimated 90% of the trees within the Project Area were removed. During this era pine was the preferred species with the largest trees on the landscape being targeted for removal. After acquiring many of the railroad logged land, partial cutting during the 1950s – 1970s by the KNF, further contributed to changes in distribution of late-successional stands. Similar to railroad logging, KNF partial cuts

primarily targeted large trees but did not focus on pine. Although the extent of impacts to wolverine habitat on the privately owned lands within the Project Area is unknown, it is expected that important components of wolverine habitat have been removed. Reasonably foreseeable future actions in the Project Area include small scale timber harvest on private lands. These activities will likely remove wolverine habitat components but are not expected to be significant. Other federal projects or activities expected to occur in the Project Area include ongoing pre-commercial thinning in existing plantations, grazing, and dispersed recreation.

By introducing a large amount of human disturbance on the landscape, these cumulative actions may preclude the use of the Project Area by wolverines.

1.1.10 Pacific Fisher

Pacific Fisher *(Martes pennanti)* is a Forest Service Region 5 Sensitive Species due to the loss and fragmentation of habitat across California, as well as the fact that they are easily trapped. FEMATs analysis of the NWFP gave the fisher a 63% chance of remaining well distributed throughout the northwest and a 37% chance that it would become locally restricted. The USFWS was petitioned to list the fisher by several environmental organizations in November 2000. After a 12-month review, the USFWS found the Pacific fisher to be a distinct population segment (DPS) and gave a "warranted but precluded" decision to the petition. As a result of that decision, the West Coast DPS has become a Federal Candidate species under the ESA (USDI Fish and Wildlife Service 2004).

Historically, fishers were distributed across North America from Hudson Bay southward to Virginia in the east and to Yellowstone and the southern Sierra Nevada in the west. By 1900, trapping and logging had led to extirpations of fishers from most of the eastern United States. Regrowth of forest, regulation of trapping, and reintroductions in New England and the northern Great Lakes states have allowed fisher to recolonize those areas (Carroll et al. 1999). Populations in the western United States, however, have continued to decline (Powell and Zielinski 1994), resulting in the apparent extirpation of fishers throughout much of their historical range in the Pacific states (Zielinski et al. 1995; Lewis and Stinson 1998; Aubry and Lewis 2003). The population in the Klamath Region, which includes the Project Area, may be the largest remaining in the western United States (Carroll et al. 1999). Fisher's typically avoid humans (Powell 1993) and as a result they are generally more common where human disturbance is limited (Powell and Zielinski 1994).

Fisher home range size is variable and likely reflects habitat quality (Zielinski et al. 2004a). Using studies from across the United States, Powell and Zielinski (1994) calculated a mean home range size of approximately 25 square miles for males and 10 square miles for females.

Habitat for fisher is typically characterized as mature, structurally complex, conifer and mixed conifer-hardwood forest (Buskirk and Powell 1994; Zielinski et al. 2006). Habitat necessary for denning, foraging, and daily resting bouts constitute the specific habitat requirements for this species (Zielinski et al. 2006). It is assumed that fishers will use patches of habitat that are connected by forested stands, but will not likely use patches of habitat that are separated by large openings or areas lacking adequate canopy cover (Buskirk and Powell 1994).

In the western United States fisher den sites are usually located in forested stands with complex structural characteristics typical of late-successional forests (Powell and Zielinski 1994). These characteristics include large trees and snags, multi layered vegetation, large woody debris, and high canopy closure. Cavities in large trees or snags are most commonly used for denning, but hollow logs may also be used (Lewis and Stinson 1998; Powell and Zielinski 1994).

Fisher diets are diverse and typically include small and medium-sized mammals, birds, carrion, reptiles, insects, and plants (Powell and Zielinski 1994; Zielinski et al. 1999; Zielinski and Duncan 2004). Because of the variability in their diet, prey can occur in a variety of forest types and seral stages (Powell and Zielinski 1994). Habitat used for foraging is more likely associated with the structural attributes that lead to abundant prey species and reduced vulnerability to predation and can be fulfilled at locations that do not have mature forest elements (Powell 1993; Truex and Zielinski 2005).

Fishers appear to be more selective of habitat for resting than foraging (Powell and Zielinski 1994). Fishers typically choose structurally diverse, closed canopy forests with the largest woody structure (both live trees and snags) available for resting bouts (Powell and Zielinski 1994; Zielinski et al. 2004b; Zielinski et al. 2006) but may rest in younger or managed stands if large remnant structures exist (Jones 1991; Yaeger 2005). Rest sites include a variety of structures including mistletoe brooms, squirrel and raptor nests, and brush piles but most commonly occur in cavities of large live and dead trees or large-diameter logs (Zielinski et al. 1994; Weir and Harestad 2003; Zielinski et al. 2004b). In more xeric areas, rest sites are typically located near drainage bottoms close to water (Zelinski et al. 2004b; Yaeger 2005). Rest sites are seldom reused, suggesting that fishers require multiple rest sites distributed throughout their home range (Zielinski et al. 2006).

Within the Project Area mature, structurally diverse stands that provide high quality denning and resting habitat are limited, but occur in the higher elevation true fir and mixed conifer and scattered pockets of mid-elevation mixed conifer stands. Within the high elevation true fir and mixed conifer there are approximately 600 acres of denning and resting habitat. The only contiguous block (>50 acres) of denning and resting habitat occurs in the extreme northeast corner of the Project Area in the true fir zone. Higher quality denning and resting habitat in the mid-elevation mixed conifer zone is distributed in small patches (typically 25 acres or less) and totals approximately 1,000 acres. Other

potential denning and resting sites occur in second growth stands where large, residual components of the original stand exist. Potential foraging habitat is more widely distributed and occurs in larger blocks.

Numerous carnivore surveys have been conducted within and adjacent to the Project Area on the KNF and on private lands in the past decade. Most recently, Farber and Criss (2006), recorded a detection of a fisher in a high elevation, mature true fir stand in the extreme northeast corner of the Project Area. Their remaining 11 camera stations located within the Project Area failed to detect fishers. Farber and Criss also detected fisher at six other camera stations approximately 3.5 to seven miles west and southwest of the Project Area. Numerous other detections of fisher have occurred within 10 to 12 miles, south and southwest of the Project Area (Farber and Franklin 2005; S. Yaeger, pers. comm. 2006).

1.1.10.1 *Effects of Alternative 1 – No Action*

Under the No Action Alternative, high-quality, structurally-complex fisher habitat would be slow in developing. FVS modeling indicates that 50 years from present stands will still be dense (>340 trees and 285 ft^2 basal area/acre), dominated by trees <12.5” DBH, and contains <9 trees per acre >30”. Although these stands would have a high canopy closure and scattered denning and rest sites, they would still not resemble the complex structural characteristics typically associated with high-quality fisher habitat. Additionally, density related mortality is expected to continue, with between 35 to 60% of the extant trees dying within that period. Thus, surface fuels are expected to dramatically increase over time. In the event of a fire start, FFE modeling indicates several general patterns regarding fire behavior and fire induced tree mortality over time including (1) a constant or increasing crown fire potential under both moderate and severe weather conditions, (2) an increase in surface fire intensity under both moderate and severe weather conditions, and (3) either a constantly high or increasing level of basal area mortality. Thus, the No Action Alternative does little to promote the development of fisher habitat and increases the potential for fire to remove existing fisher habitat.

1.1.10.2 *Effects of Alternatives 2, 4, and 5 – Action Alternatives*

The action alternatives would have similar effects to fisher and will be discussed together except where specifically stated otherwise.

Thinning and Fuels Reduction

Thinning designed to promote the development of late-successional habitat will not remove important structural components of fisher habitat such as large-diameter trees, snags, and DWD.

Trees infected with mistletoe, which may provide resting structure may be removed, but silvicultural prescriptions have been designed to ensure that this component will remain on the landscape. Thinning prescriptions are also designed to leave a minimum of 15% of each stand unthinned as well as a minimum canopy closure of 60% in existing NSO nesting, roosting, or foraging habitat. Thus, the action alternatives are not expected to significantly impact habitat connectivity for fisher. Thinning to create DFPZs may impact fisher habitat by removing large-diameter trees (>20”), snags, and DWD. The removal of large-diameter trees would only occur under limited circumstances (see chapter 2) and where consistent with DFPZ objectives large-diameter DWD will be retained. Therefore, impacts to the distribution and abundance of potential denning and rest sites are expected to be minimal. Thinning prescriptions are also designed to minimize habitat fragmentation and to ensure that the DFPZs will not result in large canopy gaps. Fuel reduction treatments have the potential to remove snags and DWD. However, prescriptions are designed to retain MLSRA recommendations for these components where stand conditions permit. Thus, fuel reduction treatments are not expected to have a significant impact to the important structural components of fisher habitat.

Thinning and fuel reduction treatments also have the potential to impact some fisher prey species by removing or reducing the availability of important habitat components. However, where thinning treatments similar to those proposed in this project have been applied, effects to small mammal species commonly found in fisher diets have been shown to be insignificant or of short duration (Carey and Wilson 2001; Suzuki and Hayes 2003). Chang’s (1996) summary of the response of small mammals to fire in the Sierra Nevada’s indicates that many species commonly found in fisher diets may be killed in large, rapid moving wildfires. However, less intense fires, such as the underburns prescribed for this project, had less detrimental effects. Because fisher’s have a diverse diet and may switch prey in response to changing density (Zielinski et al. 1999), they would likely find abundant prey in the event of a short-term reduction in some prey species following a prescribed fire.

In the long term, thinning and fuel reduction treatments are expected to have significant benefits to fisher by increasing the amount and distribution of denning and resting habitat and by reducing fuels to a level that would result in an acceptable fire behavior and post fire stand condition. FVS modeling indicates that 50 years post thinning the average tree diameter within a stand would increase to between 24 and 27” and 14 to 15 trees per acre >30” would be expected. More large stems per acre would also increase recruitment of large snags and DWD. Stands with this type of structural complexity contain the specific habitat requirements for this species. FFE modeling indicates that thinning and subsequent fuels treatment will generally reduce crown fire potential and maintain a surface fire type and significantly reduce predicted stand mortality in the event of a fire start. These factors indicate that stands will be more resistant to large-scale fires but will burn with sufficient intensity to create small openings within forested habitat. This type of pattern, would

create a mosaic of stands in different successional stages, and be consistent with patterns under historic fire regimes. This pattern of successional stages would likely benefit fisher by creating horizontal diversity of habitat across the landscape.

Temporary Road and Landing Construction

No temporary road or landing construction is proposed in high quality denning or resting habitat. Temporary road and landing construction however will remove some large trees suitable for denning or roosting and will remove between 27 and 43 acres of potential foraging habitat.

To ensure that impacts to fisher habitat are minimized, all trees >24” that need to be felled for a temporary road or landing will be left on site. Although temporary road construction will contribute to the fragmentation of fisher habitat, particularly in the upper portion of the Siskiyou Gap DFPZ under alternatives 2 and 4, openings created by temporary roads are not expected to provide barriers to fisher movements.

Road-Related Activities

Road-related activities, including maintenance, closures, and decommissioning is not expected to remove any important structural components of fisher habitat.

1.1.10.3 *Cumulative Effects*

The Project Area is predominately federal lands with small in-holdings of private ownership. Much of the Project Area is bounded by industrial timber lands. Prior to European settlement the majority of the Beaver Creek watershed, which includes the Project Area, was late-successional mixed conifer forest. During the railroad logging era (1910–1932) the Project Area was privately owned and was extensively harvested. An estimated 90% of the trees within the Project Area were removed. During this era pine was the preferred species with the largest trees on the landscape being targeted for removal. Thus, at the conclusion of the railroad logging era fisher habitat in the Project Area was limited to higher elevation true fir stands and scattered pockets of mixed conifer at lower elevations. After acquiring much of the railroad logged area in land exchanges, the KNF conducted partial cuts during the 1950s–1970s, further contributing to changes in distribution and abundance of fisher habitat. Similar to railroad logging, KNF partial cuts primarily targeted large trees but did not focus on pine. Although the extent of impacts to fisher habitat on privately owned lands within the Project Area is unknown, it is expected that important components of fisher habitat have been removed. Reasonably foreseeable future actions within the Project Area include small scale timber harvest on private lands. Although fisher denning and resting habitat is not expected to be abundant in these areas, these activities will likely continue to degrade habitat. Other federal projects or activities

expected to occur in the Project Area include ongoing pre-commercial thinning in existing plantations, grazing, and dispersed recreation. These activities are not expected to impact fisher habitat.

1.1.11 American Marten

The American marten *(Martes americana)* is listed as a Forest Service Region 5 Sensitive Species due to loss and fragmentation of habitat, and the fact that they are easily trapped. FEMATs analysis of the NWFP gave the marten a 67% chance of remaining well distributed throughout the northwest. In the Klamath Forest Plan, additional S&Gs for coarse woody debris and snags provide additional protection of habitat components for marten.

In the western United States, martens inhabit mature, late-successional stands of mesic coniferous forests and are often associated with high-elevation spruce-fir forests (Buskirk and Powell 1994; Powell et al. 2003). Complex structure near the forest floor such as low hanging limbs, logs, stumps, and/or squirrel middens are important to martens because they provide subnivean access to prey, cover from predators, and thermoregulation (Buskirk 1984; Buskirk and Powell 1994; Buskirk and Ruggerio 1994; Powell et al. 2003). Large-diameter logs, snags, or live trees are important structures for denning and resting sites (Buskirk 1984; Buskirk et al. 1989; Ruggiero et al. 1998). A low and closed canopy has also been shown to be an important habitat component for martens (Koehler and Hornocker 1977; Hargis and McCullough 1984).

Based on specimens of marten taken at known localities in California, Grinnell et al. (1937; cited in Kucera et al. 1995) concluded that “two well-marked races occur within the State [of California]”. The Humboldt marten, *M. americana humboldtensis,* occurs in the coastal redwood zone and the Sierra Nevada marten, *M. a. sierrae,* occurs from Trinity and Siskiyou counties east to Mt. Shasta and south through the Sierra Nevada. There is only one known population of Humboldt marten on the coast which occupies <5% of its historical range (Slauson et al. 2001, Slauson et al. 2003). Based on range maps in Powell et al. (2003) the Project Area is outside of the range for both races.

Between 1989 and 1997 extensive surveys for American martens occurred through northern California and southern Oregon (see Kucera et al. 1995 and Zielinski et al. 1998). Results of these surveys indicate that martens appear to occupy much of their historic range although gaps in their distribution are evident. Locally, these survey efforts detected martens in eastern Siskiyou County approximately 35 miles southeast of the Project Area; however, no martens were detected in western Siskiyou County.

Within and immediately adjacent to the Project Area, numerous carnivore surveys have been conducted over the past decade. These include 12 track plate and camera stations that were

periodically monitored by the KNF on the Oak Knoll and Scott River Ranger Districts from 1992 to 1996 (USDA Forest Service no date); 19 baited camera stations in the Collins-Baldy LSR in 2004 (Farber and Franklin 2005); 60 track plate stations monitored by the USFWS on the Oak Knoll and Scott River Ranger Districts in 2005 and 2006 (S. Yaeger, pers. comm. 2006) and 21 baited camera stations in the Mt. Ashland LSR and adjacent private lands (Farber and Criss, 2006). These combined survey efforts resulted in only a single marten detection in 2005 (S. Yaeger, pers. comm.) approximately 28 miles southwest of the Project Area. It is not known if this animal is associated with a population within the Marble Mountain Wilderness or if it is a dispersing individual from the coastal population.

Within the Project Area potential habitat for martens is restricted to the higher elevation, mature true fir stands.

1.1.11.1 *Effects of Alternative 1 – No action*

In the absence of large-scale natural disturbance it is unlikely that the amount of marten habitat in the Project Area will significantly change in the near future. However, FFE modeling indicates that in the event of a fire, crown fire potential and expected mortality in true fir stands within the Project Area will increase over time. Thus, important habitat components such as large-diameter trees, snags, and DWD and complex structure near the forest floor would likely be removed.

1.1.11.2 *Effects of Alternatives 2, 4, and 5 – Action Alternatives*

The action alternatives would have similar effects to martens and will be discussed together except where specifically stated otherwise.

Thinning and Fuels Reduction Treatments

Thinning and fuels reduction treatments are proposed in approximately 25–35 acres of potential marten denning and resting habitat. Thinning designed to promote the development of late-successional habitat will not remove important structural components of marten habitat such as large-diameter trees, snags, and DWD. Additionally, 60% canopy cover will be retained in true fir stands. Under alternatives 2 and 4, approximately five acres to be treated occur in a DFPZ. Thus, it is expected that important components of marten habitat such as large DWD and complex structure near the forest floor will be removed. Fuel reduction treatments also have the potential to remove components of marten habitat. Although, prescriptions have been designed to meet MLSRA recommendations for DWD, underburning would likely remove other important structure near the forest floor.

In the long term, thinning treatments are expected to benefit marten by increasing the amount and distribution of denning and resting habitat as well as provide complex structure near the forest floor. FVS modeling indicates that 50 years post thinning the average tree diameter within a stand would increase to between 24 and 27” and 14 to 15 trees per acre >30” would be expected. More large stems per acre would also increase recruitment of large snags and DWD. Stands exhibiting these characteristics provide the habitat components needed for denning, resting, and subnivean access. FFE modeling also indicates that thinning and subsequent fuels treatment will generally reduce crown fire potential and maintain a surface fire type and significantly reduce predicted stand mortality in the event of a fire start. These factors indicate that stands providing habitat for marten will be more resistant to large-scale fires.

Temporary Road and Landing Construction

No temporary road or landing construction is proposed in marten habitat.

Road-Related Activities

Road-related activities are not expected to impact marten habitat.

1.1.11.3 *Cumulative Effects*

Because true fir was not a sought after species, the railroad logging era had little impact to marten habitat. Although the actual amount removed since that time is unknown, timber harvest has likely impacted potential marten habitat within the Project Area. Timber harvest on private and Bureau of Land Management lands likely removed marten habitat from the north central portion of the Project Area (Section 30 of Township 40S; Range 1E). Currently this section is virtually absent marten habitat. Similarly, the amount of potential marten habitat that was removed during timber harvest on approximately 25 acres of private lands in Section 26 of Township 40S; Range 1W is unknown. However, that parcel currently provides no marten habitat. Other planned projects or activities expected to occur on federal land within the Project Area include ongoing pre-commercial thinning in existing plantations, grazing, and dispersed recreation. These activities are not expected to impact marten habitat. Due to the limited impacts to marten habitat, the action alternatives will not significantly augment the cumulative impacts to marten.

1.1.12 Pallid Bat

Pallid bats *(Antrozous pallidus)* are listed as a Forest Service Region 5 Sensitive Species because of the increasing use of caves by humans. Pallid bats are very sensitive to disturbance at their maternity

and hibernating roost sites. It is important that these sites remain undisturbed because these sites are essential for metabolic economy and juvenile growth (CDFG 1990).

Pallid bats are known to occur across the Pacific Northwest. Pallid bats will use a variety of habitats, including grasslands, shrublands, woodlands, and mixed conifer but are most common in open, dry habitats with rocky areas for roosting (CDFG 1990; Cross 1996). Suitable habitat for day roosts includes rock crevices, tree hollows, mines, caves and a variety of human-made structures (Vaughn and O'Shea 1976; CDFG 1990; Cross 1996) while night roosts are typically more open and include open buildings, porches, mines, caves, and under bridges (Lewis 1994; Szewczak et al. 1998; Cross 1996). Pallid bats forage in the air as well as on the ground and prey on items including crickets, beetles, grasshoppers, and some small vertebrates (Csuti et al. 1997).

Suitable roost sites for pallid bats in the form of large trees and snags are scattered throughout the Project Area. Other structures including buildings and bridges also occur within the Project Area. Although surveys have not been conducted within the Project Area, pallid bats have been captured <10 miles away (see USDA Forest Service 2005a). Because suitable roost sites are fairly common and the verified presence adjacent to the Project Area, it is reasonable to conclude that pallid bats are present within the Project Area.

1.1.12.1 *Effects of All Alternatives*

See discussion of Effects under Townsend's Big-eared Bat starting on page 46.

1.1.13 Townsend's Big-eared Bat

Townsend's big-eared bats *(Plecotus townsendii)* are listed as a Forest Service Region 5 Sensitive Species due to a steep decline in numbers and its high sensitivity to human disturbance at roost sites.

Townsend's big-eared bats occur throughout the western United States. In California, the species utilizes a wide variety of habitats and can be found from sea level up to 10,000' (Pierson and Fellers 1998; Szewczak et al. 1998). Distribution of this species is strongly correlated with the availability of caves and cave-like roosting habitat although the species also makes use of man-made structures such as abandoned buildings, water diversion tunnels, and bridges (Maser 1998; Pierson and Fellers 1998; Fellers and Pierson 2002). Large-diameter trees have also been shown to be used for roosting in California coastal forests (Fellers and Pierson 2002; Mazurak 2004). Foraging associations include edge habitats along streams and areas adjacent to and within a variety of wooded habitats (Fellers and Pierson 2002). The Townsend's bat is a moth specialist, with over 90% of its diet composed of lepidopterans (Sherwin 1998).

Townsend's big-eared bats are extremely sensitive to disturbance at roost sites (Humphrey and Kuntz 1976) and may abandon a roost site following a single disturbance (CDFG 1990).

There are no caves or open mines within the Project Area. However, suitable roost sites for Townsend's big-eared bats in the form of large-diameter trees are scattered throughout the Project Area and other structures including buildings and bridges are also present. Thus, it is reasonable to assume that Townsend's big-eared bats are present in the Project Area.

1.1.13.1 *Effects of Alternative 1 – No action*

In the absence of large-scale natural disturbance it is unlikely that the amount of pallid and Townsend's big-eared bat habitat in the Project Area will significantly change in the near future. FVS modeling indicates that 50 years from present stands will have more large trees per acre suitable for roosting but this habitat component will still not be abundant. FFE modeling indicates that fire intensity and resulting tree mortality will increase over time. Although fire may produce roost sites by creating tree hollows, high intensity fire has the potential to remove existing sites.

1.1.13.2 *Effects of Alternatives 2, 4, and 5 – Action Alternatives*

The action alternatives would have similar effects to pallid and Townsend's big-eared bats and will be discussed together.

Thinning and Fuels Reduction

Thinning in DFPZs and fuels reduction treatments may remove individual large trees or snags that may be used for roosting. By meeting MLSRA recommendations for snags and because the removal of large trees would only occur under limited circumstances, impacts to roosting habitat are expected to be minimal. However, the action alternatives propose activities within and adjacent to potential roosting habitat. Because these species are sensitive to disturbance at roost sites, these actions would likely have an effect on roosting behavior if bats are present.

Thinning is expected to have long-term benefits for pallid and Townsend's big-eared bats by promoting the development of large-diameter trees which may provide suitable roosting sites. Additionally, FFE modeling also indicates that the proposed thinning and fuel treatments would change expected fire behavior over time, resulting in fires of less intensity, thus, reducing the potential that existing habitat will be removed.

Temporary Road and Landing Construction

Temporary road and landing construction may remove individual large trees that may be used as roost sites. Additionally, these activities may occur adjacent to possible roost sites, increasing the potential to disrupt roosting behavior.

Road-Related Activities

Road-related activities are not expected to remove suitable habitat but may occur adjacent to potential roost sites.

1.1.13.3 *Cumulative Effects*

Past timber activities in the Project Area has impacted pallid and Townsend's big-eared bats by removing potential roost sites, although large-diameter trees remain scattered throughout. Additionally, the construction of roads has likely affected these bats by increasing the potential for human disturbance at roost sites. Reasonably foreseeable future actions in the Project Area include small scale timber harvest on private lands. These activities may remove individual large trees and snags and increase the potential to disturb roost sites, but due to the scale of these projects they are not expected to be significant. Other federal projects planned in the Project Area include ongoing pre-commercial thinning in existing plantations, grazing, and dispersed recreation. While pre-commercial thinning will not remove habitat, this activity along with recreational activities have the potential to disturb roost sites.

1.1.14 Northwestern Pond Turtle

In the Pacific Northwest the distribution of western pond turtles (*Clemmys marmorata*) is disjunct but includes southern Oregon and northern California (CDFG 1988; Brown et al. 1995). The northwestern pond turtle *(Clemmys marmorata marmorata)*, which is recognized as a subspecies of the western pond turtle (Stebbins 2003) is found only in northern California (Ashton et al. 1997). Western pond turtles are listed as a Forest Service Region 5 Sensitive Species because of declining populations, population fragmentation, habitat alteration and loss, pollution, and illegal collection.

Western pond turtles are a highly aquatic species that can be found in ponds, lakes, streams, rivers, marshes, and irrigation ditches that have a muddy or rocky bottom and abundant vegetation (Stebbins 2003). They generally require emergent basking sites (Nussbaum et al. 1983) which are important for thermoregulation and growth (Koper and Brooks 2000; Grayson and Dorcas 2004). They feed on aquatic plants, insects, worms, fish, amphibian eggs and larvae, crayfish, and carrion (Stebbins 2003).

Western pond turtles use terrestrial habitat for nesting and sometimes for overwintering. Females lay their eggs in soil and have been recorded nesting up to 300’ from water (Holland 1994). Reese and Welsh (1997) reported that individuals moved an average of approximately 600’ from water to their overwintering sites. Western pond turtles have also been reported to hibernate in mud.

Potential habitat for northwestern pond turtles is restricted to a 0.5 acre holding pond and its adjacent forest in the southern portion of the Project Area.

1.1.14.1 *Effects of Alternative 1 – No action*

In the absence of large-scale natural disturbance, particularly a flood event, it is unlikely that the amount of northwestern pond turtle habitat would change.

1.1.14.2 *Effects of Alternatives 2, 4, and 5 – Action Alternatives*

The action alternatives would have similar effects to northwestern pond turtles and will be discussed together.

Thinning and Fuels Reduction

Thinning and fuels reduction treatments will have no effect on aquatic northwestern pond turtle habitat. By promoting the development of large-diameter trees and recruitment of large DWD, the action alternatives would likely increase the recruitment of potential basking sites into existing habitat. However, the approximately 12 acres of thinning and fuels reduction treatments proposed within 600’ of the holding pond, have the potential to kill or injure overwintering or nesting turtles.

Temporary Road and Landing Construction

No temporary roads or landings are proposed adjacent to the holding pond.

Road-Related Activities

No road-related activities are proposed adjacent to the holding pond.

1.1.14.3 *Cumulative Effects*

Past logging activities that occurred adjacent to the holding pond may have killed or injured individual turtles. It is likely that past logging activities have also reduced the recruitment of basking sites into the holding pond by reducing the recruitment of DWD. Reasonably foreseeable future actions expected to occur adjacent to the holding pond include grazing. This activity is not expected to impact northwestern pond turtles.

1.1.15 Foothill Yellow-legged Frog

Foothill yellow-legged frogs *(Rana boylii)* are listed as a Forest Service Region 5 Sensitive Species because of declining populations. Many of the same reasons for decline listed for the western pond turtle also apply to this frog.

The range of the foothill yellow-legged frog extends from west-central Oregon to southern California (Stebbins 2003). This species is almost always found near water and are most common in streams with a rocky or gravelly substrate (Nussbaum et al. 1983: Stebbins 2003). Breeding takes place in shallow, slow moving water (Fuller and Lind 1992; Leonard et al. 1993). Streams occupied by foothill yellow-legged frogs are located in a variety of habitats, including valley-foothill hardwood, valley-foothill hardwood-conifer, valley-foothill riparian, ponderosa pine, mixed conifer, coastal scrub, mixed chaparral, and wet meadow types (CDFG 1988; Blaustein et al. 1995). Adults eat aquatic and terrestrial invertebrates while tadpoles forage on algae (Nussbaum et al. 1983).

In-stream environments within the Project Area are characterized by steep gradients and fast currents. There are no shallow, low gradient waters suitable for foothill yellow-legged frog's reproduction.

1.1.15.1 *Effects of the Proposed Alternatives*

There are no shallow, low-gradient waters suitable for yellow-legged frog breeding. Therefore, the action alternatives will have no effect on foothill yellow-legged frogs.

1.1.15.2 *Cumulative Effects*

The action alternatives will have no effect on foothill yellow-legged frogs; therefore, there will be no cumulative effects from the proposed alternatives combined with other actions in the Project Area.

1.1.16 Cascade Frog

Cascade frogs *(Rana cascadae)* are listed as a Forest Service Region 5 Sensitive Species because of declining populations. Many of the same reasons for decline listed for the western pond turtle also apply to this frog.

Cascade frogs range from northern Washington to north-central California (Stebbins 2003) and have been confirmed to occur approximately 25 miles southwest of the Project Area (Welsh and Pope 2004).

Cascade frogs are closely associated with water and are found in mountain lakes, small streams, and ponds and their surrounding vegetation (Stebbins 2003). Most common in small pools of streams flowing through subalpine meadows or in aquatic environments in open coniferous forests (Leonard et al. 1993; Stebbins 2003). Eggs are attached to vegetation in shallow water of stream pools, lake margins, and ponds (CDFG 1988; Leonard et al. 1993). This species hibernates in the mud on the bottom of lakes and ponds during winter (Briggs 1987).

It is found in areas lacking predatory fish, as fish (including salmonids) predate these frogs. Nesting generally occurs in water sources that can have many un-shaded hours of daylight and standing water is required for reproduction. Developing egg masses are affected by UV radiation (CDFG 1988; Nussbaum et al. 1983).

Suitable habitat for Cascades frogs within the Project Area consists of one 0.5 acre pond. This pond provides potential breeding and hibernating habitat. Streams within the Project Area are characterized by steep gradients and fast currents and do not provide breeding and hibernating habitat.

1.1.16.1 *Effects of Alternative 1 – No action*

In the absence of large-scale natural disturbance it is unlikely that the amount of Cascade Frog habitat would change. FFE modeling indicates that surface fire intensity and resulting tree mortality will increase over time, thus, increasing the likelihood that shading of existing Cascaded frog habitat will be reduced.

1.1.16.2 *Effects of Alternatives 2, 4, and 5 – Action Alternatives*

The action alternatives would have similar effects to Cascade frogs and will be discussed together.

Thinning and Fuels Reduction

Project design features and the KNF Forest Plan include a 150 buffer around the holding pond in which only pre-commercial thinning may occur. Thus, thinning activities are not expected to affect the amount of shade over the holding pond. Although prescribed fires will not be set within this buffer, underburns may be allowed to back into this area. However, these types of underburns are not expected to have a significant impact on overstory trees and pond shading. Thinning and fuels treatments will not have any direct effects to the pond and thus will not impact Cascade Frog breeding or hibernating habitat. FFE modeling also indicates a change in fire behavior over time that would decrease the likelihood that shading of Cascade frog habitat would be impacted.

Temporary Road and Landing Construction

No temporary roads or landings are proposed adjacent to the holding pond.

Road-Related Activities

No road-related activities are proposed adjacent to the holding pond.

1.1.16.3 *Cumulative Effects*

The action alternatives will have no effect on Cascades frogs; therefore, there will be no cumulative effects from the proposed alternatives combined with other actions in the Project Area.

1.1.17 Blue-gray Taildropper

Blue-gray taildroppers *(Prophysaon coeruleum)* are listed as Forest Service Region 5 Sensitive Species due to a small number of known sites.

The blue-gray taildropper ranges from southern Washington to northern California (Duncan et al. 2003). In 1999 and 2000, about 100 randomly-selected, 10-acre plots were surveyed for terrestrial mollusks on the KNF. These surveys discovered eleven and eight sites on the Goosenest and Happy Camp Ranger Districts, respectively.

The blue-gray taildropper is a forest-dwelling slug. Typical habitat for this species includes moist, usually late-successional forests, or second growth forests with late-successional attributes, often with a hardwood component (Burke et al. 2000). The blue-gray taildropper normally comes to surface during moist conditions and is otherwise thought to be subterranean. Its habitat has been described as, “sites with relatively higher shade and moisture levels than those of the general forest

habitat" (Duncan et al. 2003). It is usually associated with partially decayed logs, leaf and needle litter (especially hardwood leaf litter), mosses and moist plant communities such a big-leaf maple and sword fern associations (Burke et al. 2000; Duncan et al. 2003).

Potential habitat for the blue-gray taildropper does exist within the Project Area. However, the likelihood that this species occurs in the Project Area is small for the following reasons: (1) potential habitat is patchy and not widely distributed; (2) the lack of hardwoods; (3) the predominantly xeric conditions; and (4) the lack of known sites, Protocol, pre-disturbance surveys for mollusks were conducted for the Beaver Creek and the Uptown projects, approximately one to seven miles south and two to seven miles southwest of the project, respectively. These surveys covered approximately 3,700 acres with no detections of blue-gray taildroppers (USDA Forest Service no date).

1.1.17.1 *Effects of Alternative 1 – No action*

In the absence of large-scale natural disturbance it is unlikely that the amount of blue-gray taildropper habitat would change in the near future. However, FFE modeling indicates several general patterns regarding fire behavior and fire induced tree mortality over time including (1) a constant or increasing crown fire potential under both moderate and severe weather conditions, (2) an increase in surface fire intensity under both moderate and severe weather conditions, and (3) either a constantly high or increasing level of basal area mortality. Because this species is associated with moist sites containing high levels of shade, these patterns could potentially result in a significant loss of blue-gray taildropper habitat.

1.1.17.2 *Effects of Alternatives 2, 4, and 5 – Action Alternatives*

The action alternatives would have similar effects to blue-gray taildroppers and will be discussed together.

Thinning and Fuels Reduction

Thinning and fuels reduction treatments are proposed in suitable blue-gray taildropper habitat. However, project conservation measures for treatments within and adjacent to known sites ensure that >60 canopy cover, large DWD, and sufficient forest floor litter is retained within and adjacent to known sites. Thus impacts to specific habitat components and stand microclimates are expected to be insignificant. Additionally, FFE modeling indicates a change in fire behavior over time following thinning and fuels treatments that would decrease the likelihood of fire having significant impacts to blue-gray taildropper habitat. Over time, thinning is expected to have beneficial effects on blue-gray taildroppers by promoting the development of structurally complex, late-successional forests.

Temporary Road and Landing Construction

Approximately 0.2 mile of temporary road construction is proposed in potential blue-gray taildropper habitat. If surveys indicate that this habitat is occupied, road segments will be dropped or realigned to avoid impacts to habitat. Thus, temporary road construction will have no impact to blue-gray taildropper habitat. No landings are proposed in potential blue-gray taildropper habitat.

Because blue-gray taildroppers inhabit moist forests and their dispersal capabilities are expected to be limited (see Burke et al. 2000), temporary spur roads have the potential to isolate populated sites. However, because all temporary spur roads will be decommissioned, impacts to blue-gray taildropper population contiguity are only expected to occur in the short term until favorable habitat conditions become reestablished on decommissioned roads.

Road-Related Activities

Road-related activities are not expected to impact blue-gray taildropper habitat.

1.1.17.3 *Cumulative Effects*

Past timber harvest and road construction has likely removed or degraded the quality of blue-gray taildropper habitat and created some barriers to dispersal. Because reasonably foreseeable future actions in the Project area are not expected to significantly alter the microclimate of stands typically occupied by this species and do not include road construction, these actions are not expected to impact blue-gray taildroppers.

1.1.18 Tehama Chaparral

Tehama chaparral *(Trilobopsis tehamana)* snails are listed as Forest Service Region 5 Sensitive Species due to a small number of known sites.

The Tehama chaparral snails range is very limited; currently only known from 11 sites in Northern California (8 sites in Siskiyou County, 1 in Tehama County, 1 in Shasta County, and 1 in Butte County). Known locations on the KNF include areas along the Shasta River on the Scott River Ranger District.

Habitat for the Tehama chaparral includes shaded talus and rock piles (Weasma 1999a). When environmental conditions are favorable, individuals may range from their refugia and can be found under leaf litter and other debris in adjacent forested habitat (Ibid). Although not well understood, it is expected that Tehama chaparral snails are slow to disperse (Ibid). On the KNF, the occurrence of

rock as a dominant surface and subsurface feature is common to all known sites (USDA Forest Service 2003).

Within the Project Area suitable habitat for the Tehama chaparral snail is limited to isolated patches of shaded talus. Due to the predominately xeric conditions and the lack of known sites adjacent to the Project Area (protocol, pre-disturbance surveys for mollusks were conducted for the Beaver Creek and the Uptown projects approximately one to seven miles south and two to seven miles southwest of the project, respectively with no detections of Tehama chaparral snails) (USDA Forest Service no date) the likelihood that the species is present within the Project Area is small.

1.1.18.1 *Effects of Alternative 1 – No action*

In the absence of large-scale natural disturbance it is unlikely that the amount of Tehama chaparral habitat would change in the near future. However, FFE modeling indicates several general patterns regarding fire behavior and fire induced tree mortality over time including (1) a constant or increasing crown fire potential under both moderate and severe weather conditions, (2) an increase in surface fire intensity under both moderate and severe weather conditions, and (3) either a constantly high or increasing level of basal area mortality. These patterns have the potential to impact Tehama chaparral habitat by reducing shading of talus.

1.1.18.2 *Effects of Alternatives 2, 4, and 5 – Action Alternatives*

The action alternatives would have similar effects to Tehama chaparral snails and will be discussed together.

Thinning and Fuels Reduction

Thinning and fuels reduction treatments are proposed in potential Tehama chaparral habitat. However, project conservation measures for these treatments ensure that >60 canopy closure existing of the larger mature trees, large DWD, and sufficient forest floor litter is retained within and adjacent to known sites. Additionally, no heavy equipment will be used on talus slopes. Thus, impacts to specific habitat components and stand microclimates are expected to be insignificant. Additionally, FFE modeling indicates a change in fire behavior over time following thinning and fuels treatments that would decrease the likelihood of fire having significant impacts to the microclimates of stands within and surrounding talus slopes.

Temporary Road and Landing Construction

Approximately 0.1 mile of temporary road construction is proposed in potential Tehama chaparral habitat. If surveys indicate that this habitat is occupied, road segments will be dropped or realigned to avoid impacts to habitat. Thus, temporary road construction will have no impact to Tehama chaparral habitat. No landings are proposed in potential Tehama chaparral habitat.

Because Tehama chaparral snails can not tolerate xeric conditions and are slow to disperse, construction of temporary roads has the potential to restrict movements and isolate populations. However, because all temporary spur roads will be decommissioned, these impacts are only expected to occur in the short term until favorable habitat conditions become reestablished on decommissioned roads.

Road-Related Activities

Road-related activities are not expected to impact Tehama chaparral habitat.

1.1.18.3 *Cumulative Effects*

Past timber harvest and road construction has likely removed or degraded the quality of Tehama chaparral habitat and created some barriers to dispersal. Because reasonably foreseeable future actions in the Project area are not expected to impact riparian habitat, appreciably alter the microclimate within talus slopes, and do not include road construction, these actions are not expected to adversely effect Tehama chaparral snails.

1.1.19 Siskiyou Mountains Salamander

The range of the Siskiyou mountains salamander *(Plethodon stormi)* (SMS) is limited to portions of three counties in southwestern Oregon and northern California (Clayton and Nauman 2005). The Project Area is outside of the currently known range of the species but is within the SMS survey and manage survey zone (Clayton et al. 1999). The closest known SMS site is approximately 7.5 miles northwest of the Project Area on the north side of the Siskiyou Crest.

Siskiyou Mountain salamanders are found on forested slopes where rocky soils and talus outcrops occur. Occupied habitat for the species ranges from small, isolated rock outcrops to entire hillsides (Clayton et al. 2004). Although an association with closed canopy forests on north facing slopes has been reported (Nussbaum 1974; Ollivier et al. 2001), the species can be found in stands containing a more open canopy and all slope aspects (Farber et al. 2001; Clayton et al. 2004; CDFG 2005).

Siskiyou Mountain salamanders are lungless salamanders that require moisture in order to respire through their skin and avoid desiccation (Nussbaum et al. 1983). These traits limit the time the species can be active at the surface where they forage (Nussbaum et al. 1983; Feder 1983). Surface conditions favorable for foraging are therefore limited to brief periods when soil moisture and relative humidity are high and temperatures are moderate (Feder 1983; Nussbaum et al. 1983; Clayton et al. 1999).

Dispersal and movement of SMSs is expected to be very limited. Nussbaum (1974) reported that Siskiyou Mountains salamanders complete their life cycle in an area less than 2.5 acres. Additionally, a study by Welsh and Lind (1992) of the closely related Del Norte salamander (*Plethodon elongates*), found that 66 percent of the males and 80 percent of the females were recaptured within the same 7.5m^2 (80ft^2) study plot over a six month period and the maximum distance traveled was 36.2 meters (118 feet).

Habitat for SMSs in the Project Area is limited to isolated pockets of shaded talus. Surveys for this species adjacent to the Project Area failed to detect the presence SMS (protocol, pre-disturbance surveys for SMS were conducted on approximately 100 acres for the Beaver Creek and the Uptown projects approximately one to seven miles south and two to seven miles southwest of the project, respectively). Thus the likelihood that SMS are present in the Project Area is low. However, because surveys for the beaver Creek and Uptown projects were not designed to determine the absence of the species (Clayton et al. 1999), new sites continue to be found, and habitat for the species exists, the presence of SMS in the Project Area can not be ruled out.

Because the physiology of SMSs limits them to moist, cool environments, events or actions that dramatically disrupt the microclimate of an occupied site are considered to be the major threat to the species.

1.1.19.1 *Effects of Alternative 1 – No action*

In the absence of large-scale natural disturbance it is unlikely that the amount of SMS habitat would change in the near future. However, FFE modeling indicates general patterns of fire behavior over time that include an increase in surface fire intensity and constantly high or increasing tree mortality. These patterns have the potential to impact SMS habitat by reducing shading of talus and altering microclimates within occupied stands.

1.1.19.2 *Effects of Alternatives 2, 4, and 5 – Action Alternatives*

The action alternatives would have similar effects to SMS and will be discussed together.

Thinning and Fuels Reduction

Thinning and fuels reduction treatments are proposed in potential SMS habitat. Because SMSs are NWFP survey and manage species, survey and manage S&Gs for this species have been incorporated into the project. Thus, potential SMS habitat will be surveyed or buffered by one site potential tree. Within this buffer, no overstory trees will be removed and no disturbance of talus or rock substrate will occur. Additionally, no heavy equipment will be used on talus slopes regardless of survey results. Thus, impacts to specific habitat components and microclimates within potential habitat are expected to be minimal. FFE modeling also indicates a change in fire behavior over time following thinning and fuels treatments that would reduce the likelihood of fire having significant impacts to microclimates within and adjacent to talus slopes.

Temporary Road and Landing Construction

Approximately 200 feet of temporary road construction is proposed in potential SMS habitat. If surveys indicate that this habitat is occupied, road segments will be dropped or realigned to avoid impacts to habitat. Thus, temporary road construction will have no impact to SMS habitat. No landings are proposed in potential SMS habitat.

Forest roads have been shown to be partial barriers to movement for some Plethodontid salamanders (Marsh et al. 2004). However, all occupied SMS sites will be buffered by one site potential tree (150 to 175 feet), within which, no temporary road construction would occur. Additionally, all temporary roads will be decommisioned (closed, recountoured and/or restoring natural slope, revegetated, etc.) after use. Due to the SMSs limited dispersal capabilities, few individuals would likely disperse as far as any of the temporary spur roads prior to these roads being decommissioned. Thus, temporary spur roads are not expected to appreciably impair SMS movements across the landscape.

Road-Related Activities

Road-related activities are not expected to impact SMS habitat.

Cumulative Effects

The action alternatives will have no effect on SMS habitat; therefore, there will be no cumulative effects from the proposed alternatives combined with other actions in the Project Area.

1.1.20 Northwest Forest Plan Survey and Manage Species

1.1.20.1 *Siskiyou Sideband*

The Siskiyou sideband *(Monadenia chaceana)* is a land snail that ranges form southwestern Oregon (Douglas County) to west-central California. Habitat alteration that affects the microclimate at occupied sites or dispersal routes are considered to be the major threats to the species.

Habitat for the Siskiyou sideband includes late-successional forest and rocky slopes or talus, particularly the lower third of talus slopes where environmental conditions are more stable (Weasma 1999b). When environmental conditions are favorable, this species will also utilize adjacent forested habitat and may be found under litter on the forest floor (Ibid). Although not well understood, it is expected that this species is slow to disperse (Ibid).

Within the Project Area, suitable habitat for the Siskiyou sideband is limited to isolated patches of talus and late-successional forest. Due to the limited amount of talus habitat, the predominately xeric conditions, and the lack of known sites adjacent to the Project Area (protocol, pre-disturbance surveys for mollusks were conducted for the Beaver Creek and the Uptown projects approximately one to seven miles south and two to seven miles southwest of the project, respectively with no of Siskiyou sidebands) (USDA Forest Service no date) the likelihood that the species is present within the Project Area is small.

1.1.20.2 *Effects of Alternative 1 – No action*

In the absence of large-scale natural disturbance it is unlikely that the amount of Siskiyou sideband habitat would change in the near future. However, FFE modeling indicates general patterns of fire behavior over time that include an increase in surface fire intensity and constantly high or increasing tree mortality. These patterns have the potential to impact Siskiyou sideband snail's habitat by reducing shading of talus and altering microclimates within occupied stands.

1.1.20.3 *Effects of Alternatives 2, 4, and 5 – Action Alternatives*

The action alternatives would have similar effects to Siskiyou sideband snails and will be discussed together.

Thinning and Fuels Reduction

Thinning and fuels reduction treatments are proposed in potential Siskiyou sideband habitat. However, project conservation measures for these treatments ensure that >60 canopy closure existing of the larger mature trees, large DWD, and sufficient forest floor litter is retained within and adjacent to known sites. Additionally, no heavy equipment will be used on talus slopes. Thus, impacts to specific habitat components and stand microclimates are expected to be insignificant. FFE modeling also indicates a change in fire behavior over time following thinning and fuels treatments that would reduce the likelihood of fire having significant impacts to microclimates within late-successional stands and stands within and adjacent to talus slopes.

Temporary Road and Landing Construction

Approximately 0.3 mile of temporary road construction is proposed in potential Siskiyou sideband habitat. If surveys indicate that this habitat is occupied, road segments will be dropped or realigned to avoid impacts to habitat. Thus, temporary road construction will have no impact to Siskiyou sideband habitat. No landings are proposed in potential Siskiyou sideband habitat.

Because this species has specific habitat requirements and are slow to disperse, construction of temporary roads has the potential to restrict movements and isolate Siskiyou sideband populations. However, because all temporary spur roads will be decommissioned, these impacts are only expected to occur in the short term until favorable habitat conditions become reestablished on decommissioned roads.

Road-Related Activities

Road-related activities are not expected to impact Siskiyou sideband habitat.

1.1.20.4 *Cumulative Effects*

Past timber harvest and road construction has likely removed or degraded the quality of Siskiyou sideband habitat and created some barriers to dispersal. Because reasonably foreseeable future actions in the Project area are not expected to significantly alter the microclimate within late-successional stands or talus slopes, and do not include road construction, these actions are not expected to impact Siskiyou sideband snails.

1.1.20.5 *Siskiyou Mountains Salamander (Plethodon stormi)*

See sensitive species account.

1.1.20.6 *Blue-gray Taildropper (Prophysaon coeruleum)*

See sensitive species account.

1.1.20.7 *Tehama Chaparral (Trilobopsis tehamana)*

See sensitive species account.

Great Gray Owl (Strix nebulosa)

See sensitive species account.

Oregon Red Tree Vole (Arborimus longicaudus)

Outside of known range.

1.1.21 Klamath National Forest Management Indicator Species

1.1.21.1 *River/Stream Species Association*

The effects for the River/Stream Species Association are discussed collectively at the end of the 4 species descriptions starting on page 62.

Tailed frog

In the Pacific Northwest tailed frogs *(Ascaphus truei)* range from the Cascades to the coast from southwest British Columbia to northwestern California (Leonard et al. 1993).

Tailed frogs frequent clear, cold, rocky streams in humid forests (Stebbins 2003). Important habitat components include large stones, cobbles, and stable boulders in the streambed and riffle and cascade microclimates. These components provide cover and protection from predators for adults and larvae and also provide attachment sites for eggs (Welsh and Lind 2002; Stebbins 2003). Some quieter side pools are also needed, so that eggs and hatchlings won't be washed away. The streams must contain water year round, since tailed frog tadpoles need to stay in the water for a long growth period. Tailed frogs are mostly aquatic, but adults may emerge during cool, wet conditions to forage on land (Stebbins 2003).

Tailed frog abundance also appears to be positively correlated with annual rainfall (Welsh and Lind 2002). Bury (1968) reported most populations in California occur in areas that receive >40” of rain annually.

Potential habitat for tailed frogs within the Project Area occurs in narrow fast moving headwaters of perennial streams (an estimated 35.8 miles). General stream surveys conducted in Grouse Creek in 2005 failed to detect tailed frogs (B.Thomas, pers. comm. 2006). Additionally, the Project Area receives approximately 30” of rain annually in its lower elevations and approximately 75” of precipitation at their highest elevations in the form of snow. Surveys and prevailing climate suggest that the likelihood of tailed frogs being present within the Project Area is low.

Sedimentation and increased stream temperatures are considered to be the major threat to the species.

American Dipper

American dippers *(Cinclus mexicanus)* are associated with fast-moving, clear, unpolluted streams with cascades, riffles, and waterfalls (Kingery 1996). Streams selected for breeding rarely exceed 15 meters in width or 2 meters in depth (Ibid). Important habitat elements include rock, sand and rubble within the stream; instream or streamside boulders for perching; and overhanging ledges, and crevices for nesting. Rocks, fallen trees, and driftwood provide cover for escape from predators and serve as refuges for molting. Fallen logs and tree roots are sometimes used for nesting and roosting. Streamside habitat per se is not important, as suitable streams may flow through prairie, sagebrush, urban areas, or barren ground (Ibid).

Streams containing suitable habitat for American dippers occurs throughout the Project Area. Potential habitat exists along 43.5 miles of Beaver, Deer, Cow, Grouse, Long John, and West Branch Long John creeks.

Events or actions that increase stream temperature, silting, and flows (increase or decrease) pose the major threats to the species.

Northern Water Shrew

Northern water shrews *(Sorex palustris)* range through mountainous areas of central and eastern Oregon and northern and central California. Water shrews are closely associated with streams, marshes, lakes, and ponds (Csuti et al. 1997). They may also be found in riparian or other wet areas with thick vegetation and in coniferous forests immediately adjacent to riparian areas (CDFG 1990; Csuti et al. 1997). This species uses logs, streamside vegetation, and rocky stream bottoms for cover

(CDFG 1990). Nests very close to water in moss or other soft material in protected bank or hollow or decaying log (Conaway 1952; Maser 1998).

Streams containing suitable habitat for northern water shrews occurs throughout the Project Area. Other potential habitat includes a 0.5 acre holding pond.

Events or actions that impact riparian habitat and/or insteam habitat components pose the major threat to this species.

Long-tailed Vole

Long-tailed voles *(Microtus longicaudus)* range throughout much of Oregon and the northern coast, Cascades, and Sierra Nevada Mountains of California. These voles are common in montane riparian vegetation and forests with herbaceous understories (CDFG 1990: Csuit et al. 1997). They may also be found in marshes, wet meadows, and grasslands (Ibid). Nests of plant fibers are constructed in burrows in soft soil (CDFG 1990). Long-tailed voles seek cover in dense herbaceous vegetation or shrubs (Ibid). Long-tailed voles forage on grasses, forbs, and seeds as well as roots and bark in winter (Csuti et al. 1997).

Suitable habitat for long-tailed voles is scattered throughout the Project Area but is most predominate in the upper tributaries of Long John and Grouse Creeks.

Events or actions that impact riparian habitat and/or the herbaceous understory of forests pose the major threat to this species.

Cascade Frogs

See sensitive species section.

Effects of Alternative 1 – No action

In the absence of large-scale natural disturbance it is unlikely that the amount or quality of habitat for these river/stream associated species would change in the near future. However, FFE modeling indicates general patterns of fire behavior over time that include an increase in surface fire intensity and constantly high or increasing tree mortality. Following high intensity fire, surface erosion is expected to occur and the potential for landslides increases. These processes would contribute sediment to streams potentially impacting turbidity and stream substrate. High intensity fire also has the potential to remove riparian vegetation and structure such as downed logs. A reduction in riparian vegetation has the potential to increase stream temperatures. The extent of these impacts is dependent upon fire intensity and size.

Effects of Alternatives 2, 4, and 5 – Action Alternatives

The action alternatives would have similar effects to river/stream associated species and will be discussed together.

Thinning and Fuels Reduction

KNF Forest Plan S&G and Project design featuers for thinning and fuels reduction in riparian reserves are designed to ensure that riparian reserves are intact and functioning post treatment and that existing stream shading is not reduced. Additionally, only trees <9” DBH will be felled within 150’ of a stream. Although the turbidity in some streams may elevate slightly during initial storm events following treatments in riparian reserves, these impacts are not expected to be significant. The retention of functioning riparian reserve buffers around streams will also minimize the probability of any mobilized sediment originating from stands outside of riparian reserves from reaching the stream channel.

Underburning in riparian reserves may remove herbaceous vegetation, shrubs, and downed woody debris. However, because prescriptions for underburns in riparian reserves are designed to imitate low intensity fire, impacts to these habitat elements are expected to be minimal or short term.

Thinning and fuel reduction treatments will have no effect on the holding pond.

Thus, impacts to important components of tailed frogs, American dipper, northern water shrew, and long-tailed vole habitat, such as stream turbidity, temperature, and substrate; riparian vegetation; and downed woody debris adjacent to streams are expected to be negligible.

Temporary Road and Landing Construction

Under proposed alternatives 2 and 5, two temporary roads are proposed in riparian reserves. KNF BMPs ensure that direct impacts to individual tailed frogs and in-stream habitat and from this activity will be minimal. See fisheries environmental consequences report for a complete description of dewatering and diversion of stream flow procedures. The construction of temporary roads in riparian reserves would remove <1 acre of riparian habitat. The remaining temporary roads and landing construction will occur outside of riparian reserves, and thus, will have negligible impacts to stream water quality.

Road-Related Activities

Road-related activities, including water drafting and road decommissioning, have the potential to directly kill or injure tailed frogs or impact habitat for the other river/stream associated species.

Culvert removal during road decommissioning would be subject to the same KNF BMPs as temporary road construction in riparian reserves. Thus, this activity will have minimal impacts to in-stream habitat components and stream quality. Road decommissioning could remove up to 1 acre of riparian habitat. There are five potential water drafting sites identified within the Project Area. All drafting equipment will be screened and water drafting will not reduce naturally occurring flow by more than 10%. Thus, direct impacts to tailed frogs and impacts to stream water quality are expected to be negligible.

Cumulative Effects

Streams within the Project Area have been and continue to be subject to natural erosion. Although the exact extent is unknown, activities such as mining, railroad construction, rail road logging, and road construction, have likely resulted in significant disturbance of tailed frog and American dipper habitat.

Within the Project Area, there are approximately 550 acres of private land which contain approximately 3.5 miles of potential river/stream associated species habitat. Reasonably foreseeable future actions on these private lands include small scale timber harvest around 1.5 miles of stream that provide potential habitat. Theses actions have the potential to increase sedimentation into these streams, possibly impacting stream quality. However, these timber harvest activities only include partial cuts, which will limit erosion impacts. Although the exact amount is unknown, private land timber harvest will likely remove some streamside habitat components, degrading habitat quality. Other federal projects or activities expected to occur within the Project Area include pre-commercial thinning, grazing, and dispersed recreation. On-going pre-commercial thinning in plantations is not expected to impact tailed frog and American dipper habitat because these actions are not likely to affect the function of riparian reserve buffers. Historically, intensive grazing within the Project Area impacted riparian vegetation and increased erosion which likely impacted water quality. Although grazing still occurs within the Project Area, the reduced level of current grazing has allowed some of the riparian areas to recover from past grazing related impacts. The current level of grazing is believed to result in only minor erosion impacts. Recreation is not expected to impact the river/stream species associates.

Cumulative effects to river/stream associated habitat are expected to be minimal because functioning riparian reserves will buffer sediment delivery to streams, thinning and fuels treatments will not reduce existing stream shading, and Project design features and KNF BMPs will ensure that activities within riparian reserves will have minimal impacts. Additionally, at the scale of the Project Area, the amount of riparian habitat that may be removed or degraded on both federal and private lands is expected to be insignificant.

1.1.21.2 *Marsh/Lake/Pond Species Association*

Northern red-legged frog

The red-legged frog (Rana aurora) ranges from southwest British Columbia through western Washington, Oregon, and California (Stebbins 2003). The distribution of the northern red-legged frog *(Rana aurora aurora)*, which is recognized as a subspecies of R. aurora, includes the northern portion of the species range from northern California through British Columbia.

This species is mainly associated with ponds but also can be found in marshes, bogs, lakes, and slow moving streams especially where dense riparian cover exists (Leonard et al. 1993; Stebbins 2003). Eggs masses are attached to stems of emergent vegetation or submerged branches (Leonard et al. 1993). Outside of the breeding season red-legged frogs are highly terrestrial and may disperse into damp forests or meadows when environmental conditions are favorable (Leonard et al. 1993; Stebbins 2003).

Habitat for northern red-legged frogs is limited to a 0.5 acre holding pond. Streams within the Project Area are characterized by steep gradients and fast currents and do not provide suitable habitat.

Events or actions that impact riparian habitat or emergent vegetation pose the major threat to this species.

Effects of Alternative 1 – No action

In the absence of large-scale natural disturbance it is unlikely that the amount of northern red-legged frog habitat would change. FFE modeling indicates that surface fire intensity and resulting tree mortality will increase over time. Following a stand replacing fire, stream flows would likely increase following storms, thus, increasing the likelihood of a flood event. Thus, the No Action Alternative does little to protect the long term sustainability of the limited northern red-legged frog habitat in the Project Area.

Effects of Alternatives 2, 4, and 5 – Action Alternatives

The action alternatives would have similar effects to northern red-legged frogs and will be discussed together.

Thinning and Fuels Reduction

Thinning and fuels treatments will not have any direct effects to the pond and thus will not impact breeding habitat. However, thinning and fuels reduction treatments that occur adjacent to the pond

have the potential to kill or injure individuals. The likelihood of frogs being killed or injured during thinning operations is expected to low as approximately only 2 acres are proposed to be thinned within 150’ of the pond. Although no fires are proposed to be ignited within the riparian reserve surrounding the pond, underburns will be allowed to back into this reserve. These underburns are designed to imitate low intensity fire, thus impacts to red-legged frogs are expected to be minimal.

Temporary Road and Landing Construction

No temporary roads or landings are proposed adjacent to the holding pond.

Road-Related Activities

No road-related activities are proposed adjacent to the holding pond.

Cumulative Effects

Since the holding pond was constructed in the early 1990s, there have not been any natural events or federal or private actions that have had a significant impact to the pond or adjacent habitat. Privately owned lands exist approximately 500’ south of the pond but no reasonably foreseeable future actions are planned. Other reasonably foreseeable future actions on private lands occur >0.5 mile from the pond and are not expected to have any impacts to the pond environment. Other reasonably federal actions or activities in the Project Area include pre-commercial thinning in plantations and grazing. These actions are not expected to impact northern red-legged frog habitat.

Northwestern Pond Turtle

See Sensitive species account.

1.1.21.3 *Snag Species Association*

The effects for the Snag Species Association are discussed collectively at the end of the species descriptions starting on page 70. There will be no effects to downy woodpecker as its habitat does not occur within the Project Area.

Pileated woodpecker

Pileated woodpeckers *(Dryocopus pileatus)* are a wide ranging species occurring throughout the eastern United States, southern Canada, and the west coast to northern California (Bull and Jackson 1995). Throughout its range pileated woodpeckers are associated with mature forests (Ibid).

In Oregon, nest sites are usually located in mature, closed canopy forests and the nest tree is typically a large-diameter snag (Bull 1987; Mellen et al. 1992; Bull and Holthausen 1993). Similarly, roost sites are typically in hollow trees or cavities in large-diameter live or dead trees in closed canopy forests (Bull et al. 1992). Aubry and Raley (2002) reported that pileated woodpeckers in western Oregon were selecting nest and roost sites with a higher density of decadent large tress and snags. Individual woodpeckers typically use several roost sites (Bull et al. 1992; Aubry and Raley 2002).

Pileated woodpeckers forage primarily on ants and woodboring beetles (Bull and Jackson 1995). Downed logs have been shown to be an important substrate for forest dwelling ants (Torgersen and Bull 1995) and are often frequented by foraging woodpeckers (Manaan 1984; Bull and Holthausen 1993; Boleyn 1997). Pileated woodpeckers typically forage in large-diameter live and dead trees, logs, and stumps (Bull and Jackson 1995; Boleyn 1997).

Large, contiguous blocks of habitat suitable for pileated woodpeckers is limited to the northeast portion of the Project Area. Habitat in the remainder of the Project Area consists of small or isolated patches.

Events or actions that remove large-diameter trees and/or snags pose the major threat to this species.

Hairy Woodpecker

Hairy woodpeckers *(Picoides villosus)* are a wide ranging species occurring throughout much of the United States and Canada. This species occupies both coniferous- and deciduous-forest habitat, with habitat preferences varying geographically (Jackson et al. 2002). In the western portion of the species range they are often found in mature forests (Roberson 1993 as cited in Jackson et al. 2002, Jackson et al. 2002).

The selection of nest sites by hairy woodpeckers is opportunistic in that trees of adequate size and decay are essential (Jackson et al. 2002). In California, hairy woodpeckers typically excavate nest cavities in large-diameter snags (Raphael and White 1984; Roberson 1993 as cited in Jackson et al. 2002). Studies from the western United States and Canada suggest that aspen is selected by hairy woodpeckers for nesting (Li and Martin 1991; Martin et al. 2004) although other species will be used (Raphael and White 1984). Hairy woodpeckers forage for anthropods on the surface and subsurface of woody material. They forage in both live and dead trees and downed logs (Raphael and White 1984; Morrison and White 1987; Weikel and Hayes 1999). Weikel and Hayes (1999) reported that hairy woodpeckers in western Oregon tended to select the largest diameter trees and downed logs available for foraging.

Large, contiguous blocks of habitat suitable for hairy woodpeckers is limited to the northeast portion of the Project Area. Habitat in the remainder of the Project Area consists of small or isolated patches.

Events and actions that fragment forested habitat pose the major threats to this species.

Red-breasted sapsucker

The Red-breasted sapsucker's *(Sphyrapicus ruber)* range encompasses the west coast of the United States and Canada. This species occurs in a variety of coniferous species forests, deciduous forests, and riparian habitat (Walters et al. 2002).

In Oregon and California red-breasted sapsuckers have been shown to nest in Douglas fir, white fire, red fir-lodgepole pine- aspen forests, riparian areas, and hardwoods (Raphael and White 1984; Manaan et al. 1980). Nest cavities are typically excavated in dead trees or dead portions of live trees (Raphael and White 1984; Joy 2000).

Most foraging occurs on live trees but red-breasted sapsuckers will forage on snags, logs, and the ground (Raphael and White 1984). Sap wells used for foraging have been found in a variety of tree species including Douglas fir and white fire (see Walters et al. 2002).

Habitat suitable for nesting and foraging for red-breasted sapsuckers is widely distributed through the Project Area.

Events or actions that remove snags pose the major threat to this species.

Vaux's Swift

The breeding range of Vaux's swift *(Chaetura vauxi)* extends along the west coast from central Canada to central California. It occupies late-seral coniferous and mixed forests and is most common in old-growth forests (Bull and Hohmann 1993; Sterling and Paton 1996).

Vaux's swifts typically nest in old-growth forests with high canopy closure (Bull and Cooper 1991). Nests are made of twigs and are attached to the inside of a hollow tree or chimney (Bull and Collins 1993). In northeastern Oregon Vaux's swifts nest in large-diameter trees whose heartwood cores are decayed and hollowed out by fungus (Bull and Cooper 1991). Large-diameter hollow trees are also used by roosting swifts (Bull 1991).

Vaux's swifts are entirely insectivourous. They typically forage over mature forest but have also been observed foraging above water and grasslands (Bull and Collins 1993).

Large, contiguous blocks of old-growth forest are limited to the northeast portion of the Project Area. The remainder of the Project Area contains only small or isolated patches of habitat suitable for Vaux's swifts.

Events or actions that remove large-diameter trees and snags suitable for nesting and roosting pose the major threats to this species.

Black-backed Woodpecker

The black-backed woodpecker's *(Picoides arctus)* breeding range extends from central Alaska and northern Canada to montane areas of California (Dixon and Saab 2000). Despite its wide distribution the species is mostly confined to burned coniferous forests (Dixon and Saab 2000) but may be found in unburned forests if adequate forage is present (Bull et al. 1986; Goggans et al. 1988). Black-backed woodpeckers are an irruptive species that often forages opportunistically on outbreaks of wood boring beetles following fires (Goggans 1988; Murphy and Lenhausen 1998).

Black-backed woodpeckers typically inhabit boreal or montane coniferous forests with tree species composition of habitat varying geographically (Dixon and Saab 2000). In central Oregon, Goggans (1988) reported black-backed woodpeckers predominately occurred in lodgepole pine and lodgepole pine dominated mixed conifer forests.

Black-backed woodpeckers have been reported to nest in a variety of tree species including ponderosa pine, lodgepole pine, western larch, and aspen (Dixon and Saab 2000). Nests are more frequently located in dead trees although live trees are also used (Bull et al. 1986; Hoffman 1997). Unlike many other woodpeckers of the Pacific Northwest this species often nests in small diameter trees (Bull et al. 1986; Hoffman 1997).

Foraging occurs on a variety of both live and dead coniferous species (Raphael and White 1984; Bull et al. 1986; Goggans et al. 1988). Species and condition of tree appear to be less important for foraging than abundance of prey species.

Potential habitat for black-backed woodpeckers is widely distributed across the Project Area but is dependent upon the presence of woodboring beetles.

Actions that eliminate fire or salvage dead and dying trees pose the greatest threats to this species.

White-headed woodpecker

The white headed woodpeckers *(Picoides albolarvatus)* range is restricted to the montane coniferous forests of western North America from south-central British Columbia to southern California (Garret et al. 1996). This species is typically associated with forests dominated by mature ponderosa pines and reaches its greatest abundance where two or more pine species are present (Ibid). In California, white-headed woodpeckers have also been reported to nest in fir stands (Raphael and White 1984; Milne and Hejl 1989).

White-headed woodpeckers will nest in a variety of tree species including ponderosa pine, Jefferey pine, lodgepole pine, Douglas-fir, red fir, aspen, and Salix species (Milne and Hejl 1989; Buchanan et al. 2003). Nests typically occur in large-diameter snags although live trees and logs may also be used (Raphael and White 1984; Milne and Hejl 1989; Dixon 1995; Buchanan et al. 2003).

Foraging involves extracting seeds from conifer cones and gleaning insects from trunks of live trees and snags, typically pine and fir (Dixon 1995; Garret et al. 1996). Large-diameter trees and snags are typically used for gleaning insects (Ibid).

White-headed woodpeckers most frequently roost in cavities but will also roost behind peeling bark and fissures in tree trunks (Dixon 1995; Garret et al. 1996). Roost site are typically located in large-diameter live trees and snags.

Potential habitat for white-headed woodpeckers is limited to the mature mixed conifer and true fir stands in the northeastern and northcentral portions of the project. Within the Project Area, mature pine is limited to small (usually less than ten trees), isolated patches not expected to support white-headed woodpeckers.

Actions or events that remove large-diameter trees and snags suitable for nesting and roosting pose the greatest threat to the species.

Downy woodpecker

Habitat for downy woodpeckers *(Picoides pubescens)* does not occur within the Project Area.

Effects of Alternative 1 – No action

Under the No Action Alternative, mature stands exhibiting large-diameter trees, snags, and DWD would be slow in developing. In the event of a fire start within the Project Area, FFE modeling indicates several general patterns regarding fire behavior and fire induced tree mortality over time including (1) a constant or increasing crown fire potential under both moderate and severe weather

conditions, (2) an increase in surface fire intensity under both moderate and severe weather conditions, and (3) either a constantly high or increasing level of basal area mortality. These patterns may have some benefit to snag associated species by creating nesting and roosting structure and by increasing foraging opportunities in the short term. However, uncharacteristic wildfire has the potential to remove existing habitat components such as large snags and DWD, to impact recruitment of these components over the long term, and to significantly reduce or create large gaps in the canopy. The actual extent of these effects, whether beneficial or adverse, is dependent upon fire intensity and size. FFE modeling suggests that fire behavior over time would likely result in long term impacts that would exceed short term benefits for the snag associated species.

Effects of Alternatives 2, 4, and 5 – Action Alternatives

The action alternatives would have similar effects to snag associated species and will be discussed together except where specifically stated otherwise.

Thinning and Fuels Reduction

Thinning designed to promote the development of late-successional habitat will not remove important structural components of snag associated species such as large-diameter trees, snags, and DWD. Thinning prescriptions are also designed to leave a minimum of 15% of each stand unthinned as well as a minimum canopy closure of 60% in existing NSO nesting, roosting, or foraging habitat. Thus, canopy cover, an important element of pileated woodpecker and Vaux's swift habitat, is not expected to be significantly impacted within potential habitat for these species. Thinning to create DFPZs may impact snag associated species habitat by removing large-diameter trees (>20"), snags, and DWD. The removal of large-diameter trees would only occur under limited circumstances (see chapter 2) and where consistent with DFPZ objectives large-diameter DWD will be retained. Therefore, impacts to the distribution and abundance of potential these habitat components are expected to be minimal. Fuel reduction treatments also have the potential to remove snags and DWD. However, prescriptions are designed to imitate low intensity fire and are designed to retain MLSRA recommendations for these components. Thus, fuel reduction treatments are not expected to have a significant impact to important structural components of snag associated species habitat.

Over time, thinning and fuel reduction treatments are expected to have significant benefits to snag associated species by increasing the amount and distribution of important habitat components. FVS modeling indicates that 50 years post treatment trees >30" DBH would increase from 1 to 3 per acre to 14 to 15 per acre. FFE modeling also indicates that thinning and subsequent fuels treatment will generally reduce crown fire potential or maintain a surface fire type and significantly reduce predicted stand mortality in the event of a fire start. These factors indicate that stands will be more resistant to large-scale fires but will still burn with sufficient intensity to create snags and small openings within forested habitat. Thus, these fire behavior patterns have the potential to create

important structural components for snag associated species without significantly reducing existing components.

Temporary Road and Landing Construction

Temporary road or landing construction will remove some large trees and snags suitable for nesting and roosting. However, roads have been aligned and landing sites identified to minimize impacts to these habitat components. Thus, at the scale of the project, these impacts are expected to be minimal.

Road-Related Activities

Road-related activities, including maintenance, closures, and decommissioning is not expected to remove any important structural components of snag associated species habitat.

Cumulative Effects

Prior to European settlement the majority of the Beaver Creek watershed, which includes the Project Area, was late-successional mixed conifer forest. Thus it is reasonable to conclude that habitat for snag associated species was abundant. During the railroad logging era (1910–1932) the Project Area was privately owned and was extensively harvested. An estimated 90% of the trees within the Project Area were removed. During this era pine was the preferred species with the largest trees on the landscape being targeted for removal. Thus, at the conclusion of the railroad logging era snag associated species habitat in the Project Area was limited to higher elevation true fir stands and scattered pockets of mixed conifer at lower elevations. After acquiring much of the railroad logged area in land exchanges, the KNF conducted partial cuts during the 1950s–1970s, further contributing to changes in distribution and abundance of potential habitat. Similar to railroad logging, KNF partial cuts primarily targeted large trees but did not focus on pine. Timber harvest on private lands has also reduced the amount and distribution of habitat for snag associated species. Although the amount of habitat on private lands within the Project Area is unknown, large trees and snags do not appear to be abundant. Reasonably foreseeable future actions in the Project Area include small scale timber harvest on private lands. These activities may remove individual large trees and snags, but due to the scale of these projects, impacts to these components are not expected to be significant. Other federal projects or activities expected to occur within Project Area include ongoing pre-commercial thinning in existing plantations, grazing, and dispersed recreation. These activities are not expected to impact snag associated species habitat.

1.1.21.4 *Grassland/Shrub-Steppe Species Association*

There is no habitat for pronghorn (*Antilocarpa Americana*), montane vole (*Microtus montanus*), loggerhead shrike (*Lanius ludovicianus*), Swainson's hawk (*Buteo swainsoni*), sage thrasher (*Oreoscoptes montanus*), and burrowing owls (*Athene cunicularia*) in the Project Area.

1.1.21.5 *Mature Ponderosa Pine Species Association*

There is no habitat for white-headed woodpeckers (*Picoides albolarvatus*), flammulated owls (*Otus flammeolus*), or pinyon jay (*Gymnorhinus cyanocephalius*) in the Project Area.

1.1.22 Big Game

Effects are discussed collectively for all big game species at the end of the species descriptions starting on page 74.

1.1.22.1 *Black Bear*

In Oregon and California black bears *(Ursus americanus)* typically inhabit mixed deciduous-coniferous forests with dense understories but will forage in a variety of habitats within a forest mosaic (CDFG 1990; Csuit et al. 1997). Black bears have a seasonal variation in diet, consuming grass and forbs in early spring, insects and fruits in summer, and acorns, nuts, and fruits in the fall. Over-wintering dens include downed logs, caves, and holes dug in the ground but are most commonly constructed at the base of a hollow tree (Maser 1998).

1.1.22.2 *Elk*

Elk *(Cervus elaphus)* are primarily found in semi-open mature, confer, deciduous or mixed forests habitats (CDFG 1990: Csuti et al. 1997). Mature stands with dense brush understory are used for escape and thermal cover. Primarily grazers, preferring a diet of grasses and forbs, they will browse on trees and other woody vegetation in winter (Csuti et al. 1997). In winter elk move to lower elevations to avoid deep snow (Maser 1998).

1.1.22.3 *Mule Deer*

Mule deer (*Odocoileus hemionus*) typically inhabit open forests and brushy areas at the edges of forests and chaparral thickets but may also be found in old-growth coniferous forests (Csuti et al. 1997; Maser 1998). They graze and browse eating a variety of forbs, grasses, lichens, and tips of

woody vegetation. Brushy area and tree thickets are important for cover and thermoregulation (CDFG 1990). In winter, mule deer move downslope to areas receiving less annual snowfall (Ibid).

1.1.22.4 *Wild Turkey*

In Oregon, wild turkeys *(Meleagris gallapova)* inhabit open woodlands and riparian areas and are most often found in oak or mixed oak-conifer woodlands with grassy openings (Csuti et al. 1997). They eat a variety of foods including seeds, nuts, grains, buds, green leaves, and occasionally invertebrates (Eaton 1992). Turkeys nest on ground at base of vegetation (Ibid). Roosting sites typically occur in mature multi layered stands that provide protection from prevailing winds (Mackey 1984; Lutz and Crawford 1987).

1.1.22.5 *Effects of Alternative 1 – No action*

In the absence of large-scale natural disturbance it is unlikely that the amount or quality of habitat for big game would change significantly in the near future. In the event of a fire start in the Project Area, FFE modeling indicates general patterns of fire behavior over time that include an increase in surface fire intensity and constantly high or increasing tree mortality. These types of fire could potentially improve big game habitat by reducing conifer encroachment in naturally occurring meadows, reducing density in overstocked stands, and stimulating the development of understory vegetation. Potential adverse effects would include a short term loss of escape and thermal cover and a loss of denning, roosting, and nesting habitat. The actual extent of these effects, whether beneficial or adverse, is dependent upon fire intensity and size.

Thinning and Fuels Reduction

Thinning and underburning would likely improve habitat quality for big game by reducing stem density in overstocked stands. However, project design features for canopy cover retention will likely limit the ability of shrub and grass species to occupy these stands. Exceptions may be on the upper portions of south and west facing slopes where thinning prescriptions will retain less canopy cover. Therefore, the overall benefits to big game from thinning are expected to be limited in scope.

Temporary Road and Landing Construction

Temporary road or landing construction may remove some potential denning structure for black bears. Temporary road construction may also remove 0.5 acre of riparian habitat that may provide for foraging and cover. However, at the scale of the Project Area these impacts are expected to be insignificant.

Numerous studies have indicated that roads can have a negative effect on big game habitat use patterns, movements, and survival (Rost and Bailey 1979; Holbrook and Vaughn 1985; Witmer and deCalesta 1985; Brody and Pelton 1989; Rowland et al. 2000). Although research on the response of big game to road closure is limited, it does suggest that closing roads can effectively minimize these impacts (Basile and Lonner 1979; Cole et al. 1997). Therefore, impacts to big game are only expected over the short term until the temporary spur roads are decommissioned.

Road-Related Activities

Road-related activities, including closures and decommissioning may remove up to 1 acre of riparian habitat. At the scale of the project these impacts are expected to be insignificant.

1.1.22.6 *Cumulative Effects*

Past actions in the Project Area have likely had varying impacts to big game species. The railroad logging era undoubtedly adversely impacted big game by removing cover and denning sites. However, in the years following harvest these stands likely provided ample foraging opportunities as shrubs and herbaceous vegetation became established. Regeneration harvest by the KNF in the 1950s through the 1970s also created openings that provided foraging opportunities for deer. The lack of fire on the landscape over the past 80 years has negatively impacted big game habitat by enabling the encroachment of conifer species into naturally occurring meadows and allowing regenerated stands from the railroad logging era to attain densities not typically associated with big game habitat.

Reasonably foreseeable future actions in the Project Area include small scale timber harvest on private lands. These activities include partial cuts which may open stands and improve habitat fore some big game species. Other federal projects or activities expected to occur within the Project Area include ongoing pre-commercial thinning in existing plantations, grazing, and dispersed recreation. Thinning of plantations may benefit big game by reducing the density of stands and by promoting the development of mature stands over time. Grazing and recreation may negatively impact big game by reducing forage and increasing the likelihood of human disturbance. Thus, the cumulative effects of this project combined with other reasonably foreseeable future actions are expected to be insignificant.

3.1.2.3 Avian communities (including Resident and Neotropical Migrants)

The following discussion and analysis focuses primarily on avian species not previously addressed in this document. In the early 1990s, the southern portion of the Mount Ashland LSR was systematically surveyed for songbirds. These surveys detected over 70 avian species including 31

neotropical migratory species. In the Mount Ashland Late-successional Reserve Assessment (USDA Forest Service 1996b), these species were assigned to one of four species assemblages (cavity nesting, forest related, riparian, or early successional and shrub). Because the 1990s survey routes covered significant portions of the Project area, and the habitat requirements of the Mount Ashland Late-successional Reserve Assessment assemblages occur within the Project area, it is reasonable to assume that results of the early 1990s surveys represent the avian community within the Project area.

Studies of mixed conifer forests in the western United States indicate that structural diversity – habitat patchiness, layered canopies, well developed understories- are positively related to richness (a measure of species diversity) and abundance of avian species (Beedy 1981; Hagar et al. 1996; Siegel and DeSante 2003). Hardwood species, even small patches within a mixed conifer community can also positively influence the density of some species (Morrison and Meslow 1983).

The specific nesting and foraging requirements of the resident and neotropical migrants in the Project area are diverse. Due to these diverse requirements, any management activities or wildfire would likely benefit some species while negatively affecting others. Therefore, impacts to avian communities or assemblages would be expected to vary by species, type of treatment, wildfire intensity, and time since disturbance.

Effects of Alternative 1 – No action

Under the No Action Alternative, change in forest structure and composition at the landscape scale would be slow in developing. Thus, no significant changes in avian communities would be expected. In the event of a fire start within the Project Area, FFE modeling indicates several general patterns regarding fire behavior and fire induced tree mortality over time including (1) a constant or increasing crown fire potential under both moderate and severe weather conditions, (2) an increase in surface fire intensity under both moderate and severe weather conditions, and (3) either a constantly high or increasing level of basal area mortality.

Several studies have shown that some avian species respond favorably to wildfire events while the abundance of other species declines (Hutto 1995: Kotliar et al. 2002: Smucker et al. 2005). Even following high-severity fire, Smucker et al. (2005) found that an approximately equal number of forest birds increased in abundance as decreased. Thus, under the expected fire behavior described above, it is likely that there will be a shift in avian communities but not necessarily a decrease in forest bird abundance. Cavity nesting species such as woodpeckers, sapsuckers, and house wrens (*Troglodytes aedon*) and species that forage on insects and seeds such as Towsend's solitaires (*Myadestes townsendii*), lazuli buntings (*Passerina amoena*), and dark-eyed juncos (*Junco hyemalis*), would likely increase in abundance immediately following a fire event. Species such as western tanagers (*Piranga ludoviciana*) and hermit warblers (*Dendroica occidentalis*) that nest in the

foliage of live trees and whose foraging strategy includes gleaning insects from foliage would likely decrease following moderate to high intensity fire. Over time, as the vegetation regenerates, the avian community would likely shift to species that nest in shrubs or are associated with grass understories, eventually becoming dominated by species associated with early successional forests.

Effects of Alternatives 2, 4, and 5 – Action Alternatives

The action alternatives would have similar effects to the avian community and will be discussed together except where specifically stated otherwise.

Thinning and Fuels Reduction

Studies that have addressed the response of avian communities to thinning treatments similar to those proposed in this project, have indicated that species richness increases following treatments and that density typically increases for more species than it declines (Hagar et al. 1996; Siegel and DeSante 2003; Hagar et al. 2004). By removing live conifers, thinning will remove potential nesting habitat for some species. However, thinning prescriptions have been designed to leave a minimum of 15 percent of each stand unthinned, ensuring that habitat for species that require shaded forest stands will be well distributed throughout the Project area. Additionally, thinning prescriptions are designed to retain and promote the development of all existing hardwoods and retain important structural components such as large diameter trees and snags. Therefore, thinning prescriptions will help to maintain a variety of habitat conditions which may effectively reduce the impact to some species and promote avian diversity across the landscape (Hagar et al. 1996; Hagar et al 2004: Alexander et al. 2007). Thinning will also focus on early- and mid-successional stands that typically lack well developed understories. Over time, the thinned early- and mid-successional stands will likely support a richer avian community as their understories become more developed and the stands become more structurally complex. Thus, thinning will likely have little negative impact to existing diversity and abundance of avian species and will likely benefit the avian community over time.

Fuels reduction treatments such as underburning and mastication have the potential to remove habitat and/or impact nesting activities for some avian species. Prescriptions for underburns are designed to mimic low intensity fire and meet MLSRA recommendations for DWD. Additionally, most underburns will likely occur before or after the nesting season for most of the avian species found in the Project area. Thus, underburns are not expected to appreciably impact habitat components such as shrubs, grasses, and DWD, or damage active nests. Mastication has the potential to impact the avian community by removing shrub habitat. However, mastication is only proposed on approximately 10 percent of the Project area, much of which is limited in shrub understory. Thus, mastication is not expected to significantly alter the distribution of the shrub

component across the landscape. Masticators also have the potential to damage or destroy ground nests.

Temporary Road and Landing Construction

Temporary road and landing construction will impact habitat for avian species by removing a variety of habitat components including live trees, snags, and shrubs. Combined, these actions are expected to impact approximately 65 acres or < 1 percent of habitat within the Project area. Thus, these actions are not expected to appreciable reduce the amount of habitat on the landscape. Where temporary roads are constructed through uniform stands they may actually increase avian species richness and diversity by creating horizontal heterogeneity in the stand (Hagar et al. 1996).

Road-Related Activities

Road decommissioning may remove small, discrete patches of habitat. No other road-related activities are expected to impact habitat.

Cumulative Effects

Prior to European settlement, the majority of the Beaver Creek watershed, which includes the Project Area, was late-successional mixed conifer forests with openings created by fire. Open stands of ponderosa and sugar pine were common on the south and west aspects and denser Douglas-fir stands dominated the north and east aspects. Due to the vertical and horizontal heterogeneity of vegetation across the landscape that likely existed at that time, it is reasonable to conclude that the avian community was diverse. During the 1900s, logging, fire suppression, and grazing, have resulted in

dramatic changes to the structure of some plant communities, resulting in a landscape that is currently less diverse. Thus, it is likely that there has been a shift in the avian community over time. Reasonably foreseeable future actions in the action area include small scale timber harvest on private lands. Although these actions will remove habitat components for some species, the expected level of timber harvest would not appreciably reduce habitat quality. Other federal projects or activities expected to occur within the Project Area include ongoing pre-commercial thinning in existing plantations, grazing, and dispersed recreation. Pre-commercial thinning in plantations will likely increase species diversity over time while grazing will continue to impact riparian habitats and the grass/forb community. Cumulatively, these actions are not anticipated to have significant negative impacts to the avian community but may result in a shift of community structure over time.

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