WILDLIFE
Specialist Report

Flagtail Fire Recovery Project

Malheur National Forest
Blue Mountain Ranger District

Grant County, Oregon

/s/ Ken Schuetz________________________ February 4, 2004
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Terrestrial Wildlife

Introduction

This section describes the terrestrial wildlife species found in the project area and the effects of the alternatives on these species. Rather than addressing all wildlife species, discussions focus on Forest Plan management indicator species (MIS), threatened, endangered, and sensitive (TES) species, Forest Plan featured species, and landbirds (see individual species lists below). TES species effects are analyzed in more detail in the Flagtail Fire Recovery Biological Evaluation (Appendix D).

The existing condition is described for each species, group of species, or habitat. Direct, indirect, and cumulative effects of alternatives are identified and discussed.

Regulatory Framework

The three principle laws relevant to wildlife management are the National Forest Management Act of 1976 (NFMA), the Endangered Species Act of 1973 (ESA), and the Migratory Bird Treaty Act (MBTA) of 1918. Direction relative to wildlife is as follows:

- NFMA requires the Forest Service to manage fish and wildlife habitat to maintain viable populations of all native and desirable non-native wildlife species and conserve all listed threatened or endangered species populations (36CFR219.19).
- ESA requires the Forest Service to manage for the recovery of threatened and endangered species and the ecosystems upon which they depend. Forests are required to consult with the US Fish and Wildlife Service if a proposed activity may affect the population or habitat of a listed species.
- MBTA established an international framework for the protection and conservation of migratory birds. This Act makes it illegal, unless permitted by regulations, to "pursue, hunt, take, capture, purchase, deliver for shipment, ship, cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird . . ."

Forest Service Manual Direction provides additional guidance: identify and prescribe measures to prevent adverse modifications or destruction of critical habitat and other habitats essential for the conservation of endangered, threatened, and proposed species (FSM2670.31 (6)). The Forest Service Manual directs the Regional Forester to identify sensitive species for each National Forest where species viability may be a concern.

The principle policy document relevant to wildlife management on the Forest is the 1990 Malheur National Forest Land and Resource Management Plan, referred to as the Forest Plan for the remainder of this section. The Forest Plan provides standards and guidelines for management of wildlife species and habitats. Standards and guidelines are presented at the Forest level (LRMP, pp. IV-26 to IV-33) or Management Area level (LRMP pp. IV-50, IV-53, IV-56 to IV-57, IV-105 to IV-107, and IV-108). Management Areas include General Forest (MA-1), Rangeland (MA-2), Non-Anadromous Riparian Area (MA-3A, Old Growth (MA-13) and Visual Corridors (MA-14).

The 1995 Regional Forester's Eastside Forest Plans Amendment #2 amended Forest Plans for the National Forests in Eastern Oregon and Eastern Washington, including the Malheur National Forest. Amendment # 2 established interim wildlife standards for old growth, old growth connectivity, snags, large down logs, and northern goshawks. The Regional Forester has periodically distributed letters clarifying direction in Amendment #2 (Regional Forester, October 2, 1997; October 23, 1997; June 11, 2003).

Additional management direction is provided for migratory landbirds. Concern for declines in population trends has led to the creation of an International Partners in Flight (PIF) network and program. In 1992, an Oregon-Washington Chapter of PIF formed, with a separate Oregon subcommittee for assessing conservation needs at the state level. In 1994, the Forest Service, Region 6, signed a Memorandum of Agreement with 14 other agencies and non-agency entities to develop a program for the conservation, management, inventory, and monitoring of neotropical migratory birds. Executive Order 13186 (66 FR 3853, January 17, 2001) directs the Forest Service to consider the conservation of landbird species in the design, analysis and implementation of activities on federal lands administered by the US Forest Service.

Analysis Methods

Effects on wildlife will be assessed for the burned area of National Forest land, focusing on effects of activities within proposed treatment units. The Flagtail fire has changed approximately 7,120 acres of wildlife habitat and the proposed activities will affect the trajectory of recovery of the burned area. The existing condition is described for each species, group of species, or habitat. Direct, indirect, and cumulative effects of alternatives are identified and discussed.

Rather than addressing all wildlife species, the Forest Plan focuses on three categories of wildlife: management indicator species (MIS), featured species, and threatened, endangered and sensitive (TES) species. In addition, interest has been raised for neotropical migratory birds. Categories and wildlife species are summarized below:

- **Management Indicator Species (MIS)**

  The Malheur Forest Plan, as amended, identifies 15 Management Indicator Species (MIS) and their associated habitat requirements. MIS habitat requirements are presumed to represent those of a larger group of wildlife species, and act as a barometer for the health of their various habitats. Pine marten, pileated woodpecker, and northern three-toed woodpecker represent old growth habitats, Rocky Mountain elk represent big game species, and primary cavity excavators (most woodpeckers) represent dead wood habitats. Effects to MIS species will be discussed in the Old Growth Forest, Big Game Habitat, and Primary Cavity Excavator sections respectively.

- **Featured Species**

  The Malheur Forest Plan defines a featured species as a wildlife species of high public interest or demand. The featured species associated with the project area are northern goshawk, blue grouse, and antelope. Effects to northern goshawk and blue grouse will be discussed in the Featured Species – Northern Goshawk and the Featured Species – Blue Grouse sections, respectively. Effects to antelope will be discussed as part of the Big Game Habitat Section.

- **Threatened, Endangered and Sensitive (TES) Species**

  An endangered species is an animal or plant species listed under the Endangered Species Act that is in danger of extinction throughout all or a significant portion of its range. A threatened species is an animal or plant species listed under the Endangered Species Act that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. A sensitive species is an animal or plant species identified by the Forest Service Regional Forester for which species viability is a concern either a) because of significant current or predicted downward trend in population numbers or density, or b) because of significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution. Threatened, endangered, and sensitive species effects are summarized in this section by TES status and species. The Flagtail Fire Recovery Biological Evaluation in Appendix D provides a more detailed discussion.

- **Landbirds including Neotropical Migratory Birds (NTMB)**

  Landbirds, including neotropical migratory birds, are discussed because many species are experiencing downward population trends. Discussion can be found in the section Species of Concern – Landbirds including Neotropical Migratory Birds (NTMB).

Species presence/absence determinations were based on habitat presence, wildlife surveys, recorded wildlife sightings, observations made during fire reconnaissance, non-Forest Service databases, and status/trend and source habitat trend documented for the Interior Columbia Basin. Formal wildlife surveys were not conducted for most species. Effects on habitats are discussed, with the assumption that if appropriate habitat is available for a species, then that species occupies or could occupy the habitat. This strategy is based upon science that demonstrates connections between species populations and viability and the quantity and condition of habitat at appropriate scales of analysis (USDA Forest Service 2001). There is a high confidence level that species discussed in this document are either currently present in the area or were prior to the fire.

Effects on species will be determined by assessing how alternatives affect the structure and function of vegetation relative to current and historical distributions. The Forest Vegetation section of this document defines the historical vegetation patterns and structure within the Malheur National Forest. Field reconnaissance information, pre-fire and post-fire aerial photos, and Geographic Information System databases provided additional information.

Some wildlife habitats require a detailed analysis and discussion to determine potential effects on a particular species. Other habitats may either not be impacted or are impacted at a level which does not influence the species or their occurrence. The level of analysis depends on the existing habitat conditions, the magnitude and intensity of the proposed actions, and the risk to the resources.

Old growth habitat was analyzed through fire area reconnaissance, the District's old growth map layer, Dedicated and Replacement Old Growth surveys, and post-fire structural stage determinations made by the District silviculturist. Because the Flagtail fire damaged several Dedicated and Replacement Old Growth areas (MA-13), this analysis considered opportunities to relocate these management areas in unburned areas outside the fire area.

Elk habitat was evaluated using the Habitat Effectiveness Index (HEI) (Thomas et al. 1988), marginal and satisfactory cover percentages, and open road densities. Cover acres were estimated using 2002 aerial photo interpretation data; cover percentages were reduced to reflect losses due to the fire. Open road densities were calculated using the District access travel management database. Values were estimated for National Forest lands at the subwatershed level. The large expanses of private land to the east of the project area were not included in calculations, although they were considered in cumulative effects discussion.

Snag densities and sizes were estimated using data obtained through stand exams. The District silviculturist stratified forest stands by tree species, stand structure and burn severity. For the DEIS, exams were completed on a sample of the stands within each grouping, and then extrapolated over the remainder of the stands or treatment units. Because the Decision Maker decided to forgo salvage in the Riparian Habitat Conservation Areas (RHCAs), no exams were initially collected in these areas. Between the DEIS and FEIS, additional snag data was collected to improve the analyses for snags, fuels, harvest volume and economics. For the FEIS, snag data has been collected on nearly every stand or proposed treatment unit within the burn area perimeter, including stands in the RHCAs.

This EIS uses the DecAID analysis tool (Mellen et al. 2003) to evaluate alternative effects on dead wood habitats. DecAID is an internet-based computer program developed as an advisory tool to help federal land managers evaluate effects of management activities on wildlife species that use snags and large, down logs. The tool synthesizes published literature, research data, wildlife databases, and expert judgment and experience. Both woodpecker use and snag inventory data was used in this analysis.

Effects to threatened, endangered and sensitive (TES) species are summarized in this Chapter and then described in more detail in the Wildlife Biological Evaluation in Appendix D.

Landbirds, including neotropical migratory birds (NTMB), were analyzed based on high priority habitats identified in the Oregon-Washington Chapter of Partners in Flight, Northern Rocky Mountains Bird Conservation Plan (Altman 2000). While the Forest has not conducted official NTMB surveys in the project area, the Oregon Breeding Bird Atlas (Adamus et al. 2001) includes observational data for this area. Much of the data for the Malhuer National Forest was obtained from local biologists and ornithologists. Most NTMB species that are expected in the project area were recorded within the atlas'hexagons for the area. Based on a review of the District's wildlife database and observations made during reconnaissance of the fire area, there is a high confidence level that species discussed in this report are either currently present in the area or were prior to the fire.

Cumulative effects analyzed in respect to past, ongoing and foreseeable future activities listed in Appendix J. These effects were first analyzed within the context of the project area, i.e., the burn area. If there were no contributions to negative or positive cumulative effects at that scale, then no further analysis was conducted. If there were contributions to effects at that scale, then the analysis scale was broadened to a larger land base scale, usually the subwatershed level

Alternative 1, the No Action alternative, is required by NEPA. It is used as a benchmark to compare and describe the differences and effects between taking no action and implementing action alternatives. The No Action alternative is designed to represent the existing condition; resource conditions are then projected forward in time to estimate resource changes expected in the absence of the proposed management activities. However, if the No Action alternative is chosen, the Forest Service still maintains the discretion to adjust Dedicated and Replacement Old Growth areas (MA-13), plant trees, and close roads by conducting separate environmental analyses.

Old Growth Forest

Existing Condition

Dedicated and Replacement Old Growth

Region 6 developed a network of designated habitat areas to provide blocks of old growth coniferous forest across the landscape designed to support old growth management indicator species populations and allow for dispersal of individuals. These are known as Dedicated Old Growth (DOG) areas and Replacement Old Growth (ROG) areas. Replacement areas may not have all the characteristics of old growth, but are managed to achieve those characteristics so that when a Dedicated Old Growth area no longer meets the needed habitat requirements, the replacement old growth area can take its place.

On the Malheur National Forest, these old growth blocks were designed to provide the necessary network of habitat areas for pileated woodpecker and pine marten. Although these old growth areas are managed specifically for these two species, the Forest Plan assumes the old growth network will provide habitat for many other old growth associated species as well. In addition, the three-toed woodpecker is identified as a management indicator species for old growth lodgepole; however, habitat on the Malheur is quite limited and few old growth areas have been formally designated. No formal surveys have been conducted for these species. Pre-fire, the DOG and ROGs have periodically been visited to record species sightings.

Pileated Woodpecker

Pileated woodpecker prefer mature and old growth forests with at least 60% canopy cover (Bull and Holthausen 1993). This species relies heavily on snags and downed wood material for foraging. Nests are built in cavities excavated in large (> 21 inches

DBH) dead or decadent ponderosa pine, western larch or grand fir trees. Pileated woodpeckers are not strongly associated with post-fire habitats; individuals may use a burned area for foraging, but are not expected to nest there (Bull and Holthausen 1993).

Habitat trend information derived from Interior Columbia Basin studies (Wisdom et al. 2000) indicated that about 60% of the watersheds in the Blue Mountains showed a decreasing trend in pileated woodpecker habitat and 30% showed an increasing trend. Declines in source habitat are primarily attributed to a reduction in late seral forest. Breeding Bird Survey (BBS) data indicated a 7.8% annual decline in populations in Oregon and Washington from 1966 through 1994 (Wisdom et al. 2000).

The Forest Plan directs that pileated woodpecker Dedicated Old Growth (DOG) areas are to be at least 300 acres of mature and old growth habitat; Replacement Old Growth (ROG) areas are intended to be half the size of the DOG, i.e., about 150 acres. Pileated woodpecker DOGs were delineated Forest-wide to provide an even distribution of habitat areas, one DOG every 12,000 acres, or approximately 5 miles apart. Management requirements were derived from the US Forest Service 1986 Minimum Management Requirements.

Pine Marten

Pine martens prefer mature old growth forest with a well-developed canopy. Martens show a strong avoidance of open areas, probably as a response to predator avoidance (Hawley and Newbry 1957). Cover and prey species largely determine their distribution and abundance. Snags and downed woody material are important for winter and summer dens, resting sites, and cover for prey species. Strickland and Douglas (1987) found that marten did not use recent burns because habitat changes reduced prey populations and overhead cover. Avoidance persisted for as long as 23 years post-disturbance, generally until regenerated forests provided overhead cover.

Habitat trend information derived from Interior Columbia Basin studies (Wisdom et al. 2000) indicated that about 50% of the watersheds in the Blue Mountains showed a decreasing trend in marten habitat and 35% showed an increasing trend. The distribution of marten within the Interior Columbia Basin has been fairly stable, but population changes are not known (Wisdom et al. 2000).

The Forest Plan directs that pine marten DOGs are to be 160 acres and ROGs are to be 80 acres. Pine marten DOGs were delineated every 4,000 to 5,000 acres, or approximately 3 miles apart. Management requirements were derived from the US Forest Service 1986 Minimum Management Requirements.

Northern Three-Toed Woodpecker

There are no designated habitat areas for northern three-toed woodpecker in the project area. This species is also a management indicator species for dead and defective habitat; Existing Condition for this species is discussed in the section below on Primary Cavity Excavator Species.

Habitat trend information derived from Interior Columbia Basin studies (Wisdom et al. 2000) indicated that about 70% of the watersheds in the Blue Mountains showed an increasing trend in three-toed woodpecker habitat and 30% showed a decreasing trend. Breeding Bird Survey (BBS) data is insufficient to determine population trends in the

Interior Columbia Basin, but data summarized across the West indicates a 0.7% annual decline in populations from 1966 through 1994 (Wisdom et al. 2000).

Old Growth Forest Within the Project Area

Two DOG areas and one ROG area are located within the burn area (see Figure 14, Map Section). Prior to the fire, DOG 220 contributed towards pileated woodpecker management requirements and DOG/ROG 221 contributed to pine marten management requirements.

The fire burned through both old growth areas; fire intensities ranged from moderate intensity or mosaic burns (60% to 90% tree mortality) to severe intensity or total burns (greater than 90% tree mortality). Table WL-1 below identifies the DOGs and ROGs within the project area, subwatersheds, total acres, total acres burned, and post-fire structural stage.

Table WL-1: Dedicated and Replacement Old Growth Areas Burned

Old Growth Area	MIS Species	Subwatershed	Total Acres	Acres Burned by Mortality Class	Post-fire Structural Stages
DOG 220	Pileated Woodpecker	Snow - 60509, Jack - 60507	325	Severe = 124 ac. Mod. = 201 ac.	SI, UR
DOG 221 ROG 221	Pine Marten	Jack - 60507, Snow - 60509	611	Severe = 484 ac. Mod. = 127 ac.	SI, UR

DOG = Dedicated Old Growth, ROG = Replacement Old Growth
MIS = Management Indicator Species
Tree Mortality Classes:
Severe Mortality (total burn) = 90%+ tree mortality
Moderate Mortality (mosaic burn) = 60% to 90% tree mortality
Low Mortality (underburn) = 30% to 60% tree mortality
SI = Stand Initiation; UR = Understory Re-initiation

Post-fire, there is essentially no mature or old growth habitat remaining that meets pileated woodpecker, pine marten or three-toed woodpecker habitat requirements based on the current Forest Plan guidelines. The DOG and ROG areas are no longer functioning as old growth. Stands have been converted to understory re-initiation (UR) and stand initiation (SI) structural stages. Canopy cover has been reduced below 20% and in many places eliminated all together. Snags resulting from the fire will provide nesting and foraging habitat for northern three-toed woodpeckers and foraging habitat for pileated woodpeckers.

The fire also destroyed old growth habitat outside of the DOG and ROG areas. Forest vegetation data estimates that 1,585 acres or 26% of the forestlands were classified as old forest multiple strata (OFMS) prior to the fire. Post-fire, about 30 acres of old growth remain (see Forest Vegetation Section). What little habitat remains is small and highly fragmented, and although vegetation conditions may classify these areas as old growth, they likely provide for few old-growth dependent species. These old growth conditions may be important as legacy structures in future stands.

The Upper Silvies Watershed Analysis (USDA 2001) estimated that about 19,900 acres or 30% of the watershed classified as old growth. Post-fire, old growth estimates for the watershed would be about 28%. It is estimated that historically the amount of old growth was far greater (see Chapter 3, Forest Vegetation, Stand Structural Stages, Table FV-4).

Old Growth Connectivity

Connectivity refers to habitat between old growth areas that allows species to move between these areas. Regional Forester's Eastside Forest Plans Amendment 2 (1994) requires that connectivity corridors be established between late and old structure stands. Stands should commonly have medium diameter or larger trees (≥9 inches DBH), and canopy closure should be within the top 1/3 of site potential. Corridors should be at least 400 feet wide. If appropriate stands are not available, then the next best stands will have to provide connectivity, and should be managed to improve connectivity. Generally, connectivity corridors are maintained or managed at higher tree densities and canopy cover than adjacent areas to provide more security for dispersal or movement.

Post-fire connectivity habitat is best evaluated by viewing the tree mortality/survival map (see Figure 6, Map Section). Light mortality or underburn areas and non-burn areas (10% of the forested areas) are currently providing the best connectivity in the area, and are likely the only stands that meet Forest Plan standards. Moderate tree mortality areas (39% of the forested acres) may provide some additional connectivity, but are highly fragmented in many places due to the mosaic nature of the burn. Severe tree mortality areas do not provide connectivity. Connectivity between old growth stands in and immediately adjacent to the fire area is now highly limited.

Environmental Consequences

The Vegetation Section, Stand Structural Stages, of this DEIS projects old growth development in the burn area under the No Action and Action alternative scenarios (see Vegetation Section and Tables FV-6 and FV-7).

Direct and Indirect Effects

No Action

There would be no direct effects to old growth habitats within the project area. The fire has essentially eliminated all old growth from the burn area. Habitat effectiveness for old growth species would remain as described in the existing condition. The No Action alternative would have no immediate effects on pine marten, pileated woodpeckers, or their habitats. Research has shown that martens are unlikely to be present in burned areas for 20 or more years post-fire (Strickland and Douglas 1987). Pileated woodpeckers are not strongly associated with post-fire habitats; individuals may use a burned area for foraging, but are not expected to nest there (Bull and Holthausen 1993).

The No Action alternative would not designate any new DOG areas to replace those lost in the fire, creating gaps in the old growth network. Existing DOGs and ROGs would not meet Forest Plan standards for designated habitats, and there would be a net reduction (936 acres) in suitable habitat for pileated woodpecker and pine marten under the MA-13 designation.

Old growth development throughout the entire project area is dependent on the number and size of the trees that survived the fire. In 50 years, old growth conditions could be naturally reestablished on about 10% of the project area (see Vegetation Section, Table FV-6), still substantially lower than the 26% that existed before the fire. This old growth would develop from stem exclusion open canopy stands (SEOC) that were lightly burned by the fire, and consequently retained many medium–sized live trees. Because old growth would develop from existing live trees, reforestation success is of little consequence in these stands. Contrarily, in the moderately to severely burned areas, old growth development *is* highly dependent on regeneration success. Under a natural regeneration scenario, it is expected that it will take newly regenerated stands 150 to 180 years to reestablish old growth structure.

Stands would develop into either old forest single stratum (OFSS) or old forest multiple strata (OFMS) depending on site-specific conditions including biophysical environment, amount and rate of natural regeneration, natural disturbance, and future management activities. It is expected that the landscape would include a mosaic of both old growth types. OFSS would favor such species as white-headed woodpecker and flammulated owl and OFMS would favor cover-dependent species such as pileated woodpecker, pine marten and northern goshawk. Combined, the two old growth structural stages could comprise as much as 80% of the project area by year 150.

The No Action alternative would maintain existing connectivity. Although dead tree boles might provide a small amount of cover, the use of burn areas for connectivity is very limited. Light mortality or underburn areas and non-burn areas (10% of the forested areas) are currently providing the best connectivity in the area (see Figure 6, Map Section), and are likely the only stands that meet Forest Plan standards. In moderately and severely burned areas (90% of the forested areas), connectivity habitat for species that rely on ground cover, such as pine marten, could be reestablished once snags have fallen and live trees have been reestablished. Because the No Action alternative relies on natural regeneration to reforest burned areas, recovery of this minimal level of cover could take 35 to 65 years. Although these stands may provide connectivity habitat as early as year 35 for some animals, it should be noted that conditions would still not meet connectivity definitions as defined by the Regional Forester's Eastside Forest Plans Amendment #2 (1994). Moderately and severely burned areas could take 60 to 90 years to develop into connectivity habitat as defined in Amendment #2.

The risk of an intense reburn is high with this alternative, although risks do not increase for 10 to 20 years, the time it is expected for snags to fall to the ground and elevate fuel loads beyond risk thresholds. Development of OFSS and OFMS would be further delayed if another stand replacement fire were to occur.

Action Alternatives

All action alternatives would designate new MA-13 old growth areas to replace those lost in the fire (see Map Section, Figure 14, for original and new locations). The relocation of Dedicated Old Growth (DOGs) and Replacement Old Growth (ROGs) should better maintain the integrity of the Forest's old growth network. The Flagtail Fire has reduced the ability to maintain the old growth network at the recommended spacing, but action alternatives would maintain desired acres in MA-13.

Under all action alternatives, DOG 220 will be converted to a Replacement Old Growth area. This old growth area burned with moderate to severe mortality of trees. Although this area no longer classifies as old growth, a sufficient number of large live trees remain to manage this area as replacement old growth. A new DOG would be designated immediately outside the fire perimeter in the Hog subwatershed, approximately ¼ mile away. In the new DOG, stands are generally classified as old forest multiple strata (OFMS) and young forest multiple strata (YFMS). One stand of stem exclusion (SE) is included; however, the new DOG has been increased from 325 acres to 353 acres to ensure sufficient habitat. Although the number of large diameter trees in the YFMS stands are lower than that required for old growth classification, many of the other characteristics that define old growth (multiple canopies, snag and down wood habitat) are intact. A non-significant Forest Plan amendment would be required to create the new DOG and convert the original DOG to a ROG. A new DOG would add 353 acres of mature habitat to the MA-13 designation.

Under all action alternatives, DOG/ROG 221 will be relocated outside the fire perimeter. This old growth area burned with severe mortality of trees; few live trees remain. Areas outside the fire perimeter do not provide a similar sized block of mature and old growth habitat. Consequently, *two* new DOG/ROGs would be established to replace the one lost in the fire. DOG/ROG 221-A will be relocated approximately 3 miles northwest in the Wickiup subwatershed. DOG/ROG 221-B will be established about 2 miles southeast in the Jack subwatershed. Both sites provide late-seral habitat, a combination of old forest multiple strata (OFMS) and young forest multiple strata (YFMS) stands. These smaller DOG/ROGs would not provide the same quality habitat as the larger, single block of old growth that existed prior to the fire; however, the new locations provide better opportunities to manage for old growth given the level of fire damage in the original location. The new DOG/ROGs will meet size requirements in the Forest Plan. Acres in the DOG/ROG 221-A and 221-B would be converted from General Forest (MA-1) to Dedicated Old Growth (MA-13). Conversely, existing DOG/ROG 221 would be converted from MA-13 to MA-1. A non-significant Forest Plan amendment would be required to relocate DOG/ROG 221 and change Management Area (MA) designations. The new DOG/ROG areas would replace 611 acres of mature habitat in the MA-13 designation.

Table WL-2 summarizes changes to Dedicated and Replacement Old Growth Area Designations by Alternative.

Table WL-2: Dedicated and Replacement Old Growth Areas Burned

Old Growth Area	MIS Species	Subwatershed	Alternative 1	Alternatives 2, 3, 4 and 5	
			Acres	Acres	Comments
DOG 220 (Existing)	Pileated Woodpecker	Snow - 60509, Jack - 60507	325	353	DOG relocated to Hog Subwatershed – 60511. Converted from MA-1 to MA-13 Old Growth
ROG 220 (New)	Pileated Woodpecker	Snow - 60509, Jack - 60507	0	325	New ROG in same location as old DOG
DOG 221 (Existing)	Pine Marten	Jack - 60507, Snow - 60509	431	0	Converted from MA-13 to MA-1 General Forest
ROG 221 (Existing)	Pine Marten	Jack - 60507, Snow - 60509	180	0	Converted from MA-13 to MA-1 General Forest
DOG 221-A (New)	Pine Marten	Wickiup - 60513	0	189	Converted from MA-1 to MA-13 Old Growth
ROG 221-A (New)	Pine Marten	Wickiup - 60513	0	83	Converted from MA-1 to MA-13 Old Growth
DOG 221-B (New)	Pine Marten	Jack - 60507	0	248	Converted from MA-1 to MA-13 Old Growth
ROG 221-B (New)	Pine Marten	Jack - 60507	0	137	Converted from MA-1 to MA-13 Old Growth
TOTAL			DOG = 756 ac. ROG = 180 ac.	DOG = 790 ac. ROG = 545 ac.	

DOG = Dedicated Old Growth, ROG = Replacement Old Growth
MIS = Management Indicator Species
MA-13 = Management Area for Old Growth:
MA-1 = Management Area for General Forest

Salvage harvest and fuels reduction would not affect mature or old growth habitat in the short-term. Burned areas are no longer functioning as old growth habitat and are not likely to be used by pileated woodpecker for nesting or by pine marten for denning before forest cover is reestablished. These species may use dead wood habitats for foraging substrate, but neither has a strong association with post-burn habitats. In all alternatives, snag and woody debris guidelines would maintain habitat components for foraging (see the Primary Cavity Excavator section for addition information on foraging habitat).

Under the new MA-13 designations (see Table WL-2), only ROG 220 would be entered for treatment. Alternatives 2 and 5 would treat 277 of 325 acres with a combination of commercial and non-commercial harvest. Alternatives 3 and 4 would treat 192 acres and 277 acres respectively, but only non-commercial trees would be felled. Habitat within ROG 220 is not functioning as old growth, but will be managed to provide old growth in the future; no adverse effects to pileated woodpecker nesting habitat or pine marten denning habitat is expected. This area provides some of the better site conditions (aspect, forest type) for providing future OFMS.

Although the new ROG 220 could take as many as 150 years to redevelop into old growth, the mosaic of large, live and dead trees provides legacy features for future old growth. Snags would eventually fall, but could still provide down wood structure for cover and forage. Alternatives 3 and 4 would retain snags 10 inches DBH and greater;

therefore, leaving the most structure. In ROG 220, snags 10 inches DBH or greater range from about 35 to 65 snags per acre; snags 20 inches DBH and greater range from 3 to 8 snags per acre. Alternative 5 would retain 7 snags per acre, including the largest 5 snags over 14 inches DBH. Alternative 2 would retain 2.39 snags greater than 20 inches DBH.

All four action alternatives would decommission all existing roads within ROG 220, about 1.7 miles. Elimination of roads will benefit the ROG in the long-term, reducing the potential for future habitat fragmentation and traffic disturbance.

As stated in the No Action alternative, old growth development throughout the entire project area is dependent on the number and size of the trees that survived the fire and the rate of conifer regenetration. In 50 years, old growth conditions could be naturally reestablished on about 10% of the project area (see Vegetation Section, Table FV-7), the same as under the No Action alternative. This old growth would develop from stem exclusion open canopy stands (SEOC) that were lightly burned by the fire, and consequently retained many medium–sized live trees.

Planting proposed in all action alternatives would reforest moderately and severely burned areas more quickly than if no action was taken and natural regeneration was required to reforest the area (see Vegetation Section, Tables FV-6 and FV-7). Old growth development would be accelerated. The disparity in planting trees versus natural regeneration does not become readily apparent until around 100 years when late and mature stands (YFMS, OFMS, OFSS) could comprise 100% of the area under the action alternatives versus 80% under the no action alternative. By year 140, 100% of the stands could be OFSS or OFMS versus the No Action alternative, which would take 150 to 180 years to move 80% of these areas into the OFSS/OFMS stage.

All action alternatives would maintain existing connectivity by retaining all live trees except those felled to facilitate logging operations or reduce safety hazards (see existing condition section). Although standing dead trees might provide a small amount of cover, the use of burn areas for connectivity is very limited.

Future connectivity habitat would develop as described in Alternative 1 except that tree planting would accelerate habitat recovery. Marten would likely first return to sites where vegetation cover has recovered and an abundance of downed logs have accumulated; e.g., non-harvested riparian areas. Alternatives 2, 3 and 5, forgo commercial harvest on 30%, 53%, and 40% of the forest acres, respectively. In addition, Alternative 3 also retains the highest snags levels within salvage units (see Primary Cavity Excavator section). Alternative 4 forgoes all commercial harvest, and therefore, would generate favorable conditions on the most acres. In the moderately to severely burned areas, recovery of cover for dispersal of pine marten could take 15 to 25 years versus 35 to 65 years under the No Action scenario. Restoration of connectivity habitat as defined by the 1994 Regional Forester's Plan Amendment #2 could take 50 years to develop as compared to 60 to 90 years under the No Action alternative.

Under Alternative 4, the elevated fuel loads expected in 10 to 20 years increase the risk of an intense re-burn; another stand replacement fire could further delay development of old growth. Development of OFSS and OFMS would be further delayed if another stand replacement fire were to occur. Alternatives 2, 3 and 5 also leave some burn areas untreated, but salvage logging and fuels reductions reduce overall fuel loads and break up the continuity of fuels remaining.

Cumulative Effects

All of the activities in Appendix J have been considered for their cumulative effects on old growth and associated species. The following discussion focuses on those past, ongoing and reasonable foreseeable future activities that may contribute negative or positive effects.

Since 1993, the Forest Plan as amended, has directed the Malheur National Forest to conduct timber sales in a manner that moves stands towards OFMS and OFSS structural stages, and timber sales planned since that time should not have contributed to loss of mature and old growth forest. Although future timber management activities have yet to be proposed for the unburned areas of the affected subwatersheds, any management would be expected to continue under current or similar direction. In burned riparian areas, hardwood and conifer planting is being planned under separate NEPA documents; conifer planting will help accelerate development of old growth. The Forest's firewood policy prohibits the cutting of firewood in Dedicated and Replacement Old Growth areas, so prescribed snag and downed wood levels should be maintained.

Adjacent private lands have already been salvage logged and planted. In the past these timber stands have not been managed for old growth habitat and no change in this strategy is expected. These areas are not expected to provide OFMS or OFSS habitat.

In 2002/2003, fire-killed, hazard trees were salvaged on 14 acres at the Bear Valley Work Center and on 650 acres along roads. Future fuels reduction is planned on 100 acres inside Riparian Habitat Conservation Areas (RHCAs); dead, unmerchantable trees 8 inches DBH and smaller would be felled, then hand piled and burned outside of the riparian areas. When combined with salvage logging and fuels treatment proposed in Alternatives 2, 3 and 5, landscape-level fuels treatments are expected to help reduce the risk of an intense re-burn and another stand replacement fire. Under Alternatives 1 and 4, combined fuel treatments are less likely to reduce fuel loads sufficiently to avoid intense re-burns in the future.

In the short-term, the four action alternatives would not contribute to cumulative losses of mature and old growth habitat because stands treated no longer function as old growth. In the long-term, the action alternatives would contribute positively to cumulative effects by accelerating the development of old growth, and therefore, contribute positively toward the viability of species that use these habitats.

Summary

Salvage harvest and fuels reduction would not affect mature or old growth habitat in the short-term. Burned areas are no longer functioning as old growth. Pileated woodpeckers and pine martens are not strongly associated with post-burn habitats. In all alternatives, snag and woody debris guidelines would maintain habitat components for foraging; the amount of dead wood habitat retained varies by alternative (see the Primary Cavity Excavator section for addition information on dead wood habitat).

Planting proposed in all action alternatives would reforest moderately and severely burned areas more quickly than if no action was taken and natural regeneration was required to reforest the area. In the moderately to severely burned areas, old growth habitat could be recovered in 140 years versus 150 to 180 years under the No Action alternative.

The No Action alternative would not designate any new Dedicated Old Growth stands to replace those lost in the fire, creating gaps in the old growth network. Conversely, all action alternatives would designate new old growth areas.

Under Alternatives 1 and 4, the elevated fuel loads expected in 10 to 20 years increase the risk of an intense re-burn; another stand replacement fire could further delay development of old growth. Alternatives 2 and 3 also leave some burn areas untreated, but salvage logging and fuels reductions reduce overall fuel loads and break up the continuity of fuels remaining.

There are no significant direct, indirect or cumulative effects to pileated woodpeckers or pine martens or their habitat from any of the alternatives.

Big Game Habitat

Existing Condition

Rocky Mountain elk, mule deer and antelope are the big game species of concern due to their high public value. The project area is entirely within big-game summer range. Species are considered wildly distributed across the District, Forest and the Blue Mountain Region. Rocky Mountain elk are identified in the Forest Plan as a management indicator species (MIS); habitat quality is evaluated in terms of forest cover, forage quality, and open road density. Antelope are identified in the Forest Plan as a featured species dependent on open landscapes.

Two habitat components, thermal/hiding cover and forage, have been significantly reduced as a result of the fire. Many animals may have dispersed into the unburned portions of the Hog and Keller subwatersheds as well as other adjacent subwatersheds. Loss of habitat may concentrate more animals into adjacent areas, forcing increased competition for cover. Loss of habitat has likely affected big game distribution and use, rather than actual population numbers.

Antelope primarily use open landscapes. Most of their habitat is on private property in Bear Valley, although they are often seen along the forest edges around Bear Valley as well. Forest edges and aspen stands provide fawning habitat. Although the fire opened up landscapes, the high density of standing dead trees combined with an initial deficiency in forage may still preclude high use. The fire has probably had minimal impact on antelope populations and distribution because there is little change in the current habitat situation.

Thomas, et al. (1988), developed the Habitat Effectiveness Index (HEI) model for estimating elk habitat effectiveness on the landscape. Overall habitat effectiveness (HEscr) incorporates three variables or indices for summer range: cover quality (HEc), size and spacing of cover (HEs) and open road density (HEr). The Forest Plan establishes minimum standards for these indices. In addition, the Forest Plan establishes minimum standards for retention of satisfactory cover (%S), marginal cover (%M), total cover (%S and M), and open road density (see Table WL-3).

Table WL-3 displays existing HEI values, cover percentages, and open road densities for each subwatershed affected by the fire. The large expanses of private land to the east of the project area were not included in the analysis. Most of this private land is in open grasslands and shrublands and would not give a good picture of the real effects of cover losses and open road densities. Where the private lands were forested, stands have been intensively managed and much of the forest was burned over by the fire.

Table WL-3: Existing HEI Values, Cover Percentages and Open Road Densities by Subwatershed.

Subwatershed	HEc	HEs	HEr	HEcsr (HEI)	%S	%M	Total Cover %	Open Road Density (miles per square mile)
Forest Plan Standard	.30	.30	.40	.40	8%	5%	20%	3.2
Jack - 60507	.81	.22	.22	.37	6%	4%	10%	4.84*
Snow - 60509	.66	.14	.29	.34	1%	2%	3%	4.05
Hog - 60511	.67	.73	.32	.53	14%	27%	41%	3.75*
Keller - 60515	.63	.74	.51	.59	10%	29%	39%	1.75

HEI = Habitat Effectiveness Index
HEc = habitat effectiveness derived from the quality of cover
HEs = habitat effectiveness derived from the size and spacing of cover
HEr = habitat effectiveness derived from the density or roads open to vehicular traffic
%S = Satisfactory Cover
%M = Marginal Cover
% Total Cover = %S + %M
* Portions of the Keller and Hog subwatersheds are in the Murderer's Creek-Flagtail Cooperative Travel Management Area (also known as a green dot closure area).. Restriction periods occur in the fall and correspond to general deer hunting season and elk hunting season. Open road densities in this table do not reflect seasonal closures. These closures would further reduce open road density and increase HEr and HEI values. Very little of the green dot area is within this project area; although numbers would change to the benefit of big game, the change is relatively small.

Forage

Elk, deer and antelope are already using the burn area (personal observation); post-burn forage is limited, but the new sprouts are nutrient-rich and highly palatable. Forage is expected to recover rapidly Oregon Department of Fish and Wildlife (K. Rutherford, ODFW wildlife biologist, personal communication May 8, 2003) reported that in the Summit Fire area, northern Blue Mountain District, deer and elk use increased as forage recovered rapidly following the 1996 fire. Improved forage increased big game reproductive rates and subsequently, has increased populations. Forage may not recover as rapidly in the Flagtail Fire area because no seeding was undertaken following the fire.

Cover

Little marginal or satisfactory cover remains within the fire perimeter. Some smaller patches exist where the fire burned at low severity, but few stands meet the minimum 40% canopy closure or the 10- to 30-acre patch size standards established in the Forest

Plan. Deer and elk are believed to use thermal cover to reduce the effects of weather and temperature extremes and to hide from predators. The fire eliminated nearly all of the cover within the Snow and Jack subwatersheds, and neither subwatershed meets Forest Plan cover or HEI standards (see Table WL-3). The fire burned fewer acres in the Hog and Keller subwatersheds; therefore, these subwatersheds still meet cover and HEI standards (see Table WL-3).

It is important to note that recent research at the Starkey Experimental Station in La Grande, Oregon (Cook 1998) has raised the concern that resource managers may be overstating the importance of thermal cover, i.e., marginal and satisfactory cover, on elk condition. Studies suggest that the energetic benefits of thermal cover may be inconsequential to elk performance, and that it is forage or nutritional effects that may have the greater impact on individual animal performance. However, these studies do not dispute elk's preference for dense forest stands or the numerous studies that show elk using dense stands disproportionately to their availability. Dense conifer cover contributes to better distribution of elk across available habitat, and may be more of a disturbance/hiding cover issue than a thermal regulation issue.

Post-fire, very little hiding cover exists within the fire perimeter. Hiding cover provides a visual barrier between big game animals and disturbance sources. This is especially important during hunting season when big game animals alter their travel patterns to avoid humans. Dead tree boles might offer some security, but only where snag densities are high, and even then it is of limited value compared to a similar live, green tree situation.

Oregon Department of Fish and Wildlife (K. Rutherford, ODFW wildlife biologist, personal communication May 8, 2003) concluded that the Flagtail fire, at 7000 acres, could affect big game use and distribution, but was unlikely large enough to affect population numbers. Although the fire greatly reduced security cover, the surrounding unburned areas provide sufficient cover to meet habitat needs. Elk and deer will likely forage in the burn area, primarily during the night, and retreat to security areas during the day. During the hunting season, elevated human use and hunting pressure in the cover-deficient burn area will likely force animals into adjacent unburned areas.

Roads

The Jack, Snow, and Hog subwatersheds do not meet Forest Plan standards for open road density; the Keller subwatershed meets the Forest Plan standard (see Table WL-3). Research has shown that higher open road densities reduce habitat effectiveness for deer and elk (Thomas et al., 1979). Following the fire, all roads except County Road 63 (the Izee Highway) have been temporarily closed to public access. Once hazard trees along roads are felled, roads could be reopened and area access could be restored to pre-fire levels as displayed in Table WL-3. High open road densities would likely affect big game use and distribution, particularly given the lack of hiding cover in the burn area.

The greatest potential for impact is during the hunting seasons, when hunter traffic, and the associated "stimulus" associated with those activities is at the highest level. Portions of the Keller and Hog subwatersheds are in the Murderer's Creek-Flagtail Cooperative Travel Management Area (also known as a green dot closure area). Restriction periods further reduce traffic in the fall and correspond to general deer and elk hunting seasons.

Open road densities in Table WL-3 do not reflect seasonal closures. These closures would further reduce open road density and increase HEr and HEI values. Very little of the green dot area is within this project area; although numbers would change to the benefit of big game, the change is relatively small.

Perhaps more important than the impacts of road densities upon elk habit use and selection is the spatial relationships of those roads. Recent studies at the Starkey Experimental Station analyzed road distribution and its impacts on elk habitat use (Rowland et al. 2001 and Wisdom et al. 1998). Researchers found a strong correlation between road activity and habitat selection. Roads that averaged as little as one vehicle per 12-hour period were affecting habitat selection out to 1,000 meters or more. Elk were increasingly found in areas further away from open roads, while those areas with many roads and limited distances between roads received very limited use. Conversely, mule deer responded to the distribution of elk by avoiding areas of high elk density. This behavioral pattern put mule deer closer to roads. The mule deer showed strong preference for cover habitat, especially in the first few hundred meters of an open road.

In the Flagtail project area, the existing road network provides very few areas of security where elk can select habitats free from road influences. All habitat is within 1,000 meters of an open road. About 95% of the area is within 500 meters of an open road; i.e., only 5% of the area is further than 500 meters. Therefore, the presence of open roads likely reduces the habitat effectiveness of the area, particularly given the levels of cover loss from the fire. This spatial analysis suggests roads have a greater influence on elk and deer than the road density model suggests.

Environmental Consequences

Direct and Indirect Effects

No Action

Elk and deer are already using the burn area. Forage is expected to recover rapidly. Plants tend to sprout vigorously from the roots if the above ground portions are killed by fire, although it may take 2 to 5 years for grasses, sedges and forbs to return to their pre-fire abundance and volume. Shrub recovery may take 2 to 15 years. Fire can also increase nutrient content and palatability of forage, although the increased quantity of forage after a fire may be more significant than the increased quality of that forage (USDA 2000). As stated in the existing condition section, elk and deer will likely forage in the burn area during the night and retreat to security areas during the day.

Most of the fire-killed trees are expected to be on the ground within 10 to 20 years. Large concentrations of down woody material could impede big game movements (Thomas et al., 1979, Thomas and Toweill 1982). Consequently, the highest use of the area may be in the first 10 years, after forage has redeveloped and before many of the trees have fallen.

Excessive fuel loads would preclude the opportunity to use prescribed fire in the future. Historically, most of the subwatershed was shaped by frequent, low intensity fires, which reduced fuels levels and encouraged the growth of more succulent forage, ultimately benefiting deer and elk.

The fire destroyed most of the marginal, satisfactory and hiding cover. Alternative 1 would not further reduce cover. Development of new cover would depend on natural regeneration, unless burned areas are planted under a separate environment analysis. In the severely burned areas, recovery of hiding cover (tree vegetation) may take 35 to 65 years. Marginal cover would take 60 to 90 years to develop; satisfactory cover would likely take 90 to 120 years. Dead tree boles might offer some hiding cover, but only where snag densities are high, and even then it is of limited value compared to a similar live, green tree situation. Most of the small diameter trees will be on the ground in 10 years, so what does exist is short-lived. Lack of fuel treatment would create a high risk for an intense reburn of the area; such a fire could further delay development of cover.

Open road densities would remain in excess of standards in the Jack, Snow, and Hog subwatersheds; only the Keller Creek subwatershed would meet the open road density standard. Current road distribution could also continue to affect big game use with only 5% of the fire area further than 500 meters from an open road. High open road densities reduce security and increase the potential for disturbance, especially given the lack of hiding cover. During the hunting season, elevated human use and hunting pressure in the cover-deficient burn area will likely force animals into adjacent unburned areas.

As discussed, in the existing condition section, antelope primarily use the large open landscapes in Bear Valley. Although the fire opened up landscapes, the high density of standing dead trees may still precludes high use. As with deer and elk, antelope may take advantage of the initial flush of forage. Otherwise, the no action alternative is likely to have little affect on existing antelope populations and distribution.

Action Alternatives

As described under the No Action alternative, deer and elk use will increase as grasses, forbs and shrubs recover. Elk and deer will primarily forage in the burn area during the night and retreat to security areas during the day. In Alternatives 2, 3 and 5, salvage activities may result in a delayed or slower rate of response for some forage species; however, forage production is still expected to be high. Prescribed reforestation is planned at spacing designed to allow the trees room to grow without needing precommercial thinning to maintain adequate growth rates. This prescribed spacing is wider than normal seedling spacing, and should provide foraging habitat longer. Much of the burn area would be available for high quality forage until tree canopy recovers and begins to limit the development of ground vegetation.

In Alternatives 2, 3 and 5, salvage harvest would limit the future build up of ground fuels; therefore, access to forage is expected to remain high relative to Alternative 1. In Alternative 4, concentrations of downed logs could impede big game movement as described in Alternative 1.

Salvage of dead and dying trees would not directly impact remaining marginal and satisfactory cover, as only fire-killed trees would be salvaged. Only incidental removal of green trees would be needed to facilitate logging. Logging would not have a significant effect on hiding cover. Dead tree boles offer little security and what cover currently remains would be on the ground in 10 years. It is likely that many individual animals have already been displaced by the fire and are using surrounding areas for security habitat.

Planting would accelerate reforestation, allowing hiding cover and thermal cover to develop sooner than under a natural reforestation scenario. In the severe burn areas, recovery of hiding cover (conifer vegetation) would take 15 to 25 years versus 35 to 65 years under the No Action scenario. Marginal cover would develop in about 50 years versus 60 to 90 years under the No Action alternative. Satisfactory cover would likely take 80 years to develop versus 90 to 120 years under the No Action alternative.

Optimum calving and fawning habitat includes a combination of thermal cover, hiding cover, and quality forage located in close proximity to water. Habitat is provided primarily within riparian areas where high quality, succulent vegetation and water are readily available. Down trees can provide some security for calving and fawning. Salvage logging is not planned in riparian areas, although hazard trees may be felled. As snags fall and vegetation recovers, riparian areas are likely to become ideal for calving and fawning, especially where roads have been closed.

Under Alternatives 2, 3 and 5, salvage would reduce the potential for excessive build up of fuels in 10 to 20 years as snags fall. Salvage would permit the use of prescribed fire in the future to maintain low fuel loads and encourage the growth of more succulent forage, ultimately benefiting deer and elk.

Although Alternative 4 conducts fuels reduction activities, treatment is limited to fire-killed trees less than 8 inches DBH. Fire risk would still be elevated in 10 to 20 years as snags fall and fuel concentrations increase; another stand replacement fire could further delay development of cover. Excessive fuel loads would preclude the opportunity to use prescribed fire in the future.

Open road densities would increase during the logging operations. Roads would be opened to provide for logging access and log haul. In addition, Alternatives 2, 3 and 5 would construct 0.3 miles of system road and 4.1, 3.5 and 3.3 miles of temporary road respectively. Impacts to deer and elk are expected to last only 1 to 3 years, as there is great economic incentive to salvage dead and dying trees quickly. Disturbance during road construction and logging is expected to be minimal as animals are already expected to move out of the fire area during the day due to the lack of hiding cover. The timber sale purchaser would close roads that would be used for log haul; the Forest Service would be responsible for the remaining closures. The timber sale purchaser would decommission temporary roads.

Following implementation, road closures and road decommissioning would reduce open road densities below those that existed prior to the fire as displayed in Table WL-4. Alternative 1 reflects the existing condition and No Action alternative. In addition, the table displays habitat effectiveness for open road densities (HEr) and overall habitat effectiveness (HEI). All alternatives, the No Action alternative as well as the Action alternatives, maintain existing cover. Consequently cover and spacing indices were not re-calculated; they remain as displayed in Table WL-3 in the existing condition section.

Table WL-4: Open Road Density, Habitat Effectiveness s for Open Roads (HEr) and Total HEI (Habitat Effectiveness Index)

Alternative	Open Road Density (miles per square mile)	HEr*	HEcsr (HEI)*
Forest Plan Standard	3.2	.40	.40
Jack Subwatershed - 60507			
Alt. 1	4.84	.22	.37
Alt.'s 2, 3, 4 and 5	3.87	.31	.41
Snow Subwatershed- 60509			
Alt. 1	4.05	.29	.34
Alt.'s 2, 3, 4 and 5	2.39	.45	.38
Hog Subwatershed - 60511			
Alt. 1	3.75	.32	.53
Alt.'s 2, 3, 4 and 5	3.74	.32	.53
Keller Subwatershed- 60515			
Alt. 1	1.75	.51	.59
Alt.'s 2, 3, 4 and 5	1.75	.51	.59
*HEI = Habitat Effectiveness Index *HEr = habitat effectiveness derived from the density of roads open to vehicular traffic			

New road closures were only considered in the burn areas, and consequently effects are most dramatic in those subwatersheds where the most acres burned. In the Snow subwatershed, open road densities are reduced from 4.05 to 2.39 open miles per square mile, meeting Forest Plan standards. In the Jack subwatershed, open road densities are reduced from 4.84 to 3.87 open miles per square mile. The Jack subwatershed would still not meet Forest Plan standards, but open road densities are being moved towards the standard. In the Keller and Hog Subwatersheds, the Murderer's Creek-Flagtail Cooperative Travel Management Area (also known as a green dot closure area) requires additional closures during the general deer and elk hunting seasons, to the benefit of deer and elk. In future environmental analyses, additional road closures would likely be considered in the unburned portions of the subwatersheds; the major objective would be to reduce open road densities to meet Forest Plan standards.

Even after the proposed road closures are implemented, all habitat would remain within 1,000 meters of open roads. However, the percentage of the Flagtail project area that is within 500 meters of open roads would to be reduced from 95% under the No Action alternative to 78%. Therefore, 22% of the area would be at least 500 meters from open roads versus 5% under the No Action Alternative.

Therefore, road closures would reduce the potential for human disturbance to big game, resulting in greater use of available habitat, less unnecessary energy expenditure, and greater escapement from hunters. This would positively affect big game habitat and other species that prefer low human disturbance, particularly given the high loss of hiding cover from the fire. The total habitat effectiveness indices (HEI) and open road indices (HEr) improve as a result of the road closures (see Table WL-4). After proposed road closures occur, the two areas identified by the Oregon Natural Resources Council as unroaded (see map at the end of Chapter 4, Letter #11), would provide some of the better undisturbed habitats in the fire area.

Under Alternative 4, no commercial logging is proposed and no new roads are constructed. Consequently, the Forest Service would implement all proposed closures. Proposed road closures may take longer to implement than under Alternatives 2, 3 and 5 because funding sources are more limited. Under Alternative 4, it is expected that most closures would occur within 5 years versus 1-3 years under Alternatives 2, 3 and 5. Once all proposed road closures are completed, open road densities would be as described for Alternatives 2, 3 and 5 (see Table WL-4).

Construction of .3 miles of system road would not fragment any large blocks of interior habitat; this section of road is being constructed through burned forest and is intended to replace existing road that is being decommissioned in nearby riparian areas. Temporary road construction could temporarily fragment some habitats, but roads would be decommissioned immediately after logging is completed. Effects would last only 1-3 years. In burn areas, habitat fragmentation from roads becomes more of an issue once older forests have developed, well beyond 3 years.

As discussed, in the existing condition section, antelope primarily use the large open landscapes in Bear Valley. Although the fire opened up landscapes, the high density of standing dead trees may still precludes high use. As with deer and elk, antelope may take advantage of the initial flush of forage. The action alternatives are likely to have little affect on existing antelope populations and distribution.

Cumulative Effects

The existing condition section describes cover, forage, and open road density conditions immediately following the fire. In Table WL-3, cover, road density, and habitat effectiveness values reflect the effects of the fire as well as past timber management and access management activities. Table WL-4 displays habitat effectiveness values following implementation of the alternatives. Additional planned projects in Appendix J (Cumulative Effects) are not expected to change these values in the short-term.

The action alternatives would provide benefits to big game by closing additional roads and therefore further reducing potential big game disturbance and improving big game distribution. Benefits may be somewhat offset by the adverse effects of elevated road use expected on the remaining open roads. When area access is restored, hunting, firewood cutting, and other Forest uses are expected to increase in the burn area. In addition, off road vehicle (ORV) use could induce greater big game disturbance, particularly given the loss of hiding cover.

In burned riparian areas, hardwood and conifer planting is being planned under separate NEPA documents. In 2003, conifer trees were planted on 190 acres in riparian areas and 190 acres in uplands. Hardwoods were planted on 25 acres in 2003; additional hardwoods are proposed for interplanting on the same acres in 2004. Aspen restoration is being planned on an estimated 250 acres (76 aspen sites). Aspen is a favored browse species; initially, taller fences may exclude some big game use, but fences are expected to be removed or left unmaintained once new regeneration has developed sufficiently to out-pace browsing. Wood placement in steams would improve riparian conditions. Noxious weed treatments would reduce weed competition with preferred, native, forage species. Cumulatively, restoration activities would improve forage and accelerate development of hiding cover and fawning/calving habitat.

Livestock grazing would be delayed for at least two years post-burn to allow for recovery of ground cover (Post-fire grazing guidelines - Appendix H). Some uncontrolled cattle use occurred in the summer/fall of 2003, but effects to riparian and upland habitats were considered well within Forest Plan and Interagency Interdisciplinary Team (IIT) standards. When livestock grazing is re-initiated, grazing would be managed to meet Forest Plan and IIT standards as well. Grazing standards have been established at levels to provide sufficient forage to support both wild and domestic ungulate use.

Adjacent private lands have already been salvage logged. Reforestation is required where commercial timber harvest has occurred and the land is left under-stocked. Private lands were planted in 2003. Some private landowners have forage-seeded burned areas to benefit both big game and domestic livestock.

In 2002/2003, fire-killed, hazard trees were salvaged on 14 acres at the Bear Valley Work Center and on 650 acres along roads. Future fuels reduction is planned on 100 acres inside Riparian Habitat Conservation Areas (RHCAs); dead, unmerchantable trees 8 inches DBH and smaller would be felled, then hand piled and burned outside of the riparian areas. When combined with salvage logging and fuels treatment proposed in Alternatives 2, 3 and 5, landscape-level fuels treatments are expected to help reduce the risk of an intense re-burn and another stand replacement fire. Under Alternatives 1 and 4, combined fuel treatments are less likely to reduce fuel loads sufficiently to avoid intense re-burns in the future.

Future timber and access management activities have yet to be proposed for the unburned areas of the affected subwatersheds. Since the Flagtail Recovery Project is expected to have few negative effects on big game habitat in the short-term, and since future activities will be designed with recognition of habitat losses due to the fire, adverse cumulative effects to big game are expected to be incidental regardless of the alternative selected. In the mid- to long-term, the effects of this project combined with restoration projects in Appendix J would be considered favorable to big game.

Summary

The primary differences in alternatives relate to cover recovery, road closures, and build-up of down logs and future fuel loads. Under both the No Action and Action alternatives, overall habitat effectiveness for deer and elk would be expected to improve over time as cover develops. Population numbers are expected to remain stable; distribution and use may change initially as a result of improved forage and reduced cover.

Under the action alternatives, planting would accelerate reforestation, allowing hiding cover and thermal cover to develop sooner than under a natural reforestation scenario. In the severe burn areas, recovery of hiding cover would take 15 to 25 years versus 35 to 65 years under the No Action scenario. Marginal cover would develop in about 50 years versus 60 to 90 years under the No Action alternative. Satisfactory cover would likely take 80 years to develop versus 90 to 120 years under the No Action alternative.

Road closures have the most immediate benefit to deer and elk by reducing the potential for disturbance, particularly given the loss in hiding cover from the fire. Disturbance would be elevated during logging operations, and then reduced as road closures are implemented. The action alternatives reduce open road densities within the fire area; the No Action alternative does not.

Salvage logging reduces the future build-up of down logs that could impede big game movements and elevate risk of a future re-burn. Under Alternatives 1 and 4, big game use in the area would likely increase in the first 10 years in response to the flush in forage; after 10 years, use would decrease as high concentrations of downed trees limits big game. Alternative 1 does not remove any trees; future fuel loads would be in excess of risk thresholds. Alternative 4 only removes tree 8 inches DBH and smaller; although fire risk is reduced, future fuel loads would still be considered in excess of risk thresholds. In Alternatives 2, 3 and 5, salvage reduces the future build-up of down to the benefit of big game. Alternative 2 salvage logs the most acres (4,345 acres), followed by Alternative 5 (3,740 acres) and then Alternative 3 (2,871 acres).

Primary Cavity Excavator Species

Existing Condition

In the dry forest types of eastern Oregon, 66 bird and mammal species are known to use snags for nesting or shelter and 41 vertebrate species make use of downed logs (Mellen et al. 2003). Primary cavity excavators, such as woodpeckers, sapsuckers and flickers, are forest dwelling birds that are specialized for nesting and foraging in decayed wood. They require trees with rotted heartwood for excavating nest holes and use both snags and down logs for foraging.

The Forest Plan identifies 11 primary cavity excavators as management indicator species (MIS) for the availability and quality of dead and defective wood habitat: black-backed woodpecker, three-toed woodpecker, Lewis' woodpecker, white-headed woodpecker, pileated woodpecker, downy woodpecker, hairy woodpecker, northern flicker, Williamson's sapsucker, red-breasted sapsucker and yellow-bellied sapsucker. The red-breasted and yellow-bellied sapsuckers were formerly classified with the red-naped sapsucker. Neither the red-breasted or yellow-bellied sapsucker are known to occur in eastern Oregon; the red-naped sapsucker does occur throughout the area and will be used as a substitute MIS in this discussion. By providing habitat for these primary cavity excavators, habitat is provided for many other dead wood dependent species as well.

Habitat trend information derived from Interior Columbia Basin studies (Wisdom et al. 2000) was reviewed. Habitat trends vary across the Blue Mountains with some watersheds experiencing increased habitat and others decreased habitats, but overall, the trend is towards a loss of habitat. Population trends for these species do no reflect the loss of habitats, with only the pileated woodpecker showing large declines (Wisdom et al. 2000).

The Flagtail fire burned across approximately 7,120 acres of federal lands, of which about 6,180 acres were forested. Approximately 3,150 acres of the forested land burned severely (90% tree mortality), 2,400 acres burned moderately (60%-90% tree mortality), and 460 acres burned lightly (30%-69% tree mortality). About 170 acres that were forested did not burn, mostly in riparian areas. In the severe and moderate mortality areas, most of the pre-fire snags and down logs were consumed. In the light and no-mortality areas, pre-fire snags and downed wood habitats are relatively intact.

The fire created an abundance of new snags. Post-fire density, size and distribution of snags are a result of several factors: fire severity, past harvest, stand age, tree species composition, and the effects of past disturbances such as wind, fire, pathogens, and insects. Post-fire snag densities are estimated at 3 to 105 snags per acre, 10 inches DBH or greater. Snags greater than 20 inches DBH range from 0 to 14 snags per acre. Stands that were classified as OFMS, YFMS, and UR pre-fire, (48% of forested area) currently have the most large diameter snags. Snag estimates are calculated at the stand level.

Primary cavity excavators use burned forest habitats and green forest habitats differently. Tree canopy cover, understory shrub and grass cover, and snag numbers and qualities are all different. Snag habitats in post-fire environments are unique for several reasons: 1) early post-fire forests and associated insect outbreaks result in a rapid increase in nest sites and food supplies, 2) initially, most of the new snags are “hard” snags consisting of sound sapwood that may delay use by species that prefer “soft” snags, 3) many woodpecker species appear to respond positively to burned habitats, with some species using them as source habitats, and 4) fires leave few or no green trees for future snag replacements.

Among the management indicator species, the black-backed woodpecker, three-toed woodpecker, hairy woodpecker, Lewis’ woodpecker and northern flicker are strongly associated with post-fire habitats whereas the pileated woodpecker, white-headed woodpecker, downy woodpecker, red-naped sapsucker and Williamson’s sapsucker have much lower associations (Saab and Dudley 1997, Hutto 1995, Sallabanks 1995). The large numbers of snags created by a fire provide elevated nesting and foraging opportunities and probably contribute to good nest success and high productivity.

Fire-hardened snags and non-fire hardened snags or soft snags provide different niches for various woodpecker species. Some opportunistic birds, such as black-backed, three-toed and hairy woodpeckers, are capable of excavating nests in harder trees; other species, such as Lewis’ woodpecker and the northern flicker, require softer snags for excavating nest sites (Raphael and White 1984). Initially in burned areas, snags are primarily fire-hardened snags. Eventually, fire-killed trees that were previously sound soften with decay introduced by the multitude of insects that colonize dead and dying trees following a burn. Consequently, various woodpecker species may re-invade post-fire habitats in a series of waves, although there is certainly considerable overlap in use periods.

A key to understanding snag dynamics following fire is to know something about the longevity of snags. Many variables factor into the longevity of snags: condition of the tree before it died, cause of death, soil type, climate, extreme weather conditions, protection of snags by topography or other vegetation, tree species, snag height, and snag diameter. Morrison and Raphael (1993) found that snags created by fire decayed rapidly and fell quicker than those on unburned forests, and that large snags had greater longevity than smaller snags. Knotts (1997) summarized snag fall down rates estimated in various post-fire studies, and concluded that most snags will fall within 10 to 30 years.

In an unburned forest, enough snags are left to provide for 100 percent potential populations, and enough live trees, of various sizes, are left to become snags in the future, ensuring that snag habitat is provided over time. In areas where fire burned severely and killed all or nearly all trees, there are few live, green trees left to become snags in the future. Few snags will be available again until a new forest develops, trees reach sizes useful for woodpeckers, and these trees begin to die.

Management Direction for Dead Wood Habitats

Currently, retention of snags and down logs is based on the Forest Plan as amended by Regional Forester Eastside Forest Plans Amendment #2. This Amendment directed Forests to manage snags at the 100% population potential and to use the best available science to determine actual numbers. The Forest Plan, as amended, requires that an average 2.39 snags per acre, 21 inches DBH and greater, be retained. Amended standards for down logs are as follows: 20-40 lineal feet per acre for ponderosa pine types, 100-140 lineal feet for mixed conifer types, and 120-160 linear feet for lodgepole pine types. It is assumed that these snag and down log levels will provide the minimum level required for 100% of potential population levels of primary cavity excavators (LRMP 1990, Thomas 1979). Overall, the fire area has snags well in excess of Forest Plan standards; conversely, down logs, are well below standards, a situation that will quickly be rectified as snags begin to fall.

DecAID Tool

Subsequent to Amendment #2 direction, Rose et al. (2001) invalidated the biological potential models; they provided no replacement methodology but mentioned a Forest Service tool (DecAID) that was being developed. Very recently DecAID (Mellen et al. 2003) has been completed. DecAID is an internet-based computer program being developed as an advisory tool to help federal land managers evaluate effects of management activities on wildlife species that use dead wood habitats. The tool synthesizes published literature, research data, wildlife databases, and expert judgment and experience. DecAID is not intended to be prescriptive; i.e., it is not used to establish standards for snags or down logs. Information is used primarily as a comparison tool. DecAID provides two sets of data with which to analyze snag habitats: 1) snag inventory data and 2) wildlife use data.

Comparison of Inventory Data: Table WL-5 displays post-fire snag distributions in the Flagtail Fire area as compared to inventory distributions derived from DecAID. The DecAID snag distribution was derived from unharvested inventory plots in ponderosa pine/Douglas-fir habitat types in Oregon and Washington Eastside forests; for this analysis, this distribution is assumed to best reflect expected snag levels in dry forest types.

The first half of the table displays snag distribution for snags greater than 10 inches DBH. The second half of the table displays snag distribution for snags greater than 20 inches DBH. Snag levels are displayed by density group (e.g., density group 1 has 1-4 snags per acre). Percentages reflect the proportion of the forested acres in the Flagtail Fire project area that have the specified snag densities (e.g., Under Alternative 1, 75% of the forested acres in the fire area has snag densities in excess of 36 snags per acre).

Table WL-5: Post-fire Snag Densities for the Flagtail Fire Project Area by Density Group (Snags/Acre). DecAID Distribution (Mellen 2003) and Existing Condition.

Density Group (Alpha/Numeric Code)	Snags/Acre	DecAID Snag Distribution*	Alt. 1 (No Action) and Alt 4+
Snags equal to or greater than 10" DBH			
1	1-4	52%	10.28%
2	4-8	15%	0.99%
3	8-12	22%	1.08%
4	12-16	7%	0.48%
5	16-20	0%	2.31%
6	20-24	0%	0.94%
7	24-28	0%	1.36%
8	28-32	0%	2.63%
9	32-36	2%	5.04%
10	> 36	0%	74.89%
		99.5%	**100%**
Snags equal to or greater than 20" DBH			
A	0-2	47%	26.88%
B	2-4	39%	34.54%
C	4-6	8%	16.12%
D	6-8	0%	7.03%
E	8-10	3%	11.65%
F	10-12	0%	2.43%
G	12-14	0%	0.33%
H	14-16	0%	1.02%
I	16 –18	0%	0.00%
J	>18	0%	0.00%
		100%	**100%**
*DecAID Inventory Data: Wildlife Habitat Type = Ponderosa Pine/Douglas-fir; Structural Condition = Larger Trees			

It is useful to compare existing snag distributions in the Flagtail Fire area to those in the DecAID inventory data. Table WL-5 indicates that total snag levels (snags 10" DBH and greater) in the fire area are much higher than snag levels displayed in DecAID. This disparity is particularly obvious when comparing density groups 1 through 4 and density groups 10. The large diameter snag densities (snags 20" DBH and greater, density groups A-J) are also elevated when compared to the DecAID inventory, but the disparity is noticeably reduced.

This comparison suggests that because of the fire, the Flagtail project area may currently support snags at a much higher level than would be typically expected in dry forest types. Therefore, the Flagtail project area may also be providing far more habitat for cavity excavator species than is typical for these forest types. The DecAID tool suggests using caution when applying distributions in post-fire environments. Figure 31 in the Map Section displays snag densities by stand.

Comparison of Wildlife Use Data: Data in DecAID suggests that snag level and down log levels for some primary cavity excavators may need to be higher than the levels based on 100% of biological potential population models. Post-fire snag numbers in Flagtail were compared against woodpecker use data in DecAID; recent post-fire data in the ponderosa pine/Douglas-fir wildlife habitat type was used for comparison (Mellen et al. 2003). DecAID suggests that post-fire habitats would need to provide much higher levels of snags than live, unburned forests to support use by primary cavity excavators.

DecAID presents information on wildlife use based on snag density and snag diameter. This information is presented at three statistical levels: low (30% tolerance level), moderate (50% tolerance level), and high (80% tolerance level). A tolerance level can also be defined as an "assurance of use" or the likelihood that individuals in a population of a selected species will use an area given a specified snag size and density. For instance, at the 30 percent tolerance level for any given species, it would be expected that only 30 percent of a population would find suitable or usable habitat at the specified snag density. Consequently, 70 percent of a population would *not* find suitable habitat conditions in habitats at that snag density.

Snag density, size and distribution influence use levels and vary by individual species. For example, post-fire data in DecAID suggests that Lewis' woodpecker would need 10 snags/acre to meet the 30% tolerance level, whereas black-backed woodpeckers would need 62 snags/acre.

It should be noted that DecAID does not model biological potential or population viability. There is no direct relationship between tolerances, snag densities and sizes used in DecAID and snag densities and sizes that measure potential population levels (Mellen 2003, USDA Forest Service 1990, Thomas 1979).

Primary cavity excavators generally prefer larger diameter trees for nesting. In the Forest Plan, snags less than 12 inches DBH are not "counted" as contributing towards habitat; in DecAID, snags less than 10 inches DBH are not counted as contributing towards habitat.

Table WL-6 displays the percentage of total suitable habitat in the Flagtail Fire area by cavity nesting species and tolerance level. Values are displayed for five species that the Forest Plan identifies as Management Indicator Species (MIS). For the remaining MIS in the Forest Plan, DecAID does not provide wildlife use information for post-fire habitats; effects discussions will be more qualitative than quantitative.

Table WL-6: Existing tolerance level for cavity nesting species within the Flagtail Fire project area.

Species	Percentage of total forested habitat in Flagtail Fire area by Tolerance Level*			
	<30% Tolerance Level	*30% Tolerance Level*	*50% Tolerance Level*	*80% Tolerance Level*
Black-backed Woodpecker	66%	32%	2%	0%
Hairy Woodpecker	12%	27%	59%	2%
Lewis' Woodpecker	12%	66%	22%	0%
Northern Flicker	28%	72%	0%	0%
White-headed Woodpecker	15%	38%	46%	1%
*Based on DecAID Woodpecker Use Data: Wildlife Habitat Type = Ponderosa Pine/Douglas-fir; Structural Condition = Open; Recent Post-fire Habitats				

Generally, post-fire habitat conditions are considered ideal for primary cavity excavator species, but Table WL-6 suggests that even under the best of situations, snag densities in the Flagtail area will provide for few species at the 80% tolerance level. Habitats in the Flagtail project fire area are generally dry ponderosa pine or dry mixed conifer types. Stand densities are generally lower than in moist, mixed conifer sites due to drier habitat conditions, southerly aspects, and lower site productivities, slope conditions. Even in severe burn conditions, these vegetation types would not be expected to produce ultra high snag densities.

The Lewis woodpecker and hairy woodpecker have the highest levels of habitat available to them as a result of the 2002 fire (see Table WL-6). Both species are strongly associated with fire (Hutto 1995, Sallabanks 1995, Saab and Dudley 1997, Saab et al. 2002). Lewis' woodpeckers use burned forests because of the relatively open canopy that allows for shrub development and associated arthropods prey, perch sites for foraging, good visibility, and space for foraging maneuvers (Saab et al. 2002, Marshall 1992b, Jackman 1974, Raphael and White 1984, Saab and Dudley 1997). Maximum use may be delayed for several years until fire-killed trees began to fall, stands become more open, snags are well decayed and shrub densities have increased. Hairy woodpeckers are capable of excavating nests in harder snags, and therefore, are expected to rapidly invade the burned area (Raphael and White 1984).

Northern flickers respond positively to fire (Hutto 1995, Sallabanks 1995, Saab and Dudley 1997). Snag densities in the Flagtail fire area support use primarily at the 30% tolerance level. Data in DecAID suggests that stands would need to have over 17 snags per acre greater than 20 inches DBH to meet the 50% tolerance level, an unlikely scenario in these dry forest types (Mellen 2003).

The black-backed and three-toed woodpeckers tend to favor areas with high snag densities; therefore, these species have benefited from the fire, but at relatively low levels compared to the other species. For the black-backed woodpecker, 32% of the project area meets the 30% tolerance level; 2% meets the 50% tolerance level. Even though DecAID suggests that snag densities in Flagtail will only provide for black-backed woodpecker up to the 50% tolerance level, populations are expected to respond favorably compared to pre-fire conditions, which provided poor habitat. Black-backed and three-toed woodpeckers begin to use burned habitat shortly after the fire; they are strong excavators and can drill into newly created, hard snags. The relatively low number of black-backed woodpeckers in unburned forests may be sink populations (populations that are generally decreasing), maintained by emigrants from burns when conditions in a fire area become less suitable; in other words, burns may support source populations of black-backed woodpeckers (populations that increase and spread) (Hutto 1995).

DecAID provides post-fire data for white-headed woodpeckers, suggesting that the Flagtail Fire area could support use primarily at the 30% to 50% tolerance level. Several studies on white-headed woodpeckers, however, suggest the species is not closely associated with burned habitats (Hutto 1995, Sallabanks 1995, Raphael and White 1984, Saab and Dudley 1997), primarily because of the lack of many live trees. The species primarily forages on live, mature and overmature ponderosa pine, feeding on seeds from cones and scaling tree bark for insects. The species may use large, well-decayed snags in the burned area for nesting, provided that the burned area is within a potential home range that includes large, live ponderosa pine.

Pileated woodpeckers are not strongly associated with post-fire habitats (Hutto 1995, Sallabanks 1995, Raphael and White 1984, Saab and Dudley 1997). DecAID does not provide any post-fire woodpecker use data. The species has a strong preference for mature or old growth stands with high canopy cover (see Chapter 3, Terrestrial Wildlife, Old Growth Habitat). Pileated woodpeckers are unlikely to nest in the fire area, but would likely use the area for foraging if it is within a potential home range that also includes mature or old growth forest with high canopy cover for nesting and roosting.

The red-naped sapsucker, Williamson's sapsucker and downy woodpecker are not strongly associated with post-fire habitats (Hutto 1995, Sallabanks 1995, Saab and Dudley 1997). DecAID does not provide any post-fire woodpecker use data for these species. Sapsuckers primarily use live trees for foraging; however, they do obtain food by fly-catching, gleaning, and pecking, and could take advantage of habitat provided by the numerous dead trees (Jackman 1974). The red-naped sapsucker is strongly associated with forests containing pure stands of aspen or mixed stands of aspen and conifers (Jackman 1974, Hutto 1995). Aspen stands are very limited in the project area, comprising about 75 acres; many stands were burned in the fire and grazing by wild and domestic ungulates has greatly limited regeneration. The downy woodpecker may benefit from the fire; however, they feed and nest primarily in deciduous trees in riparian areas as well.

Post-fire, down logs levels are considered low, even compared to Forest Plan standards. DecAID does not provide wildlife tolerances for down logs. DecAID does summarize inventory information for the ponderosa pine/Douglas-fir forest types in eastern Oregon and Washington; information is presented as percent cover of down logs rather than log length. As with snag densities, DecAID suggests that the down log levels were much more variable on the landscape, with some areas having no down logs and other areas having concentrations greater that the Forest Plan standard. Eventually, as snags in the

Flagtail Fire area start to fall, there is an opportunity to mimic a more variable level of down logs.

Environmental Consequences

Post-fire snag retention was raised as a key issue in this analysis (see Key Issues in Chapter 1). Several public letters raised concern that cavity dependent species use burned forest habitats differently than live, green forests, and that salvage logging could *potentially* have negative impacts. The 1995 report by Beschta, et al. also concluded that cavity dependent species require higher levels of snags in post-fire habitats than are typically required by Forest Plans. Other letters raised the concern that salvage alternatives were leaving too many snags. Concerns are addressed through this analysis.

The alternatives retain varying levels, sizes and distribution of snags. All alternatives would meet or exceed Forest Plan snag standards, as amended, i.e., 2.39 snags per acre, 21 inches DBH or greater. Consequently, all alternatives would provide the number of snags for 100% of potential population levels of primary cavity excavators (LRMP 1990, Thomas 1979).

Data in DecAID suggests that snag level and down log levels for some primary cavity excavators may need to be higher than the levels based on 100% of biological potential population models. Because of the variation between the biological potential models (LRMP 1990, Thomas 1979) and DecAID (Mellen et al. 2003), results of both assessments are provided in this discussion.

The following discussions use snag inventory data from the Flagtail Fire area and compares it to snag inventory and woodpecker use data described in DecAID.

Effects to primary cavity excavators will be addressed in three time scales:

- 0-10 years: discusses the effects to species/habitats immediately following implementation of the no action or an action alternative,
- 10-30 years: discusses the effects to habitats as post-fire snags begin to fall,
- 30+ years: discusses time period after which new snag creation becomes an issue.

As stated in the existing condition section, the black-backed woodpecker, three-toed woodpecker, hairy woodpecker, Lewis' woodpecker and northern flicker are strongly associated with post-fire habitats whereas the pileated woodpecker, white-headed woodpecker, down woodpecker, red-naped sapsucker and Williamson's sapsucker have much lower associations (Saab and Dudley 1997, Hutto 1995, Sallabanks 1995). This effects discussion will focus more fully on the first list of species.

Direct and Indirect Effects

Comparison of Inventory Data: Table WL-7 displays snag distribution by alternative, and compares them to the inventory distribution derived from DecAID. The DecAID snag distribution was derived from unharvested inventory plots in ponderosa pine/Douglas-fir habitat types in Oregon and Washington Eastside Forests; for this analysis, this distribution is assumed to reflect expected snag levels in dry forest types.

The table displays distribution by density groups (e.g., 1-4 snags per acre). The first half of each table displays snag distribution for snags greater than 10 inches DBH. The second half of each table displays snags distribution for snags greater than 20 inches DBH. Percentages reflect the proportion of the forested acres in the Flagtail Fire project area that have the estimated snag densities (e.g., Under Alternative 1, 75% of the forested acres in the fire area has snag densities in excess of 36 snags per acre).

Table WL-7: Snag Distribution by Alternative

Density Group (Alpha/Numeric Code)	Snags/Acre	DecAID Snag Distribution*	Alt. 1 (No Action) and Alt 4+	Alt. 2	Alt. 3	Alt. 5
Snags equal to or greater than 10" DBH						
1	1-4	52%	10.28%	66.74%	10.28%	31.88%
2	4-8	15%	0.99%	5.31%	0.99%	23.69%
3	8-12	22%	1.08%	1.08%	1.08%	1.10%
4	12-16	7%	0.48%	1.50%	50.18%	12.35%
5	16-20	0%	2.31%	2.01%	2.09%	1.96%
6	20-24	0%	0.94%	2.85%	1.15%	3.87%
7	24-28	0%	1.36%	2.93%	1.36%	2.36%
8	28-32	0%	2.63%	2.37%	1.30%	0.00%
9	32-36	2%	5.04%	1.03%	3.12%	3.77%
10	> 36	0%	74.89%	14.19%	28.45%	19.02%
		99.5%	**100%**	**100%**	**100%**	**100%**
Snags equal to or greater than 20" DBH						
A	0-2	47%	26.88%	27.61%	26.88%	26.88%
B	2-4	39%	34.54%	66.03%	60.36%	60.50%
C	4-6	8%	16.12%	3.68%	5.04%	5.72%
D	6-8	0%	7.03%	0.98%	3.39%	3.39%
E	8-10	3%	11.65%	1.19%	2.80%	1.99%
F	10-12	0%	2.43%	0.45%	1.47%	1.47%
G	12-14	0%	0.33%	0.05%	0.05%	0.05%
H	14-16	0%	1.02%	0%	0.00%	0.00%
I	16 –18	0%	0.00%	0%	0.00%	0.00%
J	>18	0%	0.00%	0%	0.00%	0.00%
		100%	**100%**	**100%**	**100%**	**100%**

*DecAID Inventory Data: Wildlife Habitat Type = Ponderosa Pine/Douglas-fir; Structural Condition = Larger Trees
+Alternative 4 only removes non-commercial size snags less than 8 inches DBH; therefore, snags levels in this table would be the same as for Alternative 1, No Action.

Comparison of Wildlife Use Data: Tables WL-8 through WL-12 display tolerance levels for each primary cavity excavator species as a percentage of the Flagtail Fire area. Calculations are based on forested sites (6,180 acres or 87% of the area) and exclude acres unsuitable as forestlands, i.e., acres that do not support trees or snags (about 940 acres or 13% of the fire area). The tables display tolerance levels for each alternative. Alternative 4 only removes non-commercial size snags less than 8 inches DBH; therefore, snags levels in this table would be the same as for Alternative 1, No Action.

Table WL-8 - Black-backed Woodpecker. – Wildlife Tolerance Levels (% of Flagtail Fire Area)

Alternative	Wildlife Tolerance Levels			
	0-29%	***30-49%***	***50-79%***	***80% +***
1 and 4	66%	32%	2%	0%
2	97%	3%	0%	0%
3	91%	8%	1%	0%
5	92%	7%	1%	0%
*Based on DecAID Woodpecker Use Data: Wildlife Habitat Type = Ponderosa Pine/Douglas-fir; Structural Condition = Open; Recent Post-fire Habitats				

Table WL-9- Hairy Woodpecker – Wildlife Tolerance Levels (% of Flagtail Fire Area)

Alternative	Wildlife Tolerance Levels			
	0-29%	***30-49%***	***50-79%***	***80% +***
1 and 4	12%	27%	59%	2%
2	74%	16%	10%	0%
3	12%	67%	20%	1%
5	57%	29%	14%	1%
*Based on DecAID Woodpecker Use Data: Wildlife Habitat Type = Ponderosa Pine/Douglas-fir; Structural Condition = Open; Recent Post-fire Habitats				

Table WL-10 - Lewis' Woodpecker – Wildlife Tolerance Levels (% of Flagtail Fire Area)

Alternative	Wildlife Tolerance Levels			
	0-29%	***30-49%***	***50-79%***	***80% +***
1 and 4	12%	66%	22%	0%
2	73%	24%	3%	0%
3	12%	80%	8%	0%
5	56%	37%	7%	0%
*Based on DecAID Woodpecker Use Data: Wildlife Habitat Type = Ponderosa Pine/Douglas-fir; Structural Condition = Open; Recent Post-fire Habitats				

Table WL-11 - Northern Flicker – Wildlife Tolerance Levels (% of Flagtail Fire Area)

Alternative	Wildlife Tolerance Levels			
	0-29%	***30-49%***	***50-79%***	***80% +***
1 and 4	28%	72%	0%	0%
2	82%	18%	0%	0%
3	28%	72%	0%	0%
5	42%	58%	0%	0%
*Based on DecAID Woodpecker Use Data: Wildlife Habitat Type = Ponderosa Pine/Douglas-fir; Structural Condition = Open; Recent Post-fire Habitats				

Table WL-12 - White-Headed Woodpecker – Wildlife Tolerance Levels (% of Flagatil Fire Area)

Alternative	**Wildlife Tolerance Levels**			
	0-29%	***30-49%***	***50-79%***	***80% +***
1 and 4	15%	38%	46%	1%
2	76%	19%	5%	0%
3	65%	24%	11%	1%
5	71%	19%	10%	1%
*Based on DecAID Woodpecker Use Data: Wildlife Habitat Type = Ponderosa Pine/Douglas-fir; Structural Condition = Open; Recent Post-fire Habitats				

No Action

Period 0-10 years

Alternative 1 would provide for the greatest number of snags for primary and secondary cavity excavators. Approximately 6,180 acres of habitat with abundant snags currently exist. About 75% of the forest acres have snag densities in excess of 36 snags per acre; the DecAID inventory data suggests that 0% of these dry forest types typically have snags densities this high (see Table WL-7). The large diameter snags are also elevated when compared to the DecAID inventory. Figure 31 in the Map Section displays snag densities by stand. As discussed in the existing condition section, this comparison suggests that, because of the fire, the Flagtail project area may currently support snags at a much higher level than would be typically expected in dry forest types.

Throughout the burn area, existing snags and large down logs would remain undisturbed, providing potential nesting, roosting, and foraging habitat for primary cavity excavators and other species dependent on dead wood habitats such as small mammals, amphibians, and insects. Existing snags would be available in several size classes with differing densities. Species associated with dead wood habitats would respond favorably.

In the early post-burn period, primary cavity excavator numbers would increase until they are limited by same-species territoriality. Comparing existing snag densities and sizes against post-fire woodpecker use levels in DecAID (Tables WL-8 through WL-12), it is expected that the landscape would support most primary cavity excavators at the 30% to 50% tolerance levels. See the existing condition section.

It is likely that three-toed and black-backed woodpeckers would benefit the most from this alternative as they take advantage of the elevated snag levels. Three-toed and black-backed woodpeckers are strongly associated with early post-fire conditions and they tend to select nest sites with the highest snag densities and the least amount of logging (Saab and Dudley 1997). They rapidly colonize stand-replacement burns within 1 to 2 years of a fire; however, within 5 years they become rare, presumably due to declines in bark and wood-boring beetles (Kotliar et al. 2002). Hairy woodpeckers are also capable of excavating nests in harder snags, and therefore, are expected to rapidly increase in the burned area.

Lewis' woodpecker and the northern flicker would benefit from this alternative, as a maximum number of large snags would be available for nesting habitat. Maximum use may be delayed for several years until fire-killed trees began to fall, stands become more open, snags are well decayed and shrub densities have increased.

White-headed woodpeckers primarily forage on live, mature and overmature ponderosa pine, feeding on seeds from cones and scaling tree bark for insects. The species may use large, well-decayed snags in the burned area for nesting, provided that the burned area is within a potential home range that includes large, live ponderosa pine.

The pileated woodpecker has a strong preference for live canopy cover and would likely benefit only minimally from this alternative. Pileated woodpeckers may use the burn for foraging if it is within a potential home range that also includes mature or old growth forest with high canopy cover for nesting and roosting.

The red-naped sapsucker and Williamson's sapsucker would not greatly benefit from the No Action alternative, since their primary means of foraging is sapsucking live trees. However, they do obtain food by fly-catching, gleaning, and pecking, and could take advantage of the numerous dead trees. The downy woodpecker may benefit from this alternative; however, they feed and nest primarily in deciduous trees in riparian areas.

Initially, before snags begin to fall, large down logs may be deficient. In the severely- and moderately-burned areas (89% of the forested acres), most of the down logs were consumed. In the lightly- and non-burned areas (11% of the forested acres), downed wood habitats are relatively intact.

Period 10-30 years: Loss of Post-fire Snags

The benefits primary cavity excavators derive from the fire are somewhat limited in time. Primary cavity species will use the area, increasing in numbers until the time when a sufficient number of snags have fallen to begin to limit the density of woodpeckers.

Most of the smaller snags (~10-14 inches DBH) will fall within the first 10 years post-burn, as well as some of the larger snags, decreasing overall snag density. At that point, habitat will be less suitable for black-backed and three-toed woodpeckers, which prefer a high density of smaller, harder snags; it will be more suitable for species such as Lewis' woodpecker, northern flicker, downy woodpecker, white-headed woodpecker, and Williamson's sapsucker, which prefer softer snags and more open habitat. Hairy woodpecker will still likely use the site extensively. Red-naped sapsuckers may increase, particularly in unburned or lightly burned riparian areas. Pileated woodpeckers nesting would likely remain low.

Raphael and White (1984) estimated expected snag densities at year 15 post-fire given average snag fall down rates. They estimated that 4 hard snags are required today to retain one soft snag at year 15. Achieving a Forest Plan standard of 2.39 snags/acre at age 15 would require retention of about 10 hard snags per acre. Using the findings by Raphael and White and a No Action strategy, it is expected that snags levels at year 15 would still be well in excess of Forest Plan standards. Snag levels would still meet 100% population potential. Comparing DecAID values against Raphael and White's findings, most of the fire landscape would still remain within the 30% to 50% tolerance level for primary cavity excavator species; snag levels for black-backed woodpecker would drop below the 30% tolerance level.

As snags begin to fall, down log levels would greatly increase thereby increasing denning, nesting, and feeding habitat for down wood dependent species. By 15 years, the levels of down wood would greatly exceed the minimum Forest Plan standard. The same conclusion can be reached comparing expected down log distributions in Flagtail against the distributions in DecAID.

Period 30 + Years: Future Snag Recruitment and the Snag Gap

An important issue with respect to cavity nesters in stand replacement fire areas is that there are few live trees available to become snags in the near future. While snags are abundant after a fire, once they fall down, snags will not be available again until a new forest develops, trees reach sizes useful for woodpeckers, and these trees begin to die. This scenario can create a *snag gap* where no large snags are available. Although snag levels currently exceed Forest Plan standards, this analysis assumes that most post-burn snags will be on the ground within 30 years. Larger snags are likely to persist longer than smaller snags, with some remaining longer than 30 years.

In forested stands that burned lightly or moderately, sufficient green trees may remain to provide snag replacements either immediately or in a protracted time period as compared to the severely burned areas. Stands with a live tree component comprise about 3,030 acres (49%) within the fire area. Stands that classify as old forest multiple strata (OFMS) or young forest multiple strata (YFMS) have sufficient numbers of large diameter trees to provide snag replacements immediately. Stem exclusion open canopy (SEOC) and understory reinitiation (UR) stands would take approximately 20 years to grow 14-inch DBH trees and 70 years to grow 21-inch DBH trees.

In forested stands that burned with high severity, very few or no green trees would be available to become snags in the near future. Stand initiation acres comprise about 3,150 acres (51% of forested acres) within the fire area. Reliance on natural regeneration to reforest these areas delays development of large diameter trees and potential snag replacements (see Chapter 3, Forest Vegetation, Reforestation of Burned Forestland and Stand Structural Stages). Stand initiation (SI) stands would take 80 to 120 years to grow 10-inch DBH trees, 100 to 140 years to grow 14-inch DBH trees and 150 to 190 years to grow 21-inch DBH trees.

Data in DecAID (Mellen 2003) suggests a snag diameter of 14” DBH would meet the 30% tolerance level for most cavity excavator species, given a sufficient density of snags. Therefore, with no reforestation, there is a snag gap between 30 years post-fire and 100 years post-fire where large snags could be deficient in the severely burned portions of the project area, a gap of 70 years. If larger snags persist longer than expected, the snag gap would be reduced further, particularly for Alternatives 1 and 4, which retain the most large diameter snags.

Action Alternatives

Salvage harvest reduces snags numbers, which negatively affects some primary cavity excavator species, such as the black-backed woodpeckers, and benefits others such as the

Lewis' woodpecker. Snag retention levels vary by alternative (see Table WL-7); therefore, effects vary as well.

In all action alternatives no snags would be removed from riparian habitat conservation areas (RHCAs) unless they need to be felled to reduce safety hazards along open roads. Forested RHCA acres total approximately 600 acres or 10% of the potential forest lands within the burn area. An additional 1,195 acres of burned forests, about 20% of the potential forested lands, were not considered economically viable for salvage harvest; as with the RHCAs, snags would not be dropped unless they need to be felled to reduce safety hazards.

Harvest does raise the risk of blowdown of residual snags. Alternatives leave a varying mix of snag densities. Snags will be distributed in larger, non-harvested blocks, small patches or dispersed. Blowdown risk is reduced when snags are left in untreated patches. In the light severity burn areas, snags are interspersed with live trees, reducing the risk of blowdown as well. Estimated snag fall down rates incorporate losses expected from blowdown.

In salvage units, snags may need to be felled for operational or safety needs during logging (i.e., landings, skyline corridors, safety). Forest Service personnel contacted the Oregon Occupational Safety and Health Administration (OSHA) for their input on this issue (communication between J. Hensley, Malheur National Forest and L. Wenick, Oregon OSHA, January 2004). Based on discussions with OSHA, logging in fire salvage sales could require that an estimated 5 to 10% of protected snags be felled to meet operational/safety needs. The need to fell protected snags is reduced when salvage logging is conducted within 2 to 3 years post-fire; most snags are still in a *hardened* condition that makes them less of a risk of being danger trees. In the Flagtail Fire Recovery project, design and mitigation features have been included in the action alternatives to further reduce the potential for loss of protected snags. In salvage units, snags marked for retention would be clumped, where possible, and located at least 150 feet from open roads and other improvements such as fences (see FEIS, Chapter 2, Alternatives Considered in Detail, and Management Requirements, Constraints and Mitigation Measures, Terrestrial Wildlife). If a tree marked for snag retention is required to be felled for operational needs, a snag of equal or larger size planned for harvest would be left as a replacement, where feasible. The loss of protected snags would likely be less than 2%. This would be considered incidental given the level of snags being left.

Alternative 2

Period 0-10 years

Alternative 2 proposes timber salvage on 4,345 acres (70%of forested acres) and no timber salvage on about 1,795 acres (30% of forest lands). In salvage units, a minimum of 2.39 snags per acre over 21 inches DBH would be retained where available. Snags would be left individually and in random clumps, averaged on a 40-acre basis. In helicopter units, all other merchantable trees down to 12 inches DBH would be removed. In tractor and skyline units, all other merchantable snags down to 10 or 8 inches DBH would be removed; utilization specification vary by species. Under this proposal, forested RHCAs would not be salvage logged, but hazard trees would need to be dropped along open roads. Fuels reduction activities would remove snags less than 8 inches DBH on 2,570 acres.

Table WL-7 displays the post-treatment snag distribution; salvage harvest would aggressively shift snag densities towards the lowest snag density classes. Snag distribution in Alterative 2 better mimics the snag distributions in DecAID than Alternative 1, although one could argue that salvage may be overly aggressive in some instances. For example, density group 1 indicates that 67% of the project area would have 1 to 4 snags per acre versus 52% under the DecAID inventory. Density groups 2 through 4 appear low as compared to the DecAID distribution, but density groups 5 through 10 are high. Given, the standard of error expected for snag inventories, these disparities may or may not be significant. Figure 32 in the Map Section displays snag densities by stand or unit.

Alternative 2 would reduce potential roosting, nesting and foraging trees. Tables WL-8 through WL-12 indicate that removing snags would reduce woodpecker use levels for all species. Portions of the project area would still support woodpeckers at the 30% and 50% tolerance level, but far more acres would fall into the 0-29% tolerance level.

Direct effects would primarily be displacement from nests by removal or destruction of nest structures (snags, ground nests) during salvage operations. Adverse effects would likely be higher for such species as black-backed woodpeckers, three-toed woodpeckers and hairy woodpeckers. These species tend to use post-fire habitats first because of their ability to excavate hard snags. Logging would likely be completed within 2 to 3 years of the fire when most snags would still be hard enough to limit use by other species.

Three-toed and black-backed woodpeckers tend to select nest sites with the highest snag densities and the least amount of logging. Therefore, it is unlikely they would use salvage-logged units for nesting or foraging. Non-salvaged acres would provide the only post-fire nesting habitat for these species, comprising 1,795 acres or 30% of the potential forest lands within the burn area, and most of these areas would only provide use at the 0-29% tolerance or use level. Only 3% of the fire area would provide for black-backed woodpeckers at the 30% tolerance level or better, reduced from 34% under the existing condition. Black-backed woodpeckers respond best to unlogged conditions, and even within non-salvage areas, some snags would be dropped to reduce hazard trees along open roads and to provide woody debris in streams for bank stability.

Hairy woodpeckers often occupy post-fire habitat soon after the burn. Salvage would reduce habitat; following salvage 23% of the area would classify at the 30% tolerance level or better versus 88% of the area under the No Action alternative.

The Lewis' woodpecker, northern flicker and other species that prefer soft snags over hard snags would begin to expand into the fire area as snags begin to decay and fall, but because of the low post-salvage snag levels, use would still remain well below the 30% tolerance level (see Tables WL-10 and WL-11). Most non-salvage areas (30% of forest lands) would provide use at the 30% to 50% tolerance.

Table WL-12 suggests that white-headed woodpecker habitat would be greatly reduced, but the changes in tolerance levels may be misleading, as discussed in the existing condition section. In reality, the species may not use expansive, severely burned areas regardless of the number of snags retained, instead tending towards the periphery of burned areas where there is a mosaic of live and dead trees. In live, green stands, DecAID suggests that white-headed woodpeckers need far lower densities of snags for use, ranging from 1 to 8 snags per acre greater than 10 inches DBH.

Pileated woodpeckers would probably not be directly affected by the removal of large diameter snags, as studies show they are also rare visitors to early post-fire communities. Indirectly, removal of large diameter snags precludes accumulation of large, down logs, and consequently, reduces future foraging habitat. In salvage units, the low densities of snags left would not provide high quality foraging habitat even after snags fall. In non-salvage areas, the potential for quality foraging habitat would remain high. In Replacement Old Growth area 220, salvage harvest on 277 acres would reduce dead wood habitats. ROG 220 is being intentionally managed for future old growth (see Chapter 3, Terrestrial Wildlife, Old Growth Habitat). Given this status, it would be preferable to maintain higher levels of snags/downed wood for pileated woodpeckers in the future.

Red-naped sapsuckers and downy woodpeckers would not be significantly affected by the reduction in nesting and foraging habitat, since they stay mostly in deciduous stands of aspen and cottonwoods. Williamson's sapsuckers forage mostly on live trees, and are also unlikely to be affected.

Initially, before snags begin to fall, large down logs may be deficient. In the severely- and moderately-burned areas (89% of the forested acres), most of the down logs were consumed. In the lightly- and non-burned areas (11% of the forested acres), downed wood habitats are relatively intact.

Period 10-30 years: Loss of Post-fire Snags

Using the findings by Raphael and White (1984) on fall down rates, i.e., that 4 hard snags would need to be retained initially to produce 1 soft snag at year 15, it is expected that within salvage units nearly all snags would be on the ground by year 15. Snags are expected to be below the 2.39 snags per acre required to meet 100% population potential. Only within non-salvage areas, would snags meet levels that meet 100% population levels.

DecAID values were compared against Raphael and White's findings. In salvage units, tolerance levels for primary cavity excavator species would drop below the 30% level by year 15. In non-salvage units, sufficient snags would remain to provide for most primary cavity excavators at the 30% to 50% tolerance level; only the black-backed and three-toed woodpeckers would have snag use levels drop below the 30% tolerance level.

As snags begin to fall, down log levels would increase thereby increasing denning, nesting, and feeding habitat for down wood dependent species. By year 15 post-fire, the levels of down wood would likely meet the minimum Forest Plan standard. Down log distributions in DecAID suggest that 60% of the Flagtail area should support down logs at .1 to 1% cover and 40% of the area should support down logs at levels greater than 1%. Under Alternative 2, it is likely that only non-salvage areas could eventually support down logs at levels greater than 1%. Alternative 2 leaves 30% of the area as non-salvage areas, suggesting that levels would fall short of those expected in dry forest types.

Period 30 + Years: Future Snag Recruitment and the Snag Gap

Discussions for the No Action alternative estimated the number of years it would take before large diameter trees would be available again for snag creation. The No Action alternative relied on natural regeneration to reforest the burn area. Under Alternative 2, planting can accelerate reforestation and reduce the amount of time burned areas are without large snags.

The primary benefits of planting would be achieved on the 3,150 acres that were severely burned and have essentially no live trees left. On these acres, the time it takes to grow 10-inch DBH trees would be reduced from 80-120 years under the No Action alternative to 70 years under Alternative 2. The time it takes to grow 14-inch DBH trees would be reduced from 100-140 years under the No Action alternative to 90 years under Alternative 2. The time it takes to grow 21-inch DBH trees would be reduced from 150-190 years under the No Action alternative to 140 years under Alternative 2.

Data in DecAID (Mellen 2003) suggests a snag diameter of 14" DBH would meet the 30% tolerance level for most cavity excavator species, given a sufficient density of snags. Under Alternative 2, there is a snag gap between 15 years post-fire and 90 years post-fire when large snags could be deficient in the severely burned areas, a gap of 75 years as compared to 70 years under the No Action alternative. Note that the snag gap is greater under Alternative 2. Because initial snag retention under Alternative 2 is so low, the snag gap materializes at year 15 compared to year 30 under the No Action alternative.

Alternative 3

Period 0-10 years

Alternative 3 was designed to provide a broader range of post-fire habitats for primary cavity excavators than the other action alternatives. This alternative proposes timber salvage on 2,870 acres (46% of forested acres) and no timber salvage on approximately 3,309 acres (54% of forest lands). Estimated harvest acres reflect untreated snag patches to be left in some units. Fuels reduction activities would remove snags less than 8 inches DBH on 2,450 acres.

Primary cavity excavators use post-fire habitats differently under active management (primarily salvage logging) versus non-management (no logging). In Idaho, studies of salvage logging in post-burn habitats indicated a continuum in habitat use among primary cavity excavators with the extremes represented by black-backed and Lewis' woodpecker (Saab et al. 2002). Generally, black-backed woodpeckers prefer high densities of unlogged trees whereas Lewis' woodpecker prefers to nest in open or partially logged areas. The study suggested that leaving a range of conditions characteristic of these two species would likely incorporate habitats features necessary for other members of the cavity-nesting community. The following snag design elements use this strategy.

In salvage units, an average 13 snags per acre would be randomly distributed using the following snag size classes: 2.5 snags > 21 inches DBH; 7 snags 14 inches to 20.9 inches DBH; and 3.5 snags 10 inches to 13.9 inches DBH. Snag retention levels are higher than those proposed in Alternative 2 and 5 to provide increased cavity excavator habitat while still reducing fuel loads to levels that better mimic historical conditions. Merchantability specifications would be as described for Alternative 2, with additional snags 10-12 inches DBH being retained in helicopter units.

Where possible, snags would be retained in untreated patches 2 to 15 acres in size. Studies show that cavity dependent species select nest sites with higher tree densities and cavity nesters as a group prefer patches of snags as opposed to single snags retained in uniform, even spaced distribution (Rose et al. 2001, Saab et al., 2002, Kotliar 2002). Snag patches would support snag densities up to 75 snags per acre leaving areas in units between patches with an average of 6 to 11 snags per acre. Because of the mosaic pattern of the burn and the desire to retain snags in patches, snags may not be distributed at the 40-acre basis as required by the Forest Plan, which will require a non-significant Forest Plan amendment.

Alternative 3 proposes no timber salvage on approximately 3,309 acres or 54% of forestlands. Non-salvage acres include four black-backed/three-toed woodpecker areas (see Figure 33 in the Map Section), riparian habitat conservation areas (RHCAs), and stands that were dropped as uneconomical once higher snag requirements were prescribed. Outside salvage units, all snags 10 inches DBH and greater would be retained except those felled along open roads to reduce safety hazards and those felled to provide coarse woody material for streams, draws, and uplands (Chapter 1, Additional Fire Recovery Projects Ongoing or Completed, Actions Outside of this EIS to Address Recovery Needs).

Each of the four black-backed/three-toed woodpecker areas would be about 75-acres in size and set aside for their high snag densities, preferred post-fire habitat areas for these woodpecker species. Stand size and number of areas was based on Forest Plan Management Area 13 (MA-13) recommendations for three-toed woodpeckers. Minimum management requirements suggest establishing habitat acres of 75 acres for every 2,000 to 2,500 acres (USDA 1986). The 75-acre patch size also matches minimum recommendations for black-backed woodpeckers made in several Idaho post-fire studies (Saab and Dudley 1997, Saab et al. 2002). To establish the black-backed/three-toed woodpecker areas, Units 9, 19, 85, 87, 99, 128, 136, 138, 140, 142, and 149 in Alternative 2 were dropped under Alternative 3 and combined with adjacent, unsalvaged riparian areas. No salvage harvest or fuels reduction activities would be conducted in these areas, as these species prefer unlogged conditions.

Table WL-7 displays the post-treatment snag distribution; snag densities are aggressively shifted towards mid-level snag density group #4. Snag densities remain generally high when compared to the DecAID inventory distribution. Density groups 1 though 3 are low when compared to the DecAID distribution, suggesting that Alternative 3 leaves more snags than typically occur in dry forest types. In the large diameter snags, density groups A and B, when combined, reflect a value similar to the DecAID inventory (86% in DecAID and 87% in the Flagtail Fire area. This suggests that Alternative 3 may closely mimic the number of large diameter snags one would expect in dry forest types at the landscape level. Figure 33 in the Map Section displays snag densities by stand or unit.

The direct effect of this alternative would be the removal of potential roosting, nesting and foraging trees. Tables WL-8 through WL-12 indicate that removing snags would reduce woodpecker use levels for all species. Most acres would provide for cavity excavators at the 30% tolerance level, although a range of tolerances would occur over the project area.

In salvage units, retention of 13 snags per acre would provide for Lewis' woodpecker, hairy woodpecker, and northern flicker at the 30% level (see Tables WL-9, WL-10, and WL-11). Lewis' woodpeckers, in particular, tend to favor open or partially logged landscapes for nesting, although they prefer post-logging densities that equate to medium-density, non-burned habitats (Saab et al. 2002). The relatively open canopies allow for shrub development and associated arthropods prey, perch sites for foraging, good visibility, and space for foraging maneuvers. Typically, the species does not use burns until several years after a fire, when stands are more open, snags are well decayed and shrub densities have increased. Salvage harvest has primarily shifted snag levels and tolerance levels from the 50% to the 30% level.

Most non-salvage acres, about 3,309 acres or 54% of forestlands, would provide snag habitat for most primary cavity excavators at the 30% to 50% tolerance level with some areas providing use at the 80% level. These areas provide the greatest opportunities for the black-backed and three-toed woodpeckers. The four black-backed/three-toed woodpeckers areas were specifically selected for their high snag densities and would likely support use at the 30% to 50% tolerance or use level. Snag densities in other non-salvage areas vary, but would likely provide for these species up to the 30% tolerance level. Recall that even under the No Action scenario, the Flagtail Fire does not have snag densities at a level that would support black-backed woodpeckers at the 80% tolerance level. About 9% of the fire area would provide for black-backed woodpeckers at the 30% tolerance level or better, reduced from 34% under the existing condition. Habitat could be somewhat degraded along open roads if hazard trees need to be dropped for safety reasons. Black-backed and three-toed woodpeckers are likely to use salvage units only for foraging, but the 2- to 15-acre retention patches are probably too small to be used by these species for nesting habitat.

Table WL-12 suggests that white-headed woodpecker habitat would be greatly reduced, but the changes in tolerance levels may be misleading. As stated for Alternative 2, the species may not use expansive, severely burned areas regardless of the number of snags retained, instead tending towards the periphery of burned areas where there is a mosaic of live and dead trees. In live, green stands, DecAID suggests that white-headed woodpeckers need far lower densities of snags for use, ranging from 1 to 8 snags per acre greater than 10 inches DBH with 0.3 to 4 of these snags greater than 20 inches DBH (Mellen et al. 2003). In stands that burned with light severity as well as some of the stands that burned with moderate intensity, retention of 13 snags per acre should maintain more acres at the 50% tolerance level then Table WL-12 indicates.

Pileated woodpeckers would probably not be directly affected by the removal of large diameter snags, as studies show they are also rare visitors to early post-fire communities. Indirectly, removal of large diameter snags precludes accumulation of large, down logs, and consequently, reduces future foraging habitat. In salvage units, the low densities of snags left would not provide high quality foraging habitat, although levels would still be better than those expected under Alternative 2. In salvage units, the low densities of snags left would not provide high quality foraging habitat even after snags fall. In non-salvage areas, the potential for quality foraging habitat would remain high. No salvage harvest would occur in Replacement Old Growth area 220, which is being intentionally managed for future old growth (see Chapter 3, Terrestrial Wildlife, Old Growth Habitat).

Red-naped sapsuckers and downy woodpeckers would not be significantly affected by the reduction in nesting and foraging habitat, since they stay mostly in deciduous stands of aspen and cottonwoods. Williamson's sapsuckers forage mostly on live trees, and are also unlikely to be affected.

Initially, before snags begin to fall, large down logs may be deficient. In the severely- and moderately-burned areas (89% of the forested acres), most of the down logs were consumed. In the lightly- and non-burned areas (11% of the forested acres), downed wood habitats are relatively intact.

Period 10-30 years: Loss of Post-fire Snags

Using the findings by Raphael and White (1984) on fall down rates, i.e., that 4 hard snags would need to be retained initially to produce 1 soft snag at year 15, it is expected that retention of 13 snags per acres would generate 3.2 snags/acre at year 15. Snags are expected to be slightly above the 2.39 snags per acre required to meet 100% population potential as established in the Forest Plan.

DecAID values were compared against Raphael and White's findings. In salvage units, tolerance levels for primary cavity excavator species would drop below the 30% level by year 15. In non-salvage units, sufficient snags would remain to provide for most primary cavity excavators at the 30% to 50% tolerance level; only the black-backed and three-toed woodpeckers would have snag use levels drop below the 30% tolerance level.

As snags begin to fall, down log levels would increase thereby increasing denning, nesting, and feeding habitat for down wood dependent species. By year 15 post-fire, the levels of down wood would likely meet the minimum Forest Plan standard. Down log distributions in DecAID suggest that 60% of the Flagtail area should support down logs at .1 to 1% cover and 40% of the area should support down logs at levels greater than 1%. Under Alternative 3, it is likely both salvage and non-salvage areas could eventually support down logs at levels greater than 1%. At the landscape level, down logs would be in excess of levels suggested by the DecAID for dry forest types.

Period 30 + Years: Future Snag Recruitment and the Snag Gap

Under Alternative 3, planting can accelerate reforestation and reduce the amount of time severely burned areas are without large trees, and therefore large snags. Leaving a greater number of post-fire snags may initially retain snags on site longer than Alternative 2, possibly to year 30 post-fire versus year 15 as under Alternative 2. This may decrease the length of the snag gap from 75 years to 60 years.

Alternative 4

Period 0-10 years

Alternative 4 would reduce fuels on 4,780 acres, removing snags 8 inches DBH or less. Throughout the burn area, larger snags and downed woody material would remain undisturbed, providing potential nesting, roosting, and foraging habitat for cavity dependent species. Effects would be similar to Alternative 1. Table WL-7 displays the post-treatment snag distribution; snag densities are identical to Alternative 1; DecAID comparisons and conclusions would be similar to Alternative 1 as well. Comparison of snag distributions suggests that, because of the fire, the Flagtail project area may currently support snags at a much higher level than would be typically expected in dry forest types. Figure 31 in the Map Section displays snag densities by stand or unit.

Removal of the smaller snags is unlikely to have much effect on cavity excavator populations. Generally, cavity excavators favor large snags over smaller snags for both nesting and foraging. Although smaller snags can provide foraging habitat, they probably will not support the same insect populations as larger snags and most fall to the ground within the first 10 years post-fire. Although black-backed and three-toed woodpeckers favor high densities of smaller snags in unlogged conditions, removing understory trees are likely to have only minimal effects. Both species tend to nest in snags larger than 8 inches DBH, so only foraging substrate would be reduced. On most acres, post treatment tree densities would still be high enough to support use.

Comparing existing snag densities and sizes against those displayed in DecAID, it is expected that snag numbers would support most primary cavity excavators at the 30% to 50% tolerance level or better, as described for Alternative 1. Typically post-fire habitat conditions are considered ideal for black-backed woodpeckers, but DecAID suggests that even under the best of situations, snag densities in Flagtail will provide for use only up to about the 50% tolerance level. Species associated with dead wood habitats would respond favorably under this alternative.

Period 10-30 years: Loss of Post-fire Snags

Effects would be similar to Alternative 1.

Period 30 + Years: Future Snag Recruitment and the Snag Gap

Because burned areas will be planted, Alternative 4 is similar to Alternatives 2 and 3. Because most commercial-sized snags would be retained, the snag gap is expected to last from year 30 to year 90, a snag gap of 60 years. If larger snags persist longer than expected, the snag gap would be reduced further, particularly for Alternatives 1 and 4, which retain the most large diameter snags.

Alternative 5

Period 0-10 years

Alternative 5 was designed to provide a broader range of post-fire habitats for primary cavity excavators than the other action alternatives. This alternative proposes timber salvage on 3,740 acres (60% of forested acres) and no timber salvage on approximately 2,440 acres (40% of forest lands). Estimated harvest acres reflect untreated snag patches to be left in some units. Fuels reduction activities would remove snags less than 8 inches DBH on 2,400 acres.

The snag distribution data in DecAID suggests that dry forests may have supported lower snag levels than those created by the Flagtail Fire (Table WL-7). In addition, the data suggests that snag levels varied greatly across the landscape based on natural site conditions. Some areas likely had high concentrations of snags and other areas had few or no snags. Alternative 5 was designed to more closely mimic snag distributions expected at the landscape level. Under Alternatives 2 and 3, snag prescriptions would be nearly identical in every unit. Under Alternative 5, snag level prescriptions would vary by salvage unit based on a variety of criteria including forest type, aspect and slope, and other resource needs, such as visual quality, proximity to the wildland urban interface, and economics.

In salvage units, generally, one of three snag prescriptions would be applied. Units would retain either 13 snags per acre, 7 snags per acre, or 2.39 snags per acre. Figure 34 in the Map Section displays snag densities by stand or unit.

Under the 13-snag prescription, an average 13 snags per acre would be randomly distributed across harvest areas using the following snag size classes:

- 2.5 snags > 21-inch DBH;
- 7 snags 14-inch to 20.9-inch DBH;
- and 3.5 snags 10-inch to 13.9-inch DBH.

Under the 7-snag prescription, an average 7 snags per acre would be randomly distributed across harvest areas using the following snag size classes:

- 2.5 snags > 21-inch DBH;
- 2.5 snags 14-inch to 20.9-inch DBH;
- and 2 snags 10-inch to 13.9-inch DBH.

Under the 2.39-snag prescription, the Forest Plan standard for snags would be applied;

- an average 2.39 snags > 21-inch DBH would be randomly distributed across each unit.

A large-scale fire such as Flagtail provides nearly unlimited options to vary snag densities at a landscape level. Generally, the 13-snag, 7-snag and 2.39 snag prescriptions would be applied to salvage units using the following criteria. The 13-snag prescription would be applied in the visual corridor along County Highway 63 to maintain visual quality and to meet medium snag distribution levels. The 7-snag prescription would be applied on steeper north and east slopes, aspects that typically have higher tree densities and support conditions that often sustain snags for longer periods of times. In addition, fire frequency on north slopes tends to be lower, and therefore when fires do occur, they tend to be of mixed severity causing higher tree mortality. The 2.39 snag prescription would be applied on south and west aspects that typically support drier, less productive conditions and lower tree densities and along the wildland urban interface where lower fuel loads would reduce fire risk to private lands. In addition, consideration was given to applying lower snag prescriptions to helicopter and skyline units where retaining higher snag densities can make salvage more cost-prohibitive.

Under the 13-snag prescription, snags would be retained in untreated patched 2 to 15 acres in size, because cavity nesters as a group prefer patches as opposed to single snags retained in uniform, even spaced distribution (Rose et al, 2001, Saab et al, 2002, Kotliar 2002). Untreated patches would be retained on about 10% of each unit with location determined primarily by operational considerations. Snags located outside these patches would be clustered as natural snag patterns allow. Untreated patches would not be required in small units or units that have snags mixed with live trees; in these units better snag distribution will be achieved without the untreated patches.

Under the 7-snag and 2.39-snag prescriptions, untreated patches would not be required, because at these lower snag levels, retention of untreated patches would result in large areas between the patches being devoid of snags. Better snag distribution would be achieved without the untreated patches. Snags would be clustered as natural snag patterns allow.

Although this snag strategy prescribes 2.39 to 13 snags/acre, helicopter units would actually retain all 10-12-inch DBH snags because of utilization standard limitations described under Alternative 5, Forest Vegetation/Structure. These snags, ranging from about 5-30 snags per acre, provide additional benefits to wildlife.

Four 75+ acre black-backed woodpeckers areas would be established as described for Alternative 3 (see Map Section, Figure 34). These designated areas would be used in combination with other untreated areas to provide preferred habitat for this species.

Outside salvage units, all 10” DBH+ snags would be retained except those felled along open roads to reduce safety hazards and those felled to provide coarse woody material for streams, draws, and uplands (Chapter 1, Additional Fire Recovery Projects Ongoing or Completed, Actions Outside of this EIS to Address Recovery Needs).

Alternative 5 creates higher snag variability than Alternatives 2 and 3. Variability is greater at both the unit and landscape level. In the visual corridor along County Road 63, units with 13 snags per acre would have some snag patches with snag densities up to 75 snags per acre leaving areas in units between patches with an average of 6 to 11 snags per acre 10 inches DBH and larger. Units with a 7- or 2.39-snag per acre prescription do not include untreated patches; snags would be distributed as natural patterns allow. Because of the mosaic pattern of the burn and the desire to retain snags in patches, snags may not be distributed at the 40-acre basis as required by the Forest Plan, which will require a non-significant Forest Plan amendment.

Alternative 5 proposes no timber salvage on approximately 2,240 acres or 40% of forestlands. Non-salvage acres include four black-backed/three-toed woodpecker areas, riparian habitat conservation areas (RHCAs), and stands that were dropped as uneconomical once higher snag requirements were prescribed.

Table WL-7 displays the post-treatment snag distribution. Alternative 5 would shift snags densities towards the lower snag density groups. Alternative 5 may come closest to mimicking the DecAID snag distributions, although snags levels are still somewhat higher than those suggested by DecAID. In the large diameter snags, density groups A and B, when combined, reflect a value similar to the DecAID inventory (86% in DecAID and 88% in the Flagtail Fire area. This suggests that Alternative 5 may closely mimic the number of large diameter snags one would expect in dry forest types at the landscape level. Figure 33 in the Map Section displays snag densities by stand or unit.

The direct effect of this alternative would be the removal of potential roosting, nesting and foraging trees. Tables WL-8 through WL-12 indicate that removing snags would reduce woodpecker use levels for all species. Snag densities would support species at a range of tolerance levels, generally up to the 50% tolerance level. Woodpecker levels would fall somewhere between those expected for Alternatives 2 and 3.

In salvage units, retention of 13 snags per acre would provide for Lewis' woodpecker, hairy woodpecker, and northern flicker at the 30% level. Lewis' woodpeckers, in particular, tend to favor open or partially logged landscapes for nesting, although they prefer post-logging densities that equate to medium-density, non-burned habitats (Saab et al. 2002). Units with the 7-snag or 2.39-snag prescription do not meet the 30% tolerance levels for Lewis' woodpecker and hairy woodpeckers; the 2.39-snag prescription does not meet the 30% tolerance level for flickers.

Most non-salvage acres, about 2,440 acres or 40% of forestlands, would provide snag habitat for most cavity excavators at the 30% to 50% tolerance level with some areas providing use at the 80% level. These areas provide the greatest opportunities for the black-backed and three-toed woodpeckers. The four black-backed/three-toed woodpeckers areas were specifically selected for their high snag densities and would likely support use at the 30% to 50% tolerance or assurance level. About 8% of the fire area would provide for black-backed woodpeckers at the 30% tolerance level or better, similar to Alternative 3, but reduced from 34% under the existing condition. Habitat could be somewhat degraded along open roads if hazard trees need to be dropped for safety reasons. Black-backed and three-toed woodpeckers are likely to use salvage units only for foraging, but the 2- to 15-acre retention patches are probably too small to be used by these species for nesting habitat.

Species that do not commonly use burned forest, such as pileated and white-headed woodpecker, would be minimally affected by Alternative 5 in the short-term. The existing condition is not suitable for extensive use by these species because live trees and canopy cover are not available over most of the project area. Snags located along the periphery of the burn may provide the best opportunities for foraging or nesting if they are in close proximity to green stands that provide other critical habitat components. Indirectly, removal of large diameter snags precludes accumulation of large, down logs, and consequently, reduces future foraging habitat for pileated woodpeckers. In Replacement Old Growth area 220, salvage harvest on 277 acres would reduce dead wood habitats. ROG 220 is being intentionally managed for future old growth (see Chapter 3, Terrestrial Wildlife, Old Growth Habitat). Alternative 5 would retain 7 snags per acre in the ROG, including the largest 5 snags over 14 inches DBH, providing snags/downed wood for pileated woodpeckers in the future.

Red-naped sapsuckers and downy woodpeckers would not be significantly affected by the reduction in nesting and foraging habitat, since they stay mostly in deciduous stands of aspen and cottonwoods. Williamson's sapsuckers forage mostly on live trees, and would also unlikely be affected.

Initially, before snags begin to fall, large down logs may be deficient. In the severely- and moderately-burned areas (89% of the forested acres), most of the down logs were consumed. In the lightly- and non-burned areas (11% of the forested acres), downed wood habitats are relatively intact.

Period 10-30 years: Loss of Post-fire Snags

Using the findings by Raphael and White (1984) on fall down rates, i.e., that 4 hard snags would need to be retained initially to produce 1 soft snag at year 15, it is expected that retention of 13 snags per acres would generate 3.2 snags/acre at year 15. Snags are expected to be slightly above the 2.39 snags per acre required to meet 100% population potential as established in the Forest Plan. In the remaining salvage units, snags are expected to fall below the Forest Plan standard by year 15.

DecAID values were compared against Raphael and White's findings. In salvage units, tolerance levels for primary cavity excavator species would drop below the 30% level by year 15. In non-salvage units, sufficient snags would remain to provide for most primary cavity excavators at the 30% to 50% tolerance level; only the black-backed and three-toed woodpeckers would have snag use levels drop below the 30% tolerance level.

As snags begin to fall, down log levels would increase thereby increasing denning, nesting, and feeding habitat for down wood dependent species. By year 15 post-fire, the levels of down wood would likely meet the minimum Forest Plan standard. Down log distributions in DecAID suggest that 60% of the Flagtail area should support down logs at .1 to 1% cover and 40% of the area should support down logs at levels greater than 1%. Under Alternative 5, it is likely non-salvage areas could eventually support down logs at levels greater than 1%. At the landscape level, down logs would meet or exceed levels suggested by the DecAID for dry forest types.

Period 30 + Years: Future Snag Recruitment and the No-Snag Gap

Under Alternative 5, planting can accelerate reforestation and reduce the amount of time severely burned areas are without large trees, and therefore large snags. Snag prescriptions vary by unit from 2.39 snags per acre to 13 snags per acre, so the snag gap could vary by unit as well. The snag gap in severely burned areas could vary from 60 to 75 years.

Cumulative Effects

Due to past management including overstory removal, salvage harvest, roadside hazard tree removal, firewood cutting, and fire suppression, snag and down wood quantities have declined from historical levels. In non-harvested areas outside the fire area, snag density is often in excess of the Forest Plan standard of 2.39 snags per acre and provides for 100% potential population levels of most species. In harvested areas outside the fire area, snag density is often below the Forest Plan standard and does not provide for100% population levels. 2002 photo interpretation data estimate that areas not burned by the fire average approximately 1.5 snags per acre over 15 inches DBH and 0.5 snags per acre over 20 inches DBH.

Current trends indicate that snag and down wood numbers are increasing due to reduced harvest over the past decade and increased retention levels required by Regional Forester's Eastside Forest Plans Amendment #2. Any future timber harvest or prescribed fire activities would be designed to promote the development of late and old growth habitat and retain a snag and down wood component. Such management strategies are expected to improve habitat for cavity dependent species.

Stand replacement fires are particularly important for species such as the black-backed and three-toed woodpecker. In unburned forests, species numbers are relatively low and may be sink populations (populations that are generally decreasing). Fires serve as source habitats (populations increase and spread). When habitat conditions in a fire area become unsuitable, birds likely immigrate to the unburned areas (Hutto 1995). Consequently, periodic fires may be needed to maintain populations across the landscape.

Stand replacement fires in the immediate area have been rare in the last 30 years; generally, initial attack of wildfires has been successful in minimizing stand replacement fires. The closest stand replacement fires were the 1986 Scalp Fire, the 1989 Table Mountain Fire, the 1994 Cabin Fire, and the 1994 Scotty Fire. The Scotty Fire was located about 1.5 miles south of the project area; the remainder of the fires were located on the far side of Bear Valley, approximately 10 to 20 miles east. Fire-killed trees were salvaged in all four fires; salvage prescriptions retained a portion of the snags to meet minimum Forest Plan standards. Data on snag densities is not available; however, ocular estimates indicated many snags have fallen. Salvage reduced snag densities below levels needed for black-backed and three-toed woodpeckers. Other primary cavity species, such as the Lewis' woodpecker, hairy woodpecker and northern flicker, have likely used these habitats, but currently these snags are no longer at densities or decay stages that provide optimum forage opportunities. The 2002 Monument and Easy Fires are located over 35 miles north and east of the project area; certainly these fires benefit dead wood dependent species, but for this analysis, they were considered outside the cumulative effects area.

Under a separate NEPA analysis, a proposal is being considered to fell individual snags along streams and ephemeral draws, and use them as course, woody material in channels. Within Category 1 and 2 RHCAs, 20 snags per miles or about 2 to 4 snags per RHCA acre would be felled. Within Category 4 RHCAs, 20 to 50 snags per mile or about 2 to 4 snags per RHCA acre could be felled. Within emphemeral buffers, 20 to 70 snags or 3 to 11 snags per acre could be felled. RHCAs have been excluded from salvage units; snags would not be salvaged although trees may be felled to reduce hazards along open roads. Some of these trees may be used in streams to meet course woody debris needs. Ephemeral draw buffers are found in some units; however, snag prescriptions would retain higher levels of snags to accommodate for those to be used for steam restoration.

Future firewood cutting could reduce snag levels further; however, mitigation has been included in logging system design. In Alternatives 2, 3 and 5, snags in salvage units would be located at least 150 feet from open roads where possible. Under current Forest firewood cutting policies, this makes these snags off limits for cutting. In addition, firewood cutting would be delayed within the fire area until 2004 under Alternatives 1 and 4, or until after harvest under Alternatives 2, 3 and 5 (expected to be 2005).

Private lands typically do not provide large diameter snags. In the past, adjacent landowners have generally harvested damaged or dying trees to capture their economic value before they decay to a level where they no longer have any market value. Timber management has favored harvest of large diameter trees because of their higher economic value; removal of overstory trees releases smaller trees that are then managed over the next harvest cycle. Adjacent private lands that burned in the Flagtail fire have already been salvage logged.

Cumulatively, Alternatives 2, 3, and 5 contribute reductions in habitat for primary cavity excavator species. Alternative 4 reduces foraging habitat by treating snags less than 8 inches DBH, but additive effects would be considered negligible given the total number of snags that would be retained. Alternative 1, by retaining nearly all snags, would not contribute to further declines in snag habitat.

The Forest Plan requires that snag levels be averaged on a 40-acre basis to maintain an even distribution across the landscape. Retaining all snags in the fire area would not necessarily elevate woodpecker use in snag deficient, unburned areas, except along the periphery of the fire where a mosaic of burned and unburned forest occurs or where territories overlap with the fire area. Black-backed and three-toed woodpeckers may be the exception; these species use post-fire habits as source habitats and immigrate to non-burn areas once snags fall in the burn area.

Projects are being planned simultaneously to plant riparian areas with hardwood and conifer species and to expand and fence aspen groves. Livestock grazing has been discontinued in the burn area until ground vegetation recovers. Cumulatively, these actions will help reestablish hardwood vegetation to the benefit of primary cavity species that use these habitats, such as the Lewis woodpecker, red-naped sapsucker, and downy woodpecker.

Cumulatively, retaining high levels of snags within the project area (particularly in the Alternatives 1, 3 and 4), along with moving toward the 100 percent population levels in the surrounding area, would ensure that populations of cavity-dependent species would increase over time.

Summary

The following table (Table WL-13) summarizes snag densities, cavity excavator use as quantified by DecAID, and snag retention area acres for each of the alternatives.

Table WL-13: Snag Densities, Cavity Excavator Use, and Snag Retention Areas

Resource Issue	Unit of Measure	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Snag Density in Salvage Units	Snags /Acre	All, 3-105*	2.39	≥13	All, 3-105*	2.39 - ≥13
Cavity Excavator Use Level**	Tolerance Level (%)	5-80+	5-30	30-50	5-80+	5 - 50
Untreated Acres Providing Natural, Post-burn Snag Levels	Acres (% of forested acres)	6,180* (100%)	1,795 (30%)	3,310 (53%)	6,180* (100%)	2,440 (40%)
Down Logs Levels at Year 15.	Meets Forest Plan Standards	Yes	Yes	Yes	Yes	Yes
	Meets or Exceeds DecAID Levels	Yes	No	Yes	Yes	Yes
Snag Gap in Severely Burned Areas	Years Without Snags	70	75	60	60	60-75

* Alternatives 1 and 4 do not conduct commercial harvest. Data for these two alternatives are presented to show snag levels in the absence of commercial harvest of snags 10” DBH and greater. Alternative 4 conducts fuels treatment of dead tree 8” DBH or less.
**Displaying cavity excavator use levels as an overall range for multiple species provides a relative difference between alternatives; however, a more accurate portrayal is displayed by individual species in Tables WL-8 through WL-12.

The differences in alternatives are best evaluated by comparing 1) predicted snag distributions for each alternative against DecAID snag distributions and 2) predicted woodpecker tolerance or use levels as derived from DecAID.

Comparing Snag Distributions: Inventory data in DecAID provides a suggested snag distribution for dry forest types (see Table WL-7). The Flagtail project area may currently support snags at a much higher level than would be typically expected in dry forest types. Following implementation, Alternative 5 may come closest to mimicking the DecAID snag distributions, followed by Alternative 2, then Alternative 3. Because Alternatives 1 and 4 do not harvest 10+ inch DBH snags, snag densities are highly elevated compared to distributions in DecAID. Therefore, the inventory data suggests that reductions in snag levels or woodpecker use levels could be balanced against other resource needs while still providing sufficient habitat of wildlife species.

Comparing Wildlife Tolerance or Use Levels: Tolerance levels have less to do with viability of species and populations, and more to do with the distribution of individuals across a project area. The alternatives represent different levels of snag retention, and thus would affect woodpecker presence and distribution. The No Action alternative would maintain snag habitats across the entire fire-affected area. About 6,180 acres of suitable habitat exists. Species such as the black-backed and three-toed woodpeckers would rapidly colonize stand-replacement burns within 1 to 2 years of the fire; however, within 5 years they would decline, presumably due to declines in bark and wood-boring beetles (Kotliar et al. 2002). For other species, such as the Lewis' woodpecker, northern flicker and hairy woodpecker, suitable habitat conditions will persist longer, upwards of 25 to 30 years. Once the majority of snags fall, cavity excavators would not likely occupy the area, or they would exist at greatly reduced levels.

Table WL-13 displays cavity excavator use or tolerance levels as an overall range for cavity excavator species. Values provide a relative difference between alternatives; however, a more accurate portrayal is displayed by individual species in Tables WL-8 through WL-12. Alternatives 1 and 4 support most primary cavity excavators at the 30% to 50% tolerance level or better. Alternatives 3 and 5 support most primary cavity excavators at the 30% to 50% level. Alternative 2 would reduce snag densities for much of the area below the 30% tolerance level. Therefore, Alternatives 1 and 4 provide the most habitat for these species, followed by Alternative 3, and then Alternative 5. Alternative 2 reduces the most habitat, as is the least favorable to dead wood associated species.

Another way to compare alternatives is to review the number of acres of suitable habitat protected, either in "reserve patches" specifically established for woodpecker species or non-salvage areas established for other reasons, e.g., RHCA protection or low economic viability. These unlogged patches are particularly important to species such as the black-backed and three-toed woodpeckers that may use unlogged burn areas as source habitats to maintain populations across the landscape. Table WL-13 summarizes untreated areas by alternative. Alternatives 1 and 4 essentially retain all existing habitat, about 6,180 acres, although Alternative 4 degrades the habitat somewhat by treating trees 8 inches DBH and less. Alternatives 3 and 5 set aside approximately 3,310 acres and 2,440 acres, respectably. Alternatives 3 and 5 establish 4 black-backed/three-toed woodpecker areas, helping provide important source habitat for these species. Alternative 2 does the least to provide suitable habitat and distribution of woodpecker species; about 1,795 acres are left untreated, and likely presents elevated risks to black-backed and three-toed woodpeckers. Only 3% of the fire area would provide for black-backed woodpeckers at the 30% tolerance level or better, reduced from 34% under the existing condition.

While snags are abundant after a fire, once they fall down, they will not be available again until a new forest develops, trees reach sizes useful for woodpeckers, and these trees begin to die. The period when snags are not available can be referred to as the "snag gap." Although snag levels currently exceed Forest Plan standards, it is expected that most post-burn snags will be on the ground within 30 years. The time it takes to reforest burn areas differs between natural regeneration and planting. Natural regeneration can delay reforestation by 10 to 50 years depending on the availability of a live tree seed source. The No Action Alternative relies on natural regeneration; the Action Alternatives primarily use planting. In severely burned area, the No Action creates a snag gap of 70 years. Alternative 2 creates a snag gap of 75 years, greater than the No Action alternative. In Alternative 2, so few snags are left during salvage logging that the snag gap would materialize at year 15 instead of year 30. Alternatives 3 and 4 create snag gaps of 60 years. In Alternative 5, the snag gap varies from 60 to 75 years depending on unit snag prescription. If larger snags persist longer than expected, the snag gap would be reduced further, particularly for Alternatives 1 and 4, which retain the most large diameter snags.

Featured Species – Northern Goshawk

Existing Condition

The northern goshawk inhabits conifer-dominated forests. Goshawks utilize a wide range of forest structural conditions, often hunting prey in more open stands, yet relying on mature to old growth structure for nesting and fledging. Nests are commonly on north aspects in drainages with dense canopy (60-80%), in large trees, and near water or other forest "edges" (Reynolds et al. 1992 and Marshal 1992). Habitat trend information derived from Interior Columbia Basin studies (Wisdom et al. 2000) indicated that about 50% of the watersheds in the Blue Mountains showed a decreasing trend in goshawk habitat and 35% showed an increasing trend. Breeding Bird Survey (BBS) data suggests stable populations in western North America from 1966 through 1995; trend information derived from a study in the southwest indicated a 4% annual decline in populations (Wisdom et al. 2000). On the Blue Mountain Ranger District, known goshawks nest sites are monitored annually.

Pre-fire, 6,180 acres or 87% of the area was forested with 26% classified as old growth that could have potentially provided nesting habitat. Three known goshawk territories existed within the fire perimeter. A 30-acre nest site and 400-acre post-fledging area (PFA) had been delineated for the Jack Creek and Dipping Vat territories. No post-fledging areas (PFAs) had been delineated for the Swamp Creek territory, but nest sites had been identified. These territories have been surveyed annually since the early- to mid-1990s.

The fire burned through all three territories; fire intensities ranged from light intensity or underburns (less than 30% tree mortality) to moderate intensity or mosaic burns (60% to 90% tree mortality) to severe intensity or total burns (greater than 90% tree mortality). Table WL-14 below identifies the original goshawk territories, subwatersheds, activity record, total acres, total acres burned, and post-fire structural stage.

Table WL-14: Northern Goshawk Territories Burned

Post-fledging Area (PFA) Name	Subwatershed	Nest Activity Record	Total Acres	Acres Burned by Tree Mortality Class	Post-fire Structural Stages
Jack Creek	Jack - 60507	Active 6 out of the last 11 years.	413	Mod. = 300 ac. Low = 28 ac.	SI, UR, SEOC, OFMS
Dipping Vat	Jack - 60507	Active 10 out of the last 11 years.	443	Severe = 340 ac. Mod. = 103 ac.	SI, UR
Swamp Creek	Snow – 60509	Active 5 out of the last 8 years.*	NA	Severe tree mortality	SI

NA = Not applicable – No post-fledging area had been identified around nest site.
Tree Mortality Classes:
Severe Mortality (total burn) = 90%+ tree mortality
Moderate Mortality (mosaic burn) = 60% to 90% tree mortality
Low Mortality (underburn) = 30% to 60% tree mortality
SI = Stand Initiation; UR = Understory Re-initiation, SEOC = Stem Exclusion Open Canopy, OFMS = Old Forest Muli Strata
* In the Swamp Creek area, goshawks only actively nested 2 of the 8 years. During the other 3 active nest years, the nest site was occupied by other raptor species.

As a result of the fire, the Dipping Vat and Swamp Creek territories no longer classify as old growth habitat; essentially, all trees, including the nest trees, were killed in the territories. These territories are no longer considered functional; goshawks are not expected to return to these sites under current conditions. In the Jack Creek territory, the fire burned in a mosaic fashion; tree mortality ranges from 30% to 90%. Forest structural stages were converted from OFMS and YFMS to UR, SEOC, and SI structural stages. Two of the three nests trees in the Jack Creek PFA survived the fire; however, given the fire damage in the immediate area (about 30% tree mortality), it is uncertain whether goshawks will reoccupy these nests. Just outside the fire perimeter, about 85 acres of the original territory remains old growth; this area provides suitable nesting habitat. The mosaic burn in the remainder of the PFA opened up canopy and reduced the quality of the nesting habitat but does provide good foraging habitat. It is unknown whether or not goshawks will continue to nest and breed in this territory.

Post-fire, it is highly unlikely that goshawks will use the interior portion of the fire area for nesting, as forested stands with 60 to 80% canopy cover and suitable trees no longer exist. It is likely that goshawks will forage in the burn area. In light to moderately burn areas, fires typically improve foraging habitat for raptors by reducing hiding cover and exposing prey populations (Smith 2000). In the more severely burned areas, it is uncertain to what degree goshawks will use these areas for foraging because of the loss of cover; limited literature is available.

The three original territories and adjacent nesting habitat were surveyed for goshawks in 2003. No nesting goshawks were identified within or immediately adjacent to the burn perimeter. Foraging goshawks have been periodically sighted in the fire area; it is assumed that these individuals are taking advantage of the improved foraging conditions. The three original territories and adjacent nesting habitat will continue to be surveyed annually to determine whether or not goshawks will return for nesting. Three additional goshawk territories are located within the subwatersheds affected by the fire. Nest sites are located over ½ mile from the fire perimeter, and therefore, are not affected.

Environmental Consequences

Direct and Indirect Effects

See the Old Growth Section of this Chapter for additional effects on goshawks and their preferred nesting habitat.

No Action

There would be no direct adverse effects to goshawks from Alternative 1 because no salvage logging or fuels reduction activities would occur. Reforestation of the area would be dependent on natural regeneration, which would delay development of future forest including mature and old growth forest. See Old Growth section for the time it would take to reestablish old growth. Because goshawks will prey on dead wood associated species, retention of large quantities of snags and down logs will provide goshawks high quality foraging habitat. Under Alternative 1, the elevated fuel loads expected in 10 to 20 years increase the risk of an intense re-burn; another stand replacement fire could further delay development of nesting habitat.

Action Alternatives

The action alternatives all propose management activities within original goshawk post-fledging areas; however, there would be no direct adverse effects to nesting habitat because essentially only dead or dying trees would be removed. Some live trees would be removed for road construction, helicopter landings, and to reduce safety hazards, but effects would be considered incidental. The action alternatives would positively affect northern goshawk habitat by accelerating reforestation so that stands would become mature sooner than if no action was taken (see Old Growth section for the time it would take to reestablish old growth).

Of the three known territories burned, the Jack PFA has the best chance of being reoccupied. Two nest trees survived the fire, although it is uncertain whether goshawks will reoccupy these sites given the adjacent tree mortality and loss of canopy cover. No salvage will occur in these nest stands under any of the action alternatives. The Dipping Vat and Swamp Creek territories no longer contain any habitat suitable for nesting or post-fledging activities; goshawks are not expected to reoccupy these sites. Although the fire destroyed nesting habitat within the burn area, goshawks may establish new nests in unburned stands located outside the fire perimeter. Mature and old growth stands suitable for nesting, as well as the surviving nests stands in the Jack PFA, would be monitored annually for goshawk activity as needed. If active nest sites are identified within or immediately adjacent to the project area, management activities would be prohibited within ½ mile of the nest sites from April 1 to September 30 to avoid disturbing goshawks during the breeding season.

Salvage harvest would reduce foraging habitat by removing snag habitats that can support goshawk prey. Because goshawks will prey on primary cavity excavators, retention of dead wood habits will help improve goshawk foraging habitat. Goshawks prey on a variety of small mammal species as well; as snags fall and vegetation recovers, habitat for these prey species will improve. The greater the number of snags retained, the better the goshawk foraging habitat. The action alternatives prescribe different snag densities (see Primary Cavity Excavator section of this chapter). In salvage units, Alternative 2 would meet Forest Plan standards by retaining 2.39 snags per acre. Alternative 3 would exceed Forest Plan standards by retaining at least 13 snags per acre. Alternative 4 would retain all snags over 8 inches DBH. Alternative 5 would retain a varying number of snags ranging from 2.39 snags to 13 snags per acre of greater. Adult goshawks foraging in the area are not likely to be disturbed by project activities.

Research (Reynolds et al. 1992 and Marshal 1992) varies on conclusions as to the effects of salvage harvest in and adjacent to nest stands and whether or not goshawks will use these stands following harvest. Several studies (Marshal 1992) have suggested that selection harvest of trees can reduce nesting; however, it is unclear whether restricting harvest to dead trees would have a similar effect. Goshawk management recommendations by Reynolds et al. (1992) do not exclude timber harvest.

Action alternatives close or decommission roads. Generally, road closures reduce the potential for disturbance of nesting birds; however, site-specific effects are difficult to assess in the Flagtail Fire area due to the inability to predict if and where goshawks will nest until vegetation is restored.

Under Alternative 4, the elevated fuel loads expected in 10 to 20 years increase the risk of an intense re-burn; another stand replacement fire could further delay development of nesting habitat. Alternatives 2, 3 and 5 also leave some burn areas untreated, but salvage logging and fuels reductions reduce overall fuel loads and break up the continuity of fuels remaining.

Cumulative Effects

All of the activities in Appendix J have been considered for their cumulative effects on northern goshawk. The following discussion focuses on those past, ongoing and reasonable foreseeable future activities that may contribute adverse effects to the species or its habitat.

Nesting habitat is typically the limiting factor for goshawks. Past timber harvest reduced mature and old growth habitat preferred for nesting and fledging. Since 1993, the Forest Plan as amended, has directed the Malheur National Forest to conduct timber sales in a manner that moves stands towards OFMS and OFSS structural stages, and timber sales planned since that time should not have contributed to loss of mature and old growth forest.

Additional restoration activities are being planned for riparian areas in the burn area and include aspen restoration, hardwood and conifer planting, felling of down logs across stream channels, and fuels reduction. The scale of these projects relative to salvage logging is incidental. Existing nest trees in the Jack PFA would be protected. When the alternatives in this proposal are combined with these restoration projects, effects on northern goshawk would still be considered minimal.

Adjacent private lands have already been salvage logged. In the past these timber stands have generally not provided nesting habitat for goshawks. These stands are not being managed for old growth conditions, and therefore are not expected to provide nesting habitat in the future.

Forage is not considered a factor limiting goshawk population viability, and consequently cumulative changes to foraging habitat, whether positive or negative, would not contribute to a measurable change in goshawk populations.

In 2002/2003, fire-killed, hazard trees were salvaged on 14 acres at the Bear Valley Work Center and on 650 acres along roads. Future fuels reduction is planned on 100 acres inside Riparian Habitat Conservation Areas (RHCAs); dead, unmerchantable trees 8 inches DBH and smaller would be felled, then hand piled and burned outside of riparian areas. When combined with salvage logging and fuels treatment proposed in Alternatives 2, 3 and 5, landscape-level fuels treatments are expected to help reduce the risk of an intense re-burn and another stand replacement fire. Under Alternatives 1 and 4, combined fuel treatments are less likely to reduce fuel loads sufficiently to avoid intense re-burns in the future.

Goshawks are highly sensitive to disturbance during the breeding season. When seasonal restrictions on management activities were disregarded in the past, breeding success may have been reduced. Since 1990, seasonal restrictions on activities have been regularly used in the vicinity of occupied nests. Suitable nesting habitat is to be monitored annually; if monitoring identifies occupied nesting habitat, seasonal restrictions would be applied to all management activities.

In the short-term, the four action alternatives would not contribute to cumulative losses of mature and old growth habitat because stands treated no longer function as old growth. In the long-term, the action alternatives would contribute positively to cumulative effects by accelerating the development of old growth, i.e. goshawk nesting habitat. Cumulatively, management actions are not expected to reduce population viability.

Summary

Neither the No Action alternative nor the Action alternatives are expected to affect populations or viability of northern goshawks. The Flagtail fire already reduced or eliminated nesting habitat in the three known goshawk territories. Harvest doesn’t change live tree canopy; alternatives harvest few live trees. In the Jack PFA, two nest trees survived the fire, but goshawks did not return in 2003. Removal of dead and dying trees would reduce snag habitat used by goshawk prey, but forage, particularly in the fire area, is not considered a limiting factor for goshawks. Mature and old growth stands suitable for nesting would be surveyed annually for goshawk nesting activity. If new nest sites are identified within or immediately adjacent to the project area, silvicultural prescriptions would be modified as needed and seasonal restrictions would be applied to management activities to avoid disturbing goshawks during the breeding season.

By planting trees, the action alternatives would accelerate recovery of vegetation; in severely burned areas, development of nesting habitat could take 10 to 40 years less than under the No Action alternative.

Under Alternatives 1 and 4, the elevated fuel loads expected in 10 to 20 years increase the risk of an intense re-burn; another stand replacement fire could further delay development of nesting habitat. Alternatives 2, 3 and 5 also leave some burn areas untreated, but salvage logging and fuels reductions reduce overall fuel loads and break up the continuity of fuels remaining.

Featured Species – Blue Grouse

Existing Condition

Blue grouse inhabit coniferous forests intermixed with grassy or scabby openings. They use large mistletoe infected Douglas-fir trees, generally located within the upper 1/3 of slopes, as winter roosts.

Habitat trend information derived from Interior Columbia Basin studies (Wisdom et al. 2000) indicated that about 80% of the watersheds in the Blue Mountains showed a decreasing trend in blue grouse habitat and 10% showed an increasing trend. Declines in source habitat are primarily attributed to a reduction in late seral forest. No population data is available, but populations are likely lower than they were historically (Wisdom et al. 2000).

Pre-fire, blue grouse likely inhabited the project. Post-fire, there is little or no habitat within the burn area considered suitable for winter roost habitats; however, nesting habitat will be available once a variety of grasses and forbs becomes established and provide hiding cover.

Environmental Consequences

Direct, Indirect, and Cumulative Effects

No Action

Relying on natural regeneration to reforest the burn area would delay development of mature and old growth trees. Blue grouse favor mature/over-mature trees as winter roosts. Since fuels would not be treated under Alternative 1, there is the high risk of an intense re-burn that could delay recovery of vegetation.

Action Alternatives

Direct effects of salvage logging and fuels reduction would be disturbance to blue grouse nesting/foraging in the project area, forcing them out of activity areas and into adjacent undisturbed areas. Generally, trees expected to survive the fire would be retained, even if they were infected with mistletoe; only incidental live trees would be removed for safety or operational reasons during logging. Indirect effects to blue grouse could be increased competition for nesting/foraging habitat outside the burn area. It is assumed that salvage logging and fuels reduction activities will have minimal effects on blue grouse, as there is little habitat favored by blue grouse remaining within the burn area. Ground vegetation for nesting/foraging is expected to recover rapidly. Grasses and forbs are expected to reestablish naturally in 2 to 5 years; shrubs are expected to reestablish in 2 to 15 years. Blue grouse favor mature/over-mature trees as winter roosts; planting trees would accelerate development of mature and old growth trees. Alternative 4 has high risk of an intense re-burn that could delay recovery of vegetation.

All of the activities in Appendix J have been considered for their cumulative effects on blue grouse. Cumulatively, where livestock grazing coincides with nesting/foraging, grazing would likely reduce height of ground vegetation and possibly degrade nesting/foraging habitat. Livestock grazing is to be delayed at least 2 years to allow recovery of vegetation. The alternatives under this proposal contribute minimal adverse effects to ground vegetation recovery.

Summary

Neither the No Action alternative nor the Action alternatives are expected to affect populations or viability of blue grouse.

Threatened or Endangered Species – Bald Eagle

Existing Condition

Bald eagle nests are usually in multistoried, predominantly coniferous stands with old growth components near water bodies which support adequate food supply (U.S. Dept. Interior 1986). The nearest known nest site is approximately 18 miles south in the Silvies Valley.

On the Malheur National Forest, bald eagles congregate at winter roost sites in mature forest stands in Bear Valley, which provide a microclimate that helps protect them from cold weather and wind. Eagles typically arrive in early November and depart about the end of April. No winter roost sites are within the project area; however, two sites are located along potential timber haul routes. One winter roost exists on Forest Service land along County Road 63 in Bear Valley, between the project area and Highway 395. The roost trees are about 500 feet north of County Road 63. This roost was monitored from 1990 through 1998, except for the winter of 1996-97. Monitoring indicated use in or near the roost every year it was monitored.

A second winter roost is located on private land in Bear Valley, about 1.5 miles east of the project area on Forest Service Road 24. The roost is within 250 feet and line-of-sight of Forest Service Road 24. Monitoring over the years has been inconsistent, but the site is believed to be used annually.

Environmental Consequences

Direct, Indirect and Cumulative Effects

No Action

Under the No Action Alternative, there would be no new management activities; therefore, there should be no direct, indirect or cumulative effects to bald eagles or their habitat.

Action Alternatives

Human activities have the potential to disturb perching or roosting eagles (Spahr 1991; Steenhof 1978). Of these activities, vehicle traffic is the least disturbing, as long as the vehicle does not stop, because eagles apparently become accustomed to traffic (Steenhof 1978). Significant changes in traffic volume, however, have the potential to cause disturbance to roosting eagles or eagles entering the roosts.

County Road 63 is the primary travel route for people living in the Izee vicinity and people living along County Road 63 to travel to John Day, Oregon and points north and east, and to Seneca, Oregon and points south of Bear Valley. Most traffic is probably from residents of either Izee or Bear Valley; however, recreational and cattle ranching- and logging-associated traffic also use the road. Later in the year, during October and November, traffic would be expected to be elevated due to big-game hunting seasons.

The Grant County roads department periodically places traffic counters on County Road 63 between the roost and Highway 395. Average daily traffic ranged from 138 vehicles per day in 1995 to 213 in 1993. The average daily traffic for all years combined was 171 trips per day. Although traffic during big-game hunting season is higher, this elevated traffic flow does not appear high enough to discourage use of the winter roost.

Salvage logging proposed under Alternatives 2, 3 and 5 would generate the greatest increase in traffic volume. It is estimated that a salvage sale could generate an average daily traffic flow of 38 trips per day past the County Road 63 winter roost. When combined with local traffic, average daily traffic from all sources would be estimated at 209 trips per day. This traffic level would be within the range of 138 to 213 trips per day recorded by the traffic counters over several years; therefore, there would be no discernable increase in the traffic volume.

There is a greater disturbance risk associated with the winter roost located adjacent to Forest Road 24. Although, traffic flow data is not available for these roads, traffic volume is assumed to be far lower than volumes recorded for County Road 63. It is assumed that any timber sale traffic from a Flagtail Salvage Sale past this winter roost would be well above average traffic levels for these roads, and could cause disturbance to roosting eagles. Therefore, from November 1st to April 30th, log haul and other timber sale-related traffic would be directed to alternate routes to avoid this winter roost area.

All other management activities would generate only incidental changes in traffic flow. Alternative 4 does not propose any commercial timber logging; therefore, traffic volume would be lower than the other action alternatives. No additional direct, indirect or cumulative effects are anticipated from management activities under any of the Action alternatives. Proposed activities within the project area are sufficiently distant from the winter roost sites that no other disturbance risks are expected.

All of the activities in Appendix J have been considered for their cumulative effects on bald eagle winter roosts. Ongoing and reasonably foreseeable activities are not expected to degrade winter roost areas, nor elevate disturbance to levels where eagles will no longer roost.

Determination

There would be **NO EFFECT (NE)** to bald eagles or their habitat under the No Action alternative or any of the action alternatives. No bald eagles nest or roost within the project area. No effects are anticipated on winter roost sites located outside the project area in Bear Valley. Under the action alternatives, changes in traffic volume past the winter roost area on Forest Road 24 had the potential to disturb roosting eagles, but seasonal restrictions will be applied to mitigate potential effects.

Threatened or Endangered Species – Gray Wolf

Existing Condition

Historically, wolves occupied all habitats on this Forest (Wisdom et al. 2000), but are currently considered extirpated. Today, the Malheur, Wallowa-Whitman and Umatilla National Forests are probably suitable habitats for wolves. In 1999, a collared wolf from the experimental, non-essential Idaho population traveled to the three Blue Mountain National Forests and stayed until it was captured and returned to Idaho. Another wolf was found dead near Baker City in the spring of 2000. Over time, wolves dispersing from the Idaho wolf population could return to the Blue Mountains and establish packs.

Environmental Consequences

Direct, Indirect and Cumulative Effects, and Determination

All Alternatives

Wolves are limited by prey availability and are threatened by negative interactions with humans. Generally, land management activities are compatible with wolf protection and recovery, especially actions that manage ungulate populations. Habitat and disturbance effects are of concern in denning and rendezvous areas. No such habitat is currently occupied in Oregon.

Determination

At this time, the determination for almost all project activities on the Malheur National Forest is **NO EFFECT (NE)** for the following reasons:

- No populations currently occupy the Malheur National Forest.
- No denning or rendezvous sites have been identified on the Malheur National

Forest.
- There is an abundance of prey on the Forest; therefore prey availability is not a limiting factor.

Threatened or Endangered Species – Canada Lynx

Existing Condition

Potential lynx habitat on the Malheur National Forest is defined as stands above 5,000 feet that are subalpine fir, lodgepole pine, Engelmann spruce, or moist grand fir types. Lynx require a mix of early and late seral habitats to meet their food and cover needs. Early seral habitats provide the lynx with a prey base, primarily snowshoe hares, while mature forests provide denning space and hiding cover (Koehler 1990). Pockets of dense forest must be interspersed with prey. Lynx den sites are in forests with a high density of downfall (Koehler 1990). Favored travel ways within and between habitat areas include riparian corridors, forested ridges, and saddles. Although there are several unconfirmed sightings of lynx in Grant County, there is no indication that lynx occurs in the project area.

Research indicates that lynx need approximately 10 to 15 square miles of high quality habitat to support a functional home range (Ruggiero et al. 1994). The four subwatersheds affected by the Flagtail fire contain very little lynx habitat. No subalpine fir, Engelmann spruce or moist mixed conifer forest exists. About 850 acres, or 3% of the subwatershed acres, are in lodgepole and grand fir forest types that would classify as habitat. Within the burn area, 280 acres, or 4% of the burn area, are in lodgepole pine that would classify as habitat; the fire burned through these areas. Forest managers have conducted several mapping analyses of lynx habitat on the Malheur National Forest; none of these analyses classified the Flagtail project as a Lynx Analysis Unit (LAU). The number of acres is considered insufficient for lynx and what does exist is noncontiguous; therefore, this area is not considered suitable habitat for lynx to occupy. The nearest area that approximates lynx source habitat is located in the Strawberry Mountains, about 10 miles to the northeast.

In general, the project area is relatively dry, with mostly ponderosa pine dominated stands. Mixed conifer, high canopy closure stands with grand fir did exist prior to the fire, but they comprised only a smaller portion of the area and are still relatively dry sites. Historically, under natural fire regimes, the area was probably even more dominated by open, ponderosa pine stands than it is today, so it is not as if site potential would be conducive to historical lynx habitat.

Environmental Consequences

Direct, Indirect Effect and Cumulative Effects, and Determination

All Alternatives

Because lynx habitat is so limited in the project area, both now and historically, there would be no direct, indirect or cumulative effects expected from any of the alternatives. It is very unlikely that lynx would use the project area due to the lack of habitat. Project actions would have no effect on Canada lynx or their habitat; therefore, the call is **No Effect (NE)**.

Sensitive Species

Wolverine

Existing Condition

Wolverines were always rare in Oregon, although recent sightings, tracks, and collected remains document their continued presence at low densities in the state (Csuti et al. 1997). Current distribution appears to be restricted to isolated wilderness areas. Verts and Carraway (1998) believe that while there is a possibility of self-maintaining population of wolverine in the state, most animals seen or collected are likely dispersers from Washington and Idaho populations. Confirmed observations on the Malheur National Forest are from the Strawberry Mountain Wilderness and include a partial skeleton found in 1992 and tracks and a probable denning site found in 1997. Additional sightings of animals and tracks have occurred on the District, but none have been confirmed.

The likelihood of wolverine using or frequenting the area is expected to be very low. Source habitat is essentially non-existent in the project area. There are no subalpine forest types with or without talus surrounded by trees in or adjacent to this area. The Flagtail fire severely or moderately burned 5,550 acres of forested ground (90% of the forested acres), eliminating the contiguous forested conditions favored by wolverine. The nearest area that approximates wolverine source habitat is located in the Aldrich and Strawberry Mountains, about 10 miles to the north and northeast, respectively.

Foraging and dispersal habitat for wolverine occurs throughout the Blue Mountain Ranger District. Wolverines could possibly use any area of the District to satisfy life needs; however, areas of high deer and elk concentrations, low human impacts, low human disturbance, and potential denning sites that appear to be home range requirements are limited.

The project area may provide some marginal foraging and dispersal habitat for wolverines, but it is assumed that high levels of human disturbance (management activities, firewood cutting, and recreational use) and development (primarily high road densities) make most of this area unsuitable for wolverine for summer foraging habitat.

Winter foraging habitat is limited because elevations in the Flagtail area are above those typically associated with big game winter range. In addition, the Flagtail fire reduced habitats for many mammal species by destroying much of the cover, both vegetation and down logs. Post-fire, the loss of cover further reduces area use by wolverine and its prey species.

Environmental Consequences

Direct and Indirect Effects

No Action

The No Action alternative would have no direct effects to wolverine or potential habitat. Indirect effects result from potential changes in habitat for wolverine prey. Overall habitat effectiveness for deer and elk would be expected to improve over time as cover develops. Big game population numbers are expected to remain stable; distribution and use may change initially as a result of improved forage and reduced cover. By relying on natural regeneration for reforestation, recovery of trees would be slower than under a planting scenario. See the Big Game Habitat section for discussion of the effects of the No Action alternative on big game. Cover/forage habitat for small mammals, i.e., alternative prey, is expected to increase as vegetation recovers and snags fall and provide down logs.

The risk of an intense reburn in the project area is high with this alternative, although risks do not increase for 10 to 20 years, the time expected for snags to fall to the ground and elevate fuel loads. Another stand replacement fire would delay recovery of cover vegetation for dispersal or movement.

Action Alternatives

There are no confirmed records of wolverine occurring in the project area; therefore, there would be no direct effect to this species.

Indirect effects to wolverine, and its preferred habitat, would be minimal, regardless of the alternative. Post-fire, the project area is considered unfavorable for wolverine occupation. Human disturbance related to proposed salvage activities might displace transient or dispersing wolverine from potential foraging habitat during the duration of the project. Post-salvage road closures would help reduce the level of human disturbances as habitat conditions become more favorable to prey species.

Management recommendations by Banci (1994) suggest that management activities should incorporate strategies that improve the deer and elk forage base for wolverine, without significantly changing vegetation structure. The action alternatives would improve big game habitat; planting of trees would accelerate recovery of hiding and thermal cover, and road closures would reduce open road densities. Big game population numbers are expected to remain stable; distribution and use may change initially as a result of improved forage and reduced cover. Overall habitat effectiveness for deer and elk would be expected to improve over time as cover develops. The Big Game Habitat section discusses effects of the action alternatives to big game. Cover/forage habitat for small mammals, i.e., alternative prey, is expected to increase as vegetation recovers and snags fall and provide down logs.

Salvage logging reduces the future build-up of down logs that could impede big game movements and elevate risk of a future re-burn. Alternatives 2, 3, and 5 propose timber salvage on 4,345 acres (70%of forested acres), 2,871 acres (46% of forested acres), and 3,740 acres (60% of forested acres), respectively. Alternative 4 only removes tree 8" DBH and smaller; although fire risk is reduced, future fuel loads would still be considered in excess of risk thresholds. Another stand replacement fire could further delay development of cover.

Cumulative Effects

All Alternatives

All of the activities in Appendix J have been considered for their cumulative effects on wolverines. Past adverse effects on wolverine foraging and dispersal habitat have been primarily a result of timber harvest and road construction; the project area has been a relatively highly managed area. Activities that have cumulatively affected big game habitat and populations can also have contributing effects to wolverine. This project, combined with ongoing and reasonably foreseeable future projects, is expected to improve big game habitat (see the Big Game Habitat, Cumulative Effects section).

In burned riparian areas, hardwood and conifer planting, aspen restoration, and wood placement in streams are being planned under separate NEPA documents (see Appendix J – Cumulative Effects). Cumulatively, restoration activities would improve habitat for wolverine prey species. Livestock grazing would be delayed for at least two years post-burn to allow for recovery of ground cover (Post-fire grazing guidelines - Appendix H). Some uncontrolled cattle use occurred in the summer/fall of 2003, but effects to riparian and upland habitats were considered well within Forest Plan and Interagency Interdisciplinary Team (IIT) standards. When livestock grazing is re-initiated, grazing would be managed to meet Forest Plan and IIT standards as well, benefiting wolverine prey species.

Adjacent private lands have already been salvage logged. Reforestation is required where commercial timber harvest has occurred and the land is left under-stocked. Private lands were planted in 2003. Some private landowners have forage-seeded burned areas to the benefit of big game. Adjacent private lands are intensively managed and even less likely to support wolverine than National Forest lands in the project area.

In 2002/2003, fire-killed, hazard trees were salvaged on 14 acres at the Bear Valley Work Center and on 650 acres along roads. Future fuels reduction is planned on 100 acres inside Riparian Habitat Conservation Areas (RHCAs); dead, unmerchantable trees 8 inches DBH and smaller would be felled, then hand piled and burned outside of riparian areas. When combined with salvage logging and fuels treatment proposed in Alternatives 2, 3 and 5, landscape-level fuels treatments are expected to help reduce the risk of an intense re-burn and another stand replacement fire. Under Alternatives 1 and 4, combined fuel treatments are less likely to reduce fuel loads sufficiently to avoid intense re-burns in the future.

Future timber and access management activities have yet to be proposed for the unburned areas of the affected subwatersheds. Since the Flagtail Fire Recovery Project is expected to have few negative effects on wolverine in the short-term, and since future activities are expected to create more continuous, unfragmented habitat, wolverines are expected to benefit. With recognition of habitat losses due to the fire, adverse cumulative effects are expected to be incidental regardless of the alternative selected. In the mid- to long-term, the effects of this project combined with restoration projects in Appendix J would be considered favorable to wolverine.

Determination

Due to the nature of the No Action alternative, there would be **NO IMPACT (NI)** to wolverine.

Action alternatives **may impact individuals or habitat**, **but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population** (**MIIH**). Human disturbance related to proposed salvage activities could have short-term, indirect effects on wolverines, although the risk of disturbance to wolverines is considered low. Wolverines are considered transient based upon their large home ranges. None of the treatment areas include denning habitat. Following management activities, road closures would reduce motorized access to the benefit of wolverines. None of the alternatives will affect wolverine habitat or species viability because the principal big game prey base is expected to remain stable.

Western Sage Grouse

Existing Conditions

Sage grouse are obligate residents of sagebrush habitat, usually inhabiting sagebrush-grassland or juniper-sagebrush-grassland communities.

In 1993, Oregon Department of Fish and Wildlife (ODFW) biologists estimated that Bear Valley had about 60 birds and a stable population. ODFW monitored a known active lek on private land about 1 to 2 miles east of the Flagtail project area. In 2003, ODFW biologists (K. Rutherford, ODFW wildlife biologist, personal communication May 8, 2003) revised the 1993 estimates; they believe grouse populations in Bear Valley may have declined, primarily due to predation (coyotes), but also because of livestock grazing and agricultural conversion. Rutherford (2003) reported that the previously known active lek is no longer active. Little monitoring has been done in recent years to validate declines, but numbers are believed to be reduced.

In the Upper Silvies watershed, the majority of the shrub-steppe habitats are associated with the larger expanses of habitat in Bear Valley. There is very little sage grouse habitat on Forest Service managed lands. In the project area, about 780 acres, or 10.5% of the project area, classify as juniper/sagebrush, sagebrush shrublands or dry grasslands. The Bald Hills at 245 acres provides the largest block of potential habitat; the remaining acres are predominantly smaller openings 1 to 20 acres in size. Several stringer habits extend into the project area from Bear Valley. Additional small openings in the surrounding forest could contain sagebrush habitat.

Habitat in the project area is considered marginal. There is no documented occurrence of sage grouse within the Flagtail project area; there are no known leks or suspected leks. It is possible that adult sage grouse with young may use non-forested areas, but use would be only occasional and random. Potential late season brood rearing habitat exists within meadow/ephemeral wet riparian areas; hens with broods or hen groups may use these lower elevation habitat as sagebrush types dry up and herbaceous plants mature in June and July, but again, use is expected to be occasional or random.

Within the fire area, the shrub-steppe habitats burned in a mosaic pattern depending on vegetation patterns and fire behavior. Unburned islands of sagebrush can retain habitat features important to sagebrush-dependent species. Given, the small extent of habitat within the project area, the wildfire likely had minimal effect on species that depend on these semi-arid environments.

Environmental Consequences

Direct and Indirect Effect

No Action

Under the No Action Alternative, there would be no new management activities; therefore, there should be no direct effects to sage grouse or their habitat.

Given the small extent of sagebrush habitats, the wildfire likely had minimal effect on species that depend on these environments. Recovery of sagebrush habitats is dependent on the severity of the burn. Grass and herb species respond more rapidly after fire than sagebrush (Smith 2000). Because sagebrush does not sprout from underground buds, these communities can require several decades to establish post-fire vegetation composition and structure similar to that on unburned sites (Smith 2000). A mosaic burn, such as occurred in much of the Flagtail sagebrush communities, can accelerate recovery of these habitats as compared to completely burned areas. Unburned islands of sagebrush provide an important seed source. Unburned islands of sagebrush could provide limited habitat for sagebrush-dependent species and a seed source for regenerating burned areas.

Action Alternatives

Juniper woodland, shrub-steppe and grassland habitats would not be treated under any of the action alternatives; therefore, there would be no direct or indirect effects to sage grouse. Effects would be as described for the No Action alternative.

Cumulative Effects

All Alternatives

All of the activities in Appendix J have been considered for their cumulative effects on western sage grouse. The following discussion focuses on those past, ongoing and reasonable foreseeable future activities that may contribute adverse effects to the species or its habitat.

Juniper woodlands, sagebrush shrublands and dry grasslands have probably changed due to 100 years of fire suppression. Other conifer species have encroached on these habitats, reducing their size. On residual acres, juniper density probably has increased. Livestock grazing, primarily early in the century, may have caused changes in shrub, grass and forbs composition or abundance. The Flagtail fire reduced all conifer species, killing both juniper and the conifer species that compete with juniper. Juniper woodland and shrubland habitats are very limited in the project area. Few management activities are proposed, and natural recovery rates from the fire are expected. Proposed erosion control on the Bald Hills would slow runoff, allowing more water to percolate in soils and be available for vegetation growth.

As stated in the existing condition section, sage grouse populations on private lands in Bear Valley have declined primarily as a result of predation, livestock grazing and agricultural conversion. Adjacent private lands have already been salvage logged. Private lands were planted in 2003. Some private landowners have forage-seeded burned areas. Generally, these lands are not managed to preserve or restore sagebrush habitats.

Livestock grazing in the Flagtail project area would be delayed for at least two years post-burn to allow for recovery of ground cover (Post-fire grazing guidelines - Appendix H). Some uncontrolled cattle use occurred in the summer/fall of 2003, but effects to riparian and upland habitats were considered well within Forest Plan and Interagency Interdisciplinary Team (IIT) standards. When livestock grazing is re-initiated, grazing would be managed to meet Forest Plan and IIT standards as well. At moderate grazing levels, livestock grazing can be compatible with sage grouse management.

Current levels of noxious weeds in the project area are below threshold levels that can cause measurable changes in terrestrial habitat. Over the long-term, habitat may be degraded by encroaching noxious weeds if they are not controlled.

In 2002/2003, fire-killed, hazard trees were salvaged on 14 acres at the Bear Valley Work Center and on 650 acres along roads. Future fuels reduction is planned on 100 acres inside Riparian Habitat Conservation Areas (RHCAs); dead, unmerchantable trees 8 inches DBH and smaller would be felled, then hand piled and burned outside of riparian areas. When combined with salvage logging and fuels treatment proposed in Alternatives 2, 3 and 5, landscape-level fuels treatments are expected to help reduce the risk of an intense re-burn and another stand replacement fire. Under Alternatives 1 and 4, combined fuel treatments are less likely to reduce fuel loads sufficiently to avoid intense re-burns in the future.

With all cumulative effects considered, the additive effects of the proposed alternatives will not lead to any adverse effects to the population nor will it contribute to a trend toward federal listing or loss of viability to the population or species.

Determinations

Due to the nature of a No Action alternative, there would be **NO IMPACT (NI)** to western sage grouse or it habitat.

Activities proposed under the action alternatives are not expected to measurably change sagebrush habitats or potential late brood-rearing habitat. Given that there would be no direct, indirect or cumulative effects, there would be **NO IMPACT (NI)** to this species.

Gray Flycatcher

Existing Condition

The gray flycatcher prefers relatively treeless areas with tall sagebrush, bitterbrush, or mountain mahogany communities, but is also associated with pinyon-juniper woodland with understory sagebrush, and open ponderosa pine forests (Csuti et al. 1997). This species is most abundant in extensive tracts of big sagebrush, often selecting areas along washes where the sagebrush is especially tall. In the western Great Basin, this species nests in tall big sagebrush shrublands (Ryser 1985). During the nonbreeding season, this species commonly inhabits arid scrub, riparian woodland, and mesquite (NatureServe 2000). The Malheur National Forest considers this species as a rare (not seen every year) summer resident. Gray flycatchers have not been reported in the project area. No surveys for gray flycatchers have been conducted.

In the Upper Silvies watershed, the majority of the shrub-steppe habitats are associated with the larger expanses of habitat in Bear Valley. There is very little gray flycatcher habitat on Forest Service managed lands. In the project area, about 780 acres, or 10.5% of the project area, classify as juniper/sagebrush, sagebrush shrublands or dry grasslands. The Bald Hills at 245 acres provides the largest block of potential habitat; the remaining acres are predominantly smaller openings 1 to 20 acres in size. Several stringer habits extend into the project area from Bear Valley. Additional small openings in the surrounding forest could contain sagebrush, bitterbrush and mountain mahogany habitat.

Within the fire area, the shrub-steppe habitats burned in a mosaic pattern depending on vegetation patterns and fire behavior. Unburned islands of sagebrush can retain habitat features important to sagebrush-dependent species. Many of the small isolated patches of sagebrush, mountain mahogany and bitterbrush that occupied the understories of forested communities were lost in the fire. Given, the small extent of habitat within the project area, the wildfire likely had minimal effect on species that depend on these semi-arid environments.

Environmental Consequences

Direct, Indirect and Cumulative Effects

All Alternatives

In the Flagtail area, gray flycatchers occupy many of the same habitats as western sage grouse. Effects to sagebrush habitats would be similar to those for sage grouse. In harvest units, occasional bitterbrush, mountain mahogany, and sagebrush shrubs could be affected, but damage would be incidental. The fire killed most of these shrubs, and harvest design typically avoids larger shrub areas.

Determinations

Neither the No Action alternative nor the Action alternatives are expected to measurably change bitterbrush, mountain mahogany, or sagebrush shrub habitats. Given that there would be minimal direct, indirect or cumulative effects from this project, there would be **NO IMPACT (NI)** to this species.

Upland Sandpiper

Existing Condition

In the Blue Mountains, upland sandpiper habitat is large flat or gently rolling expanses of grassland in mountain valleys and open uplands with small creek drainages and wet to dry meadows (Akenson and Schommer 1992). Use areas have a wide diversity of plants, and forb abundance is particularly important. They often use stringer meadows, which generally are at least 125 acres. Bear Valley and Logan Valley to the east have supported breeding populations, but numbers have declined dramatically since the late 1980s/early 1990s. The reasons for the declines are uncertain.

There are no known sightings of sandpipers within the project area. Surveys have not been conducted specifically for this species on either federal or private lands. The closest nest sites are located on private lands in Bear Valley about 1 to 3 miles southeast near Scotty Creek and 1 to 2 miles northeast adjacent to Keller Creek. The project area contains potentially suitable breeding habitat on approximately 350 acres, primarily along Jack Creek and the Silvies River, but also in stringer meadows along the edge of Bear Valley. Meadow habitats are smaller than the recommended 125 acres. Compared to the extensive habitat in Bear and Logan Valley there is limited suitable upland sandpiper habitat. Therefore, use is expected to be occasional and random within the Flagtail project area. Fire damage in meadow habitats was variable; moister meadows tended not to burn or burned in a mosaic pattern. Vegetation is expected to recover rapidly.

Environmental Consequences

Direct and Indirect Effect

No Action

Under the No Action Alternative, there would be no new management activities; therefore, there should be no direct or indirect effects to upland sandpipers or their habitat.

Action Alternatives

The proposed activities will not enter meadow habitats; therefore, no impacts to upland sandpipers would be expected.

Cumulative Effects

All Alternatives

Major threats to breeding habitat are from predation, forest succession and livestock grazing (NatureServe 2003). All of the activities in Appendix J have been considered for their cumulative effects on upland sandpipers. Few management activities would affect sandpiper habitat.

Livestock grazing would be delayed for at least two years post-burn to allow for recovery of ground cover (Post-fire grazing guidelines - Appendix H). Some uncontrolled cattle use occurred in the summer/fall of 2003, but effects to riparian and meadow habitats were considered well within Forest Plan and Interagency Interdisciplinary Team (IIT) standards. When livestock grazing is re-initiated, grazing would be managed to meet Forest Plan and IIT standards as well. Prescribed burning, grazing, or mowing can be used to provide essential nesting conditions, but these activities can be detrimental if conducted inappropriately.

Current levels of noxious weeds in the project area are below threshold levels that can cause measurable changes in terrestrial habitat. Over the long-term, habitat may be degraded by encroaching noxious weeds if they are not controlled.

Livestock grazing and agricultural activities on private lands in Bear Valley can influence sandpiper habitat, although, as stated previously, management activities can be compatible with sandpiper management. Salvage logging of private timberlands has had little effect on sandpiper habitat. Private lands were planted in 2003. Some private landowners have forage-seeded the burned areas.

In 2002/2003, fire-killed, hazard trees were salvaged on 14 acres at the Bear Valley Work Center and on 650 acres along roads. Future fuels reduction is planned on 100 acres inside Riparian Habitat Conservation Areas (RHCAs); dead, unmerchantable trees 8 inches DBH and smaller would be felled, then hand piled and burned outside of riparian areas. When combined with salvage logging and fuels treatment proposed in Alternatives 2, 3 and 5, landscape-level fuels treatments are expected to help reduce the risk of an intense re-burn. Under Alternatives 1 and 4, combined fuel treatments are less likely to reduce fuel loads sufficiently to avoid intense re-burns in the future. Meadow habitats recover relatively rapidly after fire.

Neither the No Action nor the Action Alternatives would contribute additive adverse effects.

Determination

Neither the No Action alternative or the Action Alternatives are expected to measurably change upland snadpiper habitat; therefore, there would be **NO IMPACT (NI)** to this species.

Bobolink

Existing Condition

Bobolinks are found in native and tame grasslands, haylands, lightly to moderately grazed pastures, no-till cropland, small-grain fields, wet meadows, and planted cover (Dechant et al., 2001). Bobolinks prefer habitat with moderate to tall vegetation, moderate to dense vegetation, moderately deep litter, and without the presence of woody vegetation. If habitat is not maintained, use by bobolinks declines significantly, possibly due to the accumulation of litter and encroachment of woody vegetation. Bobolinks respond positively to properly timed burning or mowing treatments, and moderate grazing.

Bobolinks are very local and scattered in the eastern one-third of Oregon and are known to breed on the Malheur National Wildlife Refuge, south end of Blitzen Valley, Harney County, Union County, and Wallowa County (Marshall 1996). Locally, sporadic nesting occurs in the Prairie City, Mt. Vernon, Silvies Valley, and Bear Valley areas (Sweeney, 2001; Winters 2001). Bobolinks have not been reported in the project area. No surveys for bobolinks have been conducted.

Bobolinks appear to prefer large grassland areas to small, requiring approximately 25-110 acres depending on habitat quality. About 350 acres of capable habitat exist in the Flagtail area, with the majority of the acres along Jack Creek and the Silvies River, but also in stringer meadows along the edge of Bear Valley. Meadows habitats are generally smaller with only a few greater than 25 acres in size. Most of these acres are grazed and may not be providing tall enough grass for bobolinks. Meadows exit in the forest, but they tend to be small or habitat is naturally dry and low in productivity. Because of the low quality and the natural fragmentation, bobolinks would likely use only the largest areas. Fire damage in meadow habitats was variable; moister meadows tended not to burn or burned in a mosaic pattern. Vegetation is expected to recover rapidly.

Environmental Consequences

Direct and Indirect Effect

No Action

Under the No Action Alternative, there would be no new management activities; therefore, there should be no direct or indirect effects to bobolinks or their habitat.

All Alternatives

The proposed activities will not enter meadow habitats; therefore, no impacts to bobolinks would be expected.

Cumulative Effects

All Alternatives

All of the activities in Appendix J have been considered for their cumulative effects on bobolinks. Few management activities would affect bobolink habitat.

In the Flagtail area, bobolink habitat overlaps many of the same habitats as those available to upland sandpipers; therefore, cumulative effects from past, ongoing and reasonably foreseeable future activities are similar to those described in the Upland Sandpipers, Cumulative Effects section. Livestock grazing is likely to have the most influence on habitat, but at moderate grazing levels, grazing can be compatible with bobolink management.

Neither the No Action nor the Action Alternatives would contribute additive adverse effects.

Determination

Neither the No Action alternative or the Action alternatives are expected to measurably change bobolink habitat; therefore, there would be **NO IMPACT (NI)** to this species.

Columbia Spotted Frog

Existing Condition

Spotted frogs are rarely found far from permanent water. Breeding habitat is usually in shallow water in ponds or other quiet waters along streams. Breeding may also occur in flooded areas adjacent to streams and ponds. Habitat has been degraded by past management activities, such as livestock grazing, road construction along streams, and timber harvest adjacent to streams, springs, and marshes. No habitat surveys have been conducted specifically for spotted frog; however, habitat probably exists along most perennial and some intermittent streams.

It is unknown what effects the Flagtail fire had on individual animals. Generally, the fire killed most of the trees in the riparian uplands while leaving shrubs, forbs and grasses in the floodplains untouched or spot-burned due to the high moisture content of this ground vegetation. Snow Creek is the major exception; portions were severely burned with nearly all vegetation being killed.

Environmental Consequences

Direct and Indirect Effect

No Action

Habitat requirements for spotted frogs are limited, but it is assumed that if healthy stream channels and riparian vegetation are maintained, then population viability will be maintained.

Under the No Action alternative, there would be no new management activities; therefore, there would be no direct effects to spotted frogs or their habitat. Although the fire killed most of the conifer overstory, the expected flush of ground vegetation, particularly shrub species, may elevate the amount and distribution of riparian hardwoods to levels higher than existed prior to the fire. Grasses and forbs are expected to reestablish naturally in 2 to 5 years; shrubs are expected to reestablish in 2 to 15 years. Riparian vegetation likely provides cover for frogs and habitat for insects that frogs may feed on. The Flagtail fire created many snags that will be available for recruitment into project area streams in the future, down logs across streams can help stabilizes channels and create pools for frogs.

The No Action alternative would do nothing to reduce impacts of the existing road system. Roads in RHCAs would continue to confine stream channels and restrict frog habitat by inhibiting the expansion of wetlands that were reduced or degraded by road construction where these habitats originally existed. It would be expected that sedimentation from existing roads would increase over time, unless other projects are implemented to address these impacts.

Action Alternatives

Habitat requirements for spotted frogs are limited, but it is assumed that if healthy stream channels and riparian vegetation are maintained, then population viability will be maintained. Spotted frogs are fairly resistant and tolerant of nondestructive intrusion.

Salvage logging and fuels reduction activities would have minimal adverse effects to Columbia spotted frogs or their habitat. Overall, streams would be protected with INFISH RHCA buffers. There may be limited felling of hazard trees in RHCAs, but the trees would be left on site. It is unlikely that felling of hazard trees would kill spotted frogs, and effects to habitat would be considered minimal. Harvest and fuels treatment activities outside riparian areas are expected to have little to no indirect impacts on riparian and aquatic systems. Vegetation recovery and recruitment of snags in stream channels would be as described for Alternative 1, both considered beneficial to the riparian and aquatic system.

The activities with the highest potential for affecting streams are road management activities, particularly those that directly affect riparian vegetation, floodplains, or stream channels. Alternatives 2, 3 and 5 propose 0.3 miles of system road construction and 13.1 miles of road decommission. The objective of the road construction is to relocate an existing section of road impacting Snow Creek; the existing road would be decommissioned under these alternatives. The road construction is not within RHCAs. Road effects are typically magnified when activities occur within 100 feet of streams; only 4.2 miles of decommissioning would occur within 100 feet of streams.

Proposed road management actions such as culvert replacement or cleaning at stream crossings, or road decommission, reconstruction, or maintenance within 100 feet of streams would produce short-term (1-2 years) sediment into project area streams. These activities have the potential to adversely affect spotted frog habitat by increasing fine sediments in the short-term, although sediment may be less of a concern for frogs than fish species. The short-term increase in sediment would be very small in size and scale due to the small area of disturbance at each project point. Best management practices (BMPs) are incorporated into standard road maintenance and reconstruction practices and would reduce the probability and magnitude of the short-term risks. In the mid- to long-term, road reconstruction and maintenance would reduce the chronic sediment production of existing roads by removing ruts and rills from the driving surface, adding less erosive surfacing material, and improving drainage. Road decommissioning is designed to benefit riparian habitat and water quality in the mid- to long-term by improving filtration, restoring ground cover, reducing sediment yield and restoring floodplains.

Alternative 4 forgoes opportunities to relocate the Snow Creek road; road construction is dropped and road decommissioning is reduced from 13.1 miles to 11.9 miles. Only 3.4 miles of road decommissioning would occur within 100 feet of streams. Alternative 4, by reducing road construction and decommissioning, would reduce both short-term impacts and long-term benefits regarding sediment, drainage network, and peak/base flows proportionate to the reduced level of activities.

Cumulative Effects

All Alternatives

All of the activities in Appendix J have been considered for their cumulative effects on spotted frogs. The following discussion focuses on those past, ongoing and reasonable foreseeable future activities that may contribute adverse effects to the species or its habitat.

Road construction, timber harvest and grazing activities on private and public land have reduced spotted frog habitat quality and complexity in and adjacent to project area streams.

In burned riparian areas, hardwood and conifer planting is being implemented under separate NEPA documents. In 2003, conifer trees were planted on 190 acres in riparian areas and 190 acres in uplands. Hardwoods were planted on 25 acres in 2003; additional hardwoods are proposed for interplanting on the same acres in 2004. Aspen restoration is being planned on an estimated 250 acres (76 aspen sites). Placement of coarse woody debris in streams would improve channel condition and create additional pools. Proposed fuels reduction in the RHCAs would remove only snags 8 inches DBH or smaller, reducing future fuel loads and risk of reburn that could delay recovery of vegetation. In the short-term, restoration activities could impact individuals or habitat. In the long-term, these actions will help reestablish riparian vegetation and stream integrity to the benefit of spotted frogs.

Livestock grazing would be delayed for at least two years post-burn to allow for recovery of ground cover (Post-fire grazing guidelines - Appendix H). Some uncontrolled cattle use occurred in the summer/fall of 2003, but effects to riparian habitats were considered well within Forest Plan and Interagency Interdisciplinary Team (IIT) standards. When livestock grazing is re-initiated, grazing would be managed to meet Forest Plan and IIT standards as well.

Current levels of noxious weeds in the project area are below threshold levels that can cause measurable changes in terrestrial habitat. Over the long-term, habitat may be degraded by encroaching noxious weeds if they are not controlled.

Adjacent private lands have already been salvage logged. Private lands were planted in 2003. Some private landowners have forage-seeded the burned areas. Private lands are not typically managed to maximize wildlife habitat; therefore, habitat needs become more demanding on federal lands.

In 2002/2003, fire-killed, hazard trees were salvaged on 14 acres at the Bear Valley Work Center and on 650 acres along roads. Future fuels reduction is planned on 100 acres inside Riparian Habitat Conservation Areas (RHCAs); dead, unmerchantable trees 8 inches DBH and smaller would be felled, then hand piled and burned outside of riparian areas. When combined with salvage logging and fuels treatment proposed in Alternatives 2, 3 and 5, landscape-level fuels treatments are expected to help reduce the risk of an intense re-burn and another stand replacement fire. Under Alternatives 1 and 4, combined fuel treatments are less likely to reduce fuel loads sufficiently to avoid intense re-burns in the future.

The action alternatives would not contribute to further degradation of riparian areas. Restoration activities associated with the action alternatives are expected to contribute long-term benefits to the recovery of spotted frog habitat, more so than the No Action alternative, likely improving conditions beyond the pre-fire baseline.

Determination

Due to the nature of a No Action alternative, there would be **NO IMPACT (NI)** to spotted frogs or their habitat.

The Action alternatives **may impact individuals or habitat**, **but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population** (**MIIH**). The only short-term impacts to spotted frogs would be those from road maintenance or decommission activities that occur within 100 feet of streams; anticipated sediment impacts are expected to have a negligible effect to spotted frogs or populations. However, the long-term reduced impacts to riparian aquatic resources (also due to road management activities) would result in a **beneficial impact** for spotted frog.

Species of Concern - Landbirds Including Neotropical Migratory Birds (NTMB)

Existing Condition

Neotropical migratory birds breed in temperate North America and spend the winter primarily south of the United States-Mexico border. Of the 225 migratory birds that are known to occur in the western hemisphere, about 102 are known to breed in Oregon and about 82 are known to breed on the Malhuer National Forest. They include a large group of species, including many raptors, cavity excavators, warblers and other songbirds, with diverse habitat needs spanning nearly all plant community types and successional stages. Long-term population data on many of these birds indicate downward population trends although not all species populations are declining (Sharp 1996, Saab and Rich 1997, Altman 2000, USFWS 2002). Habitat loss is considered the primary factor in decline of neotropical migratory birds.

Forest Service compliance with the Migratory Bird Treaty Act (MBTA) has been challenged several times with regard to the "take" provision. Recently (July 2000), a United States Court of Appeals for the District of Columbia ruled that the Federal Agencies are subject to provisions of the MBTA.

Current Forest Service policy regarding bird conservation and the MBTA is:

- Permits must be obtained from the U.S. Fish and Wildlife Service (USFWS) for banding, capturing, or any other activity where there is intentional killing of birds, including control of depredating birds.
- The Forest Service must analyze the effects of actions on migratory birds and document such effects in a NEPA document.
- Negative effects to birds should be mitigated to the extent possible and where possible, plans to benefit birds should be incorporated in project or activity design.
- There currently is no process for reviewing projects with USFWS or applying for a permit for "unintentional" take. The USFWS will be providing additional guidance regarding the Federal Agencies through the formation of an interagency working group.

In 2000, the Oregon-Washington Chapter of Partners in Flight published its Northern Rocky Mountains Bird Conservation Plan (Altman 2000). The Plan provides conservation recommendations for the various species of landbirds that occupy the Oregon and Washington portions of the Interior Columbia Basin. The Plan identified the following priority habitats for landbird conservation: old-growth dry forest, old growth moist forest, riparian woodland and shrubland, and unique habitats including alpine and subalpine forests, shrub-steppe, montane meadow and aspen habitats. The Conservation Plan also identified burned old forest as a limited habitat due to fire suppression; the Flagtail Fire has obviously created a large amount of burn habitat that could provide for various landbird species. Many of the avian species/habitats identified in the Northern Rocky Mountains Bird Conservation Plan (Altman 2000), are also addressed in the USFWS's Birds of Conservation Concern (USFWS 2002).

Table WL-15 lists those priority habitats and associated focal species that would be expected in the project area. No alpine, subalpine, or moist forest types are associated with the area. The table identifies each focal species, their primary breeding habitat, and whether the Flagtail Fire positively or negatively affected them. Existing condition and effects discussions will focus on changes to priority habitats, and less on the individual species that use these habitats.

Table WL-15: Neotropical Migratory Birds – Focal Species found in the Project Area by Habitat Type, Including Fire Effects and Resource which Identified Focal Species

Focal Species	Primary Breeding Habitat	Initial Flagtail Fire Effects to Species
Dry Forest Types (ponderosa pine and dry mixed conifer)		
White-headed woodpecker	old growth - i.e., old forest single stratum (OFSS)	Negative/Positive
Flammulated owl	OFSS with interspersions grassy openings and dense thickets	Negative
Chipping sparrow	OFSS with regenerating pines	Negative/Positive
Lewis' woodpecker	Patches of burned OFSS or OFMS	Positive
Riparian Woodland and Shrublands		
Lewis' woodpecker	Large hardwood snags	Positive
Red-eyed vireo	Hardwoods - canopy foliage and structure	Negative
Veery	Hardwoods - Understory foliage and structure	Negative
Willow flycatcher	Hardwoods - Riparian shrub	Negative
Red-naped sapsucker	Aspen	Positive
Shrub-steppe Habitats		
Vesper Sparrow	Shrub-steppe shrublands	Neutral

Tables WL-16 and WL-17 lists species identified in the USFWS's Birds of Conservation Concern (USFWS 2002), Bird Conservation Regions (BCR) 9 and 10. The Flagtail Project Area is best characterized by BCR 10, the Northern Rockies Region. The area does contain small inclusions of shrub steppe habitats that could be characterized as BCR 9, so species were evaluated for potential absence or presence. Given the marginal quality of these habitats in the Project Area, use by species associated with BCR 9 is expected to be minimal or non-existent. Effects on species listed in Tables WL-16 and WL-17 will be analyzed in the context of changes in high priority habitats/focal species listed in Table WL-15.

Table W-16. List of species of BCR 10, Northern Rockies Region, species status as present or absent from the Project Area, and how each species is addressed in this report.

Species	Presence /Absence	Reason for Absence/Where Addressed If Present
Swainson's Hawk	Absent	Habitat Not Affected by Proposed Activities
Ferruginous Hawk	Absent	Habitat Not Affected by Proposed Activities
Golden Eagle	Present	Habitat Not Affected by Proposed Activities
Peregrine Falcon	Absent	No Suitable Habitat
Prairie Falcon	Present	Habitat Not Affected by Proposed Activities
Yellow Rail	Absent	No Suitable Habitat
American Golden-Plover	Absent	Outside Range
Snowy Plover	Absent	No Suitable Habitat
Mountain Plover	Absent	Outside Range
Solitary Sandpiper	Absent	Outside Range
Upland Sandpiper	Present	Habitat Not Affected by Proposed Activities
Whimbrel	Absent	Outside Range
Long-Billed Curlew	Absent	No Suitable Habitat
Marbled Godwit	Absent	Outside Range
Sanderling	Absent	Outside Range
Wilson's Phalarope	Absent	No Suitable Habitat
Yellow-Billed Cuckoo	Absent	Outside Range
Flammulated Owl	Present	Landbird Discussion
Black Swift	Absent	Outside Range
Lewis' Woodpecker	Present	MIS - Primary Cavity Excavator Discussion
Williamson's Sapsucker	Present	MIS - Primary Cavity Excavator Discussion
Red-Naped Sapsucker	Present	MIS - Primary Cavity Excavator Discussion
White-Headed Woodpecker	Present	MIS - Primary Cavity Excavator Discussion
Loggerhead Shrike	Present	Habitat Not Affected By Proposed Activities
Pygmy Nuthatch	Present	Landbird Discussion
Virginia's Warbler	Absent	Outside Range
Brewer's Sparrow	Present	Habitat Not Affected by Proposed Activities
McCown's Longspur	Absent	Outside Range

Table W-17. List of species of BCR 9, great Basin Region, species status as present or absent from the Project Area, and how each species is addressed in this report.

Species	Presence /Absence	Reason for Absence/Where Addressed If Present
Swainson's Hawk	Absent	Habitat Not Affected by Proposed Activities
Ferruginous Hawk	Absent	Habitat Not Affected by Proposed Activities
Golden Eagle	Present	Habitat Not Affected by Proposed Activities
Peregrine Falcon	Absent	No Suitable Habitat
Prairie Falcon	Present	Habitat Not Affected by Proposed Activities
Sage Grouse	Present	Habitat Not Affected by Proposed Activities
Yellow Rail	Absent	No Suitable Habitat
American Golden-Plover	Absent	Outside Range
Snowy Plover	Absent	No Suitable Habitat
Solitary Sandpiper	Absent	Outside Range
Whimbrel	Absent	Outside Range
Long-Billed Curlew	Absent	No Suitable Habitat
Marbled Godwit	Absent	Outside Range
Sanderling	Absent	Outside Range
Wilson's Phalarope	Absent	No Suitable Habitat
Yellow-Billed Cuckoo	Absent	Outside Range
Flammulated Owl	Present	Landbird Discussion
Black Swift	Absent	Outside Range
Burrowing Owl	Present	Habitat Not Affected by Proposed Activities
Lewis' Woodpecker	Present	MIS - Primary Cavity Excavator Discussion
Williamson's Sapsucker	Present	MIS - Primary Cavity Excavator Discussion
Red-Naped Sapsucker	Present	MIS - Primary Cavity Excavator Discussion
White-Headed Woodpecker	Present	MIS - Primary Cavity Excavator Discussion
Loggerhead Shrike	Present	Habitat Not Affected By Proposed Activities
Gray Vireo	Present	Outside Range
Virginia's Warbler	Absent	Outside Range
Brewer's Sparrow	Present	Habitat Not Affected by Proposed Activities
Tricolored Blackbird	Absent	No Suitable Habitat
Sage Sparrow	Present	Habitat Not Affected by Proposed Activities

Some neotropical migratory birds respond positively to fire, while others respond negatively in burned areas. However, generally, species richness and overall species abundance tends to decrease. The following sections summarize the effects of the Flagtail fire on the high priority habitats listed in Table W-15. Discussion will only focus on those habitats that exist in the project area now or that existed prior to the fire.

Dry Forests

The dry forest types refer to the dry ponderosa pine dominated habitats and the dry mixed conifer habitats, i.e., conifer stands of ponderosa pine, Douglas-fir, and/or grand fir. The majority of the forest acres in the Flagtail area are classified as dry forest types.

The Conservation Strategy (Altman 2000) identifies four habitat components of the dry forest types that are important to landbirds; old forest single stratum (OFSS), OFSS with patches of regenerating pines, OFSS with grassy openings, and burned habitats (see Table WL-15). Pre-fire, 6,180 acres or 87% of the area was forested with 26% classified as old growth. Because of past timber harvest and fire suppression, all old growth was classified as old forest multiple strata (OFMS) rather than old forest single stratum (OFSS). Prior to the fire, burned old forest was also lacking, as fire suppression had all but eliminated the influence of this disturbance factor in the project area. Large-scale declines in OFSS have raised concern for such species as the white-headed woodpecker, flammulated owl, white-breasted nuthatch, pygmy nuthatch, Williamson's sapsucker, and Lewis' woodpecker. These bird species have likely suffered some of the greatest population declines and range retractions (Altman 2000).

The fire converted essentially all mature and old growth stands to early or very early successional stages (see Old Growth Section). Dense understory thickets and regeneration patches burned extensively, although patches remain scattered throughout the area. Overstory nesting species and foliage or crown feeders, have likely disappeared within the severely burned areas, and decreased in the moderate severity burn areas. Local species adversely affected may include the pine siskin, golden-crowned kinglet, mountain chickadee, hermit thrush, ruby-crowned kinglet, yellow-rumped warbler, and western tanager.

Flycatchers, ground feeders, and cavity nesters are expected to increase as a result of the fire. Local species that may benefit include the Lewis' woodpecker, olive-sided flycatcher, red-naped sapsucker, chipping sparrow, western-wood peewee, Hammond's flycatcher, dusky flycatcher, dark-eyed junco, Cassin's finch, mountain and western bluebirds, evening grosbeak, and American robin. The Primary Cavity Excavator Section describes woodpecker, sapsucker and flicker species in more detail; most of these species respond positively to the fire.

Riparian Woodlands and Shrublands

Riparian woodlands and shrub habitats are typified by the presence of hardwood tree and shrub species, along with associated wetland herbaceous species. Water is obviously an important component of these habitats, whether it is in the form of standing wetlands, spring and seeps, or flowing water (rivers and streams). Although these habitats generally comprise only a small portion of the landscape, they usually have a disproportionately high level of avian diversity and density when compared to surrounding upland habitats.

The Conservation Strategy (Altman 2000) identifies three habitat components within the riparian woodlands and one within the riparian shrub habitats that are important to many landbirds. They include large snags, canopy foliage cover, understory shrub cover, and dense shrub patches (see Table WL-15). In addition, the Conservation Strategy identifies aspen and montane grasslands as unique habitats important to landbirds. In the Flagtail area, many of these habitats are associated with riparian areas or ephemeral draws, so they are included in this section.

Within the project area, riparian woodlands and shrublands are generally associated with Category 1 streams (6.6 miles) and Category 2 streams (4.2 miles). Priority hardwood habitats include willow, alder, and aspen; other hardwood species are present but at much lower levels. Riparian shrub- and grasslands comprise 350 acres or 5% of the project area. These acres only represent riparian openings; hardwood shrubs are also present in the understories of conifer-dominated riparian areas. Small, remnant aspen stands are scattered over approximately 75 acres and are found in Category 1, 2 and 4 streams and ephemeral draws; most aspen stands are old and decadent, exhibit poor vigor, and lack regeneration. Prior to the fire, many riparian areas were already deficient in hardwood trees and shrubs due to past and current management activities, including timber harvest, livestock grazing and fire suppression. Heavy grazing by domestic livestock and browsing by deer and elk often inhibited hardwood regeneration.

Degraded riparian habitats have likely affected such landbird species as Lewis' woodpecker, red-naped sapsucker, downy woodpecker, red-eyed vireo, willow flycatcher, ash-throated flycatcher, tree swallow, house wren, swainson's thrush, calliope hummingbird, song sparrow, spotted towhee, western wood pewee, warbling vireo, American redstart, orange-crowned warbler, and mountain chickadee.

Fire severity in riparian areas was variable. Snag habitat is now abundant. Generally, the fire killed most of the trees in the riparian uplands while leaving shrubs, forbs and grasses in the floodplains untouched or spot-burned due to the high moisture content of this ground vegetation. Snow Creek is the major exception; portions were severely burned with nearly all vegetation being killed. The Flagtail fire damaged nearly all of the aspen stands, although in most stands at least some of the aspen trees survived. The fire likely improved habitats for species that use riparian snags, such as the Lewis woodpecker and downy woodpecker. Initially, the fire likely reduced habitat for species such as the red-eyed vireo, veery and willow fly catcher; however, species are expected to recover rapidly as hardwood shrubs recover.

Shrub-steppe Habitats

Shrub-steppe habitats are comprised primarily of dry woodlands, shrublands and grasslands. Juniper woodlands cover 590 acres or 8% of the project area. Dry shrublands/grasslands comprise approximately 190 acres or 2.5% of the project area. The Bald Hills at 245 acres provide the largest block of potential habitat; the remaining acres are predominantly smaller openings 1 to 20 acres in size. Several meadow stringer habitats extend into the project area from Bear Valley. The project area provides limited shrub-steppe habitats as compared to the large expanses of habitat in Bear Valley to the east. Within the fire area, the shrub-steppe habitats burned in a mosaic pattern depending on vegetation patterns and fire behavior. Unburned islands of sagebrush can retain habitat features vital to species such as vesper and Brewer's sparrow. Given, the small extent of habitat within the project area, the wildfire likely had minimal effect on species that depend on these semi-arid environments.

Environmental Consequences

Direct and Indirect Effects

No Action

The fire removed large expanses of forest, including nearly all the mature and old growth habitat. Species that are foliage or crown feeders and overstory nesting species, likely disappeared within the severely burned areas, but may still be using the moderate and low burn areas. Delays in reforestation under the no action alternative would delay recovery of forest canopy, with adverse effects to landbird species that feed and nest in forest canopies. The No Action alternative removes no snags or downed logs; habitat would be maximized for species that use post-fire conditions such as the olive-sided flycatcher and the Lewis' woodpecker. The Primary Cavity Excavator section describes effects to cavity excavators in detail.

Dry Forests

The fire removed large expanses of forest, including nearly all the mature and old growth habitat. Bird species that are foliage or crown feeders and overstory nesting species, likely disappeared within the severely burned areas, but may still be using the moderate and low burn areas. Delays in reforestation under the No Action alternative would delay recovery of forest canopy, with adverse effects to landbird species that feed and nest in forest canopies. The No Action alternative removes no snags or downed logs; habitat would be maximized for species that use post-fire conditions such as the olive-sided flycatcher and the Lewis' woodpecker. The Primary Cavity Excavator section describes effects to cavity excavators in detail.

Riparian Woodlands and Shrublands

The fire reduced riparian vegetation. Initially, many landbirds associated with these habitats likely declined; however, effects are likely short-lived. Although the fire killed most of the conifer overstory, the expected flush of ground vegetation, particularly shrub species, may elevate the amount and distribution of riparian hardwoods to levels higher than existed prior to the fire. Grasses and forbs are expected to reestablish naturally in 2 to 5 years; shrubs are expected to reestablish in 2 to 15 years. Population numbers for grass and shrub nesting neotropical migratory birds is expected to remain stable or increase due to recovery of ground vegetation, both inside and outside riparian areas. Species such as the willow flycatcher, red-eyed vireo and western meadowlark, would likely respond positively.

Shrub-steppe Habitats

Juniper woodlands/sagebrush shrublands comprise only 10.5% of the project area. Given, the small extent of these habitats, the wildfire likely had minimal effect on landbird species that depend on these environments. Recovery of sagebrush habitats is dependent on the severity of the burn. Because sagebrush does not sprout from underground buds, these communities can require several decades to establish post-fire vegetation composition and structure similar to that on unburned sites (Smith 2000). A mosaic burn, such as occurred in much of the Flagtail sagebrush communities, can accelerate recovery of these habitats as compared to completely burned areas. Unburned islands of sagebrush provide an important seed source. In studies in Idaho (Petersen and Best 1997), prescribed burns killed about 50% of the shrubs; total bird abundance declined significantly in the first year after fire, and then rebounded in years two and three to levels similar to those in unburned areas. In the Flagtail fire area, unburned islands of sagebrush will likely provide habitat for species such as the Brewer's and Vesper sparrow, and a seed source for regenerating burned areas.

The risk of an intense reburn is high with this alternative, although risks do not increase for 10 to 20 years, the time expected for snags to fall to the ground and elevate fuel loads. Another stand replacement fire would delay recovery of vegetation.

Action Alternatives

Salvage logging is known to further reduce species richness in burn areas (Sexton 1998). Raphael and White (1984) reported that in their studies that species richness declined only in the most severely salvaged burns, although even partial salvaging altered species composition.

Salvage logging between May and August, the primary nesting season, would present the highest risk to any neotropical migratory birds nesting in the area. Some individual birds could be directly affected, but this should not be a significant number and would not affect populations or viability.

The risk of an intense reburn is high with Alternative 4, although risks do not increase for 10 to 20 years, the time expected for snags to fall to the ground and elevate fuel loads. Another stand replacement fire would delay recovery of vegetation.

Dry Forests

At a minimum, it is expected that removal of snags would have a negative effect on population numbers of cavity nesting landbirds including neotropical migratory species (see Primary Cavity Excavator Species section). Direct effects would primarily be displacement from nests by removal or destruction of nest structures (snags, ground nests) during salvage operations. The degree of impact varies by alternatives and is best correlated with the number of acres treated. Alternatives 2, 3, and 5 propose timber salvage on 4,345 acres (70%of forested acres), 2,871 acres (46% of forested acres), and 3,740 acres (61% of forested acres), respectively. Alternatives 3 and 5 modify marking prescriptions in salvage units, leaving a higher number of snags, a broader range of snag diameters, and small patches of snags untreated, likely reducing impacts. Alternative 4 would have minimal impact. Large diameter snags are retained on 6,180 acres; only snags 8 inches DBH or less would be removed.

The action alternatives would accelerate reforestation of the project area through planting conifers. Reforestation would reestablish trees in the burn area within 5 years. Many neotropical migratory species require high tree canopy levels for nesting and foraging, and it will likely take at least 30 to 50 years before overstory canopies are restored to levels that even remotely mimic pre-fire conditions. Habitat for species that require mature or old growth conditions may take 75 to 150 years to develop (see Old Growth discussion).

Riparian Woodlands and Shrublands

In riparian areas, no salvage logging or fuels reduction activities are proposed under any of the action alternatives. Where open roads are located in riparian areas, hazard trees may be felled. Proposed road closures and road decommissioning in riparian habitat conservation areas (RHCAs) would likely benefit landbird species in the mid- to long-term by reducing the potential for disturbance and restoring habitats. Direct effects to riparian landbirds, including neotropical migratory species, are likely to be minimal due to the short timeframe expected to complete these activities and the low percentage of overall acres being treated. Indirectly, riparian landbirds may experience increases in population levels as a result of the fire. Snag-dependent species are expected to increase. Population numbers for grass and shrub nesting species is expected to remain stable or increase due to recovery of grass, forbs and shrub vegetation as described in the No Action section.

Shrub-steppe Habitats

Juniper woodland, shrub-steppe and grassland habitats would not be treated under any of the action alternatives. Neotropical migratory species that utilize these habitats would not be adversely affected. Effects would be as described for the No Action alternative.

Cumulative Effects

All of the activities in Appendix J have been considered for their cumulative effects on spotted frogs. The following discussion focuses on those past, ongoing and reasonable foreseeable future activities that may contribute adverse effects to the landbirds or their habitat.

Habitat loss is considered the primary factor in decline of neotropical migratory birds. Previous sections identified high priority habitats for conservation of neotropical migratory birds: old-growth dry forest including burn habitats, riparian woodland and shrubland, montane meadow, aspen habitats, and juniper woodlands.

Cumulative effects on mature and old growth coniferous forest are discussed in the Old Growth section, and conclude that the action alternatives would have varying positive effects for mature and old growth habitat and for the species that use those habitats.

Cumulative effects to snag and related post-fire habitat are discussed in the Primary Cavity Excavator Species section. Snag habitat would be reduced under all action alternatives. Alternative 4 only removes snags 8 inches DBH and under.

Riparian vegetation within and adjacent to the Flagtail Fire area has been altered by many years of livestock grazing, primarily earlier in this century, that concentrated use in riparian areas; and by suppressing historical fire regimes that allowed encroachment of conifers, which shaded out hardwoods such as aspen. Livestock grazing also negatively affected grasslands by reducing native species' abundance and diversity. The condition of some riparian areas and grasslands has been improved by new management practices and restoration activities in more recent years, but many are still not fully restored to conditions that are most suitable for associated native wildlife species.

In burned riparian areas, restoration projects are being implemented as described in Appendix J. Hardwoods and conifers are being planted. Aspen stands are being fenced. Placement of coarse woody debris in streams would improve channel condition. Proposed fuels reduction in the RHCAs would remove only snags 8 inches DBH or smaller, reducing future fuel loads and risk of reburn that could delay recovery of vegetation. Cumulatively, these actions will help improve riparian health to the benefit of neotropical migratory birds.

Shrub-steppe habitats have probably changed due to 100 years of fire suppression. Other conifer species have encroached on these habitats, reducing their size. On residual acres, juniper density probably has increased. Livestock grazing, primarily early in the century, may have caused changes in shrub, grass and forbs composition or abundance. The Flagtail fire reduced all conifer species, killing both juniper and the conifer species that compete with juniper. Juniper woodland and shrubland habitats are very limited in the project area. Few management activites are proposed, and natural recovery rates from the fire are expected. Proposed erosion control on the Bald Hills would slow runoff, allowing more water to percolate in soils and be available for vegetation growth.

Livestock grazing would be delayed for at least two years post-burn to allow for recovery of ground cover (Post-fire grazing guidelines - Appendix H). Some uncontrolled cattle use occurred in the summer/fall of 2003, but effects to riparian and upland habitats were considered well within Forest Plan and Interagency Interdisciplinary Team (IIT) standards. When livestock grazing is re-initiated, grazing would be managed to meet Forest Plan and IIT standards as well.

Adjacent private lands have already been salvage logged. Reforestation is required where commercial timber harvest has occurred and the land is left under-stocked. Private lands were planted in 2003. Some private landowners have forage-seeded burned areas. Private lands are not typically managed to maximize wildlife habitat; therefore, habitat needs become more demanding on federal lands. Private lands likely provide for neotropical migratory birds at lower levels than the federal lands.

Current levels of noxious weeds in the project area are below threshold levels that can cause measurable changes in terrestrial habitat. Over the long-term, habitat may be degraded by encroaching noxious weeds if they are not controlled.

In 2002/2003, fire-killed, hazard trees were salvaged on 14 acres at the Bear Valley Work Center and on 650 acres along roads. Future fuels reduction is planned on 100 acres inside Riparian Habitat Conservation Areas (RHCAs); dead, unmerchantable trees 8 inches DBH and smaller would be felled, then hand piled and burned outside of the riparian areas. When combined with salvage logging and fuels treatment proposed in

Alternatives 2, 3 and 5, landscape-level fuels treatments are expected to help reduce the risk of an intense re-burn and another stand replacement fire. Under Alternatives 1 and 4, combined fuel treatments are less likely to reduce fuel loads sufficiently to avoid intense re-burns in the future.

Future projects would have to abide by existing management direction to maintain or enhance mature and old growth habitat, maintain snags and down log standards, and protect or enhance riparian areas, grassland and woodland communities. Future planning will consider potential effects to neotropical migratory birds. In the mid- to long-term, the effects of this project combined with the restoration projects in Appendix J would be considered favorable to landbirds.

Summary

Alternatives would not be expected to reduce viability of any landbird species including neotropical migratory species.

The primary effect of the action alternatives would be to reduce snag habitats; the Primary Cavity Excavator section summarizes effects to landbirds that use these habitats. Action alternatives propose few to no activities within riparian areas, aspen stands, grasslands, and juniper woodlands, habitats considered a high priority for landbird conservation. Therefore, all other adverse affects to landbird species, including neotropical migratory species, would be considered minimal.

By planting trees, the action alternatives would accelerate recovery of vegetation; in severely burned areas, regeneration of conifer trees could take 10 to 40 acres less than under the No Action alternative.

Under Alternatives 1 and 4, the elevated fuel loads expected in 10 to 20 years increase the risk of an intense re-burn; another stand replacement fire could further delay development of forest vegetation. Alternatives 2, 3 and 5 also leave some burn areas untreated, but salvage logging and fuels reductions reduce overall fuel loads and break up the continuity of fuels remaining.

Consistency with Direction and Regulations

The Malheur National Forest Plan objective for old growth is to provide suitable habitat for old growth dependent wildlife species, ecosystem diversity and preservation of aesthetic qualities. Regional Forester's Eastside Forest Plan Amendment #2 provided additional direction to protect existing late and old structure (LOS) stands and to manipulate vegetation that currently does not classify as LOS towards LOS. All alternatives are consistent with the Forest Plan, as amended. None of the alternatives will reduce old growth habitat remaining after the fires. Only incidental live trees will be cut. Natural regeneration and planting are expected to re-vegetate forest although at different rates. Planting accelerates recovery of vegetation and development of old growth. Although changes in MA-13 old growth and MA-1 General Forest designations will require a non-significant Forest Plan amendment, these changes remain consistent with the Forest Plan, as amended. All alternatives meet old growth connectivity standards in the Regional Forester's Eastside Forest Plans Amendment #2.

The Malheur National Forest Plan requires that 20% of summer range be maintained as marginal and satisfactory cover. Because of the fire, the Jack Creek subwatershed (10% cover) and Snow Creek subwatershed (3% cover) no longer meet this standard. None of the alternatives further reduce marginal and satisfactory habitat. Natural regeneration and planting are expected to re-vegetate forest although at different rates. Planting accelerates recovery of vegetation and development of hiding and thermal cover. The Jack Creek, Snow Creek and Hog Creek subwatersheds do not meet Forest Plan standards for open road density. The action alternatives close additional roads within the burn areas. Following road closures, the Snow Creek subwatershed would meet the standard and the Jack Creek and Hog Creek subwatersheds would be moved towards the standard. In future environmental analyses, additional road closures would likely be considered in the unburned portions of the subwatersheds.

All alternatives would meet or exceed Forest Plan snag standards, i.e., 2.39 snags per acre, 21 inches DBH or greater. Large down logs do not meet Forest Plan standards as a result of the fire, at least in the severely- and moderately-burned areas. In the action alternatives, mitigation has been incorporated to retain all existing down logs required to meet the standards. As snags begin to fall, down log levels would increase thereby increasing denning, nesting, and feeding habitat for down wood dependent species. By year 15 post-fire, all alternatives are expected to meet the minimum Forest Plan standard.

Under Alternatives 3 and 5, snags may not be evenly distributed on a 40-acre basis as required by the Forest Plan, requiring a non-significant Forest Plan amendment. Instead, snags in salvage units would be retained in a combination of dispersed snags and untreated patches. Studies show that cavity dependent species select nest sites with higher tree densities and cavity nesters as a group prefer patches of snags as opposed to single snags retained in uniform, even spaced distribution (Rose et al, 2001, Saab et al, 2002, Kotliar 2002).

For northern goshawks, all alternatives are consistent with the Forest Plan and the Regional Forester's Eastside Forest Plans Amendment #2. The action alternatives would fell trees within the former post-fledging areas (PFAs), but only dead and dying trees would be removed. In the Jack PFA, no commercial harvest would occur in the remaining nest stands. Natural regeneration and planting are expected to re-vegetate forest although at different rates. Planting accelerates recovery of vegetation and development of nesting habitat. Mature and old growth stands suitable for nesting, as well as the existing nest sites, would be monitored annually for nesting activity. If new nest sites are identified within or immediately adjacent to the project area, management activities would be prohibited within ½ mile of the nest sites from April 1 to September 30 to avoid disturbing goshawks during the breeding season.

All alternatives are consistent with the 1918 Migratory Bird Treaty Act (MBTA) and the Migratory Bird Executive Order 13186. Alternatives were designed under current Forest Service policy for landbirds. The Northern Rocky Mountains Bird Conservation Plan (Altman 2000) and the U.S. Fish and Wildlife Service's Birds of Conservation Concern (USFWS 2002) were reviewed for effects disclosure. Salvage logging and other vegetation management cannot completely avoid unintentional take of birds, no matter what mitigations are imposed on the activities. Mitigation, such as retention of snags and down logs, retention of live trees, and avoidance of riparian areas, grasslands and juniper woodlands proposed in this project will minimize take of migratory birds

All alternatives are consistent with the Endangered Species Act (see Appendix D, Wildlife Biological Evaluation). Alternatives are expected to have **No Effect** on threatened and endangered species. Alternatives are expected to have either a **No Impact** or a **Beneficial Impact** to all sensitive species except the California wolverine and Columbia spotted frog. In the case of these latter two species, action alternatives **may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species**. Based on these effects calls, consultation with the US Fish and Wildlife Service was not considered necessary.

Irreversible and Irretrievable Commitments of Resources

The loss of snags would be an irretrievable loss until replacements function as snags. There are no other irreversible or irretrievable commitments of resources associated with wildlife or wildlife habitat that may result from the implementation of alternatives.

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